

TII Standards Roadshow Webinar – 31st May 2022

Recent Developments in TII Publications – Standards, Technical Documents and Training



Carbon Tool and Environmental Standards

Environmental Policy & Compliance and Strategic Planning Sections



Introduction

Article 3(1) of the Amended EIA Directive states:

“The environmental impact assessment shall identify, describe and assess in an appropriate manner, in the light of each individual case the direct and indirect significant effects of a project on the following factors:

*(a) **population and human health;***

*(b) **biodiversity**, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC;*

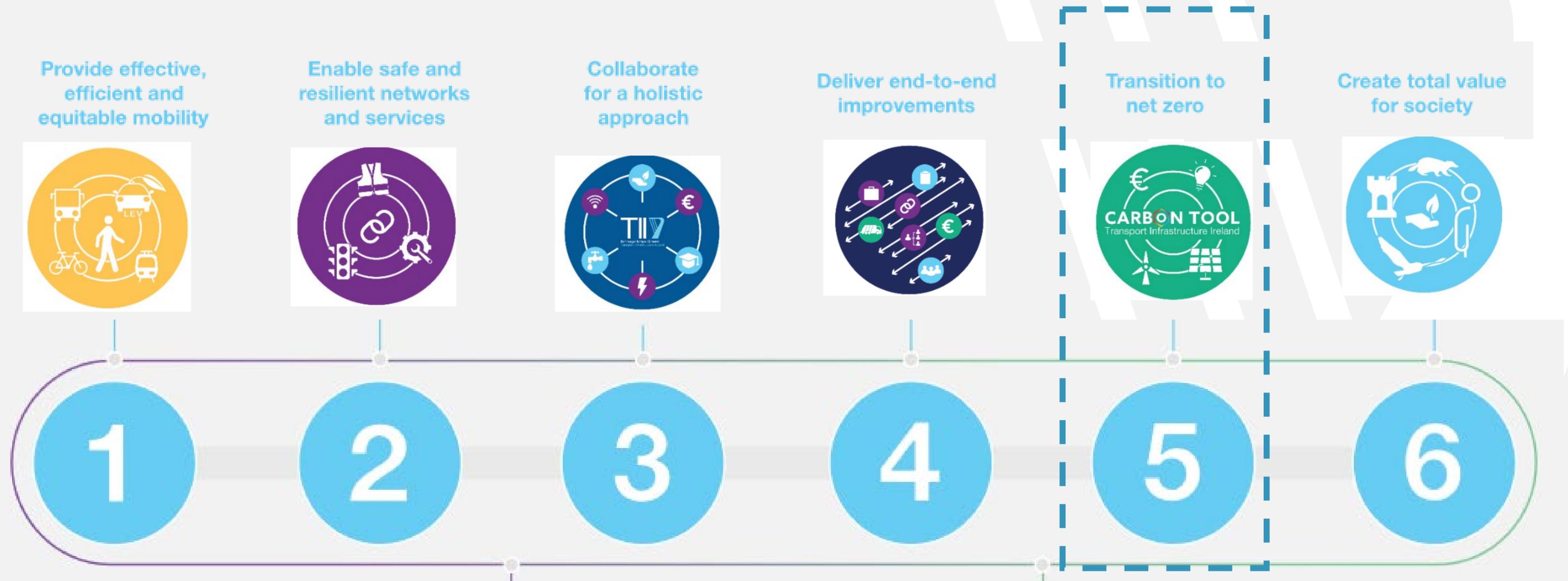
*(c) land, **soil, water, air and climate;***

*(d) material assets, cultural heritage and **the landscape;***

(e) the interaction between the factors referred to in points (a) to (d).”



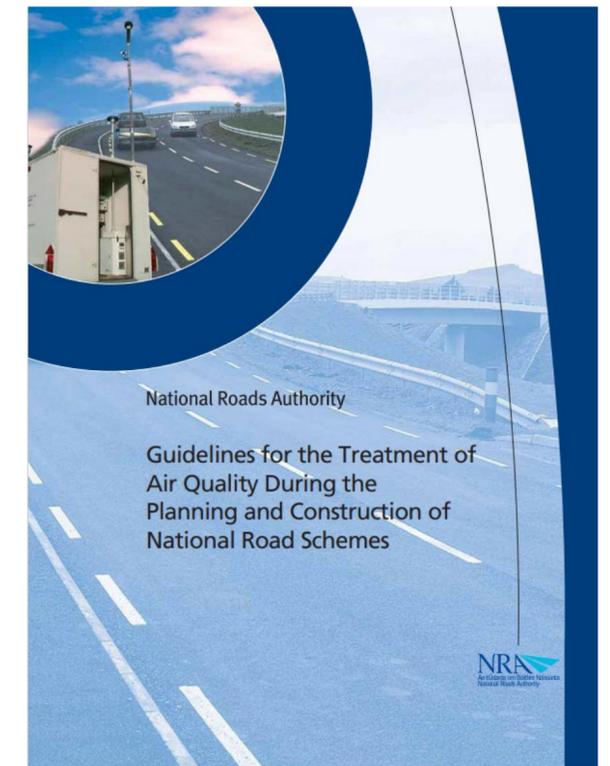
TII's Sustainability Implementation Plan: Principles of sustainability



Reduce the carbon impact of construction, operation and use of the transport network through responsible use of resources, reuse and repurposing, as well as driving the net-zero transition, while enabling customers to make more sustainable choices

Adopt a low-carbon approach in TII's designs, standards, and processes when considering climate adaptation, while also considering wider social and environmental benefits (Climate Adaptation Strategy, 2022)

- **TII Road Emissions Model (REM): Model Development Report (GE-ENV-01107) Road User Emissions**
- TII Carbon Assessment Tool for Road and Light Rail Projects and User Guidance Document **(GE-ENV-01106)** Construction (embodied) and Lifetime Maintenance Emissions
- Email climatetools@tii.ie to receive authorisation to use the REM and Carbon tools
- Air Quality Guidance for National Roads, Light Rail, and Rural Cycleways **(PE-ENV-01106)**
- Air Quality Assessment Standard for Proposed National Roads **(PE-ENV-01107)**
- Climate Guidance for National Roads, Light Rail, and Rural Cycleways **(PE-ENV-01104)**
- Climate Assessment Standard for Proposed National Roads **(PE-ENV-01105)**



OTD-Air Quality Assessment of Specified Infrastructure Projects (PE-ENV-01106) and Air Quality Assessment of Proposed National Roads – Standard (PE-ENV-01107)



These documents outlines a methodology for undertaking an Air Quality Assessment that is consistent with relevant legislation and in line with TII's planning phases.

- Gives context on Ireland's air quality regulatory and policy framework
- Aligns with TII's Project Thresholds and Phases (Kicks in at Phase 2)
- Provides guidance on how to score options for the Project Appraisal Guidelines
- Outlines the air quality assessment methodology:
 - ❖ Baseline Air Quality
 - ❖ Study Area
 - ❖ Index of Overall Change in Exposure
 - ❖ Local Air Quality Assessment for **human health** and **sensitive designated habitats**
 - ❖ Regional Assessment (**TII REM Tool**)
 - ❖ Construction Air Quality Assessment
 - ❖ Evaluation of Significance
 - ❖ Mitigation



OTD-Air Quality Assessment of Specified Infrastructure Projects (PE-ENV-01106) and Air Quality Assessment of Proposed National Roads – Standard (PE-ENV-01107)



The documents has been structured to be consistent with other TII Guidance and Standards, LVIA LCA etc.

The Guidance & Standard uses a consistent approach throughout where:

- ❖ Key information is set out in a green box at the start of sections
- ❖ Figures are also provided to show the order of different tasks within the different stages of the assessment
- ❖ Additionally detailed flow charts are provided to take the air quality practitioner through specific tasks, such as the calculation of overall change in exposure
- ❖ Detailed information is presented as Tables for easy reference throughout

➤ A glossary of terms and abbreviations is also included.

➤ A sample of expected headings within an air quality assessment is set out in an Appendix to help practitioners set out assessments

Figure 6: Summary of steps to calculate the Index of Overall Change in Exposure

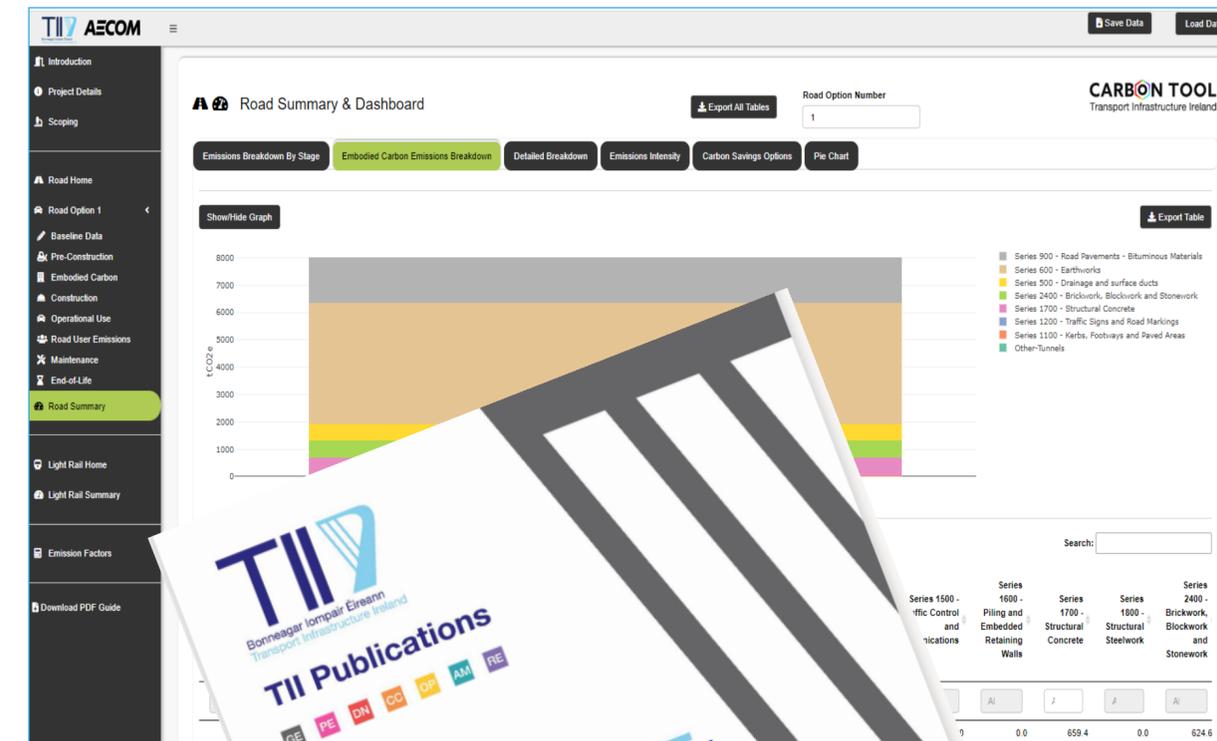


CARBON TOOL TII Carbon Tool GE-ENV-01106

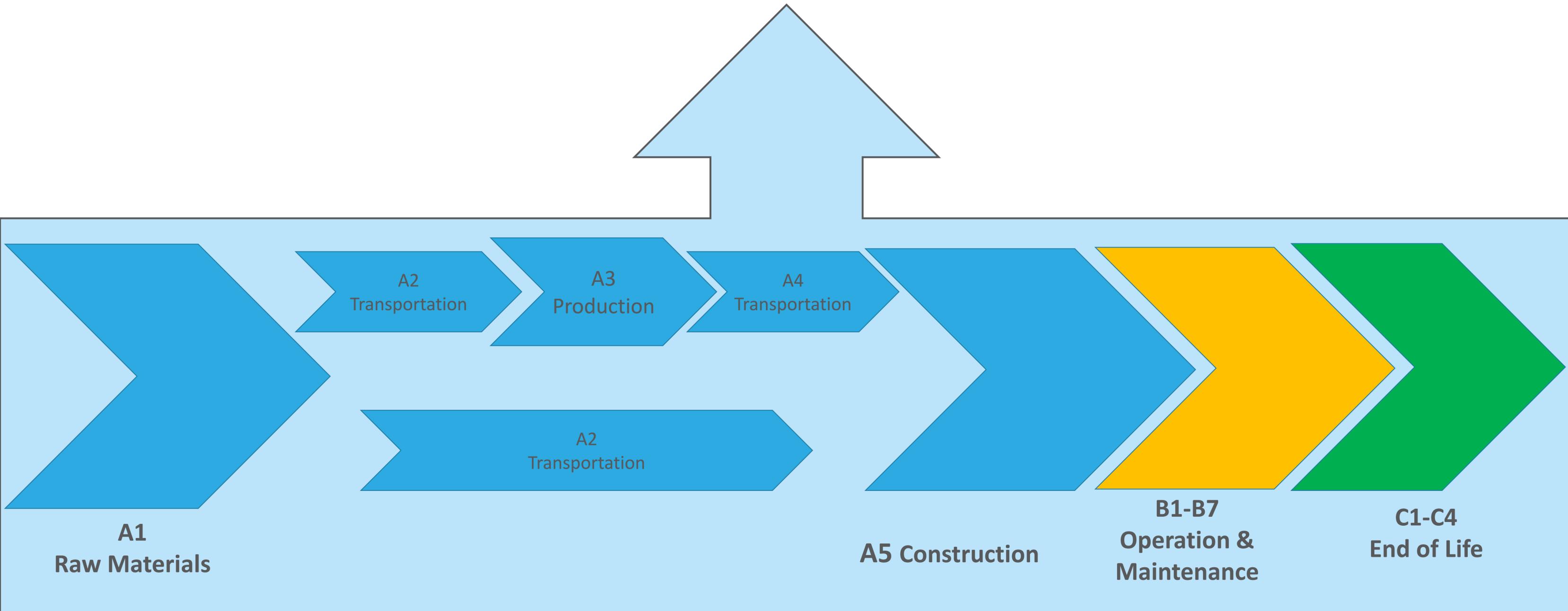
Transport Infrastructure Ireland



- Initially developed and launched in 2018 using Microsoft Excel and aligned to PAS 2080
- Assesses the embodied carbon associated with the construction and maintenance of road and light rail projects and facilitates the integration of carbon reduction measures into transport infrastructure planning, construction and operation.
- Evolved beyond excel and transitioned to a web-based application, with additional built-in functionality to allow for editing, tracking and benchmarking of project data.
- The Tool has Ireland specific calculations for assessing embodied and operational carbon for light rail and road infrastructure projects.
- Option to insert Environmental Product Declaration's into the Tool
- Audience – primarily climate practitioners but it is also used by Design Team to show reductions in carbon between designs.



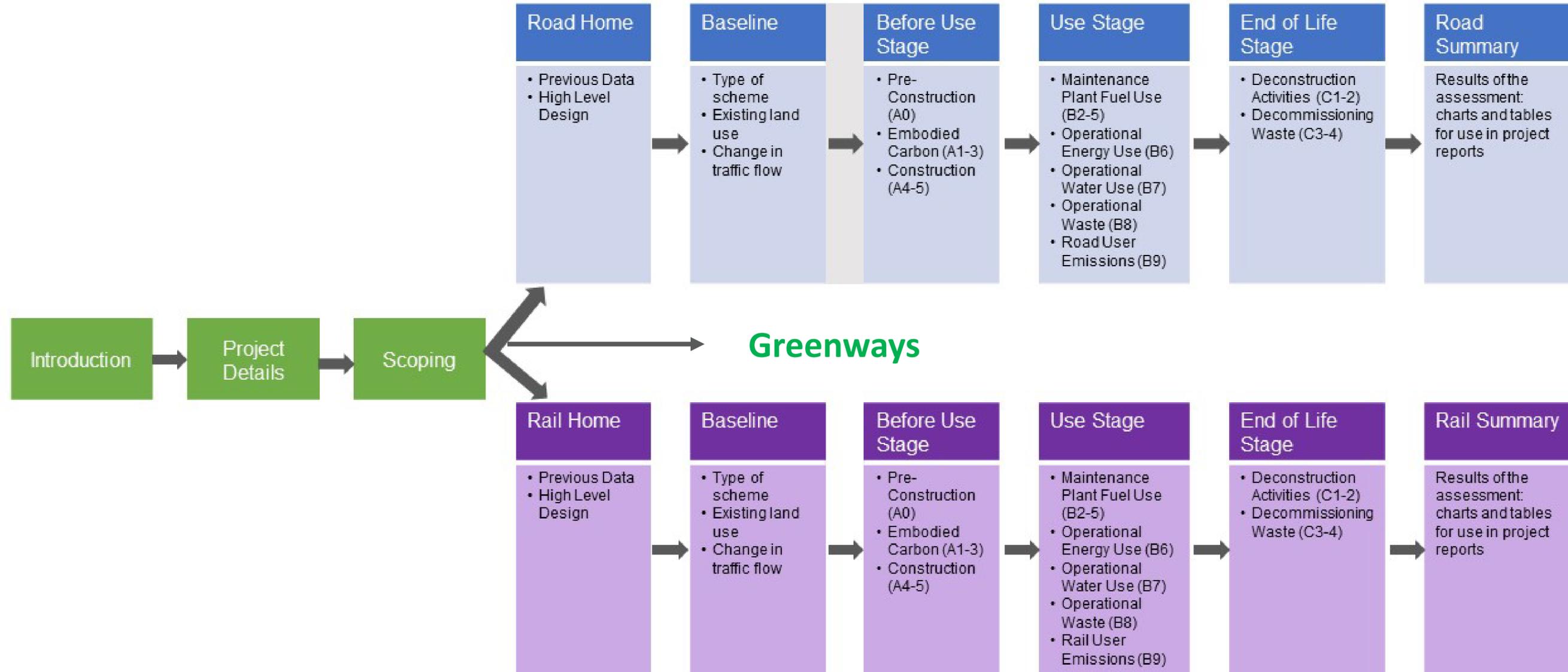
Carbon Emissions Quantification for TII Projects in accordance with PAS 2080



Carbon Data Availability

TII Project Phase – Road Projects	Data input pages within the Tool that should be completed for each Project Phase								
	Project Details	Scoping	Baseline Data	High Level Design	Pre-construction	Embodied Carbon	Construction	Use	End of Life
Phase 0: Programme Overview & Requirement Definition	Qualitative details available	No quantitative data likely to be available for assessment of GHG emissions.							
Phase 1: Project Concept & Feasibility	Qualitative details available	No data likely to be available at this project phase and no statutory requirement for analysis.							
Phase 2: Option Selection	Qualitative and estimated quantitative details available	Limited quantitative data might be available e.g. a partial Bill of Quantities, road user emissions (road projects), traction energy demand (light rail projects).							
Phase 3: Design & Environmental Evaluation	Quantitative data should be available for quantitative analysis and should be entered into the Tool for all areas that have been scoped into the EIA. Details of identified carbon savings opportunities should be completed.								
Phase 4: Statutory Processes	The assessments undertaken in previous phase will form the Climate Chapter of EIA Report for submission of the statutory consent documentation for the project as per the scoping report.								
Phase 5: Enabling & Procurement	Revised, updated and refined information should be entered into the Tool for all areas that have been scoped into the EIA. This should include all design changes. Details of identified carbon savings opportunities should be completed.								
Phase 6: Construction & Implementation	Actual and detailed data from the project should be entered into the Tool for all areas that were scoped into the EIA (this is to allow for changes during the project to be tracked according to the same project boundaries). Details of implemented carbon savings opportunities should be completed.								
Phase 7: Closeout & Review	Final data from the project should be entered into the Tool for all areas that were scoped into the EIA. Details of final carbon savings achieved should be completed within each project phase, where information is available								

Structure



Baseline data

- Scheme type and Existing land use

Pre construction

- Clearance and demolition activities, land use change and vegetation loss, water use during clearance and demolition

Embodied carbon

- Raw materials embodied carbon, transport

Construction

- Excavation, construction activities, water use, construction workers travel to site, construction waste

Operational use and Maintenance

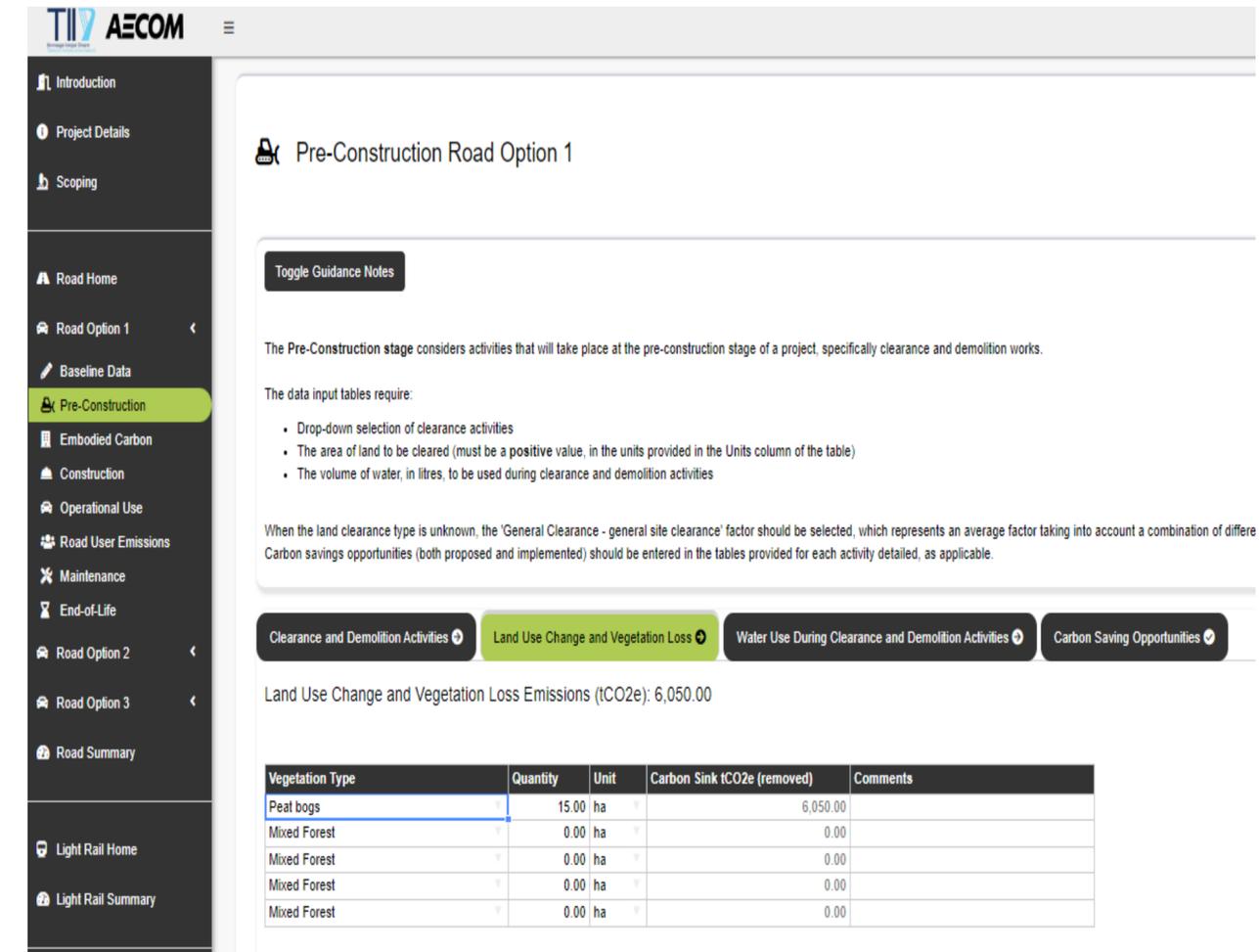
- Energy, water, waste, landscaping and vegetation
- Embodied carbon of materials
- Plant fuel life

Road user emissions

- Inputted from the REM Tool

End of Life

- Deconstruction activities
- Decommissioning waste



The screenshot shows the 'Pre-Construction Road Option 1' data input section in the Carbon Tool software. The interface includes a sidebar with navigation options like 'Introduction', 'Project Details', 'Scoping', 'Road Home', 'Road Option 1', 'Baseline Data', 'Pre-Construction', 'Embodied Carbon', 'Construction', 'Operational Use', 'Road User Emissions', 'Maintenance', 'End-of-Life', 'Road Option 2', 'Road Option 3', 'Road Summary', 'Light Rail Home', and 'Light Rail Summary'. The main content area displays a 'Toggle Guidance Notes' button and a text box explaining the 'Pre-Construction stage' and the required data input tables. Below this, there are four buttons: 'Clearance and Demolition Activities', 'Land Use Change and Vegetation Loss', 'Water Use During Clearance and Demolition Activities', and 'Carbon Saving Opportunities'. The 'Land Use Change and Vegetation Loss Emissions (tCO2e): 6,050.00' is displayed. A table shows the following data:

Vegetation Type	Quantity	Unit	Carbon Sink tCO2e (removed)	Comments
Peat bogs	15.00	ha	6,050.00	
Mixed Forest	0.00	ha	0.00	
Mixed Forest	0.00	ha	0.00	
Mixed Forest	0.00	ha	0.00	
Mixed Forest	0.00	ha	0.00	

At every stage there is an option to capture carbon saving opportunities

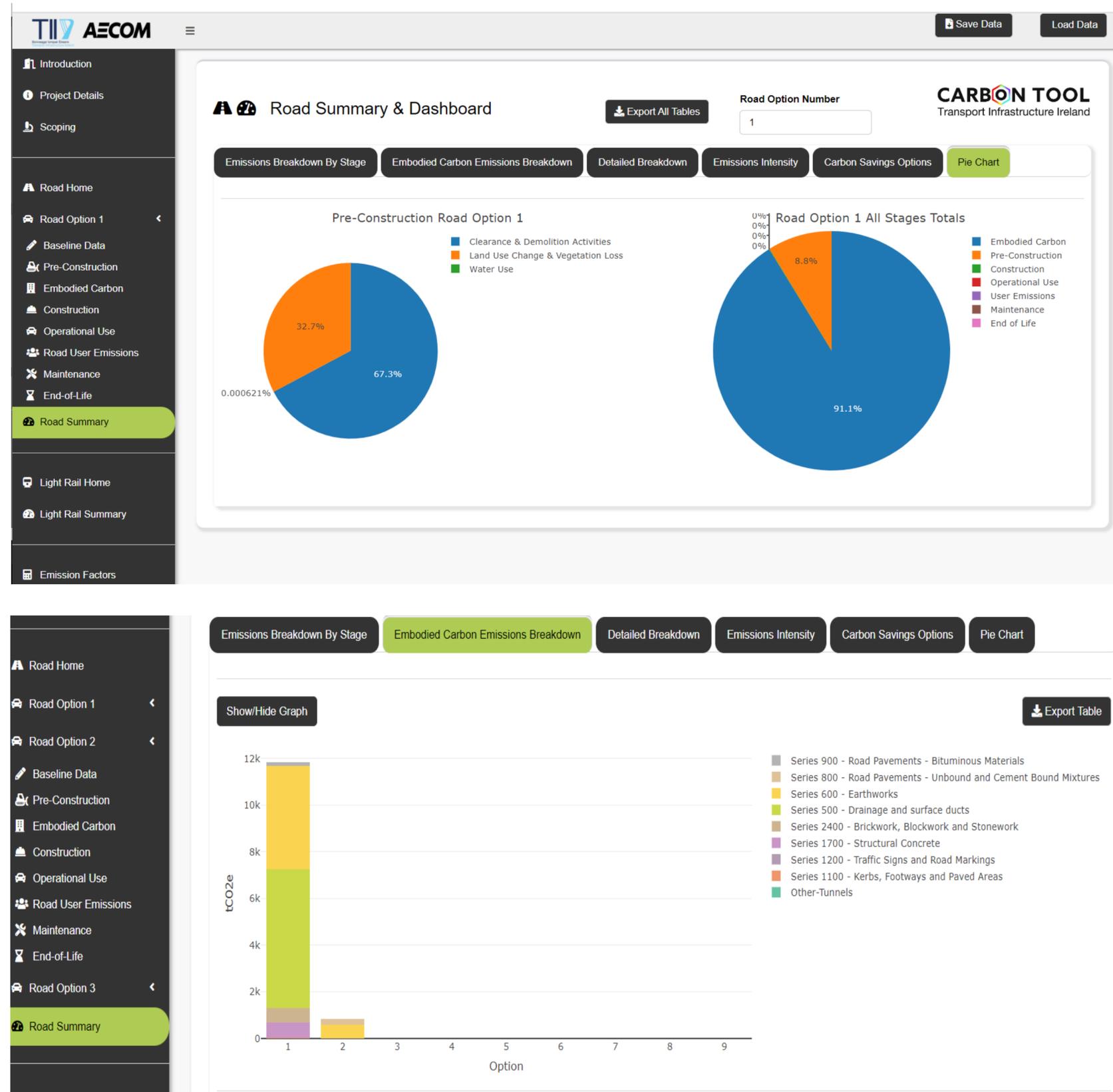
GHG Outputs

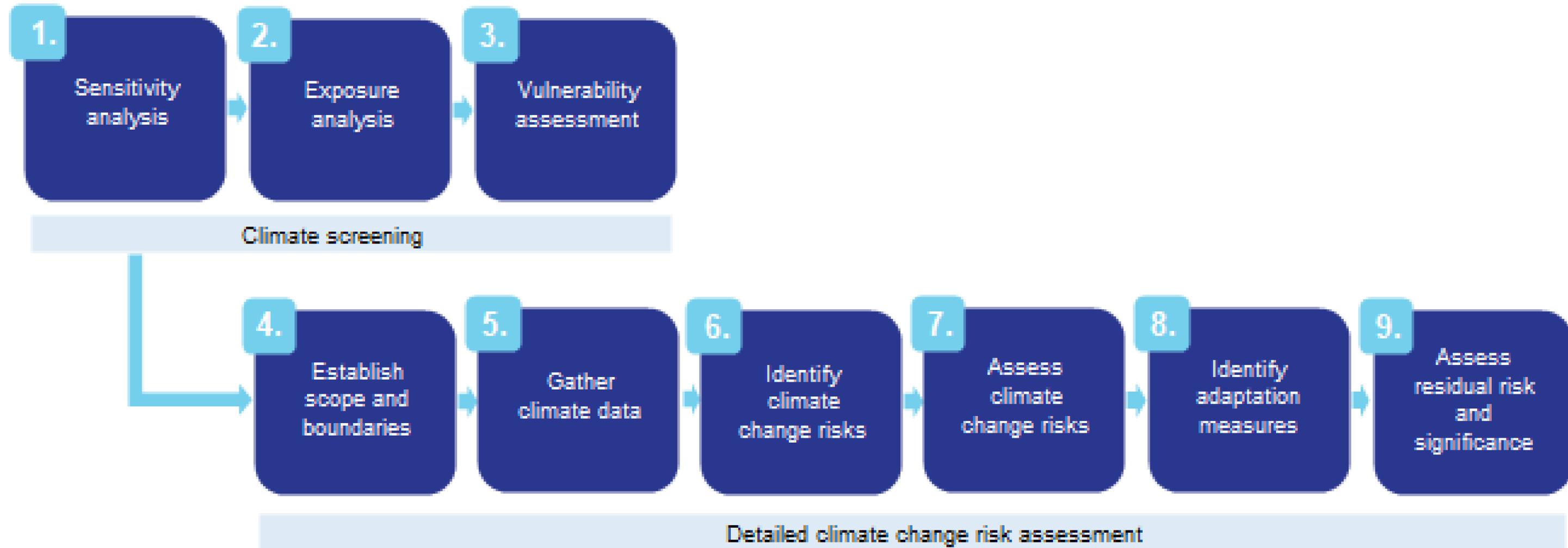
Roads/Light Rail Summary and Dashboard presents the output carbon footprint.

Emissions can be viewed via:

- Stage
- Embodied carbon
- Emissions intensity
- Carbon saving options etc.,

Visual breakdowns – pie and bar charts are available, and the data outputs can be exported via CSV file.





- Asset/entire projects vulnerability Assessment
- Cumulative impacts with other projects

Climate Assessment Guidance (PE-ENV-01104) and Standard for Proposed National Roads (PE-ENV-01105)

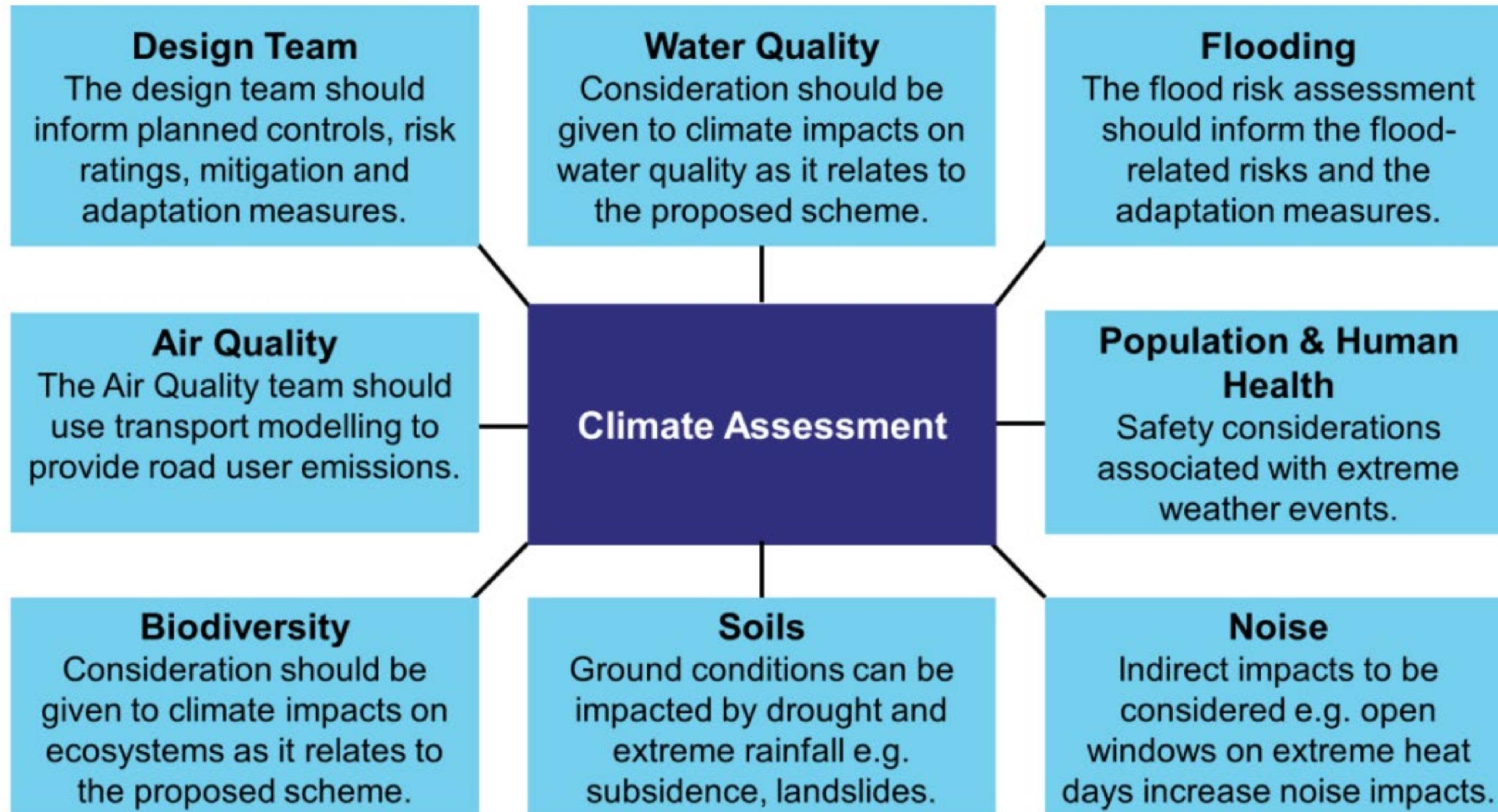


These documents provides guidance on the methodology, scope and processes underlying a climate assessment for National Roads, Light Rail, Rural Cycleways projects.

- They build on existing best practice guidance for the transportation sector.
- describes the minimum requirement to establish a comprehensive and consistent description and understanding of the climate factors relevant to National Roads, Light Rail, and Rural Cycleways.
- CA process does not replace the requirement for, or supersede, any national, regional, county, or local-level climate assessments
- **The Standard Document sets out the methodology for Climate Assessment for proposed National Roads.**
- **Aligns with TII's Project Thresholds and Phases commencing at Phase 0**



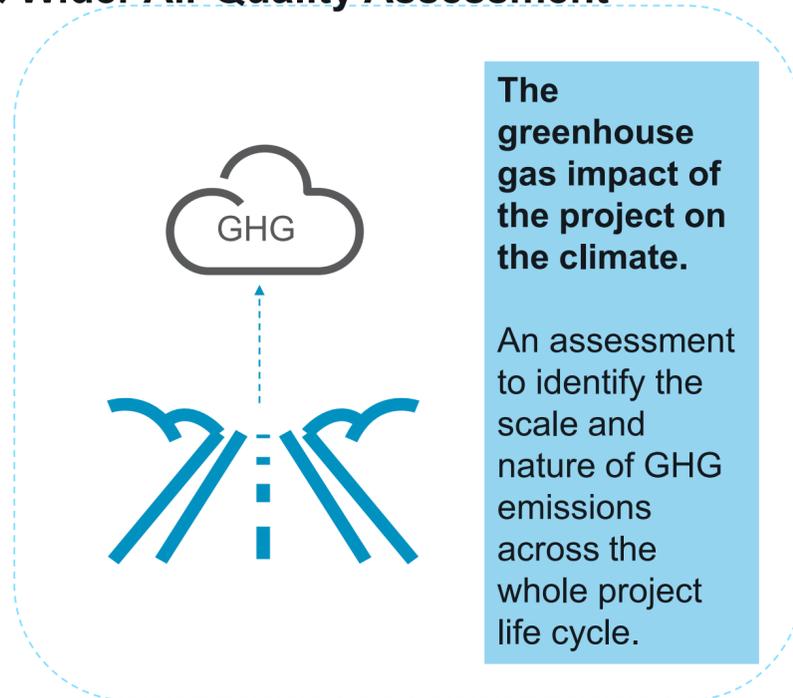
Climate Assessment Guidance (PE-ENV-01104) and Standard for Proposed National Roads (PE-ENV-01105)



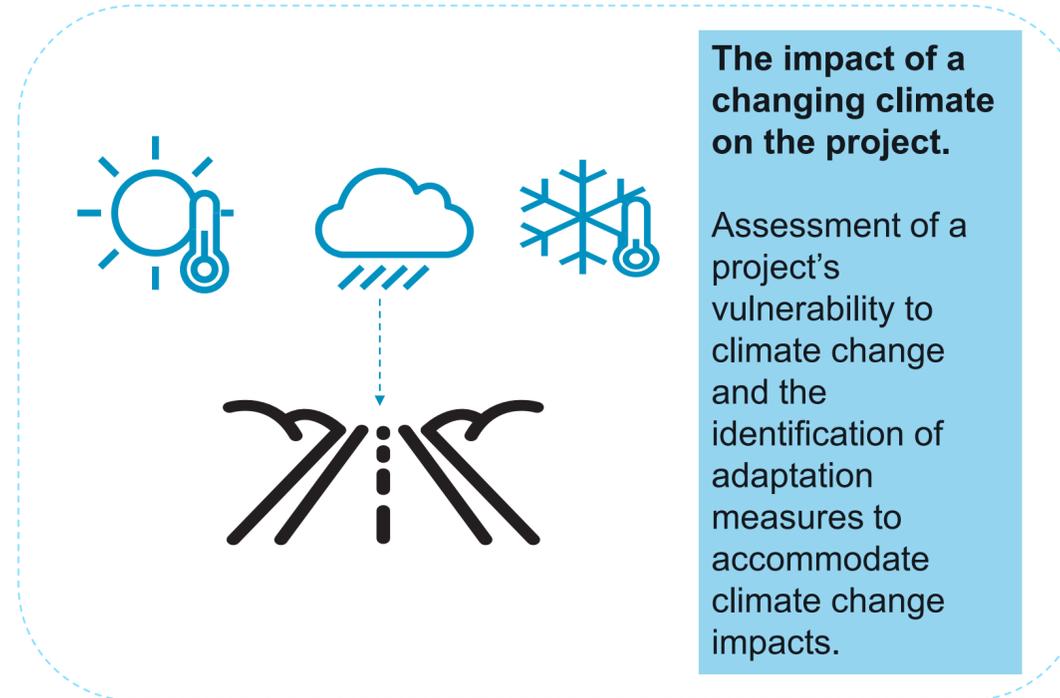
Climate Assessment Guidance (PE-ENV-01104) and Standard for Proposed National Roads (PE-ENV-01105)



1. Greenhouse Gas Emissions Assessment & Wider Air Quality Assessment



2. Climate Change Risk Assessment



Informs

Option Selection and Statutory planning processes

National and TII Specific Policy

National Planning Framework

NIFTI

NR2040

Climate Action Plan

TII Sustainability Implementation Plan

REM
Road Emissions Model
Transport Infrastructure Ireland
(GE-ENV-01107)
(PE-ENV-01106)
(PE-ENV-01107)

CARBON TOOL
Transport Infrastructure Ireland
GE-ENV-01106

Project Carbon Benchmarking



Aim:

- To establish the quantity of carbon produced during the construction of road projects:
 - At a strategic level, plan against anticipated sectoral carbon budgets and assess the level of carbon needed to construct future road projects
 - At a project level, provide high level carbon estimates at early design stages (e.g. optioneering); and
 - Provide a benchmark against which to compare/validate the carbon performance of other road schemes when practitioners are using the Carbon Tool.

Challenges:

- Quantity of data, in an inconsistent format – processing to provide calculations is very labour intensive

Table 4 - Emissions summary

		Project	
		N69 Listowel Bypass	N63 Liss Abbey
Project summary	Road Types	Type 1 Single Carriageway	Type 2 single carriageway
	Project phase (of data received)	Detailed Design	EIA
	Length of road (km)	5.95	2.30
	No. of lanes	2	2
	Individual lane width (m)	3.65	3.50
	Shoulder details	Hard shoulder. 2.5m	Hard strip 0.5m
Emissions Summary (tCO ₂ e)	Total emissions over design life	→ 160,049	→ 15,548
	Total operational emissions (incl. maintenance)	→ 26,597(17%)	→ 2,935 (19%)
	Total construction emissions	133,453 (83%)	12,613 (81%)
	Construction emissions per km of road	22,429	5,484
	Construction emissions per km of road per lane incl. shoulders	→ 11,215	→ 2,742

➤ Currently undertaking a more detailed benchmarking exercise on the N22 as the project data will allow for a structure by structure assessment of carbon emissions.

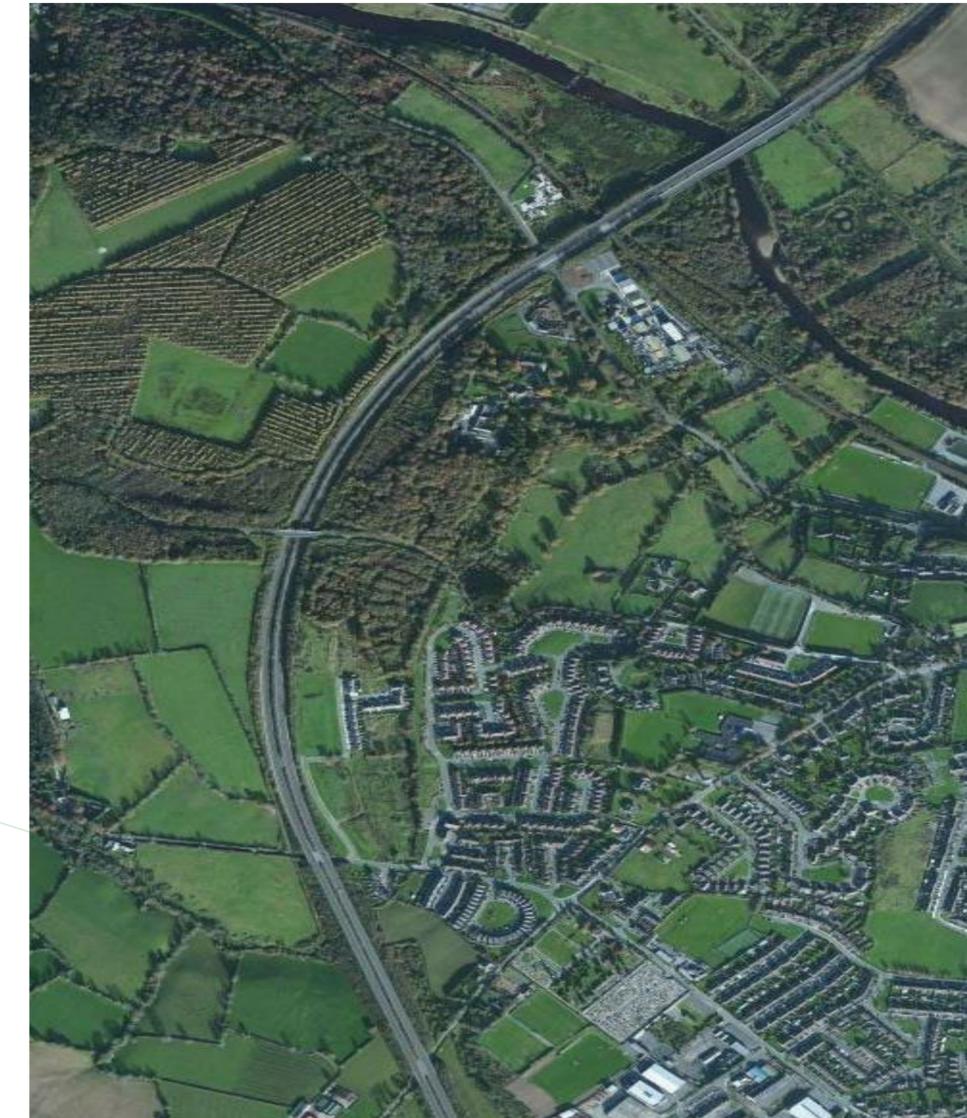


Biodiversity & Landscape Strategies and Standard Technical Document

General (GE)

Environment (ENV) Vincent O'Malley (TII), Christian Nea (TII), Sarah-Jane Phelan (TII),
Biodiversity Policy Document.

- Biodiversity & Landscape strategies drafted,
- Informed by existing national, European and international policy and legislation.
- Setting of objectives, which may include short, medium and long-term goals/actions.
- Objectives may include commitments to:
 - develop and utilise a biodiversity metric to demonstrate no net loss or net gain of biodiversity;
 - increase focus on the existing national road network; and,
 - publish biodiversity-related standard and technical documents.



TII's vision for biodiversity

“Transport Infrastructure Ireland will contribute to the **recovery** of biodiversity at a local and national level while developing and maintaining **a safe and reliable** transport infrastructure network”



TII's Biodiversity Strategy

TII's **Biodiversity Strategy** will deliver on the following **key policy areas**:

- Our aim is to ensure that Biodiversity is **fully integrated** into **all** TII operations and processes.
- TII transport corridors will promote **habitat connectivity** across the wider landscape and will contribute to the enhancement of wider ecosystem services
- New projects will be developed with **no net less of biodiversity** and will strive for a net gain in biodiversity
- **Legacy impacts** to biodiversity from existing infrastructure will be identified and addressed
- All TII activities (e.g. plans, projects and programs) comply with relevant **biodiversity legislation**.



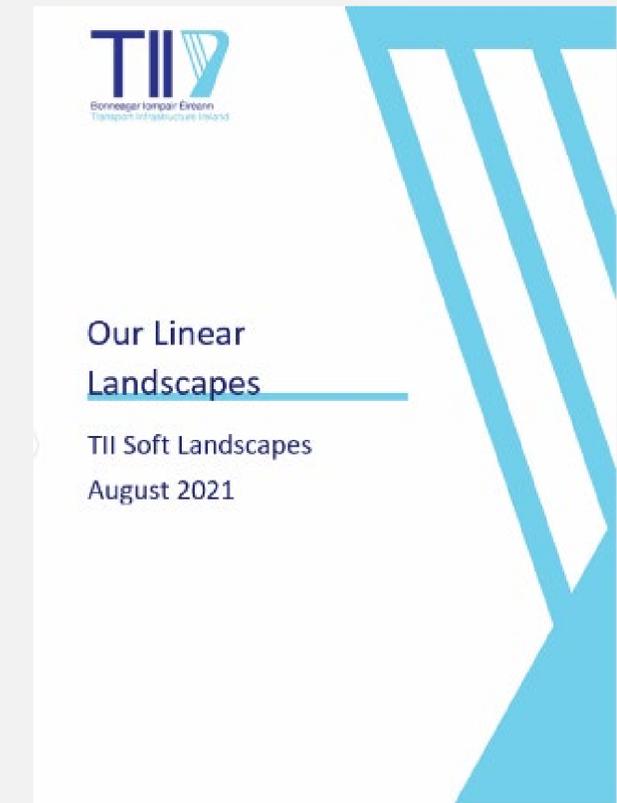
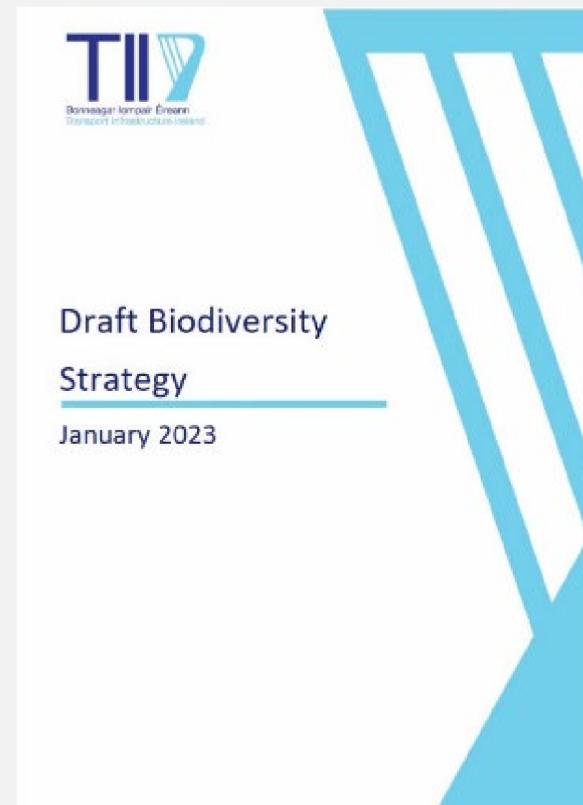


M11 Arklow

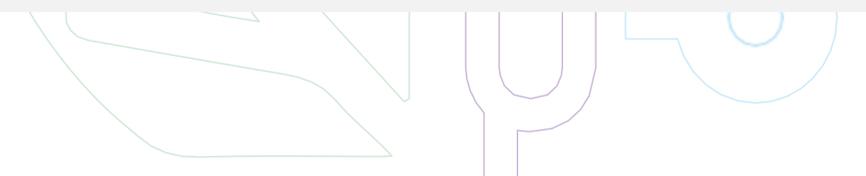
TII Biodiversity and Landscape



Our **Biodiversity and Landscape Strategies** will allow us to manage and promote **sustainable stewardship** of our landscape asset as it grows and matures.



These help **TII** positively address the **climate and biodiversity emergency** in terms of management of its land.



TII Linear Landscapes are multifunctioning assets with benefits for all of society in addition to their practical functions as part of our transport corridors.



TII Landscape Strategy will provide considered and practical guidance into all stages of our landscape's evolution from initial design to long-term management.

Five overarching objectives and associated actions to deliver on TII Landscape policy are detailed below.

- **Objective 1** – Ensure High Quality of Landscape Design
- **Objective 2** – Develop consistent, cost effective and adaptable management practices and standards
- **Objective 3** – Fulfil TII's planning and strategic commitments with regard to landscape
- **Objective 4** – Respond to associated Government Strategies and Policies including those on nature-based Solutions, SUDS, sustainability, biodiversity and blue-green infrastructure, resilience and climate change

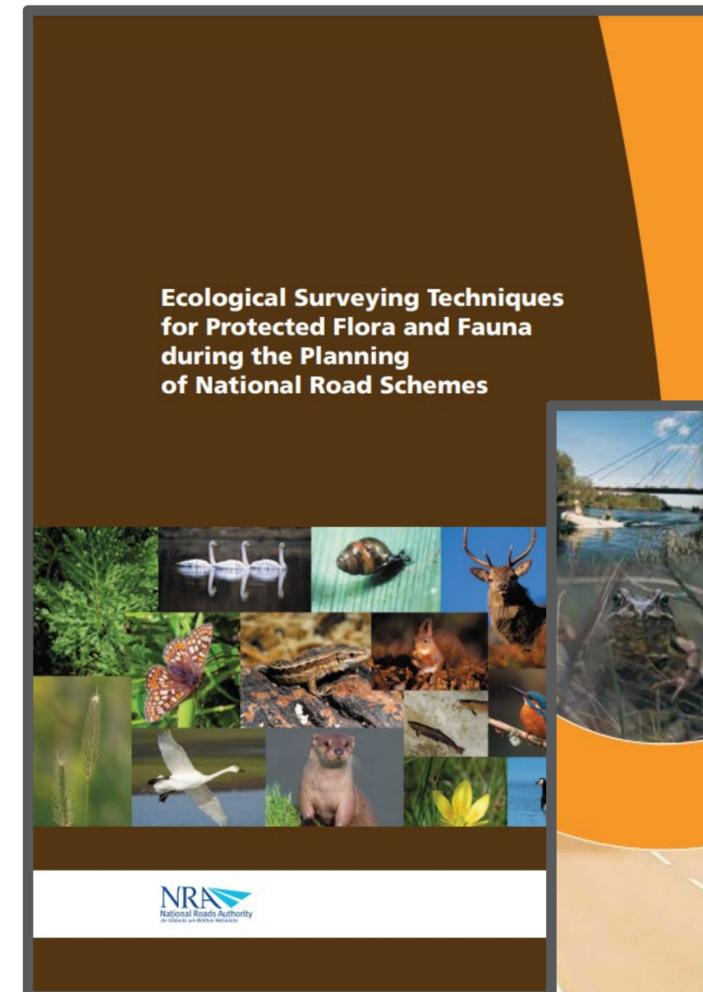


Biodiversity Standard

Planning and Evaluation (PE) Environment (ENV)

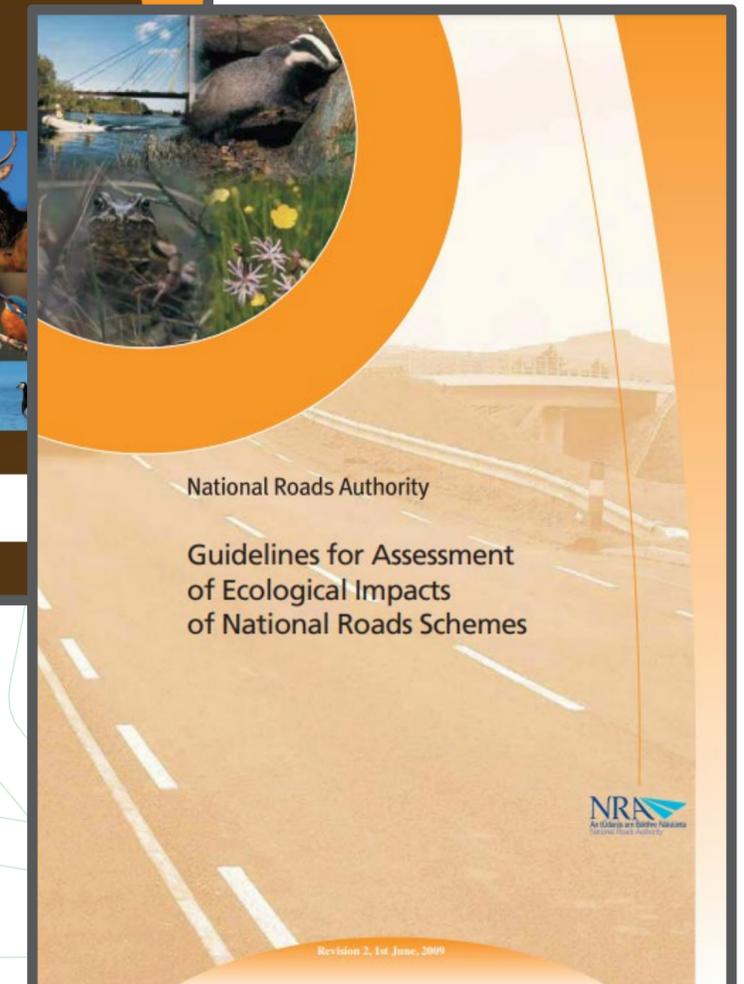
Vincent O'Malley (TII), Christian Nea (TII), Sarah-Jane Phelan (TII),

- **Biodiversity Impact Assessment.**
- Revision of NRA ecological guidelines.
- Update to incorporate current best practice (e.g. *Guidelines for Ecological Impact Assessment in the UK and Ireland* (Rev. 1.2, CIEEM, 2022)).
- Develop approach (including metric) *vis-à-vis* no net loss of biodiversity or biodiversity net gain.
- Tender documents Prepared
- Expected delivery in Q4



Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes (NRA, 2008).

Guidelines for Assessment of Ecological Impacts of National Road Schemes (Rev. 2, NRA, 2009).



National Roads Authority

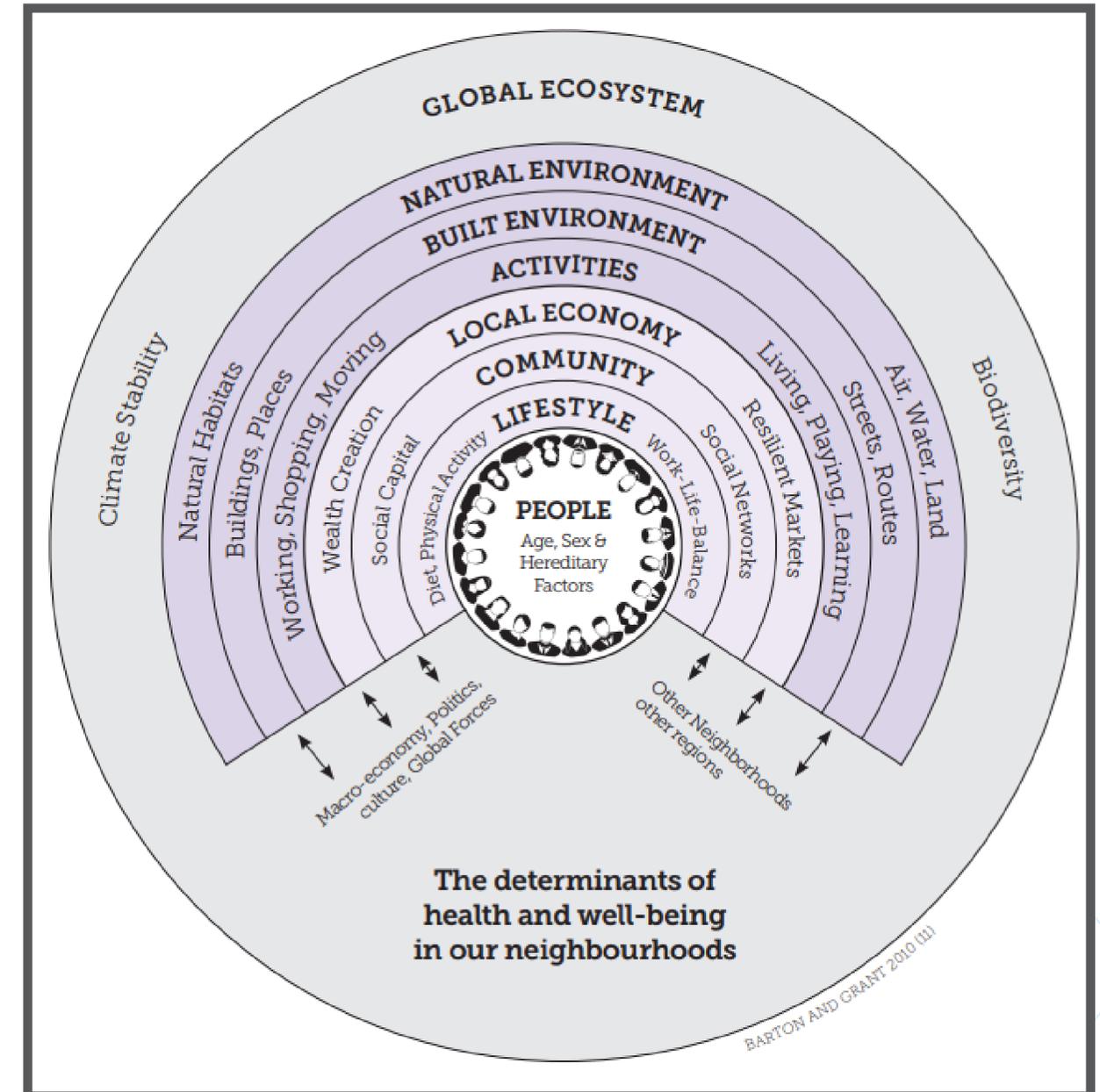
Guidelines for Assessment of Ecological Impacts of National Road Schemes

Population and Human Health Standard

Planning and Evaluation (PE)

Environment (ENV)

- TII Project Manager: **Stephen Byrne** (TII).
- Work Package 3.6e.
- **Population and Human Health Impact Assessment.**
- Guidance on assessing the effects of national road and related projects on population and human health.
- Alignment with *Project Appraisal Guidelines* and *Project Management Guidelines*.
- Literature review complete and first draft of Standard received with workshops ongoing.
- Final Standard due ~ Q4, 2023.



The determinants of health and well-being in our neighbourhoods (Barton and Grant 2010).

Noise Standard

Planning and Evaluation (PE) Environment (ENV)

TII Team Leader: *Stephen Byrne*

- **Noise Impact Assessment.**
- Two TII Open Research Call projects:
 - Irish-specific correction factors (pavement and meteorological) for noise mapping. (Final meteorological and Interim pavement factors published in Q4 2022. Final pavement factors under review and to be published in 2023).
 - Noise Impact Assessment Standard. (University of Galway led consortium procured. Standard to be published in 2024)
- Local Authority Noise Action Plans will be informed by more accurate strategic noise maps.
- Both research projects will be relevant to the assessment of noise impacts in relation to national road projects.



CPX trailer in operation.

Water

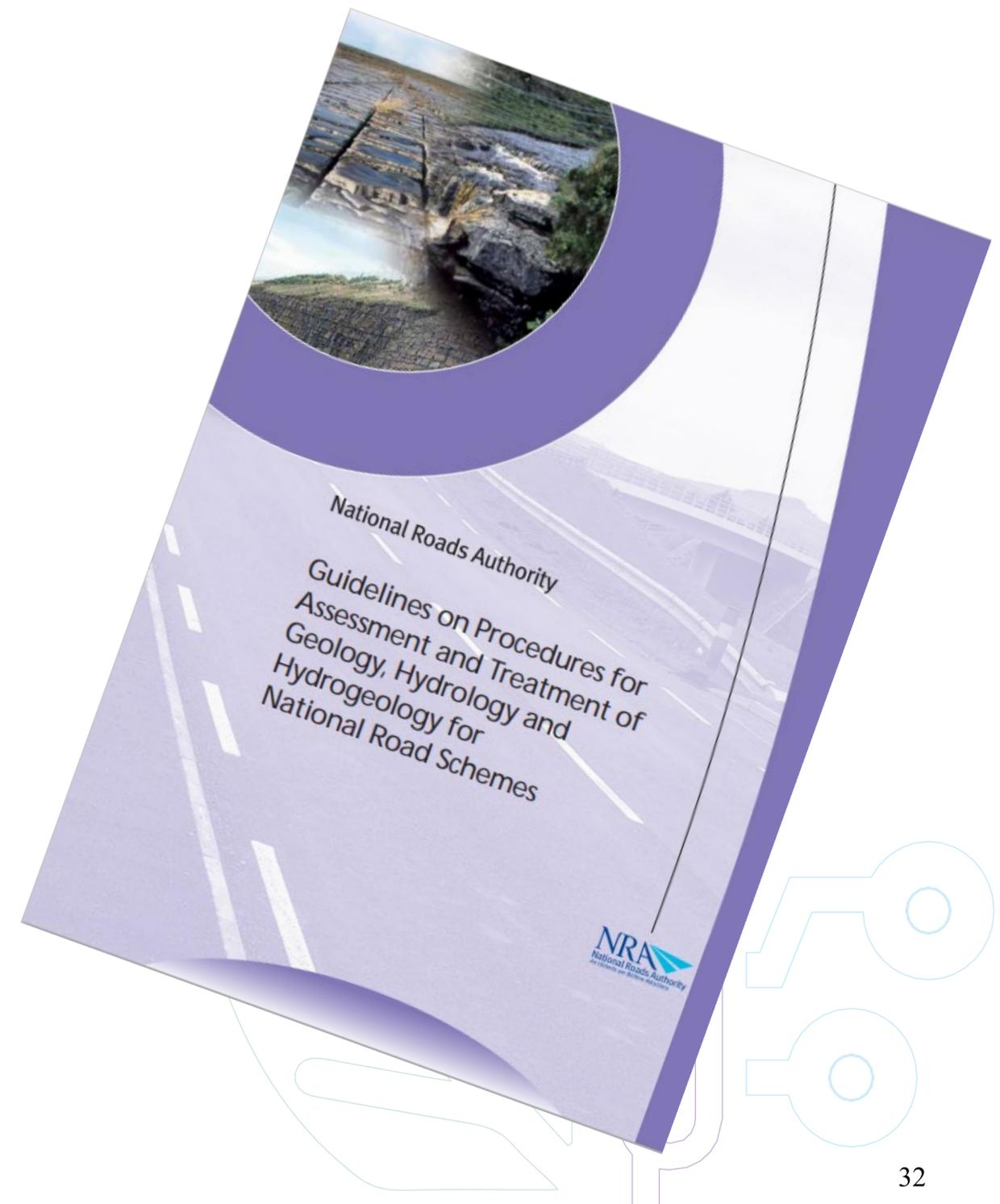
Standard and Technical Document

Planning and Evaluation (PE)

Environment (ENV)

TII Project Manager: Billy O’Keeffe (TII) Oonagh Duffy (TII).

- **Water Impact Assessment.**
 - Guidance on the assessment of impacts of water (surface and ground) during the planning process.
 - Update the current NRA guidance
 - First Draft of Standard and OTD received Q2 of 2023, currently under review.
 - Expected delivery Q1 2024

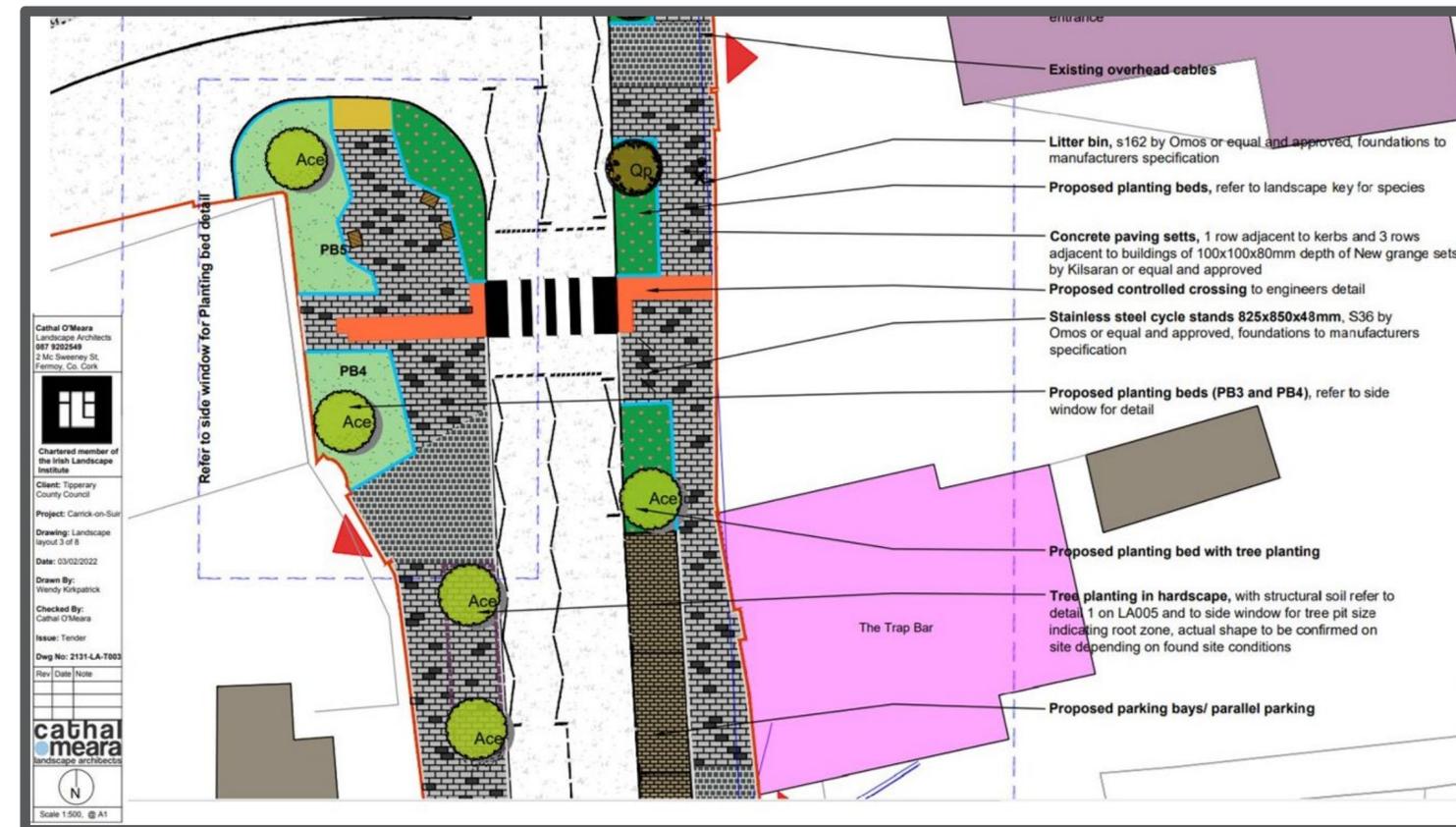


Landscape

Standard TII Team Leaders: Eimear Fox (TII) and Fiona Bohane (Cork NRO).

Design (DN) and Construction and Commissioning (CC) Environment (ENV) and Safety (STY)

- Work Package 3.3p.
- **Soft landscape treatments in and around settlements.**
- Design and detailing of landscape and planting in and around settlements on national roads.
- Draft documents under review.
- Publication anticipated in Q4, 2022.



Landscape and planting proposals in Carrick-on-Suir pilot project.

Noise Standard

Construction and Commissioning (CC) Environment (ENV)

TII Team Leader: Stephen Byrne

- Work Package 3.6c.
- ***Environmental Noise Barriers (ENB).***
- Review of ‘Series 300’ documents against suite of standards developed by CEN Technical Committee Working Group (CEN/TC 326/WG 6) complete Q2 2023.
- Technical note outlines recommended changes to ‘Series 300’ documents.
- Future standard documents, in addition to dealing with the requirements for CE marking, may require on-site testing and approval.
- Link with TII’s 5-year study on acoustic performances of ENB.
- Year 5 (2023) of study trialling findings of CEDR SOPRANOISE Project.

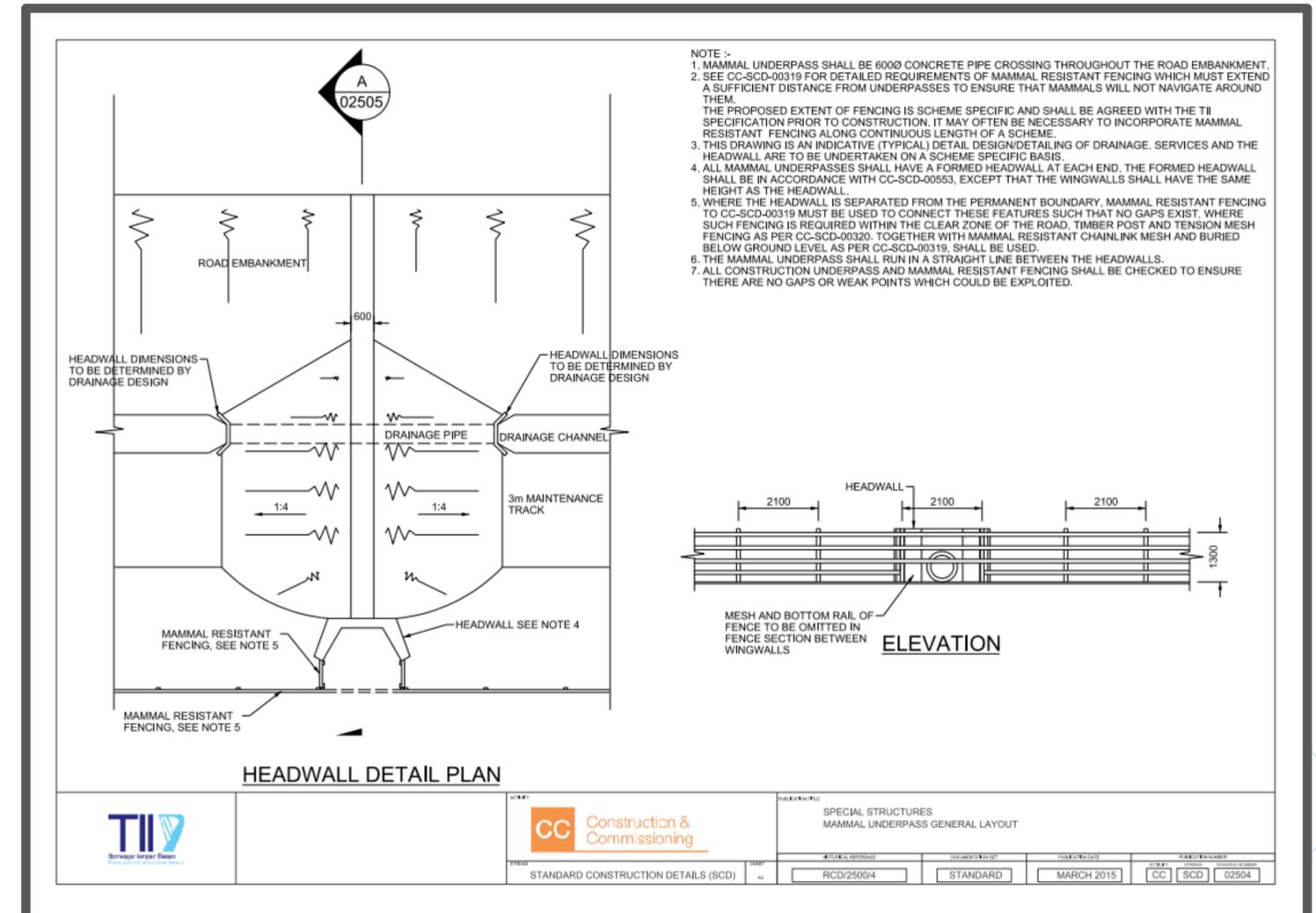


In situ acoustic testing of a reflective environmental noise barrier on M17/M18

Biodiversity (Mammals) Standard

Construction and Commissioning (CC) Environment (ENV)

- TII Team Leader: Bryan Kennedy (TII)
- Work Package 3.3e.
- **Mammal resistant fencing and underpasses.**
- Review, amongst other things:
 - fencing details at mammal underpasses; and,
 - mammal fencing,
 - particularly in relation to timber post and tension mesh fencing.



Mammal Underpass – General Layout

Carbon Tool and Environmental Standards

Questions

