



Chapter 19
Material Assets

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19. Material Assets

19.1 Introduction

This Chapter of the Environmental Impact Assessment Report (EIAR) has considered the potential impacts on material assets associated with the Construction and Operational Phases of the Ringsend to City Centre Core Bus Corridor Scheme (hereafter referred to as the Proposed Scheme).

The design of the Proposed Scheme has been developed to a stage where all potential environmental impacts can be identified, and a fully informed environmental impact assessment can be carried out. It is likely that the Proposed Scheme will be constructed by a contractor appointed under a Design and Build form of Contract. The contractor engaged will be responsible for finalising the design of the Proposed Scheme in compliance with the Employer's Requirements, including compliance with the requirements of the EIAR and Natura Impact Statement (NIS) (including all mitigation measures) and any development consent conditions. Minor modifications may be made to the current design at the detailed design stage to avail of opportunities to improve the design in the light of experience on the ground or other innovations. Any such minor modifications, however, will not give rise to any impacts which are more significant than those already identified and assessed in this EIAR.

During the Construction Phase, the potential impacts on material assets arising from the Proposed Scheme have been assessed, including potential impacts on utilities and potential impacts arising from the importation of construction materials, which result from construction activities such as utility diversions, road resurfacing and road realignments.

During the Operational Phase, the potential impacts on material assets associated with changes in utility demand from new infrastructure associated with the Proposed Scheme have been assessed. The assessment has been carried out according to best practice and guidelines relating to material asset assessment, as outlined in Section 19.4.4.

The aim of the Proposed Scheme, when in operation, is to provide enhanced walking, cycling and bus infrastructure on this key access corridor in the Dublin region, which will enable and deliver efficient, safe, and integrated sustainable transport movement along the corridor. The objectives of the Proposed Scheme are described in Chapter 1 (Introduction). The Proposed Scheme which is described in Chapter 4 (Proposed Scheme Description) has been designed to meet these objectives.

The design of the Proposed Scheme has evolved through comprehensive design iteration, with particular emphasis on minimising the potential for environmental impacts, where practicable, whilst ensuring the objectives of the Proposed Scheme are attained. In addition, feedback received from the comprehensive consultation programme undertaken throughout the option selection and design development process have been incorporated, where appropriate.

19.2 Methodology

Material assets are resources of both natural and human origin that have intrinsic value. The Environmental Protection Agency (EPA) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as the EPA Guidelines) (EPA 2022) discuss material assets as follows:

'In Directive 2011/92/EU this factor included architectural and archaeological heritage. Directive 2014/52/EU includes those heritage aspects as components of cultural heritage. Material assets can now be taken to mean built services and infrastructure. Traffic is included because in effect traffic consumes transport infrastructure. Sealing of agricultural land and effects on mining or quarrying potential come under the factors of land and soils.'

The EPA Guidelines specifically list built services, roads and traffic, and waste management as topics which fall into the category of material assets. Further to this, the Environmental Impact Assessment of Projects – Guidance on the Preparation of the Environmental Impact Assessment Report (European Commission 2017) references buildings, other structures, mineral resources, and water resources as material assets. The Proposed Scheme

will not have any impacts on buildings and other structures. This EIAR includes separate chapters covering a number of those listed material assets and other material assets, as follows:

- Roads and traffic - Chapter 6 (Traffic & Transport);
- Employment and land use assets (including property impacts) - Chapter 10 (Population);
- Ecological assets - Chapter 12 (Biodiversity);
- Waterways, rivers and streams - Chapter 13 (Water);
- Soils, lands, and mining or quarrying potential - Chapter 14 (Land, Soils, Geology & Hydrogeology);
- Cultural heritage assets - Chapter 15 (Archaeological & Cultural Heritage) and Chapter 16 (Architectural Heritage);
- Visual amenity assets - Chapter 17 (Landscape (Townscape) & Visual); and
- Waste management - Chapter 18 (Waste & Resources).

The focus of this Chapter is on built services, specifically:

- Major infrastructure and utilities; and
- Imported material, excluding the materials which will be covered in Chapter 18 (Waste & Resources).

Major infrastructure includes items such as canals, railway lines and Luas lines interacting with the Proposed Scheme. Existing utility information has been collated from the utility service providers and utility (ground penetrating radar (GPR)) surveys have been carried out, as required. In addition, as part of the design development, the diversions and changes required to existing utilities infrastructure have been considered.

Conservative estimates have been prepared of the quantities of materials that may be needed for construction to inform the impact assessment of the Proposed Scheme. For the purpose of this Chapter, imported materials includes materials which are sourced from outside the Proposed Scheme, namely the major construction materials (concrete granular fill / aggregate, asphalt, and structural steel). The impacts associated with the transportation of the material to the site have been considered within the assessments of construction traffic in Chapter 6 (Traffic & Transport), Chapter 7 (Air Quality) and Chapter 9 (Noise & Vibration).

19.2.1 Study Area

The study area with regard to major infrastructure and utilities comprises all areas within the Proposed Scheme, including both permanent and temporary land take boundaries.

19.2.2 Relevant Guidelines, Policy and Legislation

This Chapter has been prepared in accordance with the following guidance:

- EPA Guidelines (EPA 2022);
- Environmental Impact Assessment of Projects – Guidance on the Preparation of the Environmental Impact Assessment Report (European Commission 2017); and
- Institute of Environmental Management and Assessment (IEMA) Guide to: Materials and Waste in Environmental Impact Assessment - Guidance for a Proportionate Approach (hereafter referred to as the IEMA Guidance) (IEMA 2020).

19.2.3 Data Collection and Collation

All major infrastructure and utilities which may be impacted by the Proposed Scheme have been assessed including:

- Bridges over the River Liffey;
- The Royal Canal;
- George's Dock;
- Grand Canal Dock;
- District Heating;

- Electricity;
- Water / Wastewater;
- Surface Water Drainage;
- Gas; and
- Telecommunications.

Existing utility information was requested from utility companies and service providers. The following service providers provided utility information for the study area of the Proposed Scheme:

- Dublin City Council (DCC);
- Electricity Supply Board (ESB) Networks / EirGrid;
- Gas Networks Ireland (GNI);
- Irish Water; and
- Telecommunications providers.

The types and quantities of the major materials which will need to be imported for the construction of the Proposed Scheme have also been established.

19.2.4 Appraisal Method for the Assessment of Impacts

The assessment of the potential impact of the Proposed Scheme on material assets has been undertaken having regard to the EPA Guidelines (EPA 2022). The following issues have been considered as part of the assessment of impacts:

- Potential for impacts on major infrastructure and public utilities and the need to adequately protect them during the Construction Phase;
- Requirement for connections to public utilities by the Proposed Scheme during both the Construction and Operational Phases; and
- Use of imported materials required for the construction of the Proposed Scheme.

Each impact has been categorised based on:

- Quality of the impact;
- Significance of the impact; and
- Duration of the impact.

The definition of these impact characteristics, as per the EPA Guidelines is provided in Table 1.4 in Chapter 1 (Introduction). These characteristics have been used to assess the quality and duration of all impacts.

Table 19.1 provides the significance criteria used to identify the significance of impacts on major infrastructure and utilities. For the purposes of assessing the impacts on major infrastructure and utilities, an impact is deemed to be not significant from a rating of Imperceptible to Moderate, and significant from Significant to Profound.

Table 19.1: Significance Criteria for Major Infrastructure and Utilities

Significance Level	Criteria
Profound	Where there is a continuous utility interruption of more than a week; Where additional demand on a utility would consume all remaining capacity; or Where there is a permanent disruption* of a major piece of infrastructure.
Very Significant	Where there is a continuous utility interruption of more than 48 hours; Where additional demand on a utility would significantly reduce the available capacity of that utility; or Where there is long-term disruption* of a major piece of infrastructure.
Significant	Where there is a continuous utility interruption of more than 24 hours; Where there is significant additional demand on a utility; or Where there is a medium-term disruption* of a major piece of infrastructure.
Moderate	Where there are discrete utility interruption of no more than eight hours for up to seven consecutive days; Where the additional demand on a utility is relatively large; or

Significance Level	Criteria
	Where there is a short-term disruption* of a major piece of infrastructure.
Slight	Where there are discrete utility interruption of no more than eight hours for up to three days; Where additional demand on a utility is relatively small; or Where there is a temporary disruption* of a major piece of infrastructure.
Not Significant	Where there is a utility interruption of no more than eight hours on a single day; Where additional demand on a utility is quantifiable but is too small to have any impact on capacity; or Where there is a brief disruption* of a major piece of infrastructure.
Imperceptible	Where there is no utility interruption during diversion works; Where additional demand on a utility has no material change; or Where there are minor changes on a major piece of infrastructure which has no material impact on its usability.

*Disruption with respect to major infrastructure refers to the closure or significant reduction in usability of the infrastructure.

For the significance of the impacts associated with imported materials, in addition to the EPA Guidelines (EPA 2022), the IEMA Guidance (IEMA 2020) has been used. For materials, the sensitivity of the receptor (Table 19.2) and the magnitude of the impact (Table 19.3) are assigned and used to determine the significance of the impact (Table 19.4).

Table 19.2: Sensitivity Criteria for Materials (IEMA 2020)

Value	Description
	On balance, the key materials required for construction of a development ...
Very High	Are known to be insufficient in terms of production, supply and/or stock; and/or Comprise no sustainable features and benefits compared to industry-standard materials*.
High	Are forecast (through trend analysis and other information) to suffer from known issues regarding supply and stock; and/or Comprise little or no sustainable features and benefits compared to industry-standard materials*.
Medium	Are forecast (through trend analysis and other information) to suffer from some potential issues regarding supply and stock; and/or Are available comprising some sustainable features and benefits compared to industry-standard materials*.
Low	Are forecast (through trend analysis and other information) to be generally free from known issues regarding supply and stock; and/or Are available comprising a high proportion of sustainable features and benefits compared to industry-standard materials*.
Negligible	Are forecast (through trend analysis and other information) to be free from known issues regarding supply and stock; and/or Are available comprising a very high proportion of sustainable features and benefits compared to industry-standard materials.*

*Subject to supporting evidence, sustainable features and benefits could include, for example, materials or products that: comprise reused, secondary or recycled content (including excavated and other arisings); support the drive to a circular economy; or in some other way reduce lifetime environmental impacts.

Table 19.3: Assessing Magnitude for Materials (IEMA 2020)

Value	Description
	The assessment is made by determining whether through a development, the consumption of
Major	...one or more materials is >10% by volume of the regional* baseline availability;
Moderate	...one or more materials is between 6-10% by volume of the regional* baseline availability;
Minor	...one or more materials is between 1-5% by volume of the regional* baseline availability
Negligible	...no individual material type is equal to or greater than 1% by volume of the regional* baseline availability.
No changeno materials is required.

* or where justified, national.

Table 19.4: Determining Significance for Materials (IEMA 2020)

Sensitivity (or Value) of Receptor	Magnitude of impact				
	No change	Negligible	Minor	Moderate	Major
Very High	Neutral	Slight	Moderate or Large	Large or Very Large	Very Large
High	Neutral	Slight	Sight or Moderate	Moderate or Large	Large or Very Large
Medium	Neutral	Neutral or Slight	Slight	Moderate	Moderate or Large
Low	Neutral	Neutral or Slight	Neutral or Slight	Slight	Sight or Moderate
Negligible	Neutral	Neutral	Neutral or Slight	Neutral or Slight	Slight

In accordance with the IEMA Guidance, an impact is deemed to be Significant if it has a significance level of Moderate, Large or Very Large, while Neutral or Slight are deemed to be Not Significant.

19.3 Baseline Environment

The Proposed Scheme will commence at the western end at the edge of the City Centre at Talbot Memorial Bridge beside the Custom House and will proceed eastwards along the north and south quays to Tom Clarke East Link Bridge beside Dublin Port. This section of the Proposed Scheme includes a new public transportation opening bridge (hereafter referred to as the ‘Dodder Public Transport Opening Bridge (DPTOB)’) over the River Dodder at its confluence with the River Liffey. The DPTOB will span from the eastern end of Sir John Rogerson’s Quay (adjacent to the Capital Dock building) to the R131 Road adjacent to Tom Clarke East Link Bridge. It will accommodate pedestrians, cyclists, public buses and taxis, providing a gateway between Dublin City’s south quays and Ringsend as well as the Poolbeg Peninsula beyond. The Proposed Scheme will continue from this point as a cycling route towards the Poolbeg Peninsula and onward to Dublin Bay South at Sandymount. It will commence from the southern end of Tom Clarke East Link Bridge, with two branches, one in an eastern direction (along York Road and Pigeon House Road), and the other in a south-eastern direction (along Pembroke Cottages, Cambridge Park, Ringsend Park, Strand Street and Pembroke Street) and will then conclude at the junction of the R131 Sean Moore Road and the R802 Beach Road.

There are a number of utilities in place along and crossing these roads, the majority of which are buried within and along the roadways. These utilities include:

- ESB electricity lines (high, medium and low voltage) and associated infrastructure;
- GNI gas mains (high, medium and low pressure) and associated infrastructure;
- Irish Water potable water mains and associated infrastructure;
- Irish Water sewer lines (foul and combined sewers) and associated infrastructure;
- Local Authority surface water drainage network and associated infrastructure;
- Eir, Enet and Virgin Media telecommunications lines and associated infrastructure;
- Local Authority district heating infrastructure; and
- Local Authority traffic signal ducting and associated infrastructure.

The following outlines the baseline environment with respect to material assets.

19.3.1 Major Infrastructure and Existing Utilities

The Proposed Scheme will interact with a number of pieces of major infrastructure, including bridges over the River Liffey, the Royal Canal and George’s Dock.

The Proposed Scheme will cross the River Liffey via two major pieces of infrastructure, namely Talbot Memorial Bridge and Samuel Beckett Bridge. Talbot Memorial Bridge opened in 1978 and is a three span structure crossing the River Liffey from Custom House Quay and Memorial Road on the north side to City Quay and Moss Street on the south side. Samuel Beckett Bridge opened in 2009 and is a cable stayed structure which opens by swinging

the bridge by 90 degrees. It connects Guild Street and North Wall Quay on the north side to Sir John Rogerson's Quay on the south side of the River Liffey.

The Proposed Scheme will cross the mouth of George's Dock at Custom House Quay, currently crossed by twin Scherzer Lifting Bridges. George's Dock was formerly a working maritime dock, but in recent years a good deal of regeneration has occurred in the area and the dock itself is occasionally used as a public event space.

The Proposed Scheme will cross the mouth of Spencer Dock on the Royal Canal at North Wall Quay. The Royal Canal flows into the River Liffey via a lock at this location. The mouth of the canal is crossed by another set of Scherzer Lifting Bridges. The Royal Canal is mainly used for leisure activities, namely boating and angling within the waterway, and walking and cycling along the pathways running alongside it.

The DPTOB will cross the mouth of the River Dodder, the access route for boats travelling between Grand Canal Dock and the River Liffey. Grand Canal Dock is located south-west of the proposed DPTOB, and the interface between the canal and the River Dodder, controlled by a number of locks, is approximately 150m upstream of the River Dodder / River Liffey confluence. The primary boating activity in Grand Canal Dock is now leisure boating and water sports.

Table 19.5 lists the types of major utilities within the study area of the Proposed Scheme, along or crossing the Proposed Scheme. Most utilities are buried beneath the roads or footpaths, with a mixture of main trunk routes as well as branches off these main routes existing along the entire length of the Proposed Scheme. There are also three service tunnels which carry utility lines across the River Liffey, namely the Liffey Service Tunnel (under the Tom Clarke East Link Bridge), the GNI Pipeline (parallel to the Tom Clarke East Link Bridge), and the 2008 Service Tunnel (from Ringsend to North Wall Quay). These tunnels carry electricity cables, water / wastewater mains, gas mains, telecommunications lines and district heating pipes across the River Liffey.

Table 19.5: Utilities Within the Proposed Scheme Study Area

Utility Provider	Service Type	Description
ESB	High Voltage Electricity	Underground 220kV (kilovolt) lines
		Underground 110kV lines
		Underground 38kV lines
	Medium Voltage Electricity	Underground lines
	Low Voltage Electricity	Underground lines
		Overhead single phase lines
Overhead three phase lines		
Gas Networks Ireland	High Pressure Gas	250mm steel main at 19 bar
		300mm steel main at 19 bar
		400mm steel main at 19 bar
		500mm steel main at 19 bar
		500mm steel main at 40 bar
	Medium Pressure Gas	8 inch steel main at 4 bar
		63mm polyethylene main at 4 bar
		90mm polyethylene main at 4 bar
		125mm polyethylene main at 4 bar
		315mm polyethylene main at 4 bar
Low Pressure Gas	Numerous sizes of mains at low pressure along entire route	
Irish Water	Potable Water	Trunk and distribution mains of various diameters and materials, with supporting infrastructure such as valves and hydrants
	Sewer Lines	Foul sewer lines and associated infrastructure
		Combined sewer lines and associated infrastructure
Local Authorities	Surface Water Sewer Network	Surface water sewer network and associated infrastructure
	Traffic Signals	Ducting for traffic signals and associated infrastructure
	District Heating	Currently unused district heating lines east of the mouth of the River Dodder
Telecommunications	Virgin Media	Underground cables and associated infrastructure
	Eir	Underground cables and associated infrastructure
	Enet	Enet cables along much of the route

19.3.2 Imported Material

The quantities of material which are currently imported to the area covered by the Proposed Scheme under baseline conditions are low. Currently, material is only imported as part of maintenance activities which are undertaken on the existing roadways, cycle lanes, footpaths, utilities and verges. These activities would largely involve repair of road, cycle lane and footpath surfaces, repainting of road markings, drainage maintenance and repair, utility works, landscaping and winter maintenance.

A report entitled Essential Aggregates: Providing for Ireland's Needs to 2040 (Irish Concrete Federation 2019) was published in 2019 which details and quantifies Ireland's natural aggregate reserves. At the time of publication of that report, Ireland had approximately 500 active large commercial quarries, approximately 220 ready mixed concrete plants, 20 large scale precast concrete plants and 40 plants producing bitumen bound road surfacing materials.

The Irish Concrete Federation quantifies the annual production of these materials in Ireland on their website, with the 2019 figures (the most recent available) being as follows:

- Five million cubic metres of ready-mixed concrete;
- 135 million concrete blocks;
- 38 million tonnes of aggregates;
- Two million tonnes of bituminous road surfacing materials; and

- Two million square metres of paving products.

19.4 Potential Impacts

This Section presents potential impacts that may occur due to the Proposed Scheme, in the absence of mitigation. This informs the need for mitigation or monitoring to be proposed (refer to Section 19.5). Predicted residual impacts taking into account any proposed mitigation are then presented in Section 19.6.

19.4.1 Characteristics of the Proposed Scheme

19.4.1.1 Major Infrastructure and Utilities

Construction of the Proposed Scheme has the potential to have an impact on existing infrastructure and utilities in order to accommodate changes to junction layouts or changes to carriageway widths. Where protection of utilities in place is not an option, this will involve realignment, upgrade, or replacement of this infrastructure as part of works within those areas. Each proposed modification to the existing infrastructure or utilities is outlined in this Chapter. Where utility diversions are proposed, the approximate length of the diversions is provided in Table 19.6 to Table 19.8. The potential impacts would occur predominantly during the Construction Phase.

During the Operational Phase, some utilities will be required for the Proposed Scheme. This will include electricity connections for such elements as the DPTOB, the boardwalk structures, new street lighting, junction signalling, and real time passenger information (RTPI) displays at bus stops. There will also be some amendments to existing surface water drainage to control and / or attenuate surface water runoff from any additional paved surfaces.

19.4.1.2 Imported Material

Material will be required to construct the Proposed Scheme. These materials will be comprised of standard construction materials, paving materials, landscaping materials, street furniture, paints, lighting, junction infrastructure materials and fill materials, as required. This Chapter covers the major materials needing to be imported to the site for the purposes of construction of the Proposed Scheme (i.e. concrete, granular fill / aggregate, asphalt and structural steel). Any materials arising from within the site which are to be reused within the Proposed Scheme (e.g. excavated soils), are assessed in Chapter 18 (Waste & Resources).

19.4.2 'Do Nothing' Scenario

In the 'Do Nothing' scenario, the Proposed Scheme would not be implemented and there would be no changes to existing infrastructure or utilities as a result of the Proposed Scheme. Therefore, there would be a Neutral impact on infrastructure and utilities under the 'Do Nothing' scenario.

Similarly, with respect to imported material, the 'Do Nothing' scenario means that there is no requirement to import material for the construction of the Proposed Scheme. Therefore, this material is not consumed by the Proposed Scheme, and the impact under the 'Do Nothing' scenario is Neutral.

19.4.3 Construction Phase

19.4.3.1 Major Infrastructure and Utilities

The following outlines the key potential impacts on major infrastructure and utilities as a result of the Construction Phase of the Proposed Scheme. Major infrastructure includes bridges over the River Liffey (Talbot Memorial Bridge and Samuel Beckett Bridge), the Royal Canal, Grand Canal Dock and George's Dock (Scherzer Bridges). Major utilities include major electricity overhead lines and underground cables, water distribution and foul and surface water infrastructure, gas mains, telecommunications infrastructure and district heating infrastructure. Please refer to Chapter 20 (Risk of Major Accidents and / or Disasters) for an assessment of the impacts associated with major accidents involving utilities. Additionally, there will be some demand on existing utilities by the construction activities (i.e. by Construction Compounds or equipment), which is also addressed as relevant in the following sections. Chapter 5 (Construction) should also be referenced for additional detail on the Construction Phase of the Proposed Scheme.

The main Construction Phase impacts will arise from the requirement to divert utilities. The proposed utility diversions are listed in Table 19.6 to Table 19.8. To the best of the engineering experience and judgement available and based on the available records and preliminary reasonable site investigations, it is expected that the utility diversion will be to the stated length. It is likely, however, that modifications to these proposed measures may be required at the detailed design / Construction Phase, and any such modifications (if required) will not give rise to any impacts which are any more significant than those already identified and assessed in this Chapter and will not alter the summary of potential Construction Phase impacts presented in Table 19.12.

19.4.3.1.1 Major Infrastructure

The Proposed Scheme will cross the River Liffey via two existing bridges, namely Talbot Memorial Bridge and Samuel Beckett Bridge. There are no major works proposed to either of these two bridges. Therefore, there will be no significant impact on these bridges as a result of the Proposed Scheme.

The Proposed Scheme will include works at both the mouth of the Royal Canal and the mouth of George's Dock. At both locations, the existing Scherzer Bridges will be relocated, and a new bridge will be built across both openings. There will be some demolition works and piling required to construct the new bridges and to relocate the existing Scherzer Bridges. However, there will be no structures constructed within the waterway. For a description of the construction works at these locations, please refer to Chapter 5 (Construction).

Due to the need for some major works on the mouth of the Royal Canal there may be the potential need to temporarily interrupt navigation during certain periods of the construction. Therefore, the potential impact on the Royal Canal will be Negative, Slight and Temporary.

As George's Dock is currently only used occasionally as an event space, there will be no significant impact on it as a result of the bridge construction across the mouth of the dock.

A navigational passage between the River Liffey, River Dodder and Grand Canal Dock will be maintained throughout the Construction Phase. Therefore, there will be no significant impact on boating access between the River Liffey and the Grand Canal.

The construction of the DPTOB has been designed to avoid interacting with the three service tunnels which cross under the River Liffey. Therefore, there will be no significant impact on these tunnels as a result of the Proposed Scheme.

19.4.3.1.2 Electricity

The Construction Compounds will require electricity to power any temporary office and welfare facilities during the Construction Phase. Power for the Construction Compounds will be supplied through a connection into the electricity network, or where this is unavailable, via generators. Temporary electricity provision for works areas along the Proposed Scheme to power items such as temporary lighting, temporary traffic signals and other construction equipment will be provided through generators, as required.

The electricity demand during the Construction Phase is considered to be a Negative, Not Significant and Short-Term impact.

A number of interfaces between the existing electricity infrastructure and the Proposed Scheme have been identified, some of which will require diversion of the infrastructure as outlined in Table 19.6 and shown in ESB Assets Alterations Drawings (BCDD-ROT-UTL_UE-0016_XX_00-DR-CU-9001) in Volume 3 of this EIAR. As a result of these diversions, there may be temporary local interruptions to the electricity provision during works on that infrastructure.

Table 19.6: Potential Major Electricity Infrastructure Diversions

Approximate Chainage	Description	Proposed Measure (Approximate)	Figure Sheet Reference
Talbot Memorial Bridge to Tom Clarke East Link Bridge			
A1143 – A1057	Medium voltage underground duct	97m diversion	Sheet 2 of 12
A762 – A714	Low voltage underground duct	56m diversion	Sheet 3 of 12
B11426 – B11466	Medium voltage underground duct	40m diversion	Sheet 4 of 12
Tom Clarke East Link Bridge to Sean Moore Road			
N/A	N/A	N/A	N/A

In addition, new ducts are required to connect the existing substation on East Link Road to the proposed new substation at the junction of Thorncastle Street and York Road over a distance of 75m approximately (see ESB Asset Alterations Drawings (BCIDD-ROT-UTL_UE-0016_XX_00-DR-CU-0006) in Volume 3 of this EIAR for further details).

While electricity interruptions, if required, will generally only occur for a set number of hours per day (no more than eight hours where reasonably practicable), the exact number of interruption days for particular customers for each diversion cannot be ascertained at this stage, so a worst-case scenario of up to a week has been assessed. Using the criteria, as outlined in Section 19.2.4 and Table 19.1, where diversion of an electricity line is required which will result in the planned interruption of electricity provision, the worst-case potential impact will be Negative, Moderate and Temporary.

19.4.3.1.3 Water

The Construction Compounds and construction areas will require a water supply for welfare facilities within the Construction Compounds, as well as for dust suppression at certain construction areas where the conditions require it. The Construction Compounds will be connected into the local mains water supply, where possible. Where a connection is not possible, water tankers will be used.

The potable water demand during the Construction Phase is considered to be a Negative, Not Significant and Short-Term impact.

A number of interfaces between the existing water infrastructure and the Proposed Scheme have been identified, some of which will require diversion of the infrastructure, as outlined in Table 19.7 and shown in IW Water Asset Alterations Drawings (BCIDD-ROT-UTL_UW-0016_XX_00-DR-CU-9001) in Volume 3 of this EIAR. As a result of these diversions, there may be temporary local interruptions to water provision during works on that infrastructure.

Table 19.7: Potential Major Water Infrastructure Diversions

Approximate Chainage	Description	Proposed Measure (Approximate)	Figure Sheet Reference
Talbot Memorial Bridge to Tom Clarke East Link Bridge			
A1468 – A1425	610mm cast iron watermain	80m diversion	Sheet 1 of 12
A1420 – A1384	610mm cast iron watermain	80m diversion	Sheet 1 of 12
A900 – A865	600mm ductile iron watermain	35m diversion	Sheet 3 of 12
Tom Clarke East Link Bridge to Sean Moore Road			
N/A	N/A	N/A	N/A

While water interruptions, if required, will generally only occur for a set number of hours per day (no more than eight hours where reasonably practicable), the total number of interruption days for particular customers for each diversion cannot be ascertained at this stage, so a worst-case scenario of up to a week has been assessed. Using the criteria, as outlined in Section 19.2.4 and Table 19.1, where diversion of a watermain is required which will result in the planned interruption of water provision, the worst-case potential impact will be Negative, Moderate and Temporary.

19.4.3.1.4 Wastewater and Surface Water Runoff

There will be wastewater and surface water runoff created by the Construction Compounds and construction areas. Wastewater will be created by welfare facilities within the Construction Compounds and construction areas, and surface water runoff will emanate from any areas of the Construction Compounds and construction areas which are paved. The Construction Compounds will be connected into the local foul / combined sewers where possible, or where not possible, will have on-site tanks for the collection of foul water which will be emptied by means of a suction tanker and the wastewater shall be disposed of to a licensed wastewater treatment plant. Where required, temporary welfare facilities (for example portable toilets) will be used, which will be collected as required for off site disposal of the wastewater to a suitably licensed facility.

The potential impact as a result of the demand on the foul water network during the Construction Phase is considered to be a Negative, Not Significant and Short-Term impact.

There have been no major interfaces identified between the Proposed Scheme and the existing foul sewer network which will require any diversion works. Therefore, it is predicted that there will be no significant impact to the foul sewer network as a result of the construction of the Proposed Scheme.

There will be limited upgrade works required to the surface water drainage network to facilitate the changes to the road alignment and the impermeable surface area. Much of this work will involve the construction of new road gullies to align with the new kerb line. All surface water will continue to drain into existing networks and outfalls. Refer to Chapter 13 (Water) for further information on surface water drainage during the Construction Phase of the Proposed Scheme.

19.4.3.1.5 Gas

There will be no requirement for a connection to existing gas infrastructure during the Construction Phase of the Proposed Scheme. There have also been no major interfaces identified between the Proposed Scheme and the existing gas network which will require any diversion works. Therefore, it is predicted that there will be no significant impact to the gas network as a result of the construction of the Proposed Scheme.

19.4.3.1.6 Telecommunications

Telecommunications access will be required at the Construction Compounds. The potential impact as a result of the demand on the telecommunications network during the Construction Phase will be a Negative, Not Significant and Short-Term impact.

A number of interfaces between the existing telecommunications infrastructure and the Proposed Scheme have been identified, some of which will require diversion of the infrastructure as outlined in Table 19.8 and shown in Telecom Utility Asset Alteration Drawings (BCIDD-ROT-UTL_UL-0016_XX_00-DR-CU-9001) in Volume 3 of this EIAR. As a result of these diversions, there may be temporary local interruptions to the telecommunications provision during works on that infrastructure.

Table 19.8: Potential Major Telecommunications Infrastructure Diversions

Approximate Chainage	Description	Proposed Measure (Approximate)	Figure Sheet Reference
Talbot Memorial Bridge to Tom Clarke East Link Bridge			
A1438 – A1418	Eir duct	42m diversion	Sheet 1 of 12
A894 – A872	Eir duct	32m diversion	Sheet 3 of 12
A907 – A867	Virgin Media duct	42m diversion	Sheet 3 of 12
Tom Clarke East Link Bridge to Sean Moore Road			
N/A	N/A	N/A	N/A

While telecommunications interruptions, if required, will generally only occur for a set number of hours per day (no more than eight hours where reasonably practicable), the total number of interruption days for particular customers for each diversion cannot be ascertained at this stage, so a worst-case scenario of up to a week has been assessed. Using the criteria, as outlined in Section 19.2.4 and Table 19.1, where diversion of a

telecommunications line is required which will result in the planned interruption of telecommunications provision, the worst-case potential impact will be Negative, Moderate and Temporary.

19.4.3.1.7 District Heating Infrastructure

There are district heating lines located on the eastern side of the proposed DPTOB (at approximate chainage B11628). These lines have been installed for future supply of heating to parts of the Docklands, but they are currently unused. They will need to be realigned away from the new road during the Construction Phase. While these lines are currently unused, it is planned that the district heating network will be installed and commissioned over five years up to 2026, with customer connections to be delivered on a phased basis over the next 10 years (DCC 2021). Therefore, as a worst-case scenario, it has been assumed that these district heating lines will be operational by the time construction on the Proposed Scheme commences.

While interruption, if required, will generally only occur for a set number of hours per day (no more than eight hours where reasonably practicable), the total number of interruption days for the diversion of those district heating lines cannot be ascertained at this stage so a worst-case scenario of up to a week has been assessed. Using the criteria, as outlined in Section 19.2.4 and Table 19.1, where diversion is required which will result in the planned interruption of district heating provision, the worst-case potential impact will be Negative, Moderate and Temporary.

19.4.3.2 Imported Material

The Construction Phase will require the importation of a number of key construction materials for the Proposed Scheme works. This material will include items such as concrete, granular fill / aggregate, asphalt and structural steel. For a full description of the Construction Phase, please refer to Chapter 5 (Construction). An assessment of the climate impact from the carbon associated with these materials is included in Chapter 8 (Climate). Table 19.9 provides a conservative estimate of the quantities of the major materials required to complete the Construction Phase of the Proposed Scheme.

Table 19.9: Conservative Quantity Estimates of Major Construction Materials Required by the Proposed Scheme

Material	Estimated Quantity
Asphalt Products	20,400 tonnes
Concrete	36,600 tonnes
Precast Concrete Kerbs	410 tonnes
Fill Material	50,300 tonnes
Brickwork and Blockwork	12 tonnes
Structural Steel	3,300 tonnes

The quantities of material listed in Table 19.9 represent a very small proportion of the Irish quantities manufactured per year, as outlined in Section 19.3.2. The estimated quantity of concrete required represents less than 1% of the total quantity produced in Ireland per annum. Similarly, assuming the aggregate composition of asphalt is 90% to 95% and concrete is 60% to 80%, the estimated total aggregate quantity required by the Proposed Scheme represents less than 1% of the total aggregate quantity produced in Ireland per annum.

Importation of material to the Proposed Scheme will be carried out throughout the Construction Phase, with different materials being required at different times. The main direct impacts associated with the importation of construction materials arises from the gathering / manufacture of the materials, as well as the fact that once the materials are used within the Proposed Scheme, they are no longer available for other uses. There will also be impacts associated with the importation of materials through the requirement of heavy goods vehicles for the delivery of the material and the use of materials. Impacts are covered in more detail in Chapter 6 (Traffic & Transport), Chapter 7 (Air Quality), Chapter 8 (Climate) and Chapter 9 (Noise & Vibration), where relevant.

As the materials required for the Construction Phase of the Proposed Scheme are generally readily available, the sensitivity of the material will be Low. As the quantities of the material required constitute less than 1% of the quantities produced per annum in Ireland, the magnitude of the impact will be Negligible. Therefore, the potential impact associated with the imported materials will be Negative, Slight and Long-Term.

19.4.3.3 Construction Phase Impact Summary

Table 19.10 provides a summary of the potential impacts on material assets associated with the Construction Phase of the Proposed Scheme.

Table 19.10: Summary of Potential Construction Phase Impacts

Assessment Topic	Potential Impact
Major Infrastructure and Utilities	
Bridges of the River Liffey	No significant impact
Royal Canal	Negative, Slight and Temporary
George's Dock	No significant impact
Grand Canal Dock	No significant impact
Liffey Service Tunnels	No significant impact
Electricity Demand	Negative, Not Significant and Short-Term
Electricity Interruption	Negative, Moderate, Temporary
Water Demand	Negative, Not Significant and Short-Term
Water Interruption	Negative, Moderate, Temporary
Wastewater Demand	Negative, Not Significant and Short-Term
Wastewater Interruption	No significant impact
Gas Demand	No significant impact
Gas Interruption	No significant impact
Telecommunications Demand	Negative, Not Significant and Short-Term
Telecommunications Interruption	Negative, Moderate, Temporary
District Heating	Negative, Moderate, Temporary
Imported Material	
Use of Imported Material	Negative, Slight and Long-Term

19.4.4 Operational Phase

19.4.4.1 Major Infrastructure and Utilities

The main impacts on major infrastructure and utilities will be associated with the Construction Phase. However, there will be some demand on utilities by the Proposed Scheme once operational. These impacts are outlined in the following sections.

19.4.4.1.1 Major Infrastructure

The Proposed Scheme will cross the River Liffey on both the Talbot Memorial Bridge and Samuel Beckett Bridge. Any amendments to the road / pavement layouts and surfacing will be completed as part of the Construction Phase allowing for the operation of the Proposed Scheme on those two pieces of infrastructure. Therefore, there will be no significant Operational Phase impact on those two bridges as a result of the Proposed Scheme.

At the entrance to Spencer Dock (Royal Canal), the permanent vertical clearance under the new bridge will be increased by 1m to more than the standard navigation clearance along the Royal Canal. This will make provision for and exceed the anticipated rise in sea levels due to climate change. However, the bridge will no longer open to accommodate sailing vessels with their mast in the erect position, as had been used historically for sea-going vessels to access Spencer Dock for load transfer purposes. Such activities no longer occur, and the lifting bridges have not been opened in decades. Therefore, the loss of access for sailing vessels to Spencer Dock will be of no consequence. Therefore, there is no significant Operational Phase impact anticipated on the Royal Canal as a result of the Proposed Scheme.

Upon completion of construction over the entrance to George's Dock, there will be no further works or changes to the area as a result of the Proposed Scheme. Therefore, there will be no significant Operational Phase impact on George's Dock as a result of the Proposed Scheme.

Upon completion of the DPTOB, there will continue to be no significant impact on the accessibility between the River Liffey and Grand Canal Dock, due to the ability of the new bridge to open to allow any taller boats requiring access to continue to pass through the area.

19.4.4.1.2 Electricity

Once the Proposed Scheme is operational, electricity will be required to power such elements as street lighting, junction signalling and RTP1 displays. Power for these types of equipment will be supplied via power cables which connect the equipment to an electricity supply cabinet.

The DPTOB will be an opening bridge and will therefore require power to operate. A three-phase, 275kVA (kilovolt amps), 400V (volt) power supply will be required for the control cabinets and plant room associated with the bridge. The power supply will provide for the operation of hydraulic power units, control systems, drainage pumps, traffic and pedestrian gates, CCTV, marine navigation lights, lighting and ventilation of the plant room, and pedestrian warning lights. The new rowing club building will also require a power connection. As there is not sufficient capacity within the existing sub-station on York Road, a new sub-station will be constructed adjacent to the bridge to supply the required power for all associated infrastructure and the rowing club building.

As a new sub-station is being constructed to meet the power requirements of the DPTOB, and the power requirements of the rest of the Proposed Scheme will be largely as per the existing infrastructure, the anticipated impact on electricity during the Operational Phase will be Negative, Imperceptible and Long-Term.

19.4.4.1.3 Water Usage

The Proposed Scheme will not result in any additional water provision being required after the Construction Phase is completed. Therefore, there is no significant Operational Phase impact anticipated on water infrastructure as a result of the Proposed Scheme.

19.4.4.1.4 Wastewater and Surface Water Runoff

Once the Proposed Scheme is constructed, the hardstanding surface area will be larger in some places than before construction due to the construction of wider carriageways, cycle infrastructure, footpaths and urban realm improvements. The Proposed Scheme will make use of the existing drainage infrastructure along its length given its nature (i.e. the upgrading of existing road and associated infrastructure). However, new drainage infrastructure is proposed (i.e. oversized pipe) to service the proposed DPTOB to attenuate runoff from this new structural element of the Proposed Scheme. All new drainage infrastructure will connect with the existing system and present outflows. There will therefore be no significant Operational Phase impacts anticipated on surface water drainage infrastructure. Impacts on watercourses and water quality as a result of any potential increase in surface water runoff through existing outfalls is assessed in Chapter 13 (Water).

The Proposed Scheme will not require any foul sewer connection to operate. Therefore, there is no significant Operational Phase impact anticipated on foul sewer infrastructure as a result of the Proposed Scheme.

19.4.4.1.5 Gas

The Proposed Scheme will not require any gas connection to operate. Therefore, there is no significant Operational Phase impact anticipated on gas infrastructure as a result of the Proposed Scheme.

19.4.4.1.6 Telecommunications

Once the Proposed Scheme is operational, telecommunications links will be required for such equipment as traffic signal controllers, and for RTP1 displays at bus stops and on bus information apps. Generally, this equipment will be connected to the local fibre optic cable network via ducting connected to fibre cabinets. In the case of the real time bus information, cellular communications (3G / 4G / 5G) will be provided. This type of infrastructure is already in operation along the Proposed Scheme route. Therefore, any additional telecommunications requirements by any new infrastructure will be minimal.

Therefore, the anticipated impact on telecommunications during the Operational Phase will be Negative, Imperceptible and Long-Term.

19.4.4.1.7 District Heating

The Proposed Scheme will not require any connection to the district heating infrastructure to operate. Therefore, there is no significant Operational Phase impact anticipated on district heating as a result of the Proposed Scheme.

19.4.4.2 Imported Material

Materials will be required during the Operational Phase for maintenance of the infrastructure. This will include repair of roadway, cycleway and footway surfaces, as well as repair of street furniture (including bus shelters and poles), and landscaping. However, as the Proposed Scheme largely involves the upgrade and alteration of existing roadways, the majority of material required for maintenance of the Proposed Scheme would have already been required for the maintenance of the existing roadways in the absence of the Proposed Scheme. Therefore, the change in quantities of materials which will be required for the maintenance of the Proposed Scheme are very small.

As the materials required for the Operational Phase of the Proposed Scheme are generally readily available, the sensitivity of the material will be Low. As the quantities of the material required for maintenance will be lower than the quantities required for the Construction Phase, and therefore, constitute less than 1% of the quantities produced per annum in Ireland, the magnitude of the impact will be Negligible. Therefore, the potential impact associated with the imported materials will be Neutral and Long-Term.

19.4.4.3 Operational Phase Impact Summary

Table 19.11 provides a summary of the potential impacts on material assets associated with the Operational Phase of the Proposed Scheme.

Table 19.11: Summary of Potential Operational Phase Impacts

Assessment Topic	Potential Impact
Major Infrastructure and Utilities	
Major Infrastructure	No significant impact
Electricity	Negative, Imperceptible and Long-Term
Water Usage	No significant impact
Wastewater	No significant impact
Surface Water Runoff	No significant impact
Gas	No significant impact
Telecommunications	Negative, Imperceptible and Long-Term
District Heating	No significant impact
Imported Material	
Use of Imported Material	Neutral and Long-Term

19.5 Mitigation and Monitoring Measures

The following Section outlines the measures which will be adhered to in order to ensure that there are no significant impacts on material assets as a result of the construction and operation of the Proposed Scheme. No monitoring measures are considered to be required for material assets.

19.5.1 Construction Phase

19.5.1.1 Major Infrastructure and Utilities

The proposed structures and demolition works at the mouth of the Royal Canal have been designed to minimise the impact on the canal itself as far as possible. Any disruption to the waterway will be planned in consultation with Waterways Ireland, and all Waterways Ireland requirements will be adhered to during the bridge works. Where works are to take place adjacent to and above the canal, precautions will be implemented to protect the canal banks, canal locks and the navigation channel itself from damage.

The Proposed Scheme has been designed to minimise the impact on major infrastructure. This includes the avoidance of interactions with major utility infrastructure as far as possible. Where there are interfaces with existing utility infrastructure, protection in place or diversion as necessary is proposed to prevent long-term interruption to the provision of the affected services.

All possible precautions will be taken by the appointed contractor to avoid unplanned interruptions to any services during the Construction Phase of the Proposed Scheme. This will include appropriate investigation by the appointed contractor to identify the precise location of all utility infrastructure within the working areas prior to the commencement of excavation works. Where works are required in and around known utility infrastructure, precautions will be implemented by the appointed contractor to protect the infrastructure from damage, in accordance with best practice methodologies and the requirements of the utility companies, where practicable. Protection measures during construction will include warning signs and markings indicating the location of utility infrastructure, safe digging techniques in the vicinity of known utilities, and in certain circumstances where possible, isolation of the section of infrastructure during works in the immediate vicinity.

Consultation has been undertaken with the major utility companies regarding the design, potential interfaces and measures required to protect or divert the infrastructure which is interfacing with the Proposed Scheme design. All utility companies for which diversions are proposed will continue to be consulted with National Transport Authority (NTA) oversight when designing any diversions to ensure that proposed diversions conform to the utility provider's requirements, where practicable and acceptable to the NTA, and to ensure that service interruptions are kept to a minimum.

Where diversions, or modifications, are required to utility infrastructure (as listed in Section 19.4.3), service interruptions and disturbance to the surrounding residential, commercial and / or community property may be unavoidable. Where this is the case, it shall be planned in advance by the appointed contractor. Required service interruptions will generally only occur for a set period of time per day (a set number of hours not exceeding eight hours where reasonably practicable), and will generally not be continuous for full days at a time. Prior notification will be given to all impacted properties. This notification will include information on when interruptions and works are scheduled to occur and the duration of such interruptions. Any required works will be carefully planned by the appointed contractor to ensure that the duration of interruptions is minimised, in so far as is possible.

19.5.1.2 Imported Materials

The Proposed Scheme has been designed to minimise the amount and extent of major construction works required, and therefore, minimise the quantities of construction materials required. Large sections of the Proposed Scheme will require minimal intervention, being comprised of lane reconfigurations, road marking layout changes, resurfacing works and the construction of segregated cycle tracks. Larger works will include the proposed DPTOB, the Royal Canal and George's Dock replacement carriageway bridges, and the proposed boardwalks.

Consideration will be given by the appointed contractor to the sustainability of material being sourced for the construction of the Proposed Scheme. In so far as is reasonably practicable, materials required for the construction of the Proposed Scheme will be sourced locally to reduce the amount of travelling required to get the material to the site. Key issues to be considered when sourcing materials for the Construction Phase will include the source, the material specification, production and transport costs, and the availability of the material. For quarried material sourced within the State, only quarries which are included in local authority quarry registers will be used by the appointed contractor to source any quarried material.

Construction materials will be managed on-site by the appointed contractor in such a way as to prevent over-ordering and waste. Materials will be stored in appropriate storage areas or receptacles to reduce the potential for damage requiring replacement. 'Just-In-Time' ordering principles will be implemented by the appointed contractor, where practicable, to reduce the potential for over-ordering.

19.5.1.3 Summary of Construction Phase Impacts After Mitigation

Due to the fact that impacts are anticipated to be minimal and mitigation measures are largely inherent in the design of the Proposed Scheme, the predicted post-mitigation impacts are unchanged, as summarised in Table 19.12.

Table 19.12: Summary of Predicted Construction Phase Impacts Following the Implementation of Mitigation Measures

Assessment Topic	Potential Impact (Pre-Mitigation)	Predicted Impact (Post Mitigation)
Major Infrastructure and Utilities		
Bridges of the River Liffey	No significant impact	No significant impact
Royal Canal	Negative, Slight and Temporary	Negative, Slight and Temporary
George's Dock	No significant impact	No significant impact
Grand Canal Dock	No significant impact	No significant impact
Liffey Service Tunnels	No significant impact	No significant impact
Electricity Demand	Negative, Not Significant and Short-Term	Negative, Not Significant and Short-Term
Electricity Interruption	Negative, Moderate, Temporary	Negative, Moderate, Temporary
Water Demand	Negative, Not Significant and Short-Term	Negative, Not Significant and Short-Term
Water Interruption	Negative, Moderate, Temporary	Negative, Moderate, Temporary
Wastewater Demand	Negative, Not Significant and Short-Term	Negative, Not Significant and Short-Term
Wastewater Interruption	No significant impact	No significant impact
Gas Demand	No significant impact	No significant impact
Gas Interruption	No significant impact	No significant impact
Telecommunications Demand	Negative, Not Significant and Short-Term	Negative, Not Significant and Short-Term
Telecommunications Interruption	Negative, Moderate, Temporary	Negative, Moderate, Temporary
District Heating	Negative, Moderate, Temporary	Negative, Moderate, Temporary
Imported Material		
Use of Imported Material	Negative, Slight and Long-Term	Negative, Slight and Long-Term

19.5.2 Operational Phase

Due to the measures which are included within the design and the fact that impacts are anticipated to be minimal, there are no specific mitigation measures necessary during the Operational Phase. The predicted post-mitigation impact is therefore unchanged, as summarised in Table 19.13.

Table 19.13: Summary of Predicted Operational Phase Impacts Following the Implementation of Mitigation Measures

Assessment Topic	Potential Impact (Pre-Mitigation)	Predicted Impact (Post Mitigation)
Major Infrastructure and Utilities		
Major Infrastructure	No significant impact	No significant impact
Electricity	Negative, Imperceptible and Long-Term	Negative, Imperceptible, Long-Term
Water Usage	No significant impact	No significant impact
Wastewater	No significant impact	No significant impact
Surface Water Runoff	No significant impact	No significant impact
Gas	No significant impact	No significant impact
Telecommunications	Negative, Imperceptible and Long-Term	Negative, Imperceptible and Long-Term
District Heating	No significant impact	No significant impact
Imported Materials		
Use of Imported Material	Neutral and Long-Term	Neutral and Long-Term

19.6 Residual Impacts

No significant residual impacts have been identified either in the Construction or Operational Phases of the Proposed Scheme, whilst meeting the scheme objectives set out in Chapter 1 (Introduction).

19.6.1 Construction Phase

There will be no significant residual impacts on major infrastructure and utilities or as a result of imported material during the Construction Phase.

19.6.2 Operational Phase

There will be no significant residual impacts on major infrastructure and utilities or as a result of imported material during the Operational Phase.

19.7 References

Dublin City Council (DCC) (2021). Report on the Dublin District Heating Project (Letter to the Climate Action, Environment and Energy Strategic Policy Committee)

Environmental Protection Agency (EPA) (2022). Guidelines on the Information to be Contained in Environmental Impact Assessment Reports. May 2022

European Commission (EC) (2017). Environmental Impact Assessment of Projects - Guidance on the Preparation of the Environmental Impact Assessment Report

Institute of Environmental Management and Assessment (IEMA) (2020). IEMA Guide to: Materials and Waste in Environmental Impact Assessment - Guidance for a Proportionate Approach

Irish Concrete Federation (2019). Essential Aggregates Providing for Ireland's Needs to 2040

Directives and Legislation

Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment

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