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INTERREG VA Priority 3 Sustainable Transport

Evaluation 2017 - 2022

Completed by Transport Research Partners
On behalf of the SEUPB



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1. Executive Summary

The INTERREG VA Priority 3 Sustainable Transport Programme has facilitated continuing development of transport infrastructure across Ireland, Northern Ireland and Scotland. The programme supports construction of infrastructure with the intent to move trips from less sustainable to more sustainable modes. These include cycling and walking, public transport, and Electric Vehicles (EVs).

A series of desirable outcomes are defined in terms of physical Infrastructure (Outputs Indicators) and in terms of net benefits in travel behaviour (Results Indicators). Both sets of indicators are defined in the Cooperation Programme (CP), and reviewed by the initial and stage two assessment processes. The definitions include descriptions of infrastructure and of results associated with each project, discussed in the body of this document.

The programme has been broadly successful in achieving its aims, despite significant changes in the environments for transport use, employment patterns and ongoing cost of living crises, both preceding and as a result of the Covid pandemic, including enforced periods of lockdown and a fundamental shift in employment and working patterns, that remain in flux at the time of writing. It is notable that construction prices had been increasing prior to the pandemic, but were made worse as a result of it. These have all affected the circumstances in which the programme and projects have been delivered, requiring rapid responses by both the projects themselves and the programme management. Delays in some planning functions were also experienced by the projects that include, but are not limited to, planning applications on both sides of the border, and to the completion of environmental impacts required in some areas, discussed below.

The results of ongoing changes have been a change in the focus given to the delivery of infrastructure across projects, and the extension of infrastructure delivery timescales. These are detailed through the stage 2 assessment and revision process, including modification requests, described in section 7, below; and include changes to the total value of support and extended end dates, amongst others. It is our conclusion that these changes support the delivery of the programme's aims, but will also have the effect of limiting the extent to which Results Indicators can be measured, within the life of the programme.

Despite the changing context of transport, and limitations in supply, the INTERREG VA projects have continued to be delivered. By taking the actions observed through the evaluation, and described below, in maintaining and extending, it is likely that the programme management has ensured the maximum levels of infrastructure possible will be delivered. In most instances the majority of infrastructure is under construction, or timetabled for construction within extended timetables agreed with the programmes body. The extensions will support the completion of infrastructure necessary to meet the sustainable transport objectives of the programme.

The evaluation has identified a number of differences between definitions and approaches to measurement across the projects, set out in detail in the sections below. We conclude that lessons should be taken from the process in future supported activities.

The reduced abilities of projects, and the programme in general, to deliver on Results Indicators is an outcome of the context of supply, and not of any specific inaction on the part of the projects themselves. It is our conclusion that, over time, the infrastructure as delivered will achieve the results indicators in line with the intent of the programme. These will not be visible over the remaining life of the programme.

The evaluation covered the period up until September 2022 and reflects achievement and projected achievement from that point in time. Since then significant issues have impacted on delivery of the Sustainable Transport Priority, notably in relation to the Ulster Canal Greenway project, falling outside the evaluation period. These are not covered in this report.

1.1 Delivery against targets

All of the supported projects have developed infrastructure that support the diversion of travel demand from conventional internal combustion (IC) engine cars to more sustainable modes. The nature and extent of this diversion was defined in the CP and expressed as modal split percentages for most projects. The FASTER EV project was approved later in the process and had indicators defined separately.

An additional evaluation was required and undertaken in the early stages of the programme, prior to the FASTER project application, to establish the impact of not having an EV outcome. The evaluation concluding that the diversion of funding to greenways resulted in reduced benefits; the findings reported in subsequent sections of this document. The award to the FASTER project, albeit at a later point in time, being likely to reduce the loss of benefit initially measured.

Physical outcomes of the programme are likely to be achieved to a large extent, but not in their entirety. Achieved outcomes, visible at the time of writing, fall below the stated outcomes defined in the application process, including its modifications. This said, achievable outcomes, likely to be delivered by the conclusion of the programme, remain broadly on track with some variations in defined projects. Given the extent of external challenges experienced across the programme and by all of its projects, the delivery of a majority of the infrastructure planned is a significant achievement.

Insofar as Results Indicators were defined in percentages, their measurement remains possible against original and revised versions of the baseline calculation, and approved modification. However, as the majority of projects have not opened fully the potential to achieve the stated percentage change remains hypothetical, and is likely to follow beyond the life of the programme, rather than fall within it.

It is not possible for the evaluation team to determine the eventual results indicators, but would suggest that the impacts will, where measured in percentage modal split uplift, be achievable over time.

1.2 Application and review processes

The process by which applications were appraised demonstrates a series of differences in the understandings between projects and the programme body. Much of this difference related to the measurement of outcomes, and definitions, with a lack of consistency across many of the original applications and appraisals. The situation being made more complex by changes to the definitions stated in the CP, resulting in confusion around the definitions of Modal Split, the timescales applied to measurement, and the trip purpose categories used.

Misinterpretations were not limited to the projects alone, with a carry forward of differing terminology in the application appraisal processes, and further in to the Letters of Offer. The programme management body and the evaluation team went to some lengths to clarify the definitions in both reporting and through workshops held with the projects.

In addition to the use of differing definitions, a number of additional outputs were stated in the letters of offer that were not present in the CP document. The details of which are set out in subsequent sections of this document.

Ongoing review processes, including modification requests and the stage two assessment reports also reference a range of outputs that extend beyond those initially defined in the CP, discussed in section seven of this report, and likely to have been included to highlight the potential additional benefits that each project contributed to. The stage two assessments also continue to apply differential terminology in relation to modal split, using variations on modal shift and modal share

that had been identified as inconsistent in the earlier workshops held over the lifetime of the programme.

We conclude that a number of lessons should be learned in terms of clarity and common definitions. These would have reduced the level of ambiguity in the applications process for this programme and is a transferable lesson to other similar programmes.

1.3 Challenges and external pressures

The programme was delivered through a period of significant external change. By far the greatest challenge being related to the Covid pandemic, though a number of notable further factors, including rapid changes to consumer and energy prices are also noted and are of increasing severity at the time of writing. Immediate impacts of the pandemic relate to planning and construction delays, with the knock-on impact of creating delay, extended delivery times and higher costs. Project modification requests were received, and granted in most instances, allowing for extension to the delivery timescales, particularly in terms of the construction of physical infrastructure, see section seven.

Further changes affecting the construction and operation of projects are likely. Wider economic conditions as affecting cost and use are observable at the time of writing, with potential project impacts arising from higher inflation rates being experienced compared to those initially anticipated. Higher costs are likely to impact on both construction cost and potential use.

The impacts of increasing costs are felt likely to affect the electric vehicle market disproportionately as private individual vehicle purchase budgets are likely to be squeezed in the current conditions. The inverse may also be true, that the higher costs of fossil fuels being observed at the time of writing may persuade some people to move from Internal Combustion vehicles to EVs as offering better operating life costs. The impact of rapid changes to the retail costs of electricity will also be an important element in this decision, discussed in more detail below. It is also possible that the economic crisis may result in lower numbers of trips being made, a net gain in terms of sustainable transport; alongside a significant economic decline, which will impact negatively on employment and future investment.

1.4 Project Reviews

The evaluation team undertook a review of the original definitions, the spatial definition and their validation, for each of the projects, against a review of origin and destination data, reported in section five of this document. We have also undertaken a review of modification requests, summarised below and set out in detail in section seven. In a majority of instances modification relates to the extension of infrastructure construction and delivery dates, as well as additional financial support reflecting cost overruns directly associated with pandemic and other external economic conditions.

North West multimodal Hub (NWH)

The NWH provides new interchange infrastructure by redeveloping the Derry / Londonderry railway terminal. The new infrastructure extends interchange possibilities and provides a significantly improved experience for passengers accessing railway, bus, and active travel modes. It is the only INTERREG VA project within the Sustainable Transport priority to have completed infrastructure construction at the time of writing.

The hub application contains a number of differing interpretations in terms of output number and measurement to a point of divergence between CP and project calculations. Its application and appraisal included a requirement to undertake a survey of demand, subsequently undertaken by

the Department of Infrastructure in April 2017. Of the total of 314 responses, only 12 stated they were traveling across the border making extrapolation to result indicator levels problematic. It is notable that the Hub is likely to play a significant role in travel choices for trips originating on both sides of the border, particularly as the first point of interchange to rail for travellers from Donegal, but these trips were difficult to determine from the survey results alone.

A revision of the pre-pandemic baseline calculation was undertaken by the evaluation team in the early stages of the review resulting in a revised trip count, illustrated in table 14, and a lower level of modal split uplift.

The primary Output Indicator was delivered and opened to some uses in 2019, with full opening following in 2020. It is noted that some of the additional deliverables, including active travel and integrated transport links were not delivered at the time of initial opening, limiting the extent to which the hub was able to deliver all of its potential. The pandemic further reducing the extent of hub use. The main observed impacts of the pandemic being a decline in actual person trip numbers, reflecting a significant decline in the baseline numbers of trips being made, to an estimated 17% of pre-covid levels, see section 5.2.

Where the effects of the pandemic are included the baseline trip count changes further translating to an actual baseline rate of 16 regular cross-border commuting trips, with growth based on this baseline, to equate a target of 41 regular cross-border commuter trips, were all other factors to remain the same.

A modification request was received and approved in December 2021, granting a 15-month extension to the hub development to 31/03/2023.

Carlingford Lough Greenway (CLG)

The CLG links Newry with Carlingford Town. It joins a number of existing greenway and new build sections. The initial application proposed 15.3kms of new greenway, see section 5.3.

Covid impacts have resulted in a truncation of some route kms and a necessary review of the potential trip numbers, see section 5.3.1.

Additional environmental survey requirements and further negotiations on route updates, including a requirement for DFI approval for the section from Victoria Lough to the Albert Basin in Newry have created delays to the intended delivery, set out in detail below.

Given the recalculation of baselines, common across the majority of the programme projects, it is possible that the Carlingford Lough Greenway will achieve the intended percentage increase in regular cross-border commuter trips initially envisaged, but these are not anticipated until after the closure of the programme.

The greenway was granted modification in December 2021 to allow for an extension in delivery date, to 31st December 2022, and budget reallocation. A request for additional funding was reported to the July 2022 meeting but not tabled for approval given a number of risks in delivery from planning application delay and planning approval risk.

Ulster Canal Greenway (UCG)

The UCG was originally defined as 21.8kms, connected to an existing network in Monaghan town. In common with other projects, the Ulster Canal Greenway experienced a series of delays and challenges, notably delayed delivery of infrastructure and the resubmission of a shortened route, truncated to 12kms, see section 5.3.2.

The effect of the pandemic on the UCG is visible in the increased costs and timelines required for delivery. Delays have also been experienced in landowner negotiations, particularly in respect of the sections in Middletown, and as a result of a request for additional surveys for the NI planning process, that had not been previously anticipated.

A revised trip count has been calculated, resulting in a staged uplift of 10 regular cross-border commuting trips.

A modification request was submitted and approved in December 2021 granting an extension in project end date to 31/12/2022. A further modification was requested and tabled at the July 2022 meeting of the SEUPB steering group, seeking additional funding of €2.2m, alongside an extension to construction dates up to 31st December 2023, and a reduction of 12.2kms from the originally approved route.

North West Greenways Network (NWG)

The NWG proposed 46.5kms of new greenway split into three sections, see section 5.3.3. The NWG has experienced a number of delays reported to the evaluation team, that included those resulting from the pandemic, and an update to planning guidance issued by the Department of Transport Tourism and Sport (DTTAS). The change requiring a retrospective adaptation in planning process, which in turn had a significant impact on both project costs and delivery timescale, discussed below. In addition, the project reported that Covid lockdowns had also impacted on the ability of the greenway to maintain its initial timescales, construction and material costs. Contingency plans were submitted to the programme under which the full greenway length would be maintained, at 46.5kms, with a reallocation of construction and route variation set out in section 5.3.3. An analysis of the trip baselines was also undertaken resulting in an updated baseline figure set out in table 23.

In May 2021 the project wrote to the SEUPB indicating that its initial route 1 was no longer viable due to escalating construction costs and issues experienced in the planning process. A series of route alternatives was proposed, and an evaluation undertaken by external consultants. A recommendation was adopted to approve additional funding and extend the project construction period to a new end date of 31st December 2023.

On the 7th of July 2022, the steering group approved the granting of an additional €9m to the project, approving four replacement 'contingency' routes, and a 12 month extension to 31 December 2023.

FASTER EV project

The FASTER project was added in October 2020, after the initial effects of Covid had become apparent, and allowing for modifications ahead of significant activity, see section 5.4. The project is notable in that its definitions differ from those of the other projects in that it focused on private car fuel choice rather than a diversion to public transport, cycling or walking.

As in the other projects, demand for EV charging infrastructure flows from a need for travel, but differs in the nature of that demand as being related to a specific fuel type in one mode rather than the choice of one mode or the choice to travel at all. The need for EV charging infrastructure also reflects on a wider economic relationship between vehicle costs, expenditure and the chicken-and-egg relationship between the presence of charging points and choice to purchase an EV in the first place.

It is notable that the changing economics of car use, particularly the extent of change being observed at the time of writing, makes the measurement and prediction of levels of use complex.

Fuel price increases have been experienced for most of the last 18 months, to August 2022, which would argue for increased use of alternative fuels. The cost of retail electricity, however, has also increased by a significant amount, with the most significant impacts being seen from October 2022. This change is likely to offset much of the potential gain from changes in fossil fuel prices, and represent price changes that could not have been foreseen nor incorporated into the various analyses completed prior to the impact.

It is also notable that differences in relative support, specifically the incentive schemes across the project jurisdictions, can alter the extent to which populations across the various geographies are likely to move to EV, as opposed to IC vehicles.

Delays in the development and commissioning of infrastructure construction have been observed, but were felt, by the project not to have impacted on the potential to deliver the extent of infrastructure as originally planned, albeit in an extended timeframe.

1.5 Conclusion

Our evaluation has been based on the assessment of design, delivery and outcomes over time. The work was developed as a longitudinal assessment, being the comparison of outputs and results on a consistent basis over the period of the evaluation.

Insofar as the programme board and projects have sought to maintain infrastructure delivery, in the main through the extension of delivery dates, we consider it likely that the programme will deliver maximum levels of infrastructure possible in light of the current external circumstances.

The individual projects appear to have focused activity on deliverables that would be likely to be achievable, which, alongside commitments by the managing body, are likely to ensure public benefits are delivered to the greatest extent possible.

The positive impacts of the infrastructure on travel behaviour can continue to be measured but are unlikely to be fully realised in the life of the project itself.

The outbreak of Covid in the latter half of the programme, alongside economic changes arising from Brexit, an increased cost of construction, and the more recent behavioural changes affecting transport patterns and choices, further exacerbate limitations in the delivery of the projects, and in measuring Results Indicators. Structural changes in travel behaviour, as well as longer term increases in construction costs, some of which predate the pandemic, have reduced the abilities of the projects to deliver to the specifications originally anticipated, set out in summary above, and in detail in the subsequent sections of this report. We have therefore undertaken a proxy RI assessment for each project, see section five.

The extent of delivery possible differs between projects. The North West Hub being the only project to have completed its physical outputs at the time of writing.

The ability of projects to achieve changes in modal split are more challenged, however, as a result of underlying changes to travel behaviour, and a shift from office based to home-based work in many circumstances.

Public Transport Use

Given the impact Covid has had on travel and the vast reduction that has occurred on all public transport services, achieving some of the targets in relation to the mode will be challenging. The impact of this shift is likely to affect the hub more significantly than other projects, though some impact will also be felt in projects reliant on connectivity to Public Transport (PT) hubs.

Greenway Use

Greenway use has also been challenged by the Covid pandemic, facing many of the same work pattern shifts experienced by public transport. Increases in walking and cycling activities for leisure purposes have been observed as replacing commuting travel, but is not directly relevant using the measurement structure defined in the CP. Methodologies that allow for the identification of all use benefits would be an appropriate addition to future infrastructure projects.

Electric Vehicle Use

Market changes are likely to impact in the FASTER project differently to the greenway or hub projects. The FASTER project is also more likely to be affected by affordability and vehicle retail prices, price differentials and availability of EV and non-EV vehicles, access, speed and cost of charging points as well as other impacts on personal and household budgets. Changes to the comparative costs of fossil and EV fuels are in a state of flux, being disincentives to the choice of specific fuel types, particularly noted at the time of writing; while other incentives appear to differ between jurisdiction, with a lower rate of support available in NI compared to the ROI and Scotland.

In drawing a conclusion, it is necessary to highlight the difficulties and continuing market changes faced by the programme and its projects. Where these are taken into account it is reasonable to conclude the programme and projects are likely to deliver a significant amount of infrastructure that will contribute greatly to the aims of the programme. It is necessary to observe not all projects will be able to deliver on all aspects of their applications. This said, it is highly unlikely that the original stated outputs could have been delivered in light of the circumstances of their provision.

1.6 Recommendations

- Results Indicators (RI) definitions

A difficulty arose throughout the project in respect of the definition, interpretation, and measurement of RIs, both at baseline and target. This creating the necessity to confirm the intended measures, as well as those included in various levels of documentation, from the original project applications and frequently in subsequent reporting, as well as in some of the letters of offer. Only a few statements of intended RIs appeared consistently throughout. It is our recommendation that future projects precisely define the meanings of intended RIs from their outset. This will avoid confusion and allow for like-for-like analysis of intended and achieved outcomes.

- RI Measurement specific to the North West Hub

We understand that significant effort has been taken by Translink to provide a shuttle service from the hub to the Foyleside bus station. This is significant in the delivery of the intended increases in regular cross-border commuting, as it links the key railway interchange to the most frequently used arrivals and departure point for cross-border bus access. We also understand that long distance coaches linking the city to Dublin airport will also stop at the hub. As both of these activities provide an opportunity to link the hub to regular cross border we recommend that these form the primary basis of trip counts and estimated impacts in the RI. We would anticipate these be based on a passenger surveys which could be repeated over time, and a regular head count for passengers boarding at the hub. The first survey would repeat the concept of the original DFI survey, to be based in the hub itself, and to capture the trip purpose, origin and destination of its respondents, as well as the method adopted for onward travel. This would provide a validated trip count for:

- o Cross border commuter numbers, and

- The chosen method of onward travel

Combinations of these factors would allow the calculation of total cross-border commuter passengers on the basis of a head count of passengers transferring to either the shuttle or long-distance coach to and from the hub.

- Evaluation structure and engagement

We further recommend that the numbers of meetings between the Joint Secretariat and the evaluation team be increased, and set to a defined timescale. In our evaluation we have received significant support and assistance from both the JS and the projects themselves, but would also highlight the importance of defined meeting structures. We would recommend these include meetings at the outset of the applications assessment process, and at regular intervals throughout.

Detailed descriptions of the process of evaluation, including analysis and conclusion are set out in the sections below.

2. Evaluation Aims and Objectives

The SEUPB commissioned Transport Research Partners (TRP) to undertake an evaluation of the INTERREG VA Programmes Priority Axis 3, Sustainable Transport projects in the period 2017 - 2022.

Our study started in December 2017, and an inception meeting was held in February 2018, reported in document 18022205JC. The inception report set out the tasks, activities, and analyses, we would complete, summarised in this document and reported over the course of the study.

A reporting structure was also agreed including baseline analyses, review and annual reports, including this one. A common numbering system is applied throughout including to the reports listed in table 1, below. Copies of all reports are available on request.

Our work follows the specification requirements set out by SEUPB, and includes:

- Implementation Evaluations, cumulatively a longitudinal assessment of implementation,
- Impact Evaluations, cumulatively a longitudinal assessment of impacts,
- Programme and project meetings and workshops, and Sustainable Transport conference

In addition to the initial outputs, TRP was asked to undertake additional assessments of:

- The initial decision to reallocate EV project funding to other projects within the priority, and
- Assessment of the FASTER project, an EV project approved after the commencement of the initial review

Outputs and results indicator evaluation forms the basis of the numbered sections of this report. We have also included a review of survey results, in Appendix 1; and details of the workshop and conference activities in Appendix 2.

2.1 Definitions

For the purposes of clarity, the following terms will be used consistently throughout this document:

- The **study** refers to a review being undertaken by Transport Research Partners (TRP) on behalf of the Special EU Projects board (SEUPB), of which this document is part.
- The **programme**, refers to INTERREG VA priority axis 3, Sustainable Transport programme as set out in the INTERREG VA programme description¹.
- The **programme body**, refers to the SEUPB, being the body responsible for the implementation of the EU INTERREG VA Programme.
- The programme **objective** refers to INTERREG VA Objective 3: to promote Cross-border, intermodal and sustainable mobility in the region that will result in an increase in the number of cross border journeys,
- The programme **result indicators**, refer to three (3 no.) measured target metrics related to: (1) bus and rail; (2) walking and cycling; and (3) E-Vehicles.
- The study **impact metrics** are the full range of measured impact assessment tools, including the result indicators, to be applied and reported on in the course of the study.
- The **project(s)**, refers to project(s) funded under the programme and subject to the study.

¹ INTERREG V-A - United Kingdom-Ireland (Ireland-Northern Ireland-Scotland) Territorial co-operation Programme description. Available at: http://ec.europa.eu/regional_policy/en/atlas/programmes/2014-2020/ireland/2014tc16rfcb047

- **Modal Split** refers to a comparative measurement of the proportion of the total trips being made by any one mode expressed as a percentage of all trips by all modes. This term is not synonymous with modal shift..
- **Modal Shift** refers to a measure of the transfer of trips from one mode to another expressed as a percentage of trips made by the first mode. This term is not synonymous with modal split.
- A commuting **journey** refers to a regular journey to and from work or education. Such journeys need not be every day, and will normally comprise a return journey on each occasion.
- A commuting **trip** is a one-way trip either to or from work/education, and will normally represent half of a commuting journey.

Table A1: Reports cited

Reference	Full title	Date
18022205JC	Inception Meeting Report	February 2018
18022205JC	Inception meeting, review	February 2018
18082803JC	Project by project review at Baseline, Review of impact objectives, project contributions and supporting data	August 2018
18112301JC	Review of changes in Electric Vehicle (EV) objective INTERREG VA Priority 3 Sustainable Transport Programme	December 2018
18123190JC	Tabulation of project reviews	December 2018
19021101JC	2018 Annual Report	February 2019
19021420JC	Programme and Project Baseline and results indicator review	February 2019
19030701JC	Programme and Project Baseline and results indicator review, update	March 2019
19111104JC	Status Review and update	November 2019
19123101JC	2019 Annual Report	December 2019
21051904JC	2020 Annual Report	May 2021
21120601JC	2021 Annual Report	December 2021

Table A2: Acronyms used

Acronym / abbreviation	Full term
(U)LEV	(Ultra) Low Emissions Vehicles
BEV	Battery Electric Vehicles
CLG	Carlingford Lough Greenway
DFI	Department for Infrastructure (NI)
DOE	Department of the Environment (NI)
DTTaS	Department of Transport, Tourism and Sport (ROI)
EU	European Union
EV	Electric Vehicle
FST	FASTER electric vehicle project
LoO	Letter of Offer
NI	Northern Ireland
NISRA	Northern Ireland Statistical Research Agency

Acronym / abbreviation	Full term
NWG	North West Greenways Network
NWH	North West Multimodal Transport Hub
O/D	Origin / Destination
OI	Output Indicator(s)
RI	Results Indicator(s)
ROI	Republic of Ireland
CP	Cooperation Programme
UCG	Ulster Canal Greenway
UK	United Kingdom

2.2 Initial specification

The project specification required analyses and reporting in respect of project implementation, broadly the construction of infrastructure associated with the programme; and the impacts of the projects, including potential impacts on modal split. The measurements reflecting stated Outputs and Results Indicators (OI and RI) defined in the project applications to the programme.

The official wording defining RIs is set out in the document “Cooperation programmes under the European territorial cooperation goal”, the Territorial Cooperation Programme (CP) dated March 2016. The CP referring to mode/modal split, though a number of alternative interpretations pervade throughout the project applications and reporting, described in our 2019 technical report (19021420JC).

A review of the initial applications and project assumptions was undertaken in the early part of our work, and set out in our 2018 Annual Report (19021101JC). The initial analysis suggesting that a number of differences existed within and between projects in respect of the interpretations and measurements of output and results indicators, with a particular divergence in relation to the metrics used. The mismatch arose from differences in the interpretations of primary measurements, their definitions and meanings, and formed the focus of a significant portion of the initial analysis.

Journey indicators form a key part of the measured outcomes of each project and form the base of RI measurement. The indicators are intended to demonstrate the contribution of each project to the *‘share of daily cross-border journeys’*. The metric was updated in March 2016 to *‘the contribution to regular cross-border commuting journeys’*², affecting both the initial statements in some first stage applications, and pervading throughout the delivery of the programme.

The change in terminology is significant as it is applied differently in a number of programme board documents, project submissions and letters of offer allowing for an element of ambiguity between its interpretation. The use of mode specific terms is also significant with variations from the CP use of **modal split**, the proportion of trips carried by one mode as a percentage of all modes; and **modal shift**, used in some project submissions and their letters of offer, which can relate to a extent change from a primary mode to another mode as a proportion of the first. A further concept,

² See INTERREG V-A - United Kingdom-Ireland (Ireland-Northern Ireland-Scotland) Territorial co-operation Programme description. Following a meeting of the European Commission in March 2016, the definition of result indicators was amended to state that [in order to demonstrate result indicators have been met, a measure need demonstrate]... *‘the percentage of cross-border commuters who use bus or train... [or cycling and walking]... as their usual method of travel’*, rather than absolute daily values.

that of **modal growth** is included in the UCG business plan³ though this is not referred to in any other document. Table 1 highlights the differences between modal terms used.

Table 1: Modal measurement definitions

Terminology	Definition
Modal Split / Mode Split	A measure of the proportion of total trips being made by any one mode expressed as a percentage of all trips by all modes.
Modal Shift / Mode Shift	A measure of the transfer of trips from one mode to another expressed as a percentage of trips made by the first mode
Modal Growth	A measure of the rate of growth within one mode, expressed as a percentage of the original numbers of trips made by that mode.

Further complications related to computation following from the use of the term ‘shift’ in some documents as a description of an activity (the activity leading to a change in modal split (the measure)); and the use of the term ‘modal shift’ in some of the offer letters to define a measure (in place of the term ‘modal split’), thus creating differences and contradictions in interpretation. It should also be noted that later issues arising as a result of the Covid pandemic would also affect the abilities of the projects to deliver on some of the initial specifications, though these are separate from the underlying baseline and initial outcomes defined and presented in the application and first measurements. See section seven for a review of modifications made to the outputs and project delivery.

The most common difference, appearing throughout the application and application review process, related to the interpretation of journey frequency. This may have been caused, in part, by the change in the programme definitions in 2016, as well as a number of differing interpretations of calculation methods.

Differing interpretations were also observed in the application review process which resulted in a number of different formats and inconsistent statements of results indicators arising in the Letters of Offer, issued by the SEUPB to the projects.

It should also be noted that the definition of baselines against which results indicators would have changed in the period between their initial definition, being derived from 2011 census data, and the start of project development. The evaluation team undertook a review and update of baseline values applicable to each project, discussed by project in section 2.3, below.

2.2.1 Task development and interpretation

Evaluation tasks were developed on the basis of the SEUPB specification and included:

- Review of project application process and stated outcomes (OI/RI)
- Review of baseline conditions, including their change subsequent to initial definitions
- Review and update of outcomes, at various stages throughout the evaluation
- Public use surveys, including modals choice and behavioural indicators
- Review of impacts of changes in the programme, including
 - Initial reallocation of programme funds from eV projects to other sustainable transport projects, and

³ stage 2 application section 10

- Later approval of the FASTER project
- Project management and outcomes impacts of Covid
- Sustainable transport impacts of projects and programme

Five projects were approved under the programme, these being:

- Carlingford Lough Greenway (CLG),
- Ulster Canal Greenway (UCG),
- North West Greenways Network (NWG),
- North West Multimodal Transport Hub (NWH) (North West Hub), and
- FASTER electric vehicle project (FST).

2.2.2 Review of application process

The application process was undertaken in two stages, an initial applications stage, and a second stage reviewing technical outcomes. Successful projects were issued a Letter of Offer (LoO) following approval of the stage 2 application. The LoO containing a statement of support and required project outcomes, reported in our technical baseline review (19021420JC). Modification requests were received in the latter part of the programme lifetime, stated as stage 2 assessment reports, and were considered by the steering committee in December 2021, and July 2022. The modifications included, but were not limited to: project delivery time extensions and additional funding requests, see section seven.

Throughout the application and review process it is notable that differing terms and interpretations were applied, particularly in relation to the measurement of modal split, detailed above. The use of the differing terms is highly significant as they can refer to different actual measurements, but appear to be used interchangeably in some instances. This had the effect of creating differing expectations and defined measurements across documents. The same inconsistencies also appear in the separate letters of offer, and will impact on the relative abilities of the projects to achieve the outcomes defined both in their own applications, and those expected in the letters of offer. Inconsistent measurements are also visible in the later stage assessment and modification requests, possibly as a result of legacy wording.

Further differences in terminology apply to the time periods used for measurement. Differences in the definition and interpretation of regular commuting and daily traffic flows are visible across documents and between projects. These include differences in the definitions of regular commuting and the (erroneous) use of the terms daily and annual traffic flows. The same differences are also noted in some of the letters of offer, the most common difference appearing throughout the application and review process related to the interpretation of a regular cross-border commuter journey.

A further difference was noted in terms of the stated journey purpose. The CP appears unambiguous in this respect, that RIs relate to commuting journeys, and this is reinforced insofar as commuter trips are the only journey purpose defined in the census data, and thus the only purpose directly measurable under the original structure. It was observed, however, that despite the fact that the census data relates to commuting trips alone, a number of applications and some of the review documents either included other trip types or suggest baseline mode split figures relate to multiple trip purposes.

The combination of different interpretations was felt to be an underlying issue in the ability of both the programme and the projects to achieve the intended outcomes. The divergent measurements also create a significant challenge to the evaluation to assess the extent to which the indicators had been achieved. As a result both the evaluation team and programme body undertook reviews

of baseline and indicator outcomes, together with projects, to recast required outcomes on a consistent basis.

2.2.3 Baseline definition, methodological review and initial updates

In line with the need to establish consistent indicators, stated in section 2.1.2, above, the evaluation team undertook a series of reviews by project. The applications and review processes were assessed for each project, discussed in summary below, and presented from February 2018 as a series of reviews by project (tabulated in document 18123190JC, and in detail in the 2018 Annual Report (document 19021101JC)).

The 2018 Annual Report and subsequent documents assessed the impacts of the mismatch between Project Submissions, Letters of Offer and subsequent statements regarding baseline and forecast outcome indicators.

The extent of the difference between initial baseline and target figures are indicated in table 2, with initial (diverging) figures shown as struck through, discussed in our Technical Report (ibid), and at a project workshop held on the 12th of September 2019 in Dungannon. A review of the underlying calculations, including locational analyses at each individual project site are included in our evaluation update document 19111104JC, dated November 2019.

Table 2: Indicative Results Indicators by project, trip count per annum (values based on 2019 review)

Regular cross-border commuting journey counts						
Cross-border Bus / Train commuters	North West Hub					
	Baseline	Target				
	634 89	1,665 229				
Cross-border cycling / walking commuters	North West Greenway		Carlingford Lough Greenway		Ulster Canal Greenway	
	Baseline	Target	Baseline	Target	Baseline	Target
	130 36	500 131	49 6	199 21	28 7	69 18

Note: a further adjustment to the outcome values is included in sections 4 and 5, below, to account for effects of the pandemic on outcomes, and the issuance of a Census update in the Republic of Ireland.

The evaluation document also updated the terminology to be consistent between projects, resulting in the definitions of project specific modal splits for regular cross-border commuters and not to any other definition of modal trips. These are summarised:

- NWH, an increase over the life of the project in regular cross-border commuters from 89 to 229 travelling more than once per week;
- CLG, an increase over the life of the project in regular cross-border commuters from 6 to 21 travelling more than once per week;

- UCG, an increase over the life of the project in regular cross-border commuters from 7 to 18 travelling more than once per week; and
- NWG, an increase over the life of the project in regular cross-border commuters from 36 to 131 travelling more than once per week.

The same document recommending:

- The clarification of expected Results Indicators to projects, including opportunity to clarify further on the basis of local circumstances,
- The removal of any references to (any of): Modal Shift or Mode Share,
- The clarification that trip numbers refer to Regular Cross-Border Commuting and NOT to any other form of movement or purpose,
- The clarification that regular commuting relates to journeys made on multiple occasions in any given week by the same commuter, and DOES NOT EQUATE to annual trips,
- That references to other targets that may include, but not be limited to: non-commuting trips, school and greenway engagement activities, be dropped as 'requirements'.

2.2.4 Externalities and changes to material circumstances

In addition to the updated baseline measures and consistent terminology, the evaluation also underlined the need to account for changes in the material circumstances in which projects were being undertaken. The initial assumptions that assessment could assume that external circumstances at one point in time are broadly the same as at any other (*ceteris paribus*) became increasingly difficult to sustain over the course of the evaluation.

A significant number of changes became apparent in the period since application, approval and project commencement, including those affecting the material circumstances of commuting. These include, but are not limited to uncertainty over the relationships resulting from Brexit, and the Covid pandemic, amongst others. A review of both Brexit and Covid impacts has been built into the analysis and is reported in section 4 of this document.

2.2.5 Project meetings and workshops

In addition to the desk analysis and surveys, the evaluation team were also engaged in a number of workshops over the course of the study. These related to the definition and common measurements, and included both programme projects, and presentations to the EU INTERREG team. A sustainable transport conference was held at Dublin Castle as a part of the evaluation deliverables, with a further event planned for the conclusion of the study.

Workshop meetings included:

- 7th March 2018, Attending and contributing to the INTERREG priority 3 greenways projects meeting at the North South Ministerial council offices Armagh
- 30th August 2018, Facilitating a projects workshop to develop baseline data and performance management workshop, Dungannon
- 30th May 2019, presentation to the INTERREG Monitoring Committee Meeting, Edinburgh
- 12th September 2019, Facilitating a further projects workshop, Dungannon
- 9th October 2019, Developing and facilitating an INTERREG Sustainable Transport conference, held in parallel with and a supporting session at the 47th European Transport Conference, Dublin

A review of workshop and conference events is included in Appendix two.

2.2.6 Evaluation period

The evaluation covered the period up until September 2022 and reflects achievement and projected achievement from that point in time.

Since the conclusion of the observed period significant issues have impacted on delivery of the Sustainable Transport Priority, most notably in relation to the Ulster Canal Greenway project. As these fall outwith the evaluation period, these are not covered in this report.

3. Review of changes in EV objective

The initial INTERREG programme had anticipated the inclusion of an EV project under the priority, but had not received / approved an EV project as other projects went 'live'. A decision was made at that point for funds initially intended to support EVs would, as a result, be diverted to the greenway projects. The subsequent application and approval of the FASTER (EV) project was not foreseen at the time of the first change to the EV objective. The evaluation team were asked to undertake a parallel review of the effects of the change in the Electric Vehicle objectives, reported in the 2018 EV change assessment document 18112301JC, and set out in summary below.

Programme specific indicators, approved in the CP document, had originally included an objective to create 73 new and upgraded electric vehicle rapid chargers (output indicator) and to increase the number of new EV registrations from a baseline value of 186 in 2014 to a target of 2000 by 2023 (result indicator). With the diversion of funding from EV to greenway projects, a comparative review was undertaken to establish the net effect of the change.

The review compared the outcomes of Do Nothing, Do something and Do everything scenarios; reflecting the nature and benefits of each programme type, and allowing for the comparison of the net sustainable transport impacts both with and without the inclusion of the originally planned EV projects.

A review report was presented in December 2018 in the EV change assessment document, concluding that the diversion of support from EV projects to Greenways projects had not achieved the same level of sustainable transport benefit that would have been achieved had the separate support of both programme objectives been allocated as originally intended.

3.1 Change assessment methodology

The analysis of programme changes was based on the comparative level of benefits between the baseline and project delivery, with and without the EV project. The analysis was focused on environmental and societal benefits, and direct economic impacts, and necessitated a review of vehicle ownership in both the Republic and Northern Ireland.

3.1.1 Republic of Ireland

Ownership data was sourced from the Department of Transport, Tourism and Sport (DTTas) annual compendium of vehicle statistics, see table 3. Note, the figures set out in the table relate to full Battery Electric Vehicles (BEVs) alone. Other forms of electric vehicles (mild and non-plug-in hybrids) are less likely or unable to use public charging points, but will still fall under the categorisation of ULEVs.

Table 3: Republic of Ireland Number of Full Electric / BEV vehicles

Republic of Ireland Count of BEV by vehicle type	Year to 31st Dec						
	2011	2012	2013	2014	2015	2016	2017
Private cars*	81	230	251	529	1,083	1,659	2,718
Goods Vehicles	35	54	63	68	69	78	100
Tractors	4	2	4	4	4	4	3
Motorcycles*	61	62	53	49	43	28	31
Small Public Service Vehicles (Taxis)*	0	1	1	1	4	6	9

Exempt Vehicles	15	18	18	22	22	25	28
Vintage Vehicles	2	2	3	2	2	2	2
Motor Caravans	0	0	0	0	0	0	0
Large Public Service Vehicles	1	0	0	0	0	0	0
Mobile Machines	1	2	3	2	2	2	2
Excavators	0	0	0	0	0	0	0
Small Dumpers	27	27	23	23	21	18	17
General Haulage Tractor	2	1	1	1	1	1	1
School buses	0	0	0	0	0	0	0
Hearses	0	0	0	0	0	0	0
Youth Community Buses	0	0	0	0	0	0	0
Island Vehicles*	9	9	0	0	0	2	2
Off Rad Dumpers	0	0	0	0	0	0	0
TOTAL	238	408	420	701	1,251	1,825	2,913
Factor (all vehicles as percentage of private cars)	293.8%	177.4%	167.3%	132.5%	115.5%	110.0%	107.2%

Source: DTTAS Irish Bulletins of Vehicle and Driver Statistics (Table 13)

Note: Vehicle categories illustrated with an asterisk (*) are most likely to make use of public charging infrastructure.

It is noticeable that the number of EVs registered in the Republic of Ireland has grown steadily demonstrating an approximate 10-fold increase in the number of fully electric vehicles in the period from 2011 - 2017. The measured increase differing from the rate of growth derived from the 2011 census, being the base of the original programme target.

The significant majority of this growth can be attributed to an increase in fully electric private car use, which has grown from 81 vehicles across the entire jurisdiction in 2011 to 2,718 measured on the 31st December 2017. Other vehicle types likely to use fixed public charging points include Electric Motorcycles, had fallen in ownership, by approximately 50% in the same period, and, to a lesser extent Taxis, which represent a very small proportion of the Irish fleet, but had begun to move toward electric traction, in part due to purchase grant schemes.

DTTAS also record Plug-In Hybrid vehicles as a separate category from 2017, see table 4, bringing the total fleet that can plug-in to 3,784, of which 3,580 vehicles are registered as private cars.

Table 4: Republic of Ireland Number of Petrol / Plug In Hybrid Electric vehicles

Republic of Ireland PHEV	Year to 31st Dec						
						2017	
Private cars	PHEV reported as separate class from 2017						862
Goods Vehicles							4
Tractors							0
Motorcycles							2
Small Public Service Vehicles (Taxis)							0
Exempt Vehicles							3
Vintage Vehicles							0

Motor Caravans								0
Large Public Service Vehicles								0
Mobile Machines								0
Excavators								0
Small Dumpers								0
General Haulage Tractor								0
School buses								0
Hearses								0
Youth Community Buses								0
Island Vehicles								0
Off Rad Dumpers								0
TOTAL								871

Source: DTTAS Irish Bulletins of Vehicle and Driver Statistics (Table 13)

A factor process was applied to establish county-based growth in EV ownership, based on registration and tax class at county level in the DTTaS bulletin, set out in detail in the December 2018 report.

3.1.2 Northern Ireland

Vehicle data for Northern Ireland was sourced from the DOE and its successor department, the Department For Infrastructure (DFI), statistical compendium: Northern Ireland Transport Statistics. A count of Electric Vehicles was derived from Table 1.3 of the DOE/DFI statistics (ibid) on the basis of taxation classes 19 (Electric Motorcycle) and 79 (Electric vehicle), summarised in table 5, below.

Table 5: EV count, Northern Ireland

Northern Ireland EV count	Year to 31st Dec						
	2011	2012	2013	2014	2015	2016	2017
Taxation class 19	5	8	7	5	3	4	N/A
Taxation Class 79	39	77	150	343	569	724	N/A
Estimated total all vehicles	44	85	157	348	572	728	N/A

3.1.3 Cross-Border Region

The combination of data from the Republic of Ireland and Northern Ireland allowed for the calculation of a cross-border region total from both sides of the border, tabulated in table 6, below.

Table 6: EV count, Cross-Border region on the Island of Ireland

Island of Ireland, Cross-Border Region	Year to 31st Dec

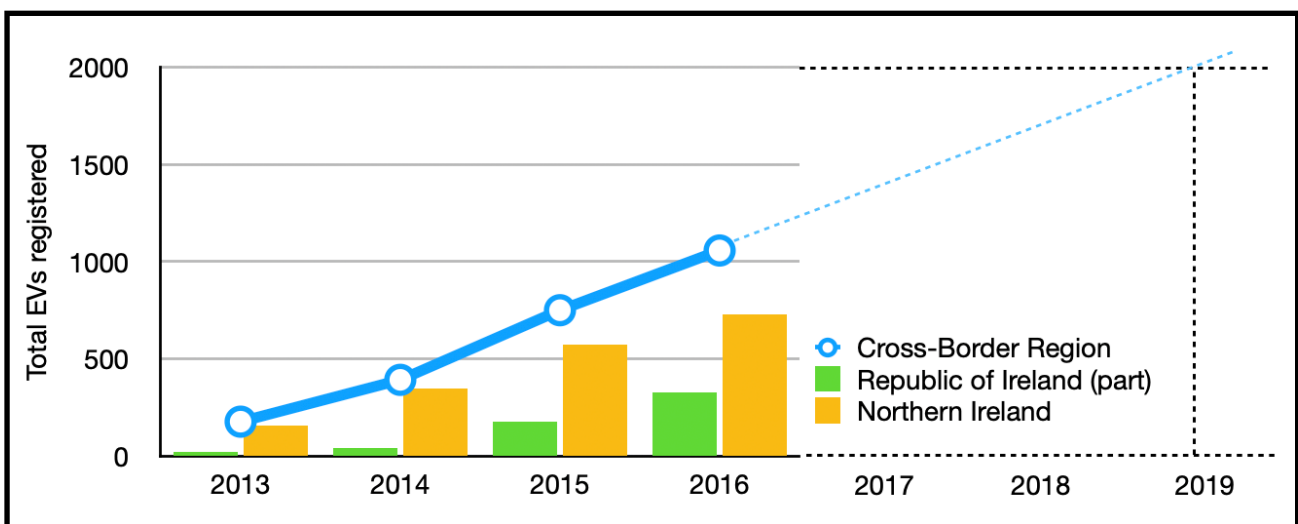
EV count	2011	2012	2013	2014	2015	2016	2017
Republic of Ireland			20	44	178	329	
Northern Ireland			157	348	572	728	
Estimated total all vehicles			177	392	750	1,057	

An estimated total of 177 EVs were recorded in 2013 in the cross-border region, rising to 392 by the end of 2014, and 1,057 by the end of 2016, compared to the original INTERREG baseline (2014) estimate of 186 vehicles.

3.2 Impacts calculation

Having established EV ownership rate, as a baseline for analysis, the review continued to assess the potential gain or loss from the trade of funding to other projects. These relate to the two indicators specific to the original EV element of the programme: a physical output indicator, the installation or update of 73 rapid charging points; and an impact result indicator based on the increase in EV ownership from the baseline of 186 vehicles, discussed in the preceding sections, to a target rate of 2,000 such vehicles in the region by 2023.

While the initial indicator, 73 new rapid charging points, may be seen as a pass/fail criterion, the latter, increased use, is more opaque, and may, in reality, have been achieved to a large extent as a result of other market factors. Indeed the increase in ownership from 177 at the end of 2013 to 1,057 at the end of 2016 suggested that the result indicator may, in fact, have been achieved in 2019 on the basis of current rates in growth, see graph 1, below.



Graph 1: Growth in EV ownership, Cross-Border region

A comparison becomes possible when the numbers of vehicles, or, more specifically, vehicle trips are compared across scenarios in line with the INTERREG stated aim to affect 'beneficial impact on carbon emissions.' The calculation will also include a number of assumed behaviours: that the 73 new charging points would have been created as a result of the programme support would have been additional to any other infrastructure developed in the absence of programme support, and

that a measured increase in EV use would also relate to additionally, the numbers of vehicles that would have been purchased are additional to growth that would have occurred without support.

In both instances the effect of the INTERREG project would have been diminished to a minor part of the growth in EVs, or no part, as significant growth may be observed without the programme. Both having an impact on any reduction in carbon emissions that may be attributed to the programme. In reality we feel that the impact goes beyond the first review of target vehicle numbers. It being reasonable that the projects would have contributed to the growth in EVs originally highlighted in the territorial programme targets. In other words that the project(s) would have created an additional growth in use of (2,000 - 186 = 1,814) EVs.

3.3 Programme output comparison

A comparative scenario approach was applied, comparing consistent metrics in relation to Electric Vehicles and the Greenway projects that benefited from the change in the programme design. Indicators were taken from the CP document and include: output indicators expressed in terms of number of kms new greenway, and result indicators expressed in terms of increased numbers of regular cross-border commuter journeys made by cycling and walking. Measurement of CO2 reduction was also included as this represented a major element in the definition of EV impacts, but not those of other project types.

The initial impact assessment is based on the effective contribution of each project scenario to the reduction of CO2 measurement. This is achieved by assessing the level of emissions by vehicle and vehicle journey attributable to each of:

- Scenario 1: Do Something, development of greenway projects but not EV
- Scenario 2: Do Everything, development of greenway projects and EV projects
- Scenario 3: Do Nothing, current baseline and projected growth

As no single consistent measure had been defined in relation to CO2 reduction across projects, we applied an indicative measurement based on the numbers of trips made in the target year of 2023, multiplied by an assumed 212 days cycling to/from work, and a regular trip length of 7.5 kms in each direction, allowing the calculation of a reduction in carbon emissions of approximately 476 tonnes attributable to INTERREG VA projects, see table 7.

Table 7: Estimated CO2 savings

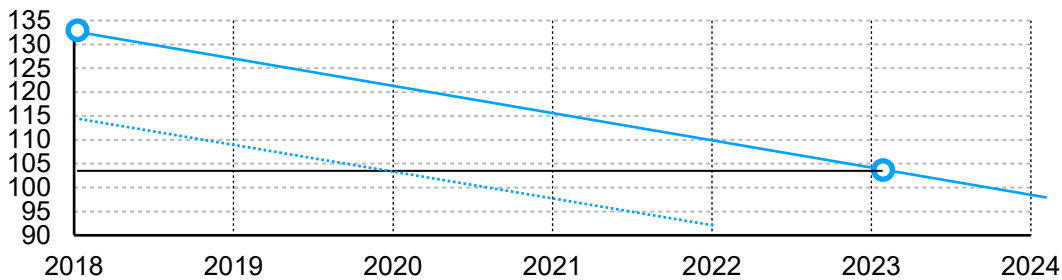
	2018	2019	2020	2021	2022	2023	ALL	Source
CO2 Emissions rate - CO2 g/km	130	124.2	118.4	112.6	106.8	101		EU
Mean distance / journey (= 2x trip) - kms	15	15	15	15	15	15		
Days Travelled per year	212	212	212	212	212	212		
Beneficiaries	N/A	0	140	280	420	561		
TOTAL Reduction in CO2 / km (tonnes)	Not open		53	100	143	180	476	

The calculation of CO2 savings is based on the reduction of car trips afforded by the supported projects based on the vehicle average emissions data, reported at EU level and factored to reflect

a mixed fleet with differing ages of vehicles in the Irish market. Thus, EU data for new vehicles, listed below, is aged using a 3 year age median point to establish current fleet means on both sides of the border.

Using the 3-year median this results in the 2018 value of 130g/km and 2023 value of 101g/km CO₂.

Graph 2: EV emissions (g/km CO₂) new and average vehicle rates



Assumptions:

- Mean trip distances: 7.5kms / cross border commuter trip across all greenways
- The year of opening: all greenway schemes go live from 2020
- Patterns of growth in use: straight line growth from year of opening to target year
- Days travelled per year: 212 days

It is inevitable that actual performance will differ from the assumed rates set out above, and may fluctuate on the basis of weather as well as availability. The rates, however, do appear to match the intended reduction in the case of the North West Greenways, which stated a total reduction of 319 tonnes CO₂ by 2023, which compares to 314 tonnes when calculated using the above methodology. A review of project-by-project outcomes is set out in the EV change assessment document, and summarised in subsequent sections below.

Comparator data, being the environmental performance of the EV project are also calculated. The measurement of environmental impacts arising from the EV projects follows the same basis as defined for greenways, being the replacement of Internal Combustion Engine vehicle types with EVs.

It was felt, however, important to note that Electric vehicles were not free of emissions, but rather displace some emissions from the point of use to the location of electricity generation, and are affected by the mix of fuels used in electricity generation itself, and the nature of the transmission network. The assessment therefore identified the likely range of efficiencies by vehicle type, electricity consumption and emissions rates by source, allowing for the estimation of emissions relative to EV applied to the (original) INTERREG EV projects. Driven distances were identified from the DFI Travel Survey for Northern Ireland, and DTTaS annual compendium. EV vehicle types were derived from the NextGreenCar dataset to allow the calculation of differing rates for BEV and PHEV impact, and their relative mix in the fleet.

A further calculation was undertaken to incorporate the level of carbon emissions resulting from the generation of electricity. The calculation includes the mix of electricity production sources currently serving the Irish market. Full details of these steps are set out in the impact report, and summarised in table 8. Transmission impacts are also included, set out in detail in the EV change assessment report and summarised in table 9.

Table 8: Generation rates and emissions at source

Fuel Type	Percentage Irish electricity generation	Emissions attributable to generation	Total emissions / 1 x kWh
Data source	IEA	UK HoP	
Unit		gCO ₂ eq/kWh	gCO ₂ eq/kWh
Coal	26%	800	208
Oil	1.43%	800	11
Natural Gas	43.6%	488	213
Biofuels	1.41%	200	3
Waste	0.53%	50	0
Hydro	3.86%	7	0
Solar PV	0.01%	88	0
Wind	23.2%	20	5
		kg CO ₂ / kWh	0.44
Mean value / kWh	gCO ₂ eq/kWh at point of production		440

Table 9: Adjusted emissions rate to include transmission and charging losses

	gCO ₂ eq/kWh	Sub Total	Adjusted
Mean Value / kWh at point of production	440	440	
Transmission Loss @ 8%	35.2	475.2	
Charging Loss @ 10%	47.52	522.72	
Nissan Leaf load	30kWh / 187.45 kms	0.16 kWh / 1 km	
Nissan Leaf emissions / km		70.41 gCO ₂ / km	83.66 gCO ₂ / km

The effect of differing on-board technologies was also included, in order to identify a consistent measure of PHEV emissions consistent with observed traction source and distance measurements (Kato et al. 2012)⁴, summarised in table 10, below.

Table 10, PHEV consumption and emissions rates

PHEV			gCO ₂ /km
Travel Distance	197826	Kms	
Gasoline consumption	4858	litres	

⁴ Hideki Kato, Ryosuke and Noriyasu Kachi (2012) Potential of Plug-in Hybrid Vehicle to Reduce CO₂ Emission Estimated from Probe Car Data in Japan, in World Electric Vehicle Journal 5, pp 771 - 776

PHEV			gCO2/km
Commercial power consumption	12567	kWh	
CO2 emission	16511	kg	83.46

Source: Kato et al. 2012

The combination of measurement described allowed for a calculation of emissions savings, see table 11. As the number of EVs in the fleet increase on the basis of straight-line growth to the original project target of 1,814 additional EVs, so the amount of carbon emissions falls to a peak of 574 tonnes / year in 2022. The target year of 2023 actually shows a small decline in emissions savings from the 2022 peak reflecting increased efficiencies in the traditional ICE car fleet.

Table 11: CO2 emissions saving with implementation of INTERREG EV projects.

	2018	2019	2020	2021	2022	2023	Total
Per vehicle kms / year	17,901	17,668	17,439	17,212	16,988	16,767	
Vehicle EV replacement resulting from project	0	363	726	1,088	1,451	1,814	
Percentage BEV	23%	23%	23%	23%	23%	23%	
Percentage PHEV	77%	77%	77%	77%	77%	77%	
BEV Emissions rate g/km CO2	19.24	19.24	19.24	19.24	19.24	19.24	
PHEV Emissions rate g/km CO2	64.3	64.3	64.3	64.3	64.3	64.3	
ICE vehicle emissions rate g/km CO2	130	124.2	118.4	112.6	106.8	101	
Net vehicle emissions saving g/km CO2	46.5	40.7	34.9	29.1	23.3	17.5	
Emissions savings (tonnes) / vehicle	0.83	0.72	0.61	0.50	0.40	0.29	
Effective CO2 savings (tonnes)	0	261	442	545	574	532	2,354
Net contribution per EV vehicle / year Tonnes CO2		0.72	0.61	0.50	0.40	0.29	

On the basis of the calculations set out above, it would not appear possible for the diversion of funds to greenway schemes to replicate the emissions savings achieved by the planned EV projects. The total emissions savings attributable to greenways is calculated at 476 tonnes CO2 saved over the full period to 2023 compared to a total of 2,354 tonnes CO2 saved from the take up in EVs.

4. Context and external factors

By 2020 it had become apparent that the external environment for travel was changing, not least as a result of the Covid pandemic. The pandemic had had the effect of dampening and suppressing trip demand to a significant extent, coinciding with lockdowns that would prevent all but essential travel, and significant shifts in the patterns of commuting that had been the focus of the original submissions.

Compulsory lockdowns were announced across jurisdictions, though these did not always coincide in severity or date. The lockdowns impacted on travel to work, tourism activities, and the nature of employment itself, including a significant shift to working from home activities that have continued despite the removal of most of the lockdown constraints.

In light of these changes, it was felt necessary to undertake a review of covid impacts on travel demand at project start and target years, initially reported in the 2020 annual report (21051904JC) and summarised below.

4.1 Patterns of Demand

The demand values initially stated, including early updates reported above, were re-evaluated to include an ongoing assessment of the impacts of Covid on travel, with initial results identified in 2020.

4.1.1 Surveys undertaken

Public and INTERREG project surveys were completed in the latter part of 2020 and used to inform demand measurement in post-covid scenarios. Two survey areas were addressed, the first being a review of the projects themselves, and the second public surveys completed locally to the projects to capture the effects of covid constraints on the potential use of project infrastructure. These are referred to as INTERREG Project Teams and Public surveys respectively. Similar surveys were also undertaken in 2021 and 2022, reported below.

As the course of the pandemic, and any associated recovery, varied over the period of analysis responses represented a best estimate in the view of the respondent at the time of the survey.

A detailed review of the survey findings are included, by project, in section 5, below.

4.1.2 Initial Covid Impacts

Covid lockdowns were first applied around March 2020 in both Ireland and Northern Ireland. Constraints were placed on individual movements, and had the effect of restricting economic activities, with some variation by jurisdiction.

The most severe restrictions included movement prohibitions in which individuals are mandated / encouraged to remain at home with similarly severe limitations applied to many business and entertainment activities. Over time these constraints have evolved into a system of tiered restrictions allowing some return to economic activity, though at a severely lower rate than pre-pandemic.

Despite the relaxations, the net effect was a restriction on movement with significant barriers to work and tourism use of infrastructure that reduced significantly the initial use of INTERREG project infrastructure.

The pandemic also impacted on the ability of projects to physically deliver construction elements of their work. The inability of the projects to complete construction in line with their original timetables was to have a knock-on effect on their delivery, discussed by project below.

4.2 Project Impacts

The precise impacts of the pandemic vary by project, although some common themes are observed, notably in relation to potential use, and in the ability of the project to complete construction. Both appear related to the underlying ability of the market to function within and following a pandemic, and were explored in relation to each project in the public and project management surveys.

By summer 2020 the ongoing nature of the pandemic was becoming apparent, with it appearing likely that disruption would not be limited to a temporary divergence from everyday activity. Project surveys were circulated in Autumn 2020 to all priority 3 projects, with the exception of the FASTER project, which had yet to develop an output strategy.

Impacts were identified and categorised by impact factor, including:

- Travel demand, including the availability of work for commuting;
- Changes in the nature of work, including remote and teleworking;
- Economic effects, including the ability and/or desire to spend on consumer goods, entertainment or leisure activities; and
- Physical constraints, including lockdowns and localised health measures.

The ongoing nature of the pandemic was taken into account at the time of survey development, with the same survey being repeated in subsequent years (longitudinal analysis).

4.2.1 Construction Impacts, initial lockdowns

All three of the greenway projects reported issues associated with construction cost and budget deficits existing prior to Covid, though this situation was felt to be made worse by the pandemic. Land acquisition had been an issue for some, and all three greenways stated that they had notified the SEUPB in respect of their budgetary position prior to the pandemic.

The Northwest Hub was completed prior to the lockdowns, and was opened on 21st October ahead of any direct travel constraints. The hub reported its own issues with uptake of facilities, , though these did not impact on the construction or primary output indicator.

As the FASTER project had not commenced its construction at the outset of the pandemic it did not report any underlying construction impacts.

4.2.2 Delivery impacts, consequential

The second part of the project survey concentrated on impacts of the pandemic that followed from changes in work patterns.

Responses split between two major areas of impact, delivery time, and delivery cost. Time related impacts included delays in getting construction workers out on site, and delays in the process itself, such as delays to the planning permission process.

All projects reported that their teams had moved to home-based working, while some sought to estimate revised dates for deliverables. The ability to undertake face-to-face activities was also significantly impacted, and remains an issue at the time of writing.

Immediate consequences, of Covid, were felt to relate to the ability of the projects to deliver on output and results indicators. A number of the projects suggested that the pandemic would reduce their ability to deliver in specific areas, with actual outcomes significantly below those originally anticipated.

4.2.3 Budgetary consequences

All three greenways reported that Covid had impact negatively on their budgets. This included significant cost shortfalls impacting on the projects' abilities to deliver, discussed by project below.

Wider impacts were also identified associated with the number of users, including the financial impacts of lower passengers in the case of NWH, though the nature of these impacts would vary dependent on: a) the extent of passenger trip reductions; and b) the financial dependence of the project delivery on such income.

Two major issues appear throughout the survey responses, that the pandemic had had an impact on the costs of delivering the projects, and the timelines for delivery had been (severely) extended.

4.3 Public Impacts

Having established the impacts of Covid that applied directly to project operations, it became apparent that longer term impacts were likely to arise from the public response to the pandemic. This can be illustrated in terms of changes in demand for travel and transport infrastructure, mirroring comments from the NWH that a financial impact was likely to follow from a reduction in the use of public transport associated with the lockdown.

In the same vein, it may also be suggested that other elements of infrastructure use would be affected, related to numbers of users, frequency and localised expenditures, upon which many of the projects were developed and supported. In short many of the assumptions, including estimated levels of use were calculated prior to the pandemic and would be unlikely to remain valid given changes in travel patterns arising from the pandemic.

4.3.1 Modal Split

Responses to the Public Surveys indicated a change in the use of all transport modes, and an ongoing impact on the use of INTERREG project infrastructure.

Survey findings indicated a rapid decline in travel demand for commuting; a significant reduction in tourism-based travel; and an increase in the number of local walking and cycling activities, mainly for exercise as leisure. The impacts of this being modelled using a cross-classification model, described in detail in the 2020 Annual Report (21051904JC).

Survey data received from the lockdown period was compared to pre-pandemic data allocated by spatial area. Impacts were identified for each of:

- Local increases in exercise walking and cycling associated with the lockdown;
- Changes to the number of incoming visitor users;
- Local Economic constraints affecting employment; and

- Changes in working patterns (longer term).

Not all lockdown effects were demonstrated as negative, with a distinct upturn in the numbers of local walking and cycling trips being made for exercise, and as displacement activities. Figures 1 and 2 highlight the rate of change as a result of lockdown, derived from public survey data over the period of the lockdown.

Figure 1: Lockdown impacts on cycling

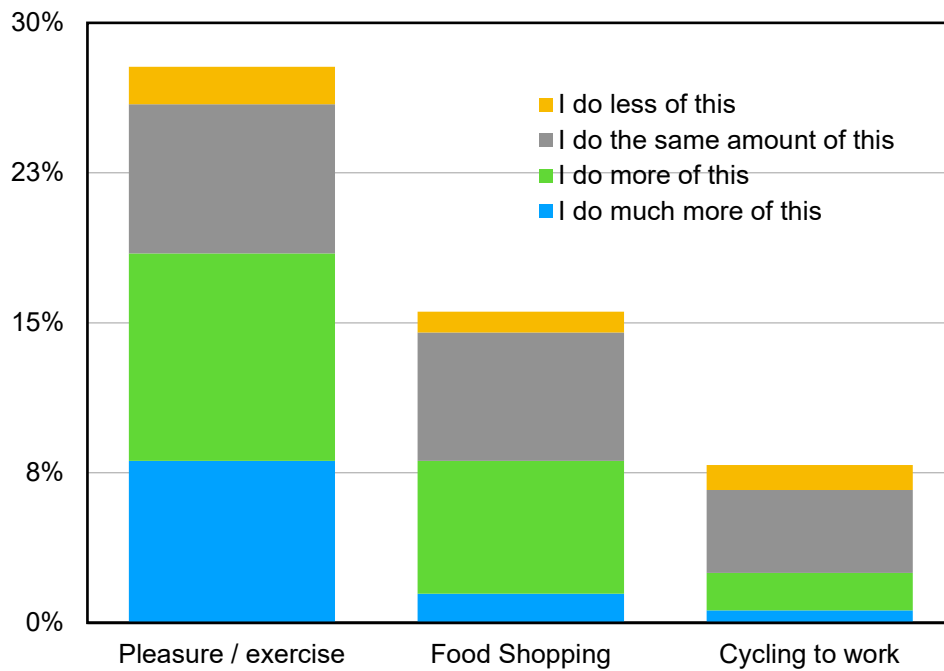


Figure 1 illustrates the cumulative effects of the pandemic on cycling choices by trip purpose. Thus, the number of trips for leisure and exercise purposes has increased. 8.1% of all responses indicate they would do much more, and a further 10.3% would do more. 7.5% of respondents would remain unchanged and only 1.9% of respondents would make fewer cycling journeys.

Out of a total of 100 nominal trips for all purposes:

Where extrapolated for pleasure or exercise: 16 would cycle ‘much more’, 20, ‘more’; 15 would make no change, and 4 would cycle less, see table 11a, below. There is insufficient data to determine the precise rate of increase as indicated by ‘much more’ or ‘more’.

Table 11a: Change to cycling behaviour by trip purpose, nominal base count of 100 trips

Nominal trip count 100	I do much more of this	I do more of this	I do the same amount of this	I do less of this
Pleasure / exercise	15.79	20.24	14.57	3.64
Food Shopping	2.83	12.96	12.55	2.02

Cycling to work	1.21	3.64	8.10	2.43
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Figure 2: Lockdown impacts on walking

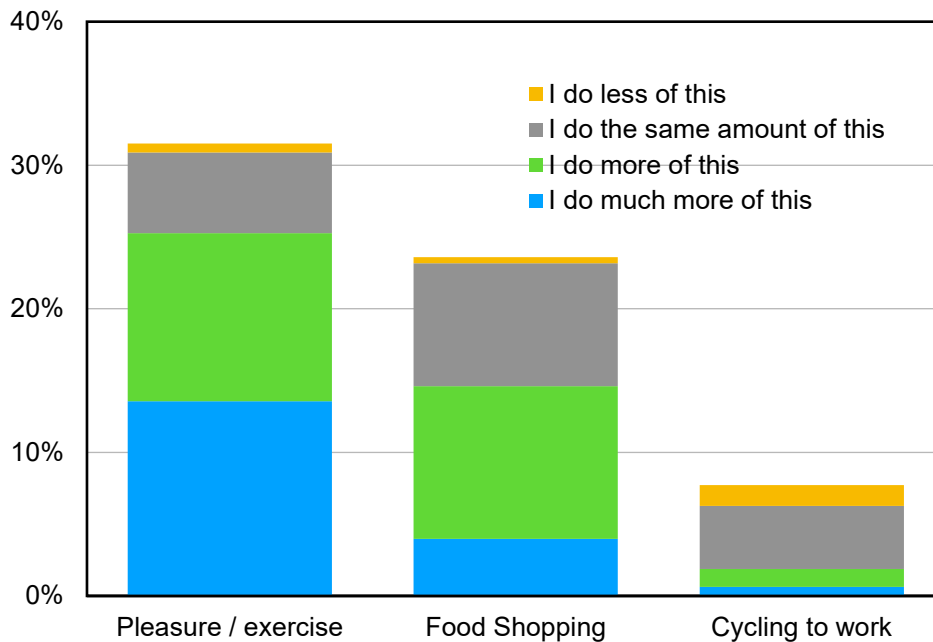


Table 11b: Change to walking behaviour by trip purpose, nominal base count of 100 trips

Nominal trip count 100	I do much more of this	I do more of this	I do the same amount of this	I do less of this
Pleasure / exercise	21.59	18.60	8.97	1.00
Food Shopping	6.31	16.94	13.62	0.66
Walking to work	1.00	1.99	6.98	2.33

It is notable that increases in cycling are visible in pleasure / exercise and food shopping, with a significant increase in the amount of pleasure and exercise trips made. Work based trips for both modes are experiencing a greater rate of decline and static state compared to the growth in the other uses.

Both Pleasure/Exercise and Food shopping increased in use above the static state rate, while some increased cycling to work may reflect changes in work patterns as a result of the lockdown. Walking displaying a similar rate of change to that of cycling, with notably higher increases in walking for pleasure and shopping trip purposes. A slightly lower increase in commuting use change is seen for walking to work than for cycling to work.

In contrast to the relative gains in local use from increased home-based activity, visitor trips were significantly hit by the travel restraints of Covid 19. Overseas trips to INTERREG projects represent a small proportion of all uses, though these are likely to be the most widely hit, with an effective loss of ALL such trips during the course of the pandemic. While we do not anticipate a permanent

loss of all visitors to the area, we have estimated a 3-year recovery for international tourism from the point of travel restriction lifting. A similar recovery rate is anticipated for the domestic market, though this is based on a decline in tourism of 20% at the point of recovery (Department of Business sectoral impact estimates, August 2020/Failte Ireland, Tourism Recovery Plan, October 2020), with even growth in the period to recovery.

The application of the factors described in the sections above allow for the recalibration of the initial trip figures, see table 12. It is important to note that the revision to non-covid number is based on a series of assumed and reported behaviours. While these are based on the best estimates identified in the course of this analysis, there are no certainties in the nature of any recovery. We have therefore chosen a limited timeframe for the analysis concluding in a revised initial trip number (post covid) applicable on opening.

Table 12: Covid Impact on Demand (all use types)

	Annual use Non-Covid			Annual use Post-Covid		
	Carlingford Lough Greenway	Ulster Canal Greenway	NorthWest Greenway	Carlingford Lough Greenway	Ulster Canal Greenway	NorthWest Greenway
Local trip count predicted for greenway	9,423	6,278	85,800	10,130	6,749	92,241
Island of Ireland visitors	7,367	4,908	67,080	1,965	1,309	17,890
Overseas visitors	343	228	3,120	17	11	155
Annual equivalent trips	17,133	11,414	156,000	12,112	8,070	110,286

The revaluation of demand to reflect changes arising from the pandemic, highlighted in table 12, was continued in subsequent years, using the same survey methodologies first reported in 2020. The changes in travel trends being noted in the subsequent annual reports, and discussed in section 6, below.

The effects of the pandemic on the hub and on the Faster projects differ from the changes in use experienced by greenways. Neither the NWH nor the EV project had the same beneficial effects of lockdown gains, effectively walking and cycling increases were not matched by increased public transport use, which faced, and continues to experience, losses in passenger numbers; while driving rates are more complex still.

A recalculation undertaken in 2021 is set out in table 13, below. The table represents a further revision of potential trips, compared to figures initially revised in 2019, reflecting the changing circumstances of travel likely to result from the pandemic. The revision suggesting a lower number of regular cross-border commuting trips, of 15, 13, and 93 cross-border commuting trips using greenways as an outcome; and 41 regular cross-border commuters using the hub. The distinctly lower value for trips via the hub reflecting the greater impact of the pandemic on public transport use, compared to cycling and walking trips.

The figure likely to be achieved around 3 years after opening of the infrastructure. It is noted that further developments pertaining to the construction of greenway infrastructure have been reported since the calculation, need also be taken into account, and are reported in section 4.4, below.

Table 13: Revised Results Indicators

Project	Outputs Indicators	Results Indicators
Carlingford Lough Greenway	10.1kms new greenway	15 Regular Cross-border commuters
Ulster Canal Greenway	22 kms new greenway	13 Regular Cross-border commuters
North West Greenway	46.5 kms new greenway	93 Regular Cross-border commuters
North West Hub	1 Multi-Modal transport Hub	41 Regular Cross-border commuters
FASTER EV project	73 Fast charge 50kW chargers	-

Results indicators shown in table 13 relate to the estimation of regular cross-border commuting trips with pandemic impacts included, on the basis of data available at the time of calculation. Their calculation reflects declines in baseline use measured both in the 2019 review, and its recalculation in the 2021 update, intended to account for pandemic effects.

4.4 Project Delivery Impact Assessment

As, at the time of writing, not all projects have been able to deliver all of the infrastructure initially intended, the evaluation team has developed measurements based on public survey responses to estimate the likely uptake of facilities when these are completed or partially completed.

The calculation is based on the parallel estimation of extent of infrastructure likely to be completed, and the travel patterns that may be associated with them once open. With the exception of the NWH and Faster projects it is unlikely that any of the other projects will be able to fully deliver infrastructure as planned in their initial applications.

It is notable that the changes in external travel demand have created a fundamental shift in the use of transport facilities that is highly unlikely to return to pre-pandemic levels in the lifetime of the programme. As a result, it appears reasonable to conclude that assessment of the delivery of each project and of the wider programme be made against the estimates of travel patterns, described by project in section 5, below.

5. Project by project review

In previous sections we outlined two areas of project delivery, the physical delivery of infrastructure, the output indicator (OI); and the effect of that infrastructure on the use of sustainable transport, the results indicators (RIs). Both physical delivery and results indicators were defined at the outset of the programme, in line with desired outcomes defined in the CP.

In the event, the delivery of the defined outcomes has been limited by a range of factors. Initial estimations of values, their calibration and evaluation appear limited and, in some cases, to vary between application, review and delivery. Significant challenges are also visible, associated with both Brexit and Covid, that have affected the ability of the projects and the programme to achieve the outcomes originally anticipated.

In this section we assess the impacts of operational challenges on the differing projects and provide a commentary on the extent to which these impacts have affected programme delivery.

5.1 Initial values and output definitions

The 2018 Annual Review and subsequent analyses reported a mismatch between project submissions, letters of offer and subsequent statements. The bulk of the mismatch related to baseline and forecast results indicators, defined as the rate of 'uplift' associated with each project in some documents. Differences were apparent between the calculation methods across projects and in the format, metric and measurement used within the review process.

The evaluation team undertook a review of the original definitions, the spatial definition and their validation, for each of the projects. Project specific Baseline and Results Indicators were validated against a review of origin and destination (O/D) data stored as vector points using a GIS point in polygon tool, reported in document 19111104JC. The validation included the separation of global and regional trip data to a project specific level and included the identification of project corridor polygons; the calculation of trip origin points (from 2011 census data), as falling within each corridor polygon; as well as the total number of trip origin points identifiable at regional level to provide a regional factor. A further factor was applied to account for changes in trip numbers identified in the 2016 census update (ROI).

5.2 North West Hub (NWH)

The NWH is a transport infrastructure development based on the redevelopment and extended use of the Derry / Londonderry railway terminal. The hub provides new interchange possibilities and a significantly improved experience for passengers accessing the site by railway, bus, and active travel modes. The redevelopment increases connectivity between services.

The initial (stage 1) application for the NWH was received in January 2016, predating a change in programme result indicator definitions, which followed in the CP of the same year. The update replacing the measure from daily cross-border commuting journeys with regular cross-border commuter journeys. The programme review of the application also used daily increases, in trip number, but notably omitted reference to trip purpose.

The second stage application was submitted after the change in CP definition of results indicators and stated that, at the time of submission, there were 634 annual cross-border journeys by public transport in this region. The second stage application defined results indicators of 1,665 annual cross-border public transport journeys in the North West to be achieved by 2023, a suggested increase of 1,031, and is notable in maintaining the use of an annual count, rather than a count of regular cross-border commuters.

We believe that the statement of numbers, and their unit of measurement, is significant and a point of divergence between CP and project calculations.

The program review concluded by recommending approval of the NWH project subject to a number of conditions, including a survey to establish the number of cross-border daily passengers. The review continuing to use the unit of measured daily passengers, while not specifying trip purpose. A survey was subsequently undertaken by NISRA on behalf of DFI in April 2017. The survey was undertaken in Northern Ireland alone, as a public intercept survey completed on board trains traveling in to / out of the existing Waterside station receiving 314 responses from existing rail users. Of the total only 12 stated they were traveling across the border (4% of all responses).

The response rate making any extrapolation, or conclusion related to cross-border travel, extremely problematic. Indeed, NISRA makes no further attempt to extrapolate for cross border journeys, while the JS review of results concludes a maximum of 3 people travelled cross-border for work purposes, though none would do so on a regular basis. The JS paper concluding that [the train] *'does not appear to be used for work/education commuting purposes on a daily basis'*.

While it would appear that the survey provided a very limited review of cross-border commuting behaviour, it is significant to highlight that the NWH is predicated on a wider range of travel impacts than onward rail use alone. Effectively the contribution of the hub to programme objectives should be measured against all related travel activities. These include, but need not be limited to:

- Travel via private car to/from Republic of Ireland, with a connection to rail at NWH
- Travel via private car to/from Republic of Ireland, with a connection to bus at NWH
- Travel via private car to/from Republic of Ireland, with a connection to cycle⁵ at NWH
- Travel via taxi to/from Republic of Ireland, with a connection to rail at NWH
- Travel via taxi to/from Republic of Ireland, with a connection to bus at NWH
- Travel via taxi to/from Republic of Ireland, with a connection to cycle at NWH
- Travel via bus to/from Republic of Ireland, with a connection to rail at NWH
- Travel via bus to/from Republic of Ireland, with a connection to another bus at NWH
- Travel via bus to/from Republic of Ireland, with a connection to cycle at NWH
- Travel via cycle/walk to/from Republic of Ireland, with a connection to rail at NWH
- Travel via cycle/walk to/from Republic of Ireland, with a connection to bus at NWH

The inclusion of cycling as a beneficial outcome of the hub follows from the specific inclusion of cycling facilities in the design of the hub. Thus a connection from a private car to a cycle at the hub may be included as an indicator of a positive outcome of the investment in the hub. In contrast, transfer from a car to walking at the hub is not included as a positive outcome, as the transfer does not, in itself, require the additional infrastructure of the hub. In addition, trips entirely within Northern Ireland, that may connect between modes in any of the stated ways, are also excluded from the assessment as these do not fulfil the primary aims of the INTERREG programme.

5.2.1 Pre-pandemic indicators calibration NWH

The hub contributes to extended commuting including passengers crossing the border to access rail and connecting services, with likely impacts summarised:

- Available for combinations of rail and road transport, including cycling, walking, bus, taxi and car use;
- Bus corridors defined as origins occurring within 0.5kms of bus routes;

⁵ Cycling is included as a sustainable mode requiring infrastructure.

- Railway corridors defined as origins occurring within 3kms of a railway station;
- Maximum single trip times in one vehicle defined as 30 minutes;
- Trips that DO NOT cross the border are excluded
- Calculation based on commuting trips alone

This provides the calculation set out in table 14, which illustrates the recalculation of baseline numbers by location of origin. The table illustrating a total baseline value of 89 regular cross border commuter trips as a revised indicator prior to pandemic effects being incorporated. This figure is also included in Table 2 as the baseline value for the hub. Table 2 also suggests a (pre-pandemic) target indicator of 229 regular trips, though this has been revised downward to account for pandemic effects, discussed below.

Table 14: Calculation of pre-pandemic user baseline numbers, regular cross border commuting, NWH

Mode of transport	NI	Donegal	All
All cross-border commuters	1,419	5,241	6,660
Cross-border commuters with potential access to NWH	397	629	1026
All Public transport commuters	79	555	634
Public transport commuters with routes via to NWH	22	67	89

5.2.2 Pandemic Impacts NWH

By the end of 2019 the basic infrastructure, the hub itself, had been completed and opened for rail passengers, with a full-scale opening in 2020. Effectively the primary Output Indicator had been delivered within the timescale originally identified for the INTERREG programme. This is summarised in table 15, below. It should be noted that some of the additional aspects of the hub, namely its active travel and integrated transport links were not delivered at the time of initial opening, discussed below. The pandemic also impacted significantly on the ability of the hub to achieve passenger numbers and modal split benefits, see table 15.

Table 15: North West Multimodal Transport Hub, key data⁶

North West Multi Modal Hub		
Multimodal Hub		Opened 2020
Output Indicators	1 of, Multi modal Hub (3.111)	Achieved
Result Indicators (Letter of Offer)	Increase in cross border daily commuter numbers from 1,031 to 1,665 by 2023. Recalibration to 41 regular cross-border commuter journeys.	See 2021 Annual Report, section 3.4

Analysis of the project’s Results Indicator is frustrated, however, by a number of coinciding factors, not least the impact of the pandemic on total trip numbers, and the use of non-standard terminologies in the letter of offer.

The main observed impacts of the pandemic being a decline in actual person trip numbers, reflecting a significant decline in the baseline numbers of trips being made, to an estimated 17% of pre-covid levels⁷, though this does not translate directly to cross-border commuting trips which are reported in the 2021 Annual Report (21120601JC) as an increase of cross-border services from 102 services (baseline) to a target of 165 return services per week, without accounting for the effects of the pandemic.

Where the effects of the pandemic are included the baseline trip count changes further. On the basis of the visible impacts of the pandemic this would translate to an actual baseline rate of 16 regular cross-border person trips via the hub, being the initial recalibration multiplied by the decline in trip rates resulting from the pandemic, reported in 2021, with growth based on this baseline, to equate a target of 41 regular cross-border commuter trips.

Some aspects of the initial offer letter, including the provision of a dedicated and branded shuttle between the hub and Foyle Street bus station, and active travel centre, also require review. While the provision of these service elements are not included in the CP, they are integral to the longer-term success of the hub in delivering an increase in cross-border travel. Thus, the branded shuttle linking the Hub to the Foyleside bus station, is a primary link to cross-border bus services. Equally the active travel centre is a critical point for interchange to other sustainable modes. While not a direct measurable, the impact of not providing these links, or their reduced supply, particularly in the case of the branded shuttle bus frequency, will impact on the long-term ability of the hub to achieve sustained diversion to public transport modes.

In light of the changing demand for public transport services, including use patterns and trip frequencies, It is likely that continued changes in public transport use will affect the total number of cross-border commuting trips. It is also likely, in our opinion, that the shift in trip patterns will continue beyond the immediate influence of covid, representing a more structural shift in travel behaviour.

It is also notable that constraints to the growth cross-border travel attributable to the hub are also likely to reflect the location of the hub in relation to cross border travel options. It is recognised that the location of the hub itself, to the east of the River Foyle is dictated by the presence of railway infrastructure; it is also observed that a majority of connecting cross-border public transport options are focused on the area to the west of the river, while only a limited number of direct options from the hub exist. This effective disconnect adds to the difficulty of making regular cross-border commuter trips. It is our opinion that a key element of any growth in regular cross-border

⁶ Trip count figures are included in the stage 2 application, see 2021 Annual report. P18.

⁷ Annualised figure based on railway uses at Derry/Londonderry

commuting trips will depend upon the extent of connectivity from the hub, not least the ability to travel quickly with minimal transfer penalties from the hub to public transport options crossing the border.

5.3 Greenways: Carlingford Lough, Ulster Canal, and NW Greenways

5.3.1 Carlingford Lough Greenway (CLG)

The CLG is greenway linking Newry in Northern Ireland with Carlingford Town in County Louth. It incorporates existing greenway sections running between Omeath and a point to the north of Carlingford town, and new build sections Newry - Omeath, and Carlingford to the Carlingford Marina.

An initial application was made in January 2016, proposing the construction of 15.3kms of new greenway. Use statistics were drawn from similar greenway schemes including: the Newry Portadown canal towpath, with 93,000 users annually; and the existing section of greenway from Omeath to Carlingford Marina with 26,000 users in its first year of operation. The application did not quantify specific regular cross border commuting uses as trip numbers but did specify percentages as an increase cross-border commuters using cycling and walking from a baseline of 2.7% to a target of 10%.

The second stage of the application process included a significantly greater level of detail and business plan, and updated the route to include a slight truncation in greenway length. The stage 2 application also updated user count, suggesting that the greenway would result in: an increase in regular cross border commuting trips from a baseline of 49 to 199 such journeys, being higher than the specified target of 176 defined in the stage 1 review.

The stage 2 application review further updated the results indicators suggesting unclear wording in the business plan to increase bicycle/pedestrian cross-border commuters, concluding that the RI should be 30 individuals using the greenway on a daily basis; and a target of $(10\% \times 2497) = 249$ regular cross-border commuters rather than the stage 2 application figure of 176.

Table 16: Carlingford Lough Greenway, key data

Section I: Carlingford Town - Carlingford Marina	2.65 km / 1.3 km (Estimate / Delivered)	Anticipated opening: 2023
Section II: Omeath Pier to National Border	4.2 km / 3.6 km	Anticipated opening: 2023
Section III: National Border to Victoria Lock	2.01 km / 1.7 km	Anticipated opening: 2023
Section IV: Victoria Lock to Albert Basin Newry	3.5 km	Opened May 2018
Pre-existing Section: Carlingford Marina to Omeath	c. 8km	Opened 2014
Output Indicators	10.1 kms new cross border greenways	Greenway infrastructure completion 2023
Result Indicators	199 people using the greenway to commute cross-border to work / education on a regular basis Recalibration to 15 regular cross-border commuter journeys.	

Recent delivery has been impacted by both the Covid pandemic, which has had the impact of raising costs, whilst also facing wider issues including delays in planning approvals, from DFI, for

the route corridor from Victoria Lough to Albert Basin, Newry. As planning approvals are a required element this has created a major factor delaying this project.

The project has also required a number of environmental surveys, and landowner negotiations especially for the change of route, including in Omeath, which have taken a long time, in part as a result of a lengthened planning process by An Bord Pleanala, which has extended the processing time from the initial 14 weeks processing, to a current estimate of around 55 weeks.

While not all sections of the greenway will be delivered within the original project lifetime, it is anticipated that the majority of the greenway route will be completed in 2023⁸.

Results indicators are less predictable, and it unlikely that the full range of benefits initially anticipated will be achieved. Recalibration of the results indicators demonstrating a potential RI target of 21 regular cross border trips. A minor impact can also be identified where population changes recorded in the ROI 2016 census update are considered, see table 17, though this is calculated to be a fraction of 1 trip, reducing total target number from 15.4 to 15.1 regular cross-border commuter trips.

The delivery of trip count uplift is likely to be phased, over time, following opening of the greenway, and unlikely to be fully visible before 2026, allowing for a three-year travel shift. As this target date occurs after the extended delivery deadline of the project, we would recommend the use of a graduated deliverable trip count number over time.

The adjustment reduces the target number of cycling and walking trips to reflect the relatively small number of cross-border commuters from the Newry/Louth sector likely to have access to the greenway.

Table 17: Adjusted greenway uplift, cross border commuting CLG

Newry / Louth	Target %	Target
Cross Border commuters with walking / cycling access to project		
Walking / Cycling	10%	15.4
Apply 2016 census factor		15.1

The application of the revised trip numbers would suggest, on the basis of straight-line growth, the following outcome increases in cycling and walking regular cross-border commuter trips:

- By 2024: five additional trips on a regular basis
- By 2025: ten additional trips on a regular basis
- By 2026: fifteen additional trips on a regular basis

Other areas of benefit included in the letter of offer, but absent from the CP, remain as potential outcomes. As these are not included in the CP we include them in table 18, below, for illustration only.

Given the recalculation of baselines, common across the majority of the programme projects, it is possible that the Carlingford Lough Greenway will achieve the intended increase in regular cross-border trips initially envisaged. It is likely, however, that this increase will not occur within the lifetime of the programme, and will be dependent on a continuing recovery from the Covid pandemic.

⁸ Estimated completion date stated in Project managers' survey 2022.

The effect of structural changes to the labour market are also likely to affect the growth in commuting in all aspects, including cycling and walking. Other areas of impact included in the Letter of Offer, but not present in the CP, are also included here for completeness, and detailed in table 18 as areas of additionality. As with the measurement of greenway uplift, these need be reviewed on the basis of a significantly reduced baseline number and are thus unlikely to be achieved at the rate initially anticipated.

Table 18: Carlingford Lough Greenway additionality (non-CP)

Type	Description	Potential outcome
Engagement	Recruitment of 10 businesses which have specific interest in the cross-border greenway for commuting to work;	Remains possible
User count	150 people using the greenway to commute cross-border to work / education on a regular basis	Highly unlikely, see table 18 for recast commute figures
User count	Equivalent of 30 people using the greenway to commute cross border on a daily basis	Highly unlikely, see table 17 for recast commute figures
Engagement	Engagement of local primary and post primary schools from both jurisdictions	Remains possible
User count	Recording up to 60,000 visits / users of the greenway crossing the border in either direction in year 1, rising in subsequent years	Remains possible. User count based on mix of users, not defined to single category. Time period unlikely to be achieved.
Engagement	Establishment of a Friends of Carlingford Greenway committee	Achieved
Engagement	Delivery of a Greenway activity programme	Achieved
Engagement	Recording of 1,500 participants involved in activities delivered through the greenway activity programme in year 1, increasing in subsequent years	Remains possible. Growth in numbers unlikely over period initially identified

5.3.2 Ulster Canal Greenway (UCG)

The UCG was originally defined as 21.8kms of new greenway running primarily along the banks of the Ulster Canal, connected to an existing network in Monaghan town. A Letter of Offer was issued to the project on the 6th of December 2016, setting out three objectives, based on modal split percentage expressed as modal shift, output of 22kms of new greenway, and a targeted community engagement programme.

In common with other projects, the Ulster Canal Greenway experienced a series of delays and challenges, notably delayed delivery of infrastructure and the resubmission of a shortened route, truncated from the original 22kms to a revised 12kms, see table 19. The effect of the pandemic on the UCG is visible in the increased costs and timelines required for delivery.

Rising costs have also resulted due to issues which have been identified along the route requiring additional work and in turn time which had been unforeseen earlier. The project has also been impacted by delays with landowner negotiations particularly in Middletown which has delayed the purchase of land and again elongated the process.

The planning authority in Northern Ireland also asked for additional surveys and works not previously anticipated by the project.

Table 20 sets out the anticipated Results Indicator outcomes for the greenway. The figures in table 20 include adjustments for the 2016 ROI census update.

Table 19: Ulster Canal Greenway, key data

Phase 1, Greenway routes in Monaghan town	Separate to INTERREG VA programme	4.2 km	Completed 2013
Phase 2, Smithborough to Middleton	Included in original submission	22 kms	See below
Smithborough to Monaghan Town (W)	Section not going ahead under this programme		

N2 Spur at Monaghan Bypass	Section not going ahead under this programme		Now included in separate funding application to NTA
Monaghan Town to Border	- Planning application approved, Jul 2021	9.8kms	Anticipated opening: H2 2023
Border to Middletown	- Planning application Border-Middletown (section 4) submitted	2kms	Anticipated opening: H2 2023
Phase 3, Smithborough to Clones	Separate to INTERREG VA programme		
Output Indicators	22kms new greenway (3.121), Letter of Offer, 6 Dec 2016		Now likely to be c. 12 kms
Result Indicators	Minimum of 4.5% modal shift by cross-border commuters from cars to walking / cycling by 2023		

Table 20: Adjusted greenway uplift, cross border commuting, Ulster Canal Greenway

Armagh / Monaghan	Target %	Target
Cross Border commuters with walking / cycling access to project		
Walking / Cycling	7.2%	13
Apply 2016 census factor		12.7

A series of further non-CP activities were also identified, see table 21.

Table 21: Ulster Canal Greenway additionality (non-CP)

Type	Description	Potential outcome
Engagement	- Targeted community engagement programme	Remains possible
Environment	A minimum reduction of 3.17 tonnes CO2 annually	Highly unlikely. Based on the original, unamended, trip count. CO2 savings should also be adjusted to reflect baseline review.

5.3.3 North West Greenways Network (NWG)

The NWG project Letter of Offer was dated 31st August 2017 making reference to three greenway sections: Route 1, Derry / Londonderry to Buncrana; Route 2, Muff to Derry / Londonderry; and Route 3, Strabane to Lifford. These totalled 46.5kms of new greenway (as objective 1). The letter also defined modal split Results Indicators in terms of a shift from 2% to 7.5% from carbon-based transport to carbon free sustainable transport, which was calculated as an increase from 130 to 500 cross border commuting and utility journeys by cycling and walking (as objective 2), see table 22.

Table 22: North West Greenways Network, key data

Route 1, Derry / Londonderry to Buncrana	Route removed from INTERREG project		Alternative project funding via DCC
Route 2, Muff to Derry / Londonderry	- Northern Ireland section opened July 2021 - ROI section to Muff expected current financial year	2.2 kms 5 kms	See text below

	- Proposed extensions Maydown, Strathfoyle, Culmore		
Route 3, Strabane to Lifford	- Strabane Lifford section opened April 2021 - Extensions proposed, Strabane North; Lifford South	6 kms	
Output Indicators	46.5 km new greenway, with some alteration to routes to reflect changes in circumstances.	Delivered at time of writing: 11kms	Routes with construction 2022: 10.5kms; Design development still in progress: c. 25km. Total: 46.5kms
Result Indicators	7.5% of cross-border journeys to be made by walking/cycling in the region		See below

The North West Greenways Network has experienced a number of changes over the lifetime of the project.

DTTAS published the ' All Ireland Greenways' Strategy in 2018, after the initial INTERREG letter of offer, requiring greenways to retrospectively adapt their delivery to the approaches set out in the 2018 strategy. The NWG project report this to have had a significant impact on both project costs and delivery timescales due to the protracted processes of having to complete an Environmental Impact Assessment. The strategy also introduced a more complex planning approval process.

Covid lockdowns also impacted on the ability of the greenway to maintain its initial timescales. The impact is illustrated in the case of the Strabane greenway section, which had mobilised onsite activities at the time of first lockdown, having to de-mobilise in March 2020 and then re-mobilise in June 2020. The changing nature of work access having both a time and construction cost impact, The project also notes indirect impacts in construction and material costs, which have risen significantly since COVID measures were introduced in 2020; and an effect from Brexit. This said, the NWGN has submitted contingency plans under which the full greenway length would be maintained, at 46.5kms, as a result of the reallocation of construction and route extension variation, discussed below.

The evaluation team undertook a series of baseline reviews, including for the North West Greenway Network sections, on the basis of the original routing, combined with assessment of pandemic impacts, set out in detail above, to calculate a revised outcome of 93 regular cross border commuter trips, see table 23, and a slight reduction to account for changes in census population data reported in ROI.

Table 23: Regular cross border commuting, original routings

North West Sector	Target %	Target
Cross Border commuters with walking / cycling access to project		
Walking / Cycling	10%	93
Apply 2016 census factor		91.1

As in other letters of offer, the NWG offer included a number of additional deliverables, set out in table 24.

Table 24: North West Greenways Network additionality (non-CP)

Type	Description	Potential outcome
Route connectivity	Connection into the Urban Greenway network in Derry / Londonderry and Strabane,	Remains possible
Route connectivity	Connections in to the strategic infrastructure being developed in the region, e.g.: NW Hub; bus stations in Derry / Londonderry, Strabane, Lifford etc.	Remains possible
Engagement and marketing	Creation of branded identity	Achieved

The North West Greenways Network appears particularly resilient to the changing environment for supply. This is illustrated by the continued expectation to deliver all route kms originally anticipated, albeit with route updates reflecting the optimisation of processes. Costs and timescales are likely to push some of this construction beyond the programme timetable, hampering the measurement of results over time; though it is likely that where constructed, the greenways would result in the results indicator calculated in table 23.

5.4 Electric Vehicles Projects, FASTER

The FASTER project was added in October 2020. While the project started after the initial lockdowns, its application and review process preceded them, with many of the assumed use characteristics based on pre-covid behaviour. As a result, the project's primary outcomes and operational assumptions reflect the same issues of declining demand as seen in the other INTERREG projects.

It is also notable that the project definitions differ from those of the other projects by concentrating on the physical delivery of infrastructure as a primary output, without specific definition of Results Indicators that had been common in the other INTERREG VA Letters of Offer, though an initial behavioural results indicator was included in the CP, see table 25.

Table 25: FASTER EV project, key data

Faster charging points	73 rapid charging stations of 50kw capacity divided between jurisdictions.	Anticipated to be delivered by 2023: Scotland procurement Sept 2022 R.O.I. procurement: Nov 2022; NI: Early 2023
Output Indicators	73 rapid charging stations of 50kw capacity	Likely to be energised 2023
Result Indicators	Initial EV registration requirement revised in application stages and removed as required outcome.	

As in the other projects, demand for EV charging infrastructure follows from a need for travel, but differs in the nature of that demand as being related to a specific fuel type in one mode rather than the choice of one mode or the choice to travel at all. The need for EV charging infrastructure also reflects on a wider economic relationship between vehicle costs, expenditure and the chicken-and-egg relationship between the presence of charging points and choice to purchase an EV in the first place.

The project reports (Aug 2022) that the pandemic had not impacted on the primary delivery of the FASTER project, but some delays in the procurement of contractors had been experienced toward the latter end of the evaluation, with the potential to delay the ultimate roll out of the EV charging points.

6. Longitudinal evaluation

Our evaluation has been based on the assessment of design, delivery and outcomes over time. The work was envisaged as a longitudinal assessment, the comparison of outputs and results on a consistent basis over the period of the evaluation; though a number of structural and external factors have impacted on the evaluators' ability to assess some of the outcomes, primarily as a result of extended construction periods, with most of the projects being unable to complete construction until the last year of the evaluation period, with necessary knock on effects on achieving and measuring results indicators, discussed in more detail below.

The period of evaluation has experienced three significant external events, some defined as crises, that include:

- The announcement and implementation of Brexit;
- The Covid pandemic and associated lockdowns;
- A cost-of-living crisis, mainly at the end of the programme, also impacted by the Russia / Ukraine war.

It is also notable that a lack of devolved administration in Northern Ireland at the time of writing, and rapid changes in alternative administrative arrangements are also likely to affect the delivery of some of the desired outcomes. A notable example related to the level of support or incentives available for the purchase of EVs, though it is likely that other effects will also result.

In each instance we have sought to describe and measure impacts arising from the various challenges to the INTERREG projects, updating measurement indicators to assess the potential outcomes on the basis of operational contexts at each point of change. It is also notable that differences in the measurements stated and used through the application and review processes lacked consistency in their definition and application.

We have, as a result, presented a series of updates to output and results indicators, described in the preceding sections of this document, and at various points in the life of the evaluation, that reflect a consistent baseline and updates in light of the changing circumstances

6.1 Outcome Measurement

The measurement of Output Indicators, including physical buildings, charging points and greenway infrastructure, was defined as a major requirement of the programme. While it is likely that three out of the five projects will deliver (a majority) of the planned infrastructure, only the North West Hub has been able to do so within the timescale initially defined. The FASTER project is likely to be able to deliver charging points within the terms of a planned extension, while the North West Greenway Network has not received confirmation, at the time of writing, in respect to proposed route updates that would allow it to deliver the distance of greenway route originally planned. Both the Ulster Canal and Carlingford Lough greenways are unlikely to deliver the full extent of route kms initially defined in their applications.

The positive impacts of the infrastructure on travel behaviour are also measured, defined as Results Indicators, and concentrated on the modal split percentages for all of the projects except FASTER. The initial measurement of results indicators varied significantly throughout the application process, with the result that most letters of offer contained inconsistent definitions of results required. Core issues related to the stated measurement units, with further inconsistencies in the time periods over which results were measured. The same inconsistencies were a recurring issue through the application process, and are reported in detail in each of the first two of our annual reports, and separately in technical notes referred to in the preceding sections of this report.

The later occurrence of Covid, and more recent behavioural changes further exacerbate difficulties in measuring Results Indicators, not least the reality that the majority of projects will not demonstrate any results that could be measured until after the conclusion of the programme. We have therefore undertaken a proxy RI assessment for each project, set out in section 5, above.

It is also unlikely that the programme will be able to achieve the full extent of modal split / results indicators originally defined, largely as a result of the significant changes in external environments, though most projects will demonstrate outcomes, over time, in line with modal shift percentages defined in the CP. It is anticipated that the intended uplifts will be achieved in line with the actual delivery of projects in the period to 2026.

The extent of delivery differs between projects. The North West Hub being the only project to have completed its physical outputs at the time of writing. The first objective, the construction of the hub, has been achieved. The ability of the hub to achieve modal shift is more challenged, however, as a result of underlying changes to travel behaviour, and a shift from office based to home-based work in many circumstances. Given the impact Covid has had on travel and the vast reduction that has occurred on all of Translink services, then achieving some of the targets in relation to Public Transport will be challenging.

Greenway use has also been challenged by the Covid pandemic, facing many of the same work pattern shifts experienced by the hub. Observed increases in walking and cycling activities for leisure purposes are likely to replace and exceed commuting travel, but is not directly measurable using the measurement structure defined in the CP.

Market changes are likely to impact in the FASTER project differently to the greenway or hub projects. Differences arise in that the EV project is focus on vehicle ownership rather than creating a shift in demand away from cars, though market changes are likely in the longer term. The FASTER project is also more likely to be affected by affordability and vehicle retail prices, as drivers remain able to purchase non-EV vehicles, with any impacts on personal and household budgets impacting on the longer-term vehicle purchase patterns, while public transport use impacts are more immediate.

6.2 Survey review

Public surveys were undertaken on an annual basis throughout the course of the evaluation. The surveys were originally developed to assess modal split, as a method of validating baseline assumptions. Following the outbreak of Covid, the surveys were updated to include a review of public responses to the pandemic, including an assessment of changes in travel behaviour as a result of the pandemic. Individual year responses are reported in detail in the annual report and summarised below.

Initial public surveys were undertaken in August 2018, with follow on panel surveys completed in 2019, and annual on-line surveys from 2020 to 2022. The original survey concentrated on the validation of modal split figures, while the later surveys included a greater range of questions pertaining to travel behaviours. The second survey introduced questions specific to changes in border infrastructure around Brexit, with subsequent surveys also addressing the impacts of Covid.

6.2.1 Cross Border modal split

The 2018 survey focused on travel between border counties that originated in one jurisdiction and terminated in the other. The survey also identified locations of normal work, education and personal activities including shopping. A vast majority of trips reported were made by private car, although some differences were noted by household structure and respondent gender. The limited

sample size (n=470) restricts gender and household effects to observations rather than statistically relevant factors.

The survey demonstrated a shift in travel mode split compared to the 2011 census data, which might indicate a positive trend toward public transport that could affect the final calculation of net benefit, illustrated in table 26.

Table 26: Cross Border modal split comparisons

Mode of Transport	Car	Public Transport	Walking / Cycling	Other
2011 Census	88%	8.8%	2.7%	0.5%
2018 Survey	86.98%	12%	1.02%	0%

The shift toward public transport was further confirmed in the 2019 survey, which suggested an increase in the number of public transport users, and forms the basis of a trend line, discussed below. Notable also, both surveys suggested a decline in the number of walking and cycling trips being made, though this trend reversed in subsequent surveys, likely to be an effect of the pandemic lockdowns.

The 2018 annual report incorporated survey responses into a revision of baseline trip counts, though these would be subsequently updated, in each of the following annual reports to accommodate the effects of lockdowns and other pandemic restrictions.

Results from the 2019 survey also included a review of Brexit impacts, but excluded the impacts of the Covid pandemic. The survey and accompanying report reviewed and updated the measurement of externalities, being the external factors having an impact on, but not arising as a result of, the INTERREG programme. In most reviews of delivery external factors are assumed to remain unchanged, effectively that external circumstances at one point in time are broadly the same as at any other. This assumption is unlikely to hold true, however, where major structural changes are visible. In the 2019 review (19123101JC) these related to the effects of Brexit, which was felt likely to affect the material circumstances of cross-border travel, and were categorised in terms of their impacts on:

- Employment,
- Trip Delays, and
- Economic Constraints

The extent to which the INTERREG projects would be able to achieve the results indicators as initially defined was felt linked to the extent to which the cross-border market remained homogenous as the effects of Brexit became apparent. The review including a modelled assessment of border crossings between Northern Ireland and the Republic, also reported as a paper presented to the INTERREG Sustainable Transport Conference, detailed in section 7, below.

In project terms the Brexit review concluded on traffic movements, treating demand at greenway and hub separately. Impacts on the use of EVs was not assessed.

Traffic movements along greenways were considered as (relatively) short distance movements - based on local employment and schools; while those at the hub, related to longer distance trips. Longer distance crossings were identified as having a more complex relationship to the macro-economic relationships between the UK and Ireland, while those at the greenway crossing points follow micro-economic relationships. Access to specific activities were also considered in relation to their specific cross-border arrangements, including access to neighbouring schools, a significant

contributor of greenway traffic, and market factors affecting shopping patterns. The analysis developed a series of explanatory variables affecting longer term delivery, discussed in subsequent sections.

6.2.2 Travel patterns update

The impacts of the pandemic began to become apparent from the responses to 2020, 2021, and 2022 public surveys. The initial impacts, discussed in section 4.1.2, above, were observed on an ongoing basis in subsequent public surveys. The 2021 annual report identifying a combination of factors, see section 2.4 of the annual report (21120601JC), to illustrate impacts in trip demand.

Enforced restrictions on movement resulted in a sharp decline in the number of trips made to work and education, and contributed to the emergence of remote working as a significant element in patterns of work. In addition, restraints were also placed on international travel with further knock-on effects on local economic activity, tourism, and associated local employment. The net effect being an observed reduction in the numbers of trips made, with significant barriers to work and tourism uses of infrastructure. Further impacts on the INTERREG projects being a limitation on some projects to deliver the full extent of infrastructure initially envisaged.

Surveys undertaken from 2020 identified the effects of the pandemic on INTERREG VA supported projects, both in terms of impacts on the projects themselves, primarily in relation to their ability to complete planned construction (infrastructure effects), and through public surveys to capture the effects of covid on the use of INTERREG projects (travel effects). Infrastructure effects are described, by project in section five, above.

Significant adjustments to estimated travel patterns have been noted and reported at various points through the life of the evaluation, and in the text set out above. Recalibrations undertaken in the period before the pandemic and measured to 2019, are set out in table 2, above. A further recalibration to take account of pandemic effects to the extent possible. Estimations of travel demand impacts are illustrated in table 27.

Table 27: Covid Impact on Trip Demand

	Non-Covid				Covid			
	CLG	UCG	NWG	NWH	CLG	UCG	NWG	NWH
Local annual trip count	9,423	6,278	85,800	See footnote	10,130	6,749	92,241	See footnote
Island of Ireland visitors	7,367	4,908	67,080		1,965	1,309	17,890	
Overseas visitors	343	228	3,120		17	11	155	
Annual equivalent trips	17,133	11,414	156,000	449,661	12,112	8,070	110,286	124,548
Regular trip equivalent	86	57	780	2,248	61	40	551	623
Cross-border commute factor	0.07	0.12	0.05	0.03	0.07	0.12	0.05	0.03
Baseline Trip Count, regular cross-border commuter	6	7	36	89	4	5	25	16
Target RI (original infrastructure)	21	18	131	229	15	13	93	41

Notes: see footnote⁹

⁹ Table excludes impacts on FASTER, which relate to charging events and vehicle registrations rather than trip demand, discussed below. NWH trip counts are based on 2017-18 and 2020-21 annual total flows for Derry / Londonderry, source: https://www.whatdotheyknow.com/request/station_usage_statistics_for_nor_3;

Table 27 illustrates the method by which a revised RI value has been determined, for each of the four original projects. The methodology applied for the FASTER EV project is detailed separately. Annual trip counts are divided by location between those that relate to local cross border movements, those by visitors arriving from external locations on the Island of Ireland, and Overseas visitors. These are summed to give an annual equivalent trip count of any type as measured in the original application. Trip counts for the North West Hub are derived from the 2014 survey, detailed in the footnote. A regular trip factor is applied, and a further factor related to cross-border commuting behaviour, establishing a baseline trip count, for both the original baseline and its update.

While the review of trip demand is necessary, it does not in and of itself change the nature the projects nor the infrastructure being delivered. The relative deliverability of projects reflecting the combination of infrastructure effects and travel effects. Pandemic impacts having slowed the processes by which planning and construction phases can be / have been delivered, both pushing the delivery dates back across many projects, and pressuring the costs of some.

Additional impacts are likely to follow in line with both infrastructure and travel effects. Stated secondary indicators, including CO2 reductions, public engagement activities, and similar, will also deviate from the results included in the application process dependent upon the extent to which original predictions of baseline and use can be achieved.

Further acknowledgement may also be appropriate of changes in demand that may actually benefit INTERREG projects, that include additional cycling and walking trips made for other trip purposes. Thus an increase in exercise and leisure uses of greenways may be seen as positive outcomes of the infrastructure, but not be included in the measurement included in the CP. The extent of that impact will be different across projects, with greenways likely to experience a counterbalance from increased exercise and leisure uses. The North West Hub is likely to experience the greatest decline in measurable results indicators and is less likely to experience increased exercise or leisure uses compared to the greenways.

An additional impact of the pandemic has been the extent to which it has affected the necessary planning processes and construction timescale and costs. A majority of projects have been impacted as detailed in the preceding sections, with a knock-on effect that infrastructure completion will, in the majority of cases, fall at the end of the programme period, and exclude measurement of Results Indicators over a sufficient length to determine success fully.

6.3 Programme Review

In this section we distinguish between project outcomes, and evaluation of the programme. The programme relating to the INTERREG VA Priority 3 Sustainable Transport programme, operating in Ireland, Northern Ireland and Scotland, charged with delivering support to achieve the following:

- To promote cross-border, intermodal and sustainable mobility in the region to include:
 - Creation of one cross border, multi-modal public transport hub encompassing integrated services;
 - Creation of 80 kms of new cross-border greenways; and
 - Creation of a cross-border EV network including 73 new/upgraded rapid chargers
- That the development of project infrastructure would contribute to:

https://www.whatdotheyknow.com/request/station_usage_statistics_for_nor_2. Public transport cross border commute factors have been derived from NISRA 2017 survey, section 4, and apply to the prediction of use patterns for the NWH.

- A 25% increase in the number of passenger journeys utilising cross-border public transport services by 2023;
- A 10% increase in the number of cross-border journeys made by walking or cycling by 2023; and
- An increase of 2,000 EV registrations by 2023, subsequently amended to reflect a change in the baseline values of EVs registered

The delivery based on the principle that each of the supported projects make a contribution to both the outputs and result indicators described.

Two potential interpretations are possible in terms of delivery of programme results indicators, the first related to measurement across the entirety of the border region, in other words all commuting trips between Northern Ireland and the Republic of Ireland; the second measured in terms of the specific locations in which projects have been established.

In our analysis we consider the intent was related to the latter measurement, being the measurement of impacts in the locations of the projects themselves, though some of the terminology in the programme document may support the former interpretation; in particular where individual projects are stated to 'contribute to', rather than fully deliver on the results indicators defined.

A further element is introduced by the term 'up to', originally used in programme documentation and applied to the numbers of regular cross-border commuter journeys - removed with effect from the 2016 updates to the CP, in effect defining a maximum output rather than an expected minimum, and potentially allowing each or any project to deliver any outcome below this figure.

We also highlight the use of regular cross-border commuting journeys as the metric applied, as many greenway journeys relate to non-commuting trips, thus complicating both the measurement of trip numbers and the ability of the projects to deliver a sustainable increase to a defined and (relatively) small sub-group of all users.

6.3.1 Physical infrastructure

Physical infrastructure is most easily measured, as set out above, as each project can be assessed terms of defined route or building infrastructure completed.

On this basis it is likely that the projects will deliver a substantial proportion, but not all of the infrastructure originally envisaged. The bulk of the shortfall resulting from the external factors impacting the projects, rather than any specific error in provision of planning. For their part the programmes body also appears to have contributed constructively, taking an early lead in establishing and updating baseline figures, where calculations had changed. The authority also appears to have been proactive in the redesign and project extensions as appropriate, although one greenway expressed concerns in the 2022 projects survey in respect of final sign off.

The programmes body also appears to have supported and prioritised the completion of infrastructure as a key outcome, over specific adherence to the original timetable. It is noted that. With one exception, none of the projects would have been likely to achieve the timetables as stated in their original proposals.

6.3.2 Results Indicators

The project delays arising from Covid had the impact of pushing most projects construction phases to the very end of the programme cycle. This includes many of the greenways and the FASTER

projects not being able to open their full infrastructure and observe operation within the lifecycle of the evaluation.

As a result it is not possible for the evaluation team to fully assess the extent of impacts that the programme may have on the Results Indicators initially defined. The ability of the projects to fully deliver on all aspects as indicated in the applications finalised and accepted prior to Covid is significantly impacted by the pandemic. We would therefore need to conclude it unlikely that the projects individually, nor the programme collectively, will be able to fully deliver on all aspects.

This said, it is our conclusion that the results indicators as may follow from the opening of the project infrastructure is likely, in time, to achieve growth in sustainable transport on the basis of the revised baselines, described above, and thus represent full delivery in light of the external circumstances described.

6.4 Gaps Analysis

In this section we discuss the gaps between intended outcomes, current (actual) and likely delivery. This is based on the observation of infrastructure building work underway, and completed, and observed use made.

It is generally the case that the greenway projects have been unable to complete their full construction projects at the time of writing, though some have opened sections of their routes allowing for the assessment of current use.

The northwest multimodal hub has been completed, being the only project to have opened within the timescales originally envisioned, and is currently carrying passengers arriving and departing by rail. Some elements of the hub that were included in the application process, but fall outwith the defined outputs as set out in the CP, have not been fully achieved, with fewer cross-border services using the hub than envisaged, likely to reflect the state of the market following covid, and Brexit.

6.4.1 Areas of shortfall by project type

6.4.1.1 Greenways

Greenway projects have been affected by the planning requirements, design and construction delays. The impacts have been felt by all three projects, with acute impacts occurring in the North West Greenways Network, in which instance planning constraints led to a refocus away from one planned route within the network. The NWG experiencing a significant additional requirement in the planning process that would have resulted in their route between Derry / Londonderry, Buncrana and Newtowncunningham extending beyond the programme lifetime.

The other greenways have also been impacted by construction delays, and have all indicated a need to reduce route kms.

In all three greenways, construction times have been significantly and are likely to mean that a significant proportion of the infrastructure will not be delivered until the close of the programme. This delay will impact on the ability of all three greenways to achieve the Results Indicators initially intended.

6.4.1.2 MultiModal Hub

The NorthWest Multimodal Hub is the only project to have completed the bulk of its construction phase within the period to date. Some gaps do exist between the indicators contained in the letter

of offer and those in place at the time of writing, but these mainly relate to deliverables not contained in the CP document, and are largely a result of the continued loss of traditional traffic patterns from all public transport in both Ireland and Northern Ireland.

It is unlikely that the hub will be able to deliver the extent of traffic mode split diversion as originally intended in the application process.

6.4.1.3 FASTER EV Project

The FASTER project focuses on differing areas of transport sustainability and has differing outcomes as a result. The project also started later into the programme, with the benefit that market changes were more readily included in the work of the project. This said, the project has faced a series of delays, including delay to the granting of permission to commence, required from the DfI in NI; and delays in procurement to appoint contractors to construct new infrastructure. The combined effect being to push the commissioning of infrastructure toward the end of the programme lifetime.

At the time of writing, it was reported that primary EV infrastructure was in the process of being commissioned in one of three tranches, with the following two anticipated to be commissioned and completed by the close of the programme. As in other projects the later opening of infrastructure will have the impact that no observations of results will be possible in the timescales of the evaluation.

6.4.2 Actions taken and proposed to mitigate shortfalls

All of the projects have worked closely with the programme body to minimise and mitigate the effects of the pandemic, Brexit and other externalities on their delivery. It is observed within the projects and programme that continued delivery of infrastructure was seen as a priority, with most projects seeking and being granted extensions for that purpose, see section seven.

As a result of increasing costs some of the projects have sought a truncation of some sections, while others have sought and are making application to other funding sources to maintain their original route kms. It is likely that the net result of this will be the delivery of a significant majority of the originally intended infrastructure, though it is unlikely that the full distance will be delivered in the lifetime of the programme.

6.4.3 Potential for and limitations to further actions

Insofar as the projects can commit to delivery, the majority have identified and are taking actions to ensure delivery of a majority of the intended infrastructure. It is our understanding that the Northwest greenway has made application to vary its route and had not, at the time of writing, received confirmation from the programmes body, though this may have been resolved in the meantime.

Further actions possible within the lifespan of the programme are limited to the maintenance of support of the projects as currently constituted. Additional actions as may support the development of the projects and further support their progress may rest in the programmes body supporting applications to third party funding sources that would continue the work of the projects, and by default the programme, in achieving its aims of promoting sustainable transport outcomes.

The extension of evaluation to include additional uses of new infrastructure may also be an appropriate add-on, particularly in the case of greenways, where the majority of new users are likely to be leisure users and thus not identified in the original measurements, which were based in

the number of regular cross-border commuters. It should be noted, however, that the full identification of user-based results indicators are likely to be observed in the longer term, and are estimated in the preceding sections to follow a build-up in use. Thus a project that its completed and fully open to users in 2023, would be unlikely to demonstrate the full range of benefits (results indicators) until 2026, allowing a period of three years for the development and diversion of traffic to be realised.

It is also important to note that there is likely to be an opening spike in demand, demonstrating an initial and rapid take up of the new infrastructure, all other factors being equal, that would not be, or be unlikely to be, maintained in the long run. The patterns of early adopter behaviours are unlikely to represent the longer-term pattern of demand and should not be taken as a growth trend in its own right.

6.5 Synthesis and review of intended versus achieved outcomes

Throughout the programme development and delivery it has been apparent that the initial and continuing aim related to the promotion of sustainable transport. In setting this goal the programme has defined a series of measures that identified concrete steps that would support this principle, and the anticipated / defined results that could be measured.

All of the programme projects have developed infrastructure that support the programme aims, through the diversion of travel demand from conventional internal combustion engine cars to more sustainable modes. The nature and extent of this diversion was defined in the transnational collaboration agreement document, the CP, and expressed as modal split impacts in percentage terms for most projects.

Insofar as the rates were defined in percentages, their measurement remains possible against original and revised versions of the baseline calculation, regardless of changes in that baseline. Where the baseline has changed this would not affect the anticipated results percentages, with changes in baseline most likely to reflect a reduction in the level of demand at the point of infrastructure opening. In other words the outcomes that can be achieved remain valid where expressed as percentage change. It need also be noted, as the majority of projects have not opened fully at the time of writing, the performance of each against the stated percentage change remains unmeasured.

Physical outcomes, the supported infrastructure, are more likely to be achieved within the lifetime of the programme, but have not fully done so at the time of writing. Thus achieved outcomes fall below those intended across all of the projects. This said, achievable outcomes remain broadly on track for a number of projects, and with small variations in others.

On the basis of achieving, a majority of, the planned physical infrastructure it is reasonable to suggest that the programme will deliver in most areas of measured outcomes.

It is not possible for the evaluation team to determine the extent of eventual results indicators, but would suggest that the impacts will, where measured in percentage modal split uplift, be achievable over time. The extent to which this can be assessed in future reviews will require an accurate statement of baseline at the point of infrastructure opening.

7. Project Modifications

As the various limitations in delivery caused by both pandemic and other external changes became apparent the projects sought variation to the terms of their contracts. Requests for project modifications were submitted to the project board Steering Committees at one or both of December 2021, and July 2022. Modification requests submitted sought initial and subsequent extensions to the time period to completion, the majority being approved; and to the level of funding, with a majority of additional funding requests also approved.

Insofar as the projects were experiencing significant practical issues in delivery, the modification requests appear to reflect genuine and unforeseen constraints that could not have reasonably be identified in the initial application stages. It also appears that the programme steering committee recognised the extent of external limitations, though the individual requests were fully assessed at the time of their submission and are summarised in the sections below.

7.1 First round modifications, notified by written procedure

Three of the projects were granted extensions in the modification round brought to committee on the 16th of December 2021. These relate to the Carlingford Lough Greenway, The Ulster Canal Greenway, and the North West Multi Modal hub.

Pandemic travel impacts observed in the year to the end of 2021 are set out in our 2021 annual report (21120601), section 4. The 2021 report highlighting that all of the INTERREG projects had experienced severe constraints to their development, the majority of which stemmed from lockdowns and subsequent health control measures required of them. The early part of the year had coincided with gradual reductions of lockdowns, initially initiated in 2020, but a further surge in virus infections and subsequent absences across broad areas of the economy.

Delays affecting planning and construction existed across the board, and had a greater impact on some of the projects more than others, notably having a negative impact on greenway construction. These delays impacted directly on the ability of the projects to deliver on the infrastructure originally planned within the allowed timescale, with all three of the modifications seeking additional time by pushing the end dates further. These are summarised:

- Carlingford Lough Greenway granted a 12-month extension from 31/12/2021, to 31/12/2022;
- Ulster Canal Greenway granted a 12-month extension from 31/12/2021, to 31/12/2022; and
- North West Multimodal hub granted a 15-month extension from 31/12/2021, to 31/03/2023.

The extensions thus granted were justified on the external circumstances of the time, but were, in the event, insufficient.

7.2 Second round modifications

A second round of modifications was brought to the steering committee in July 2022. The external circumstances experienced in the period between December 2021 and July 2022 continued to present logistical and financial challenges to the projects delivery, while increased costs were also apparent. Project specific issues were also apparent, the majority of which related to operational and construction issues becoming apparent in the latter stages of their development. It is noted that some may have existed regardless of the external pressures of Covid, but had become apparent later as a result of the pandemic and associated external impacts.

7.2.1 Ulster Canal Greenway

The greenway had faced a series of access and purchase issues. As a result the Smithborough to Monaghan route section was removed from the intended greenway. It being noted that the intention remained to develop the Smithborough to Monaghan route section at a later date with Monaghan County Council support. The committee also noted a new agreement with farming organisations was being put in place with the potential to support future projects.

The steering committee approved additional funding of EUR2.1m to the project, and a reduction in the overall route length from 22kms to 9.8kms. A further extension was granted in the completion date to the 31st of December 2023.

7.2.2 North West Greenways Network

The NWG experienced a different issue, in that planning requirements and guidance had been made significantly more onerous in the course of their development. Access to land including that necessary in the planning stages had been subject to Covid restrictions. The project made a modification request on the basis that it had become impossible to deliver their longest route corridor, Derry / Londonderry- Buncrana, within the timescales of the INTERREG project.

While it was also noted that development and construction costs had increased, in some instances significantly, the greenway proposed it would maintain the total length of new greenway by concentrating effort on the delivery of route alternatives. The project also confirmed the intent to complete the initial Derry / Londonderry- Buncrana route by applying to other support funds including the DTTAS.

The steering committee agreed to additional funding of EUR9m, in addition to the agreement to divert construction to the four contingency routes proposed by the project. The committee also approved an extension for delivery to the 31st of December 2023.

7.2.3 Carlingford Lough Greenway

The Carlingford Lough Greenway had initially suggested an intent to submit a request for additional funding, based on proposed route changes. This was not submitted, however, as the request which was going to be presented differed to subsequent route update options.

7.3 Review of Modifications

The modification requests fall generally into two categories, the extension of delivery dates, and additional funding, including the truncation of some routes.

While the additional funding requests can be justified and have been accepted by the steering committee in those instances where granted, the extension of delivery dates complicate the ability of the evaluation team to assess the full delivery of intended outcomes across the projects and the programme. Effectively any results indicators that may have been associated with the projects are no longer visible as they extend beyond the conclusion of the programme.

In the preceding sections we have sought to identify the potential Results Indicators that may be associated with the changed routes, these are highly unlikely to be achieved within the lifetime of the programme. It is our conclusion, nevertheless, that the revised indicators as set out above are achievable from the infrastructure as will be delivered in the lifetime of the project, all other factors remaining equal. This assumes the timely construction of all remaining elements of the projects

infrastructure, and the absence of any further return to lockdown, or further unexpected effects of BREXIT or similar critical external events.

The effect of the current hostilities in Ukraine are also likely to impact on the economic circumstances within which the projects are delivered, reducing the likelihood of a full recovery within the lifetime of the project. Equally concerns over the long-term economic downturn should also be factored into delivery at the point of project construction completion.

8. Review and conclusion

In this section we review the processes and outcomes of the INTERREG VA Priority 3 Sustainable Transport programme. The programme was delivered at a point of significant societal adjustment, facing the impacts of Brexit, the Covid pandemic, significant financial challenges, as well as a period of political uncertainty in the governance of Northern Ireland. A further area of change related to the policy directions of the UK government, which, at the time of writing, was also facing changes in administration. The extent of these impacts has emerged over the course of the analysis, but have not yet reached a point of new equilibrium, at the time of writing.

A further area of concern relates to the lack of a functioning executive in Northern Ireland, and relatively frequent changes to the alternative administrative arrangements in the jurisdiction. As a result some of the initiatives visible in the other jurisdictions do not apply to Northern Ireland, while an ongoing uncertainty of administration may further affect specific decision and administrative processes. It is also highly likely that the contexts in which transport is used will change further.

Despite the changing context of transport, and limitations in supply, the INTERREG VA projects have continued to be delivered. In most instances the majority of infrastructure is under construction, or timetabled for construction within extended timetables agreed with the programme body. The extensions will support the completion of infrastructure necessary to meet the sustainable transport objectives of the programme, but are unlikely to achieve the results indicators within the life of the programme.

Given the extent of external challenges experienced across the programme and by all of its projects, the delivery of a majority of the infrastructure planned is a significant achievement.

8.1 Application process

While it is our view that infrastructure delivery marks a major achievement, the process has not been without its challenges, from which we feel lessons may be learned.

The process by which applications were made and appraised demonstrated a series of differences in the understandings between projects and the programme body. These were particularly notable in terms of the measurement units and their definitions, with a lack of clarity in the use of Modal Split, Modal Share and Modal Shift. The lack of consistency in the use of these measures resulted in differences between the outcomes stated, their interpretation and potential for delivery. The review of meanings formed a significant part of our early analysis, and is reported in the annual and technical reports at the start of the evaluation.

Misinterpretations were not limited to the projects alone, with a carry forward of incorrect terminology in the application appraisal processes, and further in to the Letters of Offer. Differences between stated intent and measurable outcomes were largely concentrated on the measurement of results indicators, rather than physical infrastructure, with the definition of outputs indicators less open to interpretation.

8.2 Externalities and context

By far the largest challenge faced by the programme has been the impacts of Covid. Immediate impacts relate to planning and construction delays, the pandemic resulting in lockdowns and delays in process, while the outcome of delay extending delivery times and costs.

By extending deadlines and deliverables, the projects and programme management are likely reduce shortfalls in construction of infrastructure, though not eliminated such gaps altogether. The continued delivery of infrastructure, albeit with delay, will continue to be of benefit to the communities thus served. The delay has, however, impacted on the ability of the projects to deliver within the timescales originally envisaged, with some projects not being able to demonstrate the extent of change initially defined over the life of the programme.

Further changes in context are identified and are in open discussion at the time of writing, These include a significantly raised inflation rate, likely to impact on both construction costs and potential use. This is felt likely to affect the electric vehicle market disproportionately as vehicle purchase budgets are likely to be squeezed in the current conditions. The inverse may also be true, that the significantly higher costs of fossil fuels may persuade some people to move from Internal Combustion vehicles to EVs, where the purchase price can be met. It is also possible that the economic crisis may result in lower numbers of trips being made, a net gain in terms of sustainable transport; alongside a significant economic decline, which will impact negatively on employment and future investment.

8.3 Summary conclusion

By taking the actions observed in maintaining and extending infrastructure delivery dates it is likely that the programme management has ensured the maximum levels of infrastructure possible will be delivered. Projects have also focused activity on deliverables that are likely to be achieved, the combination of which ensuring public gains and benefits are delivered to the greatest extent possible.

Lessons in terms of standard definitions and consistency in measurement should be taken from the process.

The reduced abilities of projects, and the programme in general, to deliver on Results Indicators is an outcome of the context of supply, and not of any specific inaction on the part of the projects themselves. It is our conclusion that, over time, the infrastructure as delivered will achieve the results indicators in line with the intent of the programme. These will not be visible over the remaining life of the programme.

8.4 Recommendations

In light of the findings set out in the preceding sections, and the review and conclusions, we would propose three areas for consideration in future reviews. These take the form of recommendations, described below.

8.4.1 Results Indicators (RI) definitions

The definition of results indicators appeared inconsistent from the outset, with a variety of calculation methodologies applied throughout. Differences appeared between the definition, interpretation, and measurement of RIs, both at baseline and target. This creating the necessity to confirm the intended measures, as well as those included in various levels of documentation, from the original project applications and frequently in subsequent reporting, as well as in some of the letters of offer.

Only a few statements of intended RIs appeared consistently throughout. It is our recommendation that future projects precisely define the meanings of intended RIs from their outset. This will avoid confusion and allow for like-for-like analysis of intended and achieved outcomes.

Measurement methodology is a crucial element in the definition and interpretation of the RIs, and this appeared to be missing from the application process. We recommend that a clear statement of methodology be set out from the outset of similar programmes, and that this be assessed in terms of consistency in the application review process.

8.4.2 RI Measurements specific to Public Transport modal shift

This recommendation relates to the measurement of public transport use, in general, and the measurements applied to the North West Multi Modal hub in particular.

We understand that significant effort has been taken by Translink to provide a shuttle service from the hub to the Foyleside bus station. This is significant in the delivery of the intended increases in regular cross-border commuting, as it links the key railway interchange to the most frequently used arrivals and departure point for cross-border bus access.

We also understand that long distance coaches linking the city to Dublin airport will also stop at the hub. As both of these activities provide an opportunity to link the hub to regular cross-border transport, we recommend that these form the primary basis of trip counts and estimated impacts in the RI going forward.

We would anticipate these be based on a passenger surveys which could be repeated over time, and a regular head count for passengers boarding at the hub.

The first survey would repeat the concept of the original DFI survey, to be based in the hub itself, and to capture the trip purpose, origin and destination of its respondents, as well as the method adopted for onward travel. This would provide a validated trip count for:

- Cross border commuter numbers, and
- The chosen method of onward travel

Combinations of these factors would allow the calculation of total cross-border commuter passengers on the basis of a head count of passengers transferring to either the shuttle or long-distance coach to and from the hub.

In a more general application, we recommend that future projects that are based on the provision of infrastructure in one jurisdiction alone, but none-the-less measure the change in behaviour crossing from another (jurisdiction), are measured on the basis of multiple access modes, including private car, crossing the border between jurisdictions to access the new infrastructure, rather than being limited to the mode(s) for which the infrastructure is primarily intended.

8.4.3 Evaluation structure and engagement

We further recommend that the numbers of meetings between the Joint Secretariat and the evaluation team be increased, and set to a defined timescale.

In our evaluation we have received significant support and assistance from both the JS and the projects themselves, but would also highlight the importance of defined meeting structures. We would recommend these include meetings at the outset of the applications assessment process, and at regular intervals throughout.

Appendix 1: Surveys

A1.1 Survey text, final version

Following 12 numbered pages inserted in the PDF version.

Survey print out included on this page in the PDF version

Survey print out included on this page in the PDF version

Survey print out included on this page in the PDF version

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A1.2 Survey review

Individual survey responses are set out in the annual reports for each of the years carried out, with a combined results review included in the 2021 report. A subsequent combined review was undertaken in 2022, to highlight changes in public choices, detailed below. A further review was completed as a part of the Faster project, and is included below.

A1.2.1 Project awareness

Responses were drawn geographically across Ireland, Northern Ireland and Scotland, with respondents being asked to define counties or postcodes then allocated to counties and districts.

A majority of respondents (54%) reported their location as Northern Ireland, and 18% located in border counties of the Republic of Ireland.

Table A1: Respondent location and region

Please tell us where you live			
	Percentage	Region	Cumulative by region
Cavan	2.84%	IRL	
Donegal	3.69%	IRL	
Leitrim	1.21%	IRL	
Louth	3.38%	IRL	
Monaghan	4.41%	IRL	
Sligo	2.11%	IRL	17.64%
Antrim and Newtownabbey	19.40%	NI	
Ards and North Down	4.11%	NI	
Armagh, Banbridge and Craigavon	7.73%	NI	
Belfast	4.11%	NI	
Causeway Coast and Glens	2.36%	NI	
Derry City and Strabane	1.99%	NI	
Fermanagh and Omagh	6.65%	NI	
Lisburn and Castlereagh	1.45%	NI	
Mid and East Antrim	1.15%	NI	
Mid Ulster	2.72%	NI	
Newry, Mourne and Down	1.15%	NI	
Elsewhere in Northern Ireland	0.36%	NI	53.18%
Argyle and Bute	3.02%	Scotland	
Arran and Cumbrae	2.11%	Scotland	
Dumfries and Galloway	2.36%	Scotland	
East Ayrshire	0.97%	Scotland	
Lochaber	0.73%	Scotland	
Lochalsh	0.30%	Scotland	
North Ayrshire	0.42%	Scotland	
Skye	0.79%	Scotland	
South Ayrshire	0.48%	Scotland	11.18%

Please tell us where you live			
	Percentage	Region	Cumulative by region
England and Wales	4.23%	Outwith	
Elsewhere in Scotland	7.31%	Outwith	
Elsewhere in the Republic of Ireland	2.72%	Outwith	
International	0.18%	Outwith	
Other (please specify)	3.56%	Outwith	

The survey sought to identify awareness of the schemes, and that of close equivalents and feeder infrastructure, see table A2. Close equivalents are listed directly under the INTERREG project to allow for a direct comparison of public awareness. Thus the North West Hub, with a respondent recognition of 36%, compares directly to the Foyle Street Bus Station, awareness 38%.

The INTERREG supported greenways demonstrated awareness between 33% and 38%, and performed better in awareness than two completed and operating greenways, the Great Western and Shannon (Blueway), valued at 31.25% and 31.96% respectively.

The FASTER project is less directly comparable as few discrete examples of project based charger development was available. The FASTER project achieved 35.5% awareness, which might be compared to PodPoint, a distributed charger brand, at 39%. Nationally recognised systems, including ESB as well as mapping systems for all charting points scored more highly, but also represent more commonly recognised multi-faceted brands.

Table A2: Project awareness

Which of the following had you heard about before receiving this survey?	Yes	No
North West multimodal Transport Hub (the North West Transport Hub)	36.12%	53.13%
Foyle Street Bus Station	38.78%	48.57%
North West Greenway	32.43%	52.27%
Carlingford Lough Greenway	37.62%	47.29%
Ulster Canal Greenway	33.88%	48.80%
Great Western Greenway	31.25%	53.83%
Shannon Blueway	31.96%	51.96%
The FASTER project	35.45%	48.00%
PodPoint	39.50%	46.42%
ESB Energy	47.21%	36.42%
Charge Point	54.60%	29.70%
Zap Map	42.68%	43.21%
Pulse	36.30%	48.27%

A1.2.2 Travel Behaviours

A series of questions were asked about travel behaviour, with comparisons before and after lockdown, see table A3.

Using a weighted average across trip types, the impact of lockdown on trip number is apparent. Driving trips, all purposes fell steeply, from an average value of 2.99, to a low of 2.3, but this was rapidly recovered as the lockdowns ceased, returning to a value of 2.94 in the 2022 survey. Cycling gains in the lockdown have also fluctuated with a subsequent loss suggesting no long term gains. Public transport trips varied in frequency only slightly with a net loss as pandemic constraints were lifted.

Table A3: Journey frequency change, caused by lockdown

How many journeys did you / do you make in a week.							
	once or twice a week	three or four times a week	On average once a day, e.g.: to school	On average 2 or three journeys a day e.g.: to work AND a school run	4 or more journeys a day	Weighted Average	
Driving before lockdown	14.96%	20.87%	26.48%	26.00%	11.70%	2.99	
Driving during lockdown	34.32%	26.03%	21.24%	12.15%	6.26%	2.3	
Driving after lockdown	15.21%	23.68%	24.48%	25.58%	11.04%	2.94	
Cycling before lockdown	31.97%	24.54%	21.45%	14.11%	7.93%	2.41	
Cycling during lockdown	28.88%	28.30%	20.02%	14.03%	8.78%	2.46	
Cycling after lockdown	32.51%	23.33%	21.67%	15.63%	6.87%	2.41	
Bus or train before lockdown	29.58%	25.18%	22.36%	15.40%	7.48%	2.46	
Bus or train during lockdown	30.73%	24.79%	19.31%	16.34%	8.82%	2.48	
Bus or train after lockdown	33.96%	21.00%	22.43%	14.03%	8.58%	2.42	

A more detailed review of trip impacts by trip purpose was also included, see table A4. Large gains were noted for cycling and walking activities, primarily for leisure purposes. Driving declines were seen in most trip purposes, but these gains appear to have been lost subsequently, see table A3.

Table A4: Impact of lockdown on travel behaviour by trip purpose

The lockdown has limited the amount that people are able to and chose to move around. How has your travel behaviour changed for each of the following?					
	I do much more of this	I do more of this	I do the same amount of this	I do less of this	I do none of this
Cycling for pleasure / exercise	13.97%	21.99%	26.29%	10.73%	27.02%
Cycling to food shops	9.64%	19.88%	23.43%	9.50%	37.55%
Cycling to get to work	8.52%	15.96%	22.00%	13.21%	40.31%
Walking for pleasure / exercise	17.82%	27.72%	34.60%	13.24%	6.62%
Walking to food shops	10.99%	21.24%	30.71%	13.37%	23.69%
Walking to get to work	8.30%	15.26%	25.70%	13.05%	37.68%
Driving to food shops	8.77%	17.55%	48.15%	18.67%	6.86%
Driving to get to work	12.87%	16.72%	35.90%	21.30%	13.21%

Electric vehicle use and choices were also affected, see next section.

A1.2.3 EV Review

Car Ownership and Use (n = 1,643)	2022	2021 survey
Regular access to a car	92%	98%
No regular access to a car	8%	2%

Vehicle Type (1,494)		
ICE Vehicle Owners	78%	60%
EV Owners	22%	36%

EV Type (330)		
Hybrid without plug	9%	None
Hybrid with a plug	18%	9%
BEV	73%	89%

Access to a Home Charger (301)		
Yes	88%	87%
No	12%	N/A

Home Charging Frequency (266)		
Every Day	17%	18%
Every Two to Three Days	37%	28%
Twice Per Week	19%	17%
Once Per Week	17%	23%
Less Frequently	9%	13%
Never	1%	1%

Frequency of Charging at Work Place (283)		
Every Day I am at work	7%	6%
Every Two to Three Days	17%	7%
Once Per Week	9%	6%
Less Frequently	11%	10%
Never	56%	71%

Frequency of Charging at Public Charge Point (297)		
Every Day	3%	3%
Every Two to Three Days	12%	7%
Twice Per Week	15%	10%
Once Per Week	16%	16%
Once Per Month	11%	13%
Several Times Per Month	23%	24%
Less than Once a Month	20%	27%

Charging patterns have remained consistent over the past year with the only significant changes for those charging at their work place, those charging every two to three days has increased from 7 to 17% and those who are unable to charge at work has fallen from 71% to 56%, however this may be as a result in the fall in those reporting EV ownership

Intention to Purchase a New Vehicle (1,607)	
Not thinking of purchasing a new vehicle	22%
Within the next 6 months	32%
Within the next 12 months	17%
Within the next 2 years	14%

Within the next 3 years	10%
At some stage longer than 3 years	5%

Fuel Purchase Type by Intention

Traditional Petrol/Diesel Vehicle (1,467)		
Unlikely (Very or Somewhat Unlikely)	47%	47%
Likely (Very or Somewhat Likely)	53%	50%

Hybrid that does not plug in (1,449)		
Unlikely (Very or Somewhat Unlikely)	53%	64%
Likely (Very or Somewhat Likely)	47%	31%

Plug in Hybrid (1,436)		
Unlikely (Very or Somewhat Unlikely)	49%	64%
Likely (Very or Somewhat Likely)	51%	32%

Battery Electric Vehicle (1,468)		
Unlikely (Very or Somewhat Unlikely)	35%	39%
Likely (Very or Somewhat Likely)	65%	60%

54% of all respondents likely to purchase a battery electric vehicle, up from 52% in 2021 survey
Increase in percentages likely to opt for EV shows increase in confidence in the technology and is potentially related to an increased awareness of these vehicle types

Current BEV Owners likely to purchase another BEV (226)

Likely	94%
Unlikely	6%

Infrastructure availability and needs (1,559)

Too Many Charge Points	27%	1%
Sufficient Number	20%	4%
Too few charge points	53%	95%

There is a significant shift in attitudes towards infrastructure needs and availability. 27% of respondents felt that there were too many charge points compared to just 1% of respondents last year while 53% stated that there were too few, compared to 95% in 2021.

Awareness of Public Supports (Grants, Loans, Tax Incentives) (1,569)

Yes	66%
No	34%

Has your awareness of electric vehicles improved over the past twelve months ? (1,526) – not asked in 2021 survey

Yes	82%
No	12%
Unsure	6%

Test Driven an electric vehicle – (1,639) – not asked in 2021 survey

I have taken a test drive in an electric vehicle in the past 12 months	59%
I have been offered a test drive, but not taken one	11%
Not offered a test drive in an electric vehicle	30%

Perceived Benefits of Electric Vehicle Ownership (877 usable open-ended responses) – in survey 2021 options were presented for respondents to choose from so we cannot therefore compare to last year's responses

Better for the Environment	51%
Reduced Running Costs	46%
Improved Driver Experience & Convenience	17%
Availability of Public Supports and Tax Incentives	8%
Improved Battery Technology	3%
Greater vehicle efficiencies	3%
Reduced servicing and maintenance costs	3%
Ease of Maintenance	2%
Improved Driver Health and Wellbeing	1%

Perceived barriers to the adoption of electric vehicles (934 usable open-ended responses) – again options were presented to users in survey 2021 so response levels should not be compared

Purchase Price of Electric Vehicles	36.5%
Public Charging Infrastructure (Availability, Charger Status and Cost to Use)	33.68%
Vehicle Range	21.3%
Battery Life and Replacement Costs	10.26%
Inconvenience (Time to Recharge EV)	8.12%
Charging (Costs)	5.88%
Electricity Concerns (Supply and Rising Costs)	5.2%
Availability of Electric Vehicle	3.2%
Insufficient & incorrect public information	2.5%
Environmental Concerns (Battery Production/Lithium Mining)	2.3%
Safety Concerns (Battery Fires & Lack of Sound)	2.2%
Towing Capacity	1.2%

How many miles would you need to be able to achieve on a single charge to consider using an electric vehicle (887 usable responses)

Average 275 miles 280 miles

How many KM would you need to be able to achieve on a single charge to consider using an electric vehicle (578 usable responses)

Average 355 KM 384 KM

A1.2.4 Summary

The survey provides a snapshot at the point of data collection. The main findings suggest that the effects of the pandemic are likely to remain short-lived with any net benefits proving hard to maintain.

A detailed analysis of Electric Vehicle ownership was included in the surveys, with some indication of pandemic effects, but these appear to be less dramatic, thus the pandemic has had only limited effect on the choice of car, while affecting choice to drive more.

Appendix 2. INTERREG VA Sustainable Transport Conference

In addition to the review of project delivery, the evaluation team were asked to facilitate a series of workshop and conference outputs.

Two conferences were included in the specification, to be held in 2019 and 2022, to reflect progressive themes from the programme. The first event was held alongside the European Transport Conference (ETC) being held in Dublin, allowing for the INTERREG presentations to be available to a large international audience, and for participants to participate in a wider range of transport specific discussions than may be available from the project audience alone.

The conference specification was interpreted to include:

- An audience drawn from a range of differing disciplines, not being limited to the immediate INTERREG projects or teams;
- A conference comprising multiple sessions and thematic areas;
- An international element from which the cross-border structure of the INTERREG VA programme on the Island of Ireland can be shared with similar or parallel border issues observed elsewhere;

It was also noted that, at the time of conference preparation, the subject of cross-border collaboration and cooperation was receiving significant attention. As a result the conference was developed to include a review of wider border and transport issues. A further effort to expand the interest and participation was achieved by collaborating and collocating the INTERREG conference as a full day session within the European Transport Conference (ETC), held in Dublin Castle on the 9th - 11th October 2019.

The conference was badged specifically as the INTERREG Sustainable Transport conference, and entitled: Crossing Borders: The potential and benefits of sustainable transport in an age of barriers, infrastructure and changing politics.

All four INTERREG projects were invited to present their plans and progress, and were provided with templates, data and support in developing their presentations. Three further presentations were made looking at the impacts of borders on movement, by: Professor Austin Smyth, James Cooper and John Scott respectively; and two expert panels, a morning panel looking at border impacts, and an afternoon panel with the subject of implementation of sustainable transport. A total of 61 participants took part in the course of the day, in addition to the planning team.

A2.1 Presentations and key outcomes

The INTERREG sustainable transport conference provided a review of the issues affecting cross-border travel, including the relationships between jurisdictions, the immediate economic impacts affecting the border hinterland, and changes in these relationships, as exemplified by uncertainties surrounding Brexit.

The conference deliberately addressed both the theories and practicalities of border issues, recognising that a difference exists between the macro-economic and political relationships at country level, and the issues faced by individuals and the economies at the local level. The picture is further complicated in the case of the Northern Ireland - Ireland border by the relative ease of crossing, effectively without physical barrier in the period since the Belfast Agreement.

A2.1.1 Realities of a Hard Border Crossing point

In the first presentation, John Scott, a US based researcher, presented a review of the issues experienced at hard border crossing points arising from physical infrastructure on the US international border with Mexico. The presentation highlighted significantly differing political and trade circumstances justifying the construction and enforcement roles of the border identifying:

The need for a border

- Distinct tariff and trade differences between US and Mexico
- Firm distinction between Mexican and US citizens
- Strict movement limitations, Visa and immigrant schemes (all increasing)
- Significant differences in earnings US, Mexico and other S. American countries

Perceptions and realities

- Extent to which migrant populations contribute to economies, including taxation
- Issues around safety / risk / repercussion
- Incentivization to illegal crossing

The presentation continued to describe the physical infrastructure of the border taking the San Diego / Tijuana crossing point as an example .

- Description of the San Ysidro border point
- Review of the issues facing a hard border
- Economic costs of delay
- Human Costs of delay
- Response to border, expansion and beautification

John's presentation included an economic cost evaluation of the border suggesting an economic cost of \$308 Million per year, excluding infrastructure, at the official border crossing point at San Diego.

Human costs were identified to include: a reduction in propensity to travel ,additional personal costs of trips made, an inability to accept employment as a result of commute time, pollution and health impacts, and the local employment impacts including, but not limited to:

- Employer reduced access to workers
- Loss of economic ability as a result of stress and lower productivity
- Increased infrastructure demand over time

A2.1.2 Defining the border, barrier or opportunity

The second presentation was made by James Cooper, providing a consequential review of the border crossing point at Jonesborough on the Newry / Louth border.

The presentation contrasted the justifications and perceived needs of the US/Mexico border with that of the Republic / NI. Differences in the rights and uptake of free movement are immediately apparent (though subject to change), while the economic relationships of the two neighbouring jurisdictions need also be established and contrasted. Recent history in Ireland including, to no small part, the activities of the EU thorough programmes including INTERREG, have encouraged and resulted in effective cross-border relationships that include employment, social and local economic activities, as though no border were in place.

The potential separation and loss of regulatory alignment between the UK and Ireland were likely to affect cross-border relationships, and formed the base of an exploration of physical border impacts on the ROI / NI border. It was noted that the development of a physical border was only

seen as a part of the overall impact of divergence, with the uncertainty related to future relationships impacting on the market as much as a physical constraint

The presentation reviewed the impacts of Hard borders, including the physical and economic realities that such a border created. These were felt to include, but not be limited to a barrier impact, the frictions associated with travel through a crossing point, and differing levels of friction that may arise from differing forms of border (soft, porous or hard barrier crossing points). In ALL instances the presence of a border, regardless of the softness of that border, compare badly to the currently existing infrastructure.

The presentation set out a review of potential impacts through a calculation of crossing economic costs. The calculation was based on current user traffic figures from the Transport Infrastructure Ireland (TII) traffic database, and can be summarised:

- Regular commuting Traffic Flow – entire border: 14,687
- Of which 6,456 originates in NI; 8,231 in ROI Newry to/from Louth

Case Study: M1 / N1 / A1 IRELAND @ Jonesborough

- 25,541 cross border trips all vehicle types all trip purposes
- 14,557 cross border trips in each direction N1

The presentation applied a traffic queuing model to establish the impacts of physical delay on throughput, establishing the queue impacts of differing scenarios of delays based on a best case, which matched physical border infrastructure to current demand, to further reviews based on the availability of space within the existing alignment and a number of extended build scenarios.

It was found that very limited delay at the border, being anything in excess of 60 seconds in total (deceleration, physical check and acceleration to re-enter 'motorway environment') rapidly led to substantial queues and rapid built up of substantial economic costs of £1.7 million per annum in Northbound direction, circa £4 million in both directions under the best case scenario.

The paper presented an analysis of three border outcomes, concluding that:

The Irish border is significantly more than the physical crossing point and include (perceptions of):

- Lack of opportunity
- Increased bureaucracy
- Loss of reciprocal services
- Period since Belfast agreement has significantly reduced friction and cost
- Impacts affect the immediate vicinity and the wider community differently

The presentation highlighted that the impacts of border crossing points were comprised of a combination of factors, including: Physical constraints, opportunities and the need to cross, and the perceptions of such barriers. Regardless of the level of uncertainty in the current circumstance, the restoration of a border, whether physical, technological or simply based in trade constraints will create significantly more harm than currently reported.

A2.1.3 Public responses to the Irish border

In the third presentation, Dr. Austin Smyth presented results from a survey specific to public attitudes to the Irish border. The survey was undertaken in 2019, and provides a link between the review of infrastructure reported in the first two presentations, and the potential of the INTERREG supported projects, reported in subsequent presentations at the conference.

The presentation provided an overview of the numbers of crossings made, for which purposes, and current opinions and attitudes towards crossing the border. The presentation then considered the potential impact of differing forms of Brexit on respondents crossing the border.

Results of the survey included the identification of a friction effect based on the numbers of crossings in each location, see table A5, trip purpose and border factors affecting such movement.

Table A5: Propensity for regular cross-border movement

Location	3 - 6 months	6 - 12 months	More than 1 year ago	Never	Can't remember	Total	Interviews Achieved
Armagh	10	5	7	0	1	23	100
Belfast	4	16	18	5	0	43	65
Coleraine	3	8	12	1	0	24	40
Derry	5	3	8	3	1	20	100
Newry	2	2	8	0	0	12	100
Carlingford residents	102	114	53	1	0	270	27
Carlingford visitors	0	0	0	0	0	0	38
Derry Bus Station	0	0	0	0	0	0	40
Derry Train Station	130	119	31	3	0	283	40
Derry City Centre (not bus / train station)	0	0	0	1	0	1	100
Donegal / cross border facility	38	24	13	18	21	114	40
Donegal residents	177	153	77	11	0	418	104
Monaghan residents	32	22	19	25	11	109	52
Total	503	463	246	68	34	1,317	844

In the first instance a friction is created by distance to the border. Effectively those living closer to the border are more likely to cross it than those further away - being an effect commonly measured in traffic analysis as generalized costs. Equally locations with a good cross-border infrastructure, including large cities with Motorway and Railway links, are more likely to cross the border than those with lower levels of access; while trip purpose, reflecting the needs / opportunities to cross are also considered, see chart A1. Mode of transport is illustrated in chart A2.

Chart A1/1a: Frequencies of cross border movement by trip purpose and origin

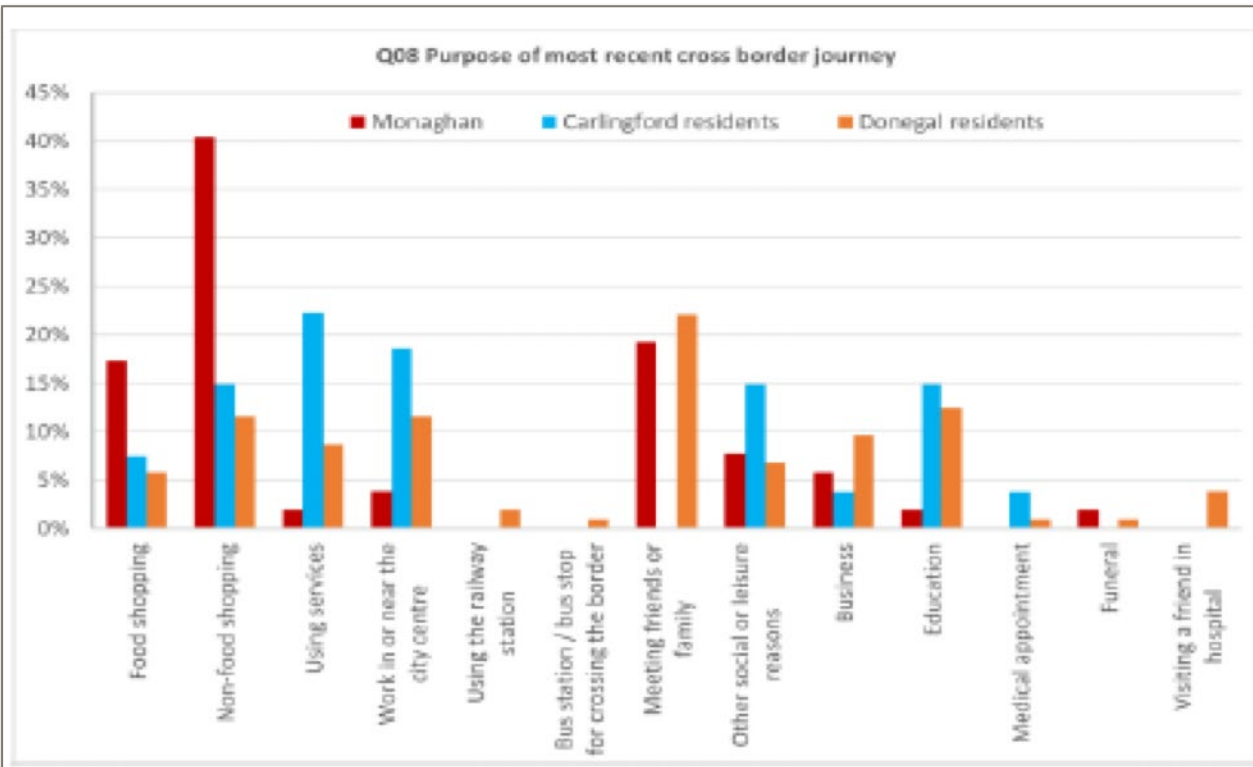
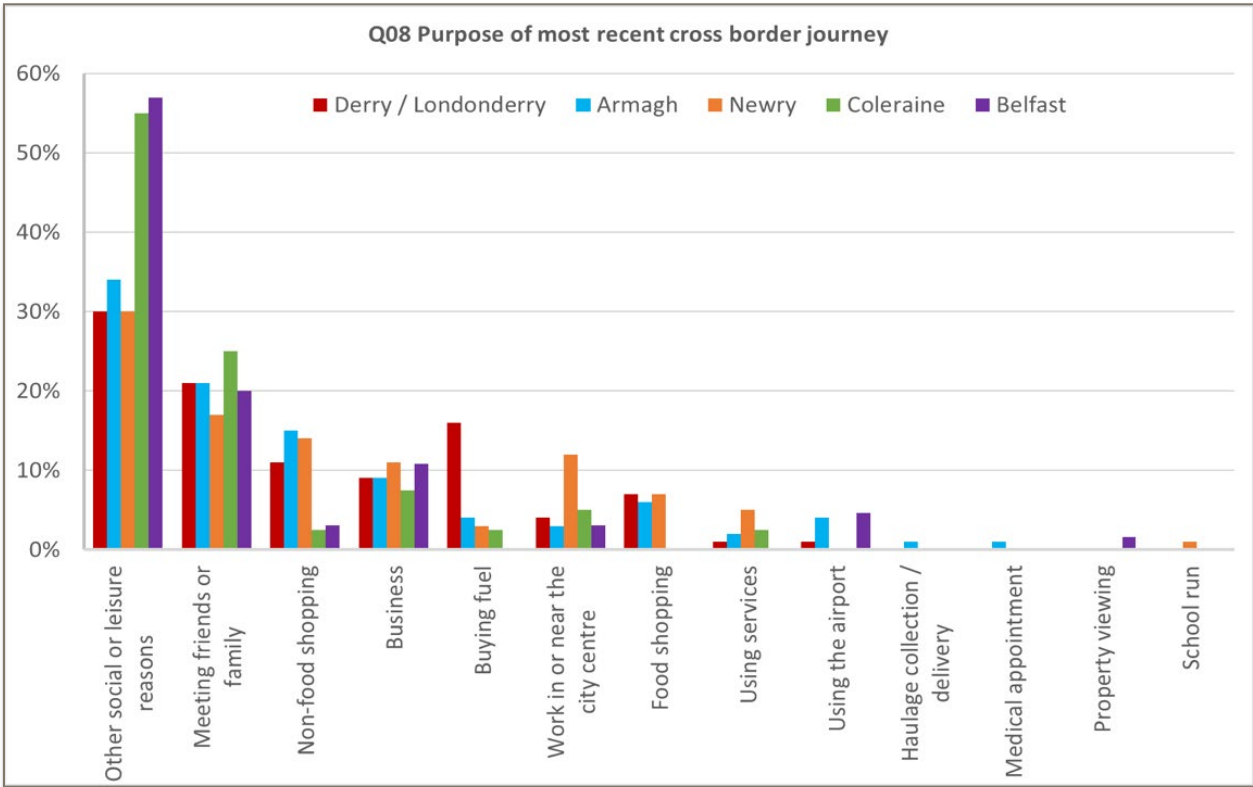
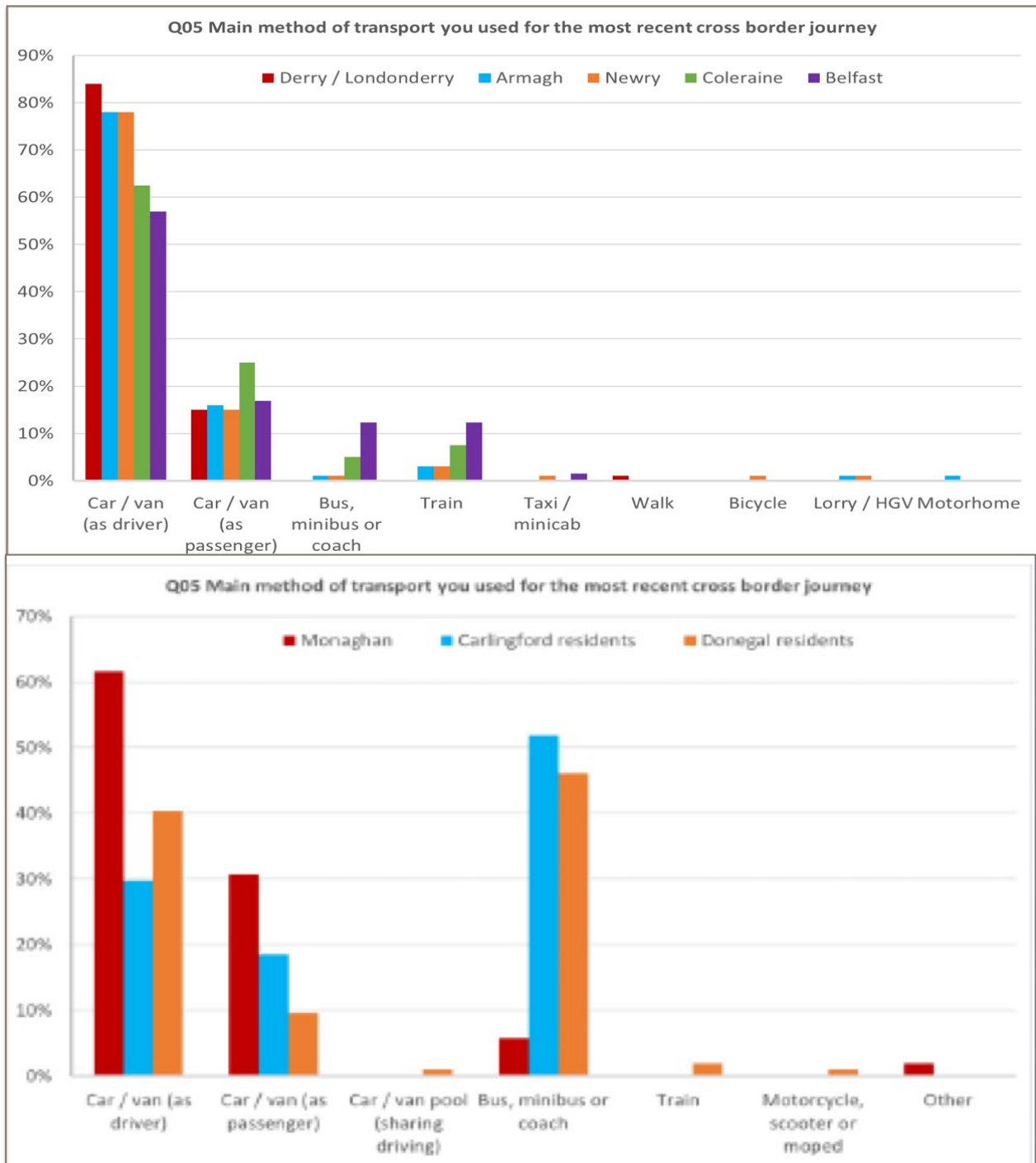


Chart A2/2a: Frequencies of cross border movement by mode



The presentation also highlighted the stated attitudes to crossing the border. The vast majority of Northern Ireland residents currently perceive crossing the border as easy and this perception is uniform across all locations surveyed both close to the border and substantially further from it - a perception of there being 'no border' is widely held. A majority of residents of Northern Ireland also reported friends or family living across the border.

A very similar pattern of attitudes to those held in Northern Ireland is evident among residents of the Republic of Ireland, though some difference is displayed by a significant minority of residents in Monaghan in relation to their perception of their ease in crossing the border at night.

There is a significant difference between Monaghan residents and those in Donegal and Carlingford in relation to their assessment of the likelihood of family and friends crossing the border. Indeed Monaghan exhibits the highest likelihood of family and friends living across the border than any other location surveyed North or South.

The survey also investigated the reported likelihood of changes to cross border travel among residents in both jurisdictions arising from alternative scenarios arising from Brexit. The manifestation of a hard border was simulated in the survey instrument in the form of delays of varying lengths (5, 15 or 30 minutes).

Under a scenario where the existing deal was ratified and current arrangements at the border were broadly maintained 8 in 10 residents of the Republic of Ireland and 9 in 10 in Northern Ireland report they would be unlikely to change their travel behaviour.

The majority of travellers would not be put off by 5 minute delays although for residents of Northern Ireland a sizeable minority would. As the extent of delay becomes more marked - a 15 minute delay - this produces a reduction in travel by more than 50% overall; this figure rises to more than 60% in the case of Derry / Londonderry and Newry. A 30 minute delay is projected to reduce the likelihood of cross border by two thirds among residents of Northern Ireland as whole. This figure rises to around 70-75% in the case of Newry and Derry / Londonderry respectively.

Visitors/users of Derry / Londonderry city centre appear to be more sensitive to the prospect of delays at the border with more than 40% indicating they would be less likely to cross the border although the frictional effect rises less sharply for 15 minute and 30 minute delays compared to the two resident based surveys on either side of the border. More than one third of Derry / Londonderry visitors would be very likely to travel less frequently across the border under a 30 minute scenario.

Among the rail and bus station users both groups seem to be less sensitive to the prospect of delays at the border, this being particularly true for bus users. In both cases for long delays approximately one third of current public transport users report being less likely to travel.

In the case of residents of the Republic of Ireland, over 85% report being unlikely to be affected by a 5 minute delay. This rises significantly with delays of 15 and 30 minute producing reductions of up to 30% and 50% respectively in cross border movement. - most marked in the case of Monaghan. A thirty minute delay would be likely to generate an 80% reduction in the likelihood of making cross border journeys among Monaghan residents.

A2.2 Synthesis of modelled approaches to border crossings

The combination of the Scott / Cooper analysis with that of Smyth, suggests a marked reduction in the levels of demand for cross border trips as a result of changes to the border arrangements between NI and ROI. The more strict the form of control the greater this impact is likely to be.

While, at the time of writing, the structure and form of border relationship has not been fully formulated, the potential impact is apparent, and likely to affect the performance of the INTERREG supported projects.

A2.3 Project Presentations

Individual project presentations were made by the Ulster Canal, Carlingford Lough and Northwest Greenways, and by the DFI presenting the North West Hub.

Each project highlighted a description of their work, measured approaches to estimating demand, and updates specific to construction status, plus a review of the likely impacts of their project(s).

Greenway projects highlighted the significant growth interest in Greenways at National Level, including the 2016 Strategic Plan for Greenways (DFI NI), and the 2018 DTTS Strategy for the Future Development of National and Regional Greenways (ROI).

Both departments recognise the benefits from the development of Greenways in Ireland; as a tourism product - with significant potential to attract overseas visitors, and as infrastructure for local communities - in terms of economic benefit, and as an amenity for physical activity and a contributor to health and well being for all users.

The Carlingford Lough Greenway highlighted the population density as being high along the East Coast, and includes the M1 Corridor from Dublin through Drogheda, Dundalk and onto Newry - accessible to just under 2.25mil people.

All three of the greenways described transport, health and community benefits arising from their development, summarised, by CLG, to include:

- Environmental benefits, reduction of carbon emissions;
- Health benefits, including Greenway Activity programmes to encourage more people to commute to work by foot or bicycle and more children to walk or cycle to school;
- Promotion of tourism;
- Development of cycling/walking Infrastructure; and
- Urban/Rural Development and Regeneration, amongst others.