The Benefits of Active Travel Investment

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Údarás Náisiúnta Iompair
National Transport Authority

Deliverable Quality

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Table of Contents

Schedule of Acronyms

Acronym	Description
BCR	Benefit-Cost Ratio
CSO	Central Statistics Office
DBC	Detailed Business Case
DCC	Dublin City Council
DCEE	Department of Climate, Energy and the Environment
DLRCC	Dún Laoghaire-Rathdown County Council
DoT	Department of Transport, Ireland
ESCO	European Skills, Competences, Qualifications and Occupations
ESRI	Economic and Social Research Institute
FBC	Final Business Case
FTE	Full-Time Equivalent
GDA	Greater Dublin Area
GHG	Greenhouse Gas
GVA	Gross Value Added
HEAT	Health Economic Assessment Tool
IG	Infrastructure Guidelines
ILO	International Labour Organisation
ITF	International Transport Forum
IO Model	Input-Output Model
IPCC	Intergovernmental Panel on Climate Change
NPF	National Policy Framework
NTA	National Transport Authority
PBC	Preliminary Business Case
PVB	Present Value of Benefits
PVC	Present Value of Costs
RSA	Road Safety Authority
SAR	Strategic Assessment Report
SDGs	Sustainable Development Goals
SQB	Status Quo Bias
TAF	Transport Appraisal Framework
TEAM	Tool for Economic Appraisal of Active Modes
TII	Transport Infrastructure Ireland
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
WACI	Walking and Cycling Index
WHO	World Health Organisation

Executive Summary

Rationale and Motivation

The purpose of this report is to assess and quantify the economic benefits that have arisen from National Transport Authority's (NTA) Active Travel Investment Programme since 2021 and are expected to continue until 2030. The analysis presents a national and macro-level assessment rather than an evaluation of individual projects. Fundamentally, this report aims to demonstrate the economic value of sustained investment in active travel infrastructure, reflecting both the progress achieved to date and the continued development of a comprehensive active travel network. It makes the case for maintaining and securing funding over the coming years through the Active Travel Investment Programme.

NTA's Active Travel Investment Programme

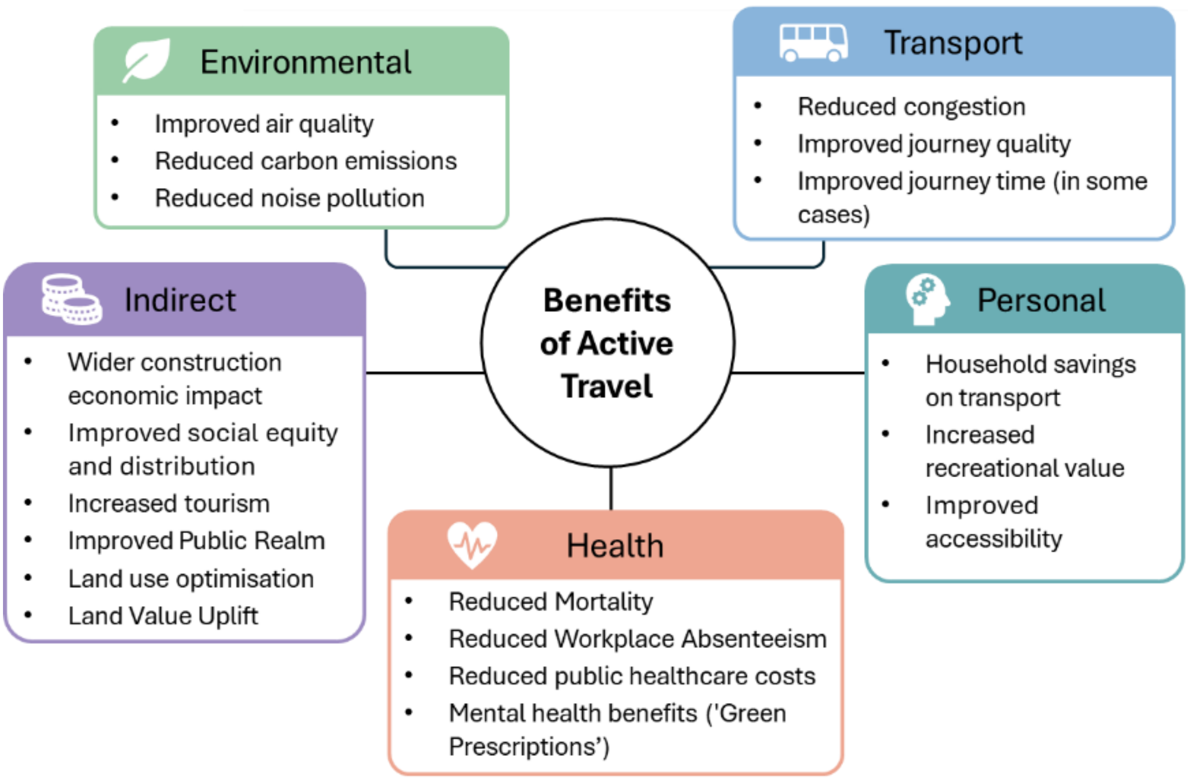
From 2021 to 2025, the NTA delivered almost 950 kilometres in active travel infrastructure, along with bridges, junction upgrades, school zones and other non-route investments. As active travel emerges as a growing sector, many local authorities require standalone active travel units. This institutional presence is supported by the Programme, which directly supported 275 active travel staff within all 31 local authorities in 2025.

The next five to ten years will be important in safeguarding and building upon the progress already made. Continued funding will allow the Programme to mature, enabling behavioural change to deepen, active travel network connections to strengthen and the full societal benefits of active travel to be realised. As planned allocations are nominal, an inflation gap of €330 million for the next 5 years is anticipated, which is expected to reduce the number of active travel projects delivered under the Programme.

Active Travel Benefits

Figure A presents the active travel benefits divided across five main categories, of which avoided health costs are one.

Figure A. Active Travel Benefits



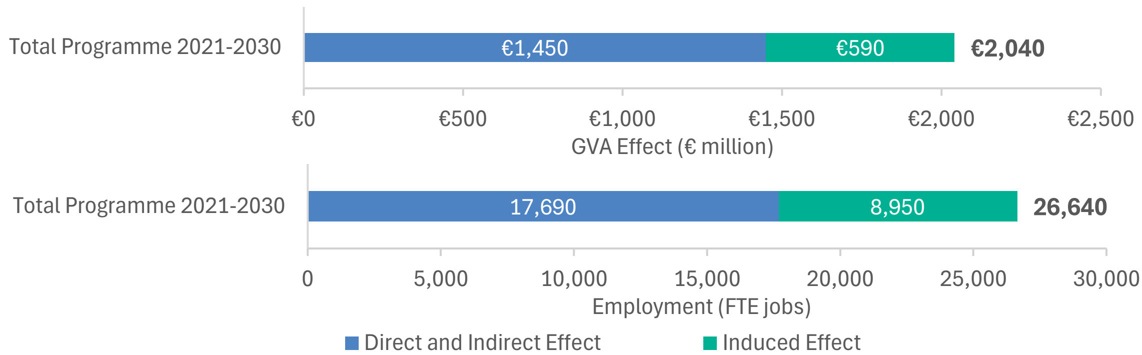
Avoided health costs are one important benefit of active travel, and there are other benefits. This report estimates and monetises those benefits of the NTA's Active Travel Programme that can be robustly quantified and are considered significant. Firstly, the direct planning and construction economic impact is calculated, comprising short-term effects generated while planning and building the active travel infrastructure. Secondly, the wider economic benefits are estimated for the combination of benefits generated from planned future investment in active travel infrastructure. Economic impacts in the planning and construction sector are short-term impacts, whereas the wider economic benefits arise due to behavioural change – people walking, cycling, scooting and wheeling more. Some benefits are not measurable in a quantifiable or monetary valuation yet recognising them is important because they represent meaningful contributions to health, wellbeing and overall quality of life.

Economic Impact Assessment of Programme Construction

The Economic Impact Assessment quantifies the economic impacts arising from the planning and construction of the Active Travel Investment Programme. After several interviews and surveys with companies working in the delivery of active travel infrastructure, this report has found that active travel planning and construction are characterised by very low leakage rates.[1] Almost all investment in active travel infrastructure is converted into benefits for Ireland's economy, supporting domestic economic development and job creation. Furthermore, the Active Travel Investment Programme supports the creation of green jobs, as many international and national organisations classify planning,[2] construction and maintenance roles in the active travel sector as 'New and Emerging Green' jobs, as they provide for and encourage low emissions travel.

Figure B presents the results of the Economic Impact Assessment Input-Output model for the Active Travel Investment Programme from 2021 to 2030. Over this timeframe, capital expenditure on active travel has generated and is projected to generate a total of €1.45 billion in Gross Value Added (GVA) through direct and indirect effects, amounting to €2.04 billion when adding induced effects. In terms of employment, the programme has supported and is expected to support 17,690 Full Time Equivalent (FTE) jobs over the 10-year period, with an overall of 26,640 when induced effects are also considered. On average, this amounts to the generation of over 2,650 FTE jobs per year over the 10 years period.

Figure B. Economic Impact Assessment - GVA Effect and Employment (€ million, 2021 constant prices and FTE) [3]



Wider Economic Benefits

The realisation of wider economic benefits from active travel depends on several interrelated factors. A safe, continuous, and well-connected active travel network is essential for increasing walking and cycling, improving safety, and supporting economic returns. Integrating active travel with public transport

[1] Leakage rate refers to the proportion of investment spending that flows out of the domestic economy.
[2] The United Nations Environment Programme (UNEP), the International Labour Organisation (ILO), the European Skills Competences, Qualifications and Occupations (ESCO) and the Economic and Social Research Institute (ESRI).
[3] The results presented are subject to constraints, reflecting data availability, model limitations and required assumptions, which are described in detail within the report.

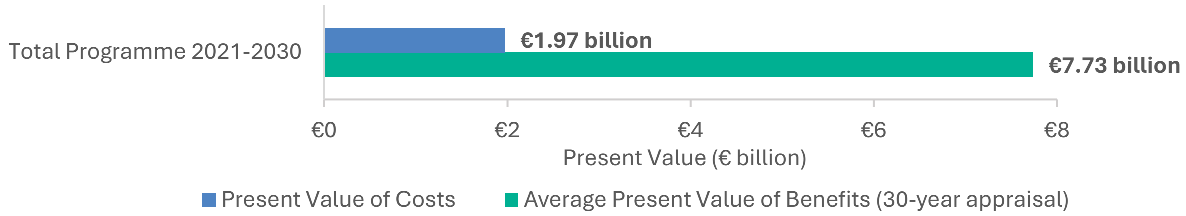
further expands accessibility, strengthens sustainable mobility, and enhances the effectiveness of both systems. Realising these benefits also requires behavioural change, since people are unlikely to shift from cars without safe, comfortable alternatives and clear communication of long-term gains.

This report finds that a commuter who cycles to work would generate €3,480 in combined savings for themselves and for society when compared with travelling by private car. Someone who walks to work would save €620 in overall benefits relative to car use.

Attributing benefits to a particular Programme poses some challenges, such as lack of data on active travel demand, as well as travel patterns that are influenced by a range of external factors that are beyond the Programme's control. In response, a benefits transfer approach was applied which is a widely accepted approach in economics for estimating the economic value of non-market goods. This method draws on established evidence from previous active travel business cases and international evidence.

Figure C presents the Active Travel Investment Programme wider economic benefits over a 30-year appraisal period compared to actual and expected expenditure in Present Value of Costs.[4] The Programme's wider economic benefits over 30 years are estimated to be €7.73 billion (2021 Values and Prices). Overall, the Benefit-Cost Ratio (BCR) is 3.9, indicating that the Programme is expected to deliver benefits that substantially exceed its costs over its lifetime. In terms of payback period on investment, it is estimated that the cost of one year's investment is fully recovered by the sixth year of the infrastructure being operational.

Figure C. Wider Economic Impact over 30-year appraisal period (2021 Values and Prices) [5]



Benefit estimates were developed for a sample project to illustrate the relative value of different benefit categories. Transport Infrastructure Ireland's (TII) TEAM Tool (Tool for Economic appraisal of Active Modes) results present the benefit weights for this sample project, showing health as the largest component at 53%, followed by collision at 21%, journey time at 12% and mode shift at 9%, among others.

Conclusion

Active travel is a growing sector since 2020, characterised by green jobs and driven by the institutional support provided by the NTA's Active Travel Investment Programme. There is evidence of skills development and consolidation of this emerging sector, with very low leakage levels of the investment. This indicates strong domestic economic development and job creation.

The Programme delivers high short-term benefits through planning and construction activity, alongside long-term wider economic benefits for both individuals and society.

Overall, continued investment in active travel infrastructure is essential to fully realise the significant and lasting societal benefits, while also supporting sustained economic development. The full impact of active travel investment often emerges only over longer periods, which further reinforces the need for consistent and long-term commitment to delivering and expanding the Irish active travel network.

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[4] Present Value of Costs discounted to 2021 and expressed in 2021 prices are lower than the nominal investment in the Programme 2021-2030. Discounting reduces the value of future expenditures: costs incurred in later years contribute less in today's terms.

[5] The results presented are subject to constraints, reflecting data availability, model limitations and required assumptions, which are described in detail within the report.

1. Introduction

1.1. Rationale and Motivation

The purpose of this report is to assess and quantify the range and scale of the economic benefits that arise from National Transport Authority (NTA) Active Travel Investment Programme from 2021 until 2030. This report presents a national and macrolevel assessment rather than an evaluation of individual projects. It complements the detailed appraisal processes set out in the Infrastructure Guidelines (IG) and the Transport Appraisal Framework (TAF). Importantly, this report seeks to demonstrate the strategic value of continued investment in active travel and to support the case for maintaining and securing funding over the coming five years.

A key focus of this report is to demonstrate that continued investment in active travel infrastructure is essential to fully realise the significant and lasting societal returns. This report emphasises that active travel infrastructure is most effective when delivered as part of a coherent and connected network.

It is important to recognise that many benefits of active travel depend on changes in travel behaviour, and these changes take time to develop. The Netherlands and Copenhagen (considered exemplary for cycle networks and a benchmark that many countries are trying to emulate) began their extensive segregated bike networks over fifty years ago, in response to the 1970s oil crisis and significant safety protests. Ireland faces the challenge of reducing transport related emissions within a growing economy.

People adopt new travel habits gradually, typically in response to improvements in safety, connectivity, comfort and perceived convenience. As a result, the full impact of active travel investment often emerges only over longer periods, which further reinforces the need for consistent and long-term commitment to delivering and expanding the active travel network (Carrigan, 2025).

Over the past decade, investment in active travel infrastructure has grown significantly in Ireland. Before 2020, the active travel sector was relatively small, with limited dedicated resources and delivery capacity. The introduction of NTA's Active Travel Investment Programme in 2021 marked a major turning point, as national policy, public interest and government commitment aligned to create the first sustained and large-scale funding stream for active travel. This shift enabled local authorities, the NTA and companies to build specialised teams and begin establishing a coherent national network for active travel.

The next five to ten years will be crucial for protecting the progress already made. Continued funding will allow the programme to mature, enabling behaviour change to deepen, network connections to strengthen and the full societal benefits of active travel to be realised. A key theme of the National Policy Framework (NPF) was to highlight the importance of providing long-term investment commitments for infrastructure, to provide confidence to investors, contractors and communities that the challenges faced by Ireland after the 2008 financial crisis are not repeated. By continuing to deliver active travel infrastructure, Ireland can create cycle networks on par with the Netherlands and Copenhagen, make active travel a mainstream choice, significantly boost the share of journeys by walking and cycling and facilitate lasting change in travel behaviour. This shift will cut transport related Greenhouse Gas emissions and contribute to legally binding carbon reductions.

1.2. Current Status of Active Travel in Ireland

According to NTA's Household Travel Surveys in Ireland (NTA, 2025a), walking accounted for 20% of all trips in 2012, 18% in 2017, 19% in 2022 and 18% in 2024. Cycling represented 2% in 2012, increased slightly to 3% in 2017, before returning to 2% in 2022 and 2024. These figures show that while walking remains a stable and significant mode of travel, cycling uptake has not yet achieved consistent growth.

Short trips are often the most suitable for active travel, however encouraging people to choose active travel for these journeys remains a challenge. In 2019, nearly 57% of all journeys of less than two kilometres were made by private car, while only about 40% of journeys over the same distance were made by walking or cycling (CSO, 2019). Access to essential services within walking or cycling distance plays a critical role in enabling these trips, although this does not appear to be a major barrier. In Ireland, 71% of people live within a 15-minute walk of a shop, 67% of a bus stop, and 64% of a restaurant (NTA, 2025a).

The persistence of relatively low active travel mode share highlights ongoing barriers in Ireland. Section 2.3 provides a more detailed analysis of the factors that can help unlock active travel mode share.

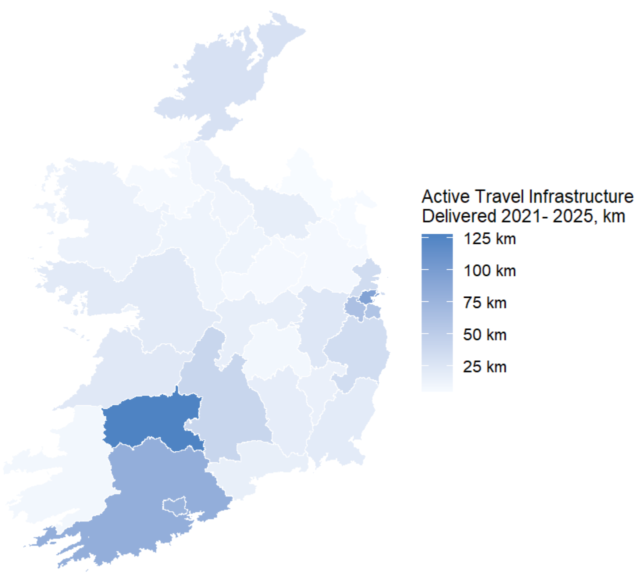
1.3. NTA's Active Travel Investment Programme

The NTA is delivering the Active Travel Investment Programme from 2021 until 2030, funded under the Sustainable Mobility allocation in the Department of Transport (DoT). The Programme funds a wide range of projects designed to encourage more people to walk, cycle and use sustainable modes of travel. This Programme represents a significant commitment by the government to enhance Ireland's active travel infrastructure in line with wider policy objectives on sustainability and climate action.

In order to secure the provision of public transport infrastructure on a value for money basis, the NTA requires that Sponsoring Agencies follow NTA's Cost Management Guidelines,[6] with respect to cost estimation, cost profiling, cost reporting and the general management of costs.

Between 2021 until 2025, the Active Travel Investment Programme delivered almost 950 kilometres in active travel infrastructure across Ireland, along with 16 pedestrian and cycling bridges. This network is complemented by other forms of non-route investment, including junction upgrades, zebra crossings, and school zones, among other projects.

Figure 1. Length of Active Travel Infrastructure delivered by Region 2021-2025 (kilometres)



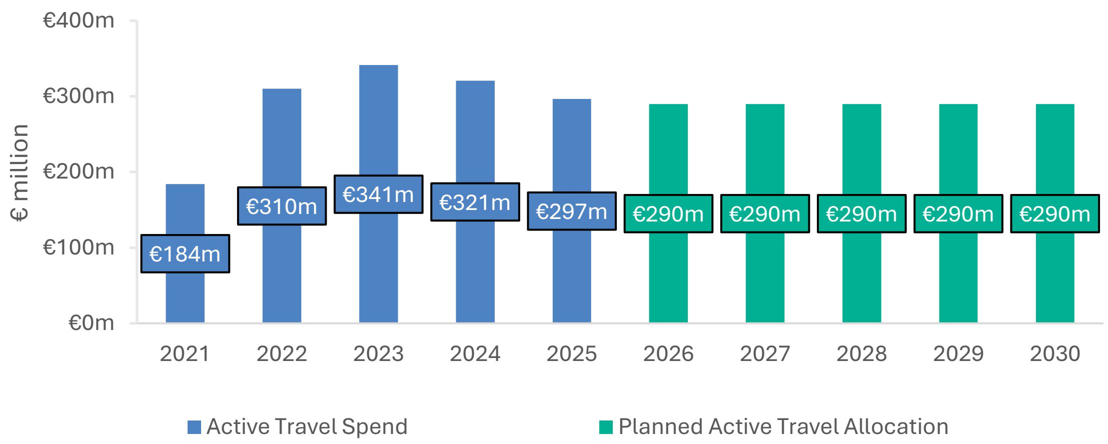
[6] https://www.nationaltransport.ie/publications/nta-cost-management-guidelines-updated-2024/

The concentration and extent of active travel infrastructure delivery in the first five years of the Programme are shown in Figure 1, with almost 950 kilometres of infrastructure provided across the country. This amounts to a substantial amount of infrastructure delivered within a relatively short period. However, many of these routes remain fragmented, with limited integration between towns, city centres, and suburban areas.

Active travel is emerging as a distinct and growing subsector within Irish local authorities. Many local authorities have standalone active travel units, signalling the sector's growing identity and formal recognition as a dedicated subsector. These teams are supported by the Active Travel Investment Programme, which in 2025 funded approximately 275 active travel staff within all 31 local authorities. These include engineers, transport planners/designers and project managers. Annual salary expenditure is estimated to average approximately €23 million per year, representing the largest component of non-capital expenditure within the Active Travel Investment Programme.

The scale of investment under the NTA's Active Travel Investment Programme is shown in Figure 2 below, which illustrates the annual actual expenditure between 2021 and 2025 and expected between 2026 and 2030. Continued funding beyond 2026 will be essential to ensure that the current active travel network evolves into a fully connected, high-quality active travel system that supports both everyday mobility and wider social and economic benefits. Further detail on NTA's Active Travel Investment Programme is given in Appendix A.

Figure 2. Annual Active Travel Investment Programme expenditure actual and expected, 2021-2030 (€ million, nominal prices). Source: NTA



The funding allocation for the 2026-2030 period reflects the Programme's budget in nominal prices set out in 2021, with no adjustment for inflation. As inflation increases, the real value of this allocation will decline, leading to a gap between the nominal budget and the actual funding requirement. Figure 3 presents the estimated inflation gap, based on inflation figures from the published CSO inflation data up to 2025,[7] and Ireland-specific ECB inflation forecasts for 2026–2028, with an assumed inflation rate of 2.0% applied for 2029 and 2030.[8] For example, the planned 2030 allocation of €290 million, set at the outset of the Programme in 2021, is projected to have a real value of approximately €214 million by 2030.

[7] Central Statistics Office, *Consumer Price Index December 2025* and associated annual CPI datasets.
[8] https://www.ecb.europa.eu/pub/pdf/other/eurosystemstaffprojectionsbreakdown202606~d101a33de2.en.pdf

Figure 3. Inflation Pressures for Active Travel Funding Allocation (€ million, 2021 constant prices and nominal prices)

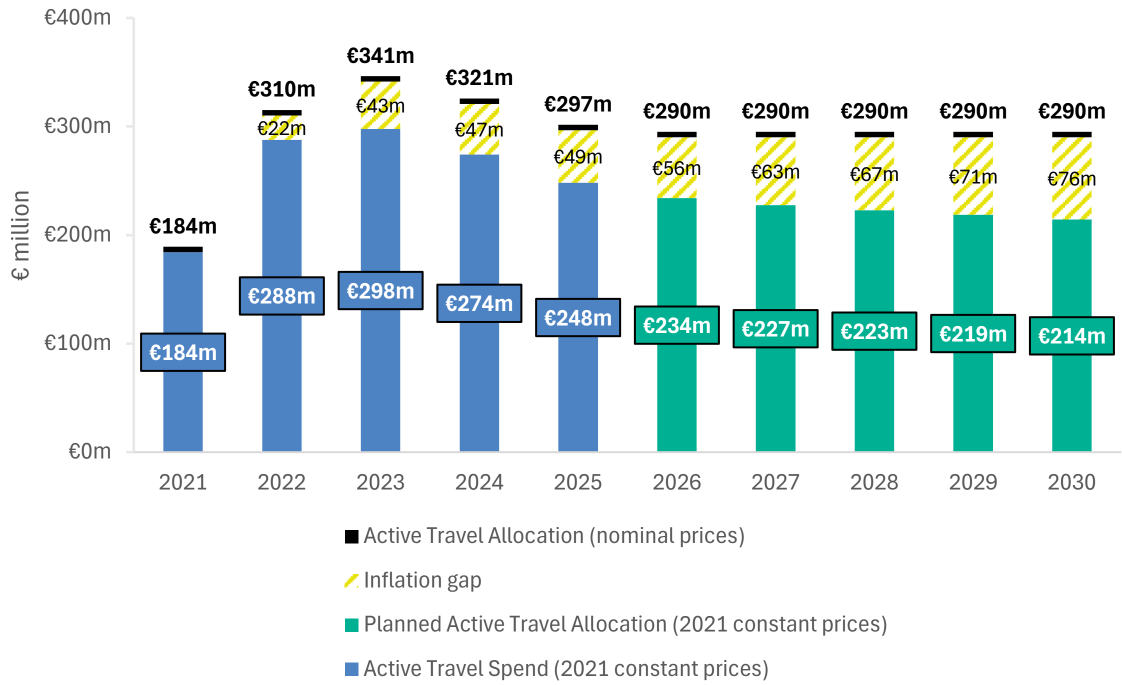


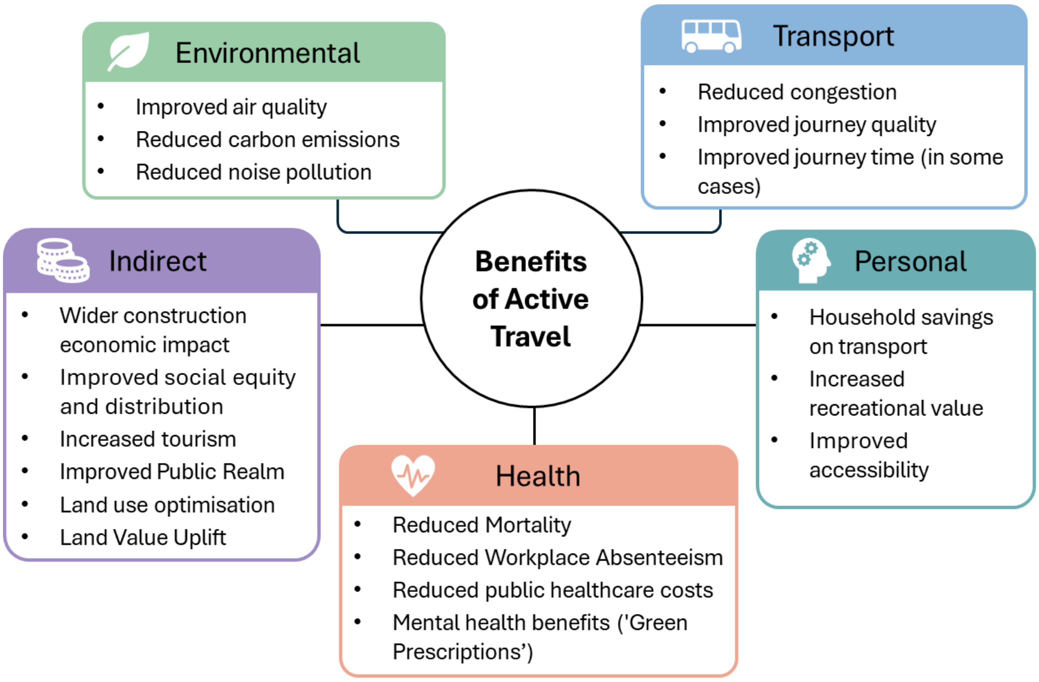
Figure 3 indicates that inflation is projected to reduce the real value of the Programme allocation by almost €500 million between the original 2021 funding baseline and 2030. Of this, approximately €160 million has already been eroded by inflation between 2021 and 2025.

Over the next five-year period from 2026 to 2030, accumulated inflation is projected to amount to €330 million considering 2021 as the Programme set out date. If the current Programme allocation is considered in 2025 prices, reflecting the funding levels approved in 2025, the relevant inflation gap over the 2026-2030 period is projected to be almost €150 million. These figures represent expected funding not accounted for in the current allocation, reducing the number active travel projects that will be delivered out to 2030.

2. Active Travel Benefits

Active Travel provides a broad and diverse set of benefits for individuals, communities, and the wider environment. Figure 4 presents the full range of active travel benefits across five main categories: environmental, transport, personal, health, and indirect/societal benefits.

Figure 4. Types of Active Travel Benefits



Some benefits are not tangible in a quantifiable or monetary sense, yet they can deliver significant social value. These non-monetisable benefits, or those for which no clear or standardised estimation methodology exists, include accessibility, equity and distributional effects, improvements to the public realm, and land use optimisation.[9] All other benefits presented in Figure 4 follow quantifiable and monetisable methodologies derived from the literature review or from Ireland's appraisal guidelines. Economic impacts in the planning and construction sector are short-term impacts, whereas the wider economic benefits arise due to behavioural change – people walking, cycling, scooting and wheeling more. These are the outcomes of the Programme.

2.1. Tangible benefits

This report estimates and monetises those active travel benefits that can be robustly quantified, with the methodology for measuring benefits in Section 3. This is followed by an analysis of the construction Economic Impact in Section 4, which form short-term effects generated while planning and building the active travel infrastructure. Section 5 presents the wider economic benefits generated over future years through the use of new active travel infrastructure, which correspond to the outcomes arising from the combination of the monetisable benefits shown in Figure 4.

As an example of measuring tangible benefits, a report from the Irish Climate and Health Alliance "Active Travel: The Magic Pill",[10] estimates that physical inactivity costs Ireland €1.13 billion a year in healthcare. This reflects the combined cause of many factors of which active travel is one.

[9] Non-tangible benefits have been incorporated as a main category in the infographic to ensure it is understandable without accompanying text.
[10] Irish Climate and Health Alliance (2025) Active Travel: The Magic Pill. https://climateandhealthalliance.wordpress.com/resources/

2.2. Non-tangible benefits

While non-tangible benefits are difficult to quantify, recognising them is important as they represent meaningful contributions to health, wellbeing and overall quality of life. These benefits require further exploration, and developing more robust methods to measure them should form a key area of future research on active travel benefits.

2.2.1. Equity and distributional impacts

Transport equity is usually examined across two dimensions. Horizontal equity refers to whether individuals in similar circumstances receive comparable levels of transport service. Vertical equity refers to whether disadvantaged groups receive at least proportional benefits given their greater mobility needs (Litman, 2022).

Disadvantaged groups often experience longer travel times, poorer access to jobs and essential services, greater exposure to pollution and collision risk, and less influence in planning processes. Geurs and van Wee (2004) emphasise that households without access to a private car face the greatest risk of reduced accessibility, because they depend entirely on the availability, affordability and quality of public transport, walking or cycling infrastructure. Lades (2020) found that individuals living in lower income areas tend to have fewer mobility options and face higher transport poverty.

Iroz-Elardo et al. (2020) demonstrate that active travel investment has clear health equity implications, as investment in active travel infrastructure in areas of need can reduce avoidable health burdens. However, most studies assessing active travel infrastructure investment fail to analyse or report how impacts vary across socio-economic, demographic, or geographic groups (Smith, 2017).

Active travel benefits relate to both vertical and horizontal equity, but they align more strongly with vertical equity. This is because active travel investment supports people who have fewer transport choices, reduces transport costs for lower income households, improves access to jobs, education and services, enhances safety for vulnerable road users and provides health benefits that disproportionately assist groups with higher health risks.

2.2.2. Accessibility impacts: 15-minute city

Accessibility refers to the ability of individuals to reach employment, education, healthcare, shops and social activities. High-quality active travel infrastructure improves accessibility by enabling people to reach everyday destinations safely, directly and reliably without depending on a car.

Evidence shows that well-designed walking and cycling networks can significantly improve access to essential services and amenities. These networks support the principle of the 15-minute city, where many daily needs can be reached within a short walk or cycle. Improved accessibility is associated with higher rates of labour market participation, reduced social exclusion and greater independence for young people, older adults and people with disabilities (Lucas, 2012). Active travel infrastructure also strengthens connections to public transport by improving the first and final parts of journeys, which increases overall transport network efficiency.

Urban and rural areas differ significantly in terms of active travel infrastructure provision. The transport poverty literature notes that if active travel investment is focused primarily on urban centres, rural and peripheral areas may experience some mobility disadvantages (Bosworth et al. 2020). Ensuring balanced investment across urban and rural types is important to avoid widening regional disparities in accessibility. The Active Travel Investment Programme addresses this risk by supporting the active travel teams in all local authorities, which are responsible for identifying and developing projects suited to local needs. This aligns with the principle of subsidiarity, where decisions are made as close as possible to the communities impacted.

2.2.3. Public realm impacts

Active travel projects contribute meaningfully to the quality of the public realm. Gaining more space for active travel, including wider footpaths, protected cycle facilities, planting, seating and traffic calming, creates more attractive and sociable environments.

Research shows that high-quality public realm improvements increase footfall, support local businesses and improve feelings of safety and comfort (Jacobs, 1993; Transport for London, 2019). Greener and more walkable streets also support improved mental wellbeing, reduced stress and increased social interaction (Maas et al., 2006). These benefits are particularly important in compact urban areas where public space is limited.

2.2.4. Land use optimisation

Investment in active travel infrastructure supports more efficient and sustainable patterns of land use. It allows for compact and mixed-use development, which is linked to shorter trip lengths, higher levels of active travel and reduced environmental and infrastructure costs (Ewing and Cervero, 2010). Coordinating land-use planning with active travel investment also shapes long-term development patterns, encouraging intensification and mixed-use neighbourhoods that sustain active modes across generations (Bertolini, 2012). Optimising land use ensures that active travel networks are embedded in broader spatial planning strategies, maximising public health, environmental and social-equity benefits.

2.3. Factors Unlocking the Benefits of Active Travel

The realisation of wider economic benefits from active travel depends on several interrelated factors. These factors are developed in the following chapters and underscore the need to deliver continuous and safe infrastructure.

2.3.1. The Role of the Active Travel Network

The development of a safe, connected, and high-quality active travel network is fundamental to achieving a sustained shift from private car use to active travel and to unlocking wider economic benefits associated with active travel. Mueller et al. (2018) demonstrate a strong, positive relationship between the expansion of cycling networks across European cities and increases in cycling mode share, health outcomes, and wider economic returns. Evidence from 167 European cities show that the presence of a designated cycling network can be associated with a cycling mode share of up to 24.7%. Their findings demonstrate that the full realisation of these benefits depends on the existence of continuous, protected, and well-integrated networks that allow users to travel safely without needing to share road space with vehicles. Incomplete or fragmented networks often limit uptake by creating perceived and real safety risks, preventing the widespread behavioural change necessary for achieving active travel targets.

Integrated urban and active travel planning can unlock immense benefits when a connected network is established, such as in many Dutch cities. The core principle of Metcalfe's Law in network theory suggests that the value of a network increases as more routes, destinations and users are connected (Metcalfe, 1995). In an active travel context, this means that a well-connected system of walking and cycling routes delivers far greater value than a collection of isolated paths, as connectivity enhances accessibility, use, and overall network efficiency.

Research has shown that the likelihood of a pedestrian or cyclist being injured decreases as the number of people walking or cycling increases (Jacobsen, 2003). Similar patterns have been observed in countries such as the Netherlands, Denmark, and Germany, where extensive, high-quality infrastructure has resulted in lower rates of cyclist and pedestrian injuries per kilometre travelled (Pucher and Buehler, 2008; Schepers et al., 2017; ITF, 2018). For Ireland, achieving this shift will depend on sustained investment in high-quality infrastructure, integrated planning, and a strong focus on safety by design across all elements of the transport network.

2.3.2. The Role of Public Transport Infrastructure

The interaction between active travel and Public Transport is a defining feature of sustainable mobility systems. Understanding the mutually reinforcing relationship is central to evaluating the wider economic benefits of active travel investments, as many of these benefits are realised through their integration with the broader public transport network. In Ireland, the National Sustainable Mobility Policy 2022 (DoT, 2022) and Greater Dublin Area Transport Strategy 2023-2042 (NTA, 2023) both explicitly recognise the need for integrated active travel - Public Transport networks.

Empirical evidence consistently supports this bi-directional relationship. Panter et al. (2016) found that new Public Transport infrastructure promoted increased active commuting, especially cycling. Studies across European cities show that over 90% of Public Transport users walk to their boarding stop, while nearly all walk or cycle from their final stop to their destination (UNECE, 2024). A high-quality pedestrian environment typically extends the effective walking catchment to around 800 metres, while the availability of cycling connections can increase this radius to 2-3 kilometres, depending on context (Larsen & El-Geneidy, 2009; Kager, R. & Harms, L., 2017).

2.3.3. The Role of Behavioural Factors

Achieving wider economic benefits depends not only on infrastructure delivery but also on effective behavioural and systemic change. For people to shift from driving to walking or cycling, there must first be a safe and connected active travel network that separates these modes from car traffic. Without this sense of security and comfort, large-scale uptake is unlikely, and the full realisation of wider economic benefits will remain limited.

Carrigan (2025) highlights two key behavioural barriers: Status Quo Bias (SQB) and car dependence.

- SQB refers to people's tendency to prefer existing conditions over change, even when the alternative offers clear long-term advantages.
- Individuals often focus more on short-term inconveniences such as reduced parking or altered traffic flow than on long-term benefits (improved health, clean air, and stronger local economy).

2.3.4. The Role of Road Safety

Safety is one of the most important factors influencing people's willingness to walk or cycle. Without a clear sense of safety, individuals are unlikely to choose cycling, regardless of the quality or convenience of other elements in their journey. Decisions to shift from other transport modes to cycling are therefore determined by the weakest part of the route rather than the best.

Despite the growing focus on active travel, pedestrian and cyclist fatalities continue to occur on Irish roads each year. Between 2018 and 2022, there were 1,546 pedestrian and 1,368 cyclist fatalities and serious injuries combined on Irish roads (RSA, 2023). This equates to an average of more than 580 pedestrians and cyclists killed or seriously injured each year, representing roughly one in three serious road casualties nationally.

3. Methodology for Measuring Benefits

3.1. Challenges in Measuring Active Travel Benefits

Measuring the economic and societal benefits of active travel is complex, as its impacts are indirect, dispersed, and embedded in wider health, environmental, and social systems. Early research focused on physical health benefits, recognising physical activity as preventative medicine, later expanding to mental wellbeing. The polluting impacts of vehicular travel connected active travel with air quality and environmental benefits. Social cohesion benefits were recognised, with active travel giving people the opportunity to meet within their communities. However, limited long-term data of active travel and a lack of standard valuation methods, made it difficult to quantify these non-market outcomes. As climate awareness grew, active travel became integral to reducing transport emissions, supported by the United Nations Sustainable Development Goals and in particular the Intergovernmental Panel on Climate Change's (IPCC) Sixth Assessment Report (IPCC, 2023).

As the global evidence base continues to grow, researchers and policymakers are increasingly adopting standardised metrics to assess and monetise the wide range of active travel benefits. The World Health Organisation's Health Economic Assessment Tool (HEAT) launched in 2007 a significant standard method of quantifying health benefits of active travel (WHO, 2007).

In the last five years, two significant methods for measuring active travel benefits were introduced in Ireland: NTA's Walking and Cycling Index (WACI) (NTA, 2025b) and Transport Infrastructure Ireland's TEAM Tool (Tool for Economic appraisal of Active Modes) (TII, 2023). The WACI provides a comprehensive picture of active travel behaviours (every two years) and measures the wider benefits at a city level. The TEAM Tool is developed for project appraisal, taking into account the localised specifics of a proposed investment.

Both methods are important, as one measures benefits from a site-specific, bottom-up perspective, while the other measures active modes from a holistic and system wide perspective. Nevertheless, both WACI and the TEAM Tool incorporate the WHO's HEAT parameters to support the estimation of health benefits. As active travel has composite co-benefits, understanding the composition of those benefits can help target future investment.

Evidence indicates that the positive health impacts of active travel interventions are more likely to emerge over longer periods, with studies showing substantially greater positive outcomes with longer follow-up periods (Ding et al., 2024). This highlights the importance of long-term evaluation in active travel interventions, as it could take time to change travel behaviour, as well as improve health and other co-benefit outcomes.

As the active travel network continues to expand, it is important to recognise that behavioural change among individuals has natural limits. A person can only decide to shift to cycling once, and the associated health, environmental, and economic benefits are realised from that initial change. As the network matures, many of the potential new cyclists will already be active, meaning that the marginal benefits of additional investment may gradually decline.

3.2. Challenges in Attributing Benefits to a Particular Programme

Attributing benefits to a specific programme presents significant challenges, as the factors influencing active travel behaviour are complex and interrelated. Behavioural shifts may be driven not only by new infrastructure or policy interventions but also by broader societal trends, weather patterns, fuel prices, public health campaigns, or even cultural shifts. Unlike traditional transport modes, travel benefits have payback periods over long periods well beyond the Programme's implementation timeframe.

Due to these complexities and with limited primary evaluation data that captures cause and effect of each and all of the Programme activities, attributing the precise benefits of the Programme is not feasible. In response, a benefits transfer approach is applied, drawing on established evidence from previous active travel business cases and international evidence to extrapolate benefits. Further detail on the wider economic benefits estimation methodology is provided in Section 3.3.2.

3.3. Approach taken in this report

Recognising the challenges outlined above, this report adopts a pragmatic approach to assessing the economic and wider benefits of the Active Travel Investment Programme. It acknowledges that not all impacts can be precisely measured, given the limitations of available data and the complex interactions between behavioural, social, and environmental factors.

Two main outcomes are delivered through this analysis. The first is an Economic Impact Assessment of the planning and construction effects under the Active Travel Investment Programme, which captures the short-term contribution of investment to employment and economic output of the Programme. The second is the estimation of wider economic benefits, reflecting the longer-term social, environmental, and health gains generated by investment in active travel infrastructure.

3.3.1. Economic Impact Assessment

Input-Output (IO) analysis is an established method for estimating how spending in one part of the economy affects other sectors. IO models are best viewed as comparative static tools. They are useful for identifying inter-industry linkages and assessing broad economic impacts.

The model links the flow of investment to employment and jobs created due to the Active Travel Investment Programme. The jobs created by the Programme are directly within the NTA, local authorities and the engineering, design, construction sector, and indirectly through the supply chain. For a detailed analysis of IO model methodology, assumptions, limitations and detailed results, see Appendix D.

It is important to acknowledge several limitations of IO modelling. These include fixed input ratios, linear relationships with no substitution, a static snapshot of the economy, fixed prices, constant returns to scale, the absence of behavioural or dynamic mechanisms and the absence of network effects. Each of these limitations is described in more detail in the Appendix D.2. Given these limitations, developing a dynamic model may be a useful next step beyond this report.

While these planning and construction wider economic benefits generated during project delivery are important, they are short-term and represent only one aspect of the overall impact of active travel. The true value of the Active Travel Investment Programme lies in the long-term wider economic benefits generated once the infrastructure is in place.

3.3.2. Wider Economic Benefits

As acknowledged in Section 3.2, there are a few challenges in attributing benefits to a particular Programme such as lack of data on active travel demand, as well as travel patterns that are influenced by a range of external factors that are beyond the Programme's control. In response, a benefits transfer approach is applied, drawing on established evidence from previous active travel business cases and international evidence to extrapolate benefits.

Benefits transfer is a practical and widely accepted approach in economics for estimating the economic value of non-market goods or services, where primary valuation studies are not available or feasible due to time or data constraints (OECD, 2018; UNEP, 2013). This method involves applying existing valuation estimates from previous studies in similar context to a new programme setting, with appropriate consideration of contextual similarity and adjustment factors (World Bank, 2004; Bateman et al., 2009). Benefits transfer enables policymakers to make informed decisions using credible evidence, even in the absence of bespoke valuation studies, and is especially useful in cost-benefit analyses for public investments.

Five analytical approaches are used to measure the Active Travel Investment Programme wider economic benefits, each drawing from distinct data sources and assumptions to provide a range of indicative results. The aim of developing multiple methods is to ensure robustness and cross-validation. Comparing outcomes across methods helps ensure that the estimated benefits are consistent and realistic, and that the findings are not driven by the assumptions of one single approach. The methodologies used to estimate active travel wider economic benefits are explained in detail in Appendix C. The five methods are:

- *Benefits Transfer from Irish Benefit Cost Ratios*. This approach estimates long-term benefits using average Benefit-Cost Ratios (BCRs) from Irish active travel business cases.
- *Benefits Transfer from International BCR*. This approach applies average BCRs from comparable international active travel projects.
- *Benefits Transfer from Network Constructed*. This approach calculates benefits by applying average benefits per kilometre from Irish active travel business cases to the total length of the network delivered under the Programme.
- *Increased Demand from Delivered Projects using the Walking and Cycling Index (WACI) estimates*. This approach estimates benefits by linking programme expenditure to the resulting increased demand per project, and transferring benefits using WACI unit benefits. WACI embeds WHO's HEAT parameters, which are applied in the estimation of health benefits.
- *Increased Demand from Delivered Projects (TEAM Tool)*. This approach estimates benefits by linking programme expenditure to the resulted demand increase per project, and associated TEAM Tool unit benefits. The TEAM Tool embeds WHO's HEAT parameters, which are applied in the estimation of health benefits.

All methods presented above have strengths and limitations, reflecting data constraints and assumptions. These approaches rely on averages and generalised correlations that may not fully capture local variations in project delivery, user behaviour, or network context. Some inputs are derived from limited case studies or international sources, while others depend on indicative cost or demand estimates. As a result, the calculated benefits should be interpreted as broad indicative values rather than precise forecasts.

4. Economic Impact Assessment

This section presents the results of the Economic Impact Assessment for the Active Travel Investment Programme, which captures the planning and construction effects of the Programme. A detailed explanation of the IO model, including its methodology, assumptions, limitations, and full results, is provided in Appendix D.

While the wider economic benefits and jobs generated during project delivery are short-term and represent only one element of the overall impact, the true value of the Programme lies in the long-term economic and societal benefits that arise once the infrastructure is in place.

4.1. IO Model Results

Figure 5 and Figure 6 present the results of the Economic Impact Assessment for the full period from 2021 to 2030 in 2021 constant prices.

Figure 5. Economic Impact Assessment - GVA Effect Results (€ million, 2021 constant prices)

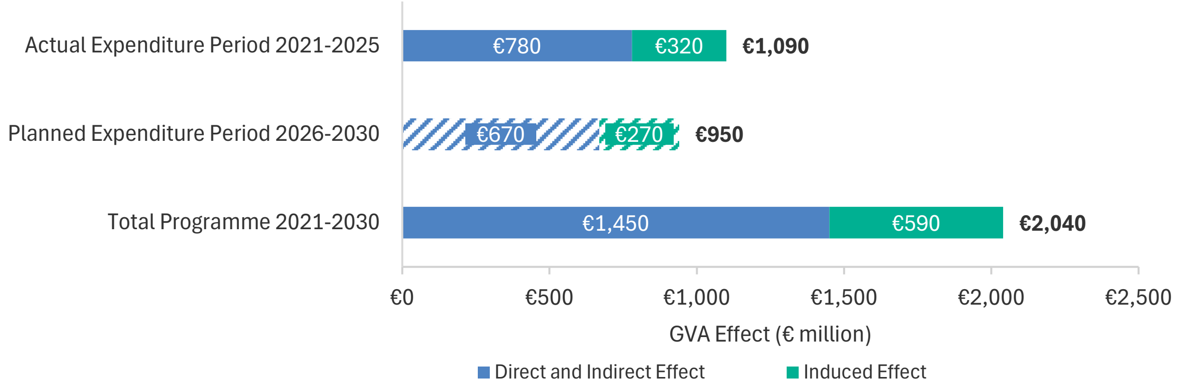
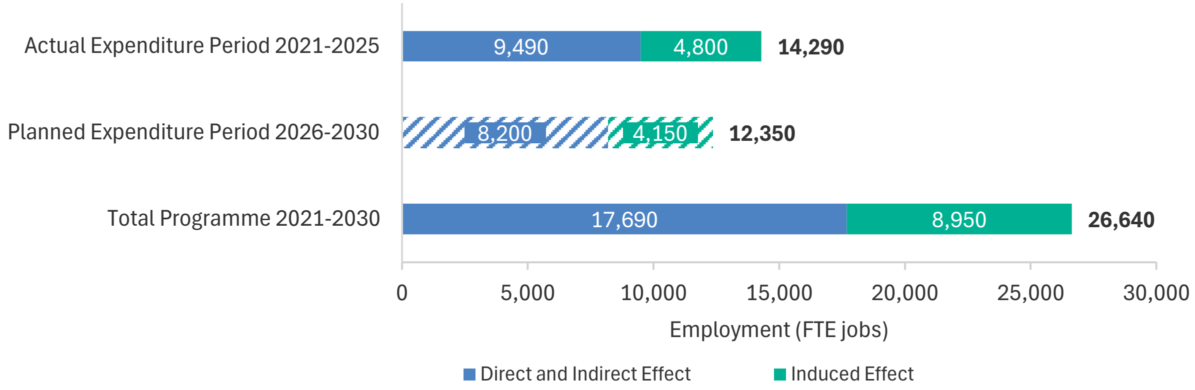


Figure 6. Economic Impact Assessment - Employment Results (FTE Jobs)



Over the full Programme timeline, capital expenditure on active travel has generated and is projected to generate a total of €1.45 billion in GVA through direct and indirect effects, amounting to €2.04 billion when adding induced effects. In terms of employment, the programme has supported and is expected to support 17,690 Full Time Equivalent (FTE) jobs over the 10-year period,[11] with an additional 8,950 FTEs when induced effects are considered, summing to 26,640 FTEs overall. On average, this amounts to over 2,650 FTE jobs per year over the 10 years period.

[11] The number of FTE jobs does not necessarily equal the number of people who will be employed, as these are counted over the entire construction and planning period (i.e. if the same person is employed for 3 years on the Programme, this would be the equivalent of 3 FTE jobs).

Furthermore, the Active Travel Investment Programme supports the creation of green jobs, according to the UNEP classification (UNECE and ILO,2020). Green jobs are those that contribute to preserving or restoring environmental quality, reducing carbon emissions, improving energy efficiency, and supporting adaptation to the effects of climate change. The United Nations Environment Programme (UNEP) and the International Labour Organisation (ILO) jointly highlight that investments in sustainable transport systems reduce environmental harm and also create employment across multiple sectors, from construction to services. Therefore, jobs in the active travel sector, such as planning, constructing and maintenance, are recognised as green jobs. Similarly, the European Skills Competences, Qualifications and Occupations (ESCO) framework developed a taxonomy to identify Green Jobs based on the job's inputs, outputs, processes and job quality. ESCO include roles and occupations that contribute to sustainable mobility, such as urban planners, transport engineers and infrastructure project managers and workers - who are central to the delivery of active travel projects (CEPS, 2023). The Economic and Social Research Institute (ESRI) assessed the labour market impact of the green transition in Ireland, and noted that transportation engineers are classified as "New and Emerging Green", and more broadly identified the overall increase in green jobs given the focus on decarbonising economic activity (ESRI, 2023).

Surveying work was undertaken regarding the level of leakage from the Irish economy to assess the proportion of project expenditure that does not remain within domestic economic activity. For further detail on the survey methodology and full results, see the Appendix D. From these surveys, the assumed leakage ratio is 8.3% during the engineering stages. For the contractor stage, a leakage rate of 0% is assumed, reflecting the fact that all construction providers engaged through the Programme are based in Ireland. These low leakage rates indicate that almost all investment in active travel infrastructure is converted into benefits for Ireland's economy, supporting domestic economic development and job creation.

A low leakage rate in a sector ensures that upskilling occurs within an industry and that skills remain within the industry, allowing expertise to accumulate and the development of highly skilled professionals over time, who have innate knowledge of the domestic market. It creates a strong foundation for continuous improvement, collaboration within the industry and the development of new ideas as teams build on shared experience and lessons learned. Feedback from the interviews undertaken for this report indicated this is happening, with growth and consolidation of many active travel teams over the last five years and evidence of high participation in active travel conferences and industry events.

Table 1 and Table 2 present the yearly IO model results, showing the GVA effects of delivered and planned infrastructure in 2021 constant prices. Table 3 and Table 4 display the corresponding yearly IO model results for employment impacts, capturing the effects of delivered and planned investment. Figures above show rounded values for clarity, while tables below retain the original unrounded data.

Table 1. GVA Effect from Active Travel Expenditure, 2021-2025 (€ million, 2021 constant prices)

	2021	2022	2023	2024	2025	Total
Direct and Indirect Effect	€111	€173	€179	€165	€149	**€777**
Direct, Indirect and Induced Effect	€156	€244	€252	€232	€210	**€1,094**

Table 2. GVA Effect from Active Travel Allocation, 2026-2030 (€ million, 2021 constant prices)

	2026	2027	2028	2029	2030	Total
Direct and Indirect Effect	€141	€137	€134	€131	€129	**€672**
Direct, Indirect and Induced Effect	€198	€193	€189	€185	€182	**€946**

Table 3. Employment Effect from Active Travel Expenditure, 2021-2025 (FTE jobs)

	2021	2022	2023	2024	2025	Total
Direct and Indirect Effect	1,352	2,113	2,186	2,014	1,821	**9,487**
Direct, Indirect and Induced Effect	2,036	3,182	3,292	3,032	2,743	**14,286**

Table 4. Employment Effect from Active Travel Allocation, 2026-2030 (FTE jobs)

	2026	2027	2028	2029	2030	Total
Direct and Indirect Effect	1,718	1,670	1,637	1,605	1,574	**8,205**
Direct, Indirect and Induced Effect	2,588	2,515	2,465	2,417	2,370	**12,355**

4.2. Sensitivity Analysis

Assumptions regarding the level of leakage from the Irish economy are made to assess the proportion of project expenditure that does not remain within domestic economic activity. As per the IO model limitations explained in Appendix D, factors in the wider economy, including behavioural inertia, political changes and supply chain constraints, cannot be incorporated into the sensitivity analysis because they fall outside the scope of this methodology.

Survey work was undertaken to estimate the level of leakage associated with contractors and engineering services within the Active Travel Investment Programme. Interviews were conducted with 8 engineering companies operating under the NTA engineering services framework. For further detail on the survey methodology and full results, see the Appendix D.4.

From these surveys, the assumed leakage ratio for central scenario is 8.3% during the engineering stages. For the contractor stage, a leakage rate of 0% is assumed, as advised by the NTA. This reflects the fact that all construction providers engaged through the Programme are based in Ireland.

Given the uncertainty of this variable, a sensitivity analysis has been undertaken to explore a range of potential outcomes. Figure 7 and Figure 8 present the results under alternative scenarios, including a “Lower Leakage” scenario assuming no leakage (representing the maximum potential benefits) and a “Higher Leakage” scenario applying leakage rates of 10% for contractors and 30% for engineering services. Detailed yearly results on sensitivity analysis are presented in Appendix D.5.

Figure 7. Sensitivity Analysis on Leakage - GVA Direct, Indirect and Induced Effects (€ million, 2021 constant prices)

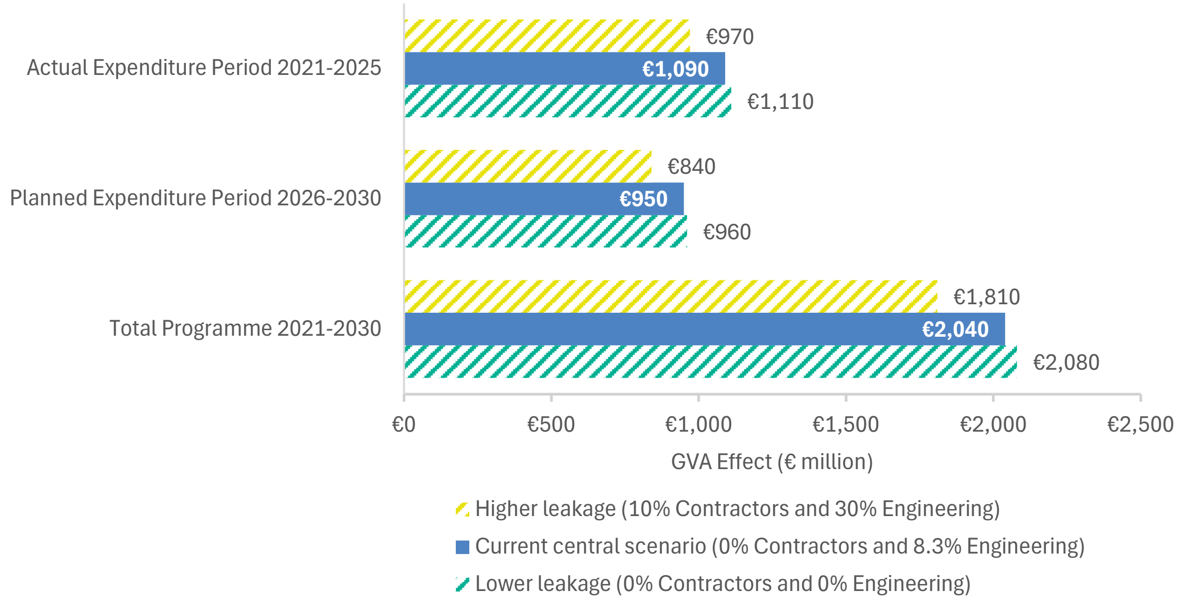
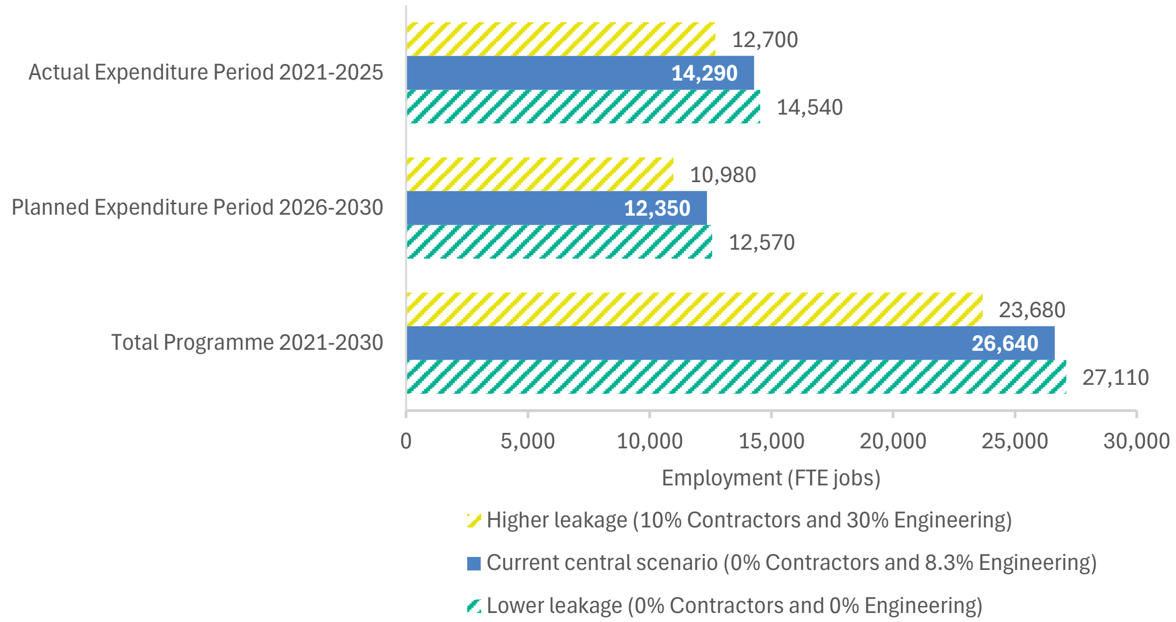


Figure 8. Sensitivity Analysis on Leakage - Employment Direct, Indirect and Induced Effects (FTE Jobs)



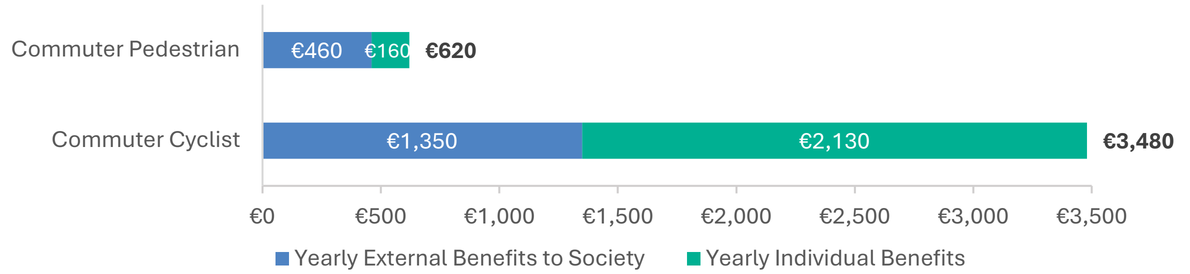
Under these scenarios, the total GVA Effect impact ranges from €1.81 billion to €2.08 billion, while the estimated employment effect varies between 23,680 and 27,110 FTE jobs, depending on the assumed level of leakage. Detailed yearly results on sensitivity analysis are presented in Appendix D.5.

5. Active Travel Wider Economic Benefits

5.1. Commuter Mode Shift Benefits

According to the NTA's WACI Tool (NTA, 2025b), based on averages across Dublin, Cork, Galway, Limerick and Waterford, the net economic benefit of shifting from private car travel is estimated at €1.65 per kilometre for cycling and €1.17 per kilometre for walking. Figure 9 shows that a cyclist commuter would generate €3,480 in combined annual savings to society and themselves, with each commuter who walks saving €620 annually. External benefits to society alone account for €1,350 per cyclist and €460 per pedestrian annually. The benefits presented in Figure 9 reflect a sensitivity analysis of the assumed walking and cycling distances, taking account of realistic limits on journey distances. Further detail on this estimation and sensitivity analysis is presented in Appendix B.

Figure 9. Annual Benefit per Cyclist and Pedestrian Commuter from Private Car Mode Shift (2025 Prices)

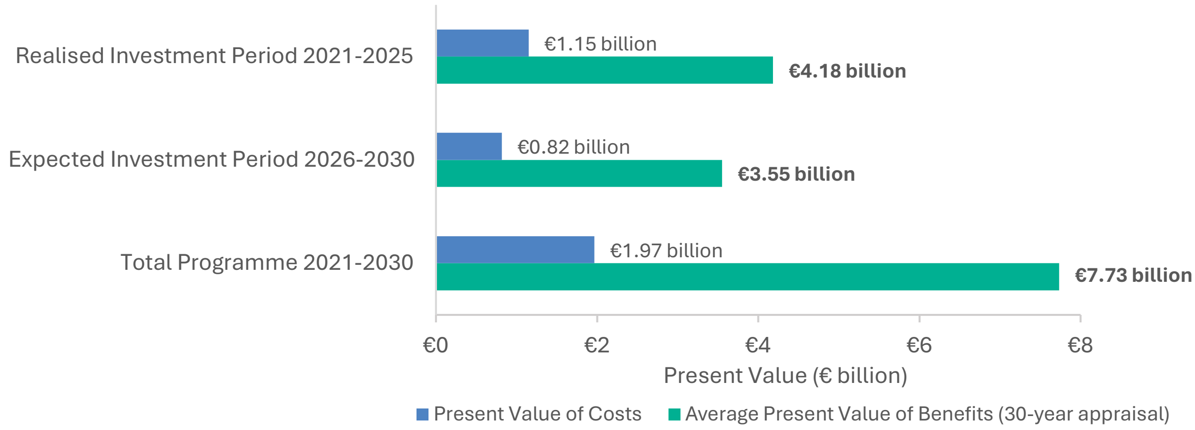


5.2. Wider Economic Benefits

Wider economic benefits from Active Travel Investment Programme were estimated using five different methodologies. Comparing outcomes across methods helps ensure that the estimated benefits are consistent and realistic, and that the findings are not driven by the assumptions of one single approach. The methodologies used to estimate active travel wider economic benefits are explained in detail in Appendix C.

Figure 10 presents results of Active Travel Investment Programme wider economic benefits over a 30-year appraisal period (PVB) compared to actual and expected expenditure in Present Value of Costs (PVC).[12]

Figure 10. Wider Economic Impact for the Active Travel Investment Programme (2021 Values and Prices)



[12] Present Value of Costs discounted to 2021 and expressed in 2021 prices are lower than the nominal investment in the Active Travel Investment Programme 2021-2030. Discounting reduces the value of future expenditures, meaning costs incurred in later years contribute less in today's terms.

These results indicate that the active travel investments are expected to deliver benefits substantially exceeding their costs over the Programme lifetime. The total benefits generated over a 30-year period from actual expenditure during 2021-2025 are estimated at €4.2 billion, corresponding to a BCR of 3.6. For the subsequent investment period, 2026-2030, the estimated benefits amount to €3.5 billion, yielding a BCR of 4.3. The higher BCR for 2026-2030 investment period reflects the lower PVC associated with expenditure occurring later in the appraisal period. While estimated benefits are lower in absolute terms, the lower discounted cost results in a higher overall BCR.

In terms of payback period, the Programme investment is estimated to be recovered by approximately year 6 of realised benefits, assuming benefits are evenly distributed over the 30-year appraisal period and discounted at 4%.[13]

According to NTA's WACI (NTA, 2025b), the combined active travel activity across Ireland's five largest metropolitan areas generates approximately €3 billion in annual economic benefits. This figure provides a useful benchmark for contextualising both the realised and projected wider economic benefits of ongoing and future active travel schemes.

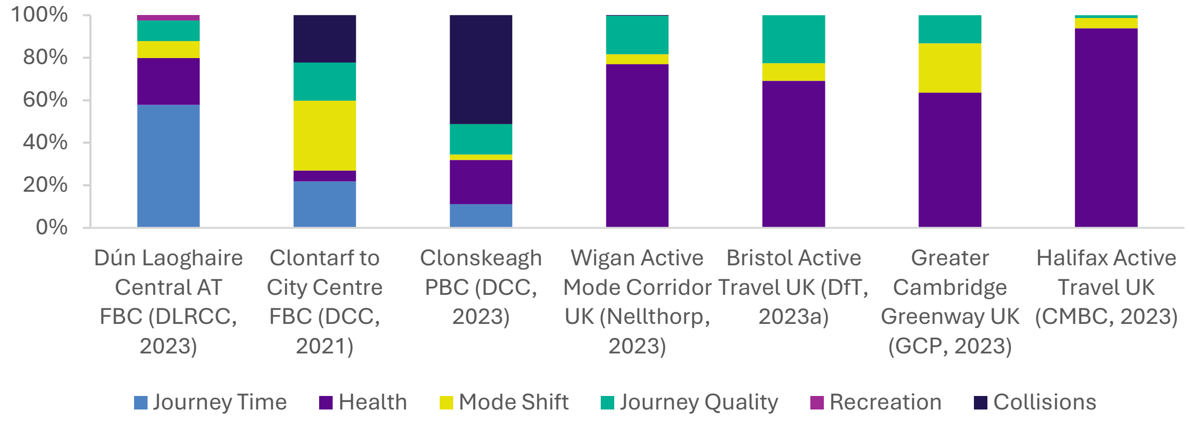
Results presented above have strengths and limitations, reflecting data constraints and assumptions. These approaches rely on averages and generalised correlations that may not fully capture local variations in project delivery, user behaviour, or network context. Some inputs are derived from limited case studies or international sources, while others depend on indicative cost or demand estimates. As a result, the calculated benefits should be interpreted as broad indicative values rather than precise forecasts.

5.3. Disaggregation of Type of Benefits

The nature and magnitude of benefits associated with new projects are highly dependent on the specific objectives and design of each scheme. Figure 11 shows an analysis of NTA and UK active travel business cases which confirms that the weighting of benefits differs considerably across scheme types. In the Irish context, different benefit weights reflect the main purpose of the project rather than a standardised set of benefit assumptions applied to all schemes. This approach is reinforced by Ireland's Active Travel Design Manual, which requires that the specific needs and context of each project are assessed at the outset and that the resulting design is tailored to be fit for purpose. By contrast, the UK approach appears to apply a more homogenised weighting of benefits across active travel schemes, which may not fully capture differences in scheme purpose and impact.

[13] This is based on converting the estimated 30-year PVB into an equivalent annual benefit and comparing the cumulative discounted benefits with the PVC; year 6 is adopted as a conservative estimate of the point at which costs are fully recovered.

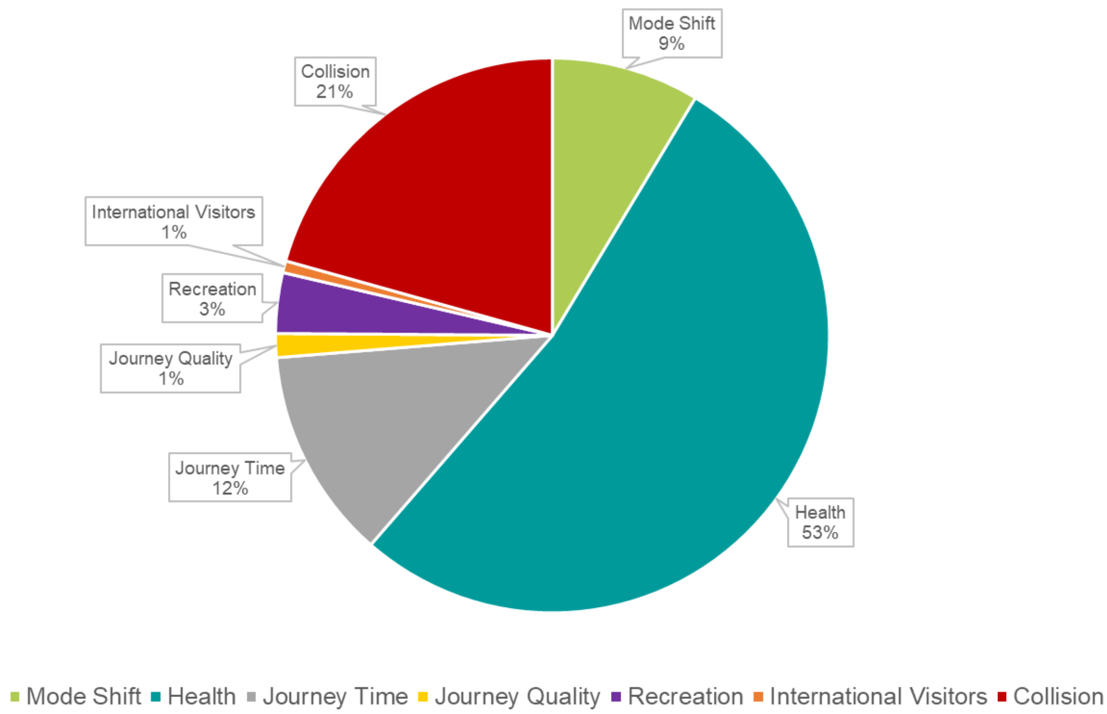
Figure 11. Weight of Active Travel Benefits Irish and UK Business Cases. Source: NTA and UK (See References)



Benefit estimates have been developed for one sample project to illustrate the typical range and relative value of benefits. Assumptions on the sample project and the limitations of this estimation method are detailed in Appendix C.1.

Figure 12 presents TEAM Tool results for the sample project. The benefit with the highest weight is Health followed by Collision, Journey Time and Mode Shift.

Figure 12. TEAM Tool Types of Benefits results from Sample Project (Method 5)



To disaggregate the different types of benefits across the total programme periods, Method 5, as outlined in Appendix C.1, was applied. This method applies the TEAM Tool, and although this benefit transfer approach offers a practical means of estimating impacts by type, it has inherent limitations, as not all schemes reflect the same characteristics or context as the sample project used in the model. The resulting estimates are presented in Table 5.

Table 5. Disaggregated benefits for the Active Travel Investment Programme with Benefits Transfer (Method 5)[14]

PVB (30-year appraisal)	Period 21-25	Period 26-30	Period 21-30
Mode Shift	**€309**	**€257**	**€565**
Vehicle Operating & Ownership Costs	€89	€74	€163
Carbon	€163	€135	€298
Air Quality	€7	€6	€12
Noise	€5	€4	€9
Congestion	€45	€38	€83
Health	**€1,886**	**€1,567**	**€3,453**
Reduced Mortality	€1,781	€1,480	€3,261
Workplace Absenteeism	€105	€87	€192
Journey Time	**€441**	**€366**	**€807**
Journey Quality	**€50**	**€41**	**€91**
Recreation	**€126**	**€105**	**€231**
International Visitors	**€25**	**€20**	**€45**
Collision *(not part of TEAM Tool)*	**€739**	**€614**	**€1,353**
Present Value of Benefits (PVB)	**€3,575**	**€2,971**	**€6,546**

[14] Congestion benefits are only realised in large towns and cities, where traffic volumes are high enough for active travel infrastructure interventions produce measurable reductions in traffic delay due to mode shift.

6. Conclusions and Next Steps

Active travel is a growing sector since 2020, characterised by the emergence of green jobs and driven by the institutional support provided by the NTA's Active Travel Investment Programme. There is evidence of skills development and consolidation of this emerging sector, with very low leakage levels of the investment. This indicates strong domestic economic development and job creation.

From 2021 to 2025, the NTA delivered almost 950 kilometres in active travel infrastructure, along with bridges, junction upgrades, school zones and other non-route investments. The next five to ten years will be crucial for protecting the progress already made, allowing for the full societal benefits of active travel to be realised.

The realisation of wider economic benefits from active travel depends on several interrelated factors. A safe, continuous, and well-connected active travel network is essential for increasing walking and cycling, improving safety, and supporting economic returns.

Over this timeframe, capital expenditure on active travel has generated and is projected to generate a total of €1.45 billion in GVA through direct and indirect effects, amounting to €2.04 billion when adding induced effects. In terms of employment, the programme has supported and is expected to support 17,690 FTE jobs over the 10-year period, with an overall of 26,640 when induced effects are also considered. On average, this amounts to over 2,650 FTE jobs per year over the 10 years period.

The Active Travel Investment Programme wider economic benefits over a 30-year appraisal period are estimated to be €7.73 billion (2021 Values and Prices). Overall, the Benefit-Cost Ratio (BCR) is 3.9, indicating that the Programme is expected to deliver benefits that substantially exceed its costs over its lifetime. In terms of payback period, it is estimated that the cost of one year's investment is fully recovered by the sixth year of the infrastructure being operational.

Benefit estimates have been developed for a sample project to illustrate the relative value of different benefit categories. Health is the largest component, followed by collision, journey time and mode shift.

Further work should focus on quantifying and monetising non-tangible benefits, and on exploring the economic impact assessment through dynamic modelling techniques that capture long-run behavioural and economic effects more accurately. IO modelling assumes the continuation of historic trends, whereas dynamic modelling, by incorporating feedback loops, captures the non-linear relationship when travel behaviour changes. It can therefore identify a transition to new scenarios or transformative change.

Another important next step would be to include a detailed assessment of the 2030 active travel target in the Climate Action Plan 2024 (DECC, 2024), since achieving a 50% increase in daily active travel journeys will depend on understanding future demand, network capacity, and the scale of behavioural change required. That would require an evaluation of whether planned active travel investment is sufficient to attain this target, and could be undertaken through an analysis of carbon reductions associated with the target. While a number of assumptions would need to be taken in this future work, it would help to further identify potential funding or policy gaps, and determine any additional measures needed to attain Ireland's Nationally Determined Contribution under the Paris Agreement.

Overall, continued investment in active travel infrastructure is essential to fully realise the significant and lasting societal benefits, while also supporting sustained economic development. The full impact of active travel investment often emerges only over longer periods, which further reinforces the need for consistent and long-term commitment to delivering and expanding the Irish active travel network.

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Appendix A. NTA's Active Travel Investment Programme Allocation

A.1. Active Travel Investment Allocation

The scale of investment delivered through the NTA's Active Travel Investment Programme is presented in Table 6 below. This shows the annual expenditure commitments over the period 2021 and 2025.

Table 6. Annual Active Travel Investment Expenditure, 2021-2025 (€ million, nominal prices)

	2021	2022	2023	2024	2025
Active Travel Spend	€184	€310	€341	€321	€297

The Active Travel Investment Programme allocation profile that has been agreed for the coming years is summarised in Table 7 below. These allocations highlight the Government's commitment to ensuring that resources are directed towards active travel infrastructure.

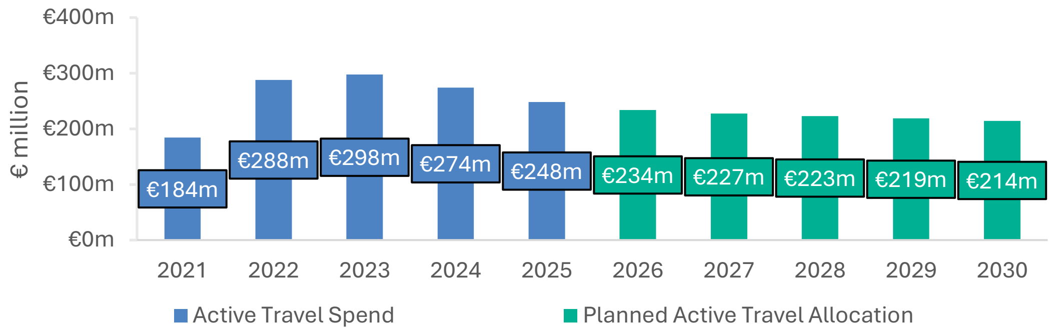
Table 7. Active Travel Investment Allocations, 2026-2030 (€ million, nominal prices)

	2026	2027	2028	2029	2030
Active Travel Allocation	€290	€290	€290	€290	€290

(*) Notes: Funding to be agreed from 2026-2030. Inflation impacts are analysed in Section 1.3.

The investment allocation used in the IO model has been converted to constant 2021 prices to ensure that economic impacts are assessed on a consistent real-terms basis across the 2021-2030 period. The conversion applies published CSO inflation data up to 2025,[15] and Ireland-specific ECB inflation forecasts for 2026–2028,[16] with an assumed inflation rate of 2.0% applied for 2029 and 2030.

Figure 13. Annual Active Travel Investment, 2021-2030 (€ million, 2021 constant prices)



A.2. Active Travel Investment Metrics

Between 2021 and 2025, a significant volume of infrastructure was delivered across the country under the programme, presented in Table 8. The delivery of these projects represents measurable progress towards a safer and more sustainable transport network that supports both local communities and national policy objectives.

Table 8. Active Travel Infrastructure Delivered (kilometres), 2021-2025

	2021	2022	2023	2024	2025
Walking Infrastructure	160 km	188 km	123 km	128km	99 km
Cycling Infrastructure	92 km	72 km	71 km	77km	70 km
Active Travel Infrastructure	221 km	226 km	170 km	182km	146 km

(*) Note: Total doesn't add up to the sum of walking and cycling infrastructure due to double counting on shared use pedestrian and cycling path and urban greenways.

[15] Central Statistics Office, *Consumer Price Index December 2025* and associated annual CPI datasets.
[16] https://www.ecb.europa.eu/pub/pdf/other/eurosystemstaffprojectionsbreakdown202606~d101a33de2.en.pdf

Appendix B. Detail on Commuter Savings Estimation

B.1. Estimation Methodology

Tables below present the estimated annual commuter savings associated with a modal shift from car use to active travel. However, the final figure reported is taken from the sensitivity analysis, based on a conservative assumption regarding distance travelled.

Table 9 provides a breakdown of how the yearly savings for a cyclist commuter have been estimated, producing an upper-bound estimate compared to Figure 9. Sensitivity analysis is presented in Section B.2.

Table 9. Calculations breakdown for Commuter Savings from Private Car to Cycling

Code	Calculation	Variable	Value	Source / Basis
A		Average cycling trip duration for commuters	22.8	TAF from Census 2016,[17] which states that average cycling journey time for commuters is 22.6 minutes per trip. From updated CSO Census 2022,[18] the average cycling journey time for commuters is 22.8 minutes, with 66% of journeys taking less than 30 minutes.
B		Average cycling speed	14 kilometres per hour	TII's TEAM Tool
C	(A/60) x B	Average cycling trip distance for commuters		
D		Round trip for commuters	2	Based on assumption of all commuters do a round trip
E	C x D	Average cycling distance per day for commuters		
F		Annualisation factor	248	365 days minus weekends (104 days), public holidays (8 days), sick days (5 days)
G	E x F	Average cycling distance per year for commuters		
H		Savings per kilometre travelled	€1.65 per kilometre travelled savings [19]	Average WACI mode-shift savings per kilometre travelled for Dublin, Cork, Galway, Limerick and Waterford (NTA, 2025b), associated with switching from private car travel to cycling
I	G x H	Yearly savings for a cyclist commuter		

[17] TAF Module 8 Detailed Guidance on Appraisal Parameters (DoT, 2023). Table 17 Average Active Travel Journey Times - Population aged 15 and over at work

[18] Census of Population 2022 Profile 7 - Employment, Occupations and Commuting. Travel Time by Means of Transport: https://data.cso.ie/table/FY081

[19] From WACI (2023), factors considered are Time Cost (travel time, non-work), Vehicle Operating Costs Prolonged Life, Health, Congestion, Infrastructure Maintenance, Accidents, Local Air Quality, Noise, Greenhouse Gases, Indirect Taxation, Soil and Water Quality, Well-to-tank Emissions.

Table 10 provides a breakdown of how the yearly savings for a walking commuter have been estimated.

Table 10. Calculations breakdown for Commuter Savings from Private Car to Walking

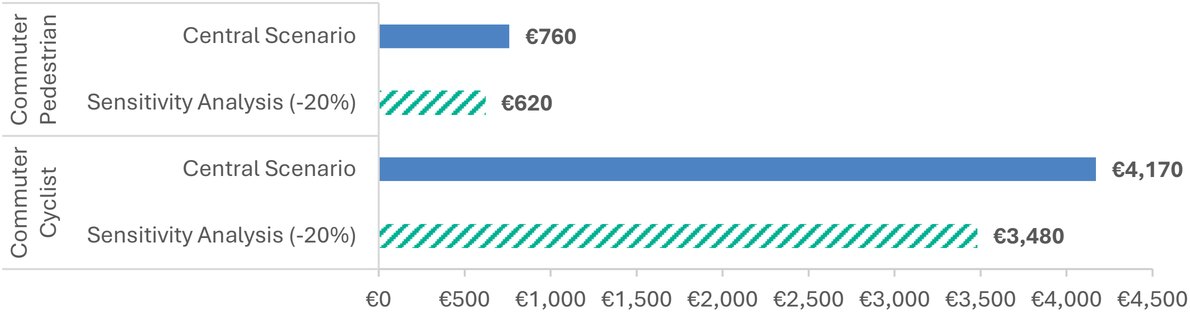
Code	Calculation	Variable	Value	Source / Basis
A		Average walking trip duration for commuters	16.3 minutes	TAF states that average walking journey time for commuters is 16.3 minutes per trip [20]
B		Average walking speed	5 kilometres per hour	TII's TEAM Tool
C	(A/60) x B	Average walking trip distance for commuters		
D		Round trip for commuters	2	Based on assumption of all commuters do a round trip
E	C x D	Average walking distance per day for commuters		
F		Annualisation factor	248	365 days minus weekends (104 days), public holidays (8 days), sick days (5 days)
G	E x F	Average walking distance per year for commuters		
H		Savings per kilometre travelled	€1.17 per kilometre travelled savings [21]	Average WACI mode-shift savings per kilometre travelled for Dublin, Cork, Galway, Limerick and Waterford (NTA, 2025b), associated with switching from private car travel to walking
I	G x H	Yearly savings for a walking commuter		

B.2. Sensitivity Analysis on Commuter Savings

Previous Irish research by Carroll, Caulfield and Ahern (2019) found that most walking and cycling commuting trips are less than 5 kilometres in length. This compares with an average commuting trip distance of 5.4 km estimated in the TAF (see TAF Module 8). To provide a more conservative assessment for Figure 9, and given that the average distance travelled by active commuters may be lower than assumed in the central case, a sensitivity analysis was undertaken. Figure 14 presents the results of this sensitivity analysis, based on a 20% reduction in trip distance for both commuter types, and the corresponding impact on annual commuter savings.

[20] As per footnote number 17.
[21] As per footnote number 19.

Figure 14. Sensitivity Analysis Results on Commuter Savings (2025 Prices)



Results show a range between €620 and €760 yearly savings for walking commuters and between €3,480 and €4,170 yearly savings for cycling commuters. Based on a more conservative assumption, the final figure reported in the main document (Figure 9) is taken from the sensitivity analysis.

Appendix C. Detail on Wider Economic Benefits Estimation

C.1. Estimation Methodology

Five analytical approaches are considered in the measurement of wider economic benefits, each with distinct inputs and assumptions. A summary of the methods is provided in Table 11.

Table 11. Wider Economic Benefits Estimation Methods Used

<table>
<tr><th>Method</th><th>Input and Sources</th><th>Calculations</th><th>Limitations</th></tr>
<tr><td>M1. Benefits Transfer from Irish BCR</td><td>– Average BCR from Irish Evidence</td><td rowspan="2">Benefits implied by the BCR are converted into an equivalent constant yearly value using standard discounting assumptions over a 30-year period</td><td rowspan="2">BCR indicates the long-term return on investment by comparing total discounted benefits to costs over the full appraisal period rather than within any single year</td></tr>
<tr><td>M2. Benefits Transfer from International BCR</td><td>– Average BCR from International active travel Infrastructure BCRs</td></tr>
<tr><td>M3. Benefits Transfer from Network Constructed</td><td>– Average Benefits per kilometre constructed from NTA’s Business Cases
– Average annual cycling-lane delivery rate from 2021-2025 is continued</td><td>Apply average benefits per kilometre from published business cases to the total routes constructed, accounting standard discounting assumptions over a 30-year period</td><td>Variations in user density, baseline conditions, or network connectivity are not captured, assuming that each additional kilometre yields similar benefits</td></tr>
<tr><td>M4. Increased demand from delivered projects (WACI)</td><td>– Average project cost, average project length and increase in demand from NTA’s business cases
– Daily average demand from DCC data
– Benefits per kilometre travelled from WACI (NTA, 2025b)</td><td>Estimate the number of projects delivered each year based on annual expenditure and average project cost, apply the average percentage increase in demand per project, calculate total additional kilometres travelled, and apply unit benefits and standard discounting assumptions over a 30-year period</td><td>Some annual costs relate to planning and design rather than completed projects, and average costs and demand increases may not fully reflect real data</td></tr>
<tr><td>M5. Increased demand from delivered projects (TEAM)</td><td>– Average project cost, average project length and increase in demand from NTA’s business cases
– Daily average demand from DCC data
– Benefits per kilometre travelled from TEAM Tool</td><td>Develop a representative sample project to run through the TEAM Tool, using its outputs to estimate and extrapolate benefits across the number of projects delivered and planned</td><td>Projects vary significantly in scale, location, and context, so the benefits derived from a sample project may not accurately reflect the full range of outcomes across all projects</td></tr>
</table>

- **Method 1 and 2. Benefits Transfer from Irish and International BCR**

These methods apply observed BCRs from completed or appraised active travel projects to recent investment data. It provides an indicative estimate of the overall scale of benefits expected from investment programmes, using Irish and international BCR evidence as a benchmark. To estimate the scale of benefits expected from a given level of investment, the total discounted benefits implied by the BCR are converted into an equivalent constant yearly value using standard discounting assumptions over a thirty-year period (IGs and TAF parameters). The result represents an indicative average annual benefit that reflects the long-term economic performance of the investment.

Irish evidence reviewed reports BCRs between approximately 1.2 and 7.0, with an average of around 2.8. By contrast, international studies report much higher BCRs showing that walking and cycling investments frequently achieve ratios between 5 and 30. Variations in these results largely reflect differences in the range of benefits included in each appraisal. A detailed analysis of Irish and international BCR estimates is provided in Table 12.

Table 12. Summary of BCRs for Active Travel Infrastructure

Source / Study	Location	Type of Investment	Reported BCR	Document	Notes / Key Findings
Clontarf to City Centre - FBC (DCC, 2021)	Dublin	Cycle & bus corridor	2.9 (range 1.9 - 3.0)	Business Case NTA	Includes journey quality and collision reduction benefits
College Green - Dame Street - SAR (DCC, 2022)	Dublin	Pedestrianisation & bus priority	2.0	Business Case NTA	High value for money; excludes health & safety monetisation
Dún Laoghaire Central - FBC (DLRCC, 2023)	Dún Laoghaire	Urban realm & active travel	1.23	Business Case NTA	Excludes healthcare & full safety benefits
Blackrock Village Living Streets - DBC (DLRCC, 2022)	Blackrock, Dublin	Public realm & active travel	1.4 (range 1.1 - 1.6)	Business Case NTA	Focus on safety, walkability & accessibility
Clonskeagh to Charlemont Street - PBC (DCC, 2023)	Dublin	Cycle corridor (UCD link)	1.24 (range 0.72 - 1.5)	Business Case NTA	Approx. 50% of benefits from collision reduction
Deenihan & Caulfield (2014)	Ireland	60 kilometres segregated cycle route	Average 7.0 (range 2.2 - 11.8)	Academic Study	HEAT-based; health-focused benefits
DoT Ireland (DoT, 2009)	Ireland	National cycling investments	4.0	Policy Estimate	Includes health, congestion & emission savings
Irish rate used in report (Method 1) - average			**2.8**		
Mueller et al. (2018)	167 European cities	Cycling network expansion	Up to 70.0	Academic Study	Health-driven; very high returns for large networks
Götschi et al. (2015)	Europe & North America	Cycling infrastructure	5.0 - 35.0	Academic Review	Median 10, safety & health included
Sustrans (2019)	UK	Active travel and economic performance	6.3 - 32.8	Cycling Demonstration Towns, Sustainable Travel Towns, Connect, Linking Communities	BCR from projects in the UK
Department for Transport, UK (DfT, 2023b)	UK	Local walking & cycling schemes	Median 5 (range 2.0 - 19.0)	Government Evidence Base	Median 5, classified as high value for money
International rate used in report (Method 2) - minimum value			**5.0**		

One limitation of this approach is that the BCR represents the relationship between the total discounted benefits and costs over the full appraisal period. In reality, the benefits of active travel projects tend to build up gradually as new routes and facilities open, more people start using them, and travel habits begin to change. The BCR should therefore be interpreted as an indicator of the overall long-term return on investment, showing that a given level of funding is expected to generate certain multiple of benefits over the entire appraisal period rather than within any single year.

Table 13 provides a breakdown of how Present Value Benefits (PVB) for 30-year appraisal period for the investment in active travel have been estimated for both Method 1 and Method 2.

Table 13. Calculations breakdown for Method 1 and Method 2

Code	Calculation	Variable	Value	Source / Basis
A		Investment in active travel Period (nominal prices)	See Metrics in Appendix A	Provided by NTA
B		Inflation rates and projections	2021-year prices	CSO Inflation Rates NTA Inflation Bulletin, NTA (2026)
C	A / B	Investment in active travel Period (real prices)		
D		Discount Factor and appraisal start year	4% 2021	TAF (DoT, 2023)
E	C x D	Present Value of Costs (PVC) 2021-2025		
F		Average BCR	Method 1 (Ireland): 2.8 Method 2 (International): 5	Based on Table 12
G	E x F	Present Value of Benefits (PVB) for 30 years		

- **Method 3. Network Constructed**

This method applies an average benefit per kilometre derived from recent Irish business cases and international evidence to the actual kilometres of new infrastructure delivered. This approach assumes that the monetised benefits of new routes are broadly proportional to their physical extent, allowing the total benefits of a programme to be estimated directly from annual network delivered.

Recent business cases published by the NTA report would use around €7 million per kilometre for the full 30-year appraisal (2011 Values and Prices), which is converted to €0.6 million yearly benefits per kilometre, using standard discount rate (2021 Values and Prices). This aligns with findings from Fosgerau et al. (2023), which report similar benefit levels. A detailed analysis of Irish and international benefits per kilometre constructed estimates is provided in Table 14.

Table 14. Incremental Network-Based Benefit Estimation

Source / Study	Context / Location	Benefit per kilometre (or equivalent metric)	Type (Infrastructure, User-kilometre, etc.)	Notes / Key Findings
Clonskeagh to Charlemont Street PBC	Dublin, Ireland	€7,147,363 per kilometre per 30-year appraisal	Infrastructure-based	Benefits from TEAM Tool. Length 3.1 kilometre and PVB €22.2 (2011 Values and Prices)
Dún Laoghaire Central Active Travel FBC	Dublin, Ireland	€6,535,813 per kilometre per 30-year appraisal	Infrastructure-based	Benefits from TEAM Tool. Length 2.8 kilometre and PVB €18,3 (2011 Values and Prices)
Fosgerau et al. (2023) Bikeability and the induced demand for cycling	Copenhagen / Denmark	€0.42 million per kilometre per year, not a discounted PV figure	Infrastructure-linked benefit	Modelled annual benefit per km of new bicycle lane including travel cost, health, accidents. Assumed 2023 prices

One limitation of this approach is it does not capture variations in user density, baseline conditions, or network connectivity, and it assumes that each additional kilometre yields similar benefits. In reality, benefits may increase as networks become continuous or decline where marginal extensions serve fewer users.

Table 15 provides a breakdown of how Present Value Benefits (PVB) for 30-year appraisal period for the investment in active travel have been estimated for Method 3.

Table 15. Calculations breakdown for Method 3

Code	Calculation	Variable	Value	Source / Basis
A		Present Value of Benefits per kilometre	€6,857,136 per kilometre per 30-year appraisal (2011 Values and Prices)	Based on Table 14
B		Discount Factor and appraisal start year Inflation rates	4% 2021 1.083	TAF (DoT, 2023) CSO Inflation Rates
C	A / B	Present Value of Benefits per converted	€10,967,781 per kilometre per 30-year appraisal (2021 Values and Prices)	
D		Annual kilometres cycling lane constructed	See Metrics in Appendix A. It is assumed that the yearly average rate of network delivery from 2021 to 2025 will be maintained throughout the period 2026 to 2030	Provided by NTA. Assumption by Turley
E	C x D	Present Value of Benefits (PVB) for 30 years		

- **Method 4. Increased demand from delivered projects (WACI)**

This method uses the WACI model to estimate benefits by applying a standard € value per kilometre travelled to the additional walking and cycling demand generated by completed projects. Average sample project is the following presented in Table 16.

Table 16. Sample active travel project

Variable	Value	Source / Basis
Average project cost	€16.3 million	Average value from NTA's Active Travel Business Cases
Average project length	3 kilometres	Average value from NTA's Active Travel Business Cases
Location of project	Dublin	Active Travel project's location
Average current cyclist demand	5,884	CSO, Code THA24 "Monthly volume of bicycles at selected Dublin sites". Average from January 2019 - May 2022 converted to daily trips.
Conversion Ratio Cyclist - Pedestrian	1 cyclist equals to 9 pedestrians	National Household Travel Survey (2023). Existing Trips cyclists and pedestrian's ratio in average Ireland
Average current pedestrian demand	53,267	Conversion Ratio Cyclist - Pedestrian (5,884 x 9)
Increase in cyclist/pedestrian demand	+5%	Increase used in NTA's Active Travel Business Cases. Conservative assumption, considering Business Cases ranges: DL Central Active Travel FBC: +10%; Clontarf FBC: +36%; Clonskeagh PBC: +25%

This method has several limitations. It assumes that all expenditure directly results in completed projects, while some years include planning and design costs without project delivery. In addition, average project costs and demand increases may not reflect local conditions or project scale, baseline demand data may be limited or inconsistent, which may not represent national conditions accurately. For the TEAM approach, projects vary significantly in scale, location, and context, so the benefits derived from a sample project may not accurately reflect the full range of outcomes across all projects.

Table 17 provides a breakdown of how Present Value Benefits (PVB) for 30-year appraisal period for the investment in active travel have been estimated for Method 4.

Table 17. Calculations breakdown for Method 4

Code	Calculation	Variable	Value	Source / Basis
A		Investment in active travel Period (nominal prices)	See Metrics in Appendix A	Provided by NTA
B		Inflation rates and projections	2021-year prices	CSO Inflation Rates NTA Inflation Bulletin, NTA (2026)
C	A / B	Investment in active travel Period (real prices)		
D		Average sample project cost	€16.3 million	Based on Table 16
E	C / D	Number of projects invested yearly		

F		Average new cyclist and pedestrian demand per project	+5%	Based on Table 16
G	E x F	New daily cyclist and pedestrian yearly		
H		Average kilometres travelled per trip	1.4 kilometres for pedestrian commuters 6km for cyclist commuters	Values from TEAM Tool and TAF (DoT, 2023)
I	G x H	New kilometres walked/cycled yearly		
J		Benefits per kilometre travelled from car to cycling/walking	€1.65 per kilometre cycled €1.17 per kilometre walked	WACI values (NTA, 2025b)
K	I x J	Undiscounted Yearly Benefits		
L		Discount Factor and appraisal start year	4% 2021	TAF (DoT, 2023)
M	K x L	Present Value of Benefits (PVB) for 30 years		

- **Method 5. Increased demand from delivered projects (TEAM)**

This method applies the TEAM Tool by running a representative sample project through the model to estimate benefits, which are then extrapolated across all delivered and planned projects.

This method has several limitations as the approach assumes that the sample project is sufficiently representative to generalise benefits at the national level. Projects differ significantly in scale, design, and context, meaning the benefits estimated from a single sample project may not accurately represent the diversity of outcomes across the full programme.

Table 18 provides a breakdown of how the Present Value Benefits (PVB) for 30-year appraisal period for the investment in active travel have been estimated for Method 5. Collision benefits are not considered directly in the TEAM Tool.

Table 18. Calculations breakdown for Method 5

Code	Calculation	Variable	Value	Source / Basis
A		PVB for Collision (2011 Values and Prices)	€11.3 million	Average value from NTA's Active Travel Business Cases
B		Discount Factor and appraisal start year Inflation rates	4% 2021 1.083	TAF (DoT, 2023) CSO Inflation Rates
C	A / B	PVB for Collision (2021 Values and Prices)	€8.3 million	
D		Sample project PVB for 30 years	Run sample project through TEAM Tool, using 2021 as base year	Based on Table 16
E	C + D	Sample project PVB for 30 years with collision		
F		Average sample project cost	€16.3 million	Based on Table 16
G	E / F	Number of projects invested yearly		
H	E x G	Present Value of Benefits (PVB) for 30 years		

C.2. Wider Economic Benefits Detailed Results

The estimation of wider economic benefits from active travel requires a clearly defined assessment period that reflects both the timeframe of infrastructure delivery and the expected duration of benefits. For this review, the assessment period has been structured into two distinct phases from the Active Travel Investment Programme: Realised Increased Benefits for 2021-2025 and Expected Increased Benefits for 2026-2030.

Figure 15. Interval of Realised Increased Benefits for 2021-2025 PVB for all Methods (2021 Values and Prices)

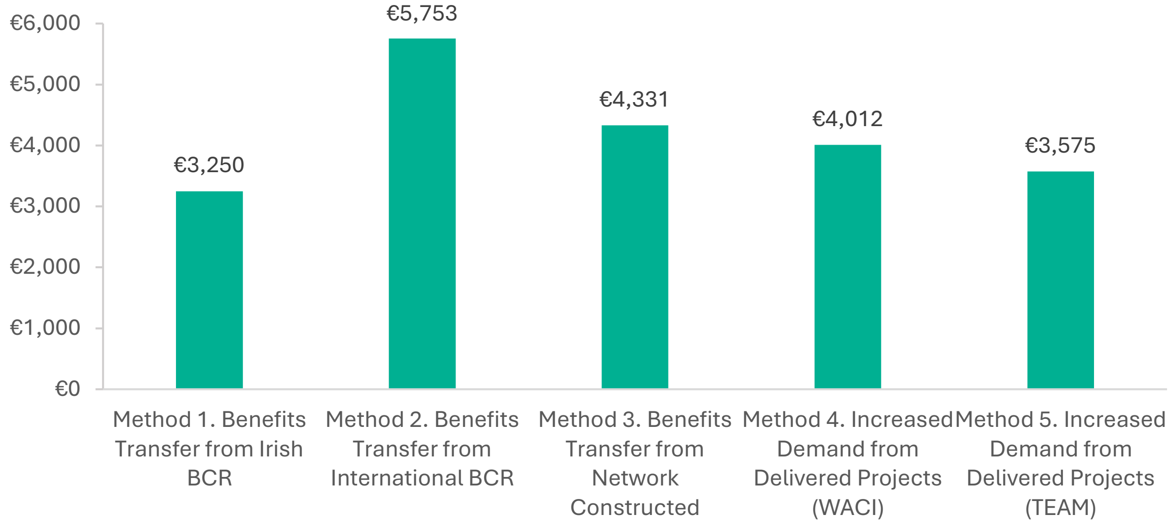
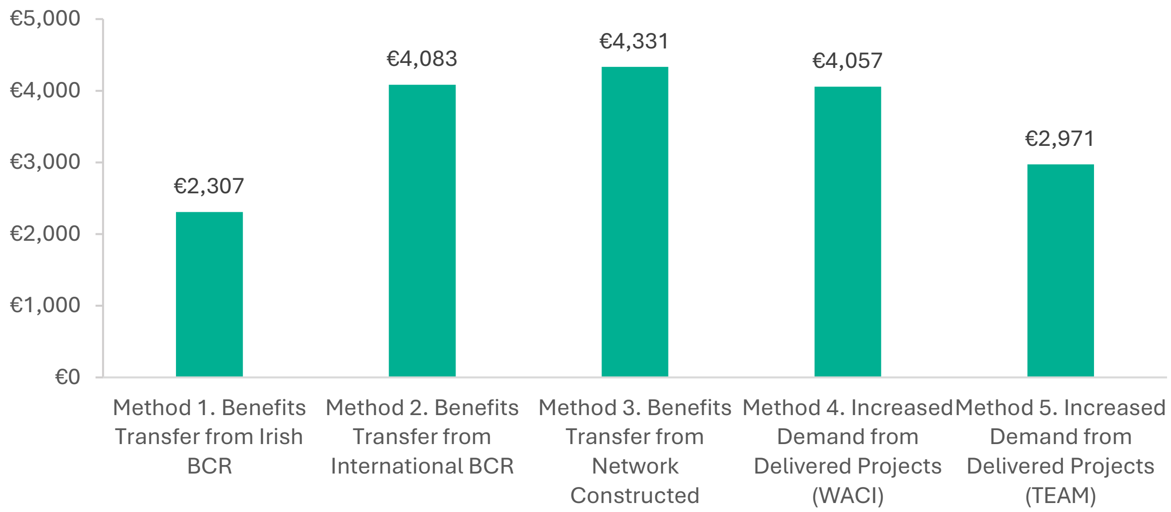


Figure 16. Interval of Expected Increased Benefits for 2026-2030 PVB for all Methods (2021 Values and Prices)



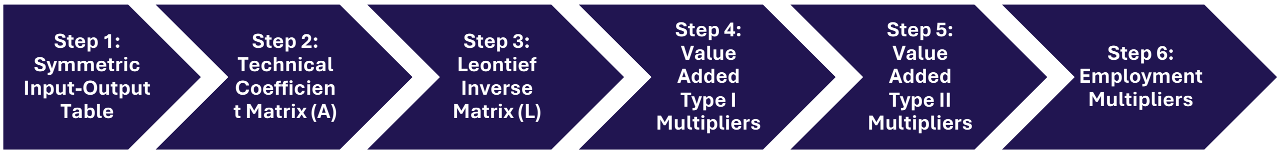
Appendix D. IO Model Report

D.1. IO Model Methodological Overview

Input Output analysis is an established method for estimating how spending in one part of the economy affects other sectors. The IO model, developed by Leontief (1936), describes interdependencies between industries in an economy. It illustrates how the output of one sector serves as input for another. Figure 17 illustrates how to obtain the multipliers following Leontief framework. Each step is explained further below.

Type I effects represent the combined direct and indirect economic impacts arising from investment expenditure. Direct effects occur within the sectors directly delivering active travel infrastructure, while indirect effects arise through supply-chain activity. Type II effects build on the Type I results by additionally incorporating induced effects generated through household spending associated with employment and income supported by the Programme. Accordingly, Type II effects capture the full direct, indirect and induced economic impacts.

Figure 17. Step-by-step Type I and II multipliers' calculations



Step 1: Symmetric Input-Output Table

The process begins with the symmetric IO tables which are provided directly by the CSO. These tables present the inter-industry flow of goods and services within the Irish economy, showing how each sector uses the output of others as inputs to its own production. The CSO tables are available in product-by-product format, where both rows and columns refer to the same categories. They also include components of final demand (such as household, government, and export consumption) and value added (including wages, profits, and taxes). Figure 18 presents the Symmetric Input-Output Table of domestic product flows at basic prices.

Figure 18. 2021 Symmetric Input-Output Table of domestic product flows at basic prices (€m). Source: CSO

		CPA Products										€m
CPA	*Products*	Agriculture, Forestry & Fishing (01-03)	Industry (excluding construction) (05-39)	Construction (41-43)	Distribution, Transport & Communication (45-63)	Business Services (64-82)	Other Services (84-97)	**Total inter-industry**	Final Consumption	Capital Formation	Exports f.o.b. (free on board)	**Total Outputs**
01-03	Agriculture, Forestry & Fishing	1,760	5,792	68	524	4	123	**8,270**	1,752	117	1,354	**11,493**
05-39	Industry (excluding construction)	1,002	12,689	3,624	4,779	1,265	2,010	**25,370**	9,151	1,466	259,395	**295,381**
41-43	Construction	179	2,246	7,067	0	93	339	**9,924**	224	25,123	759	**36,030**
45-63	Distribution, Transport & Communication	275	6,411	1,305	22,789	6,776	1,824	**39,378**	29,106	2,036	224,003	**294,523**
64-82	Business Services	347	7,156	3,389	18,983	21,363	2,975	**54,212**	25,108	9,401	69,226	**157,947**
84-97	Other Services	41	560	237	576	2,057	3,639	**7,110**	56,662	242	392	**64,406**
Total	**Total intermediate consumption**	**3,603**	**34,854**	**15,689**	**47,652**	**31,557**	**10,910**	**144,264**	**122,003**	**38,384**	**555,129**	**859,780**
	Imports	3,125	102,641	9,705	123,284	29,463	9,735	**277,953**				
	Product taxes less subsidies	207	3,622	689	4,286	3,337	857	**12,998**				
	Total consumption at purchasers' prices	**6,936**	**141,117**	**26,082**	**175,222**	**64,356**	**21,502**	**435,215**				
	Compensation of Employees	1,127	11,483	5,405	34,436	30,086	34,735	**117,272**				
	Operating surplus, net	4,000	89,361	4,751	60,352	35,380	4,413	**198,257**				
	Consumption of fixed capital	1,185	52,395	153	26,269	27,976	4,458	**112,435**				
	Non-product taxes less subsidies	-1,756	1,025	-360	-1,756	149	-703	**-3,400**				
	Value added	**4,557**	**154,264**	**9,948**	**119,302**	**93,591**	**42,904**	**424,564**				
	Total inputs (= total outputs)	**11,493**	**295,381**	**36,030**	**294,523**	**157,947**	**64,406**	**859,780**				

Intermediate Consumption refers to transactions between businesses in an industry who use the goods or services produced by others as inputs for their own production. The columns show the amount that each sector buys off other sectors. For example, in Figure 18, the construction sector purchases €3,624 million from the industry sector and has a total intermediate consumption of €15,689 million.

Value Added represents the difference between final output and intermediate consumption and appears in the bottom half of each column. This includes compensation (wages and salaries) paid to employees, operating surplus, consumption of fixed capital, and taxes less subsidies. For example, for the construction sector in Figure 18, value added is €9,948 million.

Final Demand refers to demand for goods and services for the purposes of final consumption, including demand from households, government, international markets (exports) and for capital/investment purposes. Final demand comprises the final three columns in Figure 18. For example, for the construction sector, final demand is €36,030 million.

Step 2: Technical Coefficients Matrix (A)

The technical coefficients matrix is derived from the symmetric IO table and indicates the proportion of inputs each sector requires from others to produce one unit of output. This matrix provides insight into the structure of inter-industry dependencies, highlighting, for example, how construction activities depend on manufacturing outputs or how service sectors rely on energy and utilities.

Figure 19 illustrates the Technical Coefficients Matrix (A), which represents the input-output relationships between products or sectors. Each coefficient a_{ij} indicates the amount of input from sector *i* required to produce one unit of output in sector *j*. Together, these coefficients describe the interdependence of production activities within the system.

Figure 19. Technical Coefficients Matrix (A). Source: Turley Planning Ireland IO Model Example

		Agriculture, forestry and fishing	Mining, quarrying and extraction	Manufacture of food products	Manufacture of beverages and tobacco products
NACE	***Products***				
01-03	Agriculture, forestry and fishing	0.15	0.00	0.21	0.16
05-09	Mining, quarrying and extraction	0.00	0.03	0.00	0.00
96	Other personal service activities	0.00	0.00	0.00	0.00
97	Private households with employed persons	0.00	0.00	0.00	0.00
	Total inputs (=Total domestic supply in Table 1)	**1.00**	**1.00**	**1.00**	**1.00**

Step 3: Leontief Inverse Matrix (L)

Once the technical coefficients matrix is established, it is used to form the Leontief Inverse Matrix (L), expressed as $(I - A)^{-1}$, where the Identity Matrix (I) is a square matrix with ones along the diagonal and zeros elsewhere.

This matrix captures how a change in final demand for one sector's output translates into changes in total production across all sectors. The diagonal elements represent direct effects, while the off-diagonal elements reflect the indirect effects transmitted through the supply chain.

Step 4: Type I Multipliers

The Type I output multiplier for each sector is calculated by adding up the elements in each column of the Leontief inverse. Each column represents the total increase in output across the economy resulting from an increase in final demand for that sector. These multipliers quantify the total impact on output, employment, or income resulting from an initial change in final demand, considering direct and indirect effects throughout the production network. In this approach, households are treated as exogenous, meaning their spending behaviour is not yet incorporated into the production system.

Step 5: Type II Multipliers

Type II Multipliers include Type I and induced effects from household income spending. Households are treated as endogenous, considering Wages and Private Consumption. This is achieved by linking Compensation of Employees to household spending patterns (both data sourced from CSO's Symmetric IO Table). The resulting Type II multipliers therefore capture direct, indirect, and induced effects, offering a more comprehensive representation of the total economic impact associated with a project, policy, or investment. Figure 20 illustrates the square and symmetric IO table diagram.

Figure 20. Type II Symmetric Input-Output Table. Source: Eurostat (2010)

		Agriculture	Industry	Services	Private consumption
		1	2	3	4
1	Agriculture				
2	Industry		A		C
3	Services				
4	Wages		B		E

A = matrix of input coefficients for intermediate consumption of products
B = row vector of input coefficients for wages
C = column vector of input coefficients for private consumption related to compensation of employees
E = element with zero (no entry)
D = partitioned matrix of input coefficients

Step 6: Employment Multipliers

Employment multipliers measure the total employment generated in the economy as a result of a change in final demand. These multipliers are expressed in FTE terms and reflect how labour requirements spread across sectors through direct, indirect, and induced effects.

The starting point is the calculation of FTE per euro of final demand, obtained by dividing the number of FTE jobs in each sector by that sector's total inputs. This provides a measure of the employment intensity of production across industries. Table 19 presents evolution of employment per unit of output.

Table 19. Changes in Employment Intensity and Domestic Production (2016-2021)

IO Model Versions	2016	2021 Update	Δ2016/2021
Total FTE per Industry	1,734,525	2,168,049	+25%
Total domestic supply	521,486	859,780	+65%
FTE per million euro of final demand	3.33	2.52	-24%

Total FTE employment increased by 25%, from 1.73 million to 2.17 million, reflecting overall labour market growth. Over the same period, total domestic supply increased 65%, indicating significant expansion in the scale and value of domestic production. With these changes, the FTE per million euro of final demand declined by 24%. This suggests that the Irish economy has become less employment-intensive, likely due to productivity gains, structural shifts toward higher-value sectors, and increased capital intensity in production.

Type I Employment Multipliers are derived by multiplying the FTE per euro of final demand by the Type I Leontief Inverse Matrix, capturing direct and indirect employment effects. Similarly, Type II Employment Multipliers are obtained by combining the FTE per euro of final demand with the Type II Leontief Inverse Matrix, which also includes induced effects from household income and consumption.

D.2. IO Model Limitations

It is important to acknowledge several limitations associated with IO modelling, which should be considered when interpreting the results.

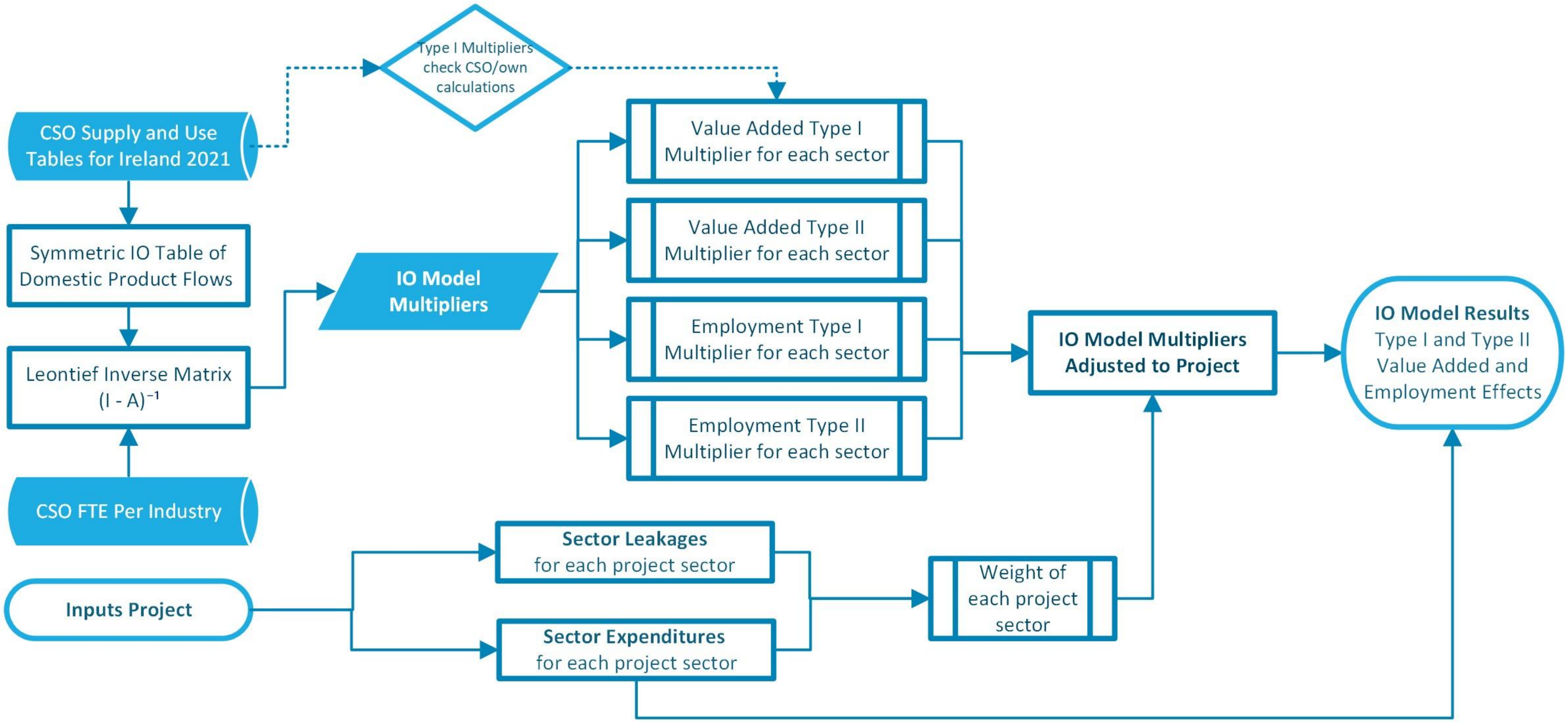
- Static snapshot: IO models represent the economy at a specific point in time. The most recent Irish tables, published in 2022, are based on data from 2021, so any subsequent changes in technology, production methods, or economic structure are not captured. The model cannot account for how industries evolve or how relationships between sectors change over time.
- Fixed input ratios: Each industry is assumed to use the same mix of inputs regardless of the scale of production.
- Linear relationships: Outputs are assumed to change in direct proportion to inputs, with no possibility of substitution between production factors
- Fixed prices: The model assumes that quantities, rather than prices, adjust to meet changes in demand.
- Constant returns to scale: The model assumes that each additional unit of output requires a proportional increase in inputs. In reality, many sectors experience economies or diseconomies of scale, where efficiency either improves or declines as output expands.
- No behavioural or dynamic mechanisms. The model does not include behaviour change, adoption curves, sensitivity to infrastructure improvements, or other dynamic responses. This limits its ability to capture realistic changes in mode choice or travel behaviour over time.
- No representation of network effects. Active travel benefits often increase as networks become more connected. Input output models cannot simulate these cumulative or reinforcing effects.

Taken together, these assumptions mean that IO models are best viewed as comparative static tools. They are useful for identifying inter-industry linkages and assessing broad economic impacts, but they do not reflect behavioural, technological, or structural changes that occur in a dynamic economy. Given these limitations, the development of a dynamic model may represent a useful further approach beyond this report.

D.3. IO Model Diagram

Figure 21 presents the diagram of the IO model used.

Figure 21. IO Model Diagram



D.4. Leakage Assumption

The IO model incorporates as input data the estimated leakage ratios for each sector of the development. To inform these estimates, the NTA commissioned Turley Planning Ireland to undertake active travel sector interviews to assess which investment in active travel supports domestic economic activity and employment within the contractor and engineering sectors.

D.4.1. Contractor Services sector leakage

For the contractor sector, a leakage rate of 0 percent is assumed, as advised by the NTA. This reflects the fact that all construction contractors engaged through the programme are based in Ireland.

D.4.2. Engineering Services sector leakage

Sector interviews were performed to assess the leakage in investment in active travel within the engineering sector. Chapters below present the methodology used for these interviews: purpose and scope, sampling and recruitment, survey design, questions list and survey results.

- **Purpose and scope**

The surveys provided validated evidence on leakage assumptions that informed the economic appraisal of the Active Travel Investment Programme, as well as sector capacity, employment, and supply chain structure.

- **Sampling and Recruitment**

The interviewees included 8 engineering companies operating under the NTA engineering services framework. To ensure that selected participants had recent and relevant experience in delivering Active Travel projects, steering from NTA was used to confirm which companies should receive invitations. This coordination ensured that interviews were conducted with firms directly involved in project delivery and that the insights collected accurately reflected the operational and economic characteristics of the sector.

A cover letter accompanied each interview invitation. Invitations were sent electronically, with follow-ups undertaken to achieve higher response rates.

- **Survey Design and Mode**

The primary mode of engagement was online or telephone interviews, each lasting approximately ten minutes. The interviews followed a semi-structured format, allowing flexibility to explore relevant themes while maintaining consistency across participants. All questions were designed to ensure clarity, comparability, and relevance across respondent types.

- **Questions list**

1. Roughly how many employees do you have, and where are they based? Are you part of a wider UK/European or Global firm that works across different countries?
2. When working on Active Travel projects, how much of the labour is sourced locally (within Ireland)? How many employees work on active travel projects? Do you have an active travel team?
3. In active travel projects, are there any components or services that you regularly need to source from outside Ireland? If so, which ones and why? Do you subcontract any parts of your work for the NTA?
    a. If so, where are these companies located (Ireland, Northern Ireland or elsewhere)?
    b. If so, what types of services or trades are typically subcontracted?

4. Can you estimate what percentage of your project costs typically go to overseas suppliers or contractors?

5. How different do you think the work you do on Active Travel has become since before COVID (say, five years ago)? Have your processes changed? What are you getting more efficient at doing, and how have things evolved?

- **Surveys results**

Each engineering company provided an estimate of its leakage percentage, with responses ranging from 0% to 20%. To produce an overall figure, a weighted average was calculated using the leakage percentage reported by each company and the value of project payments made to them by the NTA from January 2023 up to date (provided by the NTA). This weighting ensures that companies receiving larger project allocations have a proportionately greater influence on the final estimate.

Based on this approach, the weighted average leakage rate for engineering services is 8.3%.

D.5. Sensitivity Analysis on Leakage

As presented in Section 4.2, sensitivity analysis is developed on leakage, including a Lower Leakage scenario assuming no leakage (representing the maximum potential benefits) and a Higher Leakage scenario applying leakage rates of 10% for contractors and 30% for engineering services.

Table 20 and Table 21 present sensitivity analysis on the yearly IO model results for the GVA effects in 2021 constant prices. Table 22 and Table 23 present sensitivity analysis on the yearly IO model results for employment impacts. Tables below retain the original unrounded data.

Table 20. Sensitivity Analysis on GVA Effect from Active Travel Expenditure, 2021-2025 (€ million, 2021 constant prices)

Leakage Assumption	Effect Type	2021	2022	2023	2024	2025	Total
Lower Leakage (0% contractor services, 0% engineering services)	Direct and Indirect	€ 113	€ 176	€ 182	€ 168	€ 152	**€ 791**
	Direct, Indirect and Induced	€ 159	€ 248	€ 257	€ 237	€ 214	**€ 1,114**
Current Central Scenario (0% contractor services, 8.3% engineering services)	Direct and Indirect	€ 111	€ 173	€ 179	€ 165	€ 149	**€ 777**
	Direct, Indirect and Induced	€ 156	€ 244	€ 252	€ 232	€ 210	**€ 1,094**
Higher Leakage (10% contractor services, 30% engineering services)	Direct and Indirect	€ 98	€ 153	€ 158	€ 146	€ 132	**€ 687**
	Direct, Indirect and Induced	€ 138	€ 216	€ 224	€ 206	€ 186	**€ 970**

Table 21. Sensitivity Analysis on GVA Effect from Active Travel Allocation, 2026-2030 (€ million, 2021 constant prices)

Leakage Assumption	Effect Type	2026	2027	2028	2029	2030	Total
Lower Leakage (0% contractor services, 0% engineering services)	Direct and Indirect	€ 143	€ 139	€ 137	€ 134	€ 131	**€ 684**
	Direct, Indirect and Induced	€ 202	€ 196	€ 192	€ 189	€ 185	**€ 964**
Current Central Scenario (0% contractor services, 8.3% engineering services)	Direct and Indirect	€ 141	€ 137	€ 134	€ 131	€ 129	**€ 672**
	Direct, Indirect and Induced	€ 198	€ 193	€ 189	€ 185	€ 182	**€ 946**
Higher Leakage (10% contractor services, 30% engineering services)	Direct and Indirect	€ 125	€ 121	€ 119	€ 116	€ 114	**€ 594**
	Direct, Indirect and Induced	€ 176	€ 171	€ 167	€ 164	€ 161	**€ 839**

Table 22. Sensitivity Analysis on Employment Effect from Active Travel Expenditure, 2021-2025 (FTE jobs)

Leakage Assumption	Effect Type	2021	2022	2023	2024	2025	Total
Lower Leakage (0% contractor services, 0% engineering services)	Direct and Indirect	1,376	2,150	2,225	2,049	1,853	**9,653**
	Direct, Indirect and Induced	2,072	3,239	3,351	3,086	2,792	**14,540**
Current Central Scenario (0% contractor services, 8.3% engineering services)	Direct and Indirect	1,352	2,113	2,186	2,014	1,821	**9,487**
	Direct, Indirect and Induced	2,036	3,182	3,292	3,032	2,743	**14,286**
Higher Leakage (10% contractor services, 30% engineering services)	Direct and Indirect	1,200	1,876	1,941	1,788	1,617	**8,422**
	Direct, Indirect and Induced	1,809	2,828	2,926	2,695	2,438	**12,696**

Table 23. Sensitivity Analysis on Employment Effect from Active Travel Allocation, 2026-2030 (FTE jobs)

Leakage Assumption	Effect Type	2026	2027	2028	2029	2030	Total
Lower Leakage (0% contractor services, 0% engineering services)	Direct and Indirect	1,749	1,699	1,666	1,633	1,601	**8,349**
	Direct, Indirect and Induced	2,634	2,559	2,509	2,460	2,412	**12,574**
Current Central Scenario (0% contractor services, 8.3% engineering services)	Direct and Indirect	1,718	1,670	1,637	1,605	1,574	**8,205**
	Direct, Indirect and Induced	2,588	2,515	2,465	2,417	2,370	**12,355**
Higher Leakage (10% contractor services, 30% engineering services)	Direct and Indirect	1,526	1,483	1,454	1,425	1,397	**7,284**
	Direct, Indirect and Induced	2,300	2,235	2,191	2,148	2,106	**10,980**

Údarás Náisiúnta Iompair
National Transport Authority