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Project Appraisal Guidelines for National Roads Unit 14.0 - Minor Projects (€0.5m to €5m)

PE-PAG-02037

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**Updates to TII Publications resulting in changes to
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Amendment Details:

The principle changes to this document since the October 2016 publication are as follows:

- a) Additional guidance has been included in relation to project types particularly junction upgrades (Sections 1 and 2).
- b) Sections 4.1 and 5.1 have been revised in relation to project appraisal.
- c) The Project Appraisal Balance Sheet for Minor Projects (€0.5m to €5m) attachment to this unit has been revised and is available for download from the Downloads Section of the TII Publications website.

1. Context

This TII PAG Unit recommends methods of capital expenditure appraisal that are suitable for projects which can be classified as Minor Projects costing between €0.5m and €5m. The methodologies outlined within this Unit deal with schemes such as those that fall within DN-GEO-03030 “Guidance on Minor Improvements to National Roads”.

For other projects within the price category of €0.5m and €5m such as junction upgrades (particularly in urban environments) and local safety improvements, the approach outlined within this Unit should be adopted and supplemented with appropriate metrics (e.g. capacity / queuing / delay outputs from a junction model) within the appraisal criteria.

2. Minor Projects (€0.5m to €5m)

Minor Projects (€0.5m to €5m) are those projects on National Roads which are less complex in nature, and hence where project appraisal is expected to be more straightforward and proportionate to the level of investment.

In most cases, Minor Projects (€0.5m to €5m) will be categorised within DN-GEO-03030 “Guidance on Minor Improvements to National Roads”. These Minor Improvements to National Roads generally encompass the following:

- an upgrade to an existing section of sub-standard road less than 2km in length where a design element or combined set of design elements are improved; or
- a road safety improvement scheme is one that specifically targets sections of the network with high collision rates to improve road safety.

DN-GEO-03030 also considers maintenance schemes which predominantly involve pavement works and other road feature maintenance works. However, these maintenance schemes fall under current expenditure and are supported by the TII Pavement Management System (PMS). The PMS includes an appraisal of such expenditure at programme level based on life cycle analysis.

A Minor Project (e.g. removal of a sub-standard bend) may form part of a Maintenance Scheme. Where this is the case the Minor Projects (€0.5m to €5m) element needs to be appraised in accordance with this PAG Unit.

Minor Projects (€0.5m to €5m) vary in complexity, ranging from the removal of inappropriate adverse camber to the isolated improvement of sections of an existing road.

Minor Projects (€0.5m to €5m) may also encompass junction improvements in either rural or urban environments. Junction improvements, particularly in an urban environment, may need the support of a static junction model at a minimum to assess impacts on travel time and delay time. Further guidance on the development of transport models is provided in PAG Unit 5.1: Construction of Transport Models.

3. Project Management

The appraisal methodology outlined hereunder for Minor Projects (€0.5m to €5m) is designed to take account of the principles of proportionality, in which the level of resources invested into appraisal matches the scale and complexity of the proposal.

The DTTAS publication, Common Appraisal Framework for Transport Projects and Programmes (March 2016), states the following:

- Projects costing between €0.5 million and €5 million should be subject to a single appraisal incorporating elements of a preliminary and detailed appraisal.
- A Multi-Criteria Analysis (MCA) should be carried out at minimum for projects between €5 million and €20 million.
- Projects over €20 million should be subjected to a Cost Benefit Analysis (CBA).

As such, Minor Projects (€0.5m to €5m) appraisals should be proportional to the scale and likely impact of the project being proposed. For this purpose, a Minor Projects (€0.5m to €5m) Appraisal Balance Sheet (PABS) has been developed incorporating a Multi Criteria Analysis (MCA), and is deemed to fulfil the appraisal requirements of such projects. The PABS should be appended to / accompany the Preliminary Design Report (PDR) at Phase 3: Design and Environmental Evaluation. Guidance on the development of the PDR is also provided in DN-GEO-03030.

The Project Management Guidelines sets out standard TII management procedures and project roles for the appraisal of Major road projects. For Minor Projects (€0.5m to €5m), generally the same processes apply, but the need for formal appraisal and review can be reduced proportionate to the PAG deliverables required. Refer to PAG Unit 2.0 Project Appraisal Deliverables for further guidance.

4. Project Appraisal Documentation

4.1 Project Appraisal Balance Sheet for Minor Projects (€0.5m to €5m)

At Phase 3: Design and Environmental Evaluation, a PABS should be completed with any relevant attachments. This form serves as a Business Case, at a level of detail appropriate to the scale of Minor Projects (€0.5m to €5m).

Within the PABS, each project will be assessed against the Governments six key appraisal criteria as set out within the Common Appraisal Framework 2016. The resultant appraisal criteria are as follows:

- Economy;
- Safety;
- Environment;
- Accessibility and Social Inclusion;
- Integration; and
- Physical Activity (if applicable).

A set of project objectives should be defined for each appraisal criteria based on the need for the scheme and the known constraints. The Unit 14 PABS provides a one-page summary of the merits of the preferred project option and a measure of its likelihood of being able to meet the appraisal objectives outlined above, based on a multi-criteria analysis. It aims to present the totality of the impact of the project at this phase through the provision of short qualitative statements describing each impact across each objective. Given the scale of the project and low levels of capital investment, monetary values or quantitative indicators are not considered necessary.

In light of the fact that most impacts are unquantifiable, each impact is scored on a scale of 1 (major or highly negative) to 7 (major or highly positive), with a score of 4 representing a neutral or minimal impact. The integer score to be assigned according to the scale of impact is as follows:

- 7 - Major or highly positive;
- 6 - Moderately positive;
- 5 - Minor or slightly positive;
- 4 - Not significant or Neutral;
- 3 - Minor or slightly negative;
- 2 - Moderately negative; or
- 1 - Major or highly negative.

A sample PABS table necessary at Phase 3: Design and Environmental Evaluation is shown in Table 14.1 below. The header identifies clearly the option that is being appraised, notes the budget cost of the project (in current prices), and summarises the problems that the proposal is intended to address. The six appraisal criteria are divided into 19 sub-criteria and covers those listed in the Common Appraisal Framework for Transport Projects and Programmes, (and some additional sub-criteria relevant to TII); the proposed project option is assessed against each one of these with qualitative statements and indicators. A colour scale has been defined within the PABS which will clearly indicate all positive / negative benefits for clarity.

The PABS should focus on the likely cost of the proposed project, and the degree of improvement in road standard that would result. A single route option is sufficient to demonstrate the value for money likely to be achieved.

Table 14.1: Preliminary Project Appraisal Balance Sheet for PAG Unit 14.0 Projects

PAG Unit 14 Project Appraisal Balance Sheet - Summary Table for Minor Projects (€0.5m to €5m) as defined by DN-GEO-03030						
Scheme Name:		Description:		Problems Identified:		Budget Cost €m
N100 Ballytown Road Improvement Scheme		1.4km widening and realignment of road to Type 2 single carriageway standard.		Narrow road, inconsistent with standard of adjacent sections, with high collision rates. Current alignment is at flood risk during winter.		
Current Typical Carriageway Width:		Route No:		Speed Limit:	Proposed Carriageway Standard:	
Poor standard Type 3 Single C/W circa 6m		N100		100kph	Type 2 Single Carriageway	
Appraisal Criteria	Appraisal Sub-Criteria	Objectives (Guidance available in PAG Unit 3.0)	Qualitative Statement:	Sub-criteria Performance Description	Sub-criteria Score	Appraisal Criteria Score
Environment	Air Quality	To reduce greenhouse gas emissions and in doing so reduce impact on air quality nearby.	Slight increase in emissions due to increased speed however will be potentially balanced by reduced breaking.	Not significant or Neutral	4	Neutral
	Noise and vibration	To reduce impact of road related noise on nearby communities and dwellings.	Scheme moves away from dwellings on northside of carriageway but no significant alteration generally.	Minor or slightly positive	5	
	Landscape & visual quality	To minimise impact of scheme on XY heritage site.	Scheme is set in a low sensitivity landscape, furthermore impacts on landscape and visual quality is anticipated to be limited	Not significant or Neutral	4	
	Biodiversity	To minimise impact of scheme on e.g. a particular habitat / Natura 2000 site in vicinity of scheme.	Ballytown Turlough (Annex 1 habitat) located within 1km of scheme; however route follows existing alignment in vicinity.	Not significant or Neutral	4	
	Cultural, Archaeological, Architectural Heritage	To minimise impact of scheme on e.g. sensitive cultural, archaeological or architectural heritage sites or national monument.	No cultural, archaeological or architectural sites within 1km of scheme. Therefore no impact.	Not significant or Neutral	4	
	Land Use	To minimise impacts on agricultural holdings in particular to reduce farm severance.	2.3 ha of land take required from the existing boundaries of agricultural holdings with the exception of a derelict building owned by Company Ltd.	Minor or slightly negative	3	
	Water resources	To incorporate measures which will minimise impact of the scheme on nearby watercourses.	Localised impact on nearby watercourses. However, currently surface run off is unattenuated and untreated. Mitigation measures such as filter drains, swales and ditches are proposed.	Minor or slightly positive	5	
Safety	Collision reduction	Reduce the collision rate along the N100 between Ballytown and Castletown to the national average rate or less.	Provision of a widened carriageway with hard shoulder, cycleway and footpaths are anticipated to deliver are reduced collision rate.	Major or highly positive	7	Highly Positive
	Security	To improve safety conditions for all road users including pedestrians and cyclists between Ballytown and Castletown.	Provision of public lighting and footpath ensures enhanced security for walkers and cyclists.	Moderately positive	6	
Economy	Transport Efficiency and Effectiveness	To reduce journey times between Ballytown and Castletown by approximately 2 minutes. Ensure the road cross section can accommodate current and projected flows.	Scheme will deliver modest reduction in travel times. Scheme will accommodate current and forecast 2030 High Growth AADTs.	Moderately positive	6	Slightly Positive
	Wider economic impact	Support the economic performance of Ballytown and Castletown and the wider county area by providing improved transport infrastructure and reducing transport costs.	As scheme will deliver modest reduction in journey times between Ballytown and Castletown, the scheme will have a negligible to low impact in terms of wider economic impacts.	Not significant or Neutral	4	
	Transport Reliability and Quality	Improve journey time reliability on the N100 especially for long distance trips.	Cross section and pavement condition will become increasingly consistent along route corridor leading to a modest improvement in transport reliability and quality.	Minor or slightly positive	5	
Accessibility and Social Inclusion	Vulnerable groups	To improve accessibility to key facilities, such as employment, education and healthcare for all road users, but in particular vulnerable groups.	Minimal impact.	Not significant or Neutral	4	Neutral
	Deprived geographic areas	To improve accessibility for deprived areas e.g a particular RAPID or CLAR areas or other similar measures.	Will have slight positive impact on CLAR zones in improving access to nearby hubs/towns.	Not significant or Neutral	4	
Integration	Transport integration	For example, improve connectivity to strategic road network, ports, airports, railways.	Route supports Bus Eireann services and may enhance 'soft' modes. Scheme also fits into the TII Road Safety Programme.	Minor or slightly positive	5	Slightly Positive
	Land-use integration	To meet the transport objectives of e.g. Regional / County / Local planning document.	Scheme features in County Development Plan.	Minor or slightly positive	5	
	Geographical integration	To enhance connection between towns flagged within a National Planning document.	Improves access to X hub town (as defined in National Spatial Strategy).	Minor or slightly positive	5	
	Integration with other government policies	For example, scheme should support government policy on regional balance.	The route is one of regional importance.	Not significant or Neutral	4	
Physical Activity	Physical Activity	Provide opportunities for pedestrians and cyclists within the cross-section.	Footpaths and hard shoulders are provided along the carriageway delivering modest benefits in terms of physical activity.	Minor or slightly positive	5	Slightly Positive
Overall Description of Scheme:						Slightly Positive

4.2 Post Project Review

Subsequent to the approval of the PABS by the sponsoring agency, the project can proceed to tendering.

Following project completion, the outturn cost should be submitted to TII, in order to provide feedback on construction costs. TII will at this stage decide whether a post-project review should be carried out on the project; in accordance with the Common Appraisal Framework. This exercise is carried out on a sample of completed projects to identify any “lessons learnt” that would enhance future decision-making.

5. Populating the Unit 14.0 PABS Sheet

5.1 Guidance on completing the PABS sheet is provided in the following sections.

5.1.1 Environmental Criteria

TII has produced a series of Environmental Planning Guidelines to promote best practice in the area of environmental impact assessment. These guidelines cover the general environmental assessment process and also specific environmental topics including air, noise, ecology, cultural heritage, and geology. These guidelines may assist in the quantitative appraisal of Minor Projects (€0.5m to €5m) and are available to download from www.tii.ie.

An initial assessment to determine the requirement for Environmental Impact Assessment (EIA) should be undertaken, in line with the Department of Environment, Community and Local Government (DECLG) guidance on thresholds¹.

Where a road project does not trigger the need for mandatory or discretionary EIA, an appropriate level of environmental appraisal should nonetheless be undertaken to identify localised impacts and to suggest appropriate mitigation measures to address these.

In such cases where the need for an EIA has not been triggered, the Environmental section of this PAG Unit and related PABS provides an appropriate assessment methodology for minor road schemes as classified by DN-GEO-03030.

At the Design and Environmental Evaluation phase, a qualitative assessment should be completed and included in the PABS using the seven-point scale (discussed above), considering the relative scale of impacts of the Minor Projects (€0.5m to €5m).

5.1.2 Air Quality Score

Operational stage impacts may be negligible for these projects, as the impact of higher speeds is likely to be offset by a reduction in braking and acceleration of vehicles.

However, in completing the PABS in relation to operational air quality, an estimation of increase/decrease in vehicle kilometres, vehicular speeds and related emissions (with and without the project in place) can be utilised in developing a qualitative statement and associated ranking in relation to the impact of the project on air quality at Phase 3.

The scale of impact from Minor Projects (€0.5m to €5m) would not be expected to fall outside the range [3 – 5].

¹ Environmental Impact Assessment (EIA) Guidance for Consent Authorities regarding Sub-threshold Development, DEHLG, 2003

5.1.3 Noise and Vibration Score

Noise impacts associated with the operational stage of a road project can be separated into two main components, noise from:

- Vehicle engines and windrush, which is a function of type, number and speed of vehicles; and
- The interaction of vehicle tyres with the road surface, which depends on road structure – design, construction and materials.

The number of households affected by a change in noise impacts should be identified using property locations identified in the An Post Geodirectory data – this provides a complete database of address points in the Republic of Ireland.

An appropriate simple appraisal method for Minor Projects (€0.5m to €5m) is to record the number of occupied dwellings within 300m of the project works where the edge of the running lane moves closer to or further from the dwelling (positive or negative impact).

Given appropriate mitigation measures, the scale of impact from Minor Projects (€0.5m to €5m) would not be expected to fall outside the range [3 – 5].

5.1.4 Landscape and Visual Quality Score

Visual sensitivity is a combination of the sensitivity of the human receptor (i.e. resident; commuter; tourist; walker; recreationist; or worker) and the quality of view experienced by the viewer. In the case of Minor Projects (€0.5m to €5m), the impact to visual receptors will be highly localised, and unless there are particular issues of significance the impact should be scored as 4 (neutral).

5.1.5 Biodiversity Score

Biodiversity is approached based on risk to designated sites such as those included within the Natura 2000 network. For Minor Projects (€0.5m to €5m), the impact should be scored as neutral, unless there is a designated site within a radius of 1km of the project in which case the biodiversity score should be ranked relative to its impact on the site.

5.1.6 Cultural, Archaeological and Architectural Heritage Score

The scoring system for the cultural, archaeological and architectural heritage sub criteria follows the same principle as the one for biodiversity. Impact may be scored as neutral if:

There is no designated monument or site within a 1km radius; or

The view from the monument or site and level of traffic noise/vibration at the monument/site are unaffected or marginally improved by the proposed change in road alignment.

5.1.7 Land Use Score

In many cases the impact of land lost to the project (or released into productive use by the project) will be fully reflected in the element of project costs that refers to costs of land acquisition. If this is the case then the land use impact should be scored as 4 (neutral) to avoid double-counting.

Where the impact is not fully reflected in the cost – e.g. where land of no commercial value has a significant recreational or environmental worth – then the score should reflect this.

5.1.8 Water Resource Score

The scoring system for water resources follows the same principles as the one for biodiversity.

If there are no significant changes to drainage or to structures over water bodies, then the impact can be scored as 4 (neutral). If the scheme includes aspects of pollution control systems such as drainage, filtration, and sedimentation systems that may improve water resource conditions, the impacts may then be slightly positive. Otherwise, the water resource score should be ranked relative to its impact on the site.

5.2 Safety Criteria

5.2.1 Collision Reduction Score

Changes in collision numbers and severities are quantifiable. One of the primary objectives of DN-GEO-03030 is to deliver a reduction in road collisions resulting from improved consistency of road standard along the route.

Using the Roads Safety Authority collision database, a collision rate (PIA/mvkm) can be developed for the subject section of road for which proposals are being developed.

These collision rates can then be compared with the rates for the relevant proposed carriageway cross section, provided in PAG Unit 6.11: National Parameter Value Sheets. In order to determine the scale of impact and how it fits within the sub criteria 7 point scale, TII have set out a number of ranges relating the change in collision rate to this scale, and are as follows:

- Reduce collision rate by 50% or greater - Major or highly positive {7};
- Reduce collision rate by less than 50% - Moderately positive {6};
- Limited change to collision rate – Not significant or neutral {4};
- Increase collision rate by less than 50% - Moderately negative {2}; and
- Increase collision rate by 50% or greater - Major or highly negative {1};

5.3 Security Score

This sub-criterion is concerned with the fear of mishap in using the transport system. This is difficult to quantify; the current recommended approach is to use the simplest form of assessment.

Most Minor Projects (€0.5m to €5m) will score 4 (neutral) unless the proposed project addresses a section of a route which is perceived as dangerous to pedestrians / cyclists, in terms of security, e.g. the provision of improved road lighting, provision of an improved / wider hard shoulder or provision of a footpath. In this case there may be moderate positive benefits.

5.4 Economic Criteria

5.4.1 Transport Efficiency & Effectiveness (TEE) Score

In the case of schemes which are consistent with DN-GEO-03030, a simple approach should be adopted in relation to transport efficiency and effectiveness in which flows should be presented in Annual Average Daily Traffic (AADT) format. The AADT values are considered a key performance indicator for inclusion in the PABS and can be derived from TII Traffic Monitoring Units, historical traffic data (not older than 5 years) or the National Transport Model (NTpM). Forecast AADTs and peak hour flows can also be extracted from the NTpM.

The current and forecast AADTs can be entered directly into the PABS table. No assessment is required of the user delays that would occur during construction and maintenance.

If the subject Minor Project (€0.5m to €5m) is located in a rural environment, the current and forecast AADTs should be compared with the theoretical capacities contained in Table 6/1 of DN-GEO-03031, Road Link Design and a statement concerning the sufficiency of the proposed road cross section in catering for current and forecast AADTs should be provided in the PABS.

In the case of schemes falling outside of the DN-GEO-03030, the approach outlined above should be adopted and informed by appropriate metrics e.g. capacity / queuing / delay outputs from a junction model would be required under the 'Economy' criterion. The sample PABS table should be edited accordingly to include the required metrics.

Taking all of the above into account, the transport efficiency and effectiveness of the project would generally not be expected to fall outside the range [2 – 6].

5.4.2 Wider Economic Impacts Score

Economic research suggests that there are a number of other economic impacts above and beyond journey time savings, principally relating to business responses to better accessibility. Of these, the most relevant for Minor Projects (€0.5m to €5m) is to do with an economic gain from increased output by firms under conditions of imperfectly competitive markets. Time savings from road improvements twinned with a more consistent route corridor may partially contribute to wider economic benefits. One method of qualitatively ranking the wider economic benefits may be in proportion to the forecast time savings delivered by the Minor Projects (€0.5m to €5m). In light of this, the scale of impacts in terms of wider economic benefits would not be expected to fall outside the range [3 – 5].

5.4.3 Transport Reliability and Quality

Transport Reliability and Quality is also specified as an appraisal sub-criterion within the Common Appraisal Framework (CAF). The impacts of Minor Projects (€0.5m to €5m) on Transport Reliability and Quality are likely to be moderately positive and potentially related to improvements in consistency along the subject route corridor, i.e. improvement in road cross section and/or road surface. The scale of impacts in terms of Transport Reliability and Quality would not be expected to fall outside the range [3 – 5].

5.5 Accessibility and Social Inclusion Criteria

5.5.1 Vulnerable Groups Score

Given the general nature and location of Minor Projects (€0.5m to €5m), it is anticipated that such schemes will have minimal impact on vulnerable groups, and this sub-criterion should be scored as 4 (neutral).

5.5.2 Deprived Areas Score

Time savings from road improvements have particular social inclusion benefits where access is improved between disadvantaged geographical areas and regional service centres.

The simplest method of taking account of this effect is to examine available mapping in relation to areas covered by the following: Pobal Deprivation Index; Area Based Childhood programme; Rural Social Scheme; CLAR and RAPID areas. The ranking should be increased relative to the scheme proximity to these areas and time savings delivered.

5.5.3 Integration Criteria

Integration benefits may be an important part of the case for Minor Projects (€0.5m to €5m), improving the national route in the context of the National Spatial Strategy for economic development.

However, Minor Projects (€0.5m to €5m) are likely to be too small to feature specifically in policy documents, particularly where value for money is being obtained by taking the opportunity to introduce small improvements on the back of planned maintenance work.

Most integration benefits apply equally to any improvement project within a specified national route corridor. Thus it is recommended that Integration scores be taken directly from existing work such as the National Secondary Roads Needs Study or previous appraisals of projects in the same corridor.

5.5.4 Physical Activity Score

Physical Activity is also specified as an appraisal criterion within the Common Appraisal Framework and relates to health benefits that may potentially be derived from transport infrastructure via an increase in physical activity.

Most Minor Projects (€0.5m to €5m) will generally score 4 (neutral) unless the proposed project includes facilities amenable to pedestrians / cyclists, in terms of: provision of an improved / wider hard shoulder; or provision of footpaths. In this case the scale of impacts would not be expected to fall in excess of a 5 score.



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