



**Clifton Scannell Emerson**  
Associates

# **Preliminary Business Case**

## **Bóthar Stiofáin Cycle Network Scheme**



Comhairle Cathrach na Gaillimhe  
Galway City Council

---

**Client: Galway City Council**

---

---

**Date: December 2023**

---

---

**Job Number: 19\_151**

---

Civil  
Engineering

Structural  
Engineering

Transport  
Engineering

Environmental  
Engineering

Project  
Management

Health  
and Safety

CONSULTING ENGINEERS



## Document Control Sheet

Project Name: Bóthar Stiofáin Cycle Network Scheme

Project Number: 19\_151D

Report Title: Preliminary Business Case

Filename: RPT-19\_151-033

Issue No.	Issue Status	Date	Prepared by	Checked by
1 <sup>st</sup>	ISSUE	08/12/2023		

## Table of Contents

0	Project Details .....	4
1	Introduction.....	5
2	Project Background .....	6
2.1	Project Objective .....	6
2.2	Project Scope and Feasibility .....	6
2.3	Preferred Option .....	7
3	Methodology .....	8
3.1	Applicable Policies and Guidelines .....	8
3.2	Appraisal Method.....	9
3.3	Options Assessed.....	10
3.4	Assumptions .....	11
4	Financial Appraisal .....	12
4.1	Financial Outflows .....	12
4.2	Financial Inflows .....	18
5	Exchequer Flows Appraisal.....	19
5.1	Construction Impact.....	19
5.2	Tourism Impact.....	19
5.3	Shadow Price of Public Funds .....	19
5.4	Shadow Price of Labour .....	20
5.5	Additional Employment.....	20
6	Economic Appraisal .....	21
6.1	Estimating Level of Uptake.....	21
6.2	Valuing Reductions in Relative Risk.....	22
6.3	Valuing Absenteeism Impacts .....	28
6.4	Economic Value of Active Travel.....	30
6.5	Multi Criteria Analysis .....	32
7	Cost Benefit Analysis .....	38
7.1	Cost Benefit Ratio.....	42
7.2	Net Present Value .....	43
7.3	Economic Rate of Return .....	44
8	Conclusions .....	45
9	Recommendations .....	47

## 0 Project Details

As per the National Transport Authority (NTA) Project Approval Guidelines (PAG) published in December 2020, the project details and Preliminary Business Case Report requirements are shown in Table 0-1.

**Table 0-1 - Project Details and as per NTA PAG**

<b>Project Band</b>	Band 2 (€0.5M-€10M)
<b>Project Phase</b>	Phase 3 - Preliminary Design
<b>Gateway</b>	3
<b>Report</b>	<p>Preliminary Business Case</p> <p>To include:</p> <ul style="list-style-type: none"> <li>• Confirmation of the strategic relevance of the proposal and detailed specification of the objective of the proposal (<b>Section 2</b>);</li> <li>• Description of the short-list of potential options to deliver the objectives set out (<b>Section 3.3</b>);</li> <li>• Detailed demand analysis and description of underlying assumptions (<b>Section 6.1</b>);</li> <li>• Options appraisal, (<b>Sections 4, 6 &amp; 6.5</b>) including:               <ul style="list-style-type: none"> <li>➢ Financial appraisal;</li> <li>➢ Economic appraisal;</li> <li>➢ Sensitivity and Scenario Analysis;</li> </ul> </li> <li>• Assessment of affordability within existing resources (<b>Section 5</b>);</li> <li>• Risk assessment, allowance for optimism bias and full risk management strategy (<b>Section 1.1.1</b>);</li> <li>• Proposed approach to procurement (<b>Section 2</b>);</li> <li>• Proposed approaches to implementation and operation (<b>Section 2</b>);</li> <li>• Assessment of delivery risk (<b>Section 6</b>);</li> <li>• Plan for monitoring &amp; evaluation including key performance indicators (<b>Section 8</b>); and</li> <li>• Recommendation to the Approving Authority (<b>Section 9</b>).</li> </ul> <p>Band 2 projects are subject to a single appraisal, incorporating elements of a preliminary and detailed appraisal (<b>Section 3.2</b>).</p>

---

## 1 Introduction

Clifton Scannell Emerson Associates (CSEA) were engaged by Galway City Council (GCC) to carry out consultancy services and PSDP role for the design of approximately 870m in length of cycle infrastructure along Bóthar Stiofáin, from the junction with Ragoon Road to the junction with Western Distributor Road. The scheme is part of the Galway Cycle Network Stage 2. The Bóthar Stiofáin route is identified as part of a Primary Network in the Proposed Cycle Network from the Galway Transport Strategy.

The scheme is being funded by the National Transport Authority (NTA) through the Urban Regeneration Development Fund (URDF). In accordance with the Public Spending Code (PSC), all Irish public bodies are obliged to treat public funds with care, and to ensure that the best possible value for money is obtained whenever public money is being spent or invested. Therefore, a Preliminary Business Case is required to document the estimated costs and benefits associated with the scheme and will be used by GCC to inform the progression of the scheme.

This Report has been prepared by CSEA on behalf of GCC outlining the business case for the scheme. Through a Cost Benefit Analysis (CBA) appraisal method of the proposed active travel infrastructure, the financial costs and economic benefits associated with the scheme are compared in Net Present Value (NPV) terms to ascertain the economic return of the scheme.

## 2 Project Background

### 2.1 Project Objective

Galway City is undergoing an exciting and continual process of change in order to adapt and anticipate the needs of its current and growing population. Significant traffic management changes are proposed that will change the culture and expectation of mobility within the city. Such changes will contribute greatly to increased use of active travel, public transport and better utilisation of the public realm. The challenge is to reconcile the complex and often competing demands for the available space through innovative design and engineering, and to secure stakeholder buy-in through robust analysis, effective communications, and certainty of quality of delivery.

The overall aspiration of the proposed active travel scheme is to provide a safe and comfortable environment for all self-propelled travel in the city and surrounding areas. Active travel is defined as 'travelling with a purpose using your own energy' and is most commonly observed as walking and cycling. As an area with relatively flat topography and a compact city centre, Galway is well positioned to capitalise on active travel as a meaningful form of commuting.

The route typifies both the opportunity and the challenges of urban cycling in Galway City. At present, there is a latent demand for good cycle facilities in the west of Galway City. The route is recognised as lacking the provision of quality cycle facilities, which discourage people from cycling within this area of Galway and to and from the city centre. Cyclists must share the road with the general traffic in traffic lanes that are wide enough to encourage unreasonably high speeds for the residential nature of these roads. The lack of proper cyclist facilities discourages some people from cycling even for short journey trips (e.g. less than 15minutes trips).

### 2.2 Project Scope and Feasibility

Bóthar Stiofáin currently provides designated motor vehicle and pedestrian facilities through a carriageway providing for one lane of traffic in each direction and a footpath on the western extent. The footpath is in generally good condition with intermittent verges, narrowing width at pinch points and wide crossings at minor junctions.

The proposed scheme is identified as part of a Primary Network in the Proposed Cycle Network from the GTS. The cycle network proposed in the GTS is intended to maximise the provision of high-quality dedicated cycling facilities and to improve measures giving priority to cyclists, encouraging uptake in cycling both for commuting and as a leisure activity in the city and surrounding areas. Appendix F of the GTS deals specifically with cycle network and Infrastructure Development. This Appendix sets out the development of the proposed cycle network for Galway City, including an audit process undertaken to identify engineering constraints, evaluate the feasibility and suitability of each cycle link with regard to these constraints and propose alternative facilities or mitigation measures to enable the implementation of the overall network. This project, Galway Cycle Network Stage 2, forms part of the Cycle Network Strategy within the GTS.

There is a need to provide high-quality facilities for pedestrians, cyclists and public transport in order to encourage people to switch to sustainable modes of transport and to provide safe and efficient movement of people within Galway City. This provision would be an investment in Galway City and County, its economy, environment and its public realm. The proposed scheme would create better quality public realm with visual enhancement of the area. This investment would facilitate increased pedestrian and cycle movement across the city improving connectivity between businesses, schools,

housing, places of worship, etc creating more attractive and vibrant streets. It would also reduce dependence on the use of cars for short and short to medium trips reducing carbon footprint.

There is an opportunity with this scheme to promote walking and cycling culture by delivering a high-quality pedestrian and cycling facilities along these popular routes and, in doing so, to reinforce the qualities and successes of the places through which it passes. The proposed scheme will not only increase accessibility and permeability within the study area but will also provide enhanced and safer connectivity with other areas and routes. Ultimately, the route should be delivered to improve safety, reduce journey times, and contribute towards increased numbers of trips being made by bicycle and by foot in the local catchment.

The overall Scheme objective is to provide a utility network to connect residential, shopping, work and education centres for functional cycle trips. As a secondary effect, a the route will likely form a recreational network to provide a route of sufficient length and quality to cater for exercise, social and tourism trips. This will be achieved through:

- A connection to the cycle facilities on the Western Distributor Road;
- Traffic calming measures (reduced carriageway width, zebra crossings etc) to enhance safety for vulnerable road users;
- Providing a route that can cater for demand – this route, in particular, has a high density catchment from staff/customers accessing Gateway Retail Park;
- Providing a safe cycle network with segregated cycle tracks to encourage uptake of cycling;
- Improvement of footpath & crossing facilities for vulnerable road users and pedestrians, e.g. reduced crossing delays and additional crossing locations for pedestrians;
- Provision of cycling facilities and improvements to cyclist priority and safety along the route, particularly at junctions;
- Provision of a safe and legible route for commuter, leisure and delivery cyclists to access the retail and residential premises along the route; and
- Introduction of streetscapes that are conducive to cycling, ie; bollards instead of guard rails, providing shelter form wind/rain where possible, provision of smooth surfaces that are free from obstructions, routes that minimise inclines, reducing conflict points for cyclists by providing cyclist priority, avoidance of street clutter, removal of on street parking.

The target users of the scheme are local residents, delivery cyclists, commuter cyclists, leisure cyclists, students/staff of Gaelscoil Mhic Amhlaigh, staff/customers of Gateway Retail Park and members/visitors of Galway Bohemians FC.

### **2.3 Preferred Option**

The proposed solution, which emerged as the preferred option from an options study, proposes to install a 14m cross-section with 2m raised adjacent cycletracks and footpaths on both sides of the road, with some landtake required from the eastern side and zebra crossings on raised platforms at suitable intervals. The preliminary layout is shown in CSEA Drawing No. 19\_151-CSE-GEN-XX-DR-C-2111 (Appendix A). This solution will achieve the scheme objectives whilst providing the NTA, URDF and GCC with the best value-for-money design for the medium to long term.

GCC intends to submit the proposed scheme for the necessary planning procedure required by the Planning and Development Act 2000 (as amended), in accordance with the requirements of Part 8 of the Planning and Development Act (as amended).

## 3 Methodology

### 3.1 *Applicable Policies and Guidelines*

#### 3.1.1 Public Spending Code

The Public Spending Code (PSC) sets out rules and procedures to ensure that these standards are upheld across the Irish public service. The PSC provides details of expenditure appraisal, value for money requirements and related guidance covering both current and capital expenditure. Its main focus is to guarantee appropriate management of public funds and preparation of all business cases. It is therefore generic in nature and supplemented by various government department specific guidelines.

#### 3.1.2 Common Appraisal Framework for Transport Projects and Programmes

The 'Common Appraisal Framework for Transport Projects and Programmes' (CAF), published by the Department of Transport in March 2016 and as amended in October 2020 sets out a common framework for the appraisal of transport investments and is underpinned by the PSC.

The CAF provides guidance for carrying out a business case to justify public expenditure to ensure consistency in content and format across public spending projects.

#### 3.1.3 Project Appraisal Guidelines for National Roads Unit 13.0 - Pedestrian and Cyclist Facilities

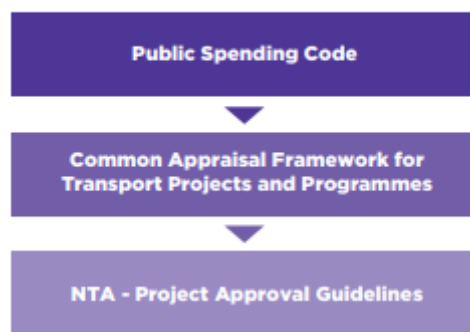
The Project Appraisal Guidelines for National Roads Unit 13.0 - Pedestrian and Cyclist Facilities (PAG), was published by Transport Infrastructure Ireland (TII) in October 2016. The PAG outlines a method for assessing the benefits of proposals to improve pedestrian and cyclist facilities. It can be used for the appraisal of both standalone schemes and road schemes which incorporate pedestrian and cyclist facilities. While the PAG does include advice and suggestions for carrying out the appraisal of pedestrian and cyclist facilities, it also notes that these should not be regarded as definitive. There are still a large number of unknowns and uncertainties about the appraisal of pedestrian and cyclist facilities and users of this guidance should use their own expertise and experience in applying this advice in the most appropriate way.

#### 3.1.4 National Transport Authority Project Approval Guidelines

The National Transport Authority Project Approval Guidelines (NTA PAG) is a set of guidelines published to provide a framework for the development, management and delivery of sustainable mobility projects of all types. The guidelines ensure that requirements relating to scope, cost, quality and time as well as value/ benefits are met. This criteria are checked at NTA Approval Points, called Gateways, which occur at key approval milestones that generally align with the end of the phases of the project lifecycle. Figure 10 of the NTA PAG, shows that the NTA PAG is preceded by the PSC and CAF (Figure 3-1).



**Figure 10 Hierarchy of Project Guidance Documents for Project Appraisal**



**Figure 3-1 Hierarchy of Project Guidance Documents for Project Appraisal (Source: NTA PAG)**

### 3.1.5 Sustainable Mobility Policy Review

The Sustainable Mobility Policy Review, Background Paper 2, Active Travel was published by the Department of Transport, Tourism and Sport to inform public consultation on Ireland's sustainable mobility policy. The purpose of the paper is to provide an opportunity to review public transport policy 'to ensure services are sustainable into the future and area meeting the needs of a modern economy' and by reviewing the role of active travel modes in the context of the wider transport network while raising some issues for consideration in developing future policy.

The five benefits of active travel that can be capitalised on are identified as:

- Environmental - reduced levels of carbon emissions and greenhouse gases;
- Health - improved levels of fitness and public health generally from increased activity;
- Safety - increased levels of active travel can stimulate the increased provision of quality footpaths and cycle paths by public authorities;
- Economic - increased active travel usage can lead to reduced congestion levels and improved accessibility in urban areas; and
- Social - increased provision for active travel modes can drive improved transport equity.

## 3.2 Appraisal Method

The scheme has an estimated value of between €0.5million and €5million and is therefore subject to a single appraisal incorporating elements of a preliminary and detailed appraisal, as per the CAF.

### 3.2.1 Preliminary Appraisal

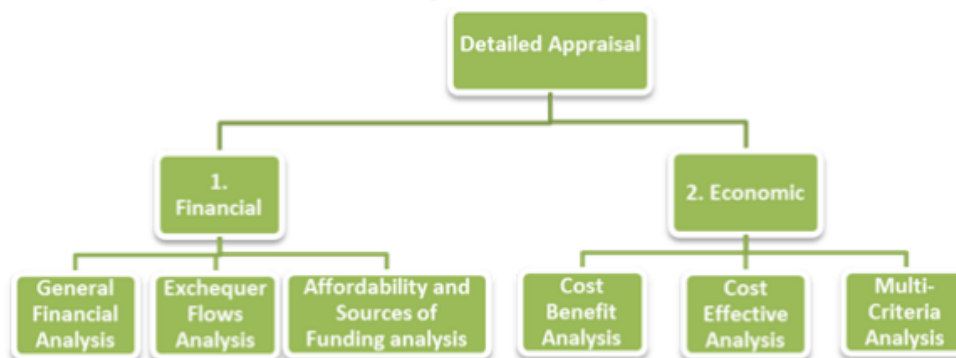
The preliminary appraisal involves:

- Defining the objective;
- Clarifying the scope;
- Assessing the feasibility; and
- Exploring different options to identified objective.

This process was carried throughout the design process, in Phase 0 Scope & Application, Phase 1 Scheme Concept and Options Selection and Phase 2 Preliminary Design and summarised in Section 2.

### 3.2.2 Detailed Appraisal

Figure 3-2 shows an overview of the detailed appraisal method as set out in the CAF.

**Table 4: Overview of Detailed Analysis Methods****Figure 3-2 Overview of Detailed Appraisal Methods (Source: CAF)**

### 3.2.2.1 Financial Appraisal

A general financial analysis of outflows and inflows and exchequer flows analysis is suitable to be carried out for the scheme. As the scheme is being funded by the NTA URDF, the affordability and sources of funding analysis is not applicable.

### 3.2.2.2 Economic Appraisal

A Cost Benefit Analysis (CBA) is suitable to be carried out for the Bóthar Stiofáin Cycle Network Scheme. A CBA will take into account monetary (financial) inflows and quantify the non-monetary (economic) benefits associated with the scheme in present value terms. The CBA will determine the following:

- Cost Benefit Ratio (CBR);
- Net Present Value (NPV); and
- Economic Rate of Return (ERR).

The CAF states that Cost Effective Analysis (CEA) is suitable in scenarios when a scheme must achieve a defined level of effectiveness and costs are to be minimised. Therefore, it is not suitable for the scheme.

The PSC determines that Multi-Criteria Analysis (MCA) should be carried out at a minimum for projects between €5 million and €20 million and therefore is not applicable to this scheme but it is acknowledged that it could be undertaken to strengthen the business case and to complement CBA. An MCA has been carried out to form a qualitative assessment in line with the PAG.

## 3.3 Options Assessed

The CAF states a minimum of four options (i.e; Do-Nothing or Do-Minimum and at least 3 Do-Something options) should be subject to appraisal at preliminary appraisal stage. However, as the scheme has a Preferred Option, that emerged as part of an extensive options assessment that incorporated cost estimates in line with NTA Cost Management Guidelines (CMG), it is considered sufficient to assess the Do-Nothing scenario with one Do-Something scenario.

### 3.3.1 Do-Nothing

Do Nothing scenario, proposes no changes to the existing layout and serves as a basis of comparison to assess the effects of the Do Something scenario.

### 3.3.2 Do-Something

The proposed solution, which emerged as the preferred option from an options assessment, proposes to install a 14m cross-section with 2m raised adjacent cycletracks on both sides of the road with some landtake required from the eastern side and zebra crossings on raised platforms at suitable intervals. This solution will achieve the scheme objectives whilst providing the NTA and GCC with the best value-for-money design for the medium to long term.

### 3.4 Assumptions

Several assumptions of economic factors that are consistently used within the appraisal have been taken from the PSC, CAF and PAG and are shown in Table 3-1.

**Table 3-1 - Assumptions of Economic Factors**

Parameter	Value
Construction Period	1 year
Design Life/Economic Life	30 years
Discount Rate	4%
Shadow Price of Public Funds	130%
Real GDP	Refer to Table 3-2
Real GNP	Refer to Table 3-2
Mean proportion of population in Ireland aged 15-64 who die each year from all causes	0.0019
Value of Prevented Fatality (2011 prices and values)	€2,310,500
Value of work time per hour (2011 prices and values)	€34.33

**Table 3-2 Economic Growth Rate Forecasts as per the CAF**

Year	2019	2020	2021-2025	2025-2030	2030+
Real GDP (%)	3	3	2.2	2	2
Real GNP (%)	2.5	2.5	2.2	2.3	2.3

It is also assumed that at the end of the 30year economic life there is no residual value in the scheme, and it is decommissioned.

## 4 Financial Appraisal

As per the PSC, financial appraisal exclusively quantifies the monetary outflows and inflows of a project.

### 4.1 Financial Outflows

The financial outflows are the expenses associated with the delivery and operation of the scheme during its economic life. This is carried out for an assessment period of 30years.

The Preliminary Cost Estimate developed as part of the NTA CMG as part of the necessary Gateway 3 documentation is shown overleaf.

4.1.1 Construction Costs

The construction cost associated with the Do-Something scenario is €2,450,299.50 (Figure 4-1). This figure is taken Preliminary Cost Estimate developed as part of the NTA CMG. This was developed for the preferred option during Project Phase 2 Concept Development and Options Selection and reviewed at Project Phase 3 Preliminary Design.

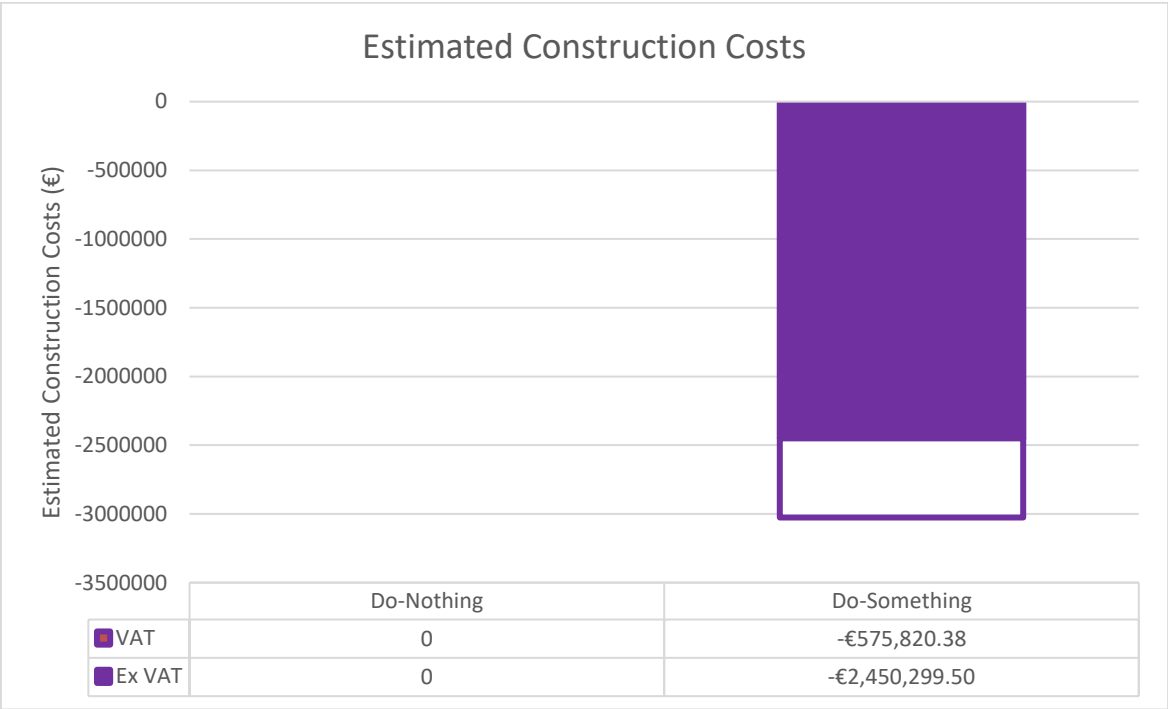


Figure 4-1 Estimated Construction Costs (\*Note that the negative figure denotes a monetary outflow from GCC)

4.1.2 Preparation and Administration Costs

The preparation and administration cost associated with the Do-Something scenario is €350,000 (Figure 4-2). This figure is taken Preliminary Cost Estimate developed as part of the NTA CMG.. This was developed for the preferred option during Project Phase 2 Concept Development and Options Selection and reviewed at Project Phase 3 Preliminary Design

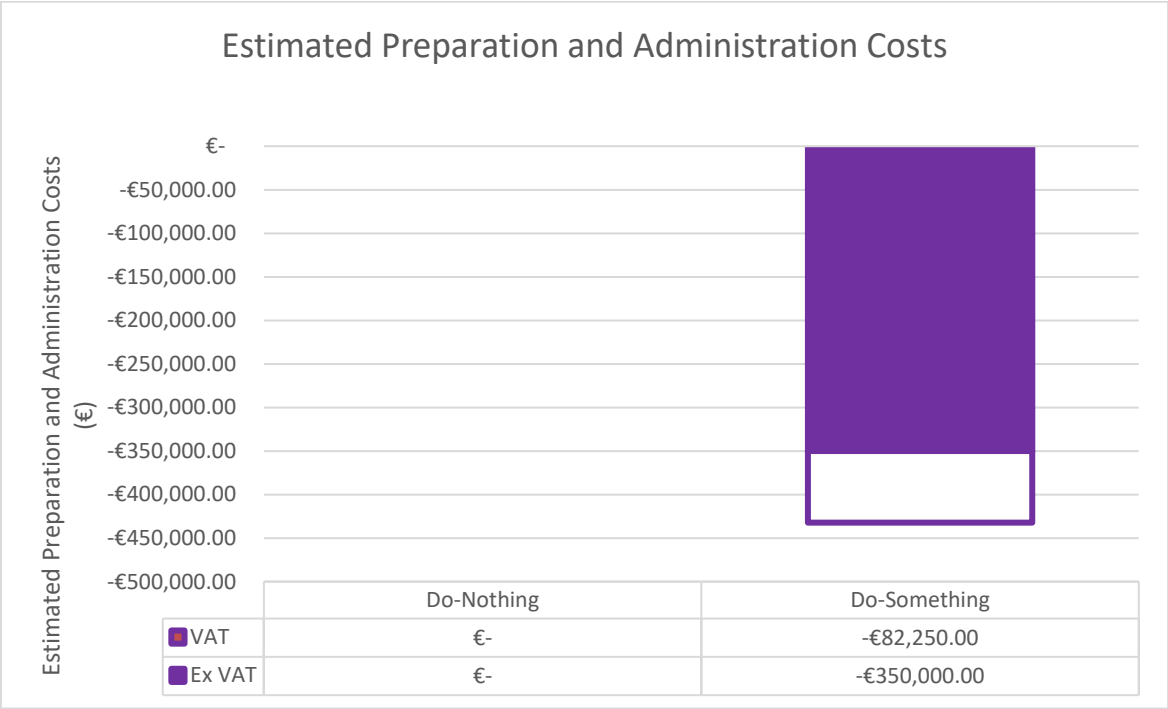


Figure 4-2 Estimated Preparation and Administration Costs (\*Note that the negative figure denotes a monetary outflow from GCC)

4.1.3 Traffic Management and Related Costs

The traffic management and related cost associated with the Do-Something scenario is €245,029.95 (Figure 4-3). This figure is taken Preliminary Cost Estimate developed as part of the NTA CMG.. This was developed for the preferred option during Project Phase 2 Concept Development and Options Selection and reviewed at Project Phase 3 Preliminary Design.

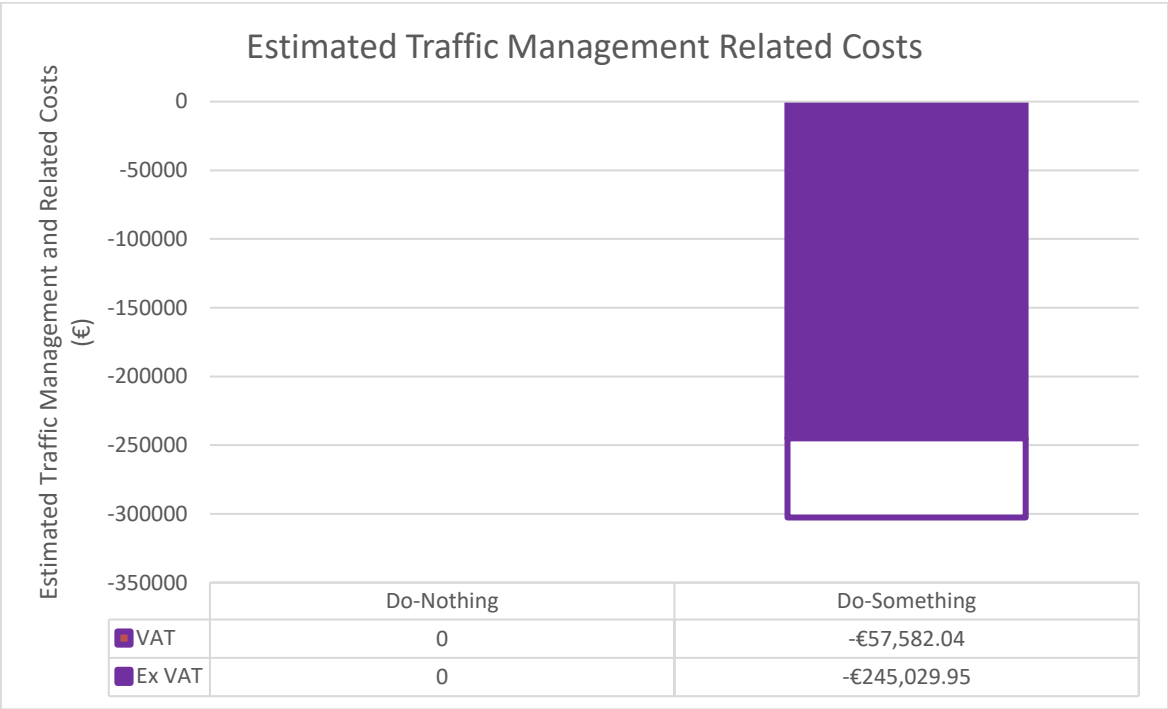


Figure 4-3 Estimated Traffic Management and Related Costs (\*Note that the negative figure denotes a monetary outflow from GCC)

4.1.4 Land and Property Costs

The scheme involves landtake along the eastern extent. A total of 2.67Ha of land is required from 5 landowners, including 0.8634Ha from GCC.

GCC is in the process of valuing the landtake requirements from all landowners. Due to area and the uncertainty of the associated costs with this expected landtake, a financial outflow of €50,000 has been accounted for (Figure 4-4). This figure is taken Preliminary Cost Estimate developed as part of the NTA CMG.. This was developed for the preferred option during Project Phase 2 Concept Development and Options Selection and reviewed at Project Phase 3 Preliminary Design.

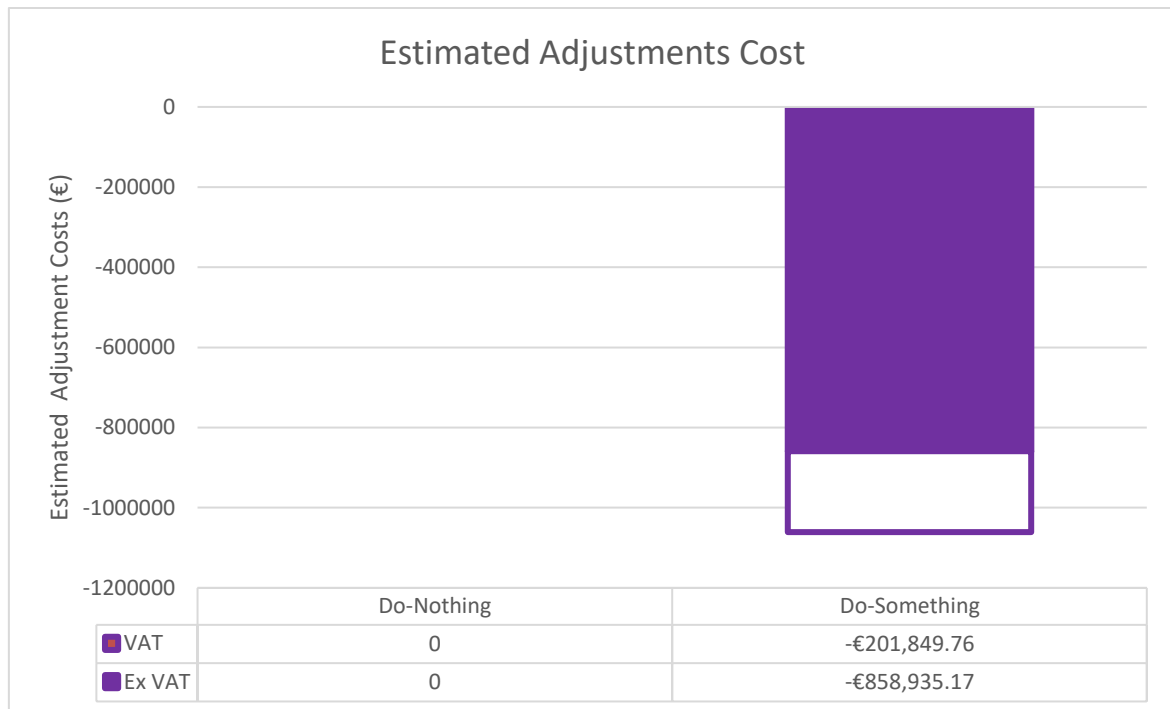


Figure 4-4 Estimated Land and Property Related Cost (\*Note that the negative figure denotes a monetary outflow from GCC)



#### 4.1.5 Adjustments

The adjustments cost associated with the Do-Something scenario is €858,935.17 (Figure 4-5). This expense accounts for inflation, project specific risk and contingency. This figure is taken Preliminary Cost Estimate developed as part of the NTA CMG.. This was developed for the preferred option during Project Phase 2 Concept Development and Options Selection and reviewed at Project Phase 3 Preliminary Design.

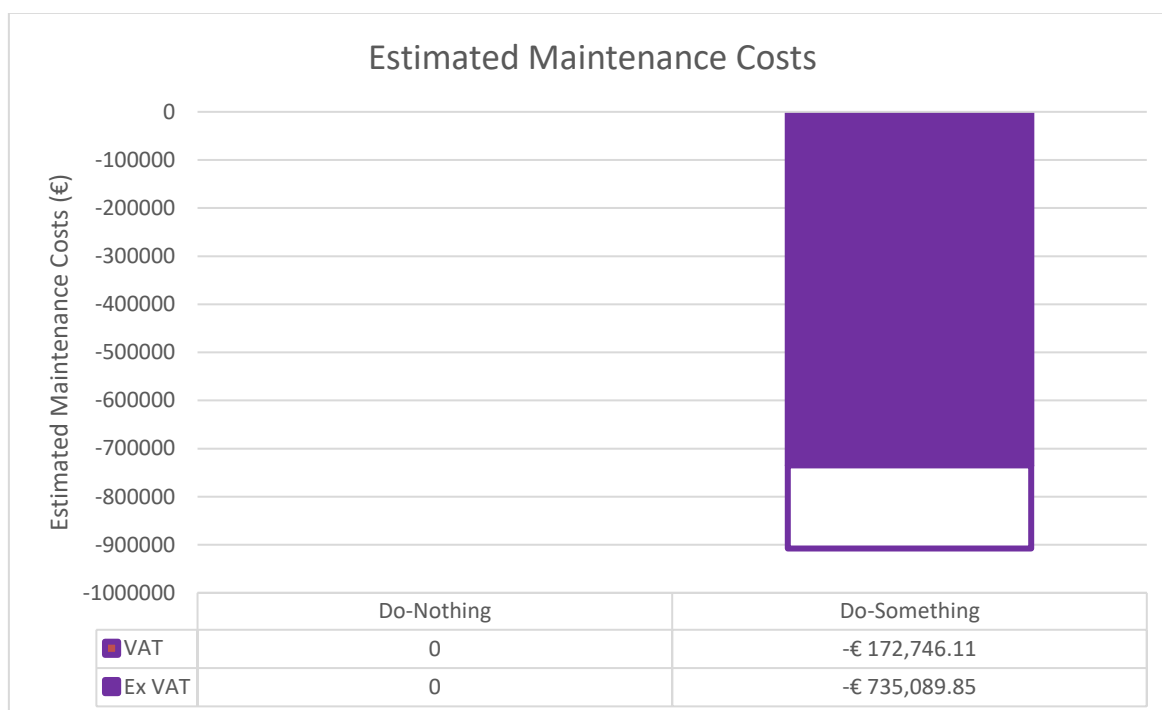


**Figure 4-5 Estimated Adjustments Cost (\*Note that the negative figure denotes a monetary outflow from GCC)**

#### 4.1.6 Maintenance Costs

It is acknowledged that as the Scheme is both an improvement to the existing infrastructure as well as the construction of new infrastructure. There are existing operational costs already accounted for in GCC's budget for the existing infrastructure. Therefore, the operational costs of the improved infrastructure will potentially be absorbed by the council's budget with only the associated maintenance costs for the new infrastructure being an additional cost. However, taking a conservative estimate and accounting for the fact that the new infrastructure is of improved quality and the intent to provide a high Quality of Service (QoS) throughout its lifetime, maintenance costs are accounted for the entirety of the infrastructure.

Maintenance costs were assumed at a value of 1% of construction costs per annum for a 30year economic life. Maintenance costs would be expected to be higher towards the end of the schemes economic life, but a flat rate is adopted to reflect uncertainty with the associated costs. The overall 30year maintenance cost is €735,089.85 (Figure 4-6).



**Figure 4-6 Estimated Maintenance Costs** (\*Note that the negative figure denotes a monetary outflow from GCC)

#### 4.2 Financial Inflows

There are no associated financial inflows associated with the Bóthar Stiofáin Cycle Network Scheme. This is owing to the fact that the infrastructure will be provided by GCC and will be free to use by the general public.

---

## 5 Exchequer Flows Appraisal

The Exchequer flows appraisal is concerned with the financial impact of the project on the Exchequer. It is thus concerned with the implications of the project for capital and maintenance spending, public transport subsidies and taxation.

### 5.1 Construction Impact

It is acknowledged that for every additional euro spent within the economy, there is a knock-on-effect of further economic activity stimulated within the exchequer. The extents of this indirect economic activity include increased productivity from suppliers to the construction industry and increased spending within the economy arising from the salaries on construction workers as well as the associated VAT and income tax.

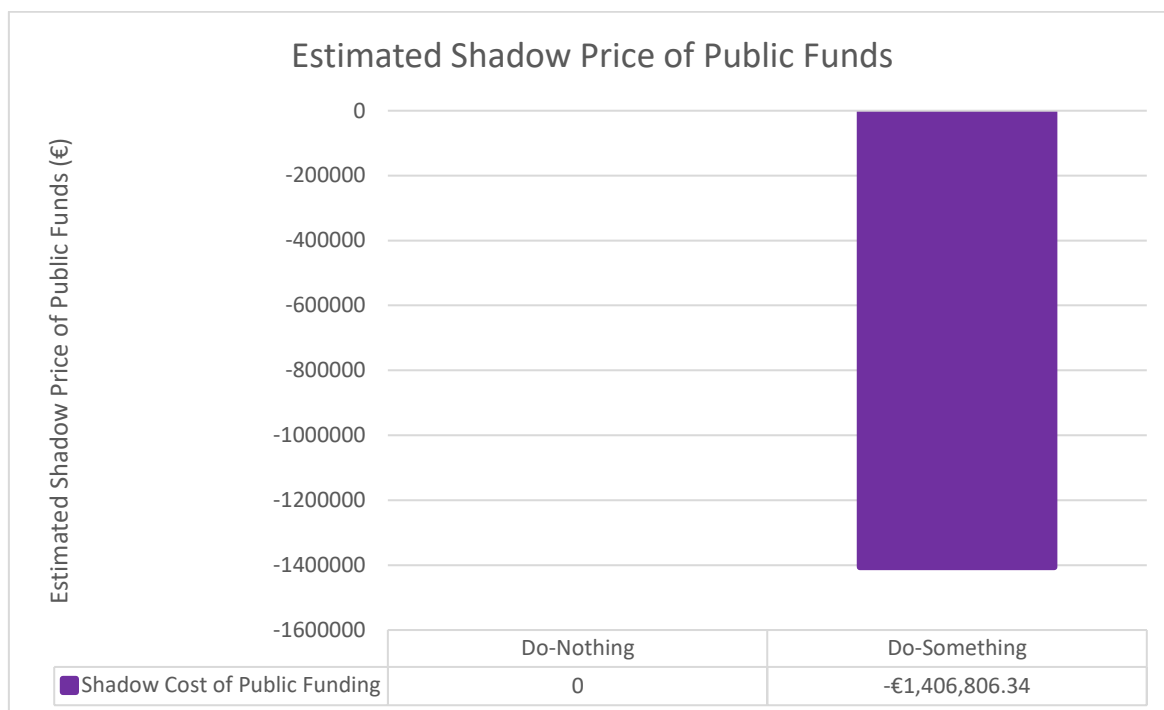
The duration of the construction phase of the scheme is envisaged to be short term in nature and the construction staff will be pulled from a framework within GCC. Therefore, it is hard to quantify the benefit of the construction impact to the Exchequer. Taking a conservative approach, no construction impact is assumed to benefit the Exchequer.

### 5.2 Tourism Impact

It is acknowledged that the scheme has the potential to benefit the exchequer indirectly through tourism revenue by direct tourism spend and increased employment. However, as the scheme is an active travel scheme, its primary purpose is utility rather than recreation. Any tourism spend that may arise as a secondary benefit is outside the scope of the scheme and is therefore not included in the assessment. It is also noted that the area is primarily residential with little tourist attraction owing to a small number of tourist accommodation.

### 5.3 Shadow Price of Public Funds

The shadow price of public funds represents the costs of raising public funds. As per the CAF, the value of the shadow price of public funds is set at 130% to take account of the distortionary effects of taxation. The estimated shadow price of public funds is € 1,406,806.34 (Figure 5-1).



**Figure 5-1 Estimated Shadow Price of Public Funds** (\*Note that the negative figure denotes a monetary outflow from GCC)

#### **5.4 Shadow Price of Labour**

The shadow price of labour quantifies the welfare benefits which accrue from spending on labour and reduced unemployment. As per the CAF, the value of the shadow price of labour is 80-100%.

The duration of the construction phase of the scheme is envisaged to be short term in nature and the construction staff will be pulled from a framework within GCC. Therefore, it is hard to quantify the benefit of the shadow price of labour to the Exchequer. Taking a conservative approach, no shadow price of labour is assumed to benefit the Exchequer.

#### **5.5 Additional Employment**

No direct additional employment is envisaged to be generated during the operational phase of the scheme. The necessary maintenance staff are already employed and budgeted for by GCC.

## 6 Economic Appraisal

As per the CAF, the total active travel benefit or cost is arrived at by combining the benefits associated with reductions in relative risk and reductions in absenteeism.

Whilst the Bóthar Stiofáin Cycle Network Scheme is primarily a cycle scheme with the intent to promote cycling and encourage uptake, there are significant improvements to pedestrian facilities along the route. These improvements, including a footpath along the eastern extent, reduced crossing widths, increased toucan crossings and resurfacing, will encourage walking and increase the number of trips made by foot within the area. Therefore, it is appropriate to assess the economic impact of walking as part of the economical assessment of the scheme.

As the Bóthar Stiofáin Cycle Network Scheme is intended to increase uptake in walking and cycling as a meaningful mode of transport, these benefits are considered as the intervention will cause more people to become physically active. Only the additional trips generated as a result of the intervention are considered. An existing walker or cyclist, even if they use the facility being assessed, will derive no extra health benefit if their level of physical activity remains the same. The additional users must also use the infrastructure regularly to realise the benefit from the scheme. Therefore, the economic benefit from active travel is derived from the number of additional regular users per year.

As the scheme is being funded by the NTA and URDF, there is no associated delivery risk to be assessed as the funding is secured and the necessary resources for implementation are already in place within GCC.

### 6.1 Estimating Level of Uptake

The scheme is expected to be well received by the local community. Therefore, the infrastructure is presumed to have a notable uptake with a marked increase in regular walker and cyclists. This is due to the infrastructure removing the current barriers to walking and cycling within the area.

At present, Bóthar Stiofáin is recognised as lacking quality active travel facilities, which discourages people from walking and cycling within the area. The footpath is located on the western extent, opposite the Gateway Retail Park, Gaelscoil Mhic Amhlaigh and Galway Bohemians FC. Cyclists must share the road with the general traffic in traffic lanes that are wide enough to encourage unreasonably high speeds for the residential nature of these roads.

The scheme addresses the need to provide high-quality facilities for pedestrians and cyclists in order to encourage people to switch to sustainable modes of transport and to provide safe and efficient movement of people within Galway City. The scheme will improve connectivity between homes, businesses, education, and services to create a more liveable and vibrant street.

This will be achieved through the following aspects of the design:

- Provision of a safe, accessible and functional pedestrian network through improvement of footpath & crossing facilities for vulnerable road users and pedestrians along Bóthar Stiofáin i.e; reduced crossing delays and additional crossing locations for pedestrians;
- Provision of a safe and legible route for active travel users to access the retail and residential premises along Bóthar Stiofáin;
- Introduction of traffic calming measures (tree lining, reduced carriageway width, reduced vehicular speed limit, toucan crossings etc) to enhance safety for vulnerable road users;
- Tie-in with the pedestrian and cyclist facilities at the junction with Western Distributor Road and provision of pedestrian and cyclist crossing facilities to make the route more accessible;

- Provision of a route that can cater for demand – the route has a large residential catchment and therefore users are likely to have a highly varied age, cycling ability and trip purpose; and
- Maintaining of the existing streetscape and visual cohesion to avoid a ‘built-up’ streetscape whilst promoting active travel modes where practicable. i.e. bollards instead of guard rails, providing shelter from wind/rain where possible, provision of smooth surfaces that are free from obstructions, routes that minimise inclines, reducing conflict points for active travel users, avoidance of street clutter and removal of on street parking.

Bóthar Stiofáin and the surrounding area is residential in nature and therefore has a large catchment of potential regular users of the proposed infrastructure. The route is envisaged to act as a transit route for users travelling from north of the Ragoon Road to Salthill, and vice versa as well as into Galway City.

In particular, Gaelscoil Mhic Amhlaigh has the potential to add significantly to the walking and cycling demand along Bóthar Stiofáin through students, staff and parents/guardians facilitating school drop-off and pick-up. The Gateway Retail Park also has a large staff and customer base that are expected to use the proposed infrastructure. The existing streetscape is not conducive to active travel and therefore the proposed scheme will utilise this demand and allow for significant increase in regular active travel users along the route.

The lands to the north east of Bóthar Stiofáin and north of Ragoon Road are currently undeveloped. As per the Galway City Development Plan, the land to the north and to the east of the scheme is zoned Residential with the land to the west zoned for Enterprise and Employment . Should this land be developed, this will add to the active travel demand along the route.

For sensitivity analysis, three levels of uptake were assessed to demonstrate the impact of the reduction of relative risk (Table 3-1).

**Table 6-1 Predicted Level of Uptake of the Scheme**

Level of Uptake	Economic Case	Number of Additional Regular Users per Year
Low	<i>Pessimistic</i>	1700
Medium	<i>Median</i>	1850
High	<i>Optimistic</i>	2000

## 6.2 Valuing Reductions in Relative Risk

There are health benefits to the general population when up-take in active travel increases due to an increase in levels of physical exercise within the population. The benefits of regular exercise compared to a more sedentary lifestyle are substantial within a large population group with it acknowledged that an increase in physical activity reduces the relative risk of mortality.

The economic benefit arising from the reduction in relative risk is converted to a monetary value through the quantity of potential lives saved and the value of a life.

As per the CAF, it is assumed that the benefit of using active modes accrues over a five year period, after which new pedestrians or cyclists achieve the full health benefit of their activities. The relative risk is calculated for each year of the economic lifetime of the scheme, ie; from 2023 to 2052 (30years). Therefore, graduated benefits are observed for the first four years of operation, 2023-2026 with full benefits seen from 2027 onwards.

The conversion of the benefit of reduced mortality to a monetary value is calculated for each assessment year. As per the CAF, to ensure consistency in appraisal of transport projects the values are presented in 2011 prices then calculated to include real growth in the value of a prevented fatality in line with forecast GDP/capita, then summed and discounted to give a total benefit in 2011 present values. The 2011 value of life is taken to be € 2,077,589.00.

The breakdown of additional trips to be made by pedestrians or cyclists as a result of the scheme is taken from current active travel modal split values as per the guidance document Sustainable Mobility Policy Review. From this, 88% of active travel trips made on foot and 12% made by bicycle (Table 6-2).

**Table 6-2 Predicted Economic Case Scenarios**

Economic Case	Additional Regular Pedestrians	Additional Regular Cyclists
Pessimistic	1496	204
Median	1628	222
Optimistic	1760	240

### 6.2.1 Walking

The amount of walking, relative risk reduction and benefit of reduced mortality for each new regular pedestrian who avails the scheme is calculated in Table 6-3 and Table 6-4. The distance walked by a new pedestrian is calculated as an average distance rather than of the scheme length as it is assumed that all new trips along the route are transit routes and have an origin and destination outside of the scheme extents. The values used are in accordance with those set out in Section 3.4 of Project Appraisal Guidelines for National Roads Unit 13.0 - Pedestrian and Cyclist Facilities.

**Table 6-3 Calculating the Amount of Walking per Pedestrian**

Calculate the amount of walking per pedestrian	
Mean distance travelled by new pedestrians	3km
Estimated walking speed	5km/ph
Estimated mean time spent walking per weekday (= (60)*(3/5))	36mins

**Table 6-4 Calculating the Relative Risk Reduction of Walking**

Calculate relative risk reduction	
Relative risk for walking 38 mins/day (CAF 2016)	0.89
Relative risk reduction for pedestrians (= 1 – 0.89)	0.11
Mean risk reduction (= (0.11)*(36/38))	0.1

The mean risk reduction value of 0.1 is used to determine the benefit of reduced mortality. Appendix A shows a full breakdown of the calculations for the pessimistic, median and optimistic case scenarios for each of the assessment years.

---

Table 6-5 shows the calculated value of the benefit of reduced mortality from the benefit of increased walking as a result of the scheme in Real Growth Value (in line with forecast GDP/Capita) and Discounted Growth Value (discounted to 2011 present values).



**Table 6-5 Economic Benefit of Reduced Mortality due to Walking**

Economic Benefit of reduced mortality due to Walking							
Economic Case Scenario		Pessimistic		Median		Optimistic	
Year	Assessment Year	Real Growth Value (in line with forecast GDP/Capita)	Discounted Growth Value (discounted to 2011 present values)	Real Growth Value (in line with forecast GDP/Capita)	Discounted Growth Value (discounted to 2011 present values)	Real Growth Value (in line with forecast GDP/Capita)	Discounted Growth Value (discounted to 2011 present values)
2024	0						
2025	1	€ 362,115.39	€ 348,187.87	€ 394,066.74	€ 378,910.33	€ 426,018.10	€ 409,632.79
2026	2	€ 386,256.41	€ 357,115.77	€ 420,337.86	€ 388,625.98	€ 454,419.31	€ 420,136.19
2027	3	€ 433,688.09	€ 385,547.14	€ 471,954.69	€ 419,566.00	€ 510,221.29	€ 453,584.87
2028	4	€ 505,969.44	€ 432,504.80	€ 550,613.81	€ 470,666.99	€ 595,258.17	€ 508,829.18
2029	5	€ 602,344.58	€ 495,083.33	€ 655,492.63	€ 538,767.16	€ 708,640.68	€ 582,450.98
2030	6	€ 602,344.58	€ 476,041.67	€ 655,492.63	€ 518,045.34	€ 708,640.68	€ 560,049.02
2031	7	€ 602,344.58	€ 457,732.37	€ 655,492.63	€ 498,120.52	€ 708,640.68	€ 538,508.67
2032	8	€ 602,344.58	€ 440,127.28	€ 655,492.63	€ 478,962.04	€ 708,640.68	€ 517,796.80
2033	9	€ 602,344.58	€ 423,199.31	€ 655,492.63	€ 460,540.42	€ 708,640.68	€ 497,881.54
2034	10	€ 602,344.58	€ 406,922.41	€ 655,492.63	€ 442,827.33	€ 708,640.68	€ 478,732.25
2035	11	€ 602,344.58	€ 391,271.55	€ 655,492.63	€ 425,795.51	€ 708,640.68	€ 460,319.47
2036	12	€ 602,344.58	€ 376,222.64	€ 655,492.63	€ 409,418.76	€ 708,640.68	€ 442,614.88
2037	13	€ 602,344.58	€ 361,752.54	€ 655,492.63	€ 393,671.88	€ 708,640.68	€ 425,591.23
2038	14	€ 602,344.58	€ 347,838.98	€ 655,492.63	€ 378,530.66	€ 708,640.68	€ 409,222.33
2039	15	€ 602,344.58	€ 334,460.56	€ 655,492.63	€ 363,971.79	€ 708,640.68	€ 393,483.01
2040	16	€ 602,344.58	€ 321,596.69	€ 655,492.63	€ 349,972.87	€ 708,640.68	€ 378,349.05
2041	17	€ 602,344.58	€ 309,227.59	€ 655,492.63	€ 336,512.38	€ 708,640.68	€ 363,797.16
2042	18	€ 602,344.58	€ 297,334.22	€ 655,492.63	€ 323,569.59	€ 708,640.68	€ 349,804.97
2043	19	€ 602,344.58	€ 285,898.29	€ 655,492.63	€ 311,124.61	€ 708,640.68	€ 336,350.93
2044	20	€ 602,344.58	€ 274,902.20	€ 655,492.63	€ 299,158.28	€ 708,640.68	€ 323,414.35
2045	21	€ 602,344.58	€ 264,329.04	€ 655,492.63	€ 287,652.19	€ 708,640.68	€ 310,975.34
2046	22	€ 602,344.58	€ 254,162.54	€ 655,492.63	€ 276,588.64	€ 708,640.68	€ 299,014.75
2047	23	€ 602,344.58	€ 244,387.06	€ 655,492.63	€ 265,950.62	€ 708,640.68	€ 287,514.18
2048	24	€ 602,344.58	€ 234,987.55	€ 655,492.63	€ 255,721.75	€ 708,640.68	€ 276,455.95
2049	25	€ 602,344.58	€ 225,949.57	€ 655,492.63	€ 245,886.30	€ 708,640.68	€ 265,823.02
2050	26	€ 602,344.58	€ 217,259.20	€ 655,492.63	€ 236,429.13	€ 708,640.68	€ 255,599.06
2051	27	€ 602,344.58	€ 208,903.08	€ 655,492.63	€ 227,335.70	€ 708,640.68	€ 245,768.33
2052	28	€ 602,344.58	€ 200,868.35	€ 655,492.63	€ 218,592.02	€ 708,640.68	€ 236,315.70
2053	29	€ 602,344.58	€ 193,142.64	€ 655,492.63	€ 210,184.64	€ 708,640.68	€ 227,226.64
2054	30	€ 602,344.58	€ 185,714.08	€ 655,492.63	€ 202,100.61	€ 708,640.68	€ 218,487.15
TOTAL		€ 17,348,988.29	€ 9,752,670.33	€ 18,879,781.38	€ 10,613,200.07	€ 20,410,574.46	€ 11,473,729.80

### 6.2.2 Cycling

The amount of cycling, relative risk reduction and benefit of reduced mortality for each new regular cyclist who avails of the scheme is calculated in Table 6-6 and Table 6-7. The distance cycled by a new cyclist is calculated as an average distance rather than of the scheme length as it is assumed that all new trips along the route are transit routes and have an origin and destination outside of the scheme extents. The values used are in accordance with those set out in Section 3.4 of Project Appraisal Guidelines for National Roads Unit 13.0 - Pedestrian and Cyclist Facilities.

**Table 6-6 Calculating the Amount of Cycling per Cyclist**

Calculate the amount of cycling per cyclist	
Mean distance travelled by new cyclist	5km
Estimated cycling speed	20km/ph
Estimated mean time spent walking per weekday (= (60)*(5/20))	15mins

**Table 6-7 Calculating the Relative Risk Reduction of Cycling**

Calculate relative risk reduction	
Relative risk for cycling 41.8 mins/day (CAF 2016)	0.79
Relative risk reduction (= 1 - 0.79)	0.21
Mean risk reduction (= (0.21)*(15/41.8))	0.075

The mean risk reduction value of 0.075 is used to determine the benefit of reduced mortality. Appendix B shows a full breakdown of the calculations for the pessimistic, median and optimistic case scenarios for each of the assessment years.

Table 6-8 shows the calculated value of the benefit of reduced mortality from the benefit of increased cycling as a result of the scheme in Real Growth Value (in line with forecast GDP/Capita) and Discounted Growth Value (discounted to 2011 present values).

**Table 6-8 Economic Benefit of Reduced Mortality due to Cycling**

Economic Benefit of reduced mortality due to Cycling							
Economic Case Scenario		Pessimistic		Median		Optimistic	
Year	Assessment Year	Real Growth Value (in line with forecast GDP/Capita)	Discounted Growth Value (discounted to 2011 present values)	Real Growth Value (in line with forecast GDP/Capita)	Discounted Growth Value (discounted to 2011 present values)	Real Growth Value (in line with forecast GDP/Capita)	Discounted Growth Value (discounted to 2011 present values)
2024	0						
2025	1	€ 37,034.53	€ 35,610.12	€ 40,302.28	€ 38,752.19	€ 43,570.03	€ 41,894.26
2026	2	€ 39,503.50	€ 36,523.20	€ 42,989.10	€ 39,745.84	€ 46,474.70	€ 42,968.47
2027	3	€ 44,354.46	€ 39,430.96	€ 48,268.09	€ 42,910.16	€ 52,181.72	€ 46,389.36
2028	4	€ 51,746.87	€ 44,233.45	€ 56,312.78	€ 48,136.40	€ 60,878.68	€ 52,039.35
2029	5	€ 61,603.42	€ 50,633.52	€ 67,039.02	€ 55,101.19	€ 72,474.61	€ 59,568.85
2030	6	€ 61,603.42	€ 48,686.08	€ 67,039.02	€ 52,981.91	€ 72,474.61	€ 57,277.74
2031	7	€ 61,603.42	€ 46,813.54	€ 67,039.02	€ 50,944.14	€ 72,474.61	€ 55,074.75
2032	8	€ 61,603.42	€ 45,013.02	€ 67,039.02	€ 48,984.75	€ 72,474.61	€ 52,956.49
2033	9	€ 61,603.42	€ 43,281.75	€ 67,039.02	€ 47,100.73	€ 72,474.61	€ 50,919.70
2034	10	€ 61,603.42	€ 41,617.06	€ 67,039.02	€ 45,289.16	€ 72,474.61	€ 48,961.25
2035	11	€ 61,603.42	€ 40,016.41	€ 67,039.02	€ 43,547.27	€ 72,474.61	€ 47,078.13
2036	12	€ 61,603.42	€ 38,477.32	€ 67,039.02	€ 41,872.37	€ 72,474.61	€ 45,267.43
2037	13	€ 61,603.42	€ 36,997.42	€ 67,039.02	€ 40,261.90	€ 72,474.61	€ 43,526.38
2038	14	€ 61,603.42	€ 35,574.44	€ 67,039.02	€ 38,713.36	€ 72,474.61	€ 41,852.28
2039	15	€ 61,603.42	€ 34,206.19	€ 67,039.02	€ 37,224.39	€ 72,474.61	€ 40,242.58
2040	16	€ 61,603.42	€ 32,890.57	€ 67,039.02	€ 35,792.68	€ 72,474.61	€ 38,694.79
2041	17	€ 61,603.42	€ 31,625.55	€ 67,039.02	€ 34,416.04	€ 72,474.61	€ 37,206.53
2042	18	€ 61,603.42	€ 30,409.18	€ 67,039.02	€ 33,092.34	€ 72,474.61	€ 35,775.51
2043	19	€ 61,603.42	€ 29,239.60	€ 67,039.02	€ 31,819.56	€ 72,474.61	€ 34,399.53
2044	20	€ 61,603.42	€ 28,115.00	€ 67,039.02	€ 30,595.73	€ 72,474.61	€ 33,076.47
2045	21	€ 61,603.42	€ 27,033.65	€ 67,039.02	€ 29,418.97	€ 72,474.61	€ 31,804.30
2046	22	€ 61,603.42	€ 25,993.90	€ 67,039.02	€ 28,287.48	€ 72,474.61	€ 30,581.05
2047	23	€ 61,603.42	€ 24,994.13	€ 67,039.02	€ 27,199.50	€ 72,474.61	€ 29,404.86
2048	24	€ 61,603.42	€ 24,032.82	€ 67,039.02	€ 26,153.36	€ 72,474.61	€ 28,273.90
2049	25	€ 61,603.42	€ 23,108.48	€ 67,039.02	€ 25,147.46	€ 72,474.61	€ 27,186.45
2050	26	€ 61,603.42	€ 22,219.69	€ 67,039.02	€ 24,180.25	€ 72,474.61	€ 26,140.81
2051	27	€ 61,603.42	€ 21,365.09	€ 67,039.02	€ 23,250.24	€ 72,474.61	€ 25,135.40
2052	28	€ 61,603.42	€ 20,543.35	€ 67,039.02	€ 22,356.00	€ 72,474.61	€ 24,168.65
2053	29	€ 61,603.42	€ 19,753.22	€ 67,039.02	€ 21,496.16	€ 72,474.61	€ 23,239.09
2054	30	€ 61,603.42	€ 18,993.49	€ 67,039.02	€ 20,669.38	€ 72,474.61	€ 22,345.28
TOTAL		€ 1,774,328.35	€ 997,432.19	€ 1,930,886.73	€ 1,085,440.92	€ 2,087,445.12	€ 1,173,449.64

### 6.3 Valuing Absenteeism Impacts

An increase in physical activity within the general population is complemented by an increase in productivity in the economy facilitated by a reduction in short-term sick leave.

The economic impact of decreased absenteeism is converted to a monetary value through the value of time associated with the average sick leave per person per year, average hours worked per day and the average benefit per minute of active travel.

The conversion of the benefit of reduced mortality to a monetary value is calculated for each assessment year. As per the CAF, to ensure consistency in appraisal of transport projects the values are presented in 2011 prices then calculated to include real growth in the value of work time per hour in line with forecast GNP per person employed, then summed and discounted to give a total benefit in 2011 present values.

As per the PAG, the values used to calculate the benefit of reduced absenteeism for each new regular pedestrian and cyclist who avails the scheme are as follows:

- The median absenteeism rate for short terms sick leave is 4.6 days and 5.8 days for the private and public sector, respectively;
- Median hours worked per day is 7.5;
- The number of employees in public sector employment is about 21% of total employment in Ireland, based on CSO employment tables;
- Calculating average sick leave taken in Ireland by weighting the relative proportions of private and public sector employment gives an overall estimate of 4.9 days per year;
- A cycling or walking intervention of 30 minutes per day reduces absenteeism in a reduction in short-term sick leave by between 6% and 32% per annum (WHO 2003). The lower bound of 6% is to be applied in appraisals to estimate the reduction in absenteeism per employee per year. Thus, a conservative estimate of the expected reduction in absenteeism as a result of an intervention delivers activity levels of 30 minutes per day is about 0.3 days per employee per year ( $= 4.9 * 0.06$ ).

These values used are in accordance with those set out in Section 3.4 of Project Appraisal Guidelines for National Roads Unit 13.0 - Pedestrian and Cyclist Facilities.

Appendix C shows a full breakdown of the calculations for the pessimistic, median and optimistic case scenarios for each of the assessment years.

Table 6-9 shows the calculated value of the benefit of reduced absenteeism from the benefit of increased walking and cycling as a result of the scheme in Real Growth Value (in line with value of work time per hour in line with forecast GNP per person employed) and Discounted Growth Value (discounted to 2011 present values).

**Table 6-9 Economic Benefit of Reduced Absenteeism**

Economic Benefit of Reduced Absenteeism							
Economic Case Scenario		Pessimistic		Median		Optimistic	
Year	Assessment Year	Real Growth Value (in line with value of work time per hour in line with forecast GNP per person employed)	Discounted Growth Value (discounted to 2011 present values)	Real Growth Value (in line with value of work time per hour in line with forecast GNP per person employed)	Discounted Growth Value (discounted to 2011 present values)	Real Growth Value (in line with value of work time per hour in line with forecast GNP per person employed)	Discounted Growth Value (discounted to 2011 present values)
2024	0						
2025	1	€ 78,910.26	€ 75,875.25	€ 85,872.93	€ 82,570.12	€ 92,835.60	€ 89,265.00
2026	2	€ 84,170.94	€ 77,820.77	€ 91,597.79	€ 84,687.31	€ 99,024.64	€ 91,553.84
2027	3	€ 94,507.00	€ 84,016.38	€ 102,845.86	€ 91,429.59	€ 111,184.71	€ 98,842.80
2028	4	€ 110,258.17	€ 94,249.15	€ 119,986.83	€ 102,565.25	€ 129,715.49	€ 110,881.35
2029	5	€ 131,259.73	€ 107,885.93	€ 142,841.47	€ 117,405.27	€ 154,423.21	€ 126,924.62
2030	6	€ 131,259.73	€ 103,736.47	€ 142,841.47	€ 112,889.69	€ 154,423.21	€ 122,042.90
2031	7	€ 131,259.73	€ 99,746.60	€ 142,841.47	€ 108,547.77	€ 154,423.21	€ 117,348.95
2032	8	€ 131,259.73	€ 95,910.20	€ 142,841.47	€ 104,372.86	€ 154,423.21	€ 112,835.52
2033	9	€ 131,259.73	€ 92,221.34	€ 142,841.47	€ 100,358.52	€ 154,423.21	€ 108,495.70
2034	10	€ 131,259.73	€ 88,674.37	€ 142,841.47	€ 96,498.58	€ 154,423.21	€ 104,322.78
2035	11	€ 131,259.73	€ 85,263.81	€ 142,841.47	€ 92,787.09	€ 154,423.21	€ 100,310.37
2036	12	€ 131,259.73	€ 81,984.44	€ 142,841.47	€ 89,218.36	€ 154,423.21	€ 96,452.28
2037	13	€ 131,259.73	€ 78,831.19	€ 142,841.47	€ 85,786.88	€ 154,423.21	€ 92,742.58
2038	14	€ 131,259.73	€ 75,799.22	€ 142,841.47	€ 82,487.39	€ 154,423.21	€ 89,175.55
2039	15	€ 131,259.73	€ 72,883.87	€ 142,841.47	€ 79,314.80	€ 154,423.21	€ 85,745.72
2040	16	€ 131,259.73	€ 70,080.64	€ 142,841.47	€ 76,264.23	€ 154,423.21	€ 82,447.81
2041	17	€ 131,259.73	€ 67,385.23	€ 142,841.47	€ 73,330.99	€ 154,423.21	€ 79,276.74
2042	18	€ 131,259.73	€ 64,793.49	€ 142,841.47	€ 70,510.56	€ 154,423.21	€ 76,227.64
2043	19	€ 131,259.73	€ 62,301.43	€ 142,841.47	€ 67,798.62	€ 154,423.21	€ 73,295.80
2044	20	€ 131,259.73	€ 59,905.23	€ 142,841.47	€ 65,190.98	€ 154,423.21	€ 70,476.74
2045	21	€ 131,259.73	€ 57,601.18	€ 142,841.47	€ 62,683.63	€ 154,423.21	€ 67,766.09
2046	22	€ 131,259.73	€ 55,385.75	€ 142,841.47	€ 60,272.73	€ 154,423.21	€ 65,159.70
2047	23	€ 131,259.73	€ 53,255.53	€ 142,841.47	€ 57,954.54	€ 154,423.21	€ 62,653.56
2048	24	€ 131,259.73	€ 51,207.24	€ 142,841.47	€ 55,725.52	€ 154,423.21	€ 60,243.81
2049	25	€ 131,259.73	€ 49,237.73	€ 142,841.47	€ 53,582.23	€ 154,423.21	€ 57,926.74
2050	26	€ 131,259.73	€ 47,343.97	€ 142,841.47	€ 51,521.38	€ 154,423.21	€ 55,698.79
2051	27	€ 131,259.73	€ 45,523.05	€ 142,841.47	€ 49,539.79	€ 154,423.21	€ 53,556.53
2052	28	€ 131,259.73	€ 43,772.16	€ 142,841.47	€ 47,634.41	€ 154,423.21	€ 51,496.66
2053	29	€ 131,259.73	€ 42,088.62	€ 142,841.47	€ 45,802.32	€ 154,423.21	€ 49,516.02
2054	30	€ 131,259.73	€ 40,469.82	€ 142,841.47	€ 44,040.69	€ 154,423.21	€ 47,611.56
TOTAL		€ 3,780,599.22	€ 2,125,250.03	€ 4,114,181.51	€ 2,312,772.09	€ 4,447,763.79	€ 2,500,294.15

#### **6.4 *Economic Value of Active Travel***

The overall economic value active travel is defined within the CAF as the sum of the economic benefits from the reduction in relative risk of walking, the reduction in relative risk of cycling and the decrease in absenteeism. This is shown in Table 6-10.

**Table 6-10 Economic Benefit of Active Travel**

Economic Benefit of Active Travel							
Economic Case Scenario		Pessimistic		Median		Optimistic	
Year	Assessment Year	Real Growth Value (in line with with forecast GDP/Capita and value of work time per hour in line with forecast GNP per person employed)	Discounted Growth Value (discounted to 2011 present values)	Real Growth Value (in line with with forecast GDP/Capita and value of work time per hour in line with forecast GNP per person employed)	Discounted Growth Value (discounted to 2011 present values)	Real Growth Value (in line with with forecast GDP/Capita and value of work time per hour in line with forecast GNP per person employed)	Discounted Growth Value (discounted to 2011 present values)
2022	0						
2023	1	€ 478,060.17	€ 459,673.24	€ 520,241.95	€ 500,232.65	€ 562,423.73	€ 540,792.05
2024	2	€ 509,930.85	€ 471,459.74	€ 554,924.75	€ 513,059.12	€ 599,918.65	€ 554,658.51
2025	3	€ 572,549.56	€ 508,994.47	€ 623,068.64	€ 553,905.75	€ 673,587.72	€ 598,817.03
2026	4	€ 667,974.49	€ 570,987.39	€ 726,913.41	€ 621,368.63	€ 785,852.34	€ 671,749.87
2027	5	€ 795,207.72	€ 653,602.78	€ 865,373.11	€ 711,273.62	€ 935,538.50	€ 768,944.45
2028	6	€ 795,207.72	€ 628,464.21	€ 865,373.11	€ 683,916.94	€ 935,538.50	€ 739,369.66
2029	7	€ 795,207.72	€ 604,292.51	€ 865,373.11	€ 657,612.44	€ 935,538.50	€ 710,932.37
2030	8	€ 795,207.72	€ 581,050.49	€ 865,373.11	€ 632,319.66	€ 935,538.50	€ 683,588.82
2031	9	€ 795,207.72	€ 558,702.40	€ 865,373.11	€ 607,999.67	€ 935,538.50	€ 657,296.94
2032	10	€ 795,207.72	€ 537,213.84	€ 865,373.11	€ 584,615.07	€ 935,538.50	€ 632,016.29
2033	11	€ 795,207.72	€ 516,551.77	€ 865,373.11	€ 562,129.87	€ 935,538.50	€ 607,707.97
2034	12	€ 795,207.72	€ 496,684.40	€ 865,373.11	€ 540,509.49	€ 935,538.50	€ 584,334.59
2035	13	€ 795,207.72	€ 477,581.15	€ 865,373.11	€ 519,720.66	€ 935,538.50	€ 561,860.18
2036	14	€ 795,207.72	€ 459,212.65	€ 865,373.11	€ 499,731.41	€ 935,538.50	€ 540,250.17
2037	15	€ 795,207.72	€ 441,550.62	€ 865,373.11	€ 480,510.97	€ 935,538.50	€ 519,471.32
2038	16	€ 795,207.72	€ 424,567.90	€ 865,373.11	€ 462,029.78	€ 935,538.50	€ 499,491.65
2039	17	€ 795,207.72	€ 408,238.37	€ 865,373.11	€ 444,259.40	€ 935,538.50	€ 480,280.44
2040	18	€ 795,207.72	€ 392,536.89	€ 865,373.11	€ 427,172.50	€ 935,538.50	€ 461,808.11
2041	19	€ 795,207.72	€ 377,439.32	€ 865,373.11	€ 410,742.79	€ 935,538.50	€ 444,046.26
2042	20	€ 795,207.72	€ 362,922.42	€ 865,373.11	€ 394,944.99	€ 935,538.50	€ 426,967.56
2043	21	€ 795,207.72	€ 348,963.87	€ 865,373.11	€ 379,754.80	€ 935,538.50	€ 410,545.73
2044	22	€ 795,207.72	€ 335,542.18	€ 865,373.11	€ 365,148.85	€ 935,538.50	€ 394,755.51
2045	23	€ 795,207.72	€ 322,636.71	€ 865,373.11	€ 351,104.66	€ 935,538.50	€ 379,572.60
2046	24	€ 795,207.72	€ 310,227.61	€ 865,373.11	€ 337,600.63	€ 935,538.50	€ 364,973.66
2047	25	€ 795,207.72	€ 298,295.78	€ 865,373.11	€ 324,615.99	€ 935,538.50	€ 350,936.21
2048	26	€ 795,207.72	€ 286,822.86	€ 865,373.11	€ 312,130.76	€ 935,538.50	€ 337,438.66
2049	27	€ 795,207.72	€ 275,791.21	€ 865,373.11	€ 300,125.73	€ 935,538.50	€ 324,460.25
2050	28	€ 795,207.72	€ 265,183.86	€ 865,373.11	€ 288,582.44	€ 935,538.50	€ 311,981.01
2051	29	€ 795,207.72	€ 254,984.48	€ 865,373.11	€ 277,483.11	€ 935,538.50	€ 299,981.74
2052	30	€ 795,207.72	€ 245,177.39	€ 865,373.11	€ 266,810.68	€ 935,538.50	€ 288,443.98
TOTAL		€ 22,903,915.87	€ 12,875,352.55	€ 24,924,849.62	€ 14,011,413.07	€ 26,945,783.37	€ 15,147,473.59

## 6.5 Multi Criteria Analysis

A qualitative appraisal of the scheme was undertaken in accordance with the CAF.

The proposed scheme is appraised under the criteria outlined in the PAG for Appraisal of Active Travel Modes. Each criterion will be ranked on a seven-point scale, ranging from having major negative impacts to having major positive impacts on the surroundings. The qualitative scoring scale is shown in Table 6-11.

**Table 6-11 Qualitative Scoring Scale**

<b>0</b>	N/A
<b>1</b>	Major Negative
<b>2</b>	Moderate Negative
<b>3</b>	Minor Negative
<b>4</b>	Neutral
<b>5</b>	Minor Positive
<b>6</b>	Moderate Positive
<b>7</b>	Major Positive

The qualitative assessment, in line with the CAF criteria is shown in Table 6-12.



**Table 6-12 Qualitative Assessment**

CAF Criteria	Sub-Criteria	CAF Description	Qualitative Comment	Qualitative Score
<b>Economy</b>	Transport Efficiency	User benefits associated with more efficient transport and lower journey times	The segregated cycle facilities provide maximum cycle journey time reliability efficiency and the pedestrian crossings enhance walking times to/from the trip attractors. The carriageway width is maintained so there is no adverse impact on vehicular traffic envisaged	
	Household Impacts	Impacts on household costs associated with owning and operating vehicles	The provision of state-of-the-art active travel facilities will fuel costs arising from modal shift but will not impact on vehicle ownership costs (tax, insurance, vehicle cost etc)	
	Tourism	Potential for increased tourism and spending from domestic and overseas visitors	The scheme is designed for active travel trips and therefore will only have a small, if any, tourism benefit.	
	Wider Economic Impacts	Other wider economic impacts that may be relevant, such as reduced congestion in urban areas, access to employment centres, and improved town centre vibrancy	The scheme connects to Gateway Retail Park, employment hubs, sports clubs and Gaelscoil Mhic Amhlaigh to the Western Distributor Road for active travel modes and therefore has a large employment, educational and retail catchment which will be enhanced for active travel modes. The predicted mode shift will reduce congestion in this catchment.	
	Funding Impacts	Costs associated with the proposal	Funding is available from the NTA URDF. There are associated land take costs.	

<b>Safety</b>	Collision Reduction	Reduced risk of collisions with traffic associated with safe and segregated walking and cycling infrastructure	Fully segregated pedestrian and cycle facilities are proposed along with traffic calming measures which will provide maximum opportunity to reduce risk of collisions.	
	Journey Quality	Other components of journey quality, such as width, gradient, surface type or setting, that influence users' journey quality and likelihood to use infrastructure.	The cycle facilities will be 2m on width on a flat gradient with adjacent traffic travelling at low speeds through a residential area.	
	Security	Sense of personal security and safety while using active travel	Adequate lighting is proposed and the area is a lively residential, shopping and school area providing passive surveillance with strong links to major roads.	
<b>Integration</b>	Policy	Integration with relevant local, regional and national policy	The scheme is in accordance with the GTS and GCC Development Plan.	
	Land Use	Improved connectivity between population, employment and retail centres	The scheme connects to Gateway Retail Park, employment hubs and Gaelscoil Mhic Amhlaigh to the Western Distributor Road for active travel modes and enhances connectivity for the residential area to the west.	
	Schools & Education	Improved connectivity to schools and third-level facilities	Gaelscoil Mhic Alhmaigh is within the catchment of the scheme.	
	Transport	Improved connectivity to major transport interchanges, such as rail, bus and ferry stations	There is no major transport hub within the catchment of the scheme but the route is a bus route.	
	Tourism	Improved connectivity to 'things to see and do', such as tourism sites, attractions or activities.	The scheme is designed for active travel trips and connects residential areas with shopping, employment and education centres.	

	Cycling	Improved connectivity to other local, regional and national cycling facilities	The scheme connects to the cycle facilities on Western Distributor Road to the south but there are no cycle facilities to the north along Rahoon Road. To the east and west, the scheme connects to several minor shared streets that are traffic calmed which lead to residential estates, Gateway Retail Park and Galescoil Mhic Ahlmhiagh.	
Physical Activity	Health	Positive health outcomes due to increased levels of physical activity, including reduced risk of premature mortality, as well as lower rates and reduced costs of serious illnesses.	The facilities proposed provide maximum opportunity for modal shift to active travel modes with the catchment areas.	
	Recreation	Improved wellbeing due to access to high quality facilities for outdoor recreation.	The scheme does not incorporate any major greenspaces but provides a connection to Galway Bohemians FC.	
Environment	Carbon	Impact on carbon emissions from transport	There will be a reduction in carbon emissions from transport from mode shift but these will be for local trips only.	
	Air Quality	Impact on non-greenhouse gas emissions from transport that have a negative impact on human health, such as nitrous oxides and particulate matter	The air quality in the area will improve with the mode shift for local trips.	
	Noise	Impact on local noise levels from transport	The noise vibrations in the area will improve with the mode shift for local trips.	
	Landscape & Visual Quality	Impact on local landscapes and viewpoints	The scheme involves land take and removal of green space to the north which will be a disruption from the current streetscape.	
	Biodiversity	Impact on biodiversity and habitats, particularly protected habitats and species.	An AA and EIA Screening determined that there would be not environmental impact.	

	Cultural Heritage	Impact on areas or structures of cultural importance, including archaeological sites, historic buildings and structures, or culturally significant landscapes	An Architectural Impact Assessment determined that the scheme (in particular ay the stone wall at Rahoon Road) will have no cultural impact.	
	Land Use	Impact on land uses, such as through land-take, excavation and infill, or severance.	The removal of greenspace for hardstanding at Rahoon Road will impact on land use. The land take is not considered to have an impact.	
	Water Resources	Impact on surface waters, ground waters and coastal resources	There is no impact on watercourses envisaged.	
<b>Accessibility &amp; Social Inclusion</b>	Disadvantaged Geographic Areas	Accessibility for users in disadvantaged areas, usually as identified in the Pobal Deprivation Index	The proposed infrastructure will enhance connectivity for non-motorised modes to the area which is an employment hub.	
	Vulnerable Groups	Accessibility of infrastructure for users of all ages and abilities	The proposed infrastructure will be universally accessible and is envisaged to attract interested users who are not confident with using the existing provision.	
	Active Travel & Gender	Impact in addressing the transport needs of women and girls and reducing the gender disparity in walking and cycling	The scheme provides a quality active travel corridor to school, shopping and employment areas and will therefore accommodate trip-chaining which is noted as being a barrier to women cycling for multi-purpose trips. The infrastructure will also accommodate cargo bikes and family bikes. The area also has an abundance of passive security that will contribute to a safe and communal environment.	

Project Number: 19\_151D

Project: Bóthar Stiofáin Cycle Network Scheme

Title: Preliminary Business Case



	Social Inclusion	Improving the potential for interaction and participation in community life and reducing the risk of isolation	The scheme will increase pedestrian and cycling trips in the area creating a vibrant atmosphere that is conducive to community life. The infrastructure will be convenient and comfortable for all users and enhance the area. The reduction in travel time will mitigate against isolation due to being 'time poor' from long commuting times.	
--	------------------	--	---	--

## 7 Cost Benefit Analysis

A CBA of each of the three economic case scenarios (pessimistic, median and optimistic) is needed to compare the costs and benefits associated with the Do-Something. For this analysis, monetary values are assigned to both costs and benefits.

The costs across each of the economic case scenarios are the same is defined as the sum of the construction costs, preparation and administration costs, traffic management and related costs, adjustments, maintenance costs and shadow price of public funding. This amounts to a capital spend of € 6,096,160.81 (Figure 7-1).

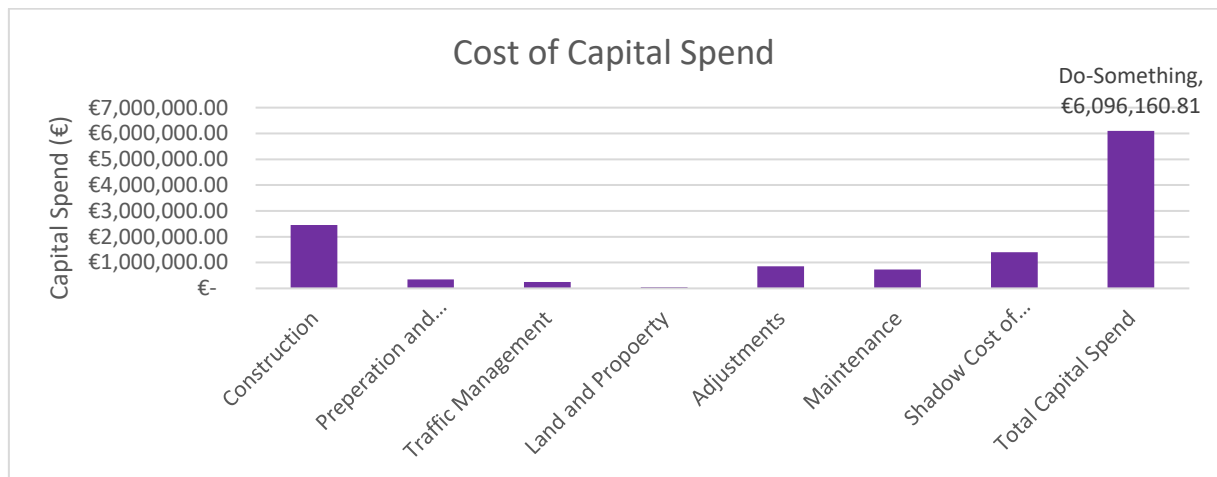


Figure 7-1 Cost of Capital and Operational Spend

The benefits across each of the economic case scenarios, as detailed in Section 6, are summarised in Table 7-1.

Table 7-1 Summary of Economic Benefits of Active Travel

Economic Case Scenario	Pessimistic		Median		Optimistic	
	Real Growth Value	Discounted Growth Value	Real Growth Value	Discounted Growth Value	Real Growth Value	Discounted Growth Value
Economic Benefit of Active Travel	€ 22,903,916	€ 12,875,353	€ 24,924,850	€ 14,011,413	€ 26,945,783	€ 15,147,473

The Test Discount Rate for Economic Appraisal applied is 4.0% as per E-02 of the Public Spending Code17 which sets out the current discount rate that should be used in relation to economic appraisals. All benefits and costs are expressed in discounted present values.

The CBA for the pessimistic, median and optimistic economic case scenarios are shown in Table 7-2, Table 7-3 and Table 7-4 respectively.

**Table 7-2 Cost Benefit Analysis - Pessimistic Scenario**

COST BENEFIT ANALYSIS - PESSIMISTIC CASE SCENARIO								
Year	Assessment Year	Total Benefit (Do Nothing) (Real Growth)	Total Benefit (Do Something) (Real Growth)	Total Capital Cost (Real Growth)	Total Benefit (Do Nothing) (NPV)	Total Benefit (Do Something) (NPV)	Total Capital Cost (NPV)	Return (NPV)
2024	0			-€6,046,160.81			€6,046,160.81	-€6,046,160.81
2025	1	€0.00	€459,673.24		€0.00	€459,673.24		€459,673.24
2026	2	€0.00	€471,459.74		€0.00	€471,459.74		€471,459.74
2027	3	€0.00	€508,994.47		€0.00	€508,994.47		€508,994.47
2028	4	€0.00	€570,987.39		€0.00	€570,987.39		€570,987.39
2029	5	€0.00	€653,602.78		€0.00	€653,602.78		€653,602.78
2030	6	€0.00	€628,464.21		€0.00	€628,464.21		€628,464.21
2031	7	€0.00	€604,292.51		€0.00	€604,292.51		€604,292.51
2032	8	€0.00	€581,050.49		€0.00	€581,050.49		€581,050.49
2033	9	€0.00	€558,702.40		€0.00	€558,702.40		€558,702.40
2034	10	€0.00	€537,213.84		€0.00	€537,213.84		€537,213.84
2035	11	€0.00	€516,551.77		€0.00	€516,551.77		€516,551.77
2036	12	€0.00	€496,684.40		€0.00	€496,684.40		€496,684.40
2037	13	€0.00	€477,581.15		€0.00	€477,581.15		€477,581.15
2038	14	€0.00	€459,212.65		€0.00	€459,212.65		€459,212.65
2039	15	€0.00	€441,550.62		€0.00	€441,550.62		€441,550.62
2040	16	€0.00	€424,567.90		€0.00	€424,567.90		€424,567.90
2041	17	€0.00	€408,238.37		€0.00	€408,238.37		€408,238.37
2042	18	€0.00	€392,536.89		€0.00	€392,536.89		€392,536.89
2043	19	€0.00	€377,439.32		€0.00	€377,439.32		€377,439.32
2044	20	€0.00	€362,922.42		€0.00	€362,922.42		€362,922.42
2045	21	€0.00	€348,963.87		€0.00	€348,963.87		€348,963.87
2046	22	€0.00	€335,542.18		€0.00	€335,542.18		€335,542.18
2047	23	€0.00	€322,636.71		€0.00	€322,636.71		€322,636.71
2048	24	€0.00	€310,227.61		€0.00	€310,227.61		€310,227.61
2049	25	€0.00	€298,295.78		€0.00	€298,295.78		€298,295.78
2050	26	€0.00	€286,822.86		€0.00	€286,822.86		€286,822.86
2051	27	€0.00	€275,791.21		€0.00	€275,791.21		€275,791.21
2052	28	€0.00	€265,183.86		€0.00	€265,183.86		€265,183.86
2053	29	€0.00	€254,984.48		€0.00	€254,984.48		€254,984.48
2054	30	€0.00	€245,177.39		€0.00	€245,177.39		€245,177.39
TOTAL		€0.00	€12,875,352.55	-€6,046,160.81	€0.00	€12,875,352.55	€6,046,160.81	€6,829,191.74

**Table 7-3 Cost Benefit Analysis - Median Scenario**

COST BENEFIT ANALYSIS - MEDIAN CASE SCENARIO								
Year	Assessment Year	Total Benefit (Do Nothing) (Real Growth)	Total Benefit (Do Something) (Real Growth)	Total Capital Cost (Real Growth)	Total Benefit (Do Nothing) (NPV)	Total Benefit (Do Something) (NPV)	Total Capital Cost (NPV)	Return (NPV)
2024	0			-€6,046,160.81			€6,046,160.81	-€6,046,160.81
2025	1	€0.00	€500,232.65		€0.00	€500,232.65		€500,232.65
2026	2	€0.00	€513,059.12		€0.00	€513,059.12		€513,059.12
2027	3	€0.00	€553,905.75		€0.00	€553,905.75		€553,905.75
2028	4	€0.00	€621,368.63		€0.00	€621,368.63		€621,368.63
2029	5	€0.00	€711,273.62		€0.00	€711,273.62		€711,273.62
2030	6	€0.00	€683,916.94		€0.00	€683,916.94		€683,916.94
2031	7	€0.00	€657,612.44		€0.00	€657,612.44		€657,612.44
2032	8	€0.00	€632,319.66		€0.00	€632,319.66		€632,319.66
2033	9	€0.00	€607,999.67		€0.00	€607,999.67		€607,999.67
2034	10	€0.00	€584,615.07		€0.00	€584,615.07		€584,615.07
2035	11	€0.00	€562,129.87		€0.00	€562,129.87		€562,129.87
2036	12	€0.00	€540,509.49		€0.00	€540,509.49		€540,509.49
2037	13	€0.00	€519,720.66		€0.00	€519,720.66		€519,720.66
2038	14	€0.00	€499,731.41		€0.00	€499,731.41		€499,731.41
2039	15	€0.00	€480,510.97		€0.00	€480,510.97		€480,510.97
2040	16	€0.00	€462,029.78		€0.00	€462,029.78		€462,029.78
2041	17	€0.00	€444,259.40		€0.00	€444,259.40		€444,259.40
2042	18	€0.00	€427,172.50		€0.00	€427,172.50		€427,172.50
2043	19	€0.00	€410,742.79		€0.00	€410,742.79		€410,742.79
2044	20	€0.00	€394,944.99		€0.00	€394,944.99		€394,944.99
2045	21	€0.00	€379,754.80		€0.00	€379,754.80		€379,754.80
2046	22	€0.00	€365,148.85		€0.00	€365,148.85		€365,148.85
2047	23	€0.00	€351,104.66		€0.00	€351,104.66		€351,104.66
2048	24	€0.00	€337,600.63		€0.00	€337,600.63		€337,600.63
2049	25	€0.00	€324,615.99		€0.00	€324,615.99		€324,615.99
2050	26	€0.00	€312,130.76		€0.00	€312,130.76		€312,130.76
2051	27	€0.00	€300,125.73		€0.00	€300,125.73		€300,125.73
2052	28	€0.00	€288,582.44		€0.00	€288,582.44		€288,582.44
2053	29	€0.00	€277,483.11		€0.00	€277,483.11		€277,483.11
2054	30	€0.00	€266,810.68		€0.00	€266,810.68		€266,810.68
TOTAL		€0.00	€14,011,413.07	-€6,046,160.81	€0.00	€14,011,413.07	€6,046,160.81	€7,965,252.26



Project Number: 19\_151D

Project: Bóthar Stiofáin Cycle Network Scheme

Title: Preliminary Business Case



**Table 7-4 Cost Benefit Analysis - Optimistic Scenario**

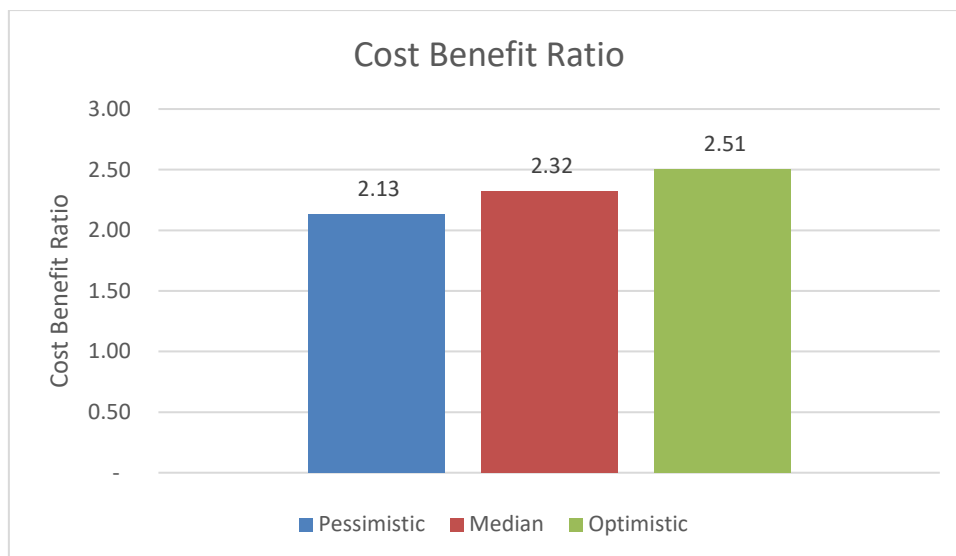
COST BENEFIT ANALYSIS - OPTIMISTIC CASE SCENARIO								
Year	Assessment Year	Total Benefit (Do Nothing) (Real Growth)	Total Benefit (Do Something) (Real Growth)	Total Capital Cost (Real Growth)	Total Benefit (Do Nothing) (NPV)	Total Benefit (Do Something) (NPV)	Total Capital Cost (NPV)	Return (NPV)
2024	0			-€6,046,160.81			€6,046,160.81	-€6,046,160.81
2025	1	€0.00	€540,792.05		€0.00	€540,792.05		€540,792.05
2026	2	€0.00	€554,658.51		€0.00	€554,658.51		€554,658.51
2027	3	€0.00	€598,817.03		€0.00	€598,817.03		€598,817.03
2028	4	€0.00	€671,749.87		€0.00	€671,749.87		€671,749.87
2029	5	€0.00	€768,944.45		€0.00	€768,944.45		€768,944.45
2030	6	€0.00	€739,369.66		€0.00	€739,369.66		€739,369.66
2031	7	€0.00	€710,932.37		€0.00	€710,932.37		€710,932.37
2032	8	€0.00	€683,588.82		€0.00	€683,588.82		€683,588.82
2033	9	€0.00	€657,296.94		€0.00	€657,296.94		€657,296.94
2034	10	€0.00	€632,016.29		€0.00	€632,016.29		€632,016.29
2035	11	€0.00	€607,707.97		€0.00	€607,707.97		€607,707.97
2036	12	€0.00	€584,334.59		€0.00	€584,334.59		€584,334.59
2037	13	€0.00	€561,860.18		€0.00	€561,860.18		€561,860.18
2038	14	€0.00	€540,250.17		€0.00	€540,250.17		€540,250.17
2039	15	€0.00	€519,471.32		€0.00	€519,471.32		€519,471.32
2040	16	€0.00	€499,491.65		€0.00	€499,491.65		€499,491.65
2041	17	€0.00	€480,280.44		€0.00	€480,280.44		€480,280.44
2042	18	€0.00	€461,808.11		€0.00	€461,808.11		€461,808.11
2043	19	€0.00	€444,046.26		€0.00	€444,046.26		€444,046.26
2044	20	€0.00	€426,967.56		€0.00	€426,967.56		€426,967.56
2045	21	€0.00	€410,545.73		€0.00	€410,545.73		€410,545.73
2046	22	€0.00	€394,755.51		€0.00	€394,755.51		€394,755.51
2047	23	€0.00	€379,572.60		€0.00	€379,572.60		€379,572.60
2048	24	€0.00	€364,973.66		€0.00	€364,973.66		€364,973.66
2049	25	€0.00	€350,936.21		€0.00	€350,936.21		€350,936.21
2050	26	€0.00	€337,438.66		€0.00	€337,438.66		€337,438.66
2051	27	€0.00	€324,460.25		€0.00	€324,460.25		€324,460.25
2052	28	€0.00	€311,981.01		€0.00	€311,981.01		€311,981.01
2053	29	€0.00	€299,981.74		€0.00	€299,981.74		€299,981.74
2054	30	€0.00	€288,443.98		€0.00	€288,443.98		€288,443.98
TOTAL		€0.00	€15,147,473.59	-€6,046,160.81	€0.00	€15,147,473.59	€6,046,160.81	€9,101,312.78

## 7.1 Cost Benefit Ratio

The CBR represents the relationship of the discounted sum of economic and financial benefits over the discounted sum of economic and financial costs.

A CBR ratio greater than 1 indicates that the benefits of the proposed scheme outweigh the costs within the design life. A CBR ratio of more than 1.5 indicates 'good value for money' as per the PSC.

Figure 7-2 shows a comparison of the CBR for the pessimistic, median and optimistic business case scenarios. For all three levels of take-up, the CBR is greater than 1.5.



**Figure 7-2 Cost Benefit Ratio**

7.2 Net Present Value

The NPV is the sum of the discounted benefits less the sum of the discounted costs.

Figure 7-3 shows a comparison of the NPV for the pessimistic, median and optimistic business case scenarios. For all three levels of take-up, the NPV is greater than the capital spend of € 6,096,160.81.

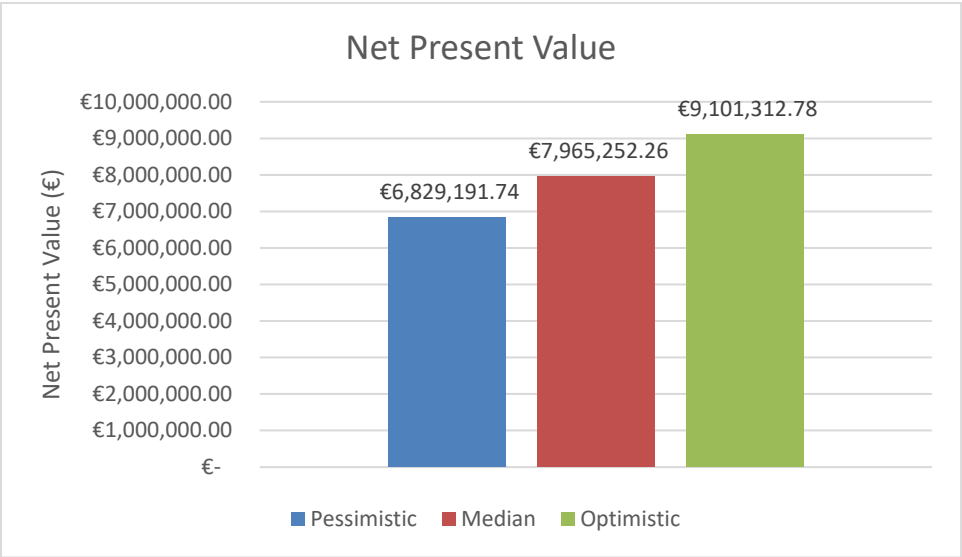


Figure 7-3 Net Present Value

### 7.3 Economic Rate of Return

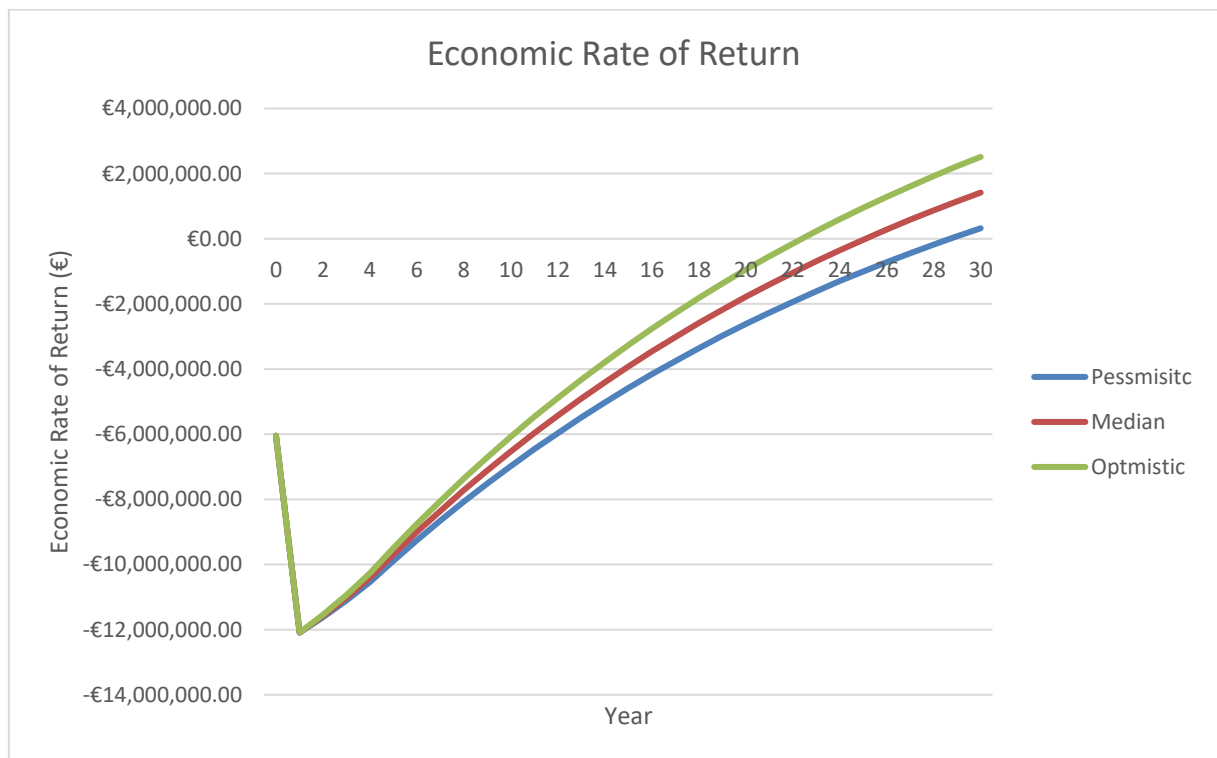
The ERR shows the year at which the benefits outweigh the costs and hence when the scheme becomes profitable.

Table 7-5 and Figure 7-4 show a comparison of the ERR for the pessimistic, median and optimistic business case scenarios.

For all three levels of take-up, the scheme breaks even and returns a profit within the economic design life (30 years).

**Table 7-5 Breakeven Year and Economic Return**

Economic Case Scenario	Pessimistic	Median	Optimistic
<b>Breakeven Year</b>	29	26	23
<b>Economic Return</b>	€323,357.69	€1,418,858.80	€2,514,359.92



**Figure 7-4 Economic Rate of Return**

## 8 Conclusions

The CBA analysis undertaken represents a conservative estimate of the potential of the economic benefit of the scheme.

The qualitative appraisal (MCA) shows that for the criteria assessed, the scheme is moderately positive overall. And will therefore be of substantial benefit to the locality.

As noted in Section 3.1.4, the Sustainable Mobility Policy Review highlights five economic benefits of active travel (environmental, health, safety, economic and social). As per the CAF, only the health benefits were monetised and evaluated. This was done in terms of valuing reductions in relative risk and valuing absenteeism impacts. Additional benefits that have not been monetised as part of the CBA process include the value of a reduction in greenhouse gas emissions resulting from a modal shift to sustainable modes, decrease in collision/accident rates through improved safety, increased employment due to increased accessibility from non-car owners through improvements in the active travel network and the value of time savings by commuters who are not spending time in traffic congestion. These criteria have the potential to be assessed through an MCA.

It was assumed that there is no residual value of the scheme. The infrastructure is likely to be in place for longer than the 30-year economic life requiring only maintenance works that have been included for. Therefore, the scheme will continue to provide an economic return after the economic lifetime of the infrastructure has passed.

As stated in Section 4.1.6, the maintenance impact has likely been overestimated as the proposed scheme is improvement works to existing infrastructure and therefore routine maintenance is already budgeted for by GCC.

No financial outflow was accounted for the required landtake, as per Section 4.1.4. The conservative estimation of maintenance costs and residual value will in practice off-set this outflow.

There is the possibility that there will be a tourism impact benefiting the exchequer through direct and indirect spend, increased employment and additional revenue streams from tourism within the local area. There will also be tourism costs associated with branding and marketing. As noted in Section 5.2, this impact is beyond the scope of an active travel scheme. Similarly, an increase in local active travel users will also increase local spend. These benefits have not been evaluated although it is acknowledged that there is potential for a secondary CBA to be carried out and included to encompass all aspects of the scheme. However, as the area is primarily residential in nature, the tourism benefit is likely to be minute.

Project-specific risk was accounted for in Section 4.1.5 as per the NTA CMG guidelines for the construction phase of the scheme. No operational risk is needed to be evaluated as the scheme is not expected to generate any revenue. In line with this, if there is no revenue forecast there is no associated financial risk with future revenue streams.

Notwithstanding this conservative approach, the scheme is predicted to have an overall positive economic impact. The CBA appraisal method, as per the CAF, was carried out for a low, medium and high level of predicted uptake of the proposed infrastructure associated with Bóthar Stiofáin Cycle Network Scheme. The three economic performance indicators (CBR, NPV and ERR) for each of the economic case scenarios has shown that the scheme is envisaged to yield a high economic return (Table 8-1).

**Table 8-1 Summary of CBA for the Economic Case Scenarios**

Economic Case Scenario	Pessimistic	Median	Optimistic
<b>CBR</b>	2.13	2.32	2.51
<b>NPV</b>	€ 6,829,191.74	€ 7,965,252.26	€ 9,101,312.78
<b>Breakeven Year</b>	29	26	23
<b>Economic Return</b>	€323,357.69	€1,418,858.80	€2,514,359.92

## 9 Recommendations

Following from the results of the CBA alone, it is recommended to proceed with the Bóthar Stiofáin Cycle Network Scheme as it is proved to be good value for money with a strong positive economic yield.

This recommendation is again strengthened by the additional benefits noted in Section 8 that were not monetised but will bring about positive economic changes.

It is also recommended that usage of the infrastructure is monitored, ie; through automated pedestrian and cycle counters, to quantify the level of uptake of the scheme when it is operational. This data should be reported on, ie; as part of an annual report.

## Appendix A

*Full breakdown of the calculations for the pessimistic, median and optimistic case scenarios for each of the assessment years for the economic benefit of reduced mortality due to walking.*

**Table A1**      *Economic Benefit of Reduced Mortality due to Walking - Pessimistic Scenario*

**Table A2**      *Economic Benefit of Reduced Mortality due to Walking – Median Scenario*

**Table A3**      *Economic Benefit of Reduced Mortality due to Walking - Optimistic Scenario*



Table A1: Economic Benefit of Reduced Mortality due to Walking - Pessimistic Scenario

		PESSIMISTIC ECONOMIC SCENARIO											
Assesment Year:		2025					2026				2027		
Year Began Walking		2021	2022	2023	2024	2025	2022	2023	2024	2025	2023	2024	2025
Years Benefit	A	5+	4	3	2	1	5+	4	3	2	5+	4	3
No. of Pedestrians	B	299.2	299.2	299.2	299.2	299.2	299.2	299.2	299.2	598.4	299.2	299.2	897.6
Average Mortality	C	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019
Expected Deaths	$D=(B*C)$	0.5685	0.5685	0.5685	0.5685	0.5685	0.5685	0.5685	0.5685	1.1370	0.5685	0.5685	1.7054
Reduction in RR	E	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000
%of Total Benefit accrued	F	1.0000	0.8000	0.6000	0.4000	0.2000	1.0000	0.8000	0.6000	0.4000	1.0000	0.8000	0.6000
Potential Lives Saved	$G=(D*E*F)$	0.0568	0.0455	0.0341	0.0227	0.0114	0.0568	0.0455	0.0341	0.0455	0.0568	0.0455	0.1023
Value of a Prevented Fatality (2011 Value)	H	€ 118,106.78	€ 94,485.42	€ 70,864.07	€ 47,242.71	€ 23,621.36	€ 118,106.78	€ 94,485.42	€ 70,864.07	€ 94,485.42	€ 118,106.78	€ 94,485.42	€ 212,592.20
Real Growth (in line with forecast GDP/Capita)	I	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2	2	2
Value of a Prevented Fatality (Forecast Value)	$J=(H*I)$	€ 120,705.13	€ 96,564.10	€ 72,423.08	€ 48,282.05	€ 24,141.03	€ 120,705.13	€ 96,564.10	€ 72,423.08	€ 96,564.10	€ 120,468.92	€ 96,375.13	€ 216,844.05
Total		€ 362,115.39					€ 386,256.41				€ 433,688.09		

**Table A1: Economic Benefit of Reduced Mortality due to Walking - Pessimistic Scenario -Continued**

[illegible]

**Table A1: Economic Benefit of Reduced Mortality due to Walking - Pessimistic Scenario -Continued**

[illegible]

Table A1: Economic Benefit of Reduced Mortality due to Walking - Pessimistic Scenario -Continued

		PESSIMISTIC ECONOMIC SCENARIO			
Assesment Year:		2051	2052	2053	2054
Year Began Walking					
Years Benefit	A	5+	5+	5+	5+
No. of Pedestrians	B	1496.0	1496.0	1496.0	1496.0
Average Mortality	C	0.0019	0.0019	0.0019	0.0019
Expected Deaths	$D=(B*C)$	2.8424	2.8424	2.8424	2.8424
Reduction in RR	E	0.1000	0.1000	0.1000	0.1000
%of Total Benefit accrued	F	1.0000	1.0000	1.0000	1.0000
Potential Lives Saved	$G=(D*E*F)$	0.2842	0.2842	0.2842	0.2842
Value of a Prevented Fatality (2011 Value)	H	€ 590,533.90	€ 590,533.90	€ 590,533.90	€ 590,533.90
Real Growth (in line with forecast GDP/Capita)	I	2	2	2	2
Value of a Prevented Fatality (Forecast Value)	$J=(H*I)$	€ 602,344.58	€ 602,344.58	€ 602,344.58	€ 602,344.58
Total		€ 248,024.24	€ 248,024.24	€ 248,024.24	€ 248,024.24

Table A2: Economic Benefit of Reduced Mortality due to Walking - Median Scenario

MEDIAN ECONOMIC SCENARIO													
Assesment Year:		2025					2026				2027		
Year Began Walking		2021	2022	2023	2024	2025	2022	2023	2024	2025	2023	2024	2025
Years Benefit	A	5+	4	3	2	1	5+	4	3	2	5+	4	3
No. of Pedestrians	B	325.6	325.6	325.6	325.6	325.6	325.6	325.6	325.6	651.2	325.6	325.6	976.8
Average Mortality	C	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019
Expected Deaths	D=(B*C)	0.6186	0.6186	0.6186	0.6186	0.6186	0.6186	0.6186	0.6186	1.2373	0.6186	0.6186	1.8559
Reduction in RR	E	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000
%of Total Benefit accrued	F	1.0000	0.8000	0.6000	0.4000	0.2000	1.0000	0.8000	0.6000	0.4000	1.0000	0.8000	0.6000
Potential Lives Saved	G=(D*E*F)	0.0619	0.0495	0.0371	0.0247	0.0124	0.0619	0.0495	0.0371	0.0495	0.0619	0.0495	0.1114
Value of a Prevented Fatality (2011 Value)	H	€ 128,527.97	€ 102,822.37	€ 77,116.78	€ 51,411.19	€ 25,705.59	€ 128,527.97	€ 102,822.37	€ 77,116.78	€ 102,822.37	€ 128,527.97	€ 102,822.37	€ 231,350.34
Real Growth (in line with forecast GDP/Capita)	I	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2	2	2
Value of a Prevented Fatality (Forecast Value)	J=(H*I)	€ 131,355.58	€ 105,084.46	€ 78,813.35	€ 52,542.23	€ 26,271.12	€ 131,355.58	€ 105,084.46	€ 78,813.35	€ 105,084.46	€ 131,098.53	€ 104,878.82	€ 235,977.35
Total		€ 394,066.74					€ 420,337.86				€ 471,954.69		





Table A2: Economic Benefit of Reduced Mortality due to Walking - Median Scenario -Continued

MEDIAN ECONOMIC SCENARIO					
Assesment Year:		2051	2052	2053	2054
Year Began Walking					
Years Benefit	A	5+	5+	5+	5+
No. of Pedestrians	B	1628.0	1628.0	1628.0	1628.0
Average Mortality	C	0.0019	0.0019	0.0019	0.0019
Expected Deaths	$D=(B*C)$	3.0932	3.0932	3.0932	3.0932
Reduction in RR	E	0.1000	0.1000	0.1000	0.1000
%of Total Benefit accrued	F	1.0000	1.0000	1.0000	1.0000
Potential Lives Saved	$G=(D*E*F)$	0.3093	0.3093	0.3093	0.3093
Value of a Prevented Fatality (2011 Value)	H	€ 642,639.83	€ 642,639.83	€ 642,639.83	€ 642,639.83
Real Growth (in line with forecast GDP/Capita)	I	2	2	2	2
Value of a Prevented Fatality (Forecast Value)	$J=(H*I)$	€ 655,492.63	€ 655,492.63	€ 655,492.63	€ 655,492.63
Total		€ 248,024.24	€ 248,024.24	€ 248,024.24	€ 248,024.24



Table A3: Economic Benefit of Reduced Mortality due to Walking - Optimistic Scenario

OPTIMISITIC ECONOMIC SCENARIO													
Assesment Year:		2025					2026				2027		
Year Began Walking		2021	2022	2023	2024	2025	2022	2023	2024	2025	2023	2024	2025
Years Benefit	A	5+	4	3	2	1	5+	4	3	2	5+	4	3
No. of Pedestrians	B	352.0	352.0	352.0	352.0	352.0	352.0	352.0	352.0	704.0	352.0	352.0	1056.0
Average Mortality	C	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019
Expected Deaths	D=(B*C)	0.6688	0.6688	0.6688	0.6688	0.6688	0.6688	0.6688	0.6688	1.3376	0.6688	0.6688	2.0064
Reduction in RR	E	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000
%of Total Benefit accrued	F	1.0000	0.8000	0.6000	0.4000	0.2000	1.0000	0.8000	0.6000	0.4000	1.0000	0.8000	0.6000
Potential Lives Saved	G=(D*E*F)	0.0669	0.0535	0.0401	0.0268	0.0134	0.0669	0.0535	0.0401	0.0535	0.0669	0.0535	0.1204
Value of a Prevented Fatality (2011 Value)	H	€ 138,949.15	€ 111,159.32	€ 83,369.49	€ 55,579.66	€ 27,789.83	€ 138,949.15	€ 111,159.32	€ 83,369.49	€ 111,159.32	€ 138,949.15	€ 111,159.32	€ 250,108.47
Real Growth (in line with forecast GDP/Capita)	I	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2	2	2
Value of a Prevented Fatality (Forecast Value)	J=(H*I)	€ 142,006.03	€ 113,604.83	€ 85,203.62	€ 56,802.41	€ 28,401.21	€ 142,006.03	€ 113,604.83	€ 85,203.62	€ 113,604.83	€ 141,728.14	€ 113,382.51	€ 255,110.64
Total		€ 426,018.10					€ 454,419.31				€ 510,221.29		

***Table A3: Economic Benefit of Reduced Mortality due to Walking - Optimistic Scenario -Continued***

[illegible]

***Table A3: Economic Benefit of Reduced Mortality due to Walking - Optimistic Scenario -Continued***

[illegible]

Table A3: Economic Benefit of Reduced Mortality due to Walking - Optimistic Scenario -Continued

OPTIMISITIC ECONOMIC SCENARIO					
Assesment Year:		2051	2052	2053	2054
Year Began Walking					
Years Benefit	A	5+	5+	5+	5+
No. of Pedestrians	B	1760.0	1760.0	1760.0	1760.0
Average Mortality	C	0.0019	0.0019	0.0019	0.0019
Expected Deaths	$D=(B*C)$	3.3440	3.3440	3.3440	3.3440
Reduction in RR	E	0.1000	0.1000	0.1000	0.1000
%of Total Benefit accrued	F	1.0000	1.0000	1.0000	1.0000
Potential Lives Saved	$G=(D*E*F)$	0.3344	0.3344	0.3344	0.3344
Value of a Prevented Fatality (2011 Value)	H	€ 694,745.76	€ 694,745.76	€ 694,745.76	€ 694,745.76
Real Growth (in line with forecast GDP/Capita)	I	2	2	2	2
Value of a Prevented Fatality (Forecast Value)	$J=(H*I)$	€ 708,640.68	€ 708,640.68	€ 708,640.68	€ 708,640.68
Total		€ 248,024.24	€ 248,024.24	€ 248,024.24	€ 248,024.24

## Appendix B

*Full breakdown of the calculations for the pessimistic, median and optimistic case scenarios for each of the assessment years for the economic benefit of reduced mortality due to cycling.*

**Table B1**      *Economic Benefit of Reduced Mortality due to Cycling - Pessimistic Scenario*

**Table B2**      *Economic Benefit of Reduced Mortality due to Cycling – Median Scenario*

**Table B3**      *Economic Benefit of Reduced Mortality due to Cycling - Optimistic Scenario*

Table B1: Economic Benefit of Reduced Mortality due to Cycling - Pessimistic Scenario

PESSIMISTIC ECONOMIC SCENARIO													
Assesment Year:		2025					2026				2027		
Year Began Cycling		2021	2022	2023	2024	2025	2022	2023	2024	2025	2023	2024	2025
Years Benefit	A	5+	4	3	2	1	5+	4	3	2	5+	4	3
No. of Pedestrians	B	40.8	40.8	40.8	40.8	40.8	40.8	40.8	40.8	81.6	40.8	40.8	122.4
Average Mortality	C	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019
Expected Deaths	D=(B*C)	0.0775	0.0775	0.0775	0.0775	0.0775	0.0775	0.0775	0.0775	0.1550	0.0775	0.0775	0.2326
Reduction in RR	E	0.0750	0.0750	0.0750	0.0750	0.0750	0.0750	0.0750	0.0750	0.0750	0.0750	0.0750	0.0750
%of Total Benefit accrued	F	1.0000	0.8000	0.6000	0.4000	0.2000	1.0000	0.8000	0.6000	0.4000	1.0000	0.8000	0.6000
Potential Lives Saved	G=(D*E*F)	0.0058	0.0047	0.0035	0.0023	0.0012	0.0058	0.0047	0.0035	0.0047	0.0058	0.0047	0.0105
Value of a Prevented Fatality (2011 Value)	H	#####	€ 9,663.28	€ 7,247.46	#####	#####	#####	€ 9,663.28	€ 7,247.46	€ 9,663.28	#####	€ 9,663.28	#####
Real Growth (in line with forecast GDP/Capita)	I	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2	2	2
Value of a Prevented Fatality (Forecast Value)	J=(H*I)	#####	€ 9,875.87	€ 7,406.91	#####	#####	#####	€ 9,875.87	€ 7,406.91	€ 9,875.87	#####	€ 9,856.55	#####
Total		€ 37,034.53					€ 39,503.50				€ 44,354.46		



***Table B1: Economic Benefit of Reduced Mortality due to Cycling - Pessimistic Scenario - Continued***

[illegible]



Table B1: Economic Benefit of Reduced Mortality due to Cycling - Pessimistic Scenario - Continued

PESSIMISTIC ECONOMIC SCENARIO					
Assesment Year:		2051	2052	2053	2054
Year Began Cycling					
Years Benefit	A	5+	5+	5+	5+
No. of Pedestrians	B	204.0	204.0	204.0	204.0
Average Mortality	C	0.0019	0.0019	0.0019	0.0019
Expected Deaths	$D=(B*C)$	0.3876	0.3876	0.3876	0.3876
Reduction in RR	E	0.0750	0.0750	0.0750	0.0750
%of Total Benefit accrued	F	1.0000	1.0000	1.0000	1.0000
Potential Lives Saved	$G=(D*E*F)$	0.0291	0.0291	0.0291	0.0291
Value of a Prevented Fatality (2011 Value)	H	€ 60,395.51	€ 60,395.51	€ 60,395.51	€ 60,395.51
Real Growth (in line with forecast GDP/Capita)	I	2	2	2	2
Value of a Prevented Fatality (Forecast Value)	$J=(H*I)$	€ 61,603.42	€ 61,603.42	€ 61,603.42	€ 61,603.42
Total		€ 248,024.24	€ 248,024.24	€ 248,024.24	€ 248,024.24

Table B2: Economic Benefit of Reduced Mortality due to Cycling - Median Scenario

MEDIAN ECONOMIC SCENARIO													
Assesment Year:		2025					2026				2027		
Year Began Cycling		2021	2022	2023	2024	2025	2022	2023	2024	2025	2023	2024	2025
Years Benefit	A	5+	4	3	2	1	5+	4	3	2	5+	4	3
No. of Pedestrians	B	44.4	44.4	44.4	44.4	44.4	44.4	44.4	44.4	88.8	44.4	44.4	133.2
Average Mortality	C	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019
Expected Deaths	D=(B*C)	0.0844	0.0844	0.0844	0.0844	0.0844	0.0844	0.0844	0.0844	0.1687	0.0844	0.0844	0.2531
Reduction in RR	E	0.0750	0.0750	0.0750	0.0750	0.0750	0.0750	0.0750	0.0750	0.0750	0.0750	0.0750	0.0750
%of Total Benefit accrued	F	1.0000	0.8000	0.6000	0.4000	0.2000	1.0000	0.8000	0.6000	0.4000	1.0000	0.8000	0.6000
Potential Lives Saved	G=(D*E*F)	0.0063	0.0051	0.0038	0.0025	0.0013	0.0063	0.0051	0.0038	0.0051	0.0063	0.0051	0.0114
Value of a Prevented Fatality (2011 Value)	H	#####	#####	€ 7,886.94	#####	#####	#####	#####	€ 7,886.94	#####	#####	#####	#####
Real Growth (in line with forecast GDP/Capita)	I	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2	2	2
Value of a Prevented Fatality (Forecast Value)	J=(H*I)	#####	#####	€ 8,060.46	#####	#####	#####	#####	€ 8,060.46	#####	#####	#####	#####
Total		€ 40,302.28					€ 42,989.10				€ 48,268.09		





Table B2: Economic Benefit of Reduced Mortality due to Cycling - Median Scenario - Continued

MEDIAN ECONOMIC SCENARIO					
Assesment Year:		2051	2052	2053	2054
Year Began Cycling					
Years Benefit	A	5+	5+	5+	5+
No. of Pedestrians	B	222.0	222.0	222.0	222.0
Average Mortality	C	0.0019	0.0019	0.0019	0.0019
Expected Deaths	$D=(B*C)$	0.4218	0.4218	0.4218	0.4218
Reduction in RR	E	0.0750	0.0750	0.0750	0.0750
%of Total Benefit accrued	F	1.0000	1.0000	1.0000	1.0000
Potential Lives Saved	$G=(D*E*F)$	0.0316	0.0316	0.0316	0.0316
Value of a Prevented Fatality (2011 Value)	H	€ 65,724.53	€ 65,724.53	€ 65,724.53	€ 65,724.53
Real Growth (in line with forecast GDP/Capita)	I	2	2	2	2
Value of a Prevented Fatality (Forecast Value)	$J=(H*I)$	€ 67,039.02	€ 67,039.02	€ 67,039.02	€ 67,039.02
Total		€ 248,024.24	€ 248,024.24	€ 248,024.24	€ 248,024.24

Table B3: Economic Benefit of Reduced Mortality due to Cycling - Optimistic Scenario

OPTIMISITIC ECONOMIC SCENARIO													
Assesment Year:		2025					2026				2027		
Year Began Cycling		2021	2022	2023	2024	2025	2022	2023	2024	2025	2023	2024	2025
Years Benefit	A	5+	4	3	2	1	5+	4	3	2	5+	4	3
No. of Pedestrians	B	48.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0	96.0	48.0	48.0	144.0
Average Mortality	C	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019
Expected Deaths	D=(B*C)	0.0912	0.0912	0.0912	0.0912	0.0912	0.0912	0.0912	0.0912	0.1824	0.0912	0.0912	0.2736
Reduction in RR	E	0.0750	0.0750	0.0750	0.0750	0.0750	0.0750	0.0750	0.0750	0.0750	0.0750	0.0750	0.0750
%of Total Benefit accrued	F	1.0000	0.8000	0.6000	0.4000	0.2000	1.0000	0.8000	0.6000	0.4000	1.0000	0.8000	0.6000
Potential Lives Saved	G=(D*E*F)	0.0068	0.0055	0.0041	0.0027	0.0014	0.0068	0.0055	0.0041	0.0055	0.0068	0.0055	0.0123
Value of a Prevented Fatality (2011 Value)	H	#####	#####	€ 8,526.43	#####	#####	#####	#####	€ 8,526.43	#####	#####	#####	#####
Real Growth (in line with forecast GDP/Capita)	I	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2	2	2
Value of a Prevented Fatality (Forecast Value)	J=(H*I)	#####	#####	€ 8,714.01	#####	#####	#####	#####	€ 8,714.01	#####	#####	#####	#####
Total		€ 43,570.03					€ 46,474.70				€ 52,181.72		







Table B3: Economic Benefit of Reduced Mortality due to Cycling - Optimistic Scenario - Continued

OPTIMISITIC ECONOMIC SCENARIO					
Assesment Year:		2051	2052	2053	2054
Year Began Cycling					
Years Benefit	A	5+	5+	5+	5+
No. of Pedestrians	B	240.0	240.0	240.0	240.0
Average Mortality	C	0.0019	0.0019	0.0019	0.0019
Expected Deaths	$D=(B*C)$	0.4560	0.4560	0.4560	0.4560
Reduction in RR	E	0.0750	0.0750	0.0750	0.0750
%of Total Benefit accrued	F	1.0000	1.0000	1.0000	1.0000
Potential Lives Saved	$G=(D*E*F)$	0.0342	0.0342	0.0342	0.0342
Value of a Prevented Fatality (2011 Value)	H	€ 71,053.54	€ 71,053.54	€ 71,053.54	€ 71,053.54
Real Growth (in line with forecast GDP/Capita)	I	2	2	2	2
Value of a Prevented Fatality (Forecast Value)	$J=(H*I)$	€ 72,474.61	€ 72,474.61	€ 72,474.61	€ 72,474.61
Total		€ 248,024.24	€ 248,024.24	€ 248,024.24	€ 248,024.24

## Appendix C

*Full breakdown of the calculations for the pessimistic, median and optimistic case scenarios for each of the assessment years for the economic benefit of reduced absenteeism.*

**Table C1**      *Economic Benefit of Reduced Absenteeism - Pessimistic Scenario*

**Table C2**      *Economic Benefit of Reduced Absenteeism – Median Scenario*

**Table C3**      *Economic Benefit of Reduced Absenteeism - Optimistic Scenario*

Table C1: Economic Benefit of Reduced Absenteeism - Pessimistic Scenario

		PESSIMISTIC ECONOMIC SCENARIO											
Assesment Year:		2025					2026				2027		
Year Began Walking/Cycling		2021	2022	2023	2024	2025	2022	2023	2024	2025	2023	2024	2025
Years Benefit		5+	4	3	2	1	5+	4	3	2	5+	4	3
No. of Pedestrians/Cyclists	A	340	340	340	340	340	340	340	340	680	340	340	1020
Average Sick Leave p.a	B	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9
Average hours worked per day	C	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
Average Benefit per minute of Active Travel	D	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
%of total benefit accrued	E	1	0.8	0.6	0.4	0.2	1	0.8	0.6	0.4	1	0.8	0.6
Expected reduction in absenteeism as a result of an intervention	F	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Reduction in absenteeism for new pedestrians/cyclists	$G = ((B)*(D)*(E))/(F))$	0.2940	0.2352	0.1764	0.1176	0.0588	0.2940	0.2352	0.1764	0.1176	0.2940	0.2352	0.1764
Hours Saved	$H = ((F)*(G))$	2.205	1.764	1.323	0.882	0.441	2.205	1.764	1.323	0.882	2.205	1.764	1.323
(2011 prices and values, PAG Unit 6.11: National Parameter Values Sheet)	I	€ 34.33	€ 34.33	€ 34.33	€ 34.33	€ 34.33	€ 34.33	€ 34.33	€ 34.33	€ 34.33	€ 34.33	€ 34.33	€ 34.33
Real Growth GNP	J	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2	2	2
Real Growth (in line with forecast GDP/Capita)	$K = ((I)*(J))$	€ 35.09	€ 35.09	€ 35.09	€ 35.09	€ 35.09	€ 35.09	€ 35.09	€ 35.09	€ 35.09	€ 35.02	€ 35.02	€ 35.02
Value of Prevented Absenteeism (Forecast Value)		€ 26,303.42	€ 21,042.74	€ 15,782.05	€ 10,521.37	€ 5,260.68	€ 26,303.42	€ 21,042.74	€ 15,782.05	€ 21,042.74	€ 26,251.95	€ 21,001.56	€ 47,253.50
Total		€ 78,910.26					€ 84,170.94				€ 94,507.00		





Table C1: Economic Benefit of Reduced Absenteeism - Pessimistic Scenario - Continued

		PESSIMISTIC ECONOMIC SCENARIO			
Assesment Year:		2051	2052	2053	2054
Year Began Walking/Cycling					
Years Benefit		5+	5+	5+	5+
No. of Pedestrains/Cyclists	A	1700	1700	1700	1700
Average Sick Leave p.a	B	4.9	4.9	4.9	4.9
Average hours worked per day	C	7.5	7.5	7.5	7.5
Average Benefit per minute of Active Travel	D	0.002	0.002	0.002	0.002
%of total benefit accrued	E	1	1	1	1
Expected reduction in absenteeism as a result of an intervention	F	0.3	0.3	0.3	0.3
Reduction in absenteeism for new pedestrians/cyclists	$G = ((B)*(D)*(E)*(F))$	0.2940	0.2940	0.2940	0.2940
Hours Saved	$H = ((F)*(G))$	2.205	2.205	2.205	2.205
(2011 prices and values, PAG Unit 6.11: National Parameter Values Sheet)	I	€ 34.33	€ 34.33	€ 34.33	€ 34.33
Real Growth GNP	J	2	2	2	2
Real Growth (in line with forecast GDP/Capita)	$K = ((I)*(J))$	€ 35.02	€ 35.02	€ 35.02	€ 35.02
Value of Prevented Absenteeism (Forecast Value)		€ 131,259.73	€ 131,259.73	€ 131,259.73	€ 131,259.73
Total		€ 131,259.73	€ 131,259.73	€ 131,259.73	€ 131,259.73

Table C2: Economic Benefit of Reduced Absenteeism - Median Scenario

MEDIAN ECONOMIC SCENARIO													
Assesment Year:		2025					2026				2027		
Year Began Walking/Cycling		2021	2022	2023	2024	2025	2022	2023	2024	2025	2023	2024	2025
Years Benefit		5+	4	3	2	1	5+	4	3	2	5+	4	3
No. of Pedestrians/Cyclists	A	370	370	370	370	370	370	370	370	740	370	370	1110
Average Sick Leave p.a	B	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9
Average hours worked per day	C	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
Average Benefit per minute of Active Travel	D	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
%of total benefit accrued	E	1	0.8	0.6	0.4	0.2	1	0.8	0.6	0.4	1	0.8	0.6
Expected reduction in absenteeism as a result of an intervention	F	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Reduction in absenteeism for new pedestrians/cyclists	$G = ((B)*(D)*(E))*(F))$	0.2940	0.2352	0.1764	0.1176	0.0588	0.2940	0.2352	0.1764	0.1176	0.2940	0.2352	0.1764
Hours Saved	$H = ((F)*(G))$	2.205	1.764	1.323	0.882	0.441	2.205	1.764	1.323	0.882	2.205	1.764	1.323
(2011 prices and values, PAG Unit 6.11: National Parameter Values Sheet)	I	€ 34.33	€ 34.33	€ 34.33	€ 34.33	€ 34.33	€ 34.33	€ 34.33	€ 34.33	€ 34.33	€ 34.33	€ 34.33	€ 34.33
Real Growth GNP	J	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2	2	2
Real Growth (in line with forecast GDP/Capita)	$K = ((I)*(J))$	€ 35.09	€ 35.09	€ 35.09	€ 35.09	€ 35.09	€ 35.09	€ 35.09	€ 35.09	€ 35.09	€ 35.02	€ 35.02	€ 35.02
Value of Prevented Absenteeism (Forecast Value)		€ 28,624.31	€ 22,899.45	€ 17,174.59	€ 11,449.72	€ 5,724.86	€ 28,624.31	€ 22,899.45	€ 17,174.59	€ 22,899.45	€ 28,568.29	€ 22,854.63	€ 51,422.93
Total		€ 85,872.93					€ 91,597.79				€ 102,845.86		





**Table C2: Economic Benefit of Reduced Absenteeism - Median Scenario - Continued**

[illegible]

Table C2: Economic Benefit of Reduced Absenteeism - Median Scenario - Continued

MEDIAN ECONOMIC SCENARIO					
Assesment Year:		2051	2052	2053	2054
Year Began Walking/Cycling					
Years Benefit		5+	5+	5+	5+
No. of Pedestrains/Cyclists	A	1850	1850	1850	1850
Average Sick Leave p.a	B	4.9	4.9	4.9	4.9
Average hours worked per day	C	7.5	7.5	7.5	7.5
Average Benefit per minute of Active Travel	D	0.002	0.002	0.002	0.002
%of total benefit accrued	E	1	1	1	1
Expected reduction in absenteeism as a result of an intervention	F	0.3	0.3	0.3	0.3
Reduction in absenteeism for new pedestrians/cyclists	$G = ((B)*(D)*(E))*(F))$	0.2940	0.2940	0.2940	0.2940
Hours Saved	$H = ((F)*(G))$	2.205	2.205	2.205	2.205
(2011 prices and values, PAG Unit 6.11: National Parameter Values Sheet)	I	€ 34.33	€ 34.33	€ 34.33	€ 34.33
Real Growth GNP	J	2	2	2	2
Real Growth (in line with forecast GDP/Capita)	$K = ((I)*(J))$	€ 35.02	€ 35.02	€ 35.02	€ 35.02
Value of Prevented Absenteeism (Forecast Value)		€ 142,841.47	€ 142,841.47	€ 142,841.47	€ 142,841.47
Total		€ 142,841.47	€ 142,841.47	€ 142,841.47	€ 142,841.47

Table C3: Economic Benefit of Reduced Absenteeism - Optimistic Scenario

OPTIMISTIC ECONOMIC SCENARIO													
Assesment Year:		2025					2026				2027		
Year Began Walking/Cycling		2021	2022	2023	2024	2025	2022	2023	2024	2025	2023	2024	2025
Years Benefit		5+	4	3	2	1	5+	4	3	2	5+	4	3
No. of Pedestrians/Cyclists	A	400	400	400	400	400	400	400	400	800	400	400	1200
Average Sick Leave p.a	B	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9
Average hours worked per day	C	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
Average Benefit per minute of Active Travel	D	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
%of total benefit accrued	E	1	0.8	0.6	0.4	0.2	1	0.8	0.6	0.4	1	0.8	0.6
Expected reduction in absenteeism as a result of an intervention	F	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Reduction in absenteeism for new pedestrians/cyclists	$G = ((B)*(D)*(E))*(F))$	0.2940	0.2352	0.1764	0.1176	0.0588	0.2940	0.2352	0.1764	0.1176	0.2940	0.2352	0.1764
Hours Saved	$H = ((F)*(G))$	2.205	1.764	1.323	0.882	0.441	2.205	1.764	1.323	0.882	2.205	1.764	1.323
(2011 prices and values, PAG Unit 6.11: National Parameter Values Sheet)	I	€ 34.33	€ 34.33	€ 34.33	€ 34.33	€ 34.33	€ 34.33	€ 34.33	€ 34.33	€ 34.33	€ 34.33	€ 34.33	€ 34.33
Real Growth GNP	J	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2	2	2
Real Growth (in line with forecast GDP/Capita)	$K = ((I)*(J))$	€ 35.09	€ 35.09	€ 35.09	€ 35.09	€ 35.09	€ 35.09	€ 35.09	€ 35.09	€ 35.09	€ 35.02	€ 35.02	€ 35.02
Value of Prevented Absenteeism (Forecast Value)		€ 30,945.20	€ 24,756.16	€ 18,567.12	€ 12,378.08	€ 6,189.04	€ 30,945.20	€ 24,756.16	€ 18,567.12	€ 24,756.16	€ 30,884.64	€ 24,707.71	€ 55,592.35
Total		€ 92,835.60					€ 99,024.64				€ 111,184.71		





Table C3: Economic Benefit of Reduced Absenteeism - Optimistic Scenario - Continued

OPTIMISTIC ECONOMIC SCENARIO					
Assesment Year:		2051	2052	2053	2054
Year Began Walking/Cycling					
Years Benefit		5+	5+	5+	5+
No. of Pedestrians/Cyclists	A	2000	2000	2000	2000
Average Sick Leave p.a	B	4.9	4.9	4.9	4.9
Average hours worked per day	C	7.5	7.5	7.5	7.5
Average Benefit per minute of Active Travel	D	0.002	0.002	0.002	0.002
%of total benefit accrued	E	1	1	1	1
Expected reduction in absenteeism as a result of an intervention	F	0.3	0.3	0.3	0.3
Reduction in absenteeism for new pedestrians/cyclists	$G = ((B)*(D)*(E))*(F))$	0.2940	0.2940	0.2940	0.2940
Hours Saved	$H = ((F)*(G))$	2.205	2.205	2.205	2.205
(2011 prices and values, PAG Unit 6.11: National Parameter Values Sheet)	I	€ 34.33	€ 34.33	€ 34.33	€ 34.33
Real Growth GNP	J	2	2	2	2
Real Growth (in line with forecast GDP/Capita)	$K = ((I)*(J))$	€ 35.02	€ 35.02	€ 35.02	€ 35.02
Value of Prevented Absenteeism (Forecast Value)		€ 154,423.21	€ 154,423.21	€ 154,423.21	€ 154,423.21
Total		€ 154,423.21	€ 154,423.21	€ 154,423.21	€ 154,423.21

**Clifton Scannell Emerson Associates Limited**, Civil & Structural Consulting Engineers  
Mentec House, Bakers Point, Pottery Road, Dun Laochaire, Co Dublin.

T. +353 1 288 5006 F. +353 1 283 3466 E. [info@csea.ie](mailto:info@csea.ie) W. [www.csea.ie](http://www.csea.ie)

