Cork Line Level Crossings

Volume 2, Chapter 2: Project Need and Alternatives

Iarnród Éireann

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Contents

Table of Acronyms

Acronym	Meaning
ABP	An Bord Pleanála
CA	Competent Authority
CCTV	Closed Circuit Television
CIÉ	Córas Iompair Éireann
CIÉ GP	Córas Iompair Éireann Group Property
CRR	Commission for Railway Regulation
EC	European Commission
EEC	European Economic Community
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
IÉ	Iarnród Éireann
IÉ NWD	Iarnród Éireann New Works Department
IÉ CCED	Iarnród Éireann Chief Civil Engineers Department
IÉ IMOD	Iarnród Éireann Infrastructure Management Operations Department
IÉ SETD	Iarnród Éireann Signalling, Electrical and Telecommunications Department
LC	Level Crossing
m	Metres
MCA	Multi Criteria Analysis
PCR	Planning Compliance Report
PDR	Preliminary Design Report
RAIU	Railway Accident Investigation Unit
RSF	Right Side Failure
SPAD	Signal Passed at Danger
TII	Transport Infrastructure Ireland

2. Project Need and Alternatives

2.1 Introduction

This chapter sets out the need for the proposed Project and the alternatives considered as the scheme has evolved. It outlines national objectives to enhance the safety of the national railway network, to increase railway line speeds through electrification and to eliminate/upgrade level crossings. The chapter also highlights national as well as site specific health and safety issues associated with the subject level crossings.

There is an underlying health and safety issue with any interface between a railway line and a public road. The function of a level crossing where there is an overlap in two different transportation modes is such that there is a heightened risk of an accident occurring. It is the duty of CIÉ to maintain the operational safety of the railway network and it is the policy of both CIÉ and IÉ to remove all level crossings in Ireland.

The existing level crossings that are the subject of the proposed Project are located along a 24km section of the Dublin – Cork Railway Line (from the northernmost level crossing at XC187 Fantstown to the southernmost at XC219 Buttevant) and are the only remaining manned level crossings on the Cork Main Railway Line. CIÉ and IÉ have identified the subject level crossings clustered within this relatively small area as a combined health and safety risk that must be addressed. Furthermore, CIÉ and IÉ are cognisant of the eventual electrification of the Dublin – Cork Railway Line and the higher speed/greater volume of railway traffic which will result from this future upgrade. An infrastructure upgrade of that nature has the potential to increase the existing safety risk profile of the railway and interventions such as the proposed Project will assist in reducing that potential risk by eliminating/reducing existing level crossing interfaces.

Volume 2, Chapter 5: Planning Policy Context outlines the full hierarchy of legislation as well as national and local planning policy applicable to the proposed Project. Furthermore, a Planning Compliance Report (PCR) has been prepared as part of the suite of documentation for the Railway Order application package. The PCR sets out the proposed Project's compliance with national and local policy objectives to improve railway safety and create a more efficient railway network.

The consultation exercise with key consultees as well as the public (as outlined in Volume 2, Chapter 1: Introduction) has demonstrated broad support for the principles behind the proposed Project and a general acknowledgement of the need to eliminate/upgrade the subject level crossings.

2.2 Project Need

2.2.1 Overview

The Need for the proposed Project is two-fold: to reduce the safety risk profile of the railway; and to increase operational reliability. However, reducing risk and improving safety is the primary need for the proposed Project.

Reducing the risk profile is considered in the context of national infrastructure improvements, identified in the National Development Plan (2018-2027) and national policies on railway safety set out in IÉs own documents and those by the Commission for Railway Regulation (CRR). In addition, the current baseline for the existing level crossings in terms of incidents and accidents is reviewed.

The operational reliability of the railway is considered in terms of the proposed electrification of the railway line and its current efficiency, including for example delays caused by vehicle strikes at the crossings. Improvement efficiencies and reduced journey times for road users is also reflected upon, as an indirect benefit to the proposed Project.

2.2.2 Reducing the Risk Profile

National Infrastructure Improvement Policy

The National Development Plan (2018-2027) sets out that the Dublin-Belfast, Dublin-Limerick and Dublin-Cork lines will be *"subject to an examination to move to higher speeds leading to improved connectivity to regional cities through improved rail journey times*[1]*"*

It is the general duty of CIÉ, as detailed in Section 15 of the Transport Act 1950 (i.e. establishing legislation for CIÉ), to:

"provide or secure or promote the provision of an efficient, economical, convenient and properly integrated system of public transport for passengers and merchandise by rail, road and water with due regard to safety of operation, the encouragement of national economic development and the maintenance of reasonable conditions of employment for its employees and for that purpose it shall be the duty of the Board to improve in such manner as it considers necessary transport facilities so as to provide for the needs of the public, agriculture, commerce and industry"[2]. (underlining emphasis added)

Similarly, the Railway Safety Act 2005 (the 2005 Act), section 36, provides that it shall be the general duty of a railway organisation to ensure, in so far as is reasonably practicable, the safety of persons in the operation of its railway.

2.2.3 Safety Policy

The 2030 Iarnród Éireann Rail Network Strategy Review (2011) sets out under 'Background' that a broad strategic goal for the rail network is:

"To provide safe, accessible and integrated rail services that contribute to the sustainable economic and regional development in an efficient manner".

It further states that:

"The Irish Rail Network Wide Risk Model (NWRM) determined that train collision with vehicles at level crossings remains one of the single biggest accident types that contribute to the overall risk on the rail network."

It continues under Section 2.3.5 (Safety) that:

"Current Irish policy on railway safety has its roots in the Railway Safety Investment Programme that was developed in 1999 following an in-depth Safety Review that had been carried out the previous year".

It sets out that a Railway Safety Task Force was established to address the recommendations from the review. The Task Force recommended a series of investments including the closure or upgrading of level crossings. It further outlines under Section 4.2 (Rehabilitation of Infrastructure & other Key Investments) that over the 11 year period between 1999 and 2009 the Programme of investment has enabled IÉ to

"Close or upgrade over 1,000 level crossings."[3]

The IÉ 10-year Asset Strategy for User-Worked Level Crossings (2013) outlines that:

"Ultimately, the elimination of level crossings is always going to be the best solution to reducing risk."[4]

The Commission for Railway Regulation (CRR) Railway Safety Performance in Ireland 2018 sets out that "*Level crossings are a significant risk to the railway and to any third parties who use them. The long-established trend… is a decrease in the in the number of level crossings; there were 1701 level crossings in 2004 vs. 934 recorded for 2018.*" It further states that "*Sustained efforts by Iarnród Éireann have contributed greatly to reducing the risk presented by level crossings."*[5]

[1] The National Development Plan (2018-2027)
[2] Section 15 of the Transport Act 1950
[3] 2030 Iarnród Éireann Rail Network Strategy Review (2011)
[4] IÉ 10-year Asset Strategy for User-Worked Level Crossings (2013)
[5] Commission for Railway Regulation (CRR) Railway Safety Performance in Ireland 2018

Specifically, in regard to manned or "attended" level crossings the number nationwide has reduced from 72 in 2012 to 51 in 2018.

The CRR Statement of Strategy 2018 – 2020 states under the heading 'Railway Interfaces' that:

"While the number of level crossings continues to decline, they are a significant area of risk given the reliance of third parties to operate and use the level crossing correctly. Misuse by level crossing users remains a cause for concern and we will continue to work with Iarnród Éireann and the road safety authority on reducing risk at level crossings." (underlining emphasis added).[6]

The NTA has prepared the Draft Integrated Implementation Plan 2019-2024 and one of its objectives under Section 7.2 for rail investment is to:

"Continue investment in a level crossing closure programme."[7]

To put these national policy statements into context: the permitted line speed of trains at the level crossing locations can reach up to 160km/hr. There are 30 to 35 scheduled trains (combined directions) passing over the subject level crossings daily. The majority of these trains are locomotive hauled express services to / from Cork each weighing 440 tonnes and capable of carrying up to 420 passengers. In addition, there can be up to 10 unscheduled train movements daily, which could be engineering trains, freight trains, or other track recording vehicles. If there was an third party incident at a level crossing junction, for example, a vehicle crashing through a closed level crossing which would be a significant safety risk should a train be approaching at the same time (vehicle strikes on level crossings in terms of delays caused are discussed further in Section 2.2.4 of this chapter). In addition, human error at manned level crossings could contribute to increased safety risks.

2.2.4 Safety Supervision and Investigations Legislative Context

Commission for Railway Regulation

Up until 1 January 2006, railway safety was supervised by Railway Inspecting Officers of the Department of Transport. An independent Railway Safety Commission (RSC), established under the 2005 Act, took over this function at that point. It was designated as a safety authority under European Union law pursuant to Statutory Instrument 57 of 2008. On 29 February 2016, the RSC became the Commission for Railway Regulation (CRR) consequent upon its designation as a regulatory body in EU law under SI 249 of 2015.

The CRR, as part of its remit, investigates railway accidents and incidents for the purposes of determining the compliance of railway organisations with their safety management systems (SMS) and safety targets. This is achieved through post occurrence inspections. The CRR do not investigate accidents and incidents for cause. This is the responsibility of the Railway Accident Investigation Unit (RAIU) which is an independent investigation unit within the Department of Transport.

Railway Accident Investigation Unit

The European Union (Railway Safety) (Reporting and Investigation of Serious Accidents, Accidents and Incidents) Regulations 2014 (S.I. No. 258 of 2014) repealed section 55 of the 2005 Act (which had initially provided for the establishment of the RAIU) and restated the national law that gives effect to Chapter V of Directive 2004/49/EC on safety of the Community's railways. Chapter V of the Directive provides for railway accident and incident investigation and reporting. The Regulations made in S.I. No.258 of 2014 provide for the establishment of the RAIU to investigate railway accidents and incidents in accordance with the Regulations. The Regulations made under S.I. No. 258 of 2014 replace and repeal the provisions for investigation of accidents and incidents by the RAIU under the 2005 Act. The stated purpose of an investigation by the RAIU is to improve railway safety by establishing, in so far as possible, the cause or causes of an accident with a view to make recommendations for the avoidance of accidents in the future and it is not the purpose of the RAIU to attribute blame or liability.

[6] CRR Statement of Strategy 2018 – 2020- Railway Interfaces
[7] Draft Integrated Implementation Plan 2019-2024

The RAIU maintains a website that sets out current investigations/incidents on railway lines/crossings throughout Ireland, mainly at field crossings and user worked level crossing, as follows: https://www.raiu.ie/investigations/.

2.2.5 Incidents and Investigations

A number of sources of information on incidents and accidents were reviewed to determine the safety context for the proposed Project. These included:

- CRR Annual Report 2019 (national context);
- RAIU Investigation Reports (national context); and
- IR Statistics for incidents at the seven sites that form the proposed Project.

Commission for Railway Regulation (Annual Report 2019)

In order to fulfil its safety functions, the CRR undertakes a range of activities associated with conformity assessment, authorisation to place in service, licensing, monitoring, supervision and enforcement. These actions are focused on the continued safe operation of the railway and tramway network in Ireland. The CRR Annual Report (2019) amongst many other things reports on these activities, areas of non-conformance, enforcement actions, reportable incidents, investigated by the RAIU. Included within Appendix 4 of the report is a set of national statistics on accidents 2009 – 2019. Those related to level crossings are detailed in Table 2.1.

Table 2.1: Commission for Railway Regulation (CRR) Annual Report 2019 – Accident Statistics

Category	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Fatal Injury to third party at a level crossing involving a train	-	2	-	-	-	-	-	-	-	-	-
Fatal injury involving train in motion on railway or level crossing where trespass or suspicious death was indicated	3	8	7	5	4	6	2	5	9	8	4
Third party at level crossing injury involving a train	-	-	1	2	-	-	-	-	-	1	1
Level crossing user injury not involving a train	1	-	2	5	1	-	-	-	-	1	1
Employee lost time injury while working at level crossing not due to train in motion.	-	-	-	1	1	2	-	3	1	1	1
Train collision with pedestrian at a level crossing	-	0	-	-	-	-	-	-	-	-	-
Train collision with attended gates at a level crossing	-	1	-	-	-	-	1	-	-	-	-

It is clear from the above that there are instances of fatal injury, injury, collisions and trespass at level crossings throughout the railway network and that the problem has not been eradicated.

RAIU Investigation Reports

The RAIU investigates all serious incidents involving railways and tramways; a serious incident is any train collision or derailment resulting in the of at least one person or serious injuries to five or more persons or extensive damage to rolling stock the infrastructure or environment or any incident with an obvious impact on railway safety regulation of the management of safety. Each year the RAIU publishes reports of the investigations it has undertaken.

Investigation Report - Operational Incidents at Ardrahan and Spa October and November 2015

In October 2016, the RAIU published an investigation report with regard to two incidents that took place within five weeks of each other.

With regard to the Ardrahan incident, a passenger service from Limerick to Galway was involved in a platform overrun and Signal Passed at Danger (SPAD) and travelled through Level Crossing XE156 Ardrahan with barrier raised and open to traffic.

With regard to the Spa incident, a passenger service from Ballybrophy to Limerick passed signals at danger without authority and collided with the level crossing gates at Level Crossing XN159 Spa. The gates at XN159 were damaged and required replacement.

The investigation report states "*The RAIU investigation found that the immediate cause of both overruns was an insufficient rate of adhesion to bring the vehicle to a stop before the relevant signals*."[8]

The above illustrate that there are occasions (albeit rare) of trains failing to stop at a danger signal and continuing through a level crossing open to traffic.

Investigation Report – Vehicle Struck by Train at Cartron Level Crossing August 2018

This study identified five groups of (human) functions that were relevant:

- Attention: including monitoring the road; distracting activities (mobile phone, radios); influence of other factors such as alcohol, fatigue; and factors competing for attention such as children in the car, radio shows.
- Perception; including of lights, signs, markings and barriers; perception of distance, speed, changes in the road; and perception of the behaviour of other road users.
- Cognition: realising that one is approaching a level crossing and what is expected; recognizing dangers and limitations; being able to predict occurrences and the behaviour of other road users; and availability of knowledge relating to level crossings.
- Motivation: understanding the dangers entailed; social pressure; self-esteem; target risk; and exaggerated feelings of control.
- Performance: ability to control the vehicle over the rails; choice of speed and distance from the curb; being able to choose when to stop; and adaptation to road surface, visual clarity and opposing traffic.

The UN-ECE Group of experts is taking this conceptual model forward into a methodological framework for assessment and design of level crossings. For the proposed Project, this model illustrates the myriad of factors influencing human behaviour at level crossings and the possibility of increased risk as a result of one or a combination of these factors. Whilst manned level crossings are less risky than user-operated gates, or those with

[8] Investigation Report - Operational Incidents at Ardrahan and Spa October and November 2015

no gates at all, all of the factors described are applicable at manned crossing also and a number of them to the operator as well as drivers. Removing level crossing where possible, eliminates all of these risks.

Iarnród Éireann Incident Reporting

IÉ maintains its own register of incidents and accidents on its railways and in the first six months of 2019, IÉ reported 51 incidents at public road level crossings, an increase of 82% on the same period in 2018. This figure includes cars and Heavy Goods Vehicles (HGVs) colliding with barriers and near-misses between vehicles and trains.

Site Specific Incidents

As of 2020, there are 48 attended level crossings on the railway network, 7 of which are the focus of the proposed Project and 41 others. Directly in relation to the seven level crossings within the proposed Project, Table 2.2 details accidents/incidents recorded by IÉ over a 6-year period (some information is available for 2020) for each location. Volume 5, Appendix 2A includes accident statistics for the level crossings associated with the proposed Project (as set out in Table 2.2 below) and accident statistics for the remaining 41 attended/manned level crossings throughout the IÉ Rail Network on operational lines.

Table 2.2: Accidents/Incidents 2015 – 2020

XC187 Fantstown						
Incident Type/Year	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Inappropriate Crossing Operation	1					
Crossing equipment failure		1				
Level Crossing Incident – operator problem with key			1			
Smoke reported – NFF Train			1			
Person threatening self-harm				1		
Gate keeper not in attendance				1		
Signal Fault					2	
XC201 Thomastown						
Incident Type/Year	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Awaiting Gatekeeper		1				
Road vehicle strikes level crossing gate			1			
Accidental obstruction of railway line					1	
XC209 Ballyhay						
Incident Type/Year	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Low rail adhesion reported	1	1				
Road vehicle strikes level crossing gate or barrier		2				
Member of public trespass onto cleared LX		1				
Gate keeper not in attendance				1	1	
LX equipment failure				1		
Trespass reported					1	
XC211 Newtown						

Incident Type/Year	2015	2016	2017	2018	2019	2020
No contact with gatekeeper	1	1				
Multiple track circuit failure		1				
Animal incursion				1		
Signalling Electrical and Telecoms equipment						1
XC212 Ballycoskery						
Incident Type/Year	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Signalling electrical and telecoms equipment	1					
Locking mechanism broken		1				
Gate keeper – delay in clearing crossing at Ballycoskery				1		
Gate keeper not in attendance				1		1
LX equipment failure				1		
Signal fault					1	
Road vehicle strikes level crossing gate or barrier					1	
Trespass on railway line					1	
XC215 Shinanagh						
Incident Type/Year	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Strong winds impacts service		1				
Level crossing equipment Right Side Failure (RSF)		1				
LX equipment failure – no initiation			1			
Gate keeper not in attendance			1	1	1	1
XC219 Buttevant						
Incident Type/Year	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
RRV collides with level crossing gate or barrier	1					
Fuel/Oil Spillage	1					
Environmental condition – possible impact to services		1				
Lightning impact services		1				
Level crossing equipment RSF		1				
Signal fault		1		1	5	1
LX equipment failure			2	1	6	3
Driver reports signal for XC219 slow to clear			1			
Road vehicle strikes level crossing gate			1			
Signalling electrical and telecoms equipment					1	
Low rail adhesion					1	
Snow/Frost impacts service					1	
Barrier damaged					1	

Accident to person						1
Category 1 near miss with trespasser on running line						1
Strong winds impacts service						3

The above provides an outline of the incidents which occurred at the subject level crossings. It only encompasses the most recent five-year period. There are a wide variety of both safety and reliability issues which can occur with respect to the operation of level crossings, ranging from the gate keeper not being in attendance to equipment failure to trespass to animal incursion to low rail adhesion and to road vehicle strikes among other issues.

In the period 2015 to 2020, there were five road vehicle strikes (involving a level crossing gate being struck) at the level crossings which are the subject with the proposed Project. IÉ regard such vehicle strikes as higher risk than a vehicle striking an unmanned CCTV level crossing due to the potential for interaction with gatekeepers. Road vehicle strikes and signalling faults are amongst the most serious safety issues associated with level crossings; this highlights the underlying safety risk associated with any railway/public road interface.

An additional safety risk occurs where members of the public trespass onto railway lines, using level crossings as access points; this risk will be significantly reduced by the proposed Project.

There are also indirect safety issues, associated with the local road network and access to the level crossings by local road users. For example at crossing XC215; for road users travelling south on the N20 and then wishing to cross the railway to travel west there is the need to queue on the N20 if the level crossing is closed to road traffic. This safety issue will be eliminated as part of this scheme.

Set in this, and the wider context of rail safety, the removal of level crossings has been placed at the core of IÉ's approach to building a safe and robust railway network.

2.2.6 Efficiency of the Dublin-Cork Railway Line

The 2030 Rail Network Strategy Review (2011) outlines under 'Phase 3: 2020-2025 Electrification of the Core Rail Network' the planned electrification of the Dublin - Cork railway line. The eventual electrification of the Dublin-Cork Railway line will allow for quicker train acceleration speeds, lower fuel costs and fewer CO2 emissions. The electrification of the line is not part of the proposed Project; however, the proposed Project would improve the efficiency of train operations on the line by reducing the number train delay minutes which can occur due inefficient operation of level crossings.

In 2018, the inefficient operation of the seven level crossings which are the subject of the proposed Project led directly to thirteen separate delays resulting in a total delay of 231 minutes to the Dublin – Cork Railway Line. The elimination/upgrade of the level crossings will remove or minimise substantially delays of this nature.

The efficiency of the Dublin-Cork Railway Line is impacted when incidents occur such as those highlighted above at Table 2.1. IÉ estimate that the delays to the Dublin-Cork Railway service as a result of the five road vehicle strikes were as follows:

- XC209 Ballyhay (May 2016) 14.5minutes
- XC209 Ballyhay (August 2016) 106 minutes
- XC201 Thomastown (July 2017) 8 minutes
- XC219 Buttevant (November 2017) 10 minutes

- XC212 Ballycoskery (May 2019) 104 minutes

As outlined in Table 2.2 above, there are also instances where a gate keeper has either been absent or there has been failure to make contact. This impacts upon the efficiency of the railway line. IÉ have estimated that a total delay of 100 minutes since 2015 has been attributed to human factors.

In addition to this, the elimination/upgrade of the level crossings will help to reduce ongoing operational and maintenance requirements associated with them.

2.2.7 Efficiency of the Local Road Network

As outlined in Volume 2, Chapter 1: Introduction, it can take up to nine minutes for a level crossing to re-open after one train passes and up to fourteen minutes for two trains to pass at the same time. This creates driver and pedestrian delay. XC187 Fantstown and XC201 Thomastown are generally closed to traffic and only opened as required when the movement of trains allows. XC209 Ballyhay and XC211 Newtown are open to road traffic during the day and closed at night to facilitate the movement of trains. XC212 Ballycoskery, XC215 Shinanagh and XC219 Buttevant are open to road traffic and only closed to road traffic to facilitate the movement of trains. Each opening and closing of the level crossings is by the gatekeeper. The resultant delays in access across the railway line causes drivers and other road users to find alternative routes to their destinations, adding further delay.

The proposed elimination and replacement with a bridge or road diversion of five of the level crossings generally with the most significant traffic use will remove driver and pedestrian/cyclist delay and allow unfettered movement 24hours a day, seven days a week.

2.3 Consideration of Alternatives

A description of the alternatives considered is a requirement under Directive 2014/52/EU, amending Directive 2011/92/EU on the Assessment of the Effects of Certain Public and Private Projects on the Environment (EIA Directive) in accordance with Article 5.1 (d), Annex IV paragraph 2 and Annex IV.3. The Directive states that the EIAR should include:

"*A description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects*".[9]

This chapter considers the main alternatives for the proposed Project. This includes alternatives such as: 'the do nothing' scenario, alternative locations, alternative alignments and alternative site layouts.

2.3.1 History of the Project

Figure 2.1 illustrates the process followed and the timeframe taken to determine a preferred solution at each site.

[9] Directive 2014/52/EU, amending Directive 2011/92/EU on the Assessment of the Effects of Certain Public and Private Projects on the Environment (EIA Directive) in accordance with Article 5.1 (d), Annex IV paragraph 2 and Annex IV.3

Figure 2.1: Steps in the Options Appraisal Process

2005- 2011: XC211 Newtown and XC212 Ballycoskery

From 2005 to 2007, Iarnród Éireann (IÉ) and Coras Iompair Éireann (CIÉ) investigated various options for the closure of level crossings XC211 and XC212 Newtown and Ballycoskery. Discussions were held with Cork County Council, local resident groups and affected landowners on possible solutions to eliminate/upgrade the level crossings. Initial scheme options for road-over-rail and rail-over-road bridges at XC212 Ballycoskery were developed but there was no consensus on a preferred scheme option.

In 2008, following an incident in 2007 relating to access across the level crossing XC212 Ballycoskery for emergency services, the operating hours of the level crossing gates were extended from 07.30hrs until 23.30hrs to a 24-hour basis.

A further attempt was made to close this level crossing in 2011 as part of a joint scheme to close level crossing XC211 Newtown when IÉ and CIÉ, in conjunction with Cork County Council sought to construct a new road-over-rail bridge to the south of the XC212 Ballycoskery level crossing thereby providing alternative access across the railway line.

In March 2011, Cork County Council in collaboration with IÉ sought consent under Section 179 of the Planning and Development Act, 2000 and Part 8 of the Planning and Development Regulations, 2001 (as amended) . The scheme included significant improvement works in the vicinity of the existing Ballyhea National School (access, turning and parking facilities for school buses and access for school drop offs and collections). A number of objections were made to the scheme following publication of the proposal, primarily relating to the proximity of the road-over-rail bridge to the Beechwood Housing Estate and the school. Further objections were raised by local residents during a public meeting in April 2011, again these related to the proximity of the road-over-rail bridge to the Beechwood Housing Estate and the school. The proposal for the scheme was withdrawn in May 2011. The local residents produced alternative proposals for the closure of the level crossing in late 2011, these proposals significantly extended the scheme and substantially increased the land take requirements. This proposal was not progressed due to funding constraints.

Following on from this, in relation to XC212 Ballycoskery, the Fermoy Municipal District Local Area Plan (LAP) (August 2017) paragraph 5.2.21 sets out that *"Reservation is made for possible construction of a new road alignment as detailed on the accompanying map. This may result in the creation of a new parking area in front of*

the school."[10] The road and walkway defined in the LAP crosses the railway line on an east - west axis to the immediate south of the school and residential area.

2009: XC187- Fantstown - Oral Hearing – November 2009

Pursuant to Section 73 of the Roads Act 1993, Limerick County Council sought to close level crossing XC187 Fantstown by extinguishment of the public right of way. On the 10th November 2009, an oral hearing was conducted. The Inspector recommended the extinguishment of the public right of way and the consequent closure of the crossing but highlighted that improvements needed to be undertaken to the alternative route in the interest of road safety. This decision was supported by the management/executive of Limerick County Council. These improvements were estimated at €250,000 at the time and IÉ gave a commitment to meet this cost contingent upon the extinguishment of the right of way and consequent closure of the crossing.

However, the extinguishment failed to gain the necessary support of the elected members of the Council due to local concerns over the proposal. The matter was not put to a vote of the elected members and the closure did not progress. The making of an Extinguishment Order and the consideration of objections/representations thereto are reserved functions of the Elected Members.

The Planning Compliance Report (PCR) included with the Railway Order application provides a further information on the XC187 Fantstown Oral Hearing.

2010-2011: All Sites: Concept Stage Options

In 2010/2011, IÉ progressed in developing concept stage options for the closure of all seven level crossings.

- XC187 Fantstown: the provision of alternative access via an existing overbridge was developed;
- XC201 Thomastown: Two options for the provision of alternative access via a new road-over-rail bridge were developed.
- XC209 Ballyhay: the provision of alternative access via a new road-over-rail bridge was developed to close XC209 Ballyhay.
- XC211 Newtown & XC212 Ballycoskery: the closure of level crossing XC211 Newtown and XC212 Ballycoskery and divert traffic via a new overbridge at XC212 Ballycoskery.
- XC215 Shinanagh: two options for the provision of alternative access via a new road-over-rail bridge to the south of the level crossing or via an existing road-over-rail bridge (OBC306) to the north of the level crossing were developed.
- XC219 Buttevant: The provision of alternative access via a new road-over-rail bridge was developed to close XC219 Buttevant.

2018: All Sites: Feasibility Study

In March 2018, the proposed Project was revisited and the board of IÉ approved the preparation of a Feasibility Study (Volume 5, Appendix 1K. A summary of the Feasibility Study is included at Section 2.3.2 below.

2019/2020: Preliminary Design to Railway Order Application

In 2019 IÉ commissioned the preparation of a Route Options Report and a Preliminary Design for the proposed Project (Volume 5, Appendix 2B). IÉ have refined and developed the preliminary designs following consultation

[10] Fermoy Municipal District Local Area Plan (LAP)

and additional survey information to form the basis of the Railway Order Application. The final designs are the subject of this EIAR.

Overview

In 2018, IÉ undertook a Feasibility Study (to investigate and appraise the options for the elimination/upgrade of the level crossings). The Feasibility Study included an options appraisal.

Options Considered

The Feasibility Study options appraisal assessed the following four options for each of the sites, as follows:

- Do Nothing;
- Straight Closure;
- Alternative access/Overbridge; and
- Upgrade to 4 Barrier CCTV.

Findings

Detailed appraisal tables are provided in the Feasibility Study. Scores were given from 1 to 5 for each criterion, ranging from 1 "*significant disadvantages over other options*" to 5 "*significant advantages over other options*". The Straight Closure option was not assessed for level crossings XC209 Ballyhay, XC212 Ballycoskery, XC215 Shinanagh and XC219 Buttevant due to the volume of road traffic using these level crossings and length of the existing alternative routes.

Table 2.3 provides an overview of the summary results for each option at each site.

Table 2.3: Summary results at each site

Site	Do Nothing	Straight closure	Alt access/ overbridge	CCTV
XC187 Fantstown	11	14	13	13
XC201 Thomastown	11	14	16	13
XC209 Ballyhay	9	N/A	13	13
XC211 Newtown	11	12	15	13
XC212 Ballycoskery	10	N/A	16	11
XC215 Shinanagh	10	N/A	15	11
XC219 Buttevant	9	N/A	15	11

The options appraisal produced clearly preferred solutions at all of the sites, with the exception of XC209 Ballyhay, where the alternative access/overbridge and CCTV scored the same. The Feasibility Report recommended CCTV on the grounds of cost.

2.3.2 Feasibility Study Findings Update

Overview of Existing Level Crossings

Table 2.4 below sets out an overview of the key characteristics associated with each of the level crossings. It combines information regard to the proposed solutions, traffic volumes, accidents, safety ratings, length of potential diversions, planning history and any other differentiators.

Table 2.4: Level Crossing Key Characteristics

Level Crossing/Consideration	XC187 – Fantstown	XC201 – Thomastown	XC209 - Ballyhay	XC211 – Newtown	XC212 – Ballycoskery	XC215 – Shinanagh	XC219 – Buttevant
Proposed Infrastructure	Straight Closure	New road over rail bridge	CCTV	New Access Road	New road over rail bridge	New Access Road	New road over rail bridge
Traffic Volume 2011 vs 2019; AADT (refer to Volume 2, Chapter 3: Project Description, Table 3.11)	15/19	31/24	326/176	90/95	1054/935	1053/1004	2185/2097
Incidents (Table 2.2)	2	1	4	1	3	2	6
Population per km^2 (based on Population & Health Chapter local Study Area)	23	35	75.45	35.73	35.73	14.39	206
Level Crossing Availability (refer to Volume 2, Chapter 3: Project Description, Table 3.1)	Closed at night	Closed at night	Generally closed at night	Generally closed at night	Manned 24hrs	Manned 24hrs	Manned 24hrs
Length and approximate journey time of Diversion Using Existing Infrastructure.	5.7km 9 minutes	8.5km 11 minutes	6.5km	2.4km 4 minutes	5.7km 7 minutes	5.2km 8 minutes	5.62km 9 minutes
Length of Diversion and approximate journey time Resulting from proposed Project (Table 2.5)	5.7km 9 minutes	1.39km 3 minutes	N/A	1.14km 2 minutes	0.54km 1 minute	1.91km 3.5 minutes	0.59km 1 minute
2020 Approximate Cost of Proposed Infrastructure (refer the Feasibility Report Volume 5, Appendix 1K)	€0.05m	€2.1m	€1.2m	€0.75m	€3.6m	€2.7m	€3.9m
Level Crossing Risk Model (LCRM) on IÉ Network and Collective Risk Factor (refer the Feasibility Report to Volume 5, Appendix 1K).	287 of 970 1.00x10-4	268 of 970 1.20x10-4	78 of 970 9.40x10-4	158 of 970 3.50x10-4	36 of 970 2.3x10-3	18 of 970 4.80x10-3.	38 of 970 2.10x10-3.
Planning History	Section 173 proposal to extinguish right of way.	N/A	N/A	N/A	Part 8 Overbridge application withdrawn.	N/A	N/A

Level Crossing/Consideration	XC187 – Fantstown	XC201 – Thomastown	XC209 - Ballyhay	XC211 – Newtown	XC212 – Ballycoskery	XC215 – Shinanagh	XC219 – Buttevant
Other Differentiator	There are no occupied houses on the southern approach to the existing level crossing, so a straight closure does not result in a significant diversion when accessing the nearest population centre, which is Kilmallock.	There are houses and farms on the southern side of the level crossing and a straight closure of the level crossing would require a significant diversion to access the nearest population centres of Kilmallock and Charleville.	Existing infrastructure makes CCTV more cost effective	N/A	2017 Local Area Plan for Fermoy Municipal District includes a new road alignment across the railway line.	N/A	N/A

In addition, Table 2.5 below sets out the potential diversions associated with each level crossing. Volume 5, Appendix 2C includes the diversions associated with each of the subject sites using both existing infrastructure and infrastructure as a result of the proposed Project.

Table 2.5: Diversions

Level Crossing	Diversion
XC187 – Fantstown	Existing private crossing further along the railway line to the southwest was discounted given the potential for impacts upon a farm holding and the level of road/bridge upgrade works required. The nearest potential diversion is approximately 2.7km to the northeast of the northside of the level crossing (total of around 5.77km from the northside to the southside and journey time by car of approximately 9 minutes), see Volume 5, Appendix 2C).
XC201 – Thomastown	Existing private bridge crossings further along the railway line to the northeast were discounted given the potential for impacts upon farm holdings and the level of road/bridge upgrade works required. The nearest potential diversion from the southside of the level crossing is around 2.7km to the southwest via an existing bridge that eventually connects with the R515 (total of around 8.24km from the northside of the railway line to the southside and journey time of approximately 11 minutes). The diversion via the proposed alignment is around 1.39km and journey time by car of approximately 3 minutes from the southside of the level crossing to the northside (see Volume 5, Appendix 2C).
XC209 - Ballyhay	Approximately 3km from the eastside of the level crossing to an overbridge to the north. Around 6.55km from the eastside to the westside of the level crossing (see Volume 5, Appendix 2C). The proposed Project does not include a diversion.

Level Crossing	Diversion
XC211 – Newtown	Approximately 0.5km to an overbridge to the north of the westside of the level crossing. Around 2.52km and journey time by car of approximately 4 minutes from westside of the level crossing to the eastside. The diversion via the proposed alignment is around 1.14km from the westside of the level crossing to the eastside of the level crossing and journey time by car of approximately 2 minutes (see Volume 5, Appendix 2C).
XC212 – Ballycoskery	Around 3.93km from the westside of the level crossing to an overbridge to the north. Approximately 5.71km or 7 minutes journey by car (north route) or 4.43km and approximately 7 minutes journey by car (south route). The diversion via the proposed alignment is around 0.54km and approximately 1-minute journey time by car from the westside of the level crossing to the eastside of the level crossing (see Volume 5, Appendix 2C).
XC215 – Shinanagh	Around 4.4km from the westside of the level crossing to an overbridge to the north and around 0.87 from the eastside. Total from eastside to the westside of the level crossing is around 5.32km and approximately 8 minutes journey by car. The diversion via the proposed alignment is around 1.91km and 3.5 minutes journey by car from the westside of the level crossing to the eastside of the level crossing (see Volume 5, Appendix 2C).
XC219 – Buttevant	Around 2.6km from eastside of the level crossing to the south. Around 5.27km from eastside to westside of the level crossing and approximately 9 minutes journey time by car. The diversion via the proposed alignment is around 0.59km and 1-minute journey time by car from the eastside of the level crossing to the westside of the level crossing (see Volume 5, Appendix 2C).

The information from Table 2.4 and Table 2.5 as well as the Feasibility Report (Volume 5, Appendix 1K) were considered together and an updated summary setting out the rationale between the selection of options at each site is set out below.

CRR Guidelines for the Design of Railway Infrastructure and Rolling Stock (RSC-G-006B)

The CRR Guidelines for the Design of Railway Infrastructure and Rolling Stock (RSC-G-006B) provides guidance on the infrastructure to be provided at each type of level crossing and also addresses the suitability of the various types of level crossing.

Section 5.3.2.1 of the Guidelines sets out that *"The decision to introduce a level crossing or upgrade an existing level crossing should follow a suitable risk assessment and after all possibilities for a grade separated crossing have been evaluated and discounted as not reasonably practicable."* This in effect means that prior to considering carrying out improvement works to an existing level crossing a range of other options for crossing the railway should be risk assessed, with retention of the level crossing being the last option which should be considered.

Section 5.3.2.2 outlines that *"The choice of level crossings should avoid causing unnecessary delay to road users…"* This highlights that consideration should be made to road users crossing the railway line. As set out above, manned crossings carry a risk of delaying road users due to accidents, failure of equipment, human error and missing or no contact with gate keepers.

Furthermore, Table 1 of Section 5.3.2.2 (Conditions for Suitability) provides details of suitability of each type level crossing. Gated crossings operated by railway staff (without protecting railway signals) *"….should not be considered for new or altered crossings"* and *"for existing crossings the traffic movement and line speed and the annual average daily traffic usage should be low"*. This provision is relevant to both XC187 Fantstown and XC201 Thomastown crossings.

In reference to Gated crossings operated by railway staff (with protecting railway signals) it also states *"the traffic movement and annual average daily traffic usage should be low."* However, as set out in Volume 2, Chapter 3:

Project Description Table 3.10 the traffic counts have shown that traffic movements are relatively high at XC209 Ballyhay, XC211 Newtown, XC212 Ballycoskery, XC215 Shinanagh and XC219 Buttevant.

Barrier crossings operated by railway staff, CCTV level crossings are said to be *"Generally, suitable for most road and rail traffic arrangements".*[11]

Do Nothing – All Sites

When reviewing options, the Feasibility Report (Volume 5, Appendix 1K) consistently returned the lowest scores for cost and other criteria for the "Do nothing" solution. In particular, the Do Nothing scored lowest for safety, and whole life cost and was second lowest (after straight closure) for integration (with the local road network). As set out in Section 2.2 of this Chapter (Project Need), of the primary purpose of the proposed Project is to eliminate/upgrade the subject level crossings to reduce the risk profile of the railway line. Do nothing was therefore not the preferred solution at any of the sites.

Straight Closure – All Sites

Straight closure is at the opposite end of the solution spectrum and completely removes the railway/road network interface. In practical terms, a 'straight closure' is the extinguishment of the right of way across the railway, the removal of the level crossing barriers and the 'stopping up' of the existing access, usually with a wall. Access gates may be included on one side or the other to allow maintenance teams to access the railway.

In terms of interventions, it is the lowest cost for enhancing safety on the railway line. However, IÉ recognises that the existing level crossings provide local access for communities within this rural area and a straight closure could lead to issues of severance for some of those communities. As a result, consideration of the current use in terms of traffic, pedestrian counts and proximity to local services (See Table 2.4) the Feasibility Report ruled out straight closure for XC209 Ballyhay, XC212 Ballycoskery, XC215 Shinanagh and XC219 Buttevant. Also, it should be noted that the volume of use associated with these level crossings is supported by the fact that XC212, XC215 and XC219 are generally open to road traffic and only close to facilitate train movements. XC209 Ballyhay is generally open to road traffic during the day, although a gate keeper is responsible for opening the gates on request; the level crossing is generally closed at night..

As a result, straight closure was only considered as a viable option for XC187 Fantstown, XC201 Thomastown and XC211 Newtown given their relatively low associated traffic volumes. This solution is discussed further for these sites in the Site-Specific Solution Assessment Summaries provided below.

CCTV – All Sites

CCTV does not remove the railway line/road network interface; however, CCTV does provide a safer means of level crossing access. Iarnrod Eireann undertook an assessment which reviewed the risk factor associated with each level crossing as it currently is and with the addition of CCTV controlled crossings. Table 2.6 sets out the results of this assessment below.

[11] CRR Guidelines for the Design of Railway Infrastructure and Rolling Stock (RSC-G-006B)

Table 2.6: Results of Assessment

Level Crossing	Risk Rating (Collective) – Manned Level Crossings – Dublin/Cork Line – 29.01.2019			Upgraded to CCTV with Existing Line speed – 29.01.2020		
	Type*	Risk Factor (Collective)	Rank Out of 970 Crossings (Network)	Type	Risk Factor (Collective)	Rank Out of 970 Crossings (Network)
XC187 Fantstown	C	1.00E-04	287	CCTV	5.50E-05	407
XC201 Thomastown	C	1.20E-04	268	CCTV	2.70E-05	487
XC209 Ballyhay	CD	9.40E-04	78	CCTV	2.20E-04	201
XC211 Newtown	CD	3.50E-04	152	CCTV	7.30E-05	340
XC212 Ballycoskery	CD	2.30E-03	36	CCTV	5.20E-04	123
XC215 Shinanagh	CD	4.80E-03	18	CCTV	5.40E-04	121
XC219 Buttevant	CX	2.10E-03	38	CCTV	5.80E-04	118

**There are three different types of existing level crossing in the proposed Projects. Details of these types for each site are provided in Volume 3, Chapter 3 Project Description.*

In each instance, CCTV enhances the safety rating from that of a manned level crossing, for example, XC209 Ballyhay reduces from a rank of 78 (out of 970 crossings) to 201.

The Feasibility Report (Volume 5, Appendix 1K) sets out that in 2017 the estimated cost to upgrade all seven crossings to 4 barrier CCTV Controlled Level Crossings was €12.3m. This would be a significant level of investment that would make the railway line safer, but it would not remove the risk profile.

As such, CCTV was considered at all sites but considered to be a last resort after Straight Closure and an Alternative Access of Overbridge Solution had been ruled out.

Site-Specific Solution Assessment Summaries

XC187 Fantstown

As is set out in Table 2.2 there have been two accidents at XC187 Fantstown; the length of a diversion using the existing road network would be around 5.7km (approximately 9 minute journey time by car); and the cost of a bridge in 2010 was € 1.6m. XC187 Fantstown is closed at night and therefore, the existing baseline situation is already partial closure. The LCRM risk factor (Table 2.6) determined the risk ranking XC187 Fantstown as 287 of 970.

In terms of the baseline with regard to the community, Volume 3, Chapter 6: Population and Human Health states that "*The local study area (represented by the relevant small area) covers a total area of 14.7km^2 and contained a population of 340 residents (as of Census day 2016).*" This equates to around 23 people per km2 which is the lowest population density among all of the level crossing study areas. Furthermore, there are no occupied houses on the southern approach to the existing level crossing so a straight closure does not result in a significant diversion for those wishing to access the nearest population centre of Killmallock.

Volume 3, Chapter 6: Population and Human Health further states, in regard to XC187 Fantstown, that *"The through road on which the crossing is located has several houses to the north, whilst the section of road to the south of the crossing is predominantly used for access to agricultural lands and holds one dwelling adjacent to the crossing. Just outside the local study area but within 1.5km of the crossing there are several recreational and*

community facilities including Staker Wallace GAA Club. There is a Public Right of Way (PRoW) across the level crossing; there are no schools, emergency or health services within the local study area."

XC187 Fantstown has the lowest number of people per km^2, it has the lowest volume of traffic movement, it has the median diversion length using existing roads, it also has the greatest number of accidents associated with it on comparison with the three level crossings considered for Straight Closure. As a result, straight closure was considered a viable option at this level crossing. Further consideration of an overbridge and it potential costs, which would have been greater than at some other sites, where the requirement for continued access was stronger, resulted in Straight Closure being the Preferred Solution at this level crossing. The cost of the Straight Closure is estimated (2020) to be approximately €0.4m. In support of this conclusion, the precedent associated with XC187 Fantstown also differentiates this level crossing from the other two sites where Straight Closure was considered (XC201 and XC209). The 2009 Oral hearing to extinguish the right of way acknowledged the low volumes using it and the safety benefits associated with closing the level crossing. Therefore, Straight Closure was taken forward as the Preferred Solution for XC187 Fantstown.

The assessment in Volume 3, Chapter 6: Population and Human Health recognises the potential for severance as a result of a Straight Closure, but mitigates the significance of this somewhat stating: "*It is, however, noted that at the Fantstown Oral Hearing in 2009 that evidence was given which states "there is little traffic using the road, even agricultural traffic, except at harvest time, and the latter would pose a high risk crossing a railway." The ABP Inspector makes specific reference in his recommendation to the "very low level of usage*" of the Fantstown Level Crossing". It continues: *"Recent survey results continue to support this view: pedestrian, livestock and cyclists counts over a seven-day period were carried out in February 2020 to determine the frequency of use of this crossing. During the seven-day period observed, no pedestrian, cyclists or livestock crossed the railway via the level crossing."*

XC201 Thomastown

As is set out in Table 2.2, there has been one accident at XC201 Thomastown; the length of a diversion using the existing road network would be around 8.5km (around 11 minutes journey time by car); and the cost of a bridge in 2010 was €1.4-1.5m. XC201 Thomastown is closed at night and therefore, the existing baseline situation is already partial closure. The LCRM (Table 2.6) determined the risk ranking of XC201 Thomastown as 268 of 970.

Volume 3, Chapter 6: Population and Human Health states "*The local study area (the relevant small area) covers a total area of 9.7km^2 and as of Census day 2016, contains a total population of 337*." This equates to around 35 people per km2 which is the fifth highest population density among all of the study areas.

It further states, in regard to XC201 Thomastown, "*The through road on which the crossing is located, has approximately four houses to the north of the railway and approximately four houses on the stretch of road south of the crossing. Within the wider study area, approximately 1.5km from the site is Dermot Kelly Motors and Our Lady Queen of Peace Church and Church hall. There are no schools, emergency or health services or PRoW located near the site."*

XC201 Thomastown has the second highest number of people per km^2 (on comparison with the three level crossings considered for Straight Closure) it has the second highest volume of traffic movement and it has the greatest diversion length (alternative access) of 8.5km, using existing roads. Effin Primary School, whilst not near the site (it is 3km south of the level crossing), is accessed by a number of families that live north of the railway by a route which uses the level crossing. Such a diversion would add significant delay to their journeys. Therefore, Straight Closure was not viable and not taken forward as an option.

In consideration of a constructed alternative access, the closest overbridge is 1.8km to the south west of XC201 Thomastown; a new road from it straight to the R515 would only reduce the diversion by a maximum of 2km.

In consideration of an overbridge solution, the cost of this at this site was the cheapest of all those costed, at €1.4-€1.5m (2010). This has been updated following more design and for today's costs to €2.1m.

The Preferred Solution was therefore determined to be an overbridge.

XC209 Ballyhay

As per Table 2.4, XC209 Ballyhay has a population density of around 75 people per km^2 which is the second highest among all of the level crossing study areas and it has the fourth highest volume of traffic movements (June 2011 = 326 and October 2019 = 176). The LCRM (Table 2.6) determined the risk ranking XC209 Ballyhay as 78 of 970 (the fourth highest of all the level crossing sites).

The baseline use of the level crossing by traffic and pedestrians, and the length of an alternative access using existing infrastructure of 6.5km, meant that Straight Closure was not viable for this site and doing nothing would not reduce safety risks. However, the cost of the overbridge was estimated to be €3.4m in 2010, Which was €650,000 more expensive than the second most expensive solution at any of the sites. In consideration of other solutions, the Feasibility Report (Volume 5, Appendix 1K) gave XC209 Ballyhay joint highest scores for the alternative access/overbridge solution and the CCTV solution.

In terms of safety, the Overbridge fared better than CCTV. It is recognised that CCTV does not remove the railway line/road network interface; however, CCTV does provide a safer means of level crossing access than the current manned level crossing situation, as well as operational benefits. This is because it eliminates many of the human factors described in Section 2.2.5. There is the risk of vehicle strikes on the gates, however the human factors associated with the gate operator at a manned level crossing are removed completely. A risk assessment for this site with CCTV using the LCRM, compared to the existing situation, demonstrates this; the ranking of this site according to its risk rating changes from 78 out of 970, to 201 out of 970. In addition, from an operational perspective currently there is no access across the railway at this location from 23.30hrs to 07.30hrs; installation of CCTV here will allow 24hr unfettered access (with the exception of closing for a short period during train movements).

XC211 Newtown and XC212 Ballycoskery

As per Table 2.4, the population within the study area is approximately 35.73 people per km^2 and is the third highest population density on comparison with the other level crossing study areas. Also, the local study area includes Ballyhea Village, a housing estate, church and local primary school. The primary school is on the opposite side of the railway line (east) from that of the main part of the village and the housing estate (west).

Volume 3, Chapter 6: Population and Human Health outlines that "*The presence of a housing estate and local primary school at XC212 Ballycoskery introduces a higher number of sensitive users and, as a result, an increased risk at this location.*" There has been one accident at XC211 Newtown and three at XC212 Ballycoskery.

The LCRM (Table 2.6) determined the risk ranking for XC211 Newtown as 158 of 970 (the fifth highest of all the level crossing sites) and the risk ranking for XC212 Ballycoskery as 36 of 970 (the second highest of all the level crossing sites).

XC211 Newtown has traffic volumes of 90 in June 2011 and 95 in October 2019. In the same periods XC212 Ballycoskery had 1054 and 935. XC212 Ballycoskery is the third highest of all the level crossing study areas in regard to traffic volumes, XC211 Newtown is the fifth highest.

XC211 Newtown is currently open throughout the day with the gates being opened by the gate keeper as and when required and generally closed at night but. XC212 Ballycoskery is currently manned 24hrs a day giving an indication of the high level of usage.

The baseline use of the level crossing by traffic and pedestrians and necessary access to local services meant that Straight Closure was not viable for these sites.

In consideration of other solutions for these sites, for XC211 Newtown, the length of a diversion using the existing road network would be around 2.4km; a diversion for XC212 Ballycoskery would be around 5.7km. A key differentiator between XC211 Newtown and other level crossings is the proximity (0.48km) of the existing bridge over the railway line to the to the north.

A diversion almost 6km for XC212 Ballycoskery was not considered a viable solution, especially given the current proximity of a local housing estate and primary school (less than 100m). An overbridge bridge at XC212 Ballycoskery was considered further. Costs for this were identified as €2.75m in 2010. The high risk ranking for the site as a result of a high number of sensitive receptors ruled out CCTV as a potential solution at this site. As a result, an overbridge was determined to be the Preferred Solution.

XC215 Shinanagh

As per Table 2.4, the population density in the level crossing study area is around 14.39 people per km2 which is the lowest density on comparison with all study areas. However, XC215 Shinanagh has the second highest traffic volumes on comparison with the other level crossing (as set out in Volume 2, Chapter 3: Project Description) 1053 in June 2011 and 1004 in October 2019). The LCRM (Table 2.6) determined the risk ranking for XC215 Shinanagh as 18 of 970 (the highest of all the level crossing sites).

XC215 Shinanagh is currently manned 24hrs a day giving an indication of the high level of usage. A diversion using existing infrastructure would be around 5.2km. The nearest existing overbridge is around 0.87km directly north.

The baseline use of the level crossing by traffic and pedestrians and necessary access to local services meant that Straight Closure was not viable for this site. In terms of other solutions, the relatively close proximity of an overbridge to the north of the level crossing brought the possibility of a constructed, short diversion into consideration. A new overbridge to the south of the level crossing was also assessed. The costs of these two solutions were €2m and €3m respectively.

The high risk ranking for the site (the highest of all sites) as a result of the high traffic use, ruled out CCTV as a potential solution at this site.

As such, the alternative access to the north, using an existing overbridge, was determined to be the Preferred Solution.

XC219 Buttevant

As per Table 2.4 the population density is around 206 people per km^2 which is the highest of all the level crossing sites. In regard to the local study area Chapter 6: Population and Human Health further outlines: "*The local study area is rural in character with some higher-density housing and small-scale commercial enterprises in Buttevant town - located 500m to the south-east. Buttevant has a number of local facilities including schools, churches, a GP surgery, a number of shops, cafes, bars, restaurants and a number of other services and businesses. Within the local study area there are a total of 163 residential properties (CSO, 2016b).*"

The LCRM determined the risk ranking XC219 Buttevant as 38 of 970 (the third highest of all the level crossing sites). Also, 6 accidents were recorded (the highest of all the level crossing sites).

Traffic volumes of 2185 were recorded in June 2011 and 2097 in October 2019. These are the greatest volumes of traffic movements of any of the level crossings within the proposed Project. The level crossing is currently manned 24hrs a day giving an indication of the high level of usage. A diversion using existing infrastructure would be around 5.62km.

The baseline use of the level crossing by traffic and pedestrians and necessary access to local services meant that Straight Closure was not viable for this site. In terms of other solutions, a new access road to an existing crossing (by overbridge or underbridge) was ruled out; the closest alternative crossing of the railway is an underbridge approximately 1km to the south which is not of a sufficient standard to take the level of traffic that would need to use it. It would also increase traffic through Buttevant itself in order to access the alternative route. An overbridge, in close proximity to the existing level crossing was considered; costs were determined to be €2.3m in 2010. Updated costs in 2020 estimate the preferred solution here to be €3.3m.

The relatively high risk ranking for the site, the high number of accidents and the high traffic use, ruled out CCTV as a potential solution at this site. As a result, an overbridge was determined to be the Preferred Solution for this site.

2.3.3 Multi-Criteria Analysis of Route Options

Overview

For those sites for which an alternative access or overbridge/underbridge were considered, a Multi-Criteria Analysis (MCA) of potential route options was carried out. As such, the MCA was carried out for XC201, XC211, XC212, XC215 and XC219. In addition, despite CCTV being the Preferred Solution at XC209, an options appraisal of potential route options for an overbridge at this site was carried out to confirm the findings of the Feasibility Study and determine whether CCTV was still considered to be the best solution at this site.

The details and findings of the MCA are presented in the Route Options Report (Volume 5, Appendix 2B). This work has taken into account existing studies and was supplemented with additional options as identified during site visits.

Method

DoT Guidelines

The MCA was carried out in accordance with the Department of Transport, Tourism and Sports' '*Guidelines on a Common Appraisal Framework for Transport Projects and Programmes*' (2016). As per Table 9 (Project Appraisal Criteria), the provision of and need for improved transport systems is based on the following criteria:

- **Economy:** The proposed Project has the potential to increase transport efficiency on both the rail and road networks. There would be a medium to long term reduction in costs associated with staff and maintenance. The elimination of the level crossings would also remove a major constraint to the future electrification of the rail line and provide reductions in journey times on the railway line and road network by removing delays.
- **Safety:** At any location where there is an interface between rail and road traffic the potential for a catastrophic accident exists. The removal of the level crossings in conjunction with providing alternative routes for vehicles, pedestrians and cyclists will permanently eliminate the risk at these locations.
- **Physical Activity:** This criterion relates to the health benefits derived from using different transport modes. This criterion is not considered relevant for differentiating between route options for this project because all options would be expected to have a broadly similar impact on physical activity.
- **Environment:** Improving Ireland's rail lines and the efficiency of the public transport network forms part of Ireland's decarbonising efforts within the transport sector whilst also improving journey times and opening up areas for investment.
- **Accessibility and Social Inclusion:** This criterion is not considered relevant for differentiating between options for this project because all options would be expected to have a broadly similar impact.

- **Integration:** This criterion relates to the extent to which the project promotes integration of transport networks and is compatible with a range of Government policies, including national spatial and planning policy. This criterion was not considered as part of the Route Options Report as all options would be expected to have a broadly similar impact.

These guidelines and requirements are themselves in compliance and in accordance with the Department of Finance's *'Guidelines on the Appraisal and Management of Capital Expenditure Proposals in the Public Sector'* (2005). The 2018 IÉ Feasibility Study (as set out in Volume 5, Appendix 1K) utilised the CAF approach. The development and appraisal of this proposed Project is being undertaken in accordance with the National Transport Authority (the NTA) *'Project Management Guidelines'* (2011).

MCA Refined Criteria

The MCA is qualitative, high level, and is based only on key criteria that would offer differentiation between the different options. As such, it was assumed that there is no relevant differentiation between the route options regarding the following criteria:

- Accessibility & Social Inclusion;
- Integration; and,
- Physical Activity.

In addition, within each broader criterion, the sub-criteria used are those that would offer differentiation between the different options. The refined criteria and sub-criteria used in the assessment are provided in Table 2.7.

Table 2.7: Criteria and sub-criteria utilised for the assessment.

Criteria	Sub-criteria	Description
Economy	Cost	Comparison of options with regards to comparative capital cost
	Land Take	Comparative qualitative assessment of land requirements for each option
	Reliability / Journey Time	Comparative assessment of journey time for each option
Engineering	Geotech	Comparison of options with regards to the assumed ground conditions based upon a desktop assessment
	Structures	Comparison of options with regards to number and complexity of bridges/structures required within each option
	Geometry	Comparison of options with regards to compliance to design criteria and ability for options to achieve required design speeds
Environment	Ecology	Qualitative appraisal of potential effects of proposed option on internationally and nationally important designated sites and associated flora and fauna
	Water/Flood Risk	Qualitative appraisal of potential impacts of proposed options on existing surface water bodies and aquifers.
	Landscape	Qualitive assessment of potential impacts on the landscape and amenity
	Noise	Qualitative assessment of sensitive receptors within the vicinity of the different options
	Cultural Heritage	Qualitative assessment of potential impacts of proposed options on legally protected sites.

Scoring Procedure

For each of the criterion, the options will be compared against each other based on the primary and sub criteria utilising a five-point scale, ranging from having significant advantages over other options, to having significant disadvantages over other options. This five-point scale is colour coded as presented in Table 2.8.

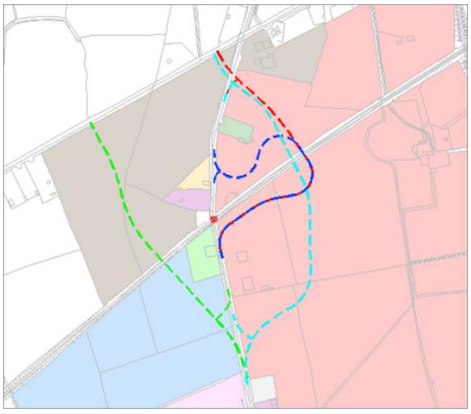
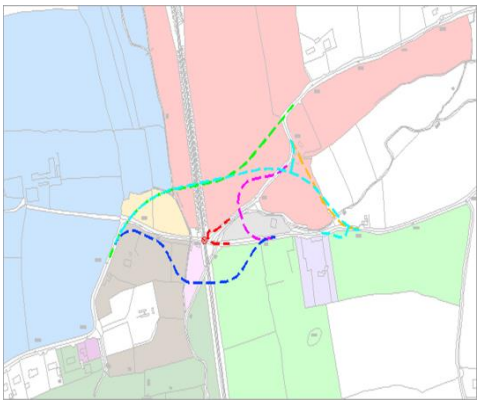
Table 2.8: Options Appraisal Colour Coding System

Score/Colour	Description
	Significant advantages over other options
	Some advantages over other options
	Comparable to other options
	Some disadvantages over other options
	Significant disadvantages over other options

Options Considered

Table 2.9 sets out the options considered at each of the crossing points, with text descriptions and Crossing Options in Table 2.10.

Table 2.9: Options Considered at Each of the Crossing Points

Level Crossing	Proposed Options
XC187 – Fantstown	Closure and diversion only. No other options considered.
XC201 – Thomastown	Closure and alternative route via a new road alignment and new road over rail bridge: 4 options for the road alignment were considered. 
XC209 – Ballyhay	Convert to CCTV or closure and alternative route via a new road over rail bridge. Three options for the road alignment considered. 

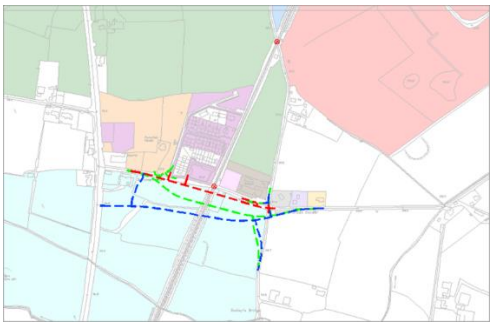
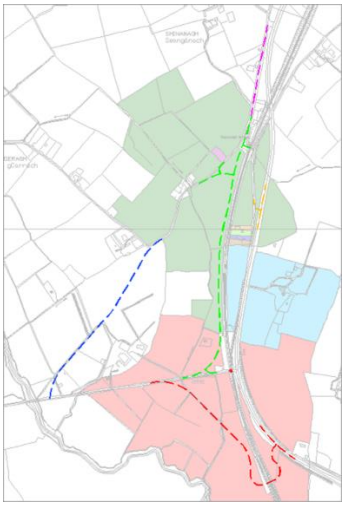
Level Crossing	Proposed Options
XC211 – Newtown	Closure and alternative diversion route via a new road alignment. Two options for the road alignment considered. 
XC212 – Ballycoskery	Closure and alternative route via new road alignment and overbridge and underbridge. Three options for alignment considered. 
XC215 – Shinanagh	Closure and alternative route via new road alignment and new/existing road-over-rail bridge. Three options for road alignment considered. 
XC219 – Buttevant	Closure and alternative route via new road alignment and new road-over-rail bridge. Three options for road alignment considered. 

Table 2.10: Summary of Level Crossings and Alternative Options

Level Crossing	Option Number	Option Colour	Description
XC201 – Thomastown	Option 1	Green	New road-over-rail bridge to SW of level crossing. New junction on R515.
	Option 2	Red	New road-over-rail bridge to NE to level crossing. Upgrade existing junction on R515.
	Option 3	Blue	New road-over-rail bridge to NE of level crossing.
	Option 4	Cyan	New road-over-rail bridge to NE to level crossing. Upgrade existing junction on R515.
XC209 – Ballyhay	Option 1	Green-Red	New road-over-rail bridge to North of level crossing. Widen existing junction.
	Option 2	Green-Pink	New road-over-rail bridge to North of level crossing. New road alignment with river bridge.
	Option 3	Green-Orange	New road-over-rail bridge to North of level crossing. New road alignment with river bridge.
	Option 4	Blue-Red	New road-over-rail bridge to South of level crossing. Widen existing junction.
	Option 5	Blue-Pink	New road-over-rail bridge to South of level crossing. New road alignment with river bridge.
	Option 6	Blue-Orange	New road-over-rail bridge to South of level crossing. New road alignment with river bridge.
	Option 7	Cyan	New road-over-rail bridge to North of level crossing with new river bridge.
XC211 – Newtown	Option 1	Green	New road alignment to west of level crossing. No new structures.
	Option 2	Blue	New road alignment to east of level crossing. No new structures.
XC212 – Ballycoskery	Option 1	Green	New road-over-rail bridge to South of level crossing.
	Option 2	Red	New rail-over-road bridge to South of level crossing.
	Option 3	Blue	New road-over-rail bridge to South of level crossing. New junction on the N20.
XC215 – Shinanagh	Option 1	Green-Orange	New road alignment to North East of level crossing to connect with upgraded junction at existing road over rail bridge. Upgrade existing junction on N20.
	Option 2	Green-Pink	New road alignment to North East of level crossing. Extend diversion to existing junction on N20 with some traffic restrictions required at existing improved bridge junction.
	Option 3	Blue-Orange	New road alignment to North West of level crossing to connect with upgraded junction at existing road over rail bridge. Upgrade existing junction on N20.
	Option 4	Blue-Pink	New road alignment to North West of level crossing. Extend diversion to existing junction on N20 with some traffic restrictions required at existing improved bridge junction.
	Option 5	Red	New road-over-rail bridge to West to level crossing. New junction on N20.
XC219 - Buttevant	Option 1	Green	New road-over-rail bridge to South of level crossing with new river bridge.
	Option 2	Red	New road-over-rail bridge to North to level crossing with new river bridge.
	Option 3	Blue	New road-over-rail bridge to South to level crossing with new river bridge.

Findings

XC201 Thomastown

The comparative assessment of the options for XC201 Thomastown level crossing location is summarised below and shown in Table 2.11.

- Due to safety concerns with sub-standard alignment and reduced sightlines, Option Red and Option Blue were sifted out of further assessment;
- The Green option is considered the least onerous in terms of cost and land take. It is also considered slightly advantageous in terms of reliability / journey time;
- The geometry of the Green option is considered favourable to the Red option; and
- The Cyan option would have a moderately higher potential for increased pluvial flood risk locally.

Table 2.11: Comparative assessment - XC201 Thomastown

Primary Criteria	Secondary Criteria	Route Option	
		Green	Cyan
Economy	Cost		
	Land Take		
	Reliability / Journey Time		
	Aggregated score		
Engineering	Geotech		
	Structures		
	Geometry		
	Aggregated score		
Environment	Ecology		
	Water/Flood Risk		
	Landscape		
	Noise		
	Cultural Heritage		
	Aggregated score		

Based on the outcome of the above comparative assessment, the preferred option is the Green Option, which had some significant advantages over the Cyan Option.

Following public consultation and engagement with Limerick County Council Roads Department in November 2019 and subsequently (see Volume 5, Appendix 1B), the design of the Preferred Option was updated, to allow for a wider bridge. This was as a result of responses from the local authority and community that there would likely be increased use of the crossing following the construction of the overbridge. The crossing is between a local community to the north and a local school to the south and is currently used by some parents in travelling to the school.

XC209 Ballyhay

XC209 Ballyhay is the only level crossing where the proposed solution is now CCTV. However, on the basis of the findings at the Feasibility stage, both CCTV and overbridge options were brought forward to the preliminary design stage and route options to cross the railway at this site via an overbridge were considered in the multi-criteria assessment.

An assessment of different route options for the road-over-rail bridge option was carried out and is summarised below in Table 2.12.

Table 2.12: Comparative Assessment XC209 Ballyhay

Primary Criteria	Secondary Criteria	Route Option				
		Green-Pink	Green-Orange	Blue-Pink	Blue-Orange	Cyan
Economy	Cost					
	Land Take					
	Reliability / Journey Time					
	Aggregated score					
Engineering	Geotech					
	Structures					
	Geometry					
	Aggregated score					
Environment	Ecology					
	Water/Flood Risk					
	Landscape					
	Noise					
	Cultural Heritage					
	Aggregated score					

In consideration of the Overbridge route options only, based on the outcomes of the above comparative assessment, the preferred option was the Green-Pink Option. The Green-Pink Option presented significant economic, and some engineering and environmental advantages, rendering the Blue Options to be of some disadvantage. The Green-Pink option had significant advantages over the Green-Orange option in terms of land take which is a key criterion and therefore is the preferred option. Whilst there are some disadvantages within the Green Options, it was considered that there were significantly more disadvantages associated with the Blue Options.

Following the outcome of this preliminary design and assessment work, however, it was confirmed that all of the options would require significant infrastructure and associated costs, as estimated in the Feasibility Study. Even the "preferred option", Green Pink would require two water bodies to be crossed and for construction to occur within a floodplain, necessitating larger bridges than would otherwise be required. In addition, the construction and operation of these bridges, in this location and in close proximity to a Special Area of Conservation (SAC) meant that the environmental impact of the overbridge solution would be significant.

Finally, a more detailed assessment of the cost of the CCTV option was undertaken. This showed that, at this site in particular, the existing infrastructure means that the installation of CCTV would be less intrusive and more cost effective here than at any of the other sites considered in the Feasibility Study.

These two studies therefore confirm that, CCTV, on balance is the preferred solution for this level crossing.

XC211 Newtown

The comparative assessment of the options for XC211 Newtown level crossing location is summarised below and shown in Table 2.13.

- Due to its length the Blue option was the more expensive option being considered;
- The Green option was preferred for its lower cost and ease of construction;
- Although the Green option was the shortest, it would result in a significant increase in traffic through a housing estate which is currently a cul-de-sac. This was a concern for residents (See further detail below);
- The Blue option would lead to a greater loss of vegetation, including an area of scrub located to the north of the scheme;
- There was an increased flood risk associated with the Blue option, to the east of the railway;
- The Green option had some disadvantages over the Blue option in terms of landscape and views due to a larger number of residential properties and associated visual impacts from the road and its users on the western side of the railway line compared to the eastern side;
- The Blue option would result in a reduction in noise from passing cars for residents in five properties currently on the route west of the level crossing; an additional house on the blue route would however be subject to increased noise levels; and
- During further progression of the scheme a geo-physical survey was undertaken of the Blue Option. The survey indicated potential archaeological findings. This has been reflected in the Secondary Criteria Cultural Heritage below.

Table 2.13: Comparative assessment - XC211 Newtown

Primary Criteria	Secondary Criteria	Route Option	
		Green	Blue
Economy	Cost		
	Land Take		
	Reliability / Journey Time		
	Aggregated score		
Engineering	Geotech		
	Structures		
	Geometry		
	Aggregated score		
Environment	Ecology		
	Water/Flood Risk		
	Landscape		
	Noise		
	Cultural Heritage		
	Aggregated score		

Based on the outcomes of the above comparative assessment, the preferred option was the Green Option, which has some advantages over the Blue option, particularly in relation to the economy criterion and some of the environmental criterion. Whilst the Blue option presents some advantages over the Green Option in the engineering and landscape criterion and significant advantages for noise, these were not deemed sufficient to consider the blue route preferred in the initial appraisal.

Following the public consultation exercise in November 2019, submissions were received in regard to the preferred option for XC211 Newtown. The submissions raised concerns in regard to the following:

- Increased traffic to adjacent to a residential area;
- Increased potential for anti-social behaviour; and
- Children play around the area of the current cul-de-sac hammer head and this amenity will be lost.

In view of the above concerns the project team re-investigated the optioneering process for XC211 Newtown and developed a Preliminary Design based upon the Blue Route. These designs have been shared with the public in order to receive feedback on the proposal. Whilst the comparative assessment between the previously "preferred" Green Option and the Blue option found the Blue option less desirable primarily due to cost and greater loss of vegetation the updated surveys, particularly in regard to ecology and cultural heritage.

There were no objections to the Blue Route, as there had been to the Green Route and so in light of this response, the Preferred Solution was changed to the Blue Route.

XC212 Ballycoskery

The comparative assessment of the route and road crossing options for XC212 Ballycoskery level crossing is summarised below and shown in Table 2.14. Note at this location, an "underbridge" (Red Route) was also considered.

- The Green option was the least expensive option as the construction of an underbridge is not required, in comparison with the Red option which is considered the most expensive;
- The construction of an underbridge with the Red option produced safety concerns, increased land take, and disruption during construction;
- The Blue option would move road traffic the furthest away from receptors, making it the best option for noise. However, the Blue option had the least advantages with regards to environment overall. Furthermore, the Blue Option had significant disadvantages over the other options with regards to Land Take and Geometry due to the required tie-in to the N20 Primary School; and
- The Blue Option was the least preferred on a number of environmental criteria also, with only noise benefitting from this option.

Table 2.14: Comparative assessment - XC212 Ballycoskery

Primary Criteria	Secondary Criteria	Route Option		
		Green	Red	Blue
Economy	Cost			
	Land Take			
	Reliability / Journey Time			
	Aggregated score			
Engineering	Geotech			
	Structures			

Primary Criteria	Secondary Criteria	Route Option		
		Green	Red	Blue
	Geometry			
	Aggregated score			
Environment	Ecology			
	Water/Flood Risk			
	Landscape			
	Noise			
	Cultural Heritage			
	Aggregated score			

Based on the outcomes of the above comparative assessment, the preferred option was the Green Option. Whilst the Green option was not the best option regarding the engineering criterion, its overall score in the economic and environment criteria presented it as the best option when compared to the others.

In support of this decision, it is important to note that the 2017 Local Area Plan for Fermoy Municipal District which includes a reservation for the construction of a new road alignment across the railway line in roughly the same area as the proposed alignment and provision for a new car park for the school. As such, the principle of a new crossing has been recognised and accepted by Cork County Council.

XC215 Shinanagh

The comparative assessment of the options for XC215 Shinanagh is summarised below and shown in Table 2.15.

- The Red option was sifted out in the preliminary analysis due to safety concerns with sub-standard geometry and reduced sightlines. The remaining options were assessed as summarised below and shown in Table 2.15;
- The Green-Pink and Blue-Orange options were considered to be similar with regards to cost. The Blue-Pink was considered to be the most advantageous in terms of cost;
- The Blue options were shorter than the Green alternatives and therefore would require less construction and land take. However, the Blue option was likely to split more plots of land, and therefore involve a higher number of landowners and therefore some disadvantages for land take;
- The Blue option required a tie in at a location close to a water treatment plant and is in close proximity to the Blackwater River SAC. It would require a greater level of engineering works compared to the green options. These points are reflected in the criteria of Structures and Geometry, ecology and water/flood risk; and
- The Green options were the longest and would require construction adjacent to the railway. A potential heritage site would be impacted in the proposed solution.
- Following scoping, a geo-physical survey was undertaken at the Green Route. Further details of this are provided in Volume 3, Chapter 12: Cultural Heritage. The survey indicated potential archaeological findings; however, from a desk top survey, it is considered there is also the potential for archaeological assets on part of the Blue Route; the comparative assessment has not been amended as the two routes remain comparable for cultural heritage.

Table 2.15: Comparative assessment - XC215 Shinanagh

Primary Criteria	Secondary Criteria	Route Option			
		Green-Orange	Green-Pink	Blue-Orange	Blue-Pink
Economy	Cost				
	Land Take				
	Reliability / Journey Time				
	Aggregated score				
Engineering	Geotech				
	Structures				
	Geometry				
	Aggregated score				
Environment	Ecology				
	Water/Flood Risk				
	Landscape				
	Noise				
	Cultural Heritage				
	Aggregated score				

Based on the outcomes of the above comparative assessment, the Green-Orange option was the preferred option. Whilst the Green-Orange is not the best option regarding the economy criterion, its overall score in the environment and engineering criteria present it as the best option when compared to the others.

XC219 Buttevant

The comparative assessment of the options for XC219 Buttevant is summarised below and shown in Table 2.16.

The Green option presented significant advantages over the other options in both the economic and engineering criterion.

- The cost of the Green option would be significantly lower due to its shorter length and lower land take. The short length of the Green option would also enhance journey time when comparable to the other two alternatives;
- The Red option had the most onerous alignment, however there was no structural preference between the options;
- The Red option had some advantages over the other options such as no direct impact on Buttevant Station or Bregoge Bridge, minor interruptions of hedgerows and mature tree lines and low potential increase in pluvial flood risk;
- While the Green Option was considered to have disadvantages over the other options in terms of the Ecology and Noise criterion, it scored better in terms of Water/Flood Risk and Landscape; and

- The Red option presented the longest route through the flood plain; the blue option the second longest routes. The green option was still within the flood plain but was the shortest route through it before connecting to the existing local road network.

Table 2.16: Comparative assessment - XC219 Buttevant

Primary Criteria	Secondary Criteria	Route Option		
		Green	Red	Blue
Economy	Cost			
	Land Take			
	Reliability / Journey Time			
	Aggregated score			
Engineering	Geotech			
	Structures			
	Geometry			
	Aggregated score			
Environment	Ecology			
	Water/Flood Risk			
	Landscape			
	Noise			
	Cultural Heritage			
	Aggregated score			

Based on the outcomes of the above comparative assessment, the preferred option was the Green Option. Whilst the Green option did present significant disadvantages in the geotech, ecology and noise criteria, there was a higher aggregate of advantages overall with the Green option compared to the Red and Blue options.

Summary of MCA Findings

Table 2.17 sets out the summary results of the multi criteria analysis and identifies the preferred solution for each of the subject sites taking into account further information where appropriate.

Table 2.17: MCA Summary results

Level Crossing	Preferred Option	Option Colour	Description
XC201 – Thomastown	Option 1	Green	New road-over-rail bridge to SW of level crossing. New junction on R515
XC209 - Ballyhay	Option 2	N/A	Despite the Green-Pink option being the best performing of the route options of an overbridge, the cost and environmental implications of this confirmed the choice of CCTV as the Preferred Solution.
XC211 – Newtown	Option 1		The MCA process identified the Green option as the preferred route option, however, following consultation in November 2019, the preferred option was updated to reflect local concerns.
XC212 – Ballycoskery	Option 1	Green	New road-over-rail bridge to South of level crossing.
XC215 – Shinanagh	Option 1	Green-Orange	New road alignment to North East of level crossing to connect with upgraded junction at existing road over rail bridge. Upgrade existing junction on N20.
XC219 - Buttevant	Option 1	Green	New road-over-rail bridge to South of level crossing with new river bridge.

2.4 Summary and Conclusions

The proposed Project has undertaken a detailed and robust assessment of alternatives which has been shaped through consultation.

The proposed Project is primarily driven by the need to improve safety on the Cork – Dublin Railway Line. It is clear that any road/rail interface such as a level crossing has a potential safety issue and the full hierarchy of plans and guidance cited in this chapter supports the removal of level crossings throughout Ireland. The proposed elimination/upgrade of the subject level crossings through new diversions, roads, bridges and CCTV will help to both reduce and remove the safety risk.

The elimination/upgrade of the subject level crossings will also help to improve the operational reliability of the Dublin – Cork Railway Line and that of the local road network as it will reduce/remove instances of delay associated with the level crossings.

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