



Cork Area Commuter Rail Glounthaune - Midleton Twin Track

Environmental Impact Assessment Report
Volume 1 Non Technical Summary

November 2022



Contents

1	Non-Technical Summary	1-1
1.1	Introduction	1-1
1.1.1	Site Location	1-3
1.2	Methodology	1-4
1.2.1	EIAR Methodology	1-5
1.3	Policy and Need for the Proposed Development	1-6
1.4	Alternatives Considered	1-7
1.5	Consultation	1-7
1.6	Description of the Proposed Development	1-8
1.6.1	Proposed Works	1-9
1.6.2	Construction Methodology	1-10
1.7	Population and Human Health	1-11
1.8	Air Quality	1-13
1.9	Climate	1-14
1.10	Lands, Soils and Hydrogeology	1-15
1.11	Surface Water and Flood Risk	1-16
1.12	Biodiversity	1-16
1.13	Landscape and Visual	1-18
1.14	Archaeology, Architectural and Cultural Heritage	1-19
1.15	Roads and Traffic	1-20
1.16	Noise and Vibration	1-23
1.17	Material Assets	1-23
1.18	Major Accidents and/ or Disasters	1-24
1.19	Interactions and Cumulative Effects	1-24

Tables

Table 1.1:	Summary of the maximum risk of construction dust activity in each works area	1-13
Table 1.2:	Summary of likely effects from proposed project	1-14
Table 1-3:	Residual Impacts to Key Ecological Receptors (KER)	1-17
Table 1-4:	Impact Assessment Summary	1-21

Figures

Figure 1.1:	Project Location	1-2
Figure 1.2:	Site Location	1-4

1 Non-Technical Summary

1.1 Introduction

Córas Iompair Éireann (CIE) is applying to An Bord Pleanála for a Railway Order (RO) for the Glounthaune to Midleton Twin Track Project (hereafter referred to as the “proposed development”) under the Transport (Railway Infrastructure) Act 2001 (as amended and substituted) (“the 2001 Act”). The RO application is made pursuant to the provisions of Section 37 of the 2001 Act.

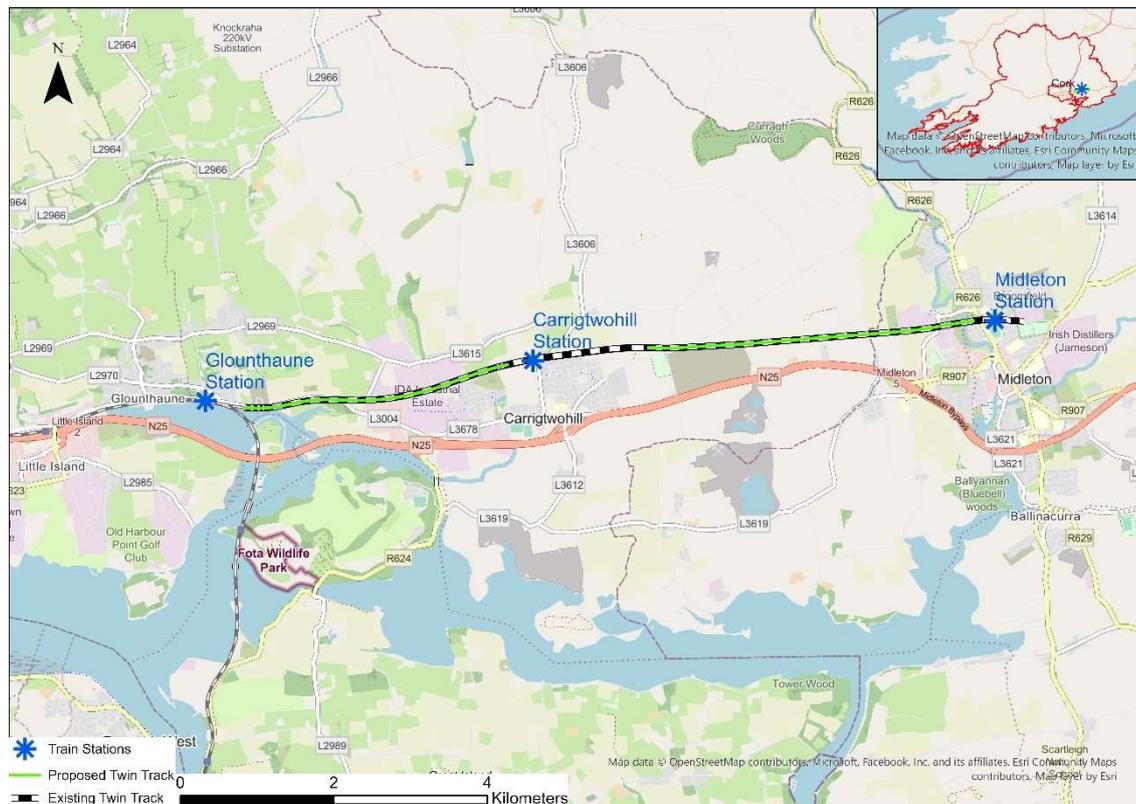
Under Section 37(e) of the 2001 Act all Railway Orders must be accompanied by Environmental Impact Assessment Report (EIAR). Mott MacDonald Ireland Limited (MMI) have been appointed to prepare this EIAR to support the RO application. This EIAR has been prepared in accordance with the provisions of the Environmental Impact Assessment Directive 2011/92/EU as amended by Directive 2014/52/EU (together, the “EIA Directive”).

The proposed development will involve the upgrade and enhancement of the Glounthaune to Midleton railway line to a twin track configuration over a total distance of approximately 10km. The proposed development will comprise the following principal elements:

- Twin tracking of the single-track sections between Glounthaune and Midleton totalling a distance of approximately 10km;
- Reconfiguration of the operational track layouts;
- Removal of 1No. bridge (OBY08, Ballyadam House overbridge) and widening of bridge deck crossing the Ownenacurra River (UBY11);
- Extinguishment of one level crossing (Ford CCTV XY010) and widening of one level crossing (Water Rock CCTV XY009);
- Provision of sidings/turn back facility at Midleton Station;
- Provision of new cable containment routes from Glounthaune to Midleton to facilitate signalling upgrades and alterations;
- Associated signalling upgrades and alterations; and
- All associated works (e.g. temporary construction compounds; drainage, retaining walls, boundary treatments).

The geographical location of the project is provided in Figure 1.1.

Figure 1.1: Project Location



As part of the European and national climate change targets, the Cork to Midleton rail line will in time rely on alternative forms of energy and will reduce greenhouse gas emissions for passenger journeys along this route.

The structure of the EIA documentation is as follows:

- Volume 1 – Non-Technical Summary
- Volume 2 – Environmental Impact Assessment Report
- Volume 3 – Appendices
- Volume 4 – Photomontages

The structure of the EIA Volume 2 is set out below:

- Chapter 1 – Introduction
- Chapter 2 – Methodology
- Chapter 3 – Policy and Need for the Proposed Development
- Chapter 4 – Alternatives Considered
- Chapter 5 – Consultation
- Chapter 6 – Description of the Proposed Development
- Chapter 7 – Population and Human Health
- Chapter 8 – Air Quality
- Chapter 9 – Climate
- Chapter 10 – Land, Soils and Hydrogeology

- Chapter 11 – Surface Water and Flood risk
- Chapter 12 – Biodiversity
- Chapter 13 – Landscape and Visual
- Chapter 14 – Archaeology, Architectural and Cultural Heritage
- Chapter 15 – Roads and Traffic
- Chapter 16 – Noise and Vibration
- Chapter 17 – Material Assets
- Chapter 18 – Major Accidents and / or Disasters
- Chapter 19 – Cumulative Effects
- Chapter 20 – Interactions of the Foregoing
- Chapter 21 – Summary of Mitigation and Monitoring Measures

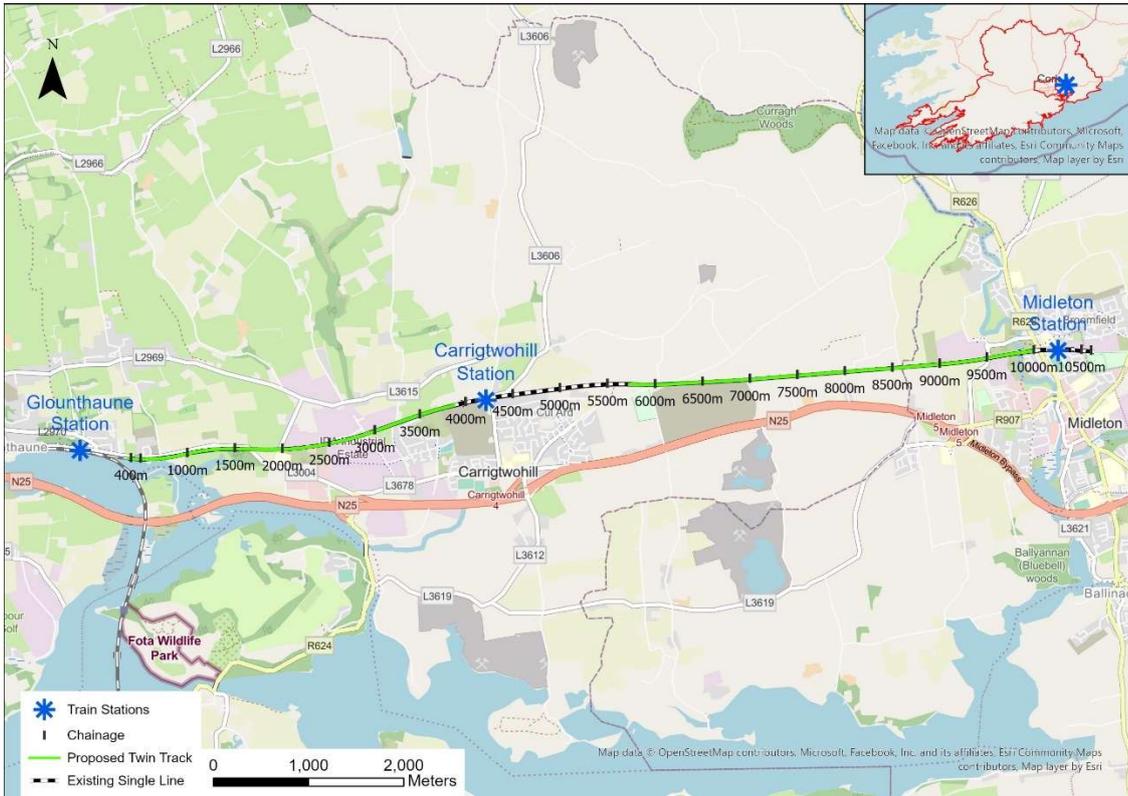
1.1.1 Site Location

The proposed development is located between Glounthaune and Midleton in Co. Cork within the functional area of Cork County Council.

Over the length of the route (approximately 10km), twin tracking is currently in place over approximately 35% of the route. The new track will be required between these sections, as shown on Figure 1.2.

The existing train route runs from the Glounthaune train station between Lough Mahon and the local road (L3004 road) for approximately 850m. The line continues to run in a southerly direction between the L3004 and open ground for approximately 910m before crossing the local road network (L3004). The existing line then progresses eastwards for approximately 2.5km passing between the IDA Industrial Estate and Fota Retail and Business Park before reaching Carrigtwohill station. The line continues along mostly open ground for approximately 6km before terminating at Midleton train station.

Figure 1.2: Site Location



Source: Mott MacDonald

1.2 Methodology

The EIAR has been prepared in accordance with the EIA Directive and Environmental Protection Agency’s (EPA) Guidelines on the information to be contained in Environmental Impact Assessment Reports 2022 (hereafter referred to as the “EPA Guidelines 2022”).

For each assessment, a precautionary approach has been applied to ensure that the worst-case scenario has been considered in the assessment. This approach provides a resilient method where it may not be possible to identify the exact design parameters before final design stage. It accommodates flexibility in design and construction while ensuring that the greatest environmental impacts and maximum extents are assessed in the EIAR. Detailed methodologies are presented in each chapter of the EIAR.

The amended EIA Directive requires that the EIAR provides:

“A description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the project as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge”.

Article 3(1) of the EIA Directive lists environmental factors to be assessed for direct and indirect effects of the project. The chapter headings of the EIAR are based on this list. The EIAR also complies with Article 5 of the EIA Directive which lists the components of an EIAR. The description of likely significant effects is prepared in accordance with Annex IV of the EIA

Directive. The EIAR requirements for consultation, as defined in Article 6 of the EIA Directive, were also complied with.

Screening is the first stage of the EIA process, whereby a decision is made as to whether an EIA is required. However, as the proposed development is being progressed as a RO application there is a mandatory requirement to submit an EIAR as per Section 37(e) of the 2001 Act which states that a RO shall be accompanied by “a statement of the likely effects on the environment (referred to subsequently in this Part as an ‘environmental impact statement’) of the proposed railway works”. This requirement of statement of likely effects is addressed by the preparation of this EIAR. The EIAR complies with the list of information to be contained in an EIAR under the 2001 Act.

1.2.1 EIAR Methodology

This EIAR has been prepared in line with the Planning and Development Act, 2000 S.I. No. 30/2000, as amended, and associated Regulations; the EPA Guidelines 2022 and associated Advice Notes; Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning and Local Government, 2018); and the European Commission Guidance on the preparation of the Environmental Assessment Report 2017. Guidelines and guidance documents specific to each environmental factor are listed in the individual chapters of the EIAR.

The receiving environment for each environmental factor describes the existing state of environmental characteristics and conditions. This includes sensitivity and significance of those environmental factors that are likely to be significantly affected by the proposed development. As per the EIA Directive, the do-nothing effects are also considered i.e., state of future receiving environment in the absence of proposed development.

For the effects identified each chapter of the EIAR describes the temporal scope, i.e., duration of the effects identified, and the spatial scope, i.e., area over which the effects may occur. The source-pathway-receptor model is used to determine the spatial scope. A receptor is defined as “any element in the environment which is subject to impacts”.

The effects are described in accordance with the EPA Guidelines 2022. The significance of a potential impacts is dependent on the sensitivity of the receiving environment and the character of the predicted impact, as shown in the EPA Guidelines 2022. Professional judgement plays a key role where magnitude or significance of impacts cannot be quantified with certainty. Where significant adverse impacts are likely, mitigation measures are proposed to offset these impacts. The assessment of impacts is conducted for construction, operational and decommissioning phase.

Mitigation is proposed as per the EPA Guidelines 2022 and is divided into four strategies: avoidance, prevention, reduction, and offsetting. Residual impacts, that remain once mitigation has been implemented, are also identified and discussed in each chapter.

A key aspect of EIAR is assessment of cumulative effects. In each chapter, the nature and scale of other developments in the vicinity of the proposed development have been evaluated to identify potential for significant cumulative effects. There is no potential for transboundary effects as all proposed works are within Ireland.

The EIAR also includes assessment of interaction of effects that may arise due to the effects of the proposed development on various environmental factors.

1.3 Policy and Need for the Proposed Development

The Glounthaune to Midleton Twin Track Project is a key development as identified within the National and Regional strategy for rail development included within the Cork Metropolitan Area Transport Strategy (CMATS) 2040. The proposed development is also identified within the Cork Area Commuter Rail (CACR) programme.

In early 2020, the National Transport Authority (NTA), in partnership with both Cork City and County Councils and Transport Infrastructure Ireland (TII), finalised the Cork Metropolitan Area Transport Strategy (CMATS) 2040¹. The rail network is a central component of the CMATS strategic vision. The CMATS recognises the imperative need to upgrade the public transport system in the Cork region; heavy rail must change and improve to play its role within an integrated local and regional transport network for the future of Cork city and its surrounds.

The proposed development has been identified within CMATS and within the Cork Area Commuter Rail (CACR) programme, which includes the principles of the heavy rail vision in CMATS, as such its need has been identified as part of the development of these strategies and its delivery is anticipated to be implemented before the lifetime of these strategies.

The following policies have been reviewed as part of this assessment.

- European Policy
 - European Sustainability and Smart Mobility Strategy – putting European transport on track for the future (COM/2020/789 final)
- National Policy
 - National Planning Framework – Project Ireland 2040
 - National Development Plan 2021-2030
 - National Investment Framework for Transport in Ireland
 - National Sustainable Mobility Policy
 - Department of Transport: Statement of Strategy 2021-2030
 - Climate Action Plan 2021
- Regional Policy
 - Regional Spatial and Economic Strategy for the Southern Region
 - Cork Metropolitan Area Strategic Plan
 - Cork Metropolitan Area Transport Strategy 2040
 - Iarnród Éireann Strategy 2027
 - Iarnród Éireann Cork Area Commuter Rail Programme Strategic Assessment Report (November 2021)
- Local Policy
 - Cork County Development Plan 2022-2028
 - East Cork Municipal District Local Area Plan (LAP)

The policy review confirms that the proposed Glounthaune to Midleton Twin Track project is consistent with EU, National, Regional and local policy provisions and will support existing and projected population centres and their sustainable economic growth. It will also facilitate future improved sustainable mobility options, supporting reductions in emissions from the transport sector and making rail travel a more viable alternative to private car use. The proposed development will deliver improved links to and from Cork City and provide a more efficient, sustainable, low carbon and climate resilient rail network, reducing road congestion. The

¹ [Cork Metropolitan Area Transport Strategy 2040](#)

proposed development helps to support Ireland's transition to a low emissions transport system helping achieve emission reduction targets.

1.4 Alternatives Considered

Four principal alternatives were considered for the proposed development:

'Do Nothing' alternative Option 1

With the 'do nothing' alternative, there would be no changes to the existing railway line between Glounthaune and Middleton and it would continue to operate as normal.

'Do Minimum' Option 2

Option 2 'Do-Minimum' explores whether inclusion of additional passing loops to the existing network will provide the required 10-minute service interval. The provision of new single-track passing loop along the existing single-track section of line will allow trains to run between Glounthaune to Middleton at 10-minute intervals, this option was found to be impractical.

Full Twin Track - Optimised Alignment Option 3

Option 3 considers the twin tracking of the single-track section, with minimum intervention to reconfigure the operational track layouts. This option looks at re-using the existing infrastructure where possible whilst providing an enhanced service interval of 10 minutes.

Full IRL1 Gauge and standard Cross Section Option 4

Option 4 consists of providing the full IRL1 gauge with standard cross sections along the route. New bridges would be required at four locations which do not achieve IRL1 gauge and three of these bridges are listed on the National Inventory of Architectural Heritage (NIAH).

Option 1 would mean foregoing the benefits of an upgraded rail line and slowing down the development of rail connectivity and economic potential as stated in the CMATS, RSES and Cork CDP. The frequency of trains would remain at the current capacity reducing the potential travel efficiencies for commuters, students and other members of the public. The increase in population at towns along the route would not be provided for in terms of a sustainable transport option.

Both Option 3 and Option 4 meet the project objectives.

- Option 3 would retain all NIAH listed bridges. It would require widening of the Owenacurra River bridge. As the existing piers can be used, environmental effects would be greatly reduced. This option would include removal of OBY 8 (an unused bridge, not a NIAH bridge) which has a local heritage value. Option 3 would require a derogation from standards but was considered feasible.
- Option 4 would cause significant permanent effects on the NIAH bridges along the railway line. There is also a potential for wider environmental impacts (like water quality effects) due to large amount of works required in dismantling and reconstructing bridges. Cork County Council suggested to avoid this significant impact on heritage structures.

Option 3 was therefore the preferred option and was taken forward as the proposed development for assessment in the EIAR. Throughout the design of the proposed development, the options selection assessment and the integration of the design and environmental team resulted in avoidance of environmental effects where possible.

1.5 Consultation

Consultation has been carried out in preparation of the EIAR in accordance with Article 6 of the EIA Directive. The consultation aims to inform consultees of the proposed development and

provides them an opportunity to submit feedback. The consultees include statutory bodies and members of the public including residents, business owners, landowners, individuals, organisations and community groups.

Stakeholder consultation was carried out in February 2022. This included consultation with prescribed bodies and stakeholders to inform them of the proposed Railway Order, and to identify potential concerns and comments on the contents of the EIAR, and to incorporate recommendations on the proposed development. Submissions were received from eight consultees in addition to several acknowledgements where no submission was received.

A public consultation was held in July-August 2022. A webpage on Iarnród Éireann's website was made available for the public consultation. This provided project information including proposed works, consultation sessions, Option Selection Report, project drawings, and FAQs. Engagement from 66 people was received in the form of letter or email. The feedback on the proposed development focused on community, design, environment and general feedback. A public consultation report is included as an appendix to Chapter 5.

The issues highlighted in statutory and non-statutory stakeholder consultation have been addressed as part of the design and the EIAR, as far as practical.

1.6 Description of the Proposed Development

The proposed development route is approximately 10km in length and comprises of:

- Twin tracking of the single-track sections between Glounthaune and Midleton totalling a distance of approximately 10km;
- Reconfiguration of the operational track layouts;
- Removal of 1No. bridge (OBY08, Ballyadam House overbridge) and widening of bridge deck crossing the Ownenacurra River (UBY11);
- Extinguishment of one level crossing (Ford CCTV XY010) and widening of one level crossing (Water Rock CCTV XY009);
- Provision of sidings/turn back facility at Midleton Station;
- Provision of new cable containment routes from Glounthaune to Midleton to facilitate signalling upgrades and alterations;
- Associated signalling upgrades and alterations; and
- All associated works (e.g. temporary construction compounds; drainage, retaining walls, boundary treatments).

There are currently (July 2022) 31 trains running daily between Cork and Midleton from Monday to Friday and 31 trips returning from Midleton to Cork, with stops at Cork, Little Island, Glounthaune, Carrigtwohill and Midleton. On a Saturday there are 18 trains each direction and on Sunday there are nine trains running from Cork to Midleton and nine trips returning from Midleton to Cork. The proposed development will facilitate an increase in frequency of trains of up to a 10-minute service in the future. The design line speed of the trains is 100km per hour and this will be maintained for the future operations.

There are three existing train stations along the proposed development, at Glounthaune, Carrigtwohill and Midleton. No works are proposed to the existing station buildings.

All appropriate Iarnród Éireann standards will be used in the development of the railway design and the TII Publications will be used where Iarnród Éireann infrastructure interfaces with public road. The drainage design will be undertaken in accordance with best practice.

1.6.1 Proposed Works

There are two existing bridges which will require works as part of the proposed development. The Ballyadam House Overbridge (OBY8) will be removed, and the deck of the Owenacurra River Bridge (UBY11) will be widened using existing river piers.

The bridge at Ballyadam House is an overpass built for agricultural purposes, to allow livestock and equipment access the farmyard at the rear of Ballyadam House. This bridge is not in use and would present an unjustifiable safety risk if it were retained. The widening of the bridge crossing of the Owenacurra River will allow for a double track. The widening structure span arrangement, structural form and articulation will match the existing bridge.

Works are also proposed at four culverts along the route: IDA Open Culvert (a portion of the existing culvert is to be re-aligned by skewing to the north over a length of ca. 200m), Culvert UBY2A (to be lengthened by ca. 2m to the north and ca. 2m to the south), Culvert UBY1B (to be lengthened by ca. 1m to the north), and Culvert UBY1C (to be lengthened by ca. 1m to the north).

There are currently three level crossings along the route, and it is proposed to close one of them (Ford CCTV XY010) and widen one level crossing (Water Rock CCTV XY009). No works are proposed to the third crossing.

It is proposed to construct new track alongside the existing single-track sections so that the line will have full twin tracks to facilitate an increase in train trips. It is necessary to realign the existing track slightly due to space constraints along the railway line. It is also proposed to construct additional sidings / turn back facilities at Midleton station.

The new twin track along the railway line will require the site to be cleared of vegetation and soil, and at some locations embankments will need to be re-profiled to allow for the new track. New sections of embankments will be required in areas of cut and retaining walls will be required where space is restricted. Retaining walls have been identified as required in order to minimise impact on adjacent lands or due to environmental constraints, or to maintain the railway corridor within the existing property boundary. The walls will be sheet piles with a reinforced concrete capping beam and steel handrail.

Drainage will also be constructed as part of the main works. Subgrade drainage will be installed to prevent the line from water logging. The proposed drainage will consist of filter drains, carrier drains, open V-ditches and subsurface drains. All existing outfalls will be retained, and no new outfalls will be required.

There is an existing property boundary fence along the length of the route however, additional lands are required due to proposed works which will be fenced following the compulsory purchase order of lands. Ca. 1.4ha of lands are to be compulsorily acquired for the proposed development. Existing fencing will be relocated and repositioned where appropriate. If there is a change in the track location a similar type fence will be relocated and if the track is not being moved the boundary fence will remain in place. Temporary noise barriers will be required at construction compounds to minimise noise effects.

Cable routes currently run parallel to the existing rail track on either side, carrying operational railway communications, signalling, and power cables. A section of the existing cable route will be relocated (ca. 8500m) to accommodate the construction of the second track.

The proposed works will also require new signage to be developed along the railway line including speed limit signs, mileposts, gradient signs and warning signs. A new signalling system will also be installed as part of a larger recontrol scheme. This will enable the operation of the reconfigured railway.

Additional lighting will be provided at Water Rock level crossing as part of the proposed works.

1.6.2 Construction Methodology

Iarnród Éireann is committed to contributing to the achievement of the United Nations Sustainable Development Goals (SDGs) and together with the CIÉ Group of Companies has developed a Sustainability Strategy that coordinates actions that assist in addressing national economic, social and environmental challenges. The proposed works focused on key themes of sustainability during design.

A Construction Environmental Management Plan (CEMP) will be implemented during the construction phase with key objective of safeguarding the environment, site personnel and nearby sensitive receptors from site activity which may cause harm or nuisance. This will remain a 'live' document to be reviewed regularly and revised as necessary to ensure effective implementation of measures. A Contractor's Environmental Clerk of Works (EnCoW) will also be appointed. Iarnród Éireann will monitor the contractor(s) performance on a regular basis and will undertake various compliance checks throughout the duration of the construction period.

A Construction Resource Waste Management Plan will also be implemented prior to construction by the appointed Contractor. This will provide for the segregation of all construction wastes into recyclable, biodegradable and residual wastes to facilitate optimum levels of re-use, recovery, and recycling operations.

Five temporary construction compounds will be required during the construction phase. These will include portacabins for offices and welfare facilities, parking for construction staff and material stockpiles. Two of the construction compounds are located on the west side and east side of the Owenacurra River. These will be set back from the riverbank at a distance of at least 15m.

The proposed development will take place in a long narrow corridor, 10km in length and of varying width (generally 15 to 30m). The proposed construction works will be undertaken over an extended period of time utilising both day and night time working. This will ensure minimum disruption to current railway operations. The number of construction workers required during the construction phase is expected to peak at approximately 125 persons. Subject to the grant of statutory approvals, the proposed works are anticipated to commence in Q4 2023 and will take approximately 36 months to complete. In general, it is anticipated that construction will take place between 0700 and 1900 Monday to Sunday when outside the operational railway footprint. Works within the operational railway footprint will be undertaken between 1900 and 0700 daily (in order to ensure the safety of the railway operations and construction staff). During the period of the railway closure, works will be undertaken around the clock. It is anticipated that the rail closure will be approximately 4 months and buses will be provided to transfer passengers. It will also be required to close Castle Rock Avenue to through traffic in order to facilitate level crossing upgrading works to Water Rock CCTV XY009. It is expected that the closure will last for 16 weeks with diversions in place.

Section 50 consents from the Office of Public Works will be required for the realignment of the IDA culvert (UBY2A) and consent will also be required for works at the Owenacurra River bridge. Following consultation with Inland Fisheries Ireland (IFI), if electrofishing is required, a licence will be required from IFI.

The majority of construction traffic will be generated during phase three and phase four, the earthworks phase (Q2 2024 – Q3 2025) and the track construction phase (Q2 2025 – Q1 2026).

A landscaping option has been recommended that considers the dual benefits of providing a habitat with considerable advantages for biodiversity, in particular pollinators, as well as providing an aesthetically pleasing landscape with low to moderate establishment requirements

and minimal maintenance needs to sustain the habitat. Also, where hedgerows are removed due to the works, the new fence line will be planted with a double staggered hedgerow comprised of native species.

The testing and commissioning of the new railway line will be a thorough and controlled process. The line will be returned to service post construction and commissioning. Any maintenance will be undertaken between midnight and 6am. The design life of the proposed development is a minimum of 60 years and Iarnród Éireann do not have current plans to decommission the railway infrastructure between Glounthaune and Midleton.

1.7 Population and Human Health

The study area for the assessment of population and human health comprises an area of ca. 500m from the railway line. Settlements (Glounthaune, Little Island, Carrigtwhill, Fota Island and Midleton) within the wider environs of the proposed development were also been included for this appraisal.

The impact assessment was conducted in accordance with relevant guidance and policies. The potential for impacts on population and human health is associated with the construction phase due to potential impacts from noise, light and dust emissions and traffic on the receiving environment.

Construction phase effects considered include:

- Impacts on Demographic and Economic Profile
- Impacts on Housing and Land Use
- Impacts on Community facilities, amenities, tourism and recreation
- Human Health and Wellbeing

It is expected that there will be no impact on the demographic profile (population or housing) during the construction phase of the proposed development. The proposed works are however expected to have a slight positive effect on the economic profile. During the construction phase, the proposed development will create additional construction-related jobs. The number of construction workers required during the construction phase is expected to peak at approximately 125 persons. The construction works are proposed for approximately 36 months. In addition to direct employment, the supply of building materials and the provision of professional services will generate significant off-site employment and economic activity. Revenue generated will benefit the local economy by increasing spending on local goods and services.

There will be minimal change in land use, as the proposed development is predominantly located within CIE lands along the existing railway line. Minor land takes are required but there will be no effect on residential properties. There will be no direct effect on housing during the construction period. Access to private properties and lands will be maintained during construction, however, there may be temporary disruptions.

There will be temporary negative impacts on tourism, recreation and amenities as a result of the proposals due to potential disruption to access, and general disturbance. The train line will remain open for the majority of the construction period and when closed for approximately 4 months, a bus transfer will be in place.

It is expected that there will be no significant offsite health risks.

Construction traffic and possible nuisances related to construction access requirements and temporary traffic congestion and traffic conversions are likely to have an impact. Small volumes of hydrocarbons will be used during construction activities, and these will be stored and handled

following best practices. Potential impacts associated with soil and/or ground/water contamination and subsequent health effects are negligible. The potential impact on soils is assessed in Chapter 10 (Land, Soils and Hydrogeology) and Chapter 11 (Surface Water and Flood Risk). Negative effects on public (Owenacurra River) and private water supplies, including the possibility of flooding, has been linked to potential health consequences. The mitigation measures are detailed in Chapter 11.

The potential impacts of air quality and noise and vibration during the construction phase are assessed in Chapter 8 (Air Quality) and Chapter 16 (Noise and Vibration).

Given the nature of the works and the sensitivity of human health and wellbeing receptors to disturbance, impacts are considered moderate during the construction phase and shall not extend into the longer term. Therefore, adverse impacts associated with the proposed construction works are expected to be temporary to short-term.

During the operational phase, the proposed development will have several long-term positive effects on the local community by providing the capacity to facilitate a future increase in train services from Cork City to Middleton. Significant adverse impacts during the operational phase are not likely.

The proposed works, due to increased frequency of trains, will also link commuters to other towns such as Mallow and Cobh and further afield to Cork City, Dublin, Killarney and Limerick junction. This will increase accessibility to Cork City, and therefore economic and employment opportunities, leading to long-term positive indirect economic benefits for the local communities, County Cork and the wider Irish economy. The proposed development will therefore result in long-term positive effects during the operational phase of the development, with respect to the demographic and economic profile.

Several housing development applications were identified in the study area. As a result of increased connectivity between towns along the route and Cork City, long-term positive impacts on housing, land use and facilities are expected during operational phase of the proposed development.

On completion of this project and other projects associated with the CACR programme, the railway line will have the capacity to facilitate a 10 minute frequency in each direction. The local community will benefit through increased access to educational facilities including 3rd level institutes, increased access to medical/health centres and accessible links to population centres (Cork City, Mallow, Cobh, Dublin). This will have a moderate positive impact on the population and economy and provide the benefits of improved reliability, and enhanced train frequency. The increased scheduling of trains will also have likely positive effects on accessibility of tourism, recreation and amenities and likely lead to an increase in modal shift from private car to the train. Iarnród Éireann Strategy 2027 instils a strong safety culture and will ensure minimum impact on people's well-being from change during expansion.

Any effects during maintenance works are likely to be imperceptible.

Projects within the study area that are likely to result in cumulative impacts were identified for assessment. There will be temporary, slight, positive effects on local businesses as a result of the cumulation of developments in the area due to the presence of construction workers using local facilities and purchasing goods during the construction phase. As a cumulation of impacts, there is likely to be a temporary slight-moderate negative nuisance effect on the local population due to traffic disruption, noise and dust. The increased housing developments in the area and the increased frequency of trains due to proposed development will result in a slight-moderate positive effect for local people and tourists.

There are no specific mitigation measures required to mitigate potential construction and operational impacts on population and human health in addition to the measures specified in other chapters of the EIAR. The appointed contractor will implement a CEMP and a Construction Traffic Management Plan (CTMP) and will be required to maintain close liaison with local community representatives, landowners and statutory consultees throughout the construction period in collaboration with Iarnród Éireann.

1.8 Air Quality

The air quality assessment considered impacts associated with construction dust within 350m of construction site boundary, within 50m of routes used by construction vehicles on public highway, and within 200m of site entrances. Emissions from construction vehicles and construction equipment were also considered.

The impact assessment was conducted in accordance with relevant guidance and policies and the impacts were assessed against relevant air quality standards and national air emissions targets. The proposed development consists of several different construction activities at different locations hence five separate construction dust assessments were conducted. Each assessment determined the risk of demolition, earthworks, construction and trackout.

The overall level of risk of impacts from dust emissions in the vicinity of each works area, before mitigation, is summarised below.

Table 1.1: Summary of the maximum risk of construction dust activity in each works area

Works area	Risk			
	Demolition	Earthworks	Construction	Trackout
Area 1 (East of Glounthaune)	N/A	Medium Risk	Low Risk	Low Risk
Area 2 (Carrigtwohill Industrial Estate)	N/A	Low Risk	Negligible Risk	Low Risk
Area 3 (Castlelake)	N/A	Medium Risk	Low Risk	N/A
Area 4 (West of Middleton)	Low Risk	Medium Risk	Low Risk	N/A
Area 5 (Middleton Town)	N/A	Medium Risk	Low Risk	Low Risk

These impacts will be temporary because for each section of railway construction activities will last for a short period before moving on to the next section of tracks.

The effects of construction plant emissions on local air quality are considered of negligible significance compared to surrounding road traffic contributions on the local road network.

The effects of construction road traffic on ambient air quality are also considered to be negligible across the study area as it does not exceed the criteria set by relevant guidance.

During the operational phase, the risk of exceedance of the 1-hour SO₂ standard due to emissions from stationary trains in areas where a train is stationary or idling for more than 15 minutes is considered negligible. The background annual mean NO₂ concentration in the study area (within 30m of the railway tracks) is likely to be well below 25µg/m³, therefore the risk of exceedance of the long-term NO₂ standard in this area due to emissions from moving trains is also considered negligible.

The existing pollutant concentrations are likely to be well below 90% of the relevant standards therefore, the risk of localised effects around the stations and level crossings resulting in exceedances of the air quality standards during operational phase is considered negligible. Any increases in traffic and emissions in local stations due to commuters to Cork who would use the Glounthaune to Middleton railway line as a park-and-ride service is likely to be offset by a reduction in traffic and emissions within the city of Cork, where NO₂ concentrations are likely to

be higher than in the study area (see Section **Error! Reference source not found.**), resulting in a potential net beneficial effect.

The impact associated with the decommissioning phase is similar to the impacts associated with the construction phase for air quality. Therefore, provided that appropriate mitigation is used, the impact of the decommissioning phase on air quality should be reduced to a level such that no significant effects would occur.

When assessed with other project impacts, the risk of cumulative impacts is negligible as the work activities along the track are likely to be completed sequentially in small sections. However, there is a risk of cumulative impacts due to committed developments in the vicinity of the proposed development. Appropriate mitigation measures will be undertaken to ensure that cumulative air quality impacts are not significant.

All mitigation measures will be outlined in the CEMP and with the successful incorporation of best practice mitigation the residual impacts on dust emissions from construction activities would be negligible.

1.9 Climate

A qualitative approach has been adopted for climate assessment in accordance with relevant guidance and policies. The proposed development has been divided into six phases with the second to fourth phases having the most significant impact, as shown in Table 1.2. These phases will require the usage of additional material such as fill, concrete, and steel, their transport, and the disposal of excavated materials offsite. Additionally, a temporary diversion will be needed to redirect traffic away from the construction site (at Water Rock level crossing), which will require vehicles to take a longer and potentially more congested route over the 16 week road closure. All sources of emissions will have an adverse effect.

The operational emissions will be an important contributor to the overall emissions as these will occur over the whole lifetime of the project. Maintenance and customer use will have moderate adverse effects compared to the do nothing scenario as increased frequency of trains will necessarily mean more maintenance and energy usage. The proposed development's overall significance may be qualified as minor adverse or negligible when accounting for the predicted modal shift. This anticipated operational saving would be further reduced when the new infrastructure is made suitable for electrified trains or trains powered by other low-carbon or renewable sources, rather than diesel engines.

Table 1.2 summarises the activities and emissions sources likely to arise from the project. Overall, given the impact of new construction, the proposed project is likely to have a significant effect.

Table 1.2: Summary of likely effects from proposed project

Phase	Construction Activity	Emission Source
Pre-construction	Preparatory works and consultations	Embodied emissions (in construction materials), vehicle movements and energy usage
	Boundary Fencing	Embodied emissions, vehicle movements
Enabling Works	Site Clearance	Vehicle movements
	Demolition of OBY8 Bridge	Vehicle movements and energy usage
	Demolition of OBY8 Bridge	Transport of waste
	Demolition of OBY8 Bridge	Waste processing and disposal
	Provision of infill	Vehicle movements and embodied emissions
	Earthworks (removal and reprofiling of embankments)	Vehicle movements, energy usage and removal of excavation

Phase	Construction Activity	Emission Source
Earthworks, drainage and track sub-base	Earthworks (new embankments, cuttings, and retaining structures)	Embodied emissions, transport of fill, and site activities
	Drainage	Embodied emissions, transport of materials, and installation
Construction	Culverts	Embodied emissions, transport of materials, and installation
	Culvert realignment	Embodied emissions, transport of materials, and installation
	Widening of bridge	Embodied emissions, transport of materials, and installation
	Track installation	Embodied emissions, transport of track, and installation
	Diversions	Additional traffic kilometres due to works
Signalling works	Cabling works	Vehicle movements, transport of materials, installation, some additional materials
	New signalling	Vehicle movements, transport of materials, installation, some additional materials
Commissioning works	Ensuring project delivery	Vehicle movements
Use	Maintenance, repair, and replacement	Vehicle movements, product usage/replacement, water and energy usage
	Operational energy use emissions	Operation of trains
Decommissioning	Deconstruction and demolition	Vehicle movements and energy usage
	Removal of waste material	Vehicle movements
	Treatment of waste material	Waste processing and disposal

A CEMP, CTMP, and CRWMP will be prepared by the appointed Contractor to include measures to mitigate climate impacts. Given the qualitative nature of this assessment, it is not possible at this stage to account for proposed mitigation and determine a residual impact.

1.10 Lands, Soils and Hydrogeology

The study area for this assessment is defined as the area crossed by the proposed development and the area extending 500m from the proposed works. The impact assessment has been conducted in accordance with relevant guidance and policies.

The assessment of impacts included those construction activities that have the potential to impact the following receiving environments:

- Land and land use
- Soils and geology
- Hydrogeology

During the construction and operation phase, permanent impacts to land and land use are minimal, with most of the works being within CIE property. Therefore, it is assessed that impacts to land and land use during construction and operation are anticipated to be negligible permanent residual impacts. A temporary slight adverse residual impact is associated with the loss of land for the site laydown areas.

During the construction phase, low adverse residual impact to soils and geology have been identified which are associated with the excavation and disruption of underlying soils and geology. However, geohazard impacts associated with landslide susceptibility and karst erosion

during both construction and operation are considered to be negligible following implementation of the mitigation and monitoring measures proposed.

During the construction and operation phase, negligible residual impacts to hydrogeology have been identified given that the additional mitigation and monitoring measures are implemented.

The proposed development will not result in a change in status of any Water Framework Directive (WFD) quality elements or prevent any groundwater bodies from reaching good status in the future, following the implementation of the embedded and additional mitigation measures proposed.

A robust CEMP will be in place during construction to ensure that there are no impacts to groundwater quality during construction.

1.11 Surface Water and Flood Risk

The Water and Flood Risk chapter assess the likely significant effects arising from the proposed development on surface waters in terms of surface water quality and flood risk through a desktop study and field surveys. The full report is contained within Chapter 11.

Potential impacts during construction, operation and decommissioning of the proposed development were assessed with regard to surface waters, water supply and wastewater discharge (including drinking water supply network, foul water and the drainage network), Water Framework Directive (WFD) surface water objectives and flood risk.

Given the nature of the proposals, the potential for impacts on the water environment are for the most part associated with the construction phase of the proposals and are similar to any civil engineering project. These include:

- Impacts to surface water quality from sediment runoff, spillages, discharges or physical modification of culverts.
- Impacts on water supply and drainage infrastructure.
- Impacts on flood risk

Effects during the operational phase are limited to oil and coolant leaking from trains, oil/greases/lubricant release from point switches and track curves, accidental spillage of chemicals. There will also be maintenance works along the railway line, however, this will be intermittent. Maintenance works may include vegetation trimming, application of herbicide, replacement of ballast and repair of track elements. Effects arising include spillage of chemicals/herbicide and dust/soil movement entering nearby watercourses.

A detailed flood risk assessment (Stage 3) has been carried out to assess the impact of the proposed development on existing flood risk. Although it is recognised that the existing railway track is at risk of flooding at various locations, the analysis determined that the proposed development will not increase flood risk to the railway track or elsewhere.

With the implementation of mitigation measures, the proposed development will not affect water quality elements or cause an increase in flood risk.

1.12 Biodiversity

Ecological surveys and a desk top assessment for the proposed development, including in combinations with other projects and plans, were undertaken with regard to the proposed development.

In EIA terms, there are no significant effects on European sites. The potential for residual or lasting impacts to Proposed Natural Heritage Areas (pNHA) associated with the proposed

development is assessed based on the features within the pNHA (including habitats, and ecology such as wintering birds) which were identified within the Biodiversity chapter as Key Ecological Receptors (KERs). These are features within the zone of influence of the proposed scheme which are “both of sufficient value to be material in decision making and likely to be affected significantly”. Guidelines state that KERs are of local importance or higher. Features of local importance are not considered in the guidance to be KERs and are therefore excluded from impact assessment.

The Residual Impacts of the Proposed Development on the KERs are detailed in the table below.

Table 1-3: Residual Impacts to Key Ecological Receptors (KER)

Habitats/Species	Ecological Value (as per NRA guideline)	Potential for Effect in the Absence of Mitigation	Potential for Residual Effect
European Sites			
Great Island Channel SAC Cork Harbour SPA Ballycotton Bay SPA	International Importance	Permanent significant adverse effects	Imperceptible
Cork Harbour Ramsar Site	International Importance	Permanent significant adverse effects	Imperceptible
Ballycotton Bay Ramsar Site	International Importance	Permanent significant adverse effects	Imperceptible
Proposed Natural Heritage Areas			
Great Island Channel pNHA Dunkettle Shore pNHA	International Importance (also European Sites)	Permanent significant adverse effects	Imperceptible
Douglas River Estuary pNHA Ballycotton, Ballynamona And Shanagarry pNHA		Permanent significant adverse effects	Imperceptible
Habitats and Sensitive Species			
Upper Salt Marsh (CM2)	International Importance	Permanent Significant Negative	Imperceptible
Other Artificial Lakes and Ponds (FL8)	Local Importance (Higher Value)	Short Term Slight Negative	Imperceptible
Drainage Ditches (FW4)	Local Importance (Higher Value)	Permanent Moderate Negative	Permanent Slight Negative
Wet Grassland (GS4)	Local Importance (Higher Value)	Permanent slight Negative	Permanent slight Negative
Mud Shores (LS4)	International Importance	Permanent Moderate Negative	Negligible impact
Hedgerows (WL1)	Local Importance (Higher Value)	Permanent Moderate Negative	Permanent Slight Negative
Treelines (WL2)	Local Importance (Higher Value)	Permanent Moderate Negative	Permanent Slight Negative
Wet Pedunculate Oak-Ash Woodland (WN4)	County Importance	Permanent Slight Negative	Permanent Slight Negative

Habitats/Species	Ecological Value (as per NRA guideline)	Potential for Effect in the Absence of Mitigation	Potential for Residual Effect
Scrub (WS1)	Local Importance (Higher Value)	Permanent Moderate Negative	Permanent Slight Negative
Owenaccura River	County Importance	Temporary Moderate Negative	Imperceptible
All Other Watercourses	Local Importance (Lower Value)	Permanent Moderate Negative	Imperceptible
Badger Setts	Local Importance (Higher Value)	Permanent significant negative effect	Short term slight negative effect
Otter holts and couches	County importance	Short term slight negative effect	Imperceptible
Amphibian breeding habitat	Local Importance (Higher Value)	Permanent slight negative effect	Permanent slight negative effect
Bat species roosting features	Local Importance (Higher Value)	Permanent moderate negative effect	Imperceptible
Wintering birds	International Importance	Short term significant negative effect	Imperceptible
Breeding birds	Local Importance (Higher Value)	Permanent slight negative effect	Imperceptible

With recommended mitigation measures to be undertaken during the construction and operational phase and the appointment of an Ecological Clerk of Works (ECoW) by the Contractor, the residual impacts will be temporary and Slight.

1.13 Landscape and Visual

The Landscape and Visual Impact Assessment (LVIA) assesses the likely landscape and visual impacts of the proposed development on the receiving environment. The visual impact was assessed at 12 no. selected viewpoints during the operational phase, viewpoints were not considered during the construction phase of the proposed development.

There will be temporary effects on the landscape character due to the construction compounds and the immediate surrounding areas. There will be impacts due to the intensity of construction activities such as the frequent movement of heavy vehicles both within and to and from the construction compounds. There will be site welfare facilities, lighting and vehicle parking, as well as areas of the site dedicated to the storage of construction materials. These are considered typical construction phase activities.

Construction activities directly related to the new rail infrastructure will occur almost exclusively within the existing rail corridor. The construction of the railway tracks are considered to have an inconsequential physical impact on the landscape.

There will be localised instances where vegetation removal will be required along the route and where the terrain will need to be re-profiled to accommodate the new infrastructure. Construction phase works will also involve the demolition of an old masonry bridge.

Following the completion of the construction phase, the main landscape effects during the operational phase relate changes in relation to the additional train line and the removal of vegetation. Vegetation removal will be highly localised and will be immediately adjacent to the

existing railway infrastructure. The landscape impact is considered negligible within the immediate vicinity of the proposed development.

The significance of visual impact was assessed at 12 no. selected viewpoints for the operational phase. Even without any specific mitigation measures, impacts were Slight-imperceptible and Permanent at three viewpoints and Imperceptible at the remaining nine viewpoints; thus, the visual impact of the proposed development is not deemed to be significant.

1.14 Archaeology, Architectural and Cultural Heritage

There is abundant evidence for prehistoric settlements in County Cork, and this is evident in the study area, along with evidence from the Medieval and Post-medieval periods.

Most impacts relating to Archaeology, Architectural and Cultural Heritage occur during the construction phase and are likely to be direct impacts as a result of sub-surface disturbance or construction works.

All impacts at the construction phase are considered to be negative and permanent. It is not considered that the twin tracking will not have any impact on townland boundaries where the townland boundary has already been transected by the existing railway (and the route will be within that existing break) or where the existing railway demarcates the current townland boundary.

An assessment of the proposed development on Archaeology and Cultural Heritage found that a programme of Archaeological Monitoring should be undertaken at the following locations:

- At the construction works at Glounthaune Estuary AAP (Johnstown/Killahora; CH030);
- At the groundworks within the Knockgriffin temporary construction compound AAP (Knockgriffin; CH031); and
- At the groundworks within the Townparks temporary construction compound AAP (Townparks; CH032).

This will reduce the Significance of Impact after implementation of mitigation measures to moderate.

No direct impacts are foreseen on archaeological, architectural or cultural heritage sites at the operational phase.

An assessment of the effect on the architectural heritage of the proposed development was also undertaken with the aim to safeguard any elements of architectural heritage significance within the subject site and its immediate vicinity. The following have been identified, with suitable mitigations, the effects will be negligible:

- The demolition of OBY 8, Ballyadam House Bridge is considered to be a slight, irreversible negative effect. It has not been given an architectural heritage designation (on the NIAH) and the effect is localised;
- When construction works are being carried out to widen the bridge deck of the Owenacurra river bridge (UBY 11), the historic buttresses that carry the bridge need to be protected during the works and assessed to ensure they can carry the structure without damaging them, during the operational phase;
- Piling for a retaining wall at culvert UBY 2 in close proximity to Haly's Bridge (OBY2) with the bridge being monitored frequently by conservation engineer to assess it for signs of stress. It is considered to be a neutral, manageable effect of brief duration. The extension of UBY 2 by 2m north and south will also necessitate the demolition and re-building of the NE wing-wall of Haly's Bridge (OBY 2), listed on the NIAH. The proposal to record, demolish and re-

build using lime mortar and the original stone is considered to be a slight, localised and brief effect.

- The proposed construction compounds at Glounthaune, Killacloyne, Ballyadam and Knockgriffen are not considered to have an effect from an architectural/ built heritage perspective and they are not in close proximity to any designated or undesignated architectural heritage structures.

It is not considered that there will be any effects during the Operational Phase.

1.15 Roads and Traffic

Likely impacts on roads and traffic can be summarised as follows:

Construction Phase

- Driver delay: Disruption and delay to users of roads from the road closures (temporary closure of a level crossing);
- Community Effects: Disruption and delay of users of footways and cycleways from the temporary closure of a level crossing; and
- Collisions and Safety: Detrimental effect on road safety as a result of the additional traffic movements that will be generated by the proposed development.

Operational Phase

- Driver delay: Disruption and delay to users of roads from the increase in operation of level crossing barriers (as a result of an increase in rail services);
- Community Effects: Disruption and delay of users of footways and cycleways from the increase in operation of level crossing barriers (as a result of an increase in rail services).

The temporary effects of construction (none of which have been assessed as 'significant') or otherwise) will be mitigated through adoption of a regulated and approved Traffic Management Plan, included within the EIAR. The Table overleaf provides a summary of the impact assessment undertaken for both construction and operation phases of the proposals in terms of roads and traffic, with the implementation of mitigation.

Table 1-4: Impact Assessment Summary

Phase	Aspect	Embedded design, mitigation and enhancement measures	Duration of impact	Magnitude of impact (with mitigation)	Significance impact
Construction	Driver Delay – disruption and delay to users of roads from closure of Castle Rock Avenue	Implementation of CTMP including signage advising of closure and diversion routing	16 weeks	6 minutes (typical)	Minor (Not Significant) Temporary
	Driver Delay – disruption and delay to users of roads from additional traffic generated by the development	Implementation of CTMP	None	None	None (Not Significant) Temporary
	Community Effects (including Severance) - Disruption and delay of users of footpaths and cycle paths from construction work in or adjacent to active travel infrastructure	Implementation of CTMP	None	None	None (Not Significant) Temporary
	Accidents and Safety - Detrimental impact on road safety as a result of the additional traffic movements that will be generated by the proposed development	Implementation of CTMP	None	None	None (Not Significant) Temporary
Operational	Driver Delay – disruption and delay to users of roads from additional closure periods of level crossing at Midleton	Iarnród Éireann and Cork County Council will investigate potential implement measures to reduce the magnitude	Permanent	Range 0 to 5 minutes	Minor (Not Significant)
	Driver Delay – disruption and delay to users of roads from additional closure periods of level crossing at Castle Rock Avenue	None	Permanent	Range 0 to 2 minutes	None (Not Significant)
	Driver Delay – disruption and delay to users of roads as a result of the additional traffic movements that will be generated by the proposed development	None	None	None	None (Not Significant)

Phase	Aspect	Embedded design, mitigation and enhancement measures	Duration of impact	Magnitude of impact (with mitigation)	Significance impact
	Community Effects (including Severance) - Disruption and delay of users of footways as a result of additional closure periods of the Mill Road (Midleton) level crossing barriers	Iarnród Éireann and Cork County Council will investigate potential to implement measures to enhance the amenity of pedestrians adjacent to the level crossing	None	Range 0 to 2 minutes	None (Not Significant)
	Community Effects (including Severance) - Disruption and delay of users of footpaths and cycle paths as a result of the additional traffic movements that will be generated by the proposed development	None	None	None	None (Not Significant)
	Accidents and Safety - Detrimental impact on road safety as a result of the additional traffic movements that will be generated by the proposed development	None	None	None	None (Not Significant)

1.16 Noise and Vibration

An assessment of predicted noise and vibration impacts arising during the construction and operation of the proposed development has been undertaken. This has been informed by the prediction of impacts using theoretical and empirical models and the results of background noise surveys conducted in March and April 2022.

Noise and vibration arising during construction will be controlled by the implementation of measures set out in the CEMP.

During the construction phase the need to undertake many activities at night inevitably could lead to temporary significant impacts from construction noise where activities are in close proximity to residential properties. Given the nature of the work, whilst best practice will be applied, some significant impacts may be impossible to avoid, and alternative arrangements to protect the affected properties may be needed. The construction methodologies will be refined at the detailed design stage, and agreement reached with the relevant stakeholders on a way to minimise any significant effects.

During operation there is an area adjacent to the proposed development which is already exposed to noise and vibration from the existing railway. Implementation of the scheme will lead to an intensification of use of the existing twin track, and on the new twin track. This will lead to increases in noise and vibration to the closest receptors, with minor to moderate increases in noise. Both noise and vibration levels will be below levels considered to result in significant adverse effects.

1.17 Material Assets

Utility providers within the project area were contacted to establish the potential impact of the planned works on their installations. There are no known third party utility providers within the works corridor. No diversions are currently planned. There is limited potential for disruption to services during construction works, however, if services are identified, impacts will be localised and brief in duration and the measures detailed above will ensure that this will not result in significant impacts in the receiving environment.

The design of the proposed development has been developed to retain structures and bridges in so far as is practicable. The removal of the Ballyadam House overbridge will have a permanent slight negative effect. The widening of the Owenacurra River Bridge will have a slight positive effect, as it will facilitate the proposed twin track layout. The modification of the culverts and level crossings will also have a slight beneficial effect, facilitating the proposed development.

Ca. 40,000m³ of cutting/excavation is required and ca. 38,000m³ of fill is required for the works and ca. 14,000 m³ of ballast. These volumes can be reduced if cut ground can be reused on site. The Contractor will be obliged to aim for an overall recycling rate of 70% of construction and demolition waste, in accordance with EU targets under the Waste Framework Directive (2008/98/EC).

There will be no effects on utilities during the operational phase. The culverts, widened level crossing and widened Owenacurra River bridge will facilitate the operation of the proposed development, having a slight positive effect.

In terms of waste, waste materials will arise, as is currently the case during periods of maintenance along the railway line. Effects will be long term and imperceptible to slight. Maintenance activities will result in the removal of spent ballast over the long term and the effect will be slight.

Once construction is complete significant adverse residual impacts associated with the proposed development on utilities, built assets and waste management are unlikely.

The implementation of the mitigation measures, including the CEMP will reduce the environmental impact of the proposed development and the residual effect will be imperceptible over the temporary – short term during construction. Residual operational effects are slight and long-term due to maintenance along the railway line.

1.18 Major Accidents and/ or Disasters

The potential for significant adverse effects of the proposed development on the environment deriving from its vulnerability to risks of relevant major accidents and / or disasters has been assessed. In all cases it was concluded that the reasonable worst consequences are managed to an acceptable level with existing mitigation in place.

In summary, there is no perceptible impact with regards Major Accidents and/or Disasters, which are not anticipated during the construction or operational phases.

1.19 Interactions

The nature of the environment is such that interactions between all environmental topics are potentially possible and / or may occur to a certain extent for most projects. Key environmental interactions that have been identified are discussed in the following table.

Interaction	Description
<p>Population and Human Health interactions with: Air, Climate, Water and Flood Risk, Landscape & Visual, Archaeology, Architectural and Cultural Heritage, Roads and Traffic, Noise & Vibration</p>	<p>Air Quality changes on local community during the construction phase are likely due to increased dust emissions from increased construction traffic, however the effect will not be significant following mitigation. Localised impacts on air quality are found to be negligible with respect to traffic emissions. Once operational, air quality impacts associated with the proposed development are not considered to be significant and the impact of additional trains are considered to be negligible and not significant.</p> <p>Climate. The proposed development will potentially reduce air pollution as commuters and rail users move from reliance on vehicular transport to increased use of trains. The future potential of an increase in the electric fleet, will also have a beneficial impact on climate pollutants as well as air quality emissions as electricity can be powered by renewable sources rather than fossil fuels.</p> <p>Water and Flood Risk, There is potential for impacts during the construction phase, in the absence of mitigation. The use of oils and lubricants during the operational phase if leaked into watercourses could potentially have impacts for local communities in terms of poor water quality. With the implementation of mitigation measures presented within this EIAR the impacts are likely to be minimised.</p> <p>Landscape & Visual, Visual impacts associated with the proposed development have the potential to impact on population, for example, views of machinery and hoarding during construction. As there is an existing railway line in place there will be no significant change to views or the landscape when operational.</p> <p>Archaeology, Architectural and Cultural Heritage, There is potential for impacts on cultural heritage assets during the construction phase. As is not unusual with any construction works involving earthworks, there is the potential for previously unrecorded archaeology to be uncovered during excavation works. Any disturbance of ground and drainage patterns can also impact unrecorded archaeology and cultural heritage. Mitigation measures are detailed within Chapter 14 of this EIAR and the Construction Environmental Management Plan which will ensure that such impacts are minimised to negligible/moderate significance.</p> <p>Roads and Traffic: There will be an increase in construction traffic levels and potential impacts on the local community. The number of vehicles on roads associated with the proposed development is likely to increase during the construction phase due to the movement of workforce to the works areas. During operation, the increased level of train service may contribute to the change in journey characteristics for the population with increased capacity and frequency of commuter rail services, the journeys made by private vehicles may decrease.</p> <p>Noise & Vibration: It is considered that there will be an increase in noise levels and impacts on the local community generated from construction activities. Following the implementation of the proposed mitigation measures, these effects will be minimised. The area adjacent to the proposed development is already exposed to noise and vibration from the existing railway. The proposed development will lead to increases in noise and vibration to the closest receptors, with minor to moderate increases in noise. Noise and vibration levels will be below levels considered to result in significant adverse effects.</p>
<p>Air quality interactions with: climate, biodiversity, roads and traffic</p>	<p>Climate, The proposed development has the potential for negative impacts on climate. However, air quality impacts associated with the proposed development are not considered to be significant and the impact of additional trains is considered to be negligible and not significant in terms of emissions.</p> <p>Biodiversity, Air quality changes on flora and fauna such as dust during construction may affect flora and fauna. Run off from works areas can impact water quality and biodiversity, dust deposition and soiling can impact on biodiversity. Following the implementation of the mitigation measures dust impacts are not predicted to be significant. Consequently, no significant residual dust effects on surface water quality or biodiversity are predicted.</p> <p>Roads and Traffic: During the construction phase, it is not expected that there will be any significant effects from construction road traffic on ambient air quality.</p>

Interaction	Description
<p>Climate interactions with: Water and Flood Risk, Biodiversity, Roads and Traffic</p>	<p>Water and Flood Risk: The impact of climate change on hydrology increases the potential for future flood risk, the latest climate change guidance has been considered when assessing the impact of the future climate change on flood risk and is included within Chapter 11 Surface Water and Flood Risk, of this EIAR.</p> <p>Biodiversity: The proposed development (along with other future developments) will facilitate a future reduction in emissions associated with the modal shift from private cars to trains which will result in reducing the effect of local emissions and associated effects on habitats, flora and fauna.</p> <p>Roads and Traffic: During the operational phase, the proposed development, along with other future developments, will facilitate an increase in the frequency of trains thereby encouraging a modal shift from private cars to trains. This will have a positive impact on climate due to lower emissions.</p>
<p>Land, Soils & Hydrogeology interactions with: Surface Water and Flood Risk, Biodiversity, Landscape & Visual, Archaeology, Architectural and Cultural Heritage.</p>	<p>Water and Flood Risk: The excavation of soils and rock for the proposed development, poses a potential risk to nearby watercourses as a result of sediment run off. Earthworks associated pose a risk to waterbody from sediment runoff. Best practice techniques, mitigation measures and guidelines have been outlined in Chapter 10 Land, Soils & Hydrogeology and Chapter 11 Water and Flood Risk and the Construction Environmental Management Plan of this EIAR.</p> <p>Biodiversity: Earthworks during the construction phase have the potential to impact on the Great Island Channel SAC and other nearby watercourses through construction site runoff. The potential impacts are likely to arise from soil excavation and from construction activities that require earthworks. A suite of best practice techniques, mitigation measures and guidelines have been outlined in Chapter 10 Land, Soils & Hydrogeology and Chapter 12 Biodiversity. All construction works involving the movement of soils will consider the identified locations of Invasive Alien Species. An updated invasive species survey will be carried out during the appropriate growing season (May–October). The findings of this invasive species survey will be incorporated into an updated Invasive Species Management Plan by the Contractor’s Ecological Clerk of Works (ECoW).</p> <p>Landscape & Visual: The construction works are considered to have a moderate-slight magnitude effect, in the vicinity of the construction compound, in the short term. The overall operational phase landscape impact will be permanent in duration, but the significance is deemed to be Imperceptible. Therefore, significant landscape impacts are not anticipated during the construction or operational phases. The impact is assessed fully in Chapter 13 Landscape of this EIAR.</p> <p>Archaeology, Architectural and Cultural Heritage: The disturbance of soil during the construction phase of the proposed development has the potential to uncover archaeological finds. All sub-surface groundworks associated with the proposed development works at the Glounthaune Estuary AAP, Knockgriffin temporary compound AAP and Townparks temporary construction compound AAP shall be subject to a programme of archaeological monitoring. Further mitigation measures are detailed in Chapter 14 Archaeology and Cultural Heritage of this EIAR.</p>
<p>Water and Flood Risk interactions with: Biodiversity, Roads and Traffic</p>	<p>Biodiversity: Construction activities have the potential to pose a risk to watercourses, particularly if contaminated surface water from construction activities was to enter the receiving waterbodies. Chapter 12 Biodiversity and the Construction Environmental Management Plan set out measures to prevent the runoff of contaminants during construction.</p> <p>Roads and Traffic: The proposed development has potential to impact on local roads during construction, including run off from local roads utilised during the construction phase. The implementation of the mitigation measures proposed within Chapter 11 Surface Water and Flood Risk, Chapter 15 Roads and Traffic and the Construction Environmental Management Plan should minimise any residual effects.</p>

Interaction	Description
Biodiversity interactions with: Noise & Vibration	Noise & Vibration: Noise and vibration can cause disturbance of protected species from noise and vibration generated from construction activities and during increased frequency of train operations. For activities which emit high levels of noise and for noise emitting works at night, sound reducing hoarding will be placed adjacent to works areas to protect fauna. Mitigation measures can include: the use of mufflers on pneumatic tools, effective exhaust silencers, sound reducing enclosures and machines in intermittent use shall be shut down during periods where they are not required. Further mitigation is included with the Chapter 12 Biodiversity, Chapter 16 Noise and Vibration and the Construction Environmental Management Plan.
Landscape and Visual interactions with: Archaeology, Architectural and Cultural Heritage.	Archaeology, Architectural and Cultural Heritage: The impact on the settings of structures of architectural heritage significance represents an interaction with landscape and visual assessment, as does the siting of landscaping as a means of mitigating the visual impact of certain of the proposed works. There are no protected heritage sites located within the immediate study area, therefore significant landscape impacts are not anticipated during the construction or operational phases.
Archaeology, Architectural and Cultural Heritage interactions with: Material Assets	Material Assets: As with any civil construction works of this nature, there is potential for previously unrecorded archaeology to be encountered during excavation works. Disturbance of ground within newly acquired lands may impact unrecorded archaeology and cultural heritage. The implementation of the measures described in this EIAR will ensure that such impacts are minimised.
Roads and Traffic interactions with: Noise & Vibration, Material Assets	Noise & Vibration: Traffic noise is likely to arise from movement of construction traffic along routes to deliver materials to construction compounds adjacent to the proposed development. Works are likely to take place at day and night time, with no predicted significant adverse impacts during day works and significant adverse impacts during night-time works. Chapter 16 Noise and Vibration and the Construction Environmental Management Plan of this EIAR set out measures to reduce the effect of noise from HGV movements on sensitive noise receptors. Material Assets: There is potentially an interaction between resource and waste management and traffic and transport effects during the construction phase of the proposed development. The transportation of resources and waste to and from site has the potential to affect local traffic and transport patterns during the construction phase. Materials will require transport from the construction compounds to the various sections of the proposed development and there will also be material requiring transport for disposal. A Construction Traffic Management Plan has been produced and will be updated by the appointed contractor. This is included as an appendix to the CEMP.

