

Cork Area Commuter Rail Glounthaune to Midleton Twin Track

Option Selection Report

June 2022

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Option Selection Report

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Executive summary

The Glounthaune to Midleton Twin Track project covers the area of the rail network from Cobh Junction to Midleton Station, a total distance of approximately 10km, and will see the upgrading of the existing line to twin track over its entire length. The twin tracking of the Glounthaune to Midleton railway will form part of the first work package undertaken by the National Transport Authority (NTA) and larnród Éireann to deliver the commuter rail vision set out in the Cork Metropolitan Area Transport Strategy (CMATS) 2040.

Cork Metropolitan Area Transport Strategy (CMATS) 2040 includes an ambitious heavy rail network, central to the strategic vision which will ensure an integrated local and regional transport network for the future of Cork city and its surrounds. CMATS will support compact urban growth in a more sustainable way, facilitating modal shift out of the private car and on to public transport. A more efficient, sustainable, low carbon and climate resilient heavy rail network will reduce road congestion and support Ireland's transition to a low emissions transport system helping us achieve emission reduction targets. The strategy for heavy rail includes the following: Development of the three existing railway corridors in the Cork area providing a high frequency north-east connection through the city; multi-model integrated transport hub at Kent Station to promote model shift from the private car, additional rolling stock to meet existing and future demand, new stations and Park & Ride interchange points.

The main element of the Glounthaune to Midleton Twin Track project consists of the provision of a second track at single track locations over the full extent of the line. These works will largely be contained within the existing railway corridor and will also include the addition of sidings/turn back facilities at Midleton, modification of bridges and level crossings to facilitate the twin tracking and associated infrastructure works such as retaining walls, boundary treatments, signage, signalling upgrades and alterations.

Four options were examined and developed for consideration in the option selection element of the design process. It is recommended that Option 3 should be taken forward to Phase 3 - Preliminary Design. On balance, this option best fulfils the project objectives based on the information available. Further work will be required at the next stages of design to refine the requirements, specifications, and costs for this solution.

1 Introduction

larnród Éireann plans to upgrade the existing rail line between Glounthaune and Midleton to enhance commuter services into Cork city. The Glounthaune to Midleton Twin Track project covers the area of the network from Cobh Junction to Midleton Station, a total distance of approximately 10km, and will see the upgrading of the existing line to twin track over its entire length.

The Twin Tracking of the Glounthaune to Midleton railway will form part of the first set of work packages undertaken by the National Transport Authority (NTA) and Iarnród Éireann as part of the <u>Cork Metropolitan Area Transport Strategy (CMATS) 2040</u>.

Along with the completion of the new Kent Station through Platform, the proposed Signalling and Communications upgrades and the delivery of a new fleet, twin tracking between Glounthaune to Midleton will facilitate a tripling of service frequency along the line while also ensuring a more reliable service for commuters and other rail users to and from the city.

1.1 **Project Key Objectives**

The delivery of Glounthaune to Midleton Twin Track project along with the completion of the new the proposed signalling and communications upgrades and the delivery of a new fleet should facilitate the following project objectives outlined in Table 1-1.

Key Project Objectives:
Operation of a higher frequency service up to a 10-minute service from the current 30-minute service
Increased capacity of the suburban rail network
Enhanced reliability of service
Provide better connectivity
Improve passenger experience.
Integrate with CMATS and CACR
Integration

Table 1-1: Key Project Objectives

This Option Selection Report assesses potential options to meet the above project objectives.

The options will be assessed using pre-selected assessment criteria that are in line with the project objectives and an assessment ranking from most favourable to least favourable. A "Do-Nothing" scenario and a 'Do Minimum' will also be assessed.

A recommendation of a preferred option will be made.

1.2 Project Requirements

The Glounthaune - Midleton Twin Track Project will have to include for the following:

- Twin track of entire length from Glounthaune to Midleton
- Provision of sidings/turn back facility at Midleton.

1.3 Existing Site Description

The rail line runs from Glounthaune station (Chainage 0) between the estuary and the L3004 road for 850m (all distances are approximate). It continues between the L3004 and open ground to the south for 910m before crossing the L3004 and then follows the L3616 for 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 6km before terminating at Midleton train station. An overview of the site can be seen in Figure 1-1.



Figure 1-1: Site Overview
Source: Mott MacDonald

2 Option Development & Evaluation

Four options were examined and developed for consideration as part of the option selection element of the design process. This chapter presents the options considered in identifying the Preferred Option.

2.1 Option 1 – 'Do-Nothing'

A 'Do Nothing' option was analysed by AECOM as part of the Cork Area Commuter Rail Pre-Feasibility Report.

There are varying levels of capacity constraints on the Cork network, Figure 1-1 below demonstrates these constraints on each line, and the potential impact of incremental frequency improvements.

Glounthaune to Midleton is a single line with a mid-point passing loop and can, in theory, accommodate four trains per hour. However, this would require a two-minute turnaround and there would be no tolerance on running. Given the constraint of a mid-way passing loop, a 17.5-minute service is the maximum that can be achieved with the existing infrastructure.



Figure 2-1: Site Overview

Source: AECOM – CACR Pre-Feasibility Study

2.1.1 Review & Conclusion

Rail:

The existing track does not meet the project objective as the current single-track layout with a mid-point passing loop at Carrigtwohill does not allow a higher operational frequency service. The allowable headway is 17.5 minutes. Therefore, the current layout will not provide the required increase in capacity and enhanced reliability of service, nor will it improve connectivity to an Integrated Public Transport Network.

Highway:

No impact is anticipated on highway elements.

Environment:

No impact is anticipated on environmental impacts.

Heritage:

No impact is anticipated on heritage bridges.

Land-take:

No impact is anticipated on Land-take requirement.

Utility Diversions:

No impact is anticipated on Utilities diversion requirements.

Sustainability:

This option is a not a sustainability option as overall it does not offer the required increase in service capacity and will not reduce the overall number of road users.

2.2 Option 2 – 'Do-Minimum'

Option 2 'Do-Minimum' explores whether inclusion of additional passing loops to the existing network will provide the required 10-minute service interval. In theory 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, although studies have concluded that this option is impractical.



Figure 2-2: Schematic of 'Do Minimum'

Source: Mott MacDonald

A full operational study of the network has been undertaken by AECOM refer to Cork Area Commuter Rail Technical Note: Train Service Specifications CACR-XX-XX-TN-ACM-OPS-0001 for, the optimum balance between service frequencies, route priorities, and passenger experience, and network modifications were recommended to improve performance. These studies conclude that the number of modifications (additional passing loops and signalling) required for this option are impractical.

2.2.1 Review & Conclusion

Rail:

Introduction of new passing loops along the existing infrastructure will provide a service level of 10-minute frequency and will provide the required increase in capacity. This will improve connectivity to an Integrated Public Transport Network.

New passing loops will present operational challenges such as any slight delays in running time could restrict movement of other trains in the intervening periods causing significant delays to service. The new layout would increase operational safety risks and could increase the likelihood of a SPAD (Signal Passed at Danger) occurring along these sections. Therefore, increasing the likelihood of a reduction in service reliability.

Highway:

No impact is anticipated on highway elements.

Environment:

Environmental impacts from the provision of additional passing loops will be marginal.

Heritage:

No impact is anticipated on heritage bridges.

Land-take:

Land-take requirement from the provision of additional passing loops will be marginal.

Utility Diversions:

Utilities diversion requirements is minimal.

Sustainability:

This option appears to be a sustainable solution, however although the capital investment appears minimal, the maintenance costs to enable a safe railway system to operate would be higher.

2.3 Option 3 – 'Full Twin Track – Optimised Alignment'

Option 3 'Full Twin Track – Optimised Alignment' was analysed. This included providing a twin track. The initial assessment identified that the I-PWY-1101 (IRL1 gauge) is not achieved at four overbridge locations.

- OBY1 Kilacloyne Overbridge (Figure 2-3)
- OBY2 Haly's Bridge (Figure 2-4)
- OBY4 Wise's Bridge (Figure 2-5)
- OBY7 Ballyadam Bridge (Figure 2-6)

Assuming that derogations against non-adherence to IRL1 gauge will be accepted, it is the intention to pursue a derogation to this standard at the following locations, with a 'Modified Great Southern and Western Railway (GSWR) minimum structure gauge'.



Figure 2-3: OBY1 Kilacloyne Overbridge – Approx. Ch 1600 Source: Mott MacDonald



Figure 2-4: OBY2 Haly's Bridge – Approx. Ch 1970

Source: Mott MacDonald



Figure 2-5: OBY4 Wise's Bridge – Approx. Ch 3240 Source: Mott MacDonald



Figure 2-6: OBY7 Ballyadam Bridge – Approx. Ch 6030 Source: Mott MacDonald

2.3.1 Review & Conclusion

Rail:

Provision of a 'Modified GSWR minimum structure gauge' along the route will provide a service level of 10-minute frequency and will provide the required increase in capacity between Glounthaune and Midleton.

Highway:

No impact is anticipated on highway elements.

Environment:

Environmental impacts from the provision a second track at single track locations over the full extent of the line is minimal.

Heritage:

No impact is anticipated on the heritage bridges.

Land-take:

Land-take requirement for the provision of the new railway cross section will be minimal.

Utility Diversions:

Utilities diversion requirements are minimal.

Sustainability:

This option is a sustainable solution as it maximises the re-use of existing infrastructure along the route which will reduce the overall carbon factor in providing a 10-minute headway service with an increase in rail service capacity.

2.4 Option 4 – 'Full IRL1 Gauge and standard Cross Section'

Option 4 – 'Full IRL1 Gauge with standard cross section' I-PWY-1101 (IRL1 gauge) was analysed which consisted of providing the full IRL1 gauge with standard cross sections along the route.

New bridges would be required at 4 locations which do not achieve IRL1 gauge.

- OBY1 Kilacloyne Overbridge (Figure 2-7)
- OBY2 Haly's Bridge (Figure 2-8)
- OBY4 Wise's Bridge (Figure 2-9)
- OBY7 Ballyadam Bridge (Figure 2-10)

OBY6 Carrigtwohill Station Bridge (Figure 2-11) which twin tracking currently runs through was also reviewed with respect to IRL1 gauge - I-PWY-1101.



Figure 2-7: OBY1 Kilacloyne Overbridge – Approx. Ch 1600

Source: Mott MacDonald



Figure 2-8: OBY2 Haly's Bridge – Approx. Ch 1970 Source: Mott MacDonald



Figure 2-9: OBY4 Wise's Bridge – Approx. Ch 3240

Source: Mott MacDonald



Figure 2-10: OBY7 Ballyadam Bridge – Approx. Ch 6030 Source: Mott MacDonald



Figure 2-11: OBY6 Carrigtwohill Station Bridge – Existing Bridge with Twin Track Source: Mott MacDonald

2.4.1 Review & Conclusion

Rail:

The proposed bridge envelope would accommodate the twin tracks, safe walkway access, the provision for future electrification, provide a service level of 10-minute frequency and will provide the required increase in capacity between Glounthaune and Midleton.

Highway:

Construction of the new bridges would require extensive and lengthy diversion routes. These would have to be agreed with Cork County Council and could affect the overall construction programme.

The IRL1 gauge will increase the vertical clearance of the bridge and in general the finished road level would need to be raised by approximately 1.0m without taking into consideration the need for any additional improvement to the local road network that may be required by the local authority.

Environment:

Killacloyne Bridge is located adjacent to a Special Area of Conservation (SAC) with woodland located to the south-west of the structure. Any work proposed works to this structure will require consultation with NPWS and may impact on the SAC.

Heritage:

OBY2, OBY4 and OBY6 overbridges date from the 1850's and are listed on the National Inventory of Architectural Heritage (NIAH Reference 20907548, 20907553 and 20907550). Loss of architectural heritage will have to be assessed in the Environmental Impact Assessment and any effects would more than likely be significant and negative.

Land-take:

Land-take requirements will be high, and disruption would likely be significant as some bridges are located adjacent to privately owned properties and as the new footprint extends outside of Irish Rail lands, significant acquisitions will be required.

Utility Diversions:

A review of site utilities records shows that services may be present at these structures which may require diversions. No consultation has taken place with the Utilities providers to date to evaluate the extent and costs of required diversions.

Sustainability:

Replacement of the existing bridges would have a significant increase in the overall carbon footprint of the project; this will be assessed in greater detail for the Environmental Impact Assessment.

3 Option Appraisal Criteria

The following appraisal criteria was used to evaluate the above options based on "The 'Common Appraisal Framework for Transport Projects and Programmes' published by the Department of Transport, Tourism and Sport (DTTAS), March 2016, which requires all schemes to undergo a 'Multi-Criteria Analysis' (MCA).

Mott MacDonald have aligned the Project Objectives with the criteria set out for the MCA for appraisal of projects under the "The Public Spending Code (PSC): Expenditure Planning, Appraisal & Evaluation in the Irish Public Service – Standard Rules & Procedures" listed below.

PSC Appraisal Criteria

Economy

The impact of a transport investment on economic growth and competitiveness are assessed under the economic impact and economic efficiency criteria.

Integration

Integration considers the extent to which the project being evaluated promotes integration of transport networks and is compatible with Government policies, including national spatial and planning policy.

Accessibility and Social Inclusion.

Accessibility and social inclusion embrace the notion that some priority should be given to benefits that accrue to those suffering from social deprivation, geographic isolation and mobility and sensory deprivation.

Safety

Safety is concerned with the impact of the investment on the number of transport related accidents.

Environment

Environment embraces a range of impacts, such as emissions to air, noise, and ecological and architectural impacts.

Physical Activity.

This relates to the health benefits derived from using different transport modes.

Physical Activity was scoped out of the multi-criteria assessment as all options promote physical activity equally, it is not considered to be a key differentiator between options.

3.1 PSC aligned with Project Objectives

The assessment criteria and assessment sub-criteria outlined in Table 3-1 below were used to aligned with the project objectives listed in Section 1.1 and the "The Public Spending Code (PSC): Expenditure Planning, Appraisal & Evaluation in the Irish Public Service – Standard Rules & Procedures"

Table 3-1: Assessment	Criteria and	Sub-criteria
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Assessment Criteria	Qualitative Assessment Sub-Criteria
Economy	1.a. Remove operational restrictions
	1.b. Journey time savings
	1.c. Increase reliability and flexibility of rail services
	1.d. Capital cost
	1e. Increase capacity of rail services
	1.f. Comfort and quality of journeys
Integration	2.a. Compatibility with CMATS and CACR
	2.b. Connectivity of the network; connect Mallow-Cork-Midleton/Cobh
Accessibility and	3.a. Eliminate the need for changing trains when travelling through Cork
Social Inclusion	3.b. Improving accessibility to socially disadvantaged areas.
Safety	4.a. Improve safety for train operation
	4.b. Improve customer safety
Environment	5.a. Respect the natural and built heritage status
	5.b. Minimise environmental impact
	5.c. Socio-Economic Impact

3.2 Assessment Ranking

The assessment criteria and sub-criteria were ranked based on the classification outlined in Table 3-2 below.

Table 3-2: Assessment Ranking Classification

Assessment Key/ Criteria Score	Appraisal Criteria Description
	Significant advantages over the other options (Highly Positive)
	Some advantages over the other options (Slightly Positive)
	Neutral compared to other options (Neutral)
	Some disadvantages over other options (Slightly Negative)
	Significant disadvantages over the other options (Highly Negative)

4 **Option Appraisal**

A Multi-Criteria Analysis (MCA) technique was used to inform the option selection process and identify the Preferred Option. The technique is informed by the Common Appraisal Framework (CAF) for Transport Projects and Programmes (Department of Transport Tourism and Sport, March 2016 & updated October 2020). A summary of the CAF guidelines in respect of option selection is presented in Chapter 3 for the application of the comparative assessment methodology.

Summary tables of each assessment criteria are presented below with a summary statement of how options performed relative to one another under each principal criterion.

Options under Consideration

- Option 1 'Do-Nothing'
- Option 2 'Do-Minimum'
- Option 3 'Full Twin Track Optimised Alignment'
- Option 4 'Full IRL1 Gauge and standard Cross Section'

4.1 Option Appraisal Qualitative Summary

4.1.1 Economy

1.a. Remove operational restric	tions
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Option 1	Option 2	Option 3	Option 4	

Option 1 maintaining the current track layout has significant limitations to providing a 10-minute headway. Option 2 considers the introduction of additional passing loops which will reduce these operational restrictions however it will not eliminate them completely. Option 3 and Option 4 will eliminate the operational restrictions currently present on the Glounthaune to Midleton line and has been awarded the most favourable rating.

1.b. Journey time savings	Option 1	Option 2	Option 3	Option 4

Option 1 will not allow the provision of a 10-minute headway and therefore the worst performing option. Option 2, in theory can provide the required 10-minute headway, however as the theoretical option carries very high operational risk a slightly negative rating has been assigned to Option 2.

Option 3 and Option 4 have been awarded the most favourable rating as both options can provide a 10-minute headway service which will provide commuters significant journey time saving when travelling in both travelling directions between Glounthaune to Midleton.

1.c. Increase reliability & flexibility of services	Option 1	Option 2	Option 3	Option

Option 1 will not allow the provision of a 10-minute headway and therefore the worst performing option in terms of reliability and flexibility. Option 2, in theory can provide the required 10-minute headway, however as the theoretical option carries very high operational risk a slightly negative rating has been assigned to Option 2.

Option 3 and Option 4 have been awarded the most favourable rating as both options can provide a 10-minute headway service which will provide commuters a consistent and flexible service when travelling in both travelling directions between Glounthaune to Midleton.

1.d. Capital Cost	Option 1	Option 2	Option 3	Option 4

Option 1 - 'Do Nothing' carries the lowest capital costs, although it does not meet the project objectives. Option 2 and Option 3 have limited interventions, however overall, both are rated to have similar capital costs. Although Option 2 does not provide a fully twin tracked route, the proposal will attract higher capital costs for signalling and telecom costs, crossing points and maintenance requirements for a high frequency service.

Option 4 is classified as a highly negative option as the interventions at bridge locations are significantly higher and will attract significant costs.

Option 1	Option 2	Option 3	Option 4

Option 1 will not allow the provision of a 10-minute headway and therefore the worst performing option in terms of increase in rail service capacity. Option 2, in theory can provide the required 10-minute headway, however as the theoretical option carries very high operational risk a slightly negative rating has been assigned to Option 2.

Option 3 and Option 4 has been awarded the most favourable rating as both options can provide a 10-minute headway service, which will increase the possible number of commuters travelling in both directions between Glounthaune to Midleton.

Option 1	Option 2	Option 3	Option 4

Option 1 will not allow the provision of a 10-minute headway and therefore the worst performing option in terms of comfort and quality of journeys. Option 2, in theory can provide the required 10-minute headway, however as the theoretical option carries very high operational risk. With train stopping/starting and movement onto the passing loop may not provide the highest ride quality and therefore a slightly negative rating has been assigned to Option 2.

Option 3 and Option 4 have been awarded the most favourable rating as both options can provide a 10-minute headway service, which provide the fastest and a better ride quality to commuters travelling in both directions between Glounthaune to Midleton.

1.e. Increase capacity of rail services

1.f. Comfort and quality of journeys

Option 1	Option 2	Option 3	Option 4

The Cork Metropolitan Area Transport Study (CMATS) has identified that the existing network has limited capacity within the existing network to cater for additional motor traffic efficiently. Landuse and transportation planning will need to be far more closely aligned to reduce the need to travel by car and support the functioning of a sustainable, integrated transport system.

Option 1 has demonstrated that maintaining the current track layout has significant limitations to providing a 10-minute headway which is not in line with the key objectives of CMATS and CACR.

Option 2 considers the introduction of additional passing loops will reduce these operational restrictions however it will not eliminate them completely.

Option 3 and Option 4 will eliminate the operational restrictions currently present on the Glounthaune to Midleton line and has been awarded the most favourable rating and will allow the key objectives of CMATS and CACR to thrive.

2.b. Connectivity of the network, connect
Mallow-Cork-Midleton/Cobh



Connectivity of the network will allow geographical integration with the possibility to connect geographic markets and labour markets between Mallow-Cork-Midleton/Cobh acting as a gateway to these sub-urban hubs.

Option 1 has demonstrated that maintaining the current track layout has significant limitations to providing a 10-minute headway which will be restrictive to the key objectives of CMATS and CACR.

Option 2 considers the introduction of additional passing loops to improve connectivity to the exiting train network and allow train network between Mallow -Cork Midleton/Cobh to function as one system. However, additional passing loops on the single-track section although will improve such connectivity, it will maintain some restrictions and has been rated as slightly negative.

Option 3 and Option 4 will provide connectivity of the network; current restrictions present on the Glounthaune to Midleton line will be eliminated; and these options meet the key objectives of CMATS and CACR, therefore the most favourable rating has been aligned to these options.

4.1.3 Accessibility and Social Inclusion

3.a. Eliminate the need for changing trains when	Option 1	Option 2	Option 3	Option 4
travelling through Cork				

All four options will eliminate the need to change trains when travelling through Cork from Mallow to Midleton/Cobh. Although this is highly desirable, it will depend upon the Operational Timetable. The risks of delays are higher with Option 1 and 2, but for this assessment, eliminating the need for changing trains when travelling through Cork is considered as neutral.

3.b Improving accessibility to socially	Option 1	Option 2	Option 3	Option 4
disadvantaged areas & vulnerable groups				

Improving accessibility to socially disadvantaged areas and vulnerable groups (elderly people, children, people with disabilities and lone parents) who use non-motorised forms of transport is an important feature of the CACR programme. This will allow integration of socially disadvantaged areas and allow increase accessibility to public transport for vulnerable groups.

Option 1 the current track layout has significant limitations to providing a 10-minute headway and will be restrictive in improving accessibility as train services will be limited.

Option 2 considers the introduction of additional passing loops to improve connectivity to the existing train network and allow train network between Mallow -Cork Midleton/Cobh to function as one system. However, additional passing loops on the single-track section although will improve such connectivity, it will maintain some restrictions and has been rated as slightly positive.

Option 3 and Option 4 will provide connectivity of the network current restrictions present on the Glounthaune to Midleton line will provide a very much improved service level and therefore the most favourable rating has been aligned to these options.

4.1.4 Safety

4.a Improve safety for train operation	Option 1	Option 2	Option 3	Option 4

Option 1 retains the existing track along the network and therefore has been rated as neutral.

Option 2 will increase the number of passing loops/crossovers in both directions, this increases crossing movements, present a risk to the railway and therefore the least favourable option was assigned.

A slightly positive rating has been assigned to Option 3 as limited allowable clearance is present at OBY1, OBY2, OBY4 and OBY7 instead of IRL1 gauge, which also reduces the risk of operational safety, when providing higher frequency service.

Option 4 has been assigned a highly positive rating as IRL gauge is being provided along the full length of the track.

4.b Improve customer safety on platforms	Option 1	Option 2	Option 3	Option 4

It is considered that the train operation safety above will transfer to the customer safety.

4.1.5 Environmental

5.a Respective the heritage status

Option 1	Option 2	Option 3	Option 4

Option 1 and Option 2 have been rated as neutral as these options do not interact with the heritage status of any bridges on the route. In terms of natural heritage such as European Sites or nationally designated sites, these options are neutral.

Option 3 has been rated as highly positive as the interactions do not impact the NIAH bridges as the track route is threaded through these pinch points. In addition, there is limited effects on European Sites, restricted to indirect disturbance effects along the estuary, and indirect water quality effects due to the widening of the Owenacurra river bridge which can be mitigated.

Option 4 has been rated as highly negative, as this option does not have any alternative apart from the demolition of the NIAH bridge structures. In addition, there is potential for effects of some woodland in the Great Island SAC due to removal of a bridge.

5.b Minimise environmental impact	Option 1	Option 2	Option 3	Option 4

For this study, the environmental impacts for Option 1 and Option 2 are considered as neutral, both options reuse the existing line, the new passing loops proposed are expected to be within CIE property boundary is considered as minor enhancement operations.

The impact of Option 3 on the environment is considered to be limited and has been assigned as highly positive as the option considers re-using the existing infrastructure with CIE property boundary as far as reasonably practical. With regard to environmental effects, the loss of OBY 8 could have a minor effect, while not a NIAH bridge, the bridge does have local heritage value – however, the NIAH bridges along the railway line would all be retained. The retention of these bridges is beneficial from a heritage perspective but also from biodiversity/air/noise/hydrology perspectives. The retainment of these bridges will mean that nuisance effects from dust and noise will be avoided at these locations as there will be no demolition and construction.

The impact of Option 4 on the environment is considered as significant and has been assigned as highly negative. In terms of the environment, there would be permanent effects on the NIAH bridges along the railway line. Due to the larger amount of works required, there would be more potential for effects on biodiversity e.g. bat roosts in bridges and water quality effects.

4.2 **Options Appraisal Matrix**

The option appraisal matrix for the project is shown in Table 4-1 below.

Assessment Criteria	Assessment Sub-Criteria	Option 1	Option 2	Option 3	Option 4
Economy	1.a. Remove operational restrictions				
	1.b. Journey time savings				
	1.c. Increase reliability and flexibility of rail services				
	1.d. Capital Cost				
	1e. Remove operational restrictions				
	1.f. Comfort and quality of journeys				
Integration	2.a. Compatibility with CMATS and CACR				
	2.b. Connectivity of the network, connect Mallow-Cork-Midleton/Cobh				
Accessibility and Social	3.a. Eliminate the need for changing trains when travelling through Cork				
Inclusion	3.b. Improving accessibility to socially disadvantaged areas.				
Safety	4.a. Improve safety for train operation				
	4.b. Improve customer safety				
Environment	5.a. Respective the heritage status				
	5.b. Minimise environmental impact				

Table 4-1: Option Appraisal Matrix

Assessment Key/ Criteria Score

Appraisal Criteria Description

Significant advantages over the other options (Highly Positive)
Some advantages over the other options (Slightly Positive)
Neutral compared to other options (Neutral)
Some disadvantages over other options (Slightly Negative)
Significant disadvantages over the other options (Highly Negative)

4.3 Options Appraisal Matrix Summary

A summary of the Options Appraisal Matrix is shown in Table 4-2 below. Each criteria has been assigned an assessment rating based on the lowest sub-criteria rating outlined in Table 4-1.



Assessment Criteria	Option 1	Option 2	Option 3	Option 4
Economy				
Integration				
Accessibility and Social Inclusion				
Safety				
Environment				
Option Assessment Summary	Option 1 is not preferred as it does not provide the required capacity and do not meet the overall project objective.	Option 2 is not preferred as it increases the operational safety risks.	Option 3 is the preferred solution as it meets the project objectives no significant environment impact.	Option 4 is not preferred due to high capital cost and high environmental impact.
PREFERRED OPTION	NO	NO	YES	NO

5 Conclusion

Mott MacDonald completed the review of options 1 to 4 under the Common Appraisal Framework for Transport Projects and Programmes published by the Department of Transport, Tourism and Sport (DTTAS), March 2016. The final rating of the 'Multi-Criteria Analysis' (MCA) is detailed in Section 4.3.

5.1 Recommendations

Option 3 appears to score the highest under the Common Appraisal Framework for Transport Projects and Programmes. It is recommended that the Preferred Option is developed further and presented to the public at Public Consultation in Summer 2022, prior to finalisation of a Railway Order Submission.

6 Next Steps

The preferred option described in this report will be developed and presented as part of the public consultation process. Once the public consultation process is complete, all feedback and submissions received will be reviewed and assessed as part of the finalisation of the design development.

A Railway Order application process as set out in the Transport (Railway Infrastructure) Act 2001 (as amended) will be required for the preferred option. As a Railway Order Application is required, a Natura Impact Statement and an Environmental Impact Assessment Report will be required to identify and assess the impacts on the environment. The report will be required to describe measures to be taken to avoid, reduce and/or monitor any impacts.

On submission of the Railway Order Application to An Bord Pleanála, the public will be invited through public notices to make submissions which will be considered by An Bord Pleanála as part of the decision-making process.

If required An Bord Pleanála may conduct an oral hearing, to allow the public to provide further participation in the decision-making process for this Project.

At an oral hearing the larnród Éireann project team will provide responses to submissions and will be available for questioning. Any person or body can make a submission or observation in writing to the Board in relation to the Railway Order application including the EIAR and the Compulsory Purchase land requirements.



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