

18 Cumulative Impacts and Interaction of Effects

18.1 Introduction

This chapter addresses the cumulative impacts and main interactions between different aspects of the environment likely to be significantly affected by the Proposed Project.

Only topics that could be logically linked to the Proposed Project have been examined in detail. Accordingly, when a topic is not mentioned, it has been concluded that no potential for impacts exists.

18.2 Assessment Methodology

18.3 Statutory Requirements

The requirement to address interactions of effects and cumulative impacts is set out in Council Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment. This Directive has been amended by Council Directive 97/11/EC, Directive 2003/35/EC, Directive 2009/31/EC, Directive 2011/92/EU and is now codified in Directive 2014/52/EU.

Article 3 of the 2014 EIA Directive outlines the information to be contained in an EIAR as follows:

“1. The environmental impact assessment shall identify, describe and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the following factors:

- (a) population and human health;*
- (b) biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC;*
- (c) land, soil, water, air and climate;*
- (d) material assets, cultural heritage and the landscape;*
- (e) the interaction between the factors referred to in points (a) to (d).*

2. The effects referred to in paragraph 1 on the factors set out therein shall include the expected effects deriving from the vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project concerned.”

In addition, Annex IV of the directive states that the following information should be included in an EIAR:

“4. A description of the factors specified in Article 3(1) likely to be significantly affected by the project: population, human health, biodiversity (for example fauna and flora), land (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydromorphological changes, quantity and quality), air, climate

(for example greenhouse gas emissions, impacts relevant to adaptation), material assets, cultural heritage, including architectural and archaeological aspects, and landscape.”

It is also stated in Annex IV that

“The description of the likely significant effects on the factors specified in Article 3(1) should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the project. This description should take into account the environmental protection objectives established at Union or Member State level which are relevant to the project.”

The aforementioned Directives are transposed into Irish legislation through Schedule 6 of the Planning and Development Regulations 2001, as amended and the Roads Act, 1993, as amended by Section 14 of the European Communities (Environmental Impact Assessment) (Amendment) Regulations, 1999

18.3.1 Guidance

This chapter has been prepared in accordance with the following guidelines:

- EPA (2015) Revised *Guidelines on the Information to be contained in Environmental Impact Statements*, Draft, 2015;
- EPA (2015) *Advice Notes on Current Practice in the Preparation of Environmental Impact Statements*, Draft, 2015; and
- EPA (2002) *Guidelines on the Information to be contained in Environmental Impact Statements*, 2002;
- EPA (2003) *Advice Notes on Current Practise in the Preparation of Environmental Impact Statements*, 2003.
- European Commission *Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions*.

18.3.2 Assessment Methodology

The potential for significant interactions, cumulative impact and indirect impacts was examined at the screening stage in the preparation of this EIAR. Where the potential for significant interactions or impacts was identified, such interactions and impacts were included in the scope and addressed in the baseline and impact assessment chapter for each of the relevant environmental media namely Chapters 6 to 16 inclusive.

The matrix and expert opinion approaches, as described and outlined in the aforementioned EU Guidelines were used in the identification of the potential for significant interactions, cumulative impacts, direct and indirect impacts. To facilitate this a workshop attended by specialist sub-consultants, the EIAR team and Dublin City Council as well as various communications between the specialist sub-groups and design team took place. Interactions and cumulative impacts are addressed in the following sections. Direct and indirect effects are described in the previous chapters of this EIAR which address the different environmental media.

18.4 Interaction of Effects

18.4.1 Introduction

All environmental factors are inter-related to some extent, and the relationships can range from tenuous to highly complex.

The major interactions between the recorded environmental impacts are assessed within the individual chapters of the EIAR.

Table 17.1 provides a matrix summarising the interactions between the various parameters outlined in this EIAR from Chapters 6 to 16, inclusive.

Table 17.1: Key Environmental Interaction Matrix

Key environmental Interaction Matrix	Traffic and Transportation	Air Quality and Climate Factors	Noise and Vibration	Biodiversity	Archaeological, Architectural and Cultural Heritage	Townscape and Visual	Land, Soil and Water	Resource and Waste Management	Material Assets: Utilities	Material Assets: Land Use and Property	Population and Human Health	Risk of Major Accident and/or Disaster
Traffic and Transportation		CO	CO	-	CO	O	-	C	-	CO	CO	CO
Air Quality and Climate Factors	CO		-	-	-	-	-	-	-	C	CO	
Noise and Vibration	CO	-		-	CO	-	C	-	-	C	CO	
Biodiversity	-	-	-		-	CO	C	-	-	-		
Archaeological, Architectural and Cultural Heritage	CO	-	CO	-		CO	C	C	C	-		
Townscape and Visual	O		-	CO	CO		-	-	-	-	CO	
Land, Soil and Water	-	-	C	C	C	-		C	-	-		
Resource and Waste Management	C	-	-	-	C	-	-C		-	-		
Material Assets: Utilities	-	-	-	-	C	-	-	-		-		
Material Assets: Land Use and Property	CO	C	C	-	-	-	-	-	-		CO	
Population and Human Health	CO	CO	CO	-	-	CO	-	-	CO	-		O
Risk of major accident and/or disaster	CO	-	-	-	-	-	-	-	-	-	O	

The effects matrix examines the potential for the topic or issue in the left hand column to have an effect on the environmental media listed in the top row of the matrix.

If there is the potential for an effect during the construction phase, this is indicated by a 'C'. An 'O' indicates the potential for an effect during the operational phase and 'CO' indicates the potential for an effect during both phases. If there is considered to be no potential for an effect, this is indicated by '-'.

The purpose of the effects matrix is to identify potential effects in different media. Actual effects and their significance are dealt with in the most relevant chapter.

This assessment was based on information contained within this EIAR, the outcome of workshops and consultation with the relevant sub-consultants.

The main environmental interactions anticipated as they relate to the Proposed Project are also summarised in the following sections.

18.4.2 Traffic and Transportation and Air Quality and Climate

The generation of traffic during the construction phase and the re-organisation of city centre traffic during the operational phase of the Proposed Project has the potential to impact on air quality and climate.

18.4.3 Traffic and Transportation and Noise and Vibration

The generation of traffic during the construction phase and the re-organisation of city centre traffic during the operational phase of the Proposed Project has the potential to impact on noise and vibration.

18.4.4 Traffic and Transportation and Archaeology, Architectural and Cultural Heritage

The generation of traffic during the construction phase and re-organisation of traffic during the operational phase of the Proposed Project has the potential to impact architectural heritage.

Vibration from traffic has the potential to impact on buildings and features of architectural and cultural significance. In addition, the re-routing of buses away from College Green has the potential to visually impact buildings and features of architectural heritage.

18.4.5 Traffic and Transportation and Townscape and Visual

The re-organisation of city centre traffic including the re-routing of buses away from College Green has the potential to result in a visual impact to buildings and features of architectural and cultural heritage.

18.4.6 Traffic and Transportation and Resource and Waste Management

During the construction phase, there is the potential for interaction between traffic and transportation and resource and waste management. Excavated material that cannot be re-used on site will be removed from site, adding to construction traffic.

18.4.7 Air Quality and Climate and Material Assets: Land Use and Property

A potential interaction between air quality and climate and material assets: land use and property during the construction phase of the Proposed Project is identified.

Dust generated during construction works has the potential to impact economic, commercial, tourism, educational and social facilities at College Green and the employees, visitors and customers who frequent the area.

18.4.8 Noise and Vibration and Archaeology, Architectural and Cultural Heritage

A potential interaction between noise and vibration and archaeology, architectural and cultural heritage during both the construction and operational phase of the Proposed Project is identified.

Vibration generated from construction activities has the potential to impact buildings and features of architectural and cultural significance at College Green. In addition, vibration from traffic has the potential to impact buildings and features of architectural and cultural significance.

18.4.9 Noise and Vibration and Land, Soil and Water

A potential interaction between noise and vibration and land and soils during the construction phase of the Proposed Project is identified. There is the potential for noise and vibration to be generated during the excavation phase of the Proposed Project.

18.4.10 Noise and Vibration and Material Assets: Land Use and Property

A potential interaction between noise and vibration and material assets: land use and property during the construction phase of the Proposed Project is identified.

Noise and vibration generated during construction works has the potential to impact economic, commercial, tourism, educational and social facilities at College Green and the employees, visitors and customers who frequent the area.

18.4.11 Biodiversity and Townscape and Visual

A potential interaction between biodiversity and landscape and visual during both the construction and operational phase of the Proposed Project is identified.

Trees will be removed from the College Green area during the construction phase, potentially impacting on the landscape. The replanting of trees has the potential to impact on architectural heritage.

18.4.12 Biodiversity and Land, Soil and Water

A potential interaction between biodiversity and land, soil and water during the construction phase of the Proposed Project is identified.

There is potential for contamination of watercourses as a result of construction activities associated with the Proposed Project.

18.4.13 Land, Soil and Water and Resource and Waste Management

An interaction between land, soil and water and resource and waste management during the construction phase of the Proposed Project is identified.

Small quantities of excavated material will be generated during construction and removed from site as a waste material.

18.4.14 Archaeology, Architectural and Cultural Heritage and Townscape and Visual

A potential interaction between archaeology, architectural and cultural heritage and landscape and visual during both the construction and operational phase of the Proposed Project is identified.

Hoarding present during the construction phase has the potential to result in the visual obstruction of some buildings and features of architectural and cultural significance.

During the operational phase, the replanting of trees along the southern boundary of the study area has the potential to result in a visual impact and impact on features of architectural and cultural significance.

18.4.15 Archaeology, Architectural and Cultural Heritage and Land, Soil and Water

An interaction between archaeology, architectural and cultural heritage and land, soil and water during the construction phase of the Proposed Project is identified. Excavated material will be monitored for features of archaeological significance during the excavation process.

18.4.16 Archaeology, Architectural and Cultural Heritage and Resource and Waste Management

An interaction between archaeology, architectural and cultural heritage and resource and waste management during the construction phase of the Proposed Project is identified.

A number of architectural heritage features will be temporarily removed from College Green, carefully and appropriately stored during the proposed works and reused within the Proposed Project.

18.4.17 Archaeology, Architectural and Cultural Heritage and Material Assets: Utilities

Construction works associated with the provision of Material Assets (Utilities), in particular underground works have the potential to interact with Archaeology, Architectural and Cultural Heritage.

18.4.18 Population and Human Health and Traffic and Transportation

An interaction between population and human health and traffic and transportation during both the construction and operational phases of the Proposed Project is identified.

Changes in road traffic movements during the construction phase will result in a temporary negative impact on population and human health during the adjustment period.

The Proposed Project will have an operational residual significant positive impact on business, retail and tourism, by improving the public realm in a city centre site, increasing the space available to people and activity, improving the quality of the experience of visiting Dublin and improving convenient walking access to economic, commercial, tourism, educational and social facilities in the area.

18.4.19 Population and Human Health and Air Quality and Climate

An interaction between population and human health and air quality and climate during both the construction and operational phases of the Proposed Project is identified.

As outlined in Chapter 7 ‘Air Quality and Climate Factors’, when mitigation measures are implemented during the construction phase of the Proposed Project, fugitive emissions of dust from the construction site will be insignificant and pose no nuisance at nearby receptors.

During operation, the air quality assessment has found that the Proposed Project will be overall beneficial to air quality in the study area.

18.4.20 Population and Human Health and Noise and Vibration

An interaction between population and human health and Noise and Vibration during both the construction and operational phases of the Proposed Project is identified.

As outlined in Chapter 8 ‘Noise and Vibration’, the modelling outputs for the day time 2018 Do-Something (DS) scenario predict an increase of 5% in residential addresses points in the undesirable day time category and a decrease of 2% in residential locations in the desirable category.

The study concludes that when comparing the Do-Minimum (DM) and DS 2018 scenarios for night time, a 5% increase in residential locations in the undesirable band and a slight decrease of approximately 1% in the desirable band is predicted.

The modelling outputs for the day time 2035 DS scenario predict an increase of 9% in residential addresses points in the undesirable day time category and a decrease of 3% in residential locations in the desirable category.

The study concludes that when comparing the DM and DS 2035 scenarios for night time, a 1% increase in residential locations in the undesirable band and a slight decrease of approximately 2% in the desirable band is predicted.

18.4.21 Population and Human Health and Townscape and Visual

An interaction between population and human health and Townscape and Visual during both the construction and operational phases of the Proposed Project is identified.

There will be moderately negative townscape and visual impacts during the construction stages of the proposed plaza, but that these will be short-term.

Once operational, the shared surface plaza is deemed to contribute positively to the form and function of College Green and will strengthen it as a key node in the central city. This is principally due to the transformation of this space from a cluttered and traffic-dominated junction into a simply organised social and civic space. Improved townscape and visual settings will result in a positive impact on population and human health in that the proposed pedestrianized plaza should encourage more people to access the area by foot or by bicycle which will subsequently result in increased physical activity of the local population and visitors alike.

18.4.22 Population and Human Health and Material Assets: Utilities

An interaction between population and human health and material assets: utilities during the construction phase of the Proposed Project is identified.

Some minor infrastructure works will be required as part of the Proposed Project- including some local electricity diversions, the installation of a new Sustainable Urban Drainage System (SuDS), and some new telecommunications ducting.

18.4.23 Population and Human Health and Risk of Major Accident and/or Disaster

An interaction between population and human health and risk of major accident and/or disaster during the operational phase of the Proposed Project is identified.

A number of potential accidents and/or disasters were considered with regards the Proposed Project. The worst case scenario with regards to a major accident and/or disaster was identified as unpermitted vehicles on the pedestrian plaza.

While it was considered that should either of these events occur, the consequence could be 'very serious', resulting in mass injury or loss of life, the likelihood was not considered to be high.

18.4.24 Traffic and Transportation and Risk of Major Accident and/or Disaster

An interaction between traffic and transportation and risk of major accident and/or disaster during the operational phase of the Proposed Project is identified.

A number of potential accidents and/or disasters were considered with regards the Proposed Project. The worst case scenario with regards to a major accident and/or disaster was identified as unpermitted vehicles on the pedestrian plaza.

Although, the consequence of this could be ‘very serious’, resulting in mass injury or loss of life, the likelihood was not considered to be high.

18.5 Cumulative Impacts

The EU Guidelines define cumulative impacts as:

“Impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project. For example:

- *incremental noise from a number of separate developments;*
- *combined effect of individual impacts, e.g. noise, dust and visual, from one development on a particular receptor; and*
- *Several developments with insignificant impacts individually but which together have a cumulative effect.”*

The EPA Guidelines on the Information to be contained in Environmental Impact Statements mirrors this approach and defines cumulative impacts as “The addition of many small impacts to create one larger, more significant, impact”.

Therefore, the assessment of cumulative impacts considers the total impact associated with the Proposed Project when combined with other past, present, and reasonably foreseeable future developments.

An examination of the potential for other projects to contribute cumulatively to the impacts from this Proposed Project was undertaken during the preparation of this EIAR. Due to the city centre location of the Proposed Project, development is continually occurring in the area. However, no major projects have been identified that would result in a significant cumulative impact with the Proposed Project.

It is assumed that the Luas Cross City will be operational once construction works commence on the Proposed Project. Therefore, no concurrent construction impacts will occur between the two projects.

The proposed traffic measures outlined in the NTA Transport Strategy for the Greater Dublin Area 2016 – 2035 have been considered cumulatively in this EIAR. Particularly, Chapter 6 ‘Traffic and Transportation’, Chapter 7, ‘Air Quality and Climate Factors’ and Chapter 8 ‘Noise and Vibration’.

18.6 References

- EPA (2015) Revised *Guidelines on the Information to be contained in Environmental Impact Statements*, Draft, 2015;
- EPA (2015) *Advice Notes on Current Practice in the Preparation of Environmental Impact Statements*, Draft, 2015; and
- EPA (2002) *Guidelines on the Information to be contained in Environmental Impact Statements*, 2002;

- EPA (2003) *Advice Notes on Current Practise in the Preparation of Environmental Impact Statements*, 2003.
- European Commission (1999), *Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions*. European Commission, Luxembourg.