Phoenix Park Tunnel Ex-Post Evaluation Report

Phase 7b Ex Post Evaluation

Iarnród Éireann/National Transport Authority (NTA)

June 2025

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Executive Summary

The Phoenix Park Tunnel (PPT) Project aimed to improve rail connectivity by reintroducing scheduled passenger services through the tunnel, linking the Kildare Line with Dublin City Centre. The project was a collaboration between the National Transport Authority (NTA) and Iarnród Éireann (IÉ) and sought to enhance commuter options, reduce congestion, and support public transport integration.

The PPT Project was launched in November 2016 after infrastructure upgrades and operational improvements were completed. Key project achievements include:

- Direct city-centre access for Kildare Line commuters without the need to interchange at Heuston Station.
- Increased public transport capacity and patronage along the corridor.
- Improved journey times and service reliability.

The approved budget for the project was €13.7 million, with an initial estimate of €13.46 million. The final project cost was €13.488 million, representing 98% of the allocated budget. Cost overruns in civil, mechanical, and electrical works were offset by savings in Per Way Works, keeping the project within contingency limits. Overall, the project remained within its allocated contingency, indicating effective financial management.

The project experienced a five-month delay beyond the planned completion date, primarily due to unforeseen challenges with existing infrastructure. Issues such as deficiencies in station structural steel works and unexpected soil conditions required design modifications and extended project timelines. Despite these setbacks, the project was successfully completed and operational by November 2016.

The project achieved its intended objectives, delivering the required infrastructure improvements and initiating new passenger services. The implementation adhered to governance and project management frameworks set by the National Transport Authority (NTA) and Iarnród Éireann (IÉ). However, the lack of an ex-post evaluation plan limited the ability to comprehensively measure long-term project benefits.

The ex-ante Benefit-Cost Ratio (BCR) was projected at 3.0, while the ex-post BCR was assessed at 2.4. The reduction is attributed to higher-than-expected operational costs. However, the project continues to deliver significant transport benefits, supporting increased rail usage and reducing reliance on private vehicles.

The PPT Project was delivered within budget, with minor delays and slight reductions in the expected economic return. Despite these factors, the project successfully enhanced Dublin's rail infrastructure and provided long-term value by improving connectivity, reducing congestion, and encouraging public transport use.

1. Introduction

This document has been prepared for the joint purpose of piloting the National Transport Authority's (NTA's) updated Guidance on Planning for and Undertaking Phase 7b as well has serving as the formal Project Completion Report (PCR) and Ex-Post Evaluation Report (EPE) for the project that was originally developed jointly for Iarnród Éireann (IÉ) and the NTA.

The document has been prepared to meet the requirements as stipulated in the Ex-Post Evaluation Guidance v2 – Working Version (December 2024). As this is a combined PCR and EPE it has been structured to minimise repetition and therefore has a combined Project Summary Chapter with two separate chapters covering the PCR and EPE respectively. There is some duplication in the requirements of a PCR and EPE which are ordinally completed a few years apart, therefore where requirements of the EPE are covered in the PCR chapter this has been highlighted and referenced.

2. Project Summary

The Phoenix Park Tunnel (PPT) Project represents a significant enhancement to Dublin's rail network, providing a vital new link between the city's western suburbs and key business districts. Completed in 2016, the project involved upgrading an existing but underutilised rail corridor to facilitate passenger services, improving connectivity, reducing congestion, and offering commuters a viable alternative to private vehicle travel.

Reopening the PPT to scheduled passenger services had been considered since 2003, when the project, initially called the 'd-Connector', was discussed in the Dáil[1]. The PPT was considered to be the thread that would link Connolly Station, Spencer Dock Station and Heuston Station into an integrated railway hub to reduce reliance on a single central station.

2.1 Issues

The heavy rail network in Dublin comprises four main routes radiating from the city. The Northern Line and the Maynooth Line converge at Connolly Station before connecting to the South Eastern Line across the River Liffey. The electrified DART service runs between Malahide and Howth (on the Northern Line) and Greystones (on the South Eastern Line), with all of these routes passing through Dublin City Centre. However, the Kildare Line terminated at Heuston Station approximately 2 km to the west of the city centre. An outline of the four key lines, with the Kildare line, is shown in Figure 2-1.

The focus of the Business Case was the Kildare corridor, which has a strong commuter flow to Dublin, with the majority of these journeys having an ultimate destination in Dublin City Centre. With the Kildare Line terminating at Heuston Station, the evidence suggested that the majority of passengers were required to interchange to other modes, namely bus or Luas services, to complete their journeys to the city centre. This is an inconvenience and added substantially to passengers' journey times and, it was believed, provided a significant barrier to the growth of patronage of Kildare line services.

Issue Summary

The need to interchange at Heuston Station impacts negatively on users and was a barrier to attracting new users of Kildare Line services.

2.2 Objectives

The principal needs the Phoenix Park Tunnel (PPT) Project was aiming to address are:

- Provide direct access to the city-centre for existing users of Kildare Line without the need to interchange; and
- Provide a suitably attractive and high-capacity services on the Kildare Line to attract new public transport users.

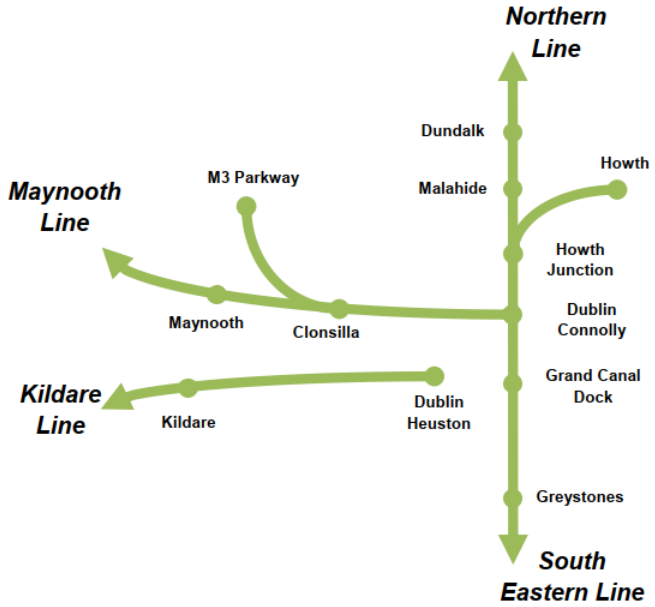

Figure 2-1 Outline of the Rail Network in the Greater Dublin Area

[1] https://www.oireachtas.ie/ga/debates/debate/joint_committee_on_transport/2003-04-15/2/?highlight%5B0%5D=11

The objectives of the PPT Project were defined and grouped into five key categories:

Economy

- Improve journey times for passengers using the Kildare Line service by reducing the need to interchange at Heuston Station; and
- Attract new customers to the Kildare line service.

Safety

- Attract transport users from road use in favour of public transport.

Environment

- Reduce traffic congestion and emissions by providing a viable public transport alternative on the Kildare Line corridor.

Accessibility and Social Inclusion

- Increase availability and attractiveness of public transport in the Greater Dublin Area.

Integration

- Assist in the delivery of the national transportation strategy by increasing patronage on the Kildare Line; and
- Improve the integration and efficiency of transportation by linking the heavy rail system in Dublin.

2.3 Implemented Intervention

The PPT is a 4km stretch of rail track running north, west of Heuston Station, joining the Maynooth Line between Broombridge and Drumcondra.

Figure 2-2: Phoenix Park Tunnel Route Overview[2]

The PPT Project included the reintroduction of scheduled passenger services using the tunnel, and remedial infrastructure works to improve the tunnel's condition. Prior to the PPT Project, infrequent scheduled passenger services that used to operate on the route had stopped in 2001. Since then, the PPT route was used for freight train movements, transfer of trains between Connolly and Heuston, and occasional unscheduled special passenger services only.

The project was developed jointly by the NTA and Iarnród Éireann (IÉ).

[2] Phoenix Park Tunnel Route Map, Irish Rail and NTA

2.4 Value for Money

The approved budget for the project was €13.7 million, with an initial estimate of €13.46 million. The final project cost was €13.488 million, representing 98% of the allocated budget. Cost overruns in civil, mechanical, and electrical works were offset by savings in Per Way Works, keeping the project within contingency limits. Overall, the project remained within its allocated contingency, indicating effective financial management.

The project experienced a five-month delay beyond the planned completion date, primarily due to unforeseen challenges with existing infrastructure. Issues such as deficiencies in station structural steel works and unexpected soil conditions required design modifications and extended project timelines. Despite these setbacks, the project was successfully completed and operational by November 2016.

The project achieved its intended objectives, delivering the required infrastructure improvements and initiating new passenger services. The implementation adhered to governance and project management frameworks set by the National Transport Authority (NTA) and Iarnród Éireann (IÉ). However, the lack of an ex-post evaluation plan limited the ability to comprehensively measure long-term project benefits.

3. Project Completion Report

3.1 Intervention, costs and performance

The PPT project was successfully launched in November 2016, a date which marked a major advancement in rail connectivity between Kildare and Dublin City Centre. This project sought to upgrade and reopen the tunnel, thereby facilitating a direct rail connection from stations on the Kildare line to stations situated in Dublin City Centre, such as Connolly, Tara Street, Pearse Street and Grand Canal Dock. Before this intervention, passengers seeking to make this journey were required to interchange to bus or tram services at Heuston Station.

The project was executed broadly in line with the budgeted cost. Though most cost items ran overbudget, the overspend on most individual cost items was kept relatively low, meaning that the final project outturn was within the project's approved contingency. The tunnel successfully introduced new high-capacity and frequent train services, greatly reducing commuter journey times. The tunnel's reopening and the necessary upgrades were broadly delivered in line with the project plan in terms of timelines and met the required technical and safety standards, ensuring a reliable and efficient service. By providing direct city centre access for existing (prior to implementation) users of the Kildare Line and attracting new public transport users, the PPT successfully delivered a solution that enhances overall network connectivity and supports the growing demand for efficient public transport options.

3.2 Relevant Operational Metrics and Indicators

This review was based on the comparison of actual PPT Project performance against its objectives. Therefore, the operational metrics and indicators proposed in the Project Appraisal Balance Sheet were the basis of this comparison. These were included in the Project Business Case and are summarised in Table 3-1.

Table 3-1: Suggested PPT Project Operational Metrics and Indicators

Objective	Indicators
Improve journey times for passengers using the Kildare Line service by reducing the need to interchange at Heuston station.	The journey times for existing passengers on the Kildare Line have been reduced as evidenced by approximately 30% of passengers using the existing services to Heuston station moving to the new PPT services.
Attract new customers to the Kildare Line service.	The number of boardings on the Kildare Line has increased by over 20% in both 2012[3] and 2033[4].

[3] While the Business Case includes 2012 as a measurement date, this date was before the Business Case was published and the project was completed, indicating that this may have been based on analysis conducted earlier in the project appraisal process. Year 2017 will be used as a measurement date in this EPER since this was after PPT Project completion.
[4] NTA GDA Transport Model was used to develop forecasts of public transport and private transport demand. These demand forecasts were carried out for the Do-Minimum and Do-Something Scenarios. Forecasts were generated for both 2012 and 2033. Forecast year models have been developed for the scheme opening year of 2016 based on a linear interpolation between the NTA's 2012 base and 2033 future model population/employment forecasts.

Objective	Indicators
Attract transport users from road use in favour of public transport	The number of boardings on the Kildare Line has increased by over 20% in both the 2012[3] and 2033[4] years.
Increase availability and attractiveness of public transport in the Greater Dublin Area.	The PPT Project results in an increase in the number of services on the Kildare Line and links the two heavy rail systems in the Greater Dublin Area.
Reduce traffic congestion and emissions by providing a viable public transport alternative on the Kildare Line corridor.	The number of boardings on the Kildare Line has increased by over 20% in both the 20123 and 2033[4] years.
Assist in the delivery of the national transportation strategy by increasing patronage on the Kildare Line.	The number of boardings on the Kildare Line has increased by over 20% in both the 2012[3] and 2033[4] years.
Improve the integration and efficiency of transportation by linking the heavy rail system in Dublin.	The PPT Project results in an increase in the number of services on the Kildare Line and links the two heavy rail systems in the Greater Dublin Area.

As shown in Table 3-1, while the PPT Project Business Case sought to achieve seven objectives, the performance of these objectives can be assessed or measured using three Key Performance Indicators (KPIs):

- Journey Times on the Kildare Line
- Number of Boardings at Stations on the Kildare Line
- Number of Services on the Kildare Line

The PPT Project's performance against these KPIs is assessed in the subsequent sections. Evaluation of the project's operational performance against these KPIs may have required detailed post-project studies to generate the relevant data, these were not provided to inform this evaluation. Where data from such studies was not available, publicly available information was used.

3.3 Project Photographs

Figures 3-1 to 3-9 display photographs of the PPT, and train services using the route during construction and after completion of the project and its launch.

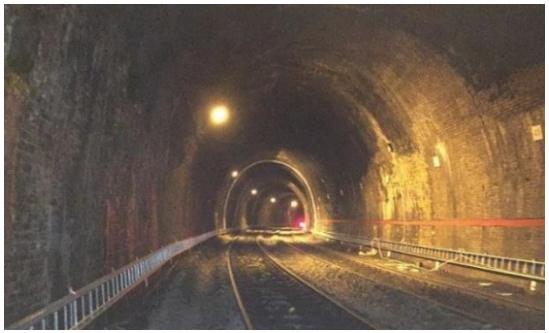

Figure 3-1: PPT Project Tunnel Works[5]

Figure 3-2: Track and Embankment Works

[5] https://www.linkedin.com/pulse/phoenix-park-rail-tunnel-enda-nolan/

Figure 3-3: PPT Project Launch[6]

Figure 3-4: PPT Trial Services[7]

Figure 3-5: Phoenix Park Tunnel Services Launch[8]

[6] https://www.flickr.com/photos/infomatique/20675313652/in/photostream/
[7] https://www.flickr.com/photos/infomatique/20675296512/in/photostream/

[8] https://www.flickr.com/photos/infomatique/20675299192/in/photostream/

Figure 3-6: PPT Project Launch[9]

Figure 3-7: PPT Project Launch[10]

Figure 3-8: Passengers on the first train from Grand Canal Dock to Hazelhatch[11]

Figure 3-9: Work on Platform 10 near the PPT[12]

[9] https://www.flickr.com/photos/infomatique/20691272141/in/photostream/
[10] https://www.flickr.com/photos/infomatique/20691275581/in/photostream/

[11] https://www.thejournal.ie/delays-phoenix-park-tunnel-3093104-Nov2016/
[12] https://www.flickr.com/photos/infomatique/20063586823/in/photostream/

3.4 Implementation analysis

The Infrastructure Guidelines (formally the Public Spending Code) required that a post project review cover:

- Project outturn, including assessing whether project benefits were realised, and objectives were achieved.
- Appraisal and management procedures, including an assessment of whether the appraisal and management procedures adopted were satisfactory

Review of appraisal of management procedures can be conducted soon after project completion and included in the PCR. Considering that **no PCR was developed for the PPT Project, the review of appraisal and management procedures was conducted at the EPE stage**. The main findings of this review are discussed in the next sections.

3.4.1 Procedural Analysis

All projects delivered by Government agencies are subject to management and appraisal procedures developed by the Approving Authority. The Approving Authority (formerly named the Sanctioning Authority at the time of the PPT Project approval and implementation) is normally a Government Minister, Department or Public Body responsible for implementing Government Policy and for providing funding for capital programmes and projects. The Approving Authority is responsible for granting approvals for publicly funded projects.

The NTA was the Approving Authority for the PPT Project, and as such the delivery of the project was guided by the authority's Project Management Guidelines (PMGs). PMGs for Projects Funded by the NTA (up to €20 million in value) [13] were applicable at the time of the PPT Project and were, therefore, referenced for this report. The guidelines provided a framework for, and a phased approach to, the development, management and delivery of transport projects funded by the NTA at the time. The guidelines outlined the six phases of project delivery illustrated in Figure 3-10.

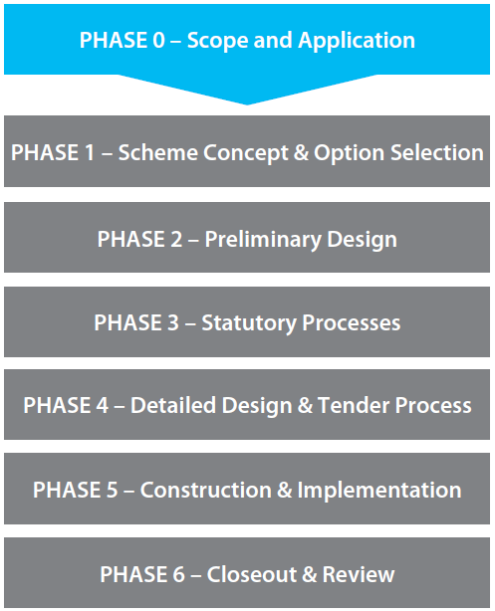

Figure 3-10: Phases of an NTA-Funded Project's Life Cycle[14]

The NTA PMGs were relatively new at the time of the PPT Project, however, significant PPT background work and planning started before the PMGs were published. Where necessary, other NTA or IÉ processes were adopted for monitoring the project. IÉ has a comprehensive suite of Project Management Procedures (PMPs) that address many of the requirements in the NTA PMGs and were useful in ensuring project compliance with procedures. An assessment of the PPT Project's compliance with guidelines is provided in Table 3-2.

[13] Project Management Guidelines for Projects Funded by the NTA (up to €20 million in value), published in December 2011

[14] National Transport Authority . (2011). *Project Management Guidelines For Projects Funded By The National Transport Authority (Up To €20 Million In Value).*

Table 3-2 PPT Project's Compliance with NTA Guidelines

Phase	Typical Requirements	Compliant with NTA guidance (Y/N)	Comments
0. Scope and Application	• Completed Application Form • Project Dossier (if applicable)	Yes	• As required in the guidelines, NTA Grant Applications for funding were submitted for approval. Ongoing Project Continuance Funding Applications were submitted and approved at various project phases. • All relevant information on the project or project phases was made available as part of the applications for funding.
1. Scheme Concept and Option Selection	• Project Execution Plan • Option Selection Report • Feasibility Working Cost Estimate	Yes	• A Project Execution Plan (PEP), document reference NW-PPT-PEP-P0201 was developed for the PPT and was updated throughout the project. As well as being required of the NTA PMGs, the PEP is also a requirement of the IÉ PMPs. • Considering the nature of the PPT Project, which included rehabilitation of existing infrastructure, no significant Option Selection was required. However, the project's Preliminary Appraisal and Business Case analysis included a comparison of scenarios such as 'Do Minimum' and 'Do Something' which can be considered applicable options.
2. Preliminary Design	• Preliminary Design Report • Road Safety/Road User Audits (if applicable) • Preliminary Appraisal Report • Preliminary Cost Estimate	Yes	• IÉ developed preliminary designs to understand the project's technical risks and economic viability. • As mentioned in the previous phase, the NTA carried out a preliminary appraisal of the project which provided a positive outlook on its feasibility and was the basis for further work such as the Business Case. • IÉ conducted several technical and safety assessments e.g., for ground conditions, flooding, tunnel conditions, coordination and management of works and interfaces with existing systems on the Kildare Line. • A Preliminary Cost Estimate was included in the project's Preliminary Appraisal and was updated in the Business Case.
3. Planning and Statutory Processes	• Final Documentation for Planning Approval (if applicable) • Planning Outcome Report	Not Applicable	• The PPT Project's scope included improvements to a railway that was built pursuant to a railway order. Such works are exempt from most statutory and planning approvals in the Transport (Railway Infrastructure) Act 2001. There were no significant statutory processes needed for the project e.g., there was no need for planning approval for any PPT works.

Phase	Typical Requirements	Compliant with NTA guidance (Y/N)	Comments
4. Detailed Design and Tender Process	• Detailed Design • Tender Documents • Tender Report • Road Safety/Road User Audits (if applicable) • Appraisal Report • Total Scheme Budget	Yes	• Detailed designs were developed where necessary and used as the basis for the tendering process. • Relevant tendering documents were prepared and approved. • Project appraisal and budget estimation was conducted and included in the Business Case. • The PPT Project's appraisal included a full Cost Benefit Analysis (CBA), exceeding the Public Spending Code (PSC) requirements of a Multi Criteria Assessment (MCA) for projects with budgets below €20 million at the time.
5. Construction and Implementation	• Road Safety/Road User Audits (if applicable) • Change Order Reports (if applicable)	Yes	• No specific Road Safety/Road User Audits were prepared for the PPT EPE. The impacts of the project on other activities and traffic around the site were evaluated in the overall Risk Assessment. • Change orders were managed and reported on according the PEP and IÉ PMPs.
6. Close out and review	• Final Project Report (incl. Post-Project Evaluation) • Completed Safety File	Yes	• This Post-Project Report fulfills the post-project evaluation requirements. A Project Closeout Report was developed at the end of the project and fulfilled the requirements of a Final Project Report. • A Safety File was developed to highlight risks encountered during the project and how these were managed.

3.4.2 Programme Review

A comparison of the PPT Project milestone's baseline and actual completion dates is provided in Table 3-3. PPT deliverables were largely completed according to schedule. There were slight delays, however, to some tasks mainly caused by the unpredictable nature of old infrastructure and facilities rehabilitated on the project.

Issues that caused delays included the station structural support steel works deficiencies. This resulted in the need for design modifications to structural steel. As such, fabrication of steel could not commence as planned. There were also slight delays caused by soil quality issues encountered during the soil nailing works for the Tunnel Civils Cutting Stabilisation Works. Whilst these issues were not a given at the outset, they were not unusual for undertakings like the PPT Project. IÉ and the NTA managed the issues effectively, working with contractors, to minimise programme impact.

Table 3-3: PPT Project Schedule Performance

Work Package/Phase	Milestone	Planned Finish[15]	Actual Finish
Phase 2/3 Scope -Preliminary Design & statutory processes	Outline Construction Strategy	October 2014	October 2014[16]
	Preliminary Design	March 2015	March 2015[17]
Detailed Design & Tender Process	Funding Approval Process	April 2015	May 2015[18]
	Safety Approvals	March 2015	May 2015
	Enabling works	July 2015	July 2015[Ψ]
	Finalise Detailed Designs	June 2015	May 2015[19]
	Procurement Process	June 2015	July 2015
Contract Award, Construction and Implementation	Safety Approvals	May 2015	May 2015
	Funding Approval for Construction stage	June 2015	May 2015
	Tunnel Cleaning, painting & M&E works	October 2015	December 2016*
	Tara Street Southbound lift relocation	December 2015	January 2016[20]
	Cutting Stabilisation & Drainage works	April 2016	June 2016
	Renovation of MKIV train cars	June 2016	June 2016
	Per Way Panel laying & linear drainage in the tunnel	November 2015	December 2015[φ]
	Station Civils & M&E Works Drumcondra	April 2016	June 2016[21]

[15] PPT Rolled Up Schedule, March 2015
[16] Phoenix Park Project -Design & Construction Programme rev.09.03.15
[17] Phoenix Park Project -Design & Construction Programme rev.09.03.15
[18] Project Closeout Report, October 2020
[Ψ*] Based on the start date of the earliest construction contract.
[19] Project Manager's Report, August 2015

[*] 85% of works were complete by October 2015 after which the contractor. agreed to move off site to allow the permanent way track installation works to proceed.
[20] Project Manager's Report, October 2015
[φ] Final tamping was conducted in January 2016
[21] 4945-008 - PPT Drumcondra Station Civils & M&E Works rev.17Feb2016

Work Package/Phase	Milestone	Planned Finish[15]	Actual Finish
	Per Way, Replace Crossover 720 A & B at Islandbridge	May 2016	Information not received
Commence services		June 2016	November 2016

3.4.3 Project Governance

NTA PMGs propose an appropriate governance structure for projects to enhance and confirm relationships between parties. The structure should include:

- The Approving Authority
- The Sponsoring Agency
- The project management team.
- Stakeholders such as public bodies, affected individuals, businesses, users of the services delivered on the project and the public.

The project team members required on projects include:

- The Project Director, appointed by the organisation partnering with the NTA. The Director has responsibility for project delivery and is the key point of contact for the NTA and IÉ.
- The Project Manager (or Project Coordinator), responsible for developing the PEP, obtaining all NTA approvals and other statutory approvals, managing the work of the project team, allocating and utilizing resources in an efficient manner and developing a cooperative, motivated, and successful team.

IÉ PMPs were also referred to in developing a governance structure for the PPT Project. An overview of the PPT Project governance structure, which met both IÉ and NTA governance requirements is provided in Figure 3-11. Additionally, the key PPT Project governance roles and responsibilities are shown in Table 3-4. Overall, this structure was successful in delivering the PPT project. Whilst there was a delay in the overall project, these delays have been identified and were not related to governance structures.

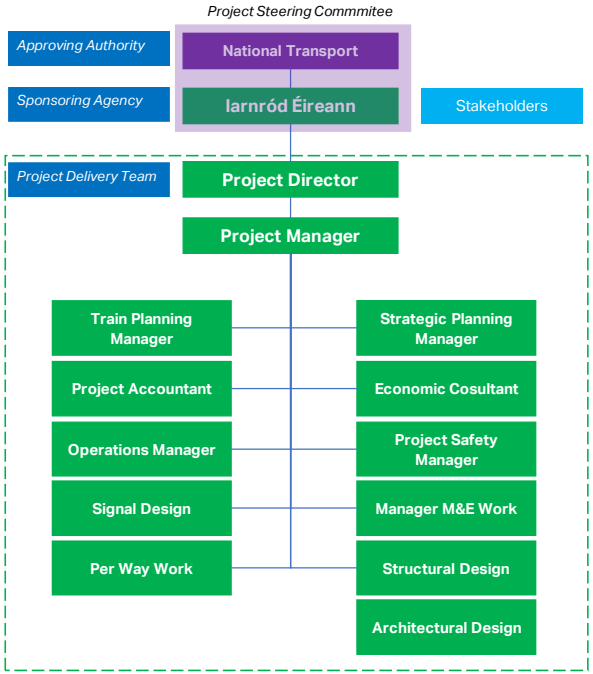

Figure 3-11 PPT Project Governance Structure

Table 3-4: PPT Governance Roles and Responsibilities

Party	Roles/Responsibilities
NTA	• Approving Agency, responsible for authorising project approval (within specified budgets, standards, schedules) and co-ordinating the Gate Review process with the Sponsoring Agency (IÉ) for the delivery of the project.
IÉ	• Sponsoring Agency with overall responsibility for delivering the project to the programme and budget targets. • Managing project delivery in compliance with the IÉ Project Management Framework (PMF), NTA Project Management Guidelines and Capital Works Management Framework GN1.1. • Appointing the project delivery team. • Managing stakeholder relationships.

3.5 Economic and financial

Whilst the PPT Project was delivered successfully in accordance with relevant procedures and has achieved all its objectives, it is necessary to determine whether project delivery was achieved efficiently and whether the project deliverables were appropriate. The main indicators of efficient delivery are budget and schedule performance, whilst post-project operating, and maintenance costs provide an indication of operational efficiency. These are discussed in the next sections.

3.5.1 Business Case Capital Estimate

The PPT Project estimated capital costs included in the Business Case are shown in Table . The forecast costs were €13.46 million (incl. VAT). The costs were estimated by IÉ after which they were reviewed and updated by AECOM. The values in Table 3-5 are those updated by AECOM. The Business Case highlighted the potential for adjustments to the costs at a later stage.

Table 3-5: PPT Project Business Case Capital Cost[22]

Category	Cost (€ thousands), incl. VAT
Surveys and Investigations	301
Planning, Design and Environmental Impact Statement (EIS)	179
Building Works	1,009
Civil Engineering Works	4,437
Per-Way Works	2,800
Signalling, Electrical and Telecoms	250
Project / Construction Management and Iarnród Éireann (IÉ)/ Córas Iompair Éireann (CIÉ) Costs	1,204
Infrastructure Protection Works	252
Reintroduction of Mark IV Units One Off Cost	1,500
Escalation	361
Contingency	1,164
Total	**13,457**

[22] PPT Project Business Case, Page 8

3.5.2 Approved Capital Budget

The approved PPT Project capital budget was €13.7 million as shown in Table 3-6. There were slight adjustments to budget provision in the Business Case which was estimated but the approved budget remained similar to the Business Case estimate.

Table 3-6: Approved PPT Project Capital Budget[23]

Category	Cost (€ thousands), incl. VAT
Civils, Building & Mechanical/Electrical works	5,500
Per Way works	2,800
Signalling & Telecoms works	100
Project / Construction Management and Iarnród Éireann (IÉ)/ Córas Iompair Éireann (CIÉ) Costs	1,150
Infrastructure Protection Works	200
Reintroduction of Mark IV Units	1,500
Contingency	1,450
Approved Expenditure from Previous Phases	1,000
Total	**13,700**

[23] PPT Budget Analysis, May 2016

3.5.3 Project Outturn Costs

The PPT Project outturn cost, provided in the Closeout Report was €13.488 million. This was 98% of the approved €13.7 million budget. A breakdown of the approved budget allocation and final costs is provided in Table . The breakdown shows that the budget allocations for several line items were updated during project implementation, resulting in values that were different from those included in the Business Case, but the total approved budget remained unchanged.

The outturn costs show that the most significant over expenditure was incurred for Civils, Building & Mechanical/Electrical Works, which were completed 36.97% or €2.1 million over budget. This over expenditure was partially offset by 38.89% or €1.1 million savings for Per Way Works. The total project expenditure was within the provided contingency, indicating that estimation of this contingency was accurate.

Table 3-7: PPT Project Interim Cost Reconciliation as of June 2016[24]

Category	Approved Budget (€ thousands)	Expenditure (€ thousands)	Over or under expenditure (€ thousands)	Over or under expenditure (%)	Reason for variance
Civils, Building & Mechanical/Electrical Works	5,900	8,081	2,181	36.97%	Overspend on M&E works within the tunnel due to harsher environmental conditions than envisaged.
Per Way Works	2,800	1,711	-1,089	-38.89%	Underspend due to refinements to drainage design/implementation and reduced ballast requirements.
Signalling & Telecoms Works	100	104	4	4%	Limited overspend due to the temporary movement of certain signals.
Project / Construction Management and Iarnród Éireann (IÉ)/ Córas Iompair Éireann (CIÉ) Costs	1,580	1,445	-135	-8.54%	Underspend due to simplification of the embankment stabilisation design.
Infrastructure Protection Works	200	243	43	21.5%	Overspend due to additional time spent on site.
Reintroduction of Mark IV Units	1,500	1,607	107	7.13%	Overspend due to additional refurbishment work.
Specialist Consultants	100	297	97	197%	Overspend on surveys due to additional ground investigation requirements.
Contingency	1,520	Included in line expenditure	N/A	N/A	

[24] Closeout -Phoenix Park Tunnel project - C658 v2, post SC BR comments.docx

The PPT Project's annual operation and maintenance costs projected at the Business Case Stage are summarised in Table .

Table 3-8: PPT Project Annual Operation and Maintenance Cost

Category	Cost (€ millions)[25]
Train Maintenance	1.7
Traction (Fuel)	1.5
Personnel (Train Drivers)	0.6
Additional Operating Costs (Mark IV Trains)	3
Infrastructure Maintenance	3
Total	**9.9**

3.5.4 Conclusion

The PPT Project budget and schedule performance were satisfactory, as evidenced by delivery of the project 2% below budget and 5-month schedule overrun. For work packages that had cost or schedule overruns, the nature of the project, which included legacy infrastructure and facilities and ongoing operations (infrequent freight trains), was partly responsible. Budget contingency was sufficient to cover cost overruns, indicating that estimation of the projects budget contingency and supporting processes such as Risk Assessment were effective.

3.6 Management

The PPT Project management approach was outlined in a Project Execution Plan (PEP), developed to provide broad guidance for the delivery of the scope that IÉ was directly responsible for, and that which was delivered by contractors. Where necessary, contractors developed their own PEPs for specific work packages, but the IÉ PEP provided overall guidance. An overview of some of the main project management processes in the PEP is provided in the next sections.

3.6.1 Risk Management

Project risks were identified at the Business Case stage and during implementation. A Risk Management Plan was implemented on the PPT Project. The plan included the development of Risk Registers for each phase of the project. The registers were updated throughout the project, for as long as the risks were valid. The Project Manager was responsible for maintaining Risk Registers, which was reviewed:

- Whenever a Change Request was initiated.
- At fortnightly Project Meetings.
- At Project Steering Committee (PSC) meetings.
- Key risks were also included in monthly Project Progress Reports.

Risks were identified and brainstormed in Risk Workshops held throughout the project. Risk identification was followed by risk evaluation, where relevant project team members assessed the likelihood of risks materialising, and the impact that the risks may have. This evaluation was used to rank risks and to determine contingency provisions. Controls were then set in place to monitor the risks in accordance with the IÉ Contingency and Risk Management Procedure. Risks were also used to update the programme schedule, where delays were likely.

3.6.1.1 Key Risks Identified

Key risks identified on the PPT Project included:

- **Delays caused by freight movement on the PPT** – whilst there were no scheduled passenger services on the PPT route, there was an average of two freight trips per day during the project, which resulted in up to 80 minutes of project work stoppages per day. Known delays were included in the project programme but there was potential for unforeseen delays caused by the freight movement. To mitigate this risk and enable better planning, direct communication between the project team and relevant signalmen was initiated.
- **Community relations issues** – this included potential community protests against the negative impacts of the project such as noise. A project Community Liaison team was appointed to mitigate these issues. Where necessary, Community Liaison teams or consultants were provided to assist with community issues. Community Liaison teams engaged those who were likely to get affected by project works and issued notifications ahead of time.
- **Condition of PPT infrastructure and facilities** – Due to limited use and already aged assets, some of the PPT infrastructure and facilities were in a poor condition - these were to be improved through work in the project scope. The state of the infrastructure and facilities increased risks for staff working on the project. The condition also increased the risk of unforeseen scope changes (time and costs) needed to address

[25] PPT Business Case. 2014 prices, including VAT. Totals may not add due to rounding.

issues that could only become evident after work had started e.g., repairs that would be identified after cleaning up of facilities or excavation had been conducted. Other potential risk factors identified at the Business Case stage included potential flooding and ground conditions. The project team considered these risks carefully at the design stage and spent significant time trying to understand and mitigation their impact. Despite this risk assessment, there was residual risk related with these factors, which materialised during implementation and resulted in cost and schedule overruns. However, the risk planning conducted was largely effective at reducing the impact of the residual risk. The planning also assisted in estimating contingencies, and the cost contingency provided was sufficient to meet cost overruns incurred on the project.

- **Economic and financial risks** - These risks were associated with the accuracy of the assumptions and analysis in this Business Case, including the accuracy of cost estimates, accuracy of demand forecasting, scale and distribution of future population growth, accuracy of evaluation parameters used (e.g. appraisal period, value of time, discount rate, etc.), and future passenger mode preferences. Sensitivity analysis was used to determine the impact of changes in assumptions used in the economic appraisal. The analysis showed that the case for the project, demonstrated by its Benefit Cost Ratio (BCR) was strong under various scenarios, supporting the decision to implement the project. Whilst there were variations in cost for elements of the project, overall estimated capital costs were accurate, which will be discussed in Section 4. Analysis of demand for the PPT services, also conducted in Section 4 shows that anticipated patronage has been achieved.
- **Operation and maintenance risks** – these risks related to the achievable demand for PPT services, accuracy of operational and maintenance costs estimated in the Business Case and the level of service provided by Mark IV trains. As discussed under the economic and financial risks, the PPT services have achieved envisaged demand.

3.6.2 Stakeholder Management

Like most projects, the PPT Project required stakeholder support for it to be delivered successfully. Ongoing interaction with various stakeholders was critical to the project. Among the key stakeholder groups were commuters who would be users of the service and the public, affected by project activities and subsequent operations. To ensure that stakeholder relationships were maintained throughout the project, a dedicated Stakeholder Liaison team was provided, responsible for communication with stakeholders and proactively identifying project issues that could impact these stakeholders. Communication with stakeholders was primarily through formal meetings where concerns, suggestions or other feedback was discussed, and written correspondence such as letters to stakeholders. IÉ and the NTA also used mass media, including radio and the internet to disseminate information. Besides interacting directly with stakeholders, the project team assisted in addressing stakeholder issues raised by parties such as senior government officials, including the Minister for Transport, Tourism & Sport. The project team assisted IÉ leadership in developing responses to such issues, ensuring that Government provided accurate updates to stakeholders. The PPT Project stakeholder management process was successful as there were no stakeholder disputes that impacted the project.

3.6.3 Procurement

The PPT Project was delivered through a combination of a Client Design for Main Civils and Mechanical and Electrical (M&E) packages and the use of in-house resources.

IÉ internal design resources were provided for the following:

- Structural/Civils/Architectural design
- Per Way Design
- PSDP
- Signalling Design

External consultants were responsible for the following disciplines.

- Tunnel fire safety
- Mechanical and Electrical Design

The PPT Project procurement process was generally successful as evidenced by the lack of procurement disputes. Successful delivery of the project to IÉ quality standards shows that the procurement process ensured that competent contractors were selected.

3.6.4 Health and Safety Management

The PPT Project complied with the Safety, Health and Welfare at Work Act 2005, the Safety, Health and Welfare at Work (Construction) Regulations 2006 and the Safety, Health and Welfare at Work (General Application) Regulations 2007. Any other relevant legislation regarding the construction and placing into service of new or modified infrastructure were referenced as necessary.

The project complied with the requirements of the IÉ Safety Management System, including IÉ-SMS-014 - Safety Validation of Changes in Plant, Equipment, Infrastructure and Operations. This was the basis for the Application for Safety Validation process, through which several certifications were approved. Health and safety were included in the appointment letters of key personnel such as the Project Manager. In addition, Health and

Safety was a key criterion in the selection and appointment of contractors, who were requited to demonstrate that they could deliver works safely. Health and safety were monitored on an ongoing basis and were included in project reporting and risk management.

The PPT Project Health and Safety Management Processes and Procedures were effective as evidenced by the lack of notable incidents throughout the project.

3.6.5 Environmental Management

Compliance with environmental requirements was guided by the following guidelines, policies and procedures:

- IÉ Environmental Policy
- Planning and Development Acts and Regulations
- Transport (Railway Infrastructure) Act 2001 as amended
- European Commission (EC) Public Participation Regulations 2010 (EU Directive 2003/35/EC on Public Participation) in respect of public participation in decision making on environmental matters
- EC Access to Information on the Environment 2007 (EU Directive 2003/4/EC)
- Guidance and advice published by Environmental Protection Agency.

Environmental impacts and sustainability were considered throughout the implementation phase and even early in the design phase. The project team maintained a record of all known environmental issues, which were managed together with other issues and risks. There were no notable environmental concerns raised by stakeholders throughout the project.

3.6.6 Conclusion

The PPT project complied with most relevant requirements in guidelines and project management best practices. Relevant project documents and processes, as required by the NTA, across the project life cycle were developed for the project, allowing the project to pass all stage gate reviews. NTA Guidelines and IÉ PMPs provided sufficient guidance that ensured that the project was managed effectively. This improved the ability to meet project objectives and mitigated risks.

Overall, project risks were well managed through an effective risk identification, evaluation and mitigation process, applied as early as the Business Case stage. Whilst residual risks, especially technical risks related to the condition of the PPT infrastructure, materialised during project implementation, measures were in place to address these risks and contributed to successful project delivery. Such measures included the provision of sufficient budget contingency to meet additional cost from delays caused by unforeseen infrastructure condition issues. This resulted in the project being delivered within the allocated budget.

3.7 Outputs and outcome

The PPT was officially opened for passenger transport in November 2016. The final output of the project is demonstrably fit-for-purpose, with the tunnel successfully upgraded and reopened to support modern passenger rail services. In doing so, the PPT significantly enhances rail connectivity (and general connectivity) between Kildare (via the Kildare Line and its stations) and Dublin City Centre. This upgrade has resulted in a direct connection between stations on the Kildare Line and various stations in Dublin City, including Connolly Station, Tara Street Station, Pearse Station and Grand Canal Dock. This infrastructure has introduced a high capacity and frequent suite of train services, thereby significantly reducing journey times for commuters.

The tunnel’s reopening and the associated infrastructure upgrades have met the technical specifications and safety standards required, thereby ensuring a reliable and efficient service for its users. The delivered solution has effectively addressed the identified need which was to provide direct access to the city centre for existing users of the Kildare Line services without the need to interchange, and to provide a suitably attractive and high-capacity service on the Kildare Line with a view to attracting new public transport users.

4. Ex-Post Evaluation Report

The following ex-post evaluation sections assess the project's effectiveness, efficiency, and overall impact, examining factors such as ridership growth, operational performance, economic benefits, and environmental outcomes. Analysing these key aspects aims to provide insights into the project's long-term value and inform future transport infrastructure decisions.

4.1 Logic Path Model and KPIs

The PPT Project Business Case did not include a Logic Path Model (LPM), therefore a LPM was developed as part of the Ex-Post Evaluation Plan (EPEP) that was completed as both an NTA pilot study and Phase 7b PPT project deliverable. The LPM begins with the Project Objectives, which are then linked to the Outputs, what the Outcomes are and ultimately what the Impacts will be. The impact is the observable impact which helps determine the KPIs that can be used to measure the success of the scheme. The LPM is present in Figure 4-1.

4.1.1 Key Performance Indicators

Although not defined either in the PPT business case or in the PPT EPEP developed as part of this pilot process, the development of KPIs has been considered when preparing this section. While the LPM shows a number of outcomes and impacts, not all of these are directly measurable and therefore KPIs have been identified as metrics that can clearly demonstrate the performance of the intervention and be easily measured. Using the forecast assumptions in the business case, target thresholds have been identified for each KPI. The KPIs are presented in Table 4-1.

Table 4-1 Key Performance Indicators

Key Performance Indicator	Threshold	Measure	Objective Category
Increased rail patronage and revenue on Kildare Corridor	Increase in corridor boardings above demand levels identified in the business case.	Daily boarding figures	Economy, Safety, Environment
Improved journey times from Kildare to Dublin City Centre	Clear reduction in journey time to key destinations / employment areas in the city centre.	Before and after Journey Time Comparison	Economy, Accessibility and Social Inclusion,
Increased footfall and interchanges at Connolly	Increase in boarding and alighting at Connolly above	Daily boarding and alighting figures	Integration
and other city centre stations	demand levels identified in the business case.		

4.1.2 Outcomes

The outcomes captured from the project are either benefits or changes in travel behaviour that result from the intervention. Some of these outcomes are qualitative in nature (improved rail passenger satisfaction and new direct journey opportunities), meaning they cannot be directly measured in the context of project performance against the stated KPIs. Other outcomes relate to the impact of the PPT on other transport modes (buses and road transport) so similarly cannot be measured as KPIs. The Outcomes that were identified alongside the KPIs in the EPEP are captured in Table 4-2.

Table 4-2 Outcomes

Outcome	Measure
New direct journey opportunities to Dublin City Centre	Demonstrate the coverage of direct journey opportunities from the Kildare Line compared to previous. Support with employment numbers from census.
Improved rail passenger satisfaction	Anecdotal evidence sourced from social media
Reduction in Luas Red Line boardings at Heuston	Any evidence of a clear reduction in Luas Red line boardings at Heuston Station between 2016 and before and 2017 and after.
Reduction in bus boardings in Heuston area. C1, C2, C3, C4	Any evidence of a clear reduction in bus boardings at Heuston Station between 2016 and before and 2017 and after. **Data not available or attributable to the project for this evaluation, so this was not assessed further.**
Reduction in car usage and associated accidents on N7, M50, R110	Any evidence in a clear reduction in car or accidents following the implementation of the scheme. **Data not available or attributable to the project for this evaluation, so this was not assessed further.**

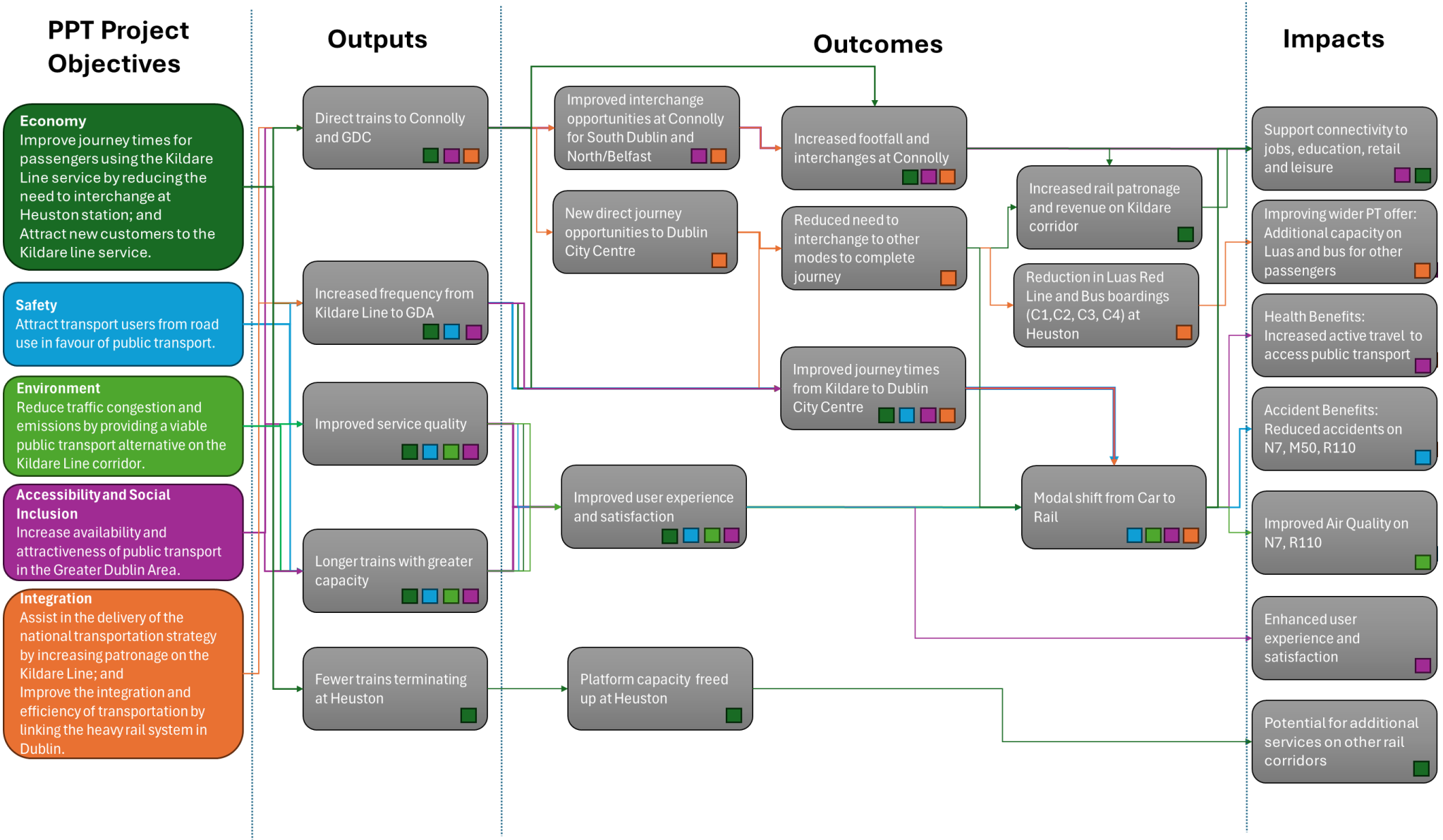

Figure 4-1 PPT Project Logic Path Model

4.2 Strategic Fit Review

The PPT Project has been evaluated to determine its alignment with current national policies, assessing its current support towards Ireland's broader goals for sustainable transportation, climate action, and urban development. This assessment is crucial as it highlights how the project contributes to reducing carbon emissions, enhancing public transport connectivity, and supporting economic growth. By examining policies such as the National Planning Framework, National Development Plan, Climate Action Plan, and the Greater Dublin Area Transport Strategy, the project's role in shaping a more efficient and environmentally friendly transport network can be better understood. Understanding these alignments helps policymakers, planners, and the public see the value of continued investment in rail infrastructure and sustainable mobility solutions.

4.2.1 Project Ireland 2040 – National Planning Framework

The PPT Project aligns with several of Ireland's National Strategic Objectives (NSOs) as outlined in the National Planning Framework under Project Ireland 2040. Key alignments include:

1. **Enhanced Regional Accessibility (NSO 2)**: By providing a direct rail link between southwest Dublin, north Kildare, and Dublin's city centre, the project improves access to economic opportunities and services across these regions.
2. **Sustainable Mobility (NSO 4)**: The project encourages a shift from private car usage to public transport, contributing to reduced traffic congestion and lower greenhouse gas emissions, supporting Ireland's climate action goals.
3. **Compact Growth (NSO 1)**: Improved public transport connectivity through the tunnel supports higher-density development in urban areas, promoting efficient land use and reducing urban sprawl.
4. **Transition to a Low-Carbon and Climate-Resilient Society (NSO 8)**: By enhancing public transport options, the project aids in decreasing reliance on fossil fuels and supports Ireland's transition to a low-carbon society.

These alignments demonstrate the project's contribution to Ireland's strategic goals of balanced regional development, environmental sustainability, and efficient urban planning.

4.2.2 National Development Plan 2021 – 2030

The National Development Plan (NDP) emphasises the development of public transport infrastructure to support economic growth and environmental sustainability. The PPT's integration into the commuter network enhances connectivity between Kildare, southwest Dublin, and Dublin's central business district, aligning with the plan's objectives.

4.2.3 National Investment Framework for Transport Infrastructure

The PPT project aligns with the National Investment Framework for Transport in Ireland (NIFTI) by supporting its core priorities and investment principles. NIFTI emphasises the need for sustainable mobility, enhanced regional accessibility, and the efficient use of existing infrastructure. By upgrading and reopening the PPT for regular commuter services, the project enhances connectivity between southwest Dublin, north Kildare, and Dublin's central business district, promoting a shift from private car usage to public transport. This shift contributes to reduced traffic congestion and lower greenhouse gas emissions, aligning with NIFTI's sustainability objectives. Additionally, the project's focus on utilising and improving existing infrastructure reflects NIFTI's principle of maximising the value of current assets before investing in new ones. Overall, the PPT project exemplifies NIFTI's strategic approach to transport investment by enhancing public transport options, promoting sustainable travel, and efficiently utilising existing resources.

4.2.4 National Sustainable Mobility Policy 2022

This policy provides a strategic framework up to 2030 to promote active travel and public transport, aiming to deliver at least 500,000 additional daily active travel and public transport journeys by 2030. The PPT project supports this goal by improving rail connectivity and encouraging a shift from private car use to public transport.

4.2.5 Climate Action Plan 2024

Aiming to reduce greenhouse gas emissions, this plan promotes a shift from private car usage to public transport. By providing a direct rail link through the PPT, the project encourages commuters to opt for train use over private vehicle, contributing to emission reduction targets.

4.2.6 Moving Together: A Strategic Approach to Improving the Efficiency of the Transport System in Ireland – 2024

This strategy focuses on managing and reducing congestion through measures such as road space reallocation and promoting public transport. By enhancing rail services through the PPT, the project contributes to reducing traffic congestion and aligns with the strategy's objectives.

4.2.7 Greater Dublin Area Transport Strategy 2022 – 2042

Developed by the NTA, this strategy focuses on enhancing public transport services within the Greater Dublin Area. The PPT's operation supports this strategy by improving rail services and increasing capacity on existing lines.

4.2.8 DART+ Programme

The DART+ Southwest project plans to extend electrified DART services from Hazelhatch & Celbridge to Heuston Station and the south city via the PPT. This aligns with goals to expand sustainable and efficient public transport options.

4.2.9 Iarnród Éireann Strategy 2027

This strategy emphasises enhancing services and growing the business to meet Ireland's transport needs. By reopening the PPT for regular commuter services, IÉ has improved connectivity between southwest Dublin, north Kildare, and Dublin's city centre, directly supporting the strategy's goals of service improvement and business growth.

4.2.10 All-Island Strategic Rail Review

This review outlines a vision for transforming rail services across Ireland, including enhancing regional connectivity and increasing service frequency. PPT's integration into the commuter network enhances regional accessibility and supports the review's recommendations for improved rail services.

4.2.11 Summary

The PPT project aligns with a wide range of current strategic policies assessed as part of the EPE, reinforcing its importance in Ireland's transport strategy. It supports key national policies such as the National Development Plan, Climate Action Plan, Greater Dublin Area Transport Strategy, and NIFTI by enhancing public transport accessibility, reducing carbon emissions, and making efficient use of existing infrastructure. Additionally, it contributes to several NSOs, including Sustainable Mobility, Compact Growth, and the Transition to a Low-Carbon Society. The project also aligns with Irish Rail's Strategy 2027, and the All-Island Strategic Rail Review, demonstrating a commitment to service expansion, sustainability, and regional connectivity.

By integrating with these policies, the PPT plays a vital role in promoting sustainable transport, improving urban mobility, and advancing Ireland's long-term environmental and economic goals.

4.3 Process Evaluation

4.3.1 Evaluation Methodology Description

The further purpose of this EPE is to demonstrate whether the project was successful and provide opportunities to learn from both the process followed to deliver the scheme, and whether the impacts of the scheme were achieved over a longer period.

While a thorough business case process was followed for the PPT scheme and the requirement to complete a Post Project / Post Implementation Review was highlighted, no detailed EPEP was included. As part of this pilot EPE exercise a plan was drafted and has been followed.

The PPT Project Business Case (February 2015), developed in line with the Public Spending Code, demonstrates that a comprehensive assessment of the scheme was undertaken. The assessment, commensurate with the level of proposed spending, included a detailed quantified appraisal of the scheme, including transport modelling and economic appraisal. The PPT Project's appraisal included a full CBA, which exceeded the PSC requirements of an MCA for projects with budgets below €20 million at the time.

As well as the detailed appraisal, the business case included the policy background, demonstrating a strong alignment with the national, regional and local policies at the time. An assessment of alternative options was undertaken and this concluded that there were no viable alternatives to the PPT Project that could meet the needs and scheme objectives.

4.3.2 Evaluation Methodology and Assumptions

An assessment of the assumptions that underpinned the projects appraisal and their validity and relevance is included in Table 4-3.

Table 4-3 Evaluation Assumptions

Assumption Category	Assumption	Commentary/Analysis
General Assumptions	Scheme Opening Year: Q4 2016[26]	This assumption was accurate – the PPT officially opened in Q4 2016.
	Scheme Construction Begins: 2015	This assumption was accurate – construction began in 2015
	Scheme Capital Cost: €13.5m (2014 Prices, Inclusive of VAT)	See section 3.5.3.
	Capital Cost Profile: 50% in 2015, 50% in 2016	This assumption was appropriate, at the time of appraisal
	Scheme Annual O&M Costs: €9.9m (2014 Prices, Inclusive of VAT)	See section 4.5.1
	O&M Cost Profile: 50% in 2016, 100% 2017 onwards	This assumption was appropriate at the time of appraisal. However, given the PPT launched in Q4 2016, it would have been more accurate to limit O&M costs to 25% in 2016, though there is an argument that it is logical and prudent to apply 50% to 2016 O&M Costs to account for the risk of any operational cost overruns experienced at the launch of the PPT.
	Should be noted that the Luas Cross-City project will open in 2017, whereas PPT will open at the beginning of Q4 in 2016. Nonetheless, assumed that Luas Cross-City will be in place from a transport modelling perspective	This assumption was appropriate at the time of appraisal.
Transport Modelling	NTA Greater Dublin Area Model will be used	This assumption was appropriate at the time of appraisal.
	Population/Employment Growth: Based on assumptions in NTA model	This assumption was appropriate at the time of appraisal.
	Annualisation Factor – AM peak period (7am to 10am) to annual: 936 (based on rail census data)	This assumption was appropriate at the time of appraisal.
Economic Appraisal	Present Value Year/Price Year: 2009. Assumed to provide consistency with other Business Cases being prepared for the NTA	The base year for economic appraisal has been rolled forward to 2016, but the use of 2009 was appropriate at the time of appraisal.
	Appraisal Period: 30 years – the Public Spending Code recommends a default 20-year period. However, the Common Appraisal Framework for transport projects recommends a 30-year appraisal period.	This assumption was appropriate at the time of appraisal, and remains to be appropriate under TAF

[26] Sourced from PPT Business Case. This differs from the commencement date sourced from the PPT Rolled Up Schedule referenced in 3.4.2

Assumption Category	Assumption	Commentary/Analysis
Economic Appraisal	Residual Period: 30 years	This assumption was appropriate at the time of appraisal, and remains to be appropriate under TAF
	The economic appraisal is carried out using prices that are inclusive of VAT	This assumption is no longer appropriate, economic appraisal should be conducted using costs that are exclusive of VAT as this VAT is deemed to be a circular payment to the exchequer.
	Discount rate: 4% (with sensitivities of 3% and 5%. Recent guidance (at time of producing business case) from DPER (DPENDR) indicates that a 5% discount rate should be used. A rate of 4% used in order to provide consistency with other business cases being prepared for transport projects and being assessed by the NTA and the DTTAS. A sensitivity is carried out at 5%	This assumption was appropriate at the time of appraisal.
	General price inflation: 3%	Inflation should not be included in the Economic Appraisal of Options. Furthermore, **actual inflation rates** in the interim, sourced from the CPI[27] were as follows: • 2015: 1% • 2016: 1% • 2017: 1% • 2018: 1% • 2019: 2% • 2020: 0% • 2021: 5% • 2022: 9% • 2023: 5% • 2024: 3%
	Tender price inflation: 3% (nominal) during the planning and construction phases	Inflation should not be included in the Economic Appraisal of Options. Furthermore, **actual construction inflation** varied from this rate. Construction inflation according to the most recent (July 2024) SCSI Tender Price Index was as follows:

[27] CPM01 - Consumer Price Index

Assumption Category	Assumption	Commentary/Analysis
		• 2015: 5% • 2016: 6% • 2017: 6% • 2018: 8% • 2019: 6% • 2020: 2% • 2021: 13 • 2022: 11% • 2023: 4% • 2024 (at End of Q2): 3%
Economic Appraisal	O&M price inflation: 3% (nominal) which assumes over 50% Labour content in O&M costs	Inflation should not be included in the Economic Appraisal of Options. Furthermore, **actual inflation rates**, sourced from the CPI[28] were as follows: • 2015: 1% • 2016: 1% • 2017: 1% • 2018: 1% • 2019: 2% • 2020: 0% • 2021: 5% • 2022: 9% • 2023: 5% • 2024: 3%
	Shadow prices:	SPPF assumption was appropriate at the time of writing.

[28] CPM01 - Consumer Price Index

Assumption Category	Assumption	Commentary/Analysis
	• Base cost 100% Shadow Price of Public Funds (SPPF) and 100% Shadow Price of Labour (SPL) • Sensitivity at 130% SPPF and 80% SPL	In terms of the SPL, whilst the application of 100% was appropriate at the time of appraisal, according to the CSO[29] actual unemployment rates in 2015 and 2016 were over 9% and 8% respectively. Therefore, a more suitable SPL might have been 80%. That being said, a sensitivity of applying the 80% SPL was conducted, which increases the robustness of the appraisal. Current mandated rates for the SPPF is 130% and SPL is 100%, though the use of sensitivities is a positive and prudent exercise.
Economic Appraisal	Wider Economic Impacts: Not Included	Wider Economic Impacts (defined as Other under the CAF) ought to have been included in the appraisal. The CAF states that in the absence of a perfect economy it is certain that other economic impacts occur due to transport investments. Examples of these are transport investments that give rise to spillover effects that are not charged for, or that facilitate economic market restructuring that yield greater competition or economies of scale. Specific impacts that may have been consideration in this regard are: • Reorganisation Impacts • Agglomeration Effects • Increased Competition in the Economy • Increased Output of Firms • Tax Benefits Arising from Increased Labour Supply • Employment Impacts • Inward Investment Impacts This is a non-exhaustive list. It is clear that to fully comply with CAF, the appraisal ought to have given some consideration to Wider/Other Economic Impacts.
	Value of Time (2002 market prices) – based on Common Appraisal Framework • Working: €26.50 per hour • Commuting: €8.10 per hour • Non-commuting: €7.30 per hour	This assumption was appropriate at the time of appraisal.
	VOT Growth per Annum – based on CAF • 2002 to 2010: 2.70% • 2011 to 2015: 2.37%	This assumption was appropriate at the time of appraisal.

[29] MUM01 - Seasonally Adjusted Monthly Unemployment

Assumption Category	Assumption	Commentary/Analysis
	• 2016 onwards: 2.29%	
	Ramp-up of Benefits • 2016: 50% - effectively 12.5% due to quarter year of operation • 2017: 70% • 2018: 90% • 2019 onwards: 100%	The assumptions used for the ramp-up of benefits are logical and were appropriate at the time of appraisal. As displayed in section 4.4, in the years following project launch daily boardings between Drumcondra and Grand Canal Dock grew substantially year-on-year meaning the ramp-up of benefits until 2019 is likely to have been achieved. The onset of the COVID pandemic in 2020 and its persistent impacts on commuting patterns and the economy as a whole mean that it is unlikely that the assumption of 100% benefits from 2020 to 2022 was achieved. However, this occurrence and its impact could not have been foreseen at the time of appraisal and the assumption of 100% benefits from 2019 onwards was appropriate at the time of appraisal.
	Demand Growth: • As per NTA Model outputs up to 2033 • Zero post 2033	These assumptions were appropriate at the time of appraisal. Though as above, the model would not have been able to foresee the COVID pandemic and its impact on demand growth for the period between 2020 and 2022 and so demand for these years is likely to be overstated.
Economic Appraisal	Fare revenue: Not included in the evaluation of the Net Economic Value of the schemes	This assumption was correct as the main benefit delivered by the project is the reduction of journey times for users rather than increasing revenues for Irish Rail.
Financial Appraisal	30-year time horizon	This assumption was appropriate and remains to be appropriate under TAF
	Costs as per Economic Appraisal	This assumption was appropriate and remains to be appropriate under TAF
	Discount Rate 4%	This was a reasonable assumption/input at the time of appraisal. However, the NDFA discount rate that would be used for financial appraisal is currently 2.85%

4.3.3 Ex-Ante Cost Benefit Analysis

The FBC CBA results are displayed below in Table 4-4. Overall, the project returned a favourable BCR of 3.0. An assessment of if these benefits materialised is explored in Section 4.4.

Table 4-4 PPT FBC CBA Results

Component	Present Value (€ millions)[30]
Total Benefits	860
Total Costs	290
Net Present Value (NPV) 570	570
Benefit to Cost Ratio (BCR)	3

4.4 Impact Evaluation

4.4.1 Overview of Assessment

As identified in the LPM and KPIs, three KPIs and three Outcomes linking back to the project objectives were deemed measurable and can be used to assess the impact of the scheme. The assessments that have been completed are presented in Table 4-5.

Table 4-5 Impact Evaluation Assessments

Key Performance Indicator / Outcome	Assessment	Objective	Achieved
Increased rail patronage and revenue on Kildare Corridor	Assess if the corridor boardings are above the demand levels identified in the business case	Economy	Yes
Improved journey times from Kildare to Dublin City Centre	Assess if a clear reduction in journey times to key destinations / employment areas in the city centre can be demonstrated	Economy Safety Environment	Yes
		Accessibility and Social Inclusion	
Increased footfall and interchanges at Connolly and other city centre stations	Assess if there is evidence of a marked increase in boarding and alighting at city centre stations	Accessibility and Social Inclusion Integration	Yes
New direct journey opportunities to Dublin City Centre	Demonstrate the coverage of direct journey opportunities from the Kildare line compared to previous. Support with employment numbers from census.	Integration	Yes
Reduction in Luas Red Line boardings at Heuston	Assessment to identify if there was a dip in Luas Red line boardings at Heuston Station between 2016 and before and 2017 and after.	Integration	Yes
Improved rail passenger satisfaction	Anecdotal evidence sourced from social media posts	Accessibility and Social	Yes

[30] PPT Business Case. 2009 prices.

4.4.2 Kildare Corridor Passenger Boardings

The stations and surrounding communities along the Kildare Line benefitting the most from the infrastructure upgrade and improved connectivity are the stations between Newbridge and Parkwest. The other section of line that could possibly experience an increase in demand is between Drumcondra and Grand Canal Dock. As a result, the analysis of passenger boardings has been separated out into the following groups to examine if clear trends can be identified:

- Portarlington - Kildare
- Newbridge - Parkwest
- Heuston
- Drumcondra - Grand Canal Dock

Analysis of the National Rail Census Report 2023 was undertaken, and trends were identified. With the scheme opening in November 2016 (after the Census for 2016 was undertaken), the census in the subsequent years picks up the impact of the scheme. Figure 4-2 considers the year on year growth for boardings at Kildare Line stations (in both directions) and clearly demonstrates a significant jump in demand at the stations most directly benefiting from the scheme compared to other stations on the corridor – growth from 2016 to the 2017 Census reaching 47% for the stations between Newbridge and Parkwest, compared to just 12% between Portarlington and Kildare and at Heuston itself. Substantially higher growth at the stations directly impacted by the scheme continued through to 2019, before the COVID pandemic in 2020.

Between Drumcondra and Grand Canal Dock (using Kildare Line services), by 2019 the year-on-year growth was outstripping that of Newbridge to Parkwest, achieving year on year growth of 30% compared with 10% respectively.

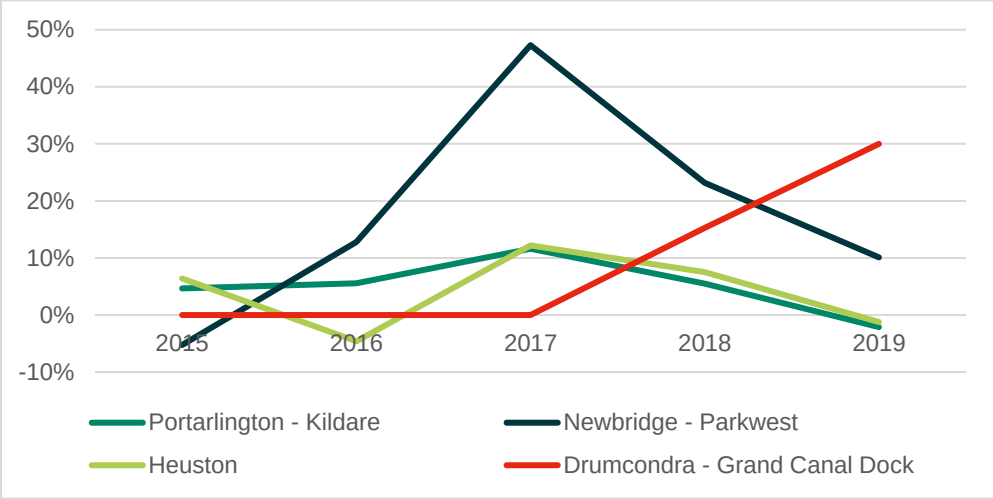

Figure 4-2: Observed Year on Year Growth in Daily Boardings on the Kildare Line

To provide context and a counterfactual to determine if the KPI was achieved, growth along the Sligo line between Maynooth and Broombridge and Drumcondra to Grand Canal Dock was also analysed, with comparable year on year growth presented in Table 4-6 below alongside the Kildare Line growth. It is shown that the PPT scheme had a significant impact on Kildare corridor patronage from 2017 onwards.

Table 4-6 Kildare Corridor Observed Year on Year Growth

Year on Year Growth (Boardings)	2015	2016	2017	2018	2019
Maynooth - Broombridge	20%	4%	18%	8%	4%
Drumcondra - Grand Canal Dock (Sligo Line services)	9%	5%	11%	5%	-1%
Portarlington - Kildare	1%	2%	7%	4%	7%
Newbridge - Parkwest	8%	7%	41%	32%	5%
Heuston	5%	3%	16%	1%	-2%
Drumcondra - Grand Canal Dock (Kildare – Line services)	0%	0%	0%*	16%	23%

*No baseline patronage in 2016 to compare against

To assess whether the KPI was achieved, a counterfactual demand for the line was prepared using the growth from the Sligo Line and this was compared to the observed

demand to identify the impact of the PPT. The observed growth on the Sligo line since 2016 is present in Table 4-7. To confirm this approach was reasonable the annual average over the 2016-2019 period was compared to growth on the Kildare corridor for New Bridge to Parkwest and at Heuston from 2013 to 2016 which resulted in an annual average growth of 8% and 5% respectively.

Table 4-7 Sligo Corridor Observed Year on Year Growth

Year on Year Growth (Boardings)	2016	2017	2018	2019	Annual Average
Maynooth - Broombridge	4%	18%	8%	4%	8%
Drumcondra - Grand Canal Dock	5%	11%	5%	-1%	5%

The analysis was split into sections that align with the analysis of demand in the business case. The business case demand increases are presented in Table 4-8. While the increase in demand for the same sections of line calculated by comparing the observed daily boardings with the counterfactual is presented in Table 4-8.

Table 4-8 Scheme Impact Forecast in the PPT Final Business Case

Increase in Morning Peak Period Boardings in Do Something v Do Minimum	2012	2033
Portlaoise, Portarlington, Monasterevin	1%	3%
Kildare, Newbridge and Salins & Naas	16%	18%
Hazelhatch & Celbridge, Adamstown, Clondalkin & Fonthill and Park West & Cherry Orchard	77%	40%
Total	22%	22%

Table 4-9 Increase in Daily Boardings Observed v Counterfactual

Increase in Daily Boardings Observed v Counterfactual	2016	2017	2018	2019
Portarlington -Monasterevin	0%	-7%	-7%	-16%
Kildare to Salins & Naas	0%	10%	17%	19%
Hazelhatch & Celbridge - Park West & Cherry Orchard	0%	53%	91%	120%
Heuston	0%	-5%	-5%	-10%

The observed demand impact presented in Table 4-9 compared to the forecast demand impact shows a very similar trend. Significant growth is observed at stations between Hazelhatch & Celbridge – Parkwest & Cherry Orchard, with a 91% increase in 2018 and a 120% increase in 2019. This compares favourably to the model forecasts presented in Table 4-8, which showed an impact of 77% in the 2012 model year and 40% in the 2033 model year. An outcome that clearly suggests the scheme is achieving the KPI of increased rail patronage and revenue on Kildare Corridor.

4.4.3 City Centre Station Impacts

In addition to demonstrating increases in demand on the corridor and services on the corridor, one of the other outcomes anticipated was a general uplift in boarding and alightings at city centre stations. To investigate this, the total boardings and alightings using all services from 2016 to 2018 was analysed to identify if there is a marked increase in demand in 2017 and subsequent years after the PPT opened. Table 4-10 and Table 4-11 present boardings and alightings at each station in the city centre respectively.

Table 4-10 City Centre Station Boardings

Daily Boardings	2016	2017	2018	2016-2017	2017-2018
Connolly	14,857	18,062	19,425	22%	8%
Pearse	14,827	15,465	16,074	4%	4%
Tara Street	7,952	9,442	9,892	19%	5%
Grand Canal Dock	2,896	3,693	3,785	28%	2%

Table 4-11 City Centre Station Alightings

Daily Alightings	2016	2017	2018	2016-2017	2017-2018
Connolly	16,109	18,927	19,379	17%	2%
Pearse	14,221	15,636	16,525	10%	6%
Tara Street	8,461	9,801	11,042	16%	13%
Grand Canal Dock	3,958	4,637	4,874	17%	5%

While some of the impact could be attributed to other factors and daily variations, there is a clear increase in demand between 2016 and 2017 when compared to 2017 which shows only moderate increases, suggesting that there may well be a correlation between the opening of the PPT and a significant increase in usage at stations in Dublin City Centre. This aligns with the findings of the prior Kildare Line analysis.

4.4.4 Direct Journey Opportunities & Journey Time Assessment

A key benefit of the PPT project was the ability to offer direct through services to / from the Kildare Line to Dublin City Centre. Without PPT services, passengers travelling to the city centre would be required to interchange at Heuston with Luas or Bus services. In addition, without PPT there are no rail-to-rail interchange opportunities between the Kildare Line and the Northern and South Eastern Lines. With the PPT, it is now possible to make onward rail journeys to destinations North or South via a single interchange at Connolly.

To better understand the journey time benefits experienced by passengers since services were reinstated through the PPT, an analysis was undertaken comparing journey times via the PTT to journeys requiring interchange with Luas at Heuston. The analysis considered both the actual journey time (including estimates for wait times based service frequency) and Generalized Journey Time (GJT) which applies weightings to walk and wait times to reflect the inconvenience of these legs of the journey. Journey times were sourced from current timetables, and walk times from google maps, Figure 4-3 compares the journey time and GJT for journeys between Hazelhatch & Celbridge to destinations in the Dublin City Centre including Busáras, Trinty College and St Stephens Green areas. In addition to this, a journey to Dun Laoghaire (to represent the benefit for onward rail travel) was also included in the analysis.

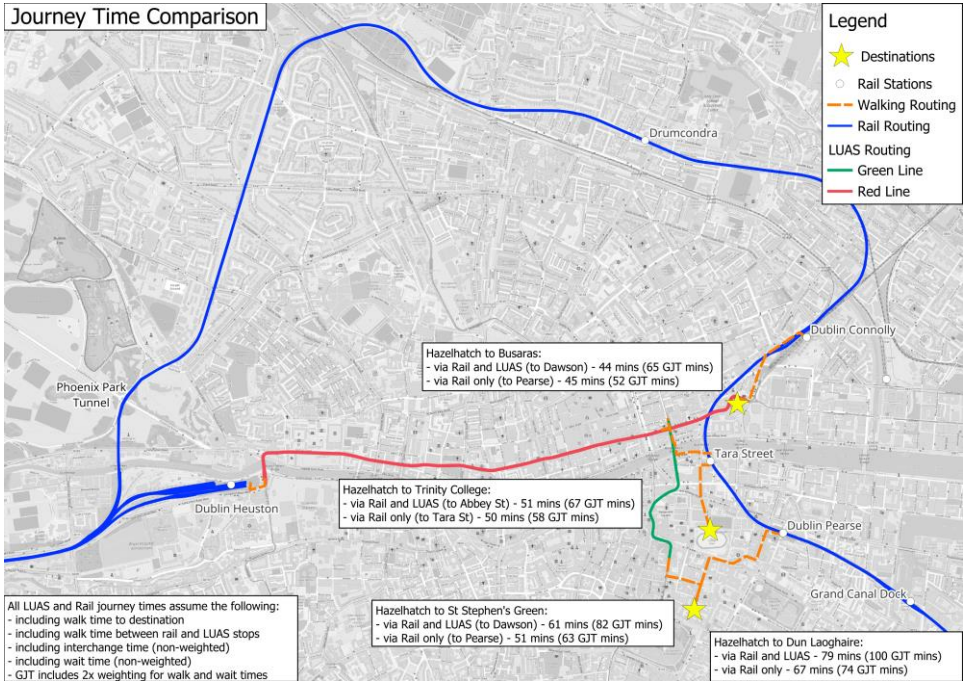

Figure 4-3: PPT Journey Time Impact Analysis

The analysis demonstrates that for some journeys (e.g. to St. Stephen's Green and Dun Laoghaire) the PPT provides a significant journey time saving due to reduced interchange, whereas for locations such as Busáras and Trinity College the end-to-end journey times are almost identical via direct rail or by rail/Luas. When considered in terms of GJT there is a saving of over 10 generalised minutes reflecting the benefit of taking a direct rail service rather than having the inconvenience of interchanging between rail and Luas at Heuston. In terms of GJT, this impact is even larger for the journeys to St. Stephen's Green and Dun Laoghaire with GJT differences of 19 mins and 26 mins respectively.

This analysis demonstrates the significant improvement in journey times and journey convenience experienced by passengers who are able to utilise services via the PTT to complete their journeys to Dublin City Centre and beyond.

4.4.5 Passenger Satisfaction

Whie specific customer satisfaction data has not been made available for this assessment, there is positive anecdotal evidence available from social media.

An example of this feedback was from commuters from around the Park West area who highlighted that in 2017 their travel time to Connolly Station had reduced to around 20 minutes[31] which was up to 40 minutes[32] less than the journey time (based on road-based travel time) before the PPT Project was completed. Sample feedback from social media is shown in Figure 4-4 and Figure 4-5.

Figure 4-4 Sample PPT Customer Feedback[33]

[31] http://www.parkwest.ie/phoenix-park-tunnel-connects-park-west-commuters/
[32] Google estimates

[33] https://www.thejournal.ie/delays-phoenix-park-tunnel-3093104-Nov2016

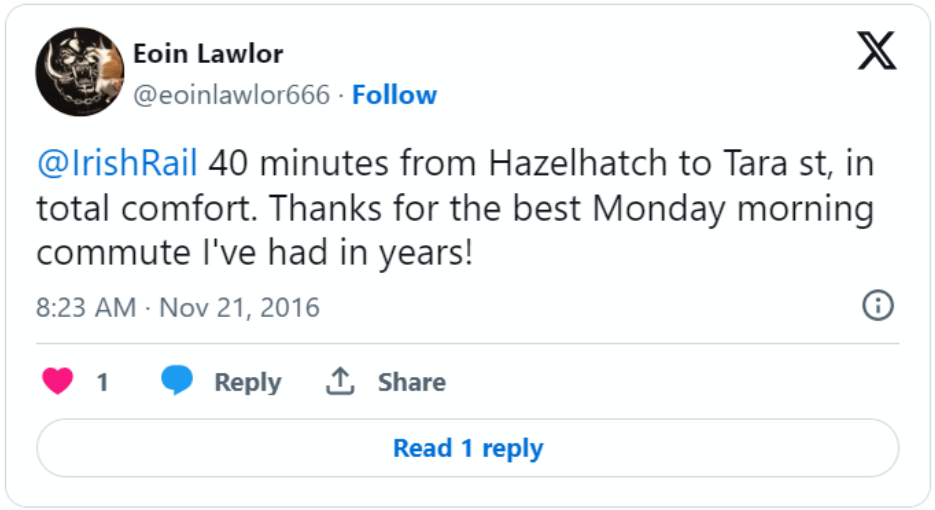

Figure 4-5 Sample PPT Customer Feedback[34]

4.4.6 Luas Red Line Impacts

Due to ongoing development and the continued growth of Luas patronage it is difficult to attribute direct impact from the opening of the PPT. However, analysis of the Luas Red Line census does identify an impact that could, at least in part be attributed to a mode shift from Luas to rail, with dips in Luas demand identified at Heuston and Connolly stations. Table 4-12 shows Luas boardings and alightings at Heuston, Connolly and for the Red Line as a whole. It is clear from the data that there is a general trend of growth on the Red Line. But this trend becomes negative at both Heuston and Connolly, after 2016 when the PPT opened. The three-year average post 2016 is negative, which may in part be an impact of abstraction to rail, with passengers choosing to make their entire journey using rail rather than transfer to/from Luas at Heuston to complete their journey.

Table 4-12 Luas Red Line Census Data

Luas Stop		2014	2015	2016	2017	2018	2019	2014 - 2016	2017 - 2019
Heuston	*Demand (000's)*	12.4	14.7	13.3	11.0	14.8	10.3	13.5	12.0
Heuston	*Annual Growth*	0%	19%	-9%	-18%	34%	-30%	N/A	-11%
Connolly	*Demand*	3.3	3.7	3.8	4.0	2.3	2.7	3.6	3.0
Connolly	*Annual Growth*	0%	10%	3%	6%	-42%	18%	N/A	-16%
Red Line Total	*Demand*	122.4	133.7	144.2	147.9	144.2	147.9	133.4	146.7
Red Line Total	*Annual Growth*	0%	9%	8%	3%	-2%	3%	N/A	10%

[34] https://www.thejournal.ie/delays-phoenix-park-tunnel-3093104-Nov2016/

4.5 Economic Evaluation

4.5.1 Operating and Maintenance Costs

The key parameters or cost drivers applied in estimating operation and maintenance costs are summarised in Table 4-13. The table provides a comparison of initial parameters applied to costs in the Business Case with Post-Business Case parameters.

Table 4-13: PPT Project Cost Drivers

Category	Cost Driver	Business Case Value	Post-Business Case Value (2018)
Train Maintenance	Maintenance cost per km	€0.57	€0.61
Traction (Fuel)	Fuel cost per km	€0.50	€0.54
Personnel (Train Drivers)	Driver salaries	9 Drivers at €65,000 per annum	14 Drivers at €67,000 per annum
Additional Operating Costs (Mark IV Trains)	Lump sum rehabilitation costs of out of service Mark IV trains and related additional traction costs	€1.8m rehabilitation costs and €1.2m additional traction costs	€1.8m rehabilitation costs and €1.2m additional traction costs[35]
Infrastructure Maintenance	Track charges for initial fleet and further charges for Mark IV trains	€423k for initial fleet and €2.6m for Mark IV trains	€416,134 for initial fleet and €2.6m[36] for Mark IV trains

The main differences in Business Case and Post-Business Case Parameters were for the following cost categories:

- Maintenance cost per kilometre: Maintenance cost per kilometre was 7% higher than budgeted at €0.61 per kilometre. However, the total maintenance cost item did not change significantly as the total kilometres delivered was 2,831,990km which is 7% lower than what was originally costed for (3,042,000 km) meaning the overall cost item was relatively stable, exhibiting just a 0.16% change (decrease).
- Fuel Cost per Kilometre: Fuel cost per kilometre was 8% higher than budgeted at €0.54 per kilometre. However, the total maintenance cost item did not change significantly as the total kilometres delivered was 2,831,990km which is 7% lower than what was originally costed for (3,042,000 km) meaning the overall cost item was relatively stable, exhibiting just a 0.22% change (increase).
- Personnel: An additional 5 drivers were employed in comparison to what was planned, with the cost per driver increasing to €67,000 from an originally budgeted €65,000. This resulted in a 60% cost increase.

The impact of changes in costs are summarised in Table 4-14. This shows that annual operation and maintenance costs have been €0.3 million above the costs projected in the Business Case. This has an impact on the project's value for money, analysed in Section 4.5.2.

Table 4-14: Updated PPT Project Annual Operation and Maintenance Cost

Category	Business Case Cost (€ millions)[37]	Post-Business Case Cost (€ millions)[38]	Variation (€ millions)
Train Maintenance	1.7	1.7	-0.16%
Traction (Fuel)	1.5	1.5	+0.22%
Personnel (Train Drivers)	0.6	0.9	+60.34%
Additional Operating Costs (Mark IV Trains)	3	3	No Change[36]
Infrastructure Maintenance	3	3	-0.23%
Total	**9.9**	**10.2**	**+3.52%**

[35] No updated cost provided for rehab costs, held constant for consistency
[36] No updated cost provided for Mark IV track charges. Held constant for consistency.

[37] PPT Business Case. 2014 prices, including VAT. Totals may not add due to rounding.
[38] 2018 Prices, inclusive of VAT. Totals may not add due to rounding.

4.5.2 Value for Money Analysis

Assessing whether the PPT Project delivered value for money is a key goal of an EPE. Value for money is achieved when project benefits are realised without incurring greater costs than those projected at the appraisal stage. A comparison of project benefits and costs is reflected in a post-project BCR, which will be compared with the ex-ante BCR in the Business Case.

4.5.2.1 PPT Project Ex-Ante BCR

The PPT Project ex-ante BCR and its components are summarised in Table 4-15.

Table 4-15: PPT project Ex-ante Cost Benefit Analysis

Component	Present Value (€ millions)[39]
Total Benefits	860
Total Costs	290
Net Present Value (NPV) 570	570
Benefit to Cost Ratio (BCR)	3

4.5.2.2 PPT Ex-Post BCR

Calculation of the project's ex-post BCR requires quantitative analysis of realised project benefits and costs. The ex-ante project benefits included commuter benefits, business benefits, other traveller benefits, environmental and other benefits. Corresponding ex-post benefits are required and should be compared with the ex-ante values. However, a bottom-up approach to determining the ex-post values was not feasible, considering the lack of detailed data on the various components which were carried out during the initial appraisal of the PPT. While realised journey time savings were calculated in Section 4.4.4, it is not feasible to compare these to the business case benefits as it is unclear where those benefits occurred (i.e., for what routes, journeys, user classes etc.).

In addition, the PPT Project appraisal was based on a 30-year project life, yet the project has been operational for seven years. Realised benefits would only be fully known at the end of the appraisal period. The ex-post BCR analysis in this report, therefore, provides an indication of whether the project is on track to achieve the projected benefits and costs.

The Project Appraisal Balance Sheet shows that most of the projected PPT Project benefits (€860m) were from the shift of approximately 30% of Kildare Line passengers to the PPT services due to reduced journey times. To mitigate the complexity of calculating benefits from first principles without available, sufficient data, evaluation of the project's performance against the journey time reduction objective was used to provide an indication of benefits realised.

Whilst the initial benefits were large and appropriate for the time of appraisal, it is worth noting that these may be overestimated in the context of COVID-19. IÉ passenger numbers have not yet returned to pre-Covid levels, but the gap is narrowing. The company carried a total of 35.8 million passengers in 2022 compared to 50.1 million in 2019[40]. In 2023 this gap narrowed again as 45.5 million passenger journeys were recorded[41]. The direct impact on the PPT line is difficult to estimate, but given the headline figures it can be expected that the benefits estimated are higher than the benefits realised in the time period from 2019 to 2024.

The PPT Business Case indicates that projected costs were mainly related with operations and maintenance over the project's lifetime. However, it is possible to update these costs given that these costs are better understood and were displayed in Table 4-14 above. By applying these updated costs over the lifetime of the PPT, as well as applying the actual inflation rates that were observed from 2015 to 2024 sourced from the CSO CPI, the ex-post cost of the project is €366m over the 60-year appraisal period. This results in an ex-post BCR of 2.4.

Table 4-16: PPT project Ex-post Cost Benefit Analysis

Component	Present Value (€ millions)[42]
Total Benefits	860
Total Costs	366
Net Present Value (NPV)	494
Benefit to Cost Ratio (BCR)	2.4

[39] PPT Business Case. 2009 prices.
[40] https://www.nationaltransport.ie/news/bus-passenger-numbers-return-to-pre-pandemic-levels-nla/
[41] https://www.nationaltransport.ie/publications/nta-national-rail-census-report-2023/
[42] 2009 prices.

5. Lessons Learnt

The PPT project was successfully completed despite the complexities involved in its implementation within Dublin's rail network. Its success can be attributed to effective planning and the ability to adapt to challenges as they arose throughout the process. The project adhered to the NTA guidelines, securing approvals at each stage and ensuring smooth delivery. While it was carried out in compliance with PMG and CAF requirements, there are still valuable lessons to be drawn from various aspects of its execution and appraisal.

5.1 No Ex-Post Evaluation Plan

A key challenge in assessing whether the PPT project delivered its intended benefits was the absence of a clearly defined EPEP in the original business case. Without a structured framework outlining the specific data to be collected, the methodologies to be used, and the KPIs to be measured, the EPE was constrained. This lack of predefined evaluation criteria made it difficult to systematically track the project's impact and assess its success against its stated objectives.

Had an EPEP been integrated into the initial business case, it would have ensured that relevant data—such as journey times, passenger demand, modal shift, and customer satisfaction—was systematically gathered and recorded from the outset. This would have allowed for a more comprehensive and evidence-based analysis of the project's effectiveness. The absence of such a plan and data record meant that the evaluation had to rely on broader, open-source datasets that were not specifically designed to capture the direct benefits of the PPT project. The EPE may therefore have been enhanced by the inclusion of a structured evaluation framework.

5.2 Project Objectives and KPIs

The PPT project lacked clearly defined objectives, KPIs, and an LPM, making EPE challenging. The absence of a structured set of objectives throughout the project led to inconsistencies in defining and assessing its success. Without a well-documented rationale for project objectives, it was difficult to ensure alignment among stakeholders and to track progress effectively.

Furthermore, the broad and unspecified nature of the project's goals made it challenging to establish meaningful KPIs and measure performance. Future projects may consider the prioritisation of setting specific, measurable, attributable, realistic and time-bound objectives, to facilitate more effective monitoring and evaluation. The omission of an LPM also contributed to a lack of clarity regarding the intended impacts of the project, making it harder to assess long-term benefits.

5.3 Data Limitations

One of the key challenges in assessing whether the PPT Project delivered its intended benefits was the lack of specified datasets tailored to the project. For example, a passenger survey might enable a better assessment of the transfer from other modes (car / bus etc.) and also on the value that customers place on the ability to take direct journeys and journey times etc. Instead of using defined metrics such as journey time data or customer satisfaction surveys, the evaluation relied on open-source datasets, such as the Rail Census data. While these sources provided useful insights, they were not specifically designed to measure the direct project impacts. As a result, the EPE would have been more robust and precise if project-specific data had been collected and utilised, enabling a more targeted assessment of the PPT effectiveness.

5.4 Updated Benefits Calculation

The model used to calculate the project's benefits (NTA's Eastern Regional Modal) would not be sufficient to reuse, as it did not account for external factors that may have influenced changes in journey time savings over time. As a result, the project benefits were held constant, limiting the ability to assess the project's true long-term impact. This highlights a key lesson for future projects: benefit calculation models should be designed with flexibility to allow for recalculations based on real-world conditions (i.e. stating key measures such as journey times by route, user class etc.). This may enable a more accurate evaluation of whether a project has achieved its intended outcomes. Additionally, revisiting the assumptions laid out in the model (i.e., population growth) to examine if they were accurate compared to actual figures that were realised would be useful for future EPEs going forward.

5.5 Evolution of Guidance Documents and Prescribed Appraisal Assumptions

Several assumptions that underpinned the scheme's appraisal have been superseded or declared no longer applicable by the guidance provided in the IG and the TAF. For example, the Economic Appraisal of the PPT included VAT for all costs and applied inflation to all costs, which no longer complies with the current overarching guidance documents. This highlights the importance of evaluating projects within the context of the guidance available at the time, as compliance requirements can vary over a project's lifetime.

Appendix A Ex-Post Evaluation Plan

Based on Draft Guidance Document v2.0 (as of 13/12/2024).

Note: This plan is being considered from the perspective of someone writing the plan when preparing the Preliminary Business Case and/or Final Business Case and therefore it is assumed it would be a section of that document. Essentially this section would replace Section 12.2.4 Post Project / Post Implementation Review in the Phoenix Park Tunnel Project (PPT) Business Case (February 2015) document.

Although it could not have been considered in 2015, the impact of COVID should be considered when considering data requirements for 5 years post opening and later data may be more suitable for evaluation.

12.2.4 Post Project / Post Implementation Review (from PPT Project Business Case, February 2016)

A post-project review aims to confirm whether project objectives have been met, the project has been delivered to the required standard, on time and within budget and to ensure that experience gained can be used on other projects. It may also help to inform managers on the continued best use of a new asset.

This Business Case will form a key starting point for the post-project review. It is proposed that an interim post-project review is carried out after one full year of operational services on the Phoenix Park Tunnel route. A detailed post-project review should be carried out approximately three years after operation commences.

A.1 Introduction

A post-project review aims to confirm whether project objectives have been met, the project has been delivered to the required standard, on time and within budget and to ensure that experience gained can be used on other projects. It may also help to inform managers on the continued best use of a new asset. This Business Case will form a key starting point for the post-project review.

A.2 Evaluation Timelines and Duration

An ex-post evaluation should be conducted once sufficient time has elapsed for the benefits, outcomes and impacts to materialise and stabilise in society. It is generally recommended that the EPE be completed within 3-5 years of project completion, however, the NTA's EX Post Evaluation Guidance indicates that timelines will vary depending on the project.

Rail projects like the PPT, which introduce a new service often take considerable time before the demand on the new service reaches its full potential. Evidence documented in UK Passenger Demand Forecasting Handbook Guidance (PDFH), suggests the lag can last up to a period of 5 years. The transfer of existing passengers to new services often happens quickly, but attracting new passengers to a service generally takes longer to ramp up due to the time taken for customers to become familiar with the improved service offer available to them. It is proposed that for PPT evaluation is undertaken post 1 year from opening to gain an understanding of the initial impact and uptake of the service and then after 5 years once the ramp up period is complete and the full benefits of the scheme should be being realised.

A.3 Scale of Evaluation

To determine the scale of the evaluation the Guidance stipulates that there needs to be consideration of Proportionality and Evaluability. Consideration of both the Proportionality and the Evaluability are set out and considered in this section.

Proportionality

With a Capital Cost estimate of ~€13.5m, this scheme falls into the lower capital cost category (<€30m), however the scheme has been subjected to a detailed Economic assessment so there is likely value and understanding to be gained from Ex-Post Evaluation, that is worth a proportionate investment in. A top-down approach to budget identification using a proportion of the capital cost has been used as a guide to the level of evaluation that can be achieved for varying budgets. Examples of available budgets are provided in Table A 1. The final selection was also based on the evaluability and the availability of existing data and/or need for new data collection.

Table A 1 EPE Budget Options

	Indicative Budget	Potential Evaluation
Capital Cost	**€13,500,000**	**N/A**
EPE Budget 0.1%	€ 13,500	Use of existing data, primarily qualitative assessment.
EPE Budget 0.25%	€ 33,750	Use of existing data, some quantification if evaluable.
EPE Budget 0.5%	€67,500	Use of existing data, supplemented by minimal primary data collection, quantification if evaluable.
EPE Budget 1.0%	€135,000	Use of existing data and primary data collection, quantification.
EPE Budget 2.0%	€270,000	Use of existing data, primary data collection, substantial analysis and quantification.

Evaluability

The evaluability has been considered by focusing on the scheme outcomes, and determining whether the outcomes associated with the scheme can be isolated from other external factors such as changes in land use, frequency of travel (working from home), wider service changes and reliability, fares, traffic congestion and costs of journeys using private vehicles (fuel, parking etc), and any other factors influencing the journey choices of potential customers. The outcomes highlighted in the Logic Map and whether they are evaluable are considered in Table A 2.

Table A 2 Evaluability Assessment

Outcome	Evaluability
Increased rail patronage and revenue on Kildare Corridor (IÉ Census)	Easy to measure, may be influenced by outside factors but primary impact should be from the scheme. Further insight can be gained by reviewing passenger numbers on the PPT link. **Conclusion: Evaluable**
New direct journey opportunities to Dublin City Centre Improved journey times from Kildare to Dublin City Centre	New rail Generalised Journey Times can be compared for key areas in the city centre, before and after intervention. **Conclusion: Evaluable**
Increased footfall and interchanges at Connolly	Footfall and interchanges at Connolly are measurable but difficult to attribute to the scheme directly. Interchanges may be evaluable by considering an increase in sales of through tickets from the Kildare line to stations North and South of Connolly. **Conclusion: Potentially Evaluable**
Reduced need to interchange to other modes to complete journey Reduction in Luas Red Line and Bus boardings (C1,C2, C3, C4) at Heuston	There may be an initial impact on Luas and Bus boardings at Heuston, but this will be difficult to attribute to PPT as other external factors are likely to have a significant impact on Luas demand. **Conclusion: Evaluable in year one, not evaluable beyond year one.**
Platform capacity freed up at Heuston	Capacity could be utilised by additional services on other routes. This is seen as a secondary outcome and not fundamental to the scheme. **Conclusion: Evaluable but not necessary.**

Outcome	Evaluability
Modal shift from Car to Rail Reduction in car usage and accidents on N7, M50, R110.	Impact as a proportion of traffic will not be possible to isolate from traffic data, due to the significant influence of external factors, such of population, employment, economic, traffic congestion etc. Survey data could be used to interview rail passengers to determine previous journey details. Potential impact on accident levels and air quality but unlikely to be significant enough to measure and attribute to the scheme directly. **Conclusion: Evaluable if significant data collection budget available.**
Improved user experience and satisfaction	Passengers happier with their journey, options and quality. **Conclusion: Evaluable, but detailed evaluation will need a significant data collection budget available.**

A.4 Logic Mapping and KPIs

The PPT Project Business Case did not include a Logic Map, therefore a Logic Map has been developed as part of this EPEP. The logic Map begins with the Project Objectives, how this links to the Outputs, what the Outcomes are and ultimately what the Impacts will be. The impact is the observable impact (ideally measurable), that can be used to measure the success of the scheme.

A.5 Data Sources

Data sources for Evaluable impacts have been considered. The focus of this plan is on the EPE, and not the PCR. Although it could not have been considered in 2015, the impact of COVID should be considered when considering data requirements for 5 years post opening and later data may be more suitable for evaluation.

A.6 Summary

A EPE Plan has been developed for the PPT scheme that has considered the evaluability, and data availability to determine the proportionality and associated budget. The focus is to make use of existing data and quantify impacts where possible by considering impacts that can be wholly attributed to the PPT scheme, such as rail patronage changes, and short term impacts on other modes. The suggestion for this scheme would be to ring fence a budget of approximately 0.2% of the Capital cost (~€25,000) of the scheme for post evaluation, making use of existing data sources, with no new primary data collection proposed.

Comments on Guidance v2 and Process

Below are some thoughts on the guidance v2 focussed on planning a EPE.

The order set out in the plan is maybe not the order that things need to be thought about to develop a structured plan for EPE. The logic map feeds the evaluability consideration, evaluability dictates the proportionality, and the proportionality needs to be considered in parallel with eth data. Only when all this is understood can the budget and timeline really be determined.

There is no mention of assessing the economic evaluation in the planning section of the guidance v2. Consideration of this may influence the data collection (need for demand and revenue related data), background growth (calculated from counterfactual), costs (from PCR) In conclusion in this instance enough data should be available to review the BCR, but it should be considered when planning the EPE.