Chapter 20
Cumulative Impacts & Environmental Interactions

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20 CUMULATIVE IMPACTS AND ENVIRONMENTAL INTERACTIONS

20.1 Introduction

This Chapter documents the cumulative impacts arising from the Bus Connects Galway: Dublin Road scheme (hereafter referred to the Proposed Development) in combination with other existing and or approved projects and projects which, at the time of assessment, were yet to be approved, but for which a decision on such project is reasonably foreseeable over the likely consenting and construction period anticipated for the Proposed Development.

In addition, this chapter outlines the applicable legislation and guidance used, presents the methodology adopted to identify and assess plans and projects that have the potential for cumulative effects, and addresses the potential for interactions between impacts on different environmental factors of the Proposed Development itself on the receiving environment.

20.1.1 Cumulative Impacts

Legislation requires that cumulative effects with other approved projects are considered. Cumulative effects are assessed in accordance with the EIA Directive 2014/52/EU[1], of which Annex IV.5(e) states:

> "*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.*"

Annex IV.5 of the EIA Directive requires that:

> '*The description of the likely significant effects of the project on the environment resulting from…the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources.*'

The Environmental Protection Agency's (EPA) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA 2022) (hereafter referred to as the EPA EIAR Guidelines) define cumulative effects as:

> '*The addition of many minor or insignificant effects, including effects of other projects, to create larger, more significant effects.*'

It should be noted that the EPA EIAR guidelines use the terms impacts and effects interchangeably. A relatively minor effect on a particular receptor caused by the Proposed Development could result in a significant effect if it is added to by impacts from other nearby projects. This Chapter identifies and provides an assessment of likely significant cumulative effects caused by the Proposed Development in combination with other planned projects. Section 20.2 of this Chapter sets out the process for deciding which other planned projects were included in the assessment.

[1] Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment

20.1.2 Environmental Interactions

Environmental interactions are the reactions between impacts, whether between the impacts of just one project (i.e., the Proposed Development), or between the impacts of multiple projects. For each environmental topic there will be certain interactions or interdependencies with other environmental topics, whereby impacts may interact to create a greater effect or different type of effect. An assessment of these interactions has been undertaken as required by Article 3 of the EIA Directive, which states the following:

> '*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).*'

Some of the topic assessments within this EIAR already address environmental interactions. For example, Chapter 10 (Population) provides an assessment of effects on community amenity, which relates to the interaction of impacts on air quality; visual amenity; traffic and transport; and noise and vibration. Furthermore, Chapter 11 (Human Health) describes and assesses how a combination of impacts on health determinants (such as air quality; noise and vibration; community amenity; traffic and transport) can interact and influence health outcomes.

Section 20.4 of this chapter sets out the main environmental interactions identified from the Proposed Development, sign-posting chapters which already address environmental interactions and providing a description and assessment of environmental interactions which are not addressed elsewhere in this EIAR.

20.1.3 Guidance

This assessment has been completed with reference to the following guidance documents:

- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA 2022);
- Guidance on the Preparation of the Environmental Impact Assessment Report (European Commission 2017);
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment, Department of Housing, Local Government and Heritage (DHLGH, 2018); and
- Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions (European Commission 1999).

20.2 Methodology for Cumulative Impacts Assessment

20.2.1 Introduction

Cumulative effects result from the addition of many minor or significant effects, including effects of other projects, to create larger, more significant effects (EPA,2022). Additional cumulative effects can be caused due to incremental changes by other past, present or reasonably foreseeable projects together with the Proposed Development.

Broadly speaking, the potential cumulative effects of the Proposed Development can be classed as traffic related or non-traffic related. The traffic related effects such as potential air emissions or noise resulting from the cumulation of traffic distribution from multiple projects are predicted through the results of traffic

scenario modelling. The traffic modelling scenarios for the cumulative assessment are described in Section 20.2.8.

For non-traffic related cumulative effects, it is necessary to consider the scale, nature and likely impacts of other projects which could combine with the Proposed Development to cause cumulative effects. It was therefore necessary to identify which other projects should be included for analysis as part of the Cumulative Effects Assessment (CEA). A staged approach to identify such other projects was applied as set out in Figure 20-1 below, with each stage described in subsequent chapter sections.

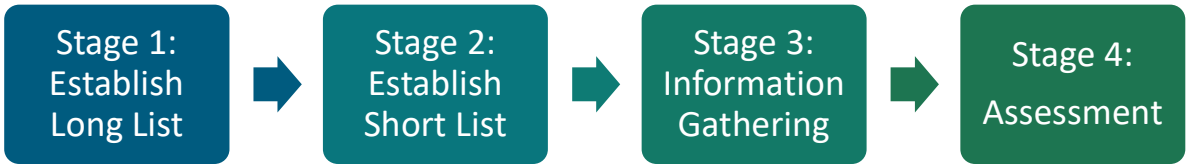

Figure 20-1 CEA Assessment Methodology

20.2.2 Study Area

The first step of undertaking CEA is to identify those projects or activities with which the Proposed Development may interact to produce a cumulative impact. These interactions may arise during the construction or operational/maintenance phases.

There is no established study area for the CEA however the study area for this cumulative assessment analysed projects within 200m of the Proposed Development. The CEA also takes into consideration the previously defined study areas in each of the respective chapters of this EIAR which are informed by the appropriate guidance documents together with professional judgement associated with the potential for cumulative environmental effects to occur based on the location, nature, and characteristics of the cumulative effects of projects and plans with the Proposed Development. Table 20-1 identifies the cumulative assessment study areas defined for each environmental factor which is based on project specific characteristics and the potential for cumulative effects to occur.

Table 20-1 Cumulative assessment study areas by environmental factor

Environmental Factors	Distance from Proposed Development /study area
Traffic and Transport	N/A. Informed by traffic modelling scenario and the area of Influence, the Proposed Development has on changing traffic volumes
Air Quality	350m
Climate	N/A (Informed by traffic modelling scenario and the area of influence the Proposed Development has on changing traffic volumes and on long-term trends of climate change)
Noise & Vibration	300m
Population	500m and community effects
Human Health	500m
Biodiversity	15km (not including watercourses linked to estuarine habitats and highly mobile species)
Water	500m
Land & Soils	250m
Archaeology, Architectural and Cultural Heritage	50m
Landscape & Visual	50m

Environmental Factors	Distance from Proposed Development /study area
Waste & Resources	N/A waste assessment is informed by regional data on waste. Study area of Connacht-Ulster Waste Region (CUWR) is applied to waste assessment.
Material Assets	50m (used as proxy for footprint of Proposed Development and affected utilities)

20.2.3 Stage 1 – Establishment of Long List of Projects

The first stage of the CEA was to identify other projects within the past 10 years (2014-2024) that fall within the development boundary and the 200 m study area from the Proposed Development which were deemed potentially relevant to be included in the long list. The assessment considers other existing and/or approved projects and those projects which are yet to be approved, but for which a decision and potentially approval is reasonably foreseeable over the likely consenting and construction period anticipated for the Proposed Development. An element of professional judgement was used to identify applications within 200m of the Proposed Development that may be significantly impacted by the Proposed Development.

20.2.3.1 Identification of Plans

A list of relevant national, regional and local plans and programmes identified as having the potential to have a cumulative effect with the Proposed Development was collated. The list of plans was circulated to Galway City Council (GCC) in advance of completing the assessment to ensure all relevant plans were considered and addressed in the cumulative assessment.

20.2.3.2 Sources for the Identification of Other Projects

A desk study was undertaken to source publicly available information on projects within the CEA study area using planning databases and other available sources, which may have the potential to give rise to cumulative effects with the Proposed Development. A list of all other project is included in Appendix A20.1 in Volume 4 of this EIAR.

Potentially relevant other projects include those from various sectors, such as residential and commercial projects, utilities, and other transport projects. The identification of projects for the long list considered the following sources:

- An Bord Pleanála (ABP) website (https://www.pleanala.ie/) – for details of Strategic Infrastructure Developments (SIDs) and Strategic Housing Developments (SHDs);
- Local authority websites and the development plans for Galway City for details of allocations and areas for regeneration;
- National Planning Application Database (https://data.gov.ie/dataset/national-planning-applications) – for downloadable list of planning applications sent from Local Authorities;
- Projects being planned by the National Transport Authority (the NTA website, (https://www.nationaltransport.ie/planning-and-investment/transport-investment/projects/ provides detail) as part of other major transport projects and programmes in accordance with the Galway Transport Strategy 2016;
- Project Ireland 2040, which combines the National Development Plan and National Planning Framework. (gov.ie - Project Ireland 2040 (www.gov.ie); Discussion between the BusConnects Infrastructure Team and Galway City Council to gain an understanding of upcoming relevant projects and programmes;
- Transport Infrastructure Ireland website (https://www.tii.ie/public-transport/projects-and-improvements/) – to identify major transport projects and programmes;
- The EIA Portal (https://www.housing.gov.ie/planning/environmental-assessment/environmental-impact-assessment-eia/eia-portal) maintained by the Department of Housing, Planning and Local Government – for applications for development consent accompanied by an EIAR; and
- Uisce Éireann website, which includes a page on its projects (https://www.water.ie/projects/).

All planning application data provided by each Local Authority is fed into the national Data.Gov.ie database (https://data.gov.ie/dataset/national-planning-applications). This dataset was used to identify planning applications within a search area of the Proposed Development.

The dataset included planning applications of various scales, most of which were for small-scale applications such as domestic residential modifications. The planning application lists were searched to identify and exclude very minor applications from the long list on the basis that given their minor nature these were not likely to have a cumulative effect noticeable over the effects of the Proposed Development in isolation. Examples of planning applications which were excluded from the preliminary long list were applications to construct or demolish conservatories, house extensions, loft conversions, change of uses for single or small numbers of buildings, construction of outbuildings, modifications to driveways and retention applications. Granted and pending applications older than ten years were also excluded from the preliminary long list on the basis that they would likely already have been built (and so would form part of the existing baseline) or are now unlikely to be progressed. Applications which have been refused or annulled were also discounted from the preliminary long list on the basis that they are unlikely to progress, unless through successful appeal. The exercise to identify relevant planning applications was undertaken in June 2023, January 2024, July 2024 and September 2024.

In addition to this process and to capture other potentially relevant foreseeable projects, major projects as part of transport and other infrastructure programmes were added to the preliminary long list. As noted earlier, this included the identification of major transport projects from the Galway Transport Strategy 2016.

Other types of projects that were identified for consideration on the long list have been classed as follows:

- Local Planning Applications – those projects for which planning permission is applied for through the local planning authorities themselves and were identified from Local Authority planning application lists;
- Strategic Housing Developments (SHDs) – housing developments of a certain type and scale (e.g., 100 or more houses or student accommodation units) for which applications are lodged directly with ABP;
- Large-scale Residential Developments (LRDs) – housing developments of a certain type and scale (e.g., 100 or more houses or student accommodation units comprising 200 bed spaces or more) for which planning permission is applied for through the local planning authorities;
- Strategic Infrastructure Developments (SIDs) – major infrastructure developments by Local Authorities and others for which applications are lodged directly with ABP;
- Uisce Éireann projects – projects under the programmes of work listed on Uisce Éireann website;
- Other Major Projects – projects which were at a pre-application stage at the time of identification, but which are anticipated to be developed over the time period for the Bus Corridor Infrastructure Works. These include projects from various sectors including energy, utilities, and transport; and
- Other Core Bus Corridor schemes proposed by the NTA – BusConnects Galway: Cross City Link.

The outcome of Stage 1 provided a long list of projects to be brought forward for review (and amendment if required) and consideration at Stage 2 at assessment, resulting in the establishment of the shortlist of projects. The long list of other projects is provided in Appendix A20.1 Summary of Stages 1 and 2 Shortlisting Outcomes in Volume 4 of the EIAR.

In the case of Biodiversity, any major or strategic project within 15km of the Proposed Development was included in the long list to be reviewed at Stage 2. For the major and strategic projects outside of the 15km buffer, considering issues such as connectivity to sensitive habitats via watercourses has helped inform whether further afield projects could contribute to likely significant cumulative impacts with the Proposed Development. Such projects were then included for assessment. In relation to the Waste & Resources assessment, consideration was given to the potential for likely significant cumulative impacts within the Connacht-Ulster Waste Region (CUWR).

20.2.4 Stage 2 – Establishing the Shortlist of 'Other Projects'

The aim of Stage 2 was to narrow down the Stage 1 long list to include only those other projects where there was potential for significant cumulative effects arising in combination with the Proposed Development (hereinafter referenced as 'other projects'). To do this, the following was considered:

- Whether the project has been completed, or the planning applications have been refused (where not identified at stage 1), annulled, or expired (if so, they were not shortlisted). If a project was identified as completed, it has been considered as part of the baseline as appropriate;
- Whether there is a likelihood of temporal overlap (including overlap for construction periods) between the Proposed Development and the other projects (identified in Stage 1); and
- Whether the scale and nature of the other project is likely to significantly contribute to the effects of the Proposed Development, taking account of the aspects of the environment for which the Zone of Influence (ZoI) are relevant.

The shortlisting was informed by input from the environmental topic specialists involved in the preparation of this EIAR, which allowed for consideration as to whether a particular type of project could result in impacts to receptors of interest for the Proposed Development assessment. In most cases, the study area for the topic has informed whether or not another project is likely to have a cumulative effect. 1.However, in some instances the environmental topic specialists extended the scope of consideration where they considered that there is potential for a likely significant cumulative effect beyond the study area applied for the Proposed Development in isolation, and therefore a project outside of the pre-defined area identified at Stage 1 could be scoped into Stages 3 and 4 for an individual topic. Appendix A20.1 Summary of Stages 1 and 2 Shortlisting Outcomes in Volume 4 of this EIAR provides a list of all projects and plans included in the Stage 1 and 2 compilation exercise. The shortlisted projects are indicated on Figures 20.1 and 20.2 in Volume 3 of the EIAR.

20.2.4.1 Biodiversity, Climate, Waste and Resources

For some topics a slightly different approach has been deemed appropriate. The biodiversity assessment has primarily considered individual SIDs, SHDs, LRDs and other Major Projects for shortlisting within the CEA. For other projects, such as those covered by local planning applications, small scale projects that did not overlap with the ZoI for the biodiversity assessment were not deemed sufficient to warrant a specific assessment of cumulative impacts on biodiversity. This is set out as part of the assessment reported in Section 20.4.8.

The Climate assessment in Chapter 8 has considered the cumulative influence of the Proposed Development with other developments on a national basis.

The Chapter 17 Waste and Resources assessment has focused on key projects that were considered to have potential for likely significant effects on a regional basis. Specifically, it has focused on those projects likely to generate a similar waste stream to the Proposed Development. which may lead to cumulative effects associated with the off-site treatment of solid waste generated by the Proposed Development and other projects in the CUWR that will have simultaneous requirements for landfill and treatment capacity of any construction and demolition (C&D) waste generated during the construction timeframe. The approach to the CEA for waste is set out in more detail along with the assessment in Section 20.4.14.

20.2.5 Stage 3 – Information Gathering for the Shortlisting of Other Projects

The CEA has relied primarily on the gathering of environmental information from a range of sources published as part of planning application submissions or planning documentation for the Stage 2 shortlisted projects. In addition, where environmental assessments have not yet been undertaken or published, then any published Strategic Environmental Assessments have been relied on for additional supporting information where available. Specific information has been obtained from the following sources:

- Planning application documentation and supporting environmental assessments obtained via the National Planning Application Database and the EIA Portal;

- Local authority websites and the development plans for Galway City for details of Strategic Environmental Assessments; and
- Developers' websites, for example for Irish Water and other utilities companies.

The information sought focused on:

- Proposed design and location of the project;
- Proposed programme of construction, operation, and decommissioning (if relevant); and
- Environmental assessments, if available, that set out baseline data and effects arising from the project.

In many cases there is limited information available on the above with which to inform the CEA; for example, projects in a pre-application stage.

20.2.6 Stage 4 – Assessment

The CEA assessment has been undertaken with the findings recorded in Appendix A20.2 Stage 4 Specialist Assessments in Volume 4 of the EIAR. The assessment has been made for construction effects and operation effects based on the scenarios outlined below.

For Construction Phase cumulative impacts, it has been generally assumed that other projects would be under construction concurrently with the Proposed Development, to present a worst-case scenario. In some cases, a worst-case was considered to be likely where other projects are constructed sequentially, with the effect of lengthening the time that certain receptors may be exposed to similar impacts. Individual topics have set out any such assumptions in the assessments provided in Appendix A20.2 Stage 4 Specialist Assessments in Volume 4 of the EIAR.

For the assessment of Operational Phase cumulative impacts, an assumption has been made that all shortlisted projects would be complete and in operation, to present a worst-case scenario.

The level of assessment is commensurate with the level of information available for each shortlisted other project.

20.2.7 Consultation

The CEA of the plans and projects was informed by consultation with Galway City Council to inform the 'other' projects list that are not yet in the planning process but may have a cumulative effect with this project.

Consultation with ABP through the Pre-Application Consultation meeting has informed the methodology taken in the CEA and ensured the approach is consistent with the directions they have been providing to other major infrastructure projects.

To inform this cumulative assessment of effects close consultation with the 'other' NTA funded projects has informed the assessments contained in this EIAR and has informed the assessments regarding likely construction effects (programmes) and operational effects.

Close collaboration and consultation with the design team, EIA specialists and technical specialists has informed the cumulative assessment as part of this EIAR.

20.2.8 Traffic Related Cumulative Effects

In relation to the traffic impact assessment, the traffic model in the Opening and Design year (2028 and 2043 respectively) assessments are based on the same network as the base year plus committed and other schemes which are likely to be in place (including the BusConnects Galway: Cross City Link which was recently approved by ABP (314597)). In addition, the model includes for forecasted increased travel demand from general development to capture projected traffic growth from reasonably foreseeable development across the city in both 2028 and 2043.

20.2.8.1 Traffic Related Cumulative Impacts: Construction Scenarios for Assessment

For the purposes of the cumulative impacts assessment, no other construction scenario has been assessed. This is due to the forecast traffic scenarios, including both committed and other schemes which are likely to be in place (as noted above). As noted in the EPA EIAR Guidelines, where uncertainty arises then an EIAR needs to describe the 'worst case' of the accumulation of effects that could arise from other projects. This worst-case scenario has already been assessed and is detailed in Appendix 6.1 (Transport Modelling Report) of this EIAR. This scenario is based on the worst-case point in the proposed construction process, during months 10 to 13, as described in Chapter 5 of this EIAR.

20.2.8.2 Operational Scenario for Assessment

For operational cumulative effects including the Proposed Development, a sensitivity test has been assessed whereby the Galway City Ring Road is included, as this scheme is currently with ABP (318220) for further consideration.

Appendix A6.1 (Transport Modelling Report) contains further information on the modelling assumptions contained within the Do Minimum scenario, including the full list of transport schemes included. The Operational Phase scenario has also been modelled including for background growth from reasonably foreseeable projects in line with regional growth projections to capture the wider traffic effects expected from projected development in Galway city and the surrounding area.

20.3 Assessment of Cumulative Impacts and Environmental Interactions

This section provides a topic-by-topic assessment of the likely significant cumulative effects of the Proposed Development in combination with other projects, before moving on to a description of the main environmental interactions identified for the Proposed Development.

In total, 186 other projects, including seven major projects, were identified in the longlisting process. A total of 51 other projects were shortlisted for further cumulative assessment. Appendix 20.1 of Volume 4 of this EIAR sets out a record of which projects were shortlisted for assessment. Reference should be made to Figure 20.1 and Figure 20.2 in Volume 3 of the EIAR, for the locations of the shortlisted projects.

20.3.1 Construction Impacts

20.3.1.1 Traffic and Transport

In terms of the Proposed Development in isolation, significant impacts due to general traffic redistribution away from the direct study area are not anticipated during the Construction Phase. This is based on the intended nature of the progressive works along the corridor whereby traffic flows are generally to be maintained in both directions – refer to Chapter 5 (Construction) and Chapter 6 (Traffic & Transport) of this EIAR for further information on the Proposed Development assessment. There may be a requirement for some localised temporary lane closures for short durations of the day or night, which will involve consultation between the appointed contractor and Galway City Council. Access for general traffic to existing residential and commercial units immediately adjacent to the Proposed Development will be accommodated throughout the Construction Phase. Early engagement with local residents will be undertaken, and advance notice given of any planned lane closures and diversions as set out in the Construction Environmental Management Plan (CEMP) (Appendix A5.1 in Volume 4 of this EIAR.

A Construction Traffic Management Plan (CTMP) has been prepared and is included in the CEMP). The appointed contractor will develop the CTMP to ensure that it gives due consideration to provision of local access requirements and designates appropriate diversion routes in the cases where localised temporary closures are required. It will be a condition of the Employer's Requirements that the successful contractor, immediately following appointment, must detail in the CTMP the manner in which it is intended to effectively implement all the applicable mitigation measures identified in this EIAR and any additional measures required pursuant to conditions imposed by An Bord Pleanála, should they grant approval.

Other major infrastructure projects could directly interface with the construction of the Proposed Development. As specified in Section 5.7.4 in Chapter 5 (Construction) of this EIAR, interface liaison will take place on a case-by-case basis, as will be set out in the Construction Contract, to ensure that there is coordination between projects, that construction access locations remain unobstructed by the Proposed Development works and that any additional construction traffic mitigation measures required to deal with cumulative impacts are managed appropriately.

Based on the aim to coordinate between the Proposed Development works and other major infrastructure projects and major projects which are proposed along the route, or in the vicinity of the Proposed Development, no likely significant cumulative effects are predicted on Traffic and Transport over and above the effects of the Proposed Development in isolation which are reported in Chapter 5 (Construction) and Chapter 6 (Traffic and Transport).

20.3.1.2 Air Quality

According to the Institute of Air Quality Management (IAQM) Guidance on the Assessment of Dust from Demolition and Construction (IAQM 2024) should the construction phase of the Proposed Development coincide with the construction phase of any other development within 500m then there is the potential for cumulative construction dust impacts. A review of relevant planning applications and projects listed in Appendix A20.1 of this EIAR was conducted in order to identify sites with the potential for cumulative impacts.

The Proposed Development has been assessed as having at most a high risk of dust soiling, a low risk of human health impacts and a high risk of ecological impacts during the Construction Phase. A number of mitigation measures have been proposed in order to ensure significant dust impacts do not occur. However, no significant cumulative effects on human health or ecological receptors due to construction dust is predicted on the basis that the mitigation measures outlined in Chapter 07 (Air Quality) of this EIAR and the CEMP (Appendix A5.1 in Volume 4 of this EIAR) are implemented throughout the construction phase of the Proposed Development. The cumulative effect is predicted to be direct, short-term, negative and not significant, which is overall not significant in EIA terms.

20.3.1.3 Climate

With respect to the requirement for a cumulative assessment PE-ENV-01104[2] (TII, 2022) states that *"for GHG Assessment is the global climate and impacts on the receptor from a project are not geographically constrained, the normal approach for cumulative assessment in EIA is not considered applicable"*.

By presenting the greenhouse gas (GHG) impact of a project in the context of its alignment to Ireland's trajectory of net zero and any sectoral carbon budgets, this assessment demonstrates the potential for the project to affect Ireland's ability to meet its national carbon reduction target. Therefore, the assessment approach is considered to be inherently cumulative.

20.3.1.4 Noise and Vibration

An appraisal was carried out to assess the cumulative impact to noise sensitive locations (NSLs) as a result of construction noise due to the Construction Phase of the Proposed Development and other projects listed in Appendix A20.1 of this EIAR, including the adjacent Bus Connects Cross City Link Project. Twenty-five projects were identified within a 200m potential Zone of Influence (ZoI) of the Proposed Development (Refer to Table 20.2.3 in Appendix A20.2). These include twenty-two GCC planning applications (including two Part 8 applications), one SHD application, one major project, and the BusConnects Galway: Cross-City Link Scheme.

[2] Climate Guidance for National Roads, Light Rail, and Rural Cycleways (Offline & Greenways) - Overarching Technical Document", Transport Infrastructure Ireland

The highest noise impacts associated with the Proposed Development are calculated at NSLs along the immediate boundary of the proposed construction works (typically within 50m of a specific working area, indicated in Appendix A9.1 – A9.4 in Volume 3 of this EIAR). Due to the linear nature of works associated with the Proposed Development, construction noise impacts will occur over temporary periods at any one location. Construction activities associated with the Proposed Development will therefore dominate noise levels at the closest NSLs to the Proposed Development when occurring in their proximity. Due to the further distance from Proposed Development to the adjacent BusConnects Galway: Cross-City Link Scheme and other projects to these NSLs, the cumulative construction noise levels will remain dominated by the Proposed Development and the magnitude of impacts described in Section 9.4.4.2 of Chapter 9 (Noise and Vibration) remain valid.

In order to ensure that construction activities associated with the Proposed Development are controlled at the closest NSLs, a series of mitigation measures will be implemented throughout the construction phase. These measures are set out in Section 9.5.1.1 of Chapter 9 (Noise and Vibration) of this EIAR. With the implementation of the mitigation measures to reduce construction noise levels associated with the Proposed Development and due to the separation from the nearest adjacent Bus Connects Galway Cross-City Link Scheme, there are no significant cumulative impacts predicted to occur from concurrent construction of the Proposed Development in combination with the other Bus Connects Cross City Scheme and other projects identified.

20.3.1.5 Population

Cumulative construction effects on Population due to the Proposed Development, when considered together with effects arising from other plans and projects, are assessed using the same criteria as has been applied to the principal Population assessment. Effects on receptor populations can arise from impacts identified in the assessments, in particular in Traffic & Transportation, Noise & Vibration, Air Quality and Landscape & Visual, and have been considered also in relation to their assessment in the chapter on Human Health. A review has been undertaken of the relevant planning applications, plans and projects listed in Appendix A20.1 of this EIAR.

During the Construction Phase, potential cumulative effects can arise from environmental impacts generated by noise or vibration, impacts on air quality, and impacts on visual amenity arising from individual projects. For the Proposed Development, these impacts are addressed in the respective assessment chapters of this EIAR and can have in-combination effects on community amenity, including that of local residents, users of community facilities, or pedestrians and cyclists. Some such impacts could also affect commercial amenity, for example via effects on the amenity of hotel guests and, therefore, on room occupancy, or on retail customers and, therefore, on turnover, potentially affecting commercial viability. These effects are more likely for developments which could present elevated environmental impacts in their own right, for larger developments in close proximity to the Proposed Development, and for developments beside the Proposed Development where these are located in areas identified by the respective assessments of the Proposed Development as having elevated residual impacts. For example, the Part 8 (Planning and Development Regulations 2001) application for the Dublin Road Lawn Cemetery together with applications 2411 and 24/60244 (listed in Appendix A20.1 in Volume 4 of this EIAR) are, relevant for these criteria as they are proposed for locations which have been identified as being at risk of elevated noise and visual effects in the vicinity of residential housing and a hotel. Mitigation measures to address these effects are presented in the respective chapters, for instance in Section 9.5.1.1 of Chapter 9 (Noise & Vibration), and are described as sufficient to prevent cumulative effects.

In addition, construction will generate construction traffic. In addition to existing traffic volumes, construction traffic, including HGVs, can have an effect on community amenity, on the journey amenity of pedestrians and cyclists, and potentially on community severance. Dublin Road is a major artery for Galway and existing levels of traffic are high. Some restrictions on the movement of traffic will be necessary during construction of the Proposed Development. Because construction traffic for the Proposed Development will be additional to existing traffic volumes, the CEMP aims to minimise construction traffic movements, and it is proposed that works sections will proceed sequentially. Chapter 6 (Traffic and Transport) assesses that traffic impacts during construction of the Proposed Development will be “not significant”. There is, nevertheless, the potential for cumulative effects along parts of Dublin Road due to the addition of construction traffic associated with other developments, with impacts more likely where normal traffic volumes are highest and

where there will be a need for temporary road closures, lane closures or a reduced number of lanes. However, most of the projects, which could either be under construction at the commencement of the Proposed Development, or for which planning permissions are now being sought, do not present a likelihood of causing significant additional construction traffic volumes as they are too small or too distant. A number of projects for which planning permissions are being sought (e.g. 222, 23160, 23289, 2460058 and 2460098) are also located in or near the HSE Merlin Woods complex, or beside Dublin Road in Section 2 of the Proposed Development. Here, there is less residential development and population receptors, including pedestrians and cyclists. On the other hand, the hospital and related facilities in Merlin Woods are accessed by sensitive population subsets for whom safety and separation from traffic is a priority. In the first instance, section 20.3.1.1. of this chapter states that interface liaison will take place on a case-by-case basis through Galway City Council, to ensure that there is coordination between projects and that construction access locations remain unobstructed by the Proposed Development works. If a need for mitigation measures is identified, this could be achieved by the use of alternative routes for construction traffic if works are expected to coincide with peak construction activity on the Proposed Development. For example, this alternative could be available for the Part 8 application LA1/2021 for Social and Affordable Housing at Merlin Woods, and for applications 2235, 2432 and 2460107 at ATU, and for the HSE applications 222, 23160, 23289, 2460058 and 2460098 included in Appendix A20.1 in Volume 4 of this EIAR, and GCC as developer will arrange this if required.

Alternatively, mitigation can be achieved by deferring works until the peak period of construction on the respective section of the Proposed Development has been completed. GCC aims to minimise the impacts by phasing this project. A third option would be for developments proposed for the same location to be phased so that works do not occur at the same time as one another, so to minimise the addition of construction traffic to the Proposed Development in the event that simultaneous construction cannot be avoided. Liaison by the project contractor and third-party developers is proposed through Galway City Council as described in Section 5.7.4 of Chapter 5 (Construction). This option applies, for example, to HSE proposals 222, 23160, 23289, 2460058 and 2460098 included in Appendix A20.1 in Volume 4 of this EIAR.

Finally, there is the possibility that negative cumulative effects could occur from excess demand for a limited supply of specialist engineers, construction workers or equipment, should the proposed Ballybane Road and Castlepark Road Cycle Network (commencing construction in coming weeks) or BusConnects Cross-City Link be built at the same time, see Figure 20.1 in Volume 3 of this EIAR. However, if there is a risk of this occurring in practice, then mitigation can be achieved through the sequential timing of these projects.

20.3.1.6 Human Health

Cumulative construction effects on Human Health due to the Proposed Development when considered together with effects arising from other plans and projects are dealt with in relation to the factors under which human health effects might occur, particularly Traffic and Transportation, Noise and Vibration and Landscape and Visual.

For some of the shortlisted projects, the Human Health assessment identified potential for construction noise and general disruption. Impacts are likely to be psychosocial responses, such as irritation and loss of concentration, but health impacts are likely to be transient. However, these cumulative effects, in conjunction with the Proposed Development are not considered to be significant

As outlined in Chapter 5 (Construction) of this EIAR, liaison with third-party developers will take place on a case-by-case basis, as will be set out in the Construction Contract, to ensure that there is coordination between projects, that construction access locations remain unobstructed by the Proposed Development works and that any additional construction traffic mitigation measures required to deal with cumulative impacts are managed appropriately.

20.3.1.7 Biodiversity

This cumulative impact assessment examines whether the Proposed Development, along with any other projects could cumulatively result in a likely significant effect on biodiversity during the construction phase.

Projects either in place, or proposed, were considered in assessing the potential for cumulative impacts to increase the significance of the impacts predicted for the Proposed Development on biodiversity.

The potential for cumulative impacts on biodiversity to arise are limited to those residual impacts associated with the Proposed Development and those effects the Proposed Development will have, along with any other projects, on the receiving environment that are measurable in some way, but themselves will not result in a likely significant residual effect on biodiversity.

In general, impacts on biodiversity arising from the Construction Phase of the Proposed Development are related to:

- Habitat loss and fragmentation;
- Surface water run-off and contamination;
- Invasive species spread; and
- Disturbance and displacement.

In relation to residual impacts, all residual Construction Phase impacts were assessed as being Not Significant, with the exception of impacts on Designated Sites, which were assessed as being Imperceptible (refer to Table 12-19 in Chapter 12 (Biodiversity) and the accompanying AA Screening and NIS (APEM, 2024)).

This section of the EIAR was prepared with consideration of the policies and objectives of the Galway City Development Plan (2023-2029) in relation to Biodiversity. The Galway City Development Plan in complying with the requirements of the Habitats Directive, Wildlife Acts and Planning & Development Acts requires that all Projects and Plans that could affect biodiversity in the same potential Zone of Influence of the Proposed Development site would be assessed on a case-by-case basis and that appropriate employable mitigation measures would be put in place to avoid, reduce or ameliorate negative effects.

The listed Projects and Plans in Appendix A20.1 in Volume 4 of this EIAR, would be unlikely to have significant in-combination effects with the Proposed Development. Due to the construction works required as part of the Proposed Development, it is assessed that permanent and temporary impacts from habitat loss, fragmentation and invasive species will be limited to a ZoI in the immediate vicinity of the Proposed Development and temporary works areas. Considering the existing land use of these areas, which consist of existing roads, pedestrian pathways, and cycleways, with residential, commercial, or industrial zoning in this urbanised area, listed developments are not likely to result in a significant effect on biodiversity. There are no predicted in-combination effects relating to surface water run-off and contamination, given that the listed developments have or are proposed to have connection to the existing public sewer network for the treatment of surface water and wastewater. Listed developments also include for site-specific surface water treatment prior to discharge, where appropriate. The Projects and Plans are not expected to result in a significant cumulative impact on disturbance or displacement, given the existing land use and urban nature of the area, and the limited ZoI for disturbance and displacement impacts for the Proposed Development.

The listed Projects and Plans have also been subject to Appropriate Assessments, NIS's and Biodiversity assessments where appropriate, and measures have been included to reduce the potential for any integrity level impacts on the Natura 2000 network, and negative impacts on biodiversity for the ZoIs concerned. These other projects cannot have received planning permission without having met the consenting authority requirement in this regard.

Given the inclusion of best practice construction management measures to be employed, and additional measures, as detailed in Chapter 12 (Biodiversity), to reduce or minimise effects on biodiversity, there is no potential for significant in-combination effects to occur. There are no predicted cumulative construction effects given that it is predicted that the Proposed Development will have no significant effects on biodiversity. In this way, in-combination impacts with completed developments, consented and proposed developments, plans and projects for the study area and surrounding area in which the development site is located, would be avoided.

20.3.1.8 Water

The Water assessment shortlisted 7 other projects with potential for likely direct significant cumulative effects with the Proposed Development during construction and took those into the assessment Stages 3 and 4 (see Appendix A21.1 in Volume 4 of this EIAR). These include six GCC planning applications and the Bus Connects Galway Cross-City Link Scheme.

Development proposals outlined in Galway City Development plan 2023-2029 include standard surface water management strategies in the form of SUDs to mitigate against impacts on the receiving waters.

The further assessment predicted that given the mitigation measures set out in the Surface Water Management Plan (SWMP) included in Appendix A5.1 CEMP for the Proposed Development and considering the projects at issue via there planning permission are obliged to implement the same mitigation measures, the cumulative impacts on hydrology during construction would be not significant.

20.3.1.9 Land, Soils, Geology & Hydrogeology

Following implementation of the proposed mitigation measures, the anticipated Construction Phase residual impacts on Land, Soils, Geology and Hydrogeology due solely to the Proposed Development are considered negligible magnitude and imperceptible significance.

A review of relevant planning applications and other projects listed in Appendix 20.1 was conducted, in order to identify sites with the potential for cumulative impacts. It is considered that the construction of the Proposed Development in combination with other proposed projects will result in cumulative impacts that are negligible in magnitude and imperceptible in significance, subject to implementation of the proposed mitigation measures laid out in Chapter 14 (Land, Soils, Geology & Hydrology) of this EIAR.

Where multiple projects proceed at the same time, there is potential for increased accidental spillages and mobilisation of contaminants to the regionally important aquifer. However, provided the mitigation measures outlined in Section 14.5 of Chapter 14 of this EIAR are implemented in full, cumulative impacts are considered to be negligible in magnitude and imperceptible in significance. Construction of the N6 Galway City Ring Road is unlikely to be concurrent with the Proposed Development. The interaction between the Proposed Development and the N6 Galway City Ring Road is minimal. Therefore, cumulative impacts on the land, soils, geology, and hydrogeology are considered to be negligible in magnitude and imperceptible in significance.

As such, there are no likely significant direct or indirect cumulative impacts in combination with other proposed projects predicted on land, soils, geology, and hydrogeology in the Construction Phase.

20.3.1.10 Cultural Heritage

All permitted and proposed projects as detailed in Appendix 20.1 of Volume 4 of this EIAR were reviewed as part of the potential cumulative impact assessment.

Given the scheme of this Proposed Development and its location within an urban development, and when assessed in a cumulative context with regard to other developments, there is an identified cumulative effect in relation to direct overall impact on the Cultural Heritage resource.

Projects in the general area have applied a range of cultural heritage mitigation measures (where applicable, at construction stage), which will allow for the preservation either in-situ or by record of any archaeological or built heritage remains that may have been identified. Similarly, the Proposed Development has avoided, reduced, and/or offset identified impacts at construction stage.

Although a cumulative measurement of a range of Cultural Heritage receptor impacts is acknowledged, none have been identified as of such magnitude, that when considered in tandem with the Proposed Development, result in an overall significant cumulative effect on the resource. As such, the cumulative impact at construction stage is considered Not Significant.

20.3.1.11 Landscape and Visual

The Landscape and Visual assessment reviewed all permitted and proposed projects and plans as detailed in Appendix 20.1 of Volume 4 of this EIAR as part of the potential cumulative effect assessment.

During construction, no significant cumulative effects are expected to occur once the proposed mitigation measures set out in Chapter 16 (Landscape & Visual), are implemented. A number of plans and projects are active in the area including the Galway City Biodiversity Action Plan 2014-2024 and Galway City Biodiversity Draft Action Plan 2024-2030. The proposed residential developments, which are adjacent to the Proposed Development, will contribute to the negative visual impact due to tree removal. The removal of trees during construction will have a negative impact on visual amenity and landscape in the area, resulting in heightened negative cumulative effects. These are expected to be temporary, moderate, negative.

20.3.1.12 Waste and Resources

A qualitative assessment has been undertaken using publicly available information to establish the cumulative effects associated with the off-site treatment of solid waste that will be generated by the Construction and Operational phase of the Proposed Development and other developments (refer to Appendix 20.1 in Volume 4 of this EIAR) that will have simultaneous requirements for landfill and treatment capacity of any construction and demolition (C&D) waste generated during the construction timeframe.

20.3.1.12.1 Baseline Trends

The waste management baseline for the Connacht Ulster Waste Region (CUWR), established for the assessment using publicly available data from the Regional Waste Management Offices and the EPA, has been used as the baseline for the cumulative assessment. Tables 17.3, Table 17.4 and Table 17.5 in Section 17.3 of Chapter 17 (Waste & Resources) of this EIAR, set out permitted and licensed capacity and Article 27 notifications for 2024. This data has been used to establish a baseline for 2024. The available C&D waste and by-product capacity in CUWR for 2024 is approximately 1.93 million tonnes based on the following assumptions (see Table 20-2)

- Using the available capacity for permitted facilities for construction and demolition wastes;
- Including only licensed facilities accepting soil and stones; and
- Including all Article 27 notifications dated 2024 in the CUWR.

Table 20-2 C&D Waste Management Baseline for CUWR, 2024 (Permitted, Licensed and Article 27 Notifications)

C&D Waste Management Baseline for 2024	Capacity / Annual Intake (Tonnes)
Minimum Permitted capacity (Local Authority Waste Facility Register, 2024)	1,569,994
Licenced annual intake (soil and stone facilities) (EPA 2024b)	90,000
Article 27 (by-product) notifications (EPA 2024a)	270,612
Total	**1,930,606**

Therefore, the authorised C&D waste and by product tonnage in CUWR in 2024, and so the construction and operation waste baseline, is an estimated 1.93 million tonnes per annum.

20.3.1.12.2 Key Developments

A list of developments that have been considered in the cumulative effects assessment is provided in Appendix 20.1 in Volume 4 of this EIAR. Due to the nature of waste management in Ireland cumulative effects for waste have been considered on a regional basis. A short-list of proposed developments planned within the region, was also developed, including having regard to those projects set out in Project Ireland

2040 (Department of Public Expenditure and Reform 2018; Investment Projects and Programmes Office 2019). These projects were reviewed and screened base on the following criteria:

- Construction phases likely to overlap with the Proposed Development - where unknown, overlap is considered as worst case; and
- Similar project waste profile is expected to be generated i.e. demolition and excavation material, soil, stones, and bitumen containing material.

A list of regional developments that have been considered in the cumulative effects assessment is provided in Table 20-3:

Table 20-3 Regional Developments included in Cumulative Assessment

Project Name	Project Type	Anticipated Construction completion (year where known)	Waste type likely to be generated
BusConnects Galway Cross-City Link (ABP 314597)	A Public transport priority corridor, encompassing pedestrian crossings, upgraded footpaths public realm improvements, enhances cycle facilities and additional bus priority measures. The Scheme has an overall length of approximately 6.7km.	2027	Soil and stones; Bitumen containing material; and General C&D waste.
N6 Galway City Ring Road (ABP 318220 (old no.302848))	The proposed road development comprises 11.8km of motorway between the existing N6 at Coolagh (northeast of the city) to the existing Ballymoneen Road (northwest of the city) and then continues as a single carriageway road for a further 5.6km as far as the R336 Coast Road, west of Bearna.	2027	Soil and stones; Bitumen containing material; General C&D Waste.
N5 Ballaghaderreen to Scramoge (ABP 300493)	The project comprises a proposed road development of 33.4km which consists of a single carriageway road. There are an additional 13km of side road improvements, 17 at-grade T-junctions and 5 roundabouts to be provided as part of the scheme.	2024	Soil and stones; Bitumen containing material; General C&D Waste.
Ceannt Station Redevelopment	Redevelopment of Ceannt Station – works involve increase in platforms in the station from two to five, A new southern entrance and façade to Ceannt Station will be built, Infrastructure works including track and resignalling.	2025	Soil and stones; Bitumen containing material; General C&D Waste.
Lands to the rear of Ceannt Train Station, Galway (ABP 310568)	10-year permission - construction of mixed-use regeneration project including 376 no. apartments, retail units, cafe/restaurant/bar units, Hotel, office use, childcare facility, car parking and other services and associated site works.	2026	General C&D Waste
Galway Harbour Development	The project provides for a mixed-use urban quarter which will complement and support the dominant role of the city centre. The uses proposed are predominantly residential and office/ employment, with a range of ancillary	2024	Soil and stones; General C&D Waste.

Project Name	Project Type	Anticipated Construction completion (year where known)	Waste type likely to be generated
	supporting uses such as hotel, leisure, cultural, multi-purpose public spaces and local services.		
Galway to Athlone Cycleway	205km dedicated walking and cycle route starting near Ballyloughane Beach to the East of Galway City and then proceeds close to or through the following settlement areas: Oranmore, Rinville, Clarinbridge, Kilcolgan, Kinvara, Gort, Woodford, Portumna, Meelick, Clonfert, Ballinasloe, Shannonbridge, and Athlone Castle.	TBC	General C&D waste; Soil and Stone.
Atlantic Technological University Galway Old Dublin Road, (GCC 2460107)	Permission for development which will consist of a new 686sq meter, two-storey modular building, containing replacement classrooms and ancillary offices and all associated site works at the rear of the site adjacent to the existing gym building.	TBC	General C&D waste.
Uisce Eireann, Merlin Park Pumping Station (GCC 24/60226)	Permission for development which consists of a new 949m3 underground storage tank and all associated works. The underground storage tank will provide additional wastewater storage capacity to the Merlin Park pumping station. The application is for a 10-year planning permission.	TBC	Soil and stones; General C&D waste
Ballybane Road and Castlepark Road Cycle Network Scheme (GCC Pt. 8 LA3/2023)	To provide a segregated high quality cycle route along the R865 Ballybane Road and the L5029 Castlepark Road, Galway	2026	Soil and stones; Bitumen containing material; and General C&D waste.

The developments identified comprise a mixture of major infrastructure transport projects, commercial and residential developments. Each development would generate solid waste from construction and demolition and from operation for management within the regional areas. Waste will generally be generated over the period of construction for each development. Additionally, waste generation will vary over time as the nature of the projects are multi-year and are undertaken with a phase approach i.e., demolition, excavation, and construction.

20.3.1.12.3 Cumulative Construction Effects

Construction of projects within the region will produce C&D waste, a proportion of which will be sent for recycling, further treatment or disposal to landfill. In line with the waste hierarchy and relevant policy including the Waste Framework Directive 2008/98/EC and EPA (2023) National By-Product Criteria for Site-Won Asphalt (road plannings) BP-N001/2023, also applicable to the Proposed Development, it is anticipated that all these projects will seek to minimise disposal to landfill and manage waste in accordance with the waste hierarchy.

The Proposed Development, together with the developments listed in Appendix 20.2 in Volume 4 of this EIAR will add to the need for off-site capacity for recovery, recycling, treatment and disposal of waste to landfill. Many of the listed projects are in very early stages so documentation has not been published or associated planning documents submitted which would include waste generation estimates. However, it is anticipated that the proposed developments will give rise to similar types of wastes to the Proposed Development and that the quantities will vary depending on the type of project.

Opportunities are likely to continue to arise during the construction phase of other projects to provide C&D waste arising from the Proposed Development and surplus excavated material for use in other local construction projects thereby increasing diversion of such materials from landfill.

The regional waste management offices have published a Construction and Demolition- Update Report 2020 which states that (Regional Waste Management Offices 2020):

"In comparison to [the East Midlands and Southern] regions, the CUR had just 10% of the remaining national capacity at the end of 2018."

The Construction Phase of the Proposed Development is not predicted to give rise to significant adverse impacts and all the impacts will be short-term in duration. Considering therefore, the likely potential for waste generation from other projects, the opportunities to divert waste from off-site treatment and the amount of inert, non-hazardous and hazardous waste treatment capacity likely to be available in the region in the coming years over the time period for the delivery of the Proposed Development, it is considered that that there will be no likely significant effects as a result of the construction of the Proposed Development in combination with the projects in Table 20-3.

20.3.1.13 Material Assets

All proposed projects as detailed in Appendix A20.1 of Volume 4 of this EIAR were reviewed as part of the potential cumulative impact assessment related to utilities. The Material Assets assessment did not identify any potential for likely significant cumulative effects on services and utilities during the Construction Phase. No potential for overlap in utilities was identified, but these would be managed in accordance with utility provider requirements and would not result in significant cumulative effects. On this basis, no projects were shortlisted for further assessment.

Material quantities for the Proposed Development are considered insignificant and therefore no likely significant cumulative effects on material quantities are predicted as a result of the Proposed Development in combination with other projects

20.3.2 Operational Phase

20.3.2.1 Traffic and Transport

A detailed assessment of cumulative impacts on Traffic and Transport are set out in Appendix 6.1 (Transport Modelling Report) of this EIAR. Reference should be made to that appendix for details on the cumulative impacts. A summary of the findings is set out in this section of the EIAR.

In general, total trip demand (combining all transport modes) will increase into the future in line with projected population and employment growth.

The analysis indicates that with the Galway City Ring Road in place, (this scheme is currently back with An Bord Pleanála for further consideration), there will be a slight decrease in the number of bus passengers travelling through the corridor in both the Do Minimum and Do Something Design year (2043) scenarios (between 3% - 16% reduction compared to the core scenarios). This is the result of the Galway City Ring Road reducing traffic across the city, as traffic reroutes onto this scheme when it is in place. This results in a change in a number of metrics across the city, like the level of delay experienced across the city (reduces by approx. 25%) and the average speed for general traffic will increase (by between 20% - 50%), as a result of the reduction in traffic in the city, brought about by the Galway City Ring Road. All of these contribute towards a slight decrease in the number of bus passengers travelling through the Dublin Road corridor, as they transfer mode, to car.

20.3.2.2 Air Quality

The traffic data supplied for the Operational Phase assessment included data for cumulative development within the area. The traffic was reviewed, and a detailed air quality assessment of vehicle exhaust emissions was carried out as per Section 7.4.3 of Chapter 7 – Air Quality.

The local air quality assessment of these Operational Phase traffic emissions determined that the effect of the Proposed Development on nitrogen dioxide (NO_2) and particulate matter (as PM_{10} and $PM_{2.5}$) concentrations is direct, long term and neutral at all modelled receptors in both the Opening Year 2028 and the Design Year 2043, which is not significant in EIA terms.

The ecological impacts associated with the operational phase traffic emissions are overall direct, long-term, negative, and slight, which is not significant in EIA terms.

The regional impacts associated with the operational phase traffic emissions are considered overall direct, neutral and long-term, which is not significant in EIA terms.

20.3.2.3 Climate

With respect to the requirement for a cumulative assessment, Climate Guidance for National Roads, Light Rail, and Rural Cycleways (Offline & Greenways) - Overarching Technical Document PE-ENV-01104 (TII, 2022) states that *"Cumulative impact assessment in EIAR requires that the impact from a project is assessed cumulatively with other projects being brought forward in a defined geographical and temporal boundary. However, as the identified receptor for GHG Assessment is the global climate and impacts on the receptor from a project are not geographically constrained, the normal approach for cumulative assessment in EIA is not considered applicable"*.

However, by presenting the GHG impact of a project in the context of its alignment to Ireland's trajectory of net zero and any sectoral carbon budgets, this assessment will demonstrate the potential for the project to affect Ireland's ability to meet its national carbon reduction target. Therefore, the assessment approach is considered to be inherently cumulative. Additionally, the traffic data supplied for the operational phase assessment included data for cumulative development within the area. The traffic was reviewed, and a detailed air quality assessment of vehicle exhaust emissions was carried out as per Section 8.5.2.2 of Chapter 8 – Climate.

The cumulative effects are predicted to be direct, positive, long term and not significant, which is overall not significant in EIA terms.

20.3.2.4 Noise and Vibration

The traffic data supplied for the operational phase noise impact assessment included traffic flows in the Opening year (2028) assessment which includes the base traffic flow in addition to other committed schemes. The Design year (2043) traffic assessment is based in the context of the full implementation of the Galway Transport Strategy (GTS) network re-design (including the BusConnects Galway: Cross City Link and the N6 Galway City Ring Road) in both the Do Minimum and Do Something scenarios, with the Proposed Development servicing the new GTS services. In addition, the traffic model includes for forecasted increased travel demand from general development to capture projected traffic growth from reasonably foreseeable development across the city in both 2028 and 2043. The operational phase noise assessment therefore includes a full cumulative assessment of the scheme in combination with a range of planned and committed schemes.

The traffic was reviewed, and a detailed traffic noise assessment was carried out as per Section 9.4.3 of Chapter 9 of the EIAR. Highest impacts are determined to be indirect, negative, slight and short to long term along a small number of roads. These impacts are not significant in EIA terms. Lowest impacts are neutral, not significant and short to long term.

Overall, there are no significant noise impacts associated with the Operational Phase in combination with other schemes in the surrounding area.

20.3.2.5 Population

There is the prospect of significant long term positive cumulative effects from other proposed projects for which planning permission is being sought and which aim to provide connecting infrastructure for public transport or active travel. These applications are the Part 8 application for the Ballybane Road and Castlepark Road Cycle Network and BusConnects Cross City Link from University Road to Dublin Road, (LA3/2023 listed in Appendix A20.1 in Volume 4). The former will provide an opportunity for cyclists to connect directly to the network of the Proposed Development. The BusConnects application will allow passengers to connect directly or interchange between the two BusConnects schemes to reach destinations in the city centre and elsewhere in Galway City. These two schemes, together with the Proposed Development, will encourage greater uptake of active travel and public transport by providing a more connected network, noting also that public transport passengers will typically need to walk or cycle to reach bus stops. This will raise the practicality of both modal options and increase their appeal relative to private vehicle use.

Other planning applications reviewed have been required to comment on their contribution to active travel and several, such as the Part 8 application for Merlin Wood Social and Affordable Housing (LA1/2021 listed in Appendix A20.1 in Volume 4), include facilities to encourage active travel. Although there is no direct cumulative effect with these applications, there is an indirect effect in that these facilities will encourage active travel which, in turn, is made more practical by the infrastructure included in the Proposed Development.

20.3.2.6 Human Health

Cumulative effects on Human Health due to the operation of the Proposed Development when considered together with effects arising from other plans and projects (see Appendix A20.1 in Volume 4) are dealt with in relation to the factors under which human health effects might occur, particularly Traffic and Transport, Noise and Vibration and Landscape. The Human Health assessment identified 9 other projects with potential for likely significant positive cumulative effects with the Proposed Development and took these into the assessment Stages 3 and 4 (see Appendix A20.2 in Volume 4 of this EIAR).

Assuming all other schemes identified above would become operational it is considered likely that this would encourage greater uptake of sustainable transport options among the population surrounding the Proposed Development by offering a choice of efficient public transport journeys and active travel opportunities. This would be beneficial to health by improving wellbeing from greater journey reliability, access to services (including health services) for those without a car and supporting greater physical activity as a part of an active travel journey or overall journey via public transport. The implementation of the above projects and the Proposed Development will facilitate a step change in modal shift, reducing reliance on car travel. In the medium to long term this should help environmental improvement such as reduced air pollutants, improved urban realm and better use of social space. Due to the substantial size of overall population with the opportunity to benefit from the proposals, the cumulative effect is assessed as Positive, Very Significant and Long-term for health.

20.3.2.7 Biodiversity

The potential for cumulative impacts on biodiversity from the operational phase of the proposed development to arise are limited to those residual impacts associated with the Proposed Development and those effects the Proposed Development, along with any other projects, will have on the receiving environment that are measurable in some way, but themselves will not result in a likely significant residual effect on biodiversity.

In general, impacts on biodiversity arising from the Operational Phase of the Proposed Development are related to:

- Habitat loss;
- Surface water run-off and contamination;
- Invasive species spread; and
- Disturbance and displacement.

In relation to residual impacts, all residual operational phase impacts were assessed as being Not Significant, with the exception of impacts on Designated Sites, which were assessed as being Imperceptible.

This section of the EIAR was prepared with consideration of the policies and objectives of the Galway City Development Plan (2023-2029) in relation to Biodiversity. The Galway City Development Plan in complying with the requirements of the Habitats Directive[3], Wildlife Act[4] and Planning & Development Act[5] requires that all Projects and Plans, listed in Appendix A20.1 in Volume 4, that could affect biodiversity in the same potential Zone of Influence of the Proposed Development site would be assessed on a case-by-case basis that appropriate employable mitigation measures would be put in place to avoid, reduce or ameliorate negative effects.

The Projects and Plans included in Appendix A20.1 in Volume 4 of this EIAR would be unlikely to have significant in-combination effects with the Proposed Development. Due to the operational works required as part of the Proposed Development, it is assessed that permanent and temporary impacts from habitat loss and invasive species will be limited to a ZoI in the immediate vicinity of the Proposed Development. Considering the existing land use of these areas, which consist of existing roads, pedestrian pathways, and cycleways, with residential, commercial, or industrial zoning in this urbanised area, listed Projects and Plans are not likely to result in a significant effect on biodiversity.

There are no predicted in-combination effects relating to surface water run-off and contamination, given that the listed developments have or are proposed to have connection to the existing public sewer network for the treatment of surface water and wastewater. Listed developments also include for site-specific surface water treatment prior to discharge, where appropriate. The listed developments are not expected to result in a significant cumulative impact on disturbance or displacement, given the existing land use and urban nature of the area, and the limited ZoI for disturbance and displacement impacts for the Proposed Development.

The listed developments have also been subject to Appropriate Assessments, NIS's and Biodiversity assessments where appropriate, and measures included to reduce the potential for integrity level impacts on the Natura 2000 network, and negative impacts on biodiversity for the ZoIs concerned. The developments cannot have received planning permission without having met the consenting authority requirement in this regard.

Given the inclusion of measures to reduce or minimise effects on biodiversity detailed in Chapter 12 (Biodiversity), there is no potential for significant in-combination effects to occur. There are no predicted cumulative operational phase effects given that it is predicted that the Proposed Development alone will have no significant effects on biodiversity. In this way, in-combination impacts with completed developments, consented and proposed developments, plans and projects for the study area and surrounding area in which the development site is located, would be avoided.

20.3.2.8 Water

The Water assessment predicted that given the mitigation measures set out in the Surface Water Management Plan (SWMP) for the Proposed Development and the use of Sustainable Drainage Systems

[3] EU Habitats Directive 92/43/EEC, European Communities (Natural Habitats) Regulations 1997, European Communities (Birds and Natural Habitats) Regulations 2011

[4] The Wildlife Act (1976) and amendments

[5] Planning and Development Act 2000, as amended

(SuDS), the cumulative impacts of the Proposed Development in combination with the other projects and plans and Proposed Development on water during the Operational Phase would be not significant.

20.3.2.9 Lands, Soils, Geology and Hydrogeology

The residual impacts on Land, Soils, Geology and Hydrogeology due to the Proposed Development are expected to be of negligible magnitude and imperceptible significance as a result of the Operational Phase of the Proposed Development.

From a land, soils, geology and hydrogeology perspective, several proposed projects will result in a not significant decrease in recharge to the aquifer. Considering the size of the projects, and the existing land use and urban nature of the area, the cumulative loss is considered small on a local scale.

The interaction between the N6 Galway City Ring Road and the Proposed Development is minimal and the cumulative impact is not considered significant.

As such, there are no likely significant direct or indirect cumulative impacts in combination with other proposed projects predicted on land, soils, geology, and hydrogeology in the Operational Phase.

20.3.2.10 Cultural Heritage

All permitted and proposed projects as detailed in Appendix 20.1 of Volume 4 of this EIAR were reviewed as part of the potential cumulative impact assessment.

Given the scheme of this Proposed Development and its location within an urban development, and when assessed in a cumulative context with regard to other developments, there is an identified cumulative effect in relation to direct overall impact on the Cultural Heritage resource.

Projects in the general area have applied a range of cultural heritage mitigation measures (where applicable, at operational stage), which will allow for the preservation either in-situ of any archaeological or built heritage remains that may have been identified. Similarly, the Proposed Development has avoided, reduced, and/or offset identified impacts at operational stage.

Although a cumulative measurement of a range of Cultural Heritage receptor impacts is acknowledged, none have been identified as of such magnitude, that when considered in tandem with the Proposed Development, result in an overall significant cumulative effect on the resource. As such, the cumulative impact at operational stage is considered Not Significant.

20.3.2.11 Landscape and Visual

No likely significant cumulative effects on landscape and visual amenity have been identified.

The removal of trees and relocation of stone walls as part of the Proposed Development, combined with the development considered in the cumulative impact assessment are expected to result in reversible, short-term, moderate to slight, negative effects to residential receptors and users of the footpaths, cycleways and carriageway situated adjacent to the Proposed Development. The objectives of Galway City Biodiversity Action Plan 2014-2024 and the Galway City Biodiversity Draft Action Plan 2024-2030 will be negatively impacted by the removal of trees, but the proposed tree planting is expected to reduce this impact. The selection of species to be more in line with the All-Ireland Pollinator Project is expected to have a potential positive impact in the long term. Other potential cumulative impacts arising from the Proposed Development are not expected to be significant. Potential impacts of lower significance are also expected to be further reduced over time due to the proposed replacement tree and hedgerow planting. The long-term effect will be temporary slight to permanent, imperceptible to neutral once the proposed replacement tree planting reaches full growth.

20.3.2.12 Waste and Resources

The predominant source of Operational Phase waste from the Proposed Development may arise as a result of carriageway maintenance which will be undertaken at regular intervals, or as necessary. This will primarily

consist of bitumen containing material due to maintenance of carriageway pavement. The predicted impact of operational construction and demolition waste will be slight negative, not significant and long-term. It is therefore considered that the Operational Phase waste arising from the Proposed Development considered on combination with the types of waste arising from other developments will not give rise to likely significant cumulative effects.

20.3.2.13 Material Assets

No likely significant cumulative effects were identified for Material Assets for the Operational Phase.

20.4 Environmental Interactions

Table 20-4 sets out a matrix to indicate where interactions between different effects on different environmental factors have been addressed. This is in line with the approach set out in the EIAR Guidelines (EPA 2022). These interactions are described briefly in Table 20-4.

Table 20-4 Environmental Interaction

Typical Inter-Relationship Matrix – Environmental Elements	Population		Human Health		Biodiversity		Land & Soils		Water		Air Quality		Climate		Noise & Vibration		Waste		Landscape & Visual		Cultural Heritage		Material Assets		Traffic & Transport		Major Accident & Disasters	
	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.
Population																												
Human Health	✓	✓																										
Biodiversity																												
Land & Soils					✓																							
Water			✓		✓	✓	✓	✓																				
Air Quality	✓	✓	✓	✓	✓	✓																						
Climate																												
Noise & Vibration	✓	✓	✓	✓	✓	✓																						
Waste					✓		✓						✓	✓														
Landscape & Visual	✓	✓			✓	✓	✓																					
Cultural Heritage							✓								✓				✓									
Material Assets			✓				✓													✓								
Traffic & Transport	✓	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓	✓	✓												
Major Accidents & Disasters	✓	✓	✓	✓	✓		✓		✓	✓			✓	✓					✓				✓		✓	✓		

Notes: This matrix should be read down, starting with each topic identified across the top. ✓ = significant interaction between. Blank cells indicate no or weak interaction. Con. = Construction phase. Op. = Operational phase

20.4.1 Interactions between Population and Human Health

The topics of 'Population' and 'Human Health' are inextricably linked. Chapter 10 (Population) of this EIAR has focused on how the Proposed Development could have impacts on communities and the local economy (commercial businesses). As outlined in the methodology in Chapter 11 (Human Health), the social conditions, community networks and economic conditions within which people live are considered wider determinants of health and have an important influence on human health.

20.4.1.1 Construction Phase

The Population assessment has identified areas of community, individual and commercial land-take, some of which would be permanent. The impacts would be felt at a local, individual level rather than widespread community level. It is considered that the impacts would be strongly linked with impacts on amenity and general disruption from construction activities. Similarly, both the Population and Human Health assessments identify that accessibility may be temporarily disrupted for pedestrians and cyclists during construction, with requirements for lane closure and localised diversions. However, access to businesses and properties will be maintained at all times. Health outcomes associated with these construction impacts are likely to be psychosocial, such as stress and anxiety. Where footpaths or cycle tracks are affected by construction, a safe route will be provided past the work area, and where practicable, provisions for matching existing facilities for pedestrians and cyclists will be made. This will limit the likelihood of adverse psychosocial responses.

20.4.1.2 Operational Phase

The Population and Human Health assessments identify positive impacts on accessibility. While the Population assessment looks at this this in relation to community and commercial receptors, the Human Health assessment considers the health outcomes which may be associated with this improved accessibility. This could include improved and more equitable access to health, education and other services. This is also a social impact, improving the wider determinant of health in relation to transport and opportunities to access services. Health outcomes including persons with disabilities and senior citizens may also be associated with improved physical fitness arising from increased active travel linked to the proposed improvements to walking and cycling infrastructure and improved social interactions.

20.4.2 Interactions between Population and Air Quality, Noise and Vibration and Landscape and Visual

Chapter 10 (Population) of this EIAR assesses impacts on amenity, which involves an assessment of the interactions between Landscape & Visual, Air Quality, Noise and Vibration. It addresses environmental interactions during both the Construction and Operational Phases. Reference should be made to Chapter 10 (Population) of this EIA for the assessments on commercial and community facilities. Visual impacts and landscape impacts on properties have been assessed in Chapter 16 (Landscape& Visual) of this EIAR.

20.4.3 Interactions between Human Health, Land, Soils, Geology & Hydrogeology, Water, Air Quality and Noise &Vibration

The quality of the environment, including exposure to pollution and environmental hazards, is an important consideration in health protection. The Human Health assessment reported in Chapter 11 of this EIAR has considered the interaction of these environmental factors on human health. Chapter 11 (Human Health) has assessed the interaction between Air Quality (Chapter 7) and Noise and Vibration (Chapter 8) of this EIAR. Reference should be made to Chapter 11 (Human Health) for an assessment of potential health outcomes linked with these issues during the Construction and Operational Phases.

Chapter 13 (Water) of this EIAR assesses a variety of potential impacts on water including impacts on water quality and impacts on flood risk, both of which have an interaction with human health.

Chapter 14 (Land, Soils, Geology & Hydrogeology) of this EIAR assesses the potential for the excavation of contaminated ground, which can pose an environmental health hazard.

20.4.4 Interactions between Human Health and Landscape and Visual

The assessment of Human Health (Chapter 11) has an indirect interaction between Landscape and Visual (Chapter 16) via the assessment of amenity in Chapter 10 (Population) of this EIAR.

20.4.5 Interactions between Human Health and Material Assets

Material assets are resources of both natural and human origin that have intrinsic value. Chapter 18 (Material Assets) provides an assessment of impacts on major infrastructure and utilities and imported materials. Chapter 18 notes that other types of material assets are assessed in other chapters of the EIAR, for example, roads and traffic are assessed in Chapter 6 (Traffic & Transport).

20.4.5.1 Construction Phase

During construction the Material Assets assessment identified Negative, Moderate, Temporary impacts of disruption to water supplies, electricity, gas and telecommunications, due diversions which may be required for the proposed works. There is an interaction with Human Health as these disruptions could affect the essential services needed to support healthy lives (i.e. fresh water, sanitation, energy and communication). In the case of the Proposed Development, it is not considered that any of these disruptions would be of a duration to affect health at a population level. The most likely health effects are transient psychosocial impacts such as annoyance and frustration, which are unlikely to result in any change of overall health status.

20.4.5.2 Operational Phase

No significant Operational Phase impacts on material assets were identified and therefore there is no likely interaction between material assets and Human Health during the Operational Phase.

20.4.6 Interactions between Traffic & Transport and Material Assets

Chapter 18 (Material Assets) of this EIAR provides an assessment of impacts on major infrastructure and utilities. The chapter notes that other types of material assets are assessed in other chapters of the EIAR, for example, roads and traffic are assessed in Chapter 6 (Traffic & Transport).

20.4.7 Interactions between Population, Human Health, Air Quality, Noise and Vibration and, Traffic and Transport

There is significant interaction between these topics. The Traffic and Transport assessment has informed the assessments of population, human health, air quality, and noise and vibration. The Population assessment has considered effects on accessibility which directly interacts with traffic and transport. The Population assessment has also assessed effects on amenity which relate to traffic emissions of air pollution and noise, which indirectly interact with traffic and transport. The Human Health assessment has considered the evidence of associations with health outcomes from exposure to air pollution, traffic noise as well as changes to wider determinants of health such as traffic and transport, and access. It is considered that the key interactions for both Construction and Operational Phases, are captured across Chapter 6 (Traffic & Transport), Chapter 7 (Air Quality), Chapter 9 (Noise & Vibration), Chapter 10 (Population) and Chapter 11 (Human Health).

20.4.8 Interactions between Biodiversity, Traffic and Transport, Land, Soils, Geology and Hydrogeology; Water; and Air Quality; Noise and Vibration and, Landscape (Townscape) & Visual

The biodiversity assessment has considered how species, habitats and various other environmental issues interact. For example, traffic and transport can increase the risk of species mortality. Water and air quality can also affect biodiversity, as poor surface water quality and air pollution can degrade habitats. Invasive non-native plants can spread through soil and further harm habitats present, negatively affecting biodiversity. During the Construction Phase, some trees and vegetation will be removed, as detailed in Chapter 16 (Landscape and Visual). This can have negative effects on habitats and species that utilise

these habitats within the study area. However, the Chapter 16 (Landscape and Visual) also includes for planting of new trees and vegetation, including a buffer zone, which will likely enhance biodiversity over time and result in a better separation from the existing road. Although it will take time for trees and other planted vegetation to mature to full ecological value, no significant or medium-term impacts on biodiversity are expected from the changes in landscape and visual factors. Chapter 12 (Biodiversity) explains how the Proposed Development's effects on traffic, water, soil, air quality, noise and landscape interact with biodiversity. Reference should be made to Chapter 12 (Biodiversity) to understand those interactions.

20.4.9 Interactions between Land, Soils, Geology and Hydrogeology and Water

The Land, Soils, Geology and Hydrogeology (Chapter 14) and Water (Chapter 13) are closely linked, primarily through the relationship between groundwater and surface water. Chapter 14 assesses potential impacts on the aquifers, both in terms of recharge and potential contamination.

20.4.9.1 Construction Phase

During the Construction Phase, there is increased risk of fine particle run off into surface water features due to erosion of stockpiles. However, due to the limited earthworks to be completed, it is anticipated that this impact shall be of negligible magnitude and imperceptible significance.

20.4.9.2 Operational Phase

During the operational phase, there is potential for increased runoff to surface water bodies, due to increased hardstanding and/or soil compaction. Increased hardstanding further increases the potential for run off of contaminants from accidental spills to enter the water courses.

It is considered that the interactions between Land, Soils, Geology and Hydrogeology and Water are captured within Chapter 14 (Land, Soils, Geology & Hydrogeology) and Chapter 13 (Water) respectively, since they are intrinsic to the assessments.

20.4.10 Interactions between Land, Soils, Geology & Hydrogeology, Waste & Resources and Material Assets

There is an interaction between Chapter 14 (Land, Soils, Geology & Hydrogeology), Chapter 17 (Waste and Resources) and Chapter 18 (Material Assets). These potential impacts are primarily associated with the loss of topsoil, importation of fill, and handling, storage or disposal of surplus or unsuitable soil. One of the main reasons for undertaking any excavation of soils as part of the Proposed Development is to allow for utility diversions. The need for utility diversions is assessed in Chapter 19 (Material Assets). It is considered that these interactions are captured within the relevant chapters, since they are intrinsic to the assessments.

20.4.11 Interactions between Land, Soils, Geology & Hydrogeology, and Landscape & Visual

Where earthworks are undertaken, there shall be an interaction between Land, Soils, Geology & Hydrogeology (Chapter 14), and Landscape & Visual (Chapter 16). Chapter 16 has considered the impact of construction machinery on the Proposed Site, and only very limited earthworks are anticipated. As such, it is considered that the significance of the impact from the interaction is not significant.

20.4.12 Interactions between Land, Soils, Geology and Hydrogeology; and Traffic and Transport

Chapter 14 (Land, Soils, Geology & Hydrogeology) identifies the potential for accidental spills or small amounts of contaminants from vehicles to result in contamination of the aquifer and surrounding environment. Traffic and Transport are one of the most likely potential sources of such pollution during the Operational Phase of the Proposed Development. While there is an interaction, this same interaction exists in the Do-Nothing scenario and so the significance of the impact is imperceptible.

20.4.13 Interactions between Water and Traffic & Transport

Chapter 13 (Water) identifies the potential impact from the interaction between traffic and transport and the water environment. It refers to traffic modelling described in Chapter 6 (Traffic & Transport) to inform the likelihood of a significant impact on pollutants and sediment from road surface run-off. Chapter 6 identifies that all changes in traffic flows would occur within the same drainage catchments and so there would be no significant impacts from this interaction.

20.4.14 Interactions between Climate, Air Quality, Material Assets, Waste & Resources and Traffic & Transport

Chapter 8 (Climate) provides an assessment of the effects of the Proposed Development on GHG emissions.

20.4.14.1 Construction Phase

There is an interaction between climate, waste, and material assets as the amount of material to be imported, and waste generated during construction of the Proposed Development, influences the embodied carbon footprint of the Proposed Development, which is assessed in Chapter 8 (Climate). The redistribution of traffic associated with the traffic management during construction, will also generate GHG emissions, which have informed the assessment in Chapter 8 (Climate).

20.4.14.2 Operational Phase

Operational Phase traffic is intrinsic to the assessment of climate impacts reported in Chapter 8 (Climate). This interaction is therefore captured within that chapter.

20.4.15 Interactions between Climate and Water

The impact of climate change is considered in the Flood Risk Assessment (Appendix A13.2 in Volume 4 of this EIAR), which is summarised in Chapter 13 (Water) and Chapter 8 (Climate). The interaction between climate change and flood risk is therefore captured in these assessments.

20.4.16 Interactions with Landscape and Visual

As an environmental factor landscape and visual considerations have natural relationships with all other environmental factors. Some are clearly direct relationships, e.g., population and visual impacts; biodiversity and landscape; land, soils, water, and landscape; or the setting around features of cultural heritage etc. Others may be indirect, e.g. human health, air quality, material assets and landscape and visual aspects. Wherever possible these potential interactions have been incorporated into the landscape and visual impact assessment presented in Chapter 16 (Landscape and Visual.

20.4.17 Interactions between Landscape and Visual and Cultural Heritage

Cultural heritage has an influence on the quality of townscape visual amenity and therefore there is an interaction between these topics. Cultural heritage includes tangible heritage such as archaeology, architectural heritage, settlements, buildings and structures, designed landscapes, in addition to placenames and intangible heritage such as folklore, traditions and traditional practices. These issues are therefore interrelated.

Visual impacts and landscape impacts on features / properties of cultural heritage value have been assessed in this landscape and visual chapter. The Construction Phase will have impacts on a number of local features of heritage value and the impacts on these features are set out in in Chapter 16 (Landscape & Visual). The main impacts on cultural heritage would take place during the Construction Phase. Relevant interactions are captured in Chapter 15 (Cultural Heritage).

20.4.18 Major Accidents and Natural Disasters

Chapter 19 (Major Accidents and Natural Disasters) considers several potential interactions. For example, it assesses the risk of impacts on or from utilities (interacting with Chapter 18 (Material Assets)) such as a gas mains strike. It assesses the risk of tree instability, which has an interaction between Chapter 16 (Landscape & Visual), and it assesses the risk of spreading invasive species which is interrelated with Chapter 12 (Biodiversity) and Chapter 14 (Land, Soils, Geology & Hydrogeology). Also related to Chapter14 (Land, Soils, Geology & Hydrogeology) is the risk of encountering contaminated ground or materials. Chapter 19 (Major Accidents and Natural Disasters) assesses the risk of extreme weather events, which are linked to Chapter 8 (Climate) and flood risk Chapter 13 (Water) and Appendix A13.1 in Volume 4 of this EIAR. The risk of a major road traffic event due to construction traffic is also assessed in Chapter 19 (Major Accidents and Natural Disasters) which is an issue interrelated with Chapter 6 (Traffic and Transport) as well as Chapter 11 (Human Health). Since all identified risks have the potential to harm human health, the assessment in Chapter 19 (Major Accidents and Natural Disasters) is strongly interrelated with population Chapter 10 (Population).

20.5 Mitigation

Where any potential interactive negative impacts have been identified in the above, a full suite of appropriate mitigation measures has already been included in the relevant sections (Chapters 7 – 19) of this EIAR. The implementation of these mitigation measures will reduce or remove the potential for these effects. Information on potential residual impacts and the significance of effects, is also presented in each relevant chapter. Construction Phase

Appropriate construction planning of the Proposed Development, as detailed in Chapter 5 (Construction), and other nearby projects will mitigate potential cumulative impacts of general construction disruption on neighbouring communities.

Other major infrastructure projects could directly interface with the construction of the Proposed Development. Interface liaison will take place on a case-by-case basis through GCC, as will be set out in the Construction Contract, to ensure that there is coordination between projects, that construction access locations remain unobstructed by the Proposed Development works and that any additional construction traffic mitigation measures required to deal with cumulative impacts are managed appropriately.

Appropriate construction planning and phasing of programmes of the Proposed Development and other nearby projects was identified as mitigation for the Human Health assessment which identified potential cumulative impacts of general construction disruption on neighbouring communities.

20.5.1 Operational Phase

No significant negative effects over and above those considered in the standalone assessments for the Operational Phase were predicted in the cumulative impact assessment. No additional mitigation measures are considered necessary.

20.6 Summary of Residual Cumulative Effects and Environmental Interactions

This chapter has identified and assessed the likely significant cumulative effects caused by the Proposed Development in combination with other existing and planned projects and plans. This section provides a summary of the main residual cumulative effects predicted.

The results of the traffic modelling showed that with the N6 Galway City Ring Road scheme in place at the same time as the Proposed Development, there would result to a reduction in traffic within the city, and thus would have a slight impact on the effect of the Dublin Road Development as a result by lessening the impact of the Dublin Road Development. While no significant residual effects at operational stage are anticipated.

The Population assessment identified three other projects, BusConnects Galway Cross-City Link, Ballybane Road and Castlepark Road Cycle Network and Dublin Road Lawn Cemetery, when considered in combination with the Proposed Development, were deemed to have potential for Positive Significant cumulative effects during the Operational Phase.

The Human Health assessment identified nine other projects, in combination with the Proposed Development, that were deemed to have potential for Positive Significant cumulative effects during the Operational Phase.

Significant environmental interactions occur between the topics of population, human health, air quality, noise and vibration and traffic and transport. The assessments made for each of those topics consider those interactions both directly and indirectly. As an environmental factor, landscape and visual considerations have natural relationships with all other environmental factors. Some are direct relationships, e.g., population and visual impacts; biodiversity and landscape; land, soils and water and landscape; or the setting around features of cultural heritage etc. Others may be indirect, e.g. human health, air quality and landscape, material assets and landscape and visual aspects. Wherever possible these potential interactions have been incorporated into the relevant assessments.

In brief, the Proposed Development will provide for considerable journey time reliability for existing bus services coming into and running through the Galway City while also cumulatively complementing the proposed new BusConnects Galway: Cross-City Link scheme and the City bus network cross-city spine routes proposed as part of the Galway Transport Strategy (GTS, 2016). The bus network routes will be designed to coalesce along this high-quality corridor, providing high-frequency services with journey time reliability and opportunities for interchange. This in turn will support the potential to increase the bus network capacity of services operating along the corridor and thereby further increasing the attractiveness of public transport. In addition to this, the significant segregation and safety improvements to walking and cycling infrastructure that is a key feature of the Proposed Development will further maximise the movement of people travelling sustainably along the corridor and will therefore cater for higher levels of future population and employment growth.

20.7 References

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