

Project Appraisal Guidelines

Unit 6.7 Preparation of Scheme Costs

August 2011

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Preparation of Scheme Costs

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Attachments to this PAG Unit:

- *Cost Spreadsheet – Phase 2 Route Selection.xls*
 - *Cost Spreadsheet – Phase 3 Design + Phase 4 Tender.xls*
 - *Cost Spreadsheet – Phase 7 Closeout.xls*
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1 Context

- 1.1. This PAG Unit has been developed to address the issue on how estimates of scheme costs are converted into a format to be used in the Cost Benefit Analysis (CBA) of road schemes. Specifically, the processes described in the document relate to the preparation of the input required for use with the COBA program; however the approach is equally applicable in the case of a TUBA assessment, although there are some differences in the format of the data entry.
- 1.2. Guidance is given on how scheme costs are treated at different phases of the project and a worked example is presented. To assist in the process, spreadsheets for deriving the input costs during appraisal and evaluation have been developed, which are available for download, along with other appendices described in this document, from the NRA website.
- 1.3. A number of Input Cost Spreadsheets are available for download as part of this PAG Unit for the following project phases:
 - Phase 2 Route Selection;
 - Phase 3 Design/Phase 5 Tender; and
 - Phase 7 Closeout.
- 1.4. It is important to note that all scheme costs used in the economic appraisal must be agreed with the NRA's Cost Estimation Unit in advance of any CBA commencing (see Section 3 for further guidance).

2. Components of Scheme Costs

- 2.1. The Scheme Cost in CBA is made up from the following elements:
 - Main contract construction;
 - Main contract supervision;
 - Land and property;
 - Planning and design; and
 - Archaeology.
- 2.2. For the purpose of the discussion here, costs associated with Residual Network, Advance Works & Other Contracts as outlined in the Project management Guidelines and Cost Management Manual are included in the headings above.

Main Contract Construction Costs

- 2.3. Construction costs comprise:
 - The **main works**, covering the preliminaries, earthworks, roadworks, main carriageways, interchanges and junctions, side roads, structures, signage, accommodation works, etc;
 - The **ancillary works**, covering lighting, landscaping, noise mitigation, maintenance compounds, motorway communications, tolling, etc; and

- Those **works by other authorities**, such as Iarnród Éireann, Local Authorities and Utility Companies.

2.4. All construction costs should include any costs associated with measures required to mitigate the environmental impact of the scheme.

2.5. Construction costs are input into COBA / TUBA exclusive of VAT.

Main Contract Supervision

2.6. Supervision costs are those associated with the costs of site staff acting on behalf of the client, together with the back office support. Supervision costs are inclusive of income tax but exclusive of VAT.

Archaeology

2.7. Archaeology costs comprise all those associated with the undertaking of excavations and the management of discovered sites. Archaeology costs are entered exclusive of VAT.

Advance Works

2.8. All works required prior to execution of Main Contract. Costs are entered exclusive of VAT.

Residual network

2.9. Works required to mitigate impacts or to make good the existing road network. Expenditure might also include Traffic Management on the residual road network that forms part of the scheme. Costs are entered exclusive of VAT.

Land and Property Costs

2.10. Land and property costs are those which accrue as a result of the scheme, and may comprise both online and offline costs. Such costs are often difficult to predict, since they can depend on the outcome of arbitration or other factors. However, information on the likely costs involved is available from the outturn costs of previous schemes.

2.11. Land and property costs relate to all payments for land and property, including:

- **Acquisition costs** – the current valuation of the land and property, converted to the price base year;
- **Legal transaction costs** – the amount paid to estate agents and solicitors to support in the acquisition or sale, in addition to compensation costs. All acquisition or sale costs should exclude stamp duties;
- **Property management costs** – the costs of managing and preparing the land and property before it is used for the scheme. It is usually desirable to keep agricultural land farmed and properties occupied, rather than let them go unused. There may be a transaction cost of renting out the land or property to be included; and

- **Resale value of surplus** (i.e. off-line) land and property. The current valuation of the land and property that the Authority might buy, but would be subsequently sold. This is entered in the appraisal as a negative cost at the point in time in which it is likely to be resold.
- 2.12. Land and property costs should also include the value of land already owned by the Authority.
- 2.13. Payments for land and property may be made at various times before, during and after construction. Where land has been purchased in advance of its use for a scheme, the value of the land may have changed in the interval. This change reflects a change in the 'opportunity cost' of the land, that is, the value of the land when put to its best alternative use. Irrespective of the original purchase price, the current price estimated by the valuer should be used in the scheme appraisal.
- 2.14. Land and property costs entered into COBA are all exclusive of VAT.

Planning and Design

- 2.15. Preparation costs include the fees payable to those involved in developing the project up to construction stage. These include costs associated with design, planning, public consultation and oral hearing, in addition to the costs of any surveys carried out during scheme preparation. If the NRDO (Design Office) undertakes the design work, the design costs incurred should be included in the CBA. In considering preparation costs, reference should be made to the discussion of 'bygone and retrievable costs' later in this PAG Unit.
- 2.16. All Scheme Preparation costs are exclusive of VAT.

3. Maintenance

- 3.1. The difference in costs incurred from maintaining the Do-Minimum and Do-Something networks must be accounted for. Maintenance costs comprise non-traffic and traffic related works, with the former including items such as structures, drainage, street lighting, verge maintenance, and signals/signage which are largely independent of traffic flows; and the latter consisting of the reconstruction, overlaying, resurfacing works, etc. that depend on the level of traffic flow.
- 3.2. Default values maintenance costs by road type are provided in *PAG Unit 6.11: National Parameter Values Sheet*.

4. Timing of Costs

Dealing with Land Costs

- 4.1. An important general principle of cost benefit analysis is that the cost of resources should be recorded at the time that the resources are to be used (that is, become unavailable for alternative uses), rather than when they are actually paid for. This issue is particularly relevant to land and property costs where the purchase of agricultural land, for example, may occur some time before the time when farming of

the land ceases. In such instances the acquisition cost should relate to the year in which the land is taken out of current use, which for many schemes will occur in the first year of construction. However, there are situations when this is an inappropriate assumption:

- Where significant land or property is taken out of use before the first year of construction;
- Where the land and property costs of a scheme are unusually large; and
- For all schemes at Design when the simplifying assumption should be reviewed if better information is available.

4.2. Land and property costs consist of a number of different items and it is important to consider when each resource cost is likely to be incurred. This may mean that instead of making the assumption that land costs are incurred in the first year of construction, costs are disaggregated and each element is input at different stages of the appraisal period.

4.3. The following treatment for land and property costs is recommended:

- Scenario 1 – Land and property ‘on-line’, not farmed / unoccupied from purchase to construction. The costs to be input into the COBA appraisal are all acquisition costs and legal transaction costs, to be input at time of purchase, and any property management costs.
- Scenario 2 – Land and property ‘on-line’, farmed/occupied until construction begins. The costs to be input into the COBA appraisal are legal transaction costs, estimated costs of renting and property management costs, to be input at time of purchase, with acquisition costs input when taken out of use for construction of the road scheme.
- Scenario 3 – Land and property ‘off-line’, not farmed / unoccupied and later resold. The costs to be input into the COBA appraisal are the full purchase costs (acquisition and legal transaction costs) input when taken out of use, and resale value input when resold and returned to use.
- Scenario 4 – Land and property ‘off-line’, farmed / occupied and later resold. The costs to be input into the COBA appraisal are the transaction costs of purchase and property management costs, which should be input at time of acquisition.

Bygone and Retrievable Costs

- 4.4. Bygones' are expenditures incurred prior to economic appraisal that cannot be retrieved as a result of any subsequent decision. A distinction should be made between expenditure that is genuinely a bygone, and that which is retrievable.
- 4.5. An example of a bygone cost might be the preparation costs that have been incurred in the design of a scheme in order to take it to the planning stage. These costs are not retrievable, as they will have been 'sunk' regardless as to whether or not the scheme goes ahead. However, land and property costs are generally retrievable since it is usually possible to resell if the scheme does not go ahead. These costs should not, therefore, be treated as a bygone. Even if the property has actually been demolished the land on which the property stood will still have a resale value.
- 4.6. Unless otherwise directed by the NRA, all expenditure incurred in the development of a scheme should be included within the COBA appraisal. Costs may only be treated as 'bygones' only with NRA approval.

5. Applicability of Scheme Estimates

- 5.1. CBA is required at four distinct project phases:
- Phase 2 Route Selection;
 - Phase 3 Design;
 - Phase 5 Tender; and
 - Phase 7 Closeout (a CBA is required for a sample of schemes at this stage).
- 5.2. At all stages of the appraisal process the best available information on scheme costs should be used in the CBA. Hence, depending on the phase, a different cost estimate is to be used in the economic evaluation of road schemes. At all phases, the costs used in the economic assessment must have been agreed by the NRA's Cost Estimation Unit.
- 5.3. The following terminology is used to describe the various types of cost estimates:

The following terminology shall be used to describe the type of cost estimates:

- **Feasibility Working Cost** - Estimates prepared during Phase 1 of the scheme (Concept and Feasibility).
- **Option Comparison Cost Estimate** - Estimates prepared during Phase 2 of the scheme (Route Selection).
- **Total Scheme Budget (TSB) and Target Cost 1 (TC1)** - Estimates produced at Phase 3 of the scheme (Design). The Total Scheme Budget set here shall remain constant for the rest of the project lifecycle.
- **Total Scheme Budget (TSB) and Target Cost 2 (TC2)** - Estimates produced at Phase 5 of the scheme (Main Contract Award). The Total Scheme Budget shall be the same as the one set at Phase 3. Target Cost 2 will incorporate adjustments by the NRA to take account of An Bórd Pleanála conditions or agreed variations to the Schedule of Environmental Commitments and the

tender received. Feasibility Working Costs and Option Comparison Estimates shall be point estimates based on the philosophy that the estimate is “unlikely to be exceeded but is not excessively conservative”.

- **Target Cost (TC)** – This is the realistic estimate of the Final Outturn for the project based on assumptions made, identified risks and defined scope of work inclusive of VAT and inflation. It does not take into account exceptional events happening on the project.
- **Total Scheme Budget (TSB)** – This is the formal cost estimate for the project incorporating the identified core cost elements, an appropriate contingency in respect of these elements, and an allowance for future inflation to the completion of the project. In addition, a programme level contingency, known as “Programme Risk”, will be included to cover the situation of exceptional items occurring on isolated projects.

5.4. The estimate applicable to each phase of CBA is highlighted below:

Phase 2 Route Selection

5.5. At this phase Option Comparison Cost Estimates (OCCE), to be agreed with the NRA Cost Estimation Unit, will be used. The CBA must reflect the relative benefits of competing options.

Phase 3 Design and Phase 5 Tender

5.6. Separate CBA runs should be undertaken at preliminary design stage based on Target Cost 1 (TC1) and Total Scheme Budget (TSB) figures.

5.7. The CBA must be therefore be run six times: one for each combination of traffic growth scenario (‘high’, ‘medium’ and ‘low’) and cost estimate (Total Scheme Budget and Target Cost). The results of each of the six scenarios should be presented separately.

5.8. Additional scenario testing / sensitivity analysis may be required at this phase, in which case additional CBA runs may be necessary.

Phase 7 Closeout

5.9. CBAs are required at handover, review & closeout stage for a sample of schemes. The Design Office Project Manager (DOPM) should contact the NRA in advance of this stage to ascertain whether a closeout CBA will be required for their scheme.

5.10. Final outturn costs should be used at this project phase. The results of ‘high’, ‘medium’ and ‘low’ traffic growth scenarios should be presented.

Contingencies

- 5.11. The OCCE, TC and TSB estimates described above all contain an element of contingency to account for project risk. There is no requirement for any further adjustment to be made to the approved estimates prior to developing cost data for input into CBA.

6. Converting Scheme Estimated to CBA Format*Correcting for Inflation*

- 6.1. Scheme costs are incurred over a period of years. All costs should, therefore, be allocated to appropriate years for input to the CBA process.
- 6.2. The effects of general inflation should be removed by application of the Consumer Price Index (CPI) to convert from the current year to the price base year. For example, an expenditure of €1.05m in 2010 at a CPI inflation of 5% from 2009 to 2010 would be equivalent to an expenditure of €1.0m in 2010 but based on 2009 prices. The user undertakes this calculation before costs are input to the CBA file.
- 6.3. The CPI is used to convert scheme costs to the price base year using the following expression.

$$\text{Cost at Price Base Year} = \text{Latest Available Costing} \times \frac{\text{CPI}_b}{\text{CPI}_q}$$

where: *q* refers to the year and month corresponding to the rates used; and
b refers to the price base year

Correcting for Year of Expenditure

- 6.4. Costs also require discounting to account for the year in which they are accrued. Discounting of costs to the present value year is undertaken by COBA and TUBA software. In the above example, the €1.0m expenditure in 2010 is discounted to 2009 values by applying the discount rate of 4%, leading to an expenditure of €0.96m in 2009 values and 2009 prices.
- 6.5. The discount rate (*r*) is used to convert a sum (*S*) received in year *I* to a value at the present value year (*P*) using the following expression.

$$\text{Present Value} = \frac{S}{(1+r)^{I-P}}$$

- 6.6. Discounting and the price base are discussed in detail in *PAG Unit 6.1: Guidance on Conducting CBA*. The latest information on the CPI and discount rate should be obtained from the National Roads Authority.

Relative Price Factor

- 6.7. The process of accounting for the changes in the price of construction relative to movements in the general price index is undertaken by application of the Relative Price Factor (RPF). For all project phases, an RPF value of unity is applicable unless the NRA direct otherwise.

Indirect Taxation

- 6.8. All elements of scheme costs should be input into COBA net of indirect taxation and VAT. A different rate of VAT is applicable for the various expenditure headings.

Table 6.7.1: VAT rates

| Base cost expenditure heading | VAT |
|--|-------|
| Land and Property | 0.0% |
| Main Contract Construction, Advance Works, Residual Network | 13.5% |
| Archaeology | 17.3% |
| Main Contract Supervision, Planning and Design | 21.0% |

Input to COBA Format

- 6.9. In line with recent guidance from both the Department of Finance and the Department of Transport, both costs and benefits are to be presented in CBA reports to a given base year. In addition, costs must be entered into COBA in multiples of €1,000 and in factor prices of a given base year (i.e. exclusive of VAT and indirect taxes). Consequently, the cost figure inputted into COBA is quite different to the NRA estimates at each project phase.
- 6.10. The procedure to be used to convert cost estimates to COBA format is largely the same for preliminary design and construction documents preparation / tender award phases. The procedure is described below, with reference to the user inputs into spreadsheets that have been developed to assist in this task. Copies of these spreadsheets for Phase 2 (Route Selection), Phases 3/5 (Design and Tender) and Phase 7 (Closeout) are provided as annexes to this PAG Unit. These are available for download at www.nra.ie/publications/projectappraisal.

7. CBA Procedures

- 7.1. The procedures for the calculation of scheme costs associated with each project phase are outlined below.

Phase 2 Route Selection

- 1) Based on information in the signed off option comparison cost estimate spreadsheet, the user enters the breakdown of expenditure according to expenditure category (main contract construction, main contract supervision, archaeology, advance works, residual network, land & property and planning &

design), as well as the total inflation allowance and NRA programme risk. All these figures are inputted in units of €1 million.

- 2) The spreadsheet calculates the option comparison cost estimate itself (though the user should check this number to ensure that the figures were entered correctly).
- 3) The user reviews the assumed labour content (labour as a % of total cost) for each expenditure category as well as the applicable VAT rate, making changes where appropriate. In the case of schemes with external funding (e.g. some PPP schemes, schemes with developer contributions or schemes with EU funding) the Government funding percentage may need to be lowered from 100%, in which case advice from the NRA Strategic Planning Unit should be sought.
- 4) The user enters CPI for year and month of the price estimate and an average value for the price base year. Current guidance is to apply an RPF factor of unity for all appraisals. A shadow price of unity should also be used.
- 5) Using the data provided, the spreadsheet deducts the total inflation allowance from the option comparison cost estimate to bring costs to a current base year and then, using the CPI data, rebases to the price base year.
- 6) The spreadsheet applies the appropriate RPF factor and automatically deducts VAT from the resulting figures.
- 7) The spreadsheet calculates the undiscounted costs for input into the CBA, according to the year in which they accrue in multiples of €1,000 in base year factor prices.

Phase 3 Design / Phase 5 Tender

- 1) Based on information in the signed off scheme cost estimate reporting form, the user enters the Total Scheme Budget, Target Cost and the inflation allocated to Target Cost into the spreadsheet. All values are to be entered in multiples of €m.
- 2) The spreadsheet subtracts the full inflation allowance from the Total Scheme Budget to get the un-inflated Total Scheme Budget.
- 3) The spreadsheet subtracts the full inflation allowance from the Target Cost figure to get the un-inflated Target Cost.
- 4) User enters CPI data for year and month when the price estimate was completed and CPI data for the price base year. User must also enter a value for RPF of unity.
- 5) Using CPI data the spreadsheet re-bases costs to scheme price base year.
- 6) The user enters the breakdown on the base cost expenditure into headings relating to main contract construction, main contract supervision, archaeology, advance works, residual network, land and property and planning and design.

The sum of these expenditure items should exactly equal the un-inflated Target Cost.

- 7) The user reviews the assumed labour content (labour cost as a % of total scheme expenditure) for each expenditure category as well as the applicable VAT rate, making changes where appropriate. In the case of schemes with external funding (e.g. PPP schemes, schemes with developer contributions or schemes with EU funding) the Government funding percentage may need to be lowered from 100%, in which advice from the NRA Strategic Planning Unit should be sought.
- 8) VAT is automatically deducted from the resulting figures and the appropriate adjustments to cost to account for shadow prices are made.
- 9) The user then allocates the proportion of each expenditure heading occurring over the years in which expenditure accrues.
- 10) Using the data in the scheme cost profile, the spreadsheet calculates the undiscounted costs for input into the CBA, according to the year in which they accrue in multiples of €1,000 in price base year factor prices. The spreadsheet produces two sets of cost data to enter into COBA, one based on Target Costs and the other based on Total Scheme Budget.

7.2. Note that for design, statutory procedures and construction documents CBAs, six runs are required, one for each combination of cost (Total Scheme Budget and Target Cost), and traffic growth scenario ('high', 'medium' and 'low'). A CBA based on Total Scheme Budget and 'medium' traffic growth scenario should ordinarily be taken as the baseline scenario.

Phase 7 Closeout

- 1) The user enters actual expenditure figures into the spreadsheet for each single year of the project according to the expenditure item.
- 2) The user enters the VAT rate that is applicable to each item of expenditure as well as the labour content (labour costs as a percentage of total expenditure) and Government funds percentage – the percentage of scheme expenditure incurred by either local government or the national exchequer. Shadow price factors, currently unity, are then applied to costs.
- 3) The user enters the CPI index at expenditure year. The user re-bases the CPI data (with the price base year given the value of 1) and enters data into column provided.
- 4) The spreadsheet calculates the outturn cost at each year, exclusive of VAT and at the price base year for each item of expenditure.
- 5) The total factor cost at each year, at factor cost and at the price base year is entered into the CBA, according to the year in which the expenditure occurs in multiples of €1,000 in price base year factor prices.

Residual Value

- 7.3. Residual Values are calculated differently for COBA and TUBA. A discussion on Residual Values is provided in Section 17 of *PAG Unit 6.1: Guidance on Conducting CBA*.
- 7.4. In COBA, Residual value is automatically calculated for either 30-year or 10-year Residual Value periods. With TUBA, residual value can be calculated by a separate assessment of benefits from year 30 onwards.

8. Worked Example

- 8.1. The following worked example describes how to convert the Target Cost and Total Scheme Budget estimates to a format suitable for entry into COBA. The example presented here is for a hypothetical road scheme “Scheme A”, at Phase 3 Design. The corresponding spreadsheets for Phase 2 Route Selection and Phase 7 Closeout are slightly different, but follow similar principles and should be easy to interpret by the user.
- 8.2. The derivation of the COBA inputs requires cost data from the scheme cost estimate reporting form, duly signed off by the NRA’s Cost Estimate Unit. A sample scheme cost estimate is provided as Table 6.7.9.
- 8.3. In using each spreadsheet, the user is only required to input values into the coloured cells. Outputs are then calculated automatically.
- 8.4. Based on the agreed cost estimates, the user enters values for Total Scheme Budget, Target Cost and Inflation allocated to Target Cost. The spreadsheet then calculates:
 - Un-inflated Total Scheme Budget (d) = (a)-(c), and
 - Un-inflated Target Cost (e) = (b)-(c).

Table 6.7.2: Total Scheme Budget and Target Cost

| | €m |
|------------------------------------|---------|
| Total Scheme Budget | €128.00 |
| Target Cost | €106.00 |
| Inflation allocated to Target Cost | €9.00 |
| Un-inflated Total Scheme Budget | €119.00 |
| Un-inflated Target Cost | €97.00 |

- 8.5. For this simplified hypothetical scheme A we have assumed a CPI index for the price base year and month of cost estimate of 100.0. In practice these values will typically differ. The shadow price factors for Government funds (1.0) and Labour (1.0) are then entered. An RPF factor of unity is then applied.

Table 6.7.3: CPI, RPF and Shadow Prices

| CPI / RPF DATA | |
|--------------------------------------|-------|
| CPI Index for month of cost estimate | 100.0 |
| CPI Index for base year | 100.0 |
| Shadow Price of Government Funds | 1.0 |
| Shadow Price of Labour | 1.0 |
| RPF Factor | 1.0 |

- 8.6. The spreadsheet then applies the CPI data to rebase the un-inflated Target Cost and the un-inflated Total Scheme Budget to base year prices.

Table 6.7.4: TC and TSB Calculation

| TSB & TC | €m |
|---|---------|
| Un-inflated Target Cost, base year | €97.00 |
| Un-inflated Target Cost, base year, RPF applied | €97.00 |
| Un-inflated TSB, base year | €119.00 |
| Un-inflated TSB, base year, RPF applied | €119.00 |

- 8.7. The user then enters the un-inflated target costs under each heading of expenditure, the percentage of expenditure under each heading which Government funds accounts for and the estimated proportion of costs that are accounted for by labour. Default rates of Government funds (% of total expenditure), assumed labour content and applicable VAT rates are provided in the spreadsheet.

Table 6.7.5: Base Cost Expenditure Data

| Base Cost Expenditure Heading | €m | Government funds (% of total expenditure) | Assumed Labour content | % of total | Applicable VAT rate |
|-------------------------------|--------|---|------------------------|------------|---------------------|
| Main Contract Construction | €50.00 | 100% | 30.0% | 51.5% | 13.5% |
| Main Contract Supervision | €5.00 | 100% | 50.0% | 5.2% | 21.0% |
| Archaeology (all phases) | €2.00 | 100% | 50.0% | 2.1% | 17.3% |
| Advance works | €10.00 | 100% | 30.0% | 10.3% | 13.5% |
| Residual Network | €5.00 | 100% | 30.0% | 5.2% | 13.5% |
| Land & Property | €20.00 | 100% | 10.0% | 20.6% | 0.0% |
| Planning and Design | €5.00 | 100% | 60.0% | 5.2% | 21.0% |
| <i>Uninflated Target Cost</i> | €97.00 | | | 100.0 % | |

- 8.8. The spreadsheet automatically applies the shadow price factors for Government funds (1.0) and Labour (1.0). The VAT is then automatically removed from both the un-inflated Target Cost (price base year, RPF applied) and the un-inflated Total Scheme Budget (price base year, RPF applied).

Table 6.7.6: Cost in Base year Prices

| | TSB €m | Target Cost €m |
|----------------------------|--------|----------------|
| Main Contract Construction | €54.04 | €44.05 |
| Main Contract Supervision | €5.07 | €4.13 |
| Archaeology (all phases) | €2.09 | €1.71 |
| Advance works | €10.81 | €8.81 |
| Residual Network | €5.40 | €4.41 |
| Land & Property | €24.54 | €20.00 |
| Planning and Design | €5.07 | €4.13 |

- 8.9. Costs of each of the individual items are allocated according to the year in which they are expected to accrue. The proportion of expenditure (expressed as a percentage) within each category accruing in each year is taken to be identical to that in the un-inflated Target Cost profile in the scheme cost estimate reporting form. These percentages are entered into the spreadsheet under the 'Allocation of Costs to Each Year' heading.
- 8.10. Using this distribution, the spreadsheet automatically calculates the costs that are input to the CBA, for both the Target Cost and Total Scheme Budget scenarios. These costs are undiscounted and in multiples of €1,000 at factor prices at the appropriate price base year. Discounting is undertaken within the CBA programme.
- 8.11. The output from the cost spreadsheets is presented as Tables 6.7.7 and 6.7.8 overleaf.


Table 6.7.7: Outputs for **Total Scheme Budget**

| Year | Main Contract Construction (€m) | Main Contract Supervision (€m) | Archaeology (all phases) (€m) | Advance works (€m) | Residual Network (€m) | Land & Property (€m) | Planning & Design (€m) | COSTS TO INPUT INTO COBA (€ '000s) |
|------|---------------------------------|--------------------------------|-------------------------------|--------------------|-----------------------|----------------------|------------------------|---|
| 2002 | € - | € - | € - | € - | € - | € - | € - | € - |
| 2003 | € - | € - | € - | € - | € - | € - | € - | € - |
| 2004 | € - | € - | € - | € - | € - | € - | € - | € - |
| 2005 | € - | € - | € - | € - | € - | € - | € - | € - |
| 2006 | € - | € - | € - | € - | € - | € - | € - | € - |
| 2007 | € - | € - | € - | € - | € - | € - | € - | € - |
| 2008 | € - | € - | € - | € - | € - | € - | € - | € - |
| 2009 | € - | € - | € - | € - | € - | € - | € 1.0 | € 1,014 |
| 2010 | € - | € - | € - | € - | € - | € - | € 1.0 | € 1,014 |
| 2011 | € - | € - | € 1.0 | € 5.4 | € - | € 6.1 | € 2.0 | € 14,613 |
| 2012 | € 21.6 | € 2.0 | € 1.0 | € 5.4 | € - | € 6.1 | € 1.0 | € 37,244 |
| 2013 | € 21.6 | € 2.0 | € - | € - | € - | € 6.1 | € - | € 29,779 |
| 2014 | € 10.8 | € 1.0 | € - | € - | € - | € 6.1 | € - | € 17,957 |
| 2015 | € - | € - | € - | € - | € 5.4 | € - | € - | € 5,404 |
| 2016 | € - | € - | € - | € - | € - | € - | € - | € - |
| 2017 | € - | € - | € - | € - | € - | € - | € - | € - |
| 2018 | € - | € - | € - | € - | € - | € - | € - | € - |
| 2019 | € - | € - | € - | € - | € - | € - | € - | € - |
| 2020 | € - | € - | € - | € - | € - | € - | € - | € - |
| 2021 | € - | € - | € - | € - | € - | € - | € - | € - |
| 2022 | € - | € - | € - | € - | € - | € - | € - | € - |
| 2023 | € - | € - | € - | € - | € - | € - | € - | € - |
| 2024 | € - | € - | € - | € - | € - | € - | € - | € - |
| 2025 | € - | € - | € - | € - | € - | € - | € - | € - |
| 2026 | € - | € - | € - | € - | € - | € - | € - | € - |
| 2027 | € - | € - | € - | € - | € - | € - | € - | € - |
| 2028 | € - | € - | € - | € - | € - | € - | € - | € - |
| | € 54.0 | € 5.1 | € 2.1 | € 10.8 | € 5.4 | € 24.5 | € 5.1 | |

Table 6.7.7: Outputs for **Target Cost Scenario**

| Year | Main Contract Construction (€m) | Main Contract Supervision (€m) | Archaeology (all phases) (€m) | Advance works (€m) | Residual Network (€m) | Land & Property (€m) | Planning and Design (€m) | COSTS TO INPUT INTO COBA (€ '000s) |
|------|---------------------------------|--------------------------------|-------------------------------|--------------------|-----------------------|----------------------|--------------------------|---|
| 2002 | € - | € - | € - | € - | € - | € - | € - | € - |
| 2003 | € - | € - | € - | € - | € - | € - | € - | € - |
| 2004 | € - | € - | € - | € - | € - | € - | € - | € - |
| 2005 | € - | € - | € - | € - | € - | € - | € - | € - |
| 2006 | € - | € - | € - | € - | € - | € - | € - | € - |
| 2007 | € - | € - | € - | € - | € - | € - | € - | € - |
| 2008 | € - | € - | € - | € - | € - | € - | € - | € - |
| 2009 | € - | € - | € - | € - | € - | € - | € 0.8 | € 826 |
| 2010 | € - | € - | € - | € - | € - | € - | € 0.8 | € 826 |
| 2011 | € - | € - | € 0.9 | € 4.4 | € - | € 5.0 | € 1.7 | € 11,911 |
| 2012 | € 17.6 | € 1.7 | € 0.9 | € 4.4 | € - | € 5.0 | € 0.8 | € 30,359 |
| 2013 | € 17.6 | € 1.7 | € - | € - | € - | € 5.0 | € - | € 24,274 |
| 2014 | € 8.8 | € 0.8 | € - | € - | € - | € 5.0 | € - | € 14,637 |
| 2015 | € - | € - | € - | € - | € 4.4 | € - | € - | € 4,405 |
| 2016 | € - | € - | € - | € - | € - | € - | € - | € - |
| 2017 | € - | € - | € - | € - | € - | € - | € - | € - |
| 2018 | € - | € - | € - | € - | € - | € - | € - | € - |
| 2019 | € - | € - | € - | € - | € - | € - | € - | € - |
| 2020 | € - | € - | € - | € - | € - | € - | € - | € - |
| 2021 | € - | € - | € - | € - | € - | € - | € - | € - |
| 2022 | € - | € - | € - | € - | € - | € - | € - | € - |
| 2023 | € - | € - | € - | € - | € - | € - | € - | € - |
| 2024 | € - | € - | € - | € - | € - | € - | € - | € - |
| 2025 | € - | € - | € - | € - | € - | € - | € - | € - |
| 2026 | € - | € - | € - | € - | € - | € - | € - | € - |
| 2027 | € - | € - | € - | € - | € - | € - | € - | € - |
| 2028 | € - | € - | € - | € - | € - | € - | € - | € - |
| | € 44.1 | € 4.1 | € 1.7 | € 8.8 | € 4.4 | € 20.0 | € 4.1 | |

Table 6.7.9: Sample Cost Estimate Report

| | | | | | | | | |
|---------------------------|----------|----------------|--|----------------|------------|-----------------|---|--|
| SCHEME NAME | Scheme A | | | NRA Ref. | | |  | |
| Road Authority | | | | Project Status | Design | | Region | |
| Mainline Scheme Length | 15 | Cross Section | | Current Date | 01/07/2010 | | | |
| Grade Separated Junctions | | No. of Bridges | | Start Date | 2012 | Completion Date | 2014 | |
| Total Land Acquired (ha) | | | | Terrain | | | Ground Conditions | |

| Base Cost Expenditure Heading | Base Cost (Inclusive of Total Risk) | Current Risk Allocation to TC | Un-inflated Target Cost | Un-Inflated Target Cost Profile | | | | | | |
|--|-------------------------------------|------------------------------------|------------------------------------|------------------------------------|-------------|--------------|--------------|--------------|--------------|-------------|
| | | | | Pre-2010 | 2010 | 2011 | 2012 | 2013 | 2014 | Post 2014 |
| Main Contract Construction (incl VAT) | 40.00 | | 50.00 | | | | 20.00 | 20.00 | 10.00 | |
| <i>Employer Risks on Construction</i> | 12.00 | 10.00 | | | | | | | | |
| Main Contract Supervision | 4.00 | | 5.00 | | | | 2.00 | 2.00 | 1.00 | |
| <i>Employer Risks on Supervision</i> | 1.50 | 1.00 | | | | | | | | |
| Archaeology | 1.00 | | 2.00 | | | 1.00 | 1.00 | | | |
| <i>Pre-construction Archaeological Risks</i> | 1.00 | 1.00 | | | | | | | | |
| Advance Works & Other Contracts | 9.00 | | 10.00 | | | 5.00 | 5.00 | | | |
| <i>Employer Risks</i> | 1.00 | 1.00 | | | | | | | | |
| Residual network | 5.00 | | 5.00 | | | | | | | 5.00 |
| Land & Property | 16.00 | | 20.00 | | | 5.00 | 5.00 | 5.00 | 5.00 | |
| <i>Land Issues Risks</i> | 4.00 | 4.00 | | | | | | | | |
| Planning & Design (incl GI & Topo) | 4.00 | | 5.00 | 1.00 | 1.00 | 2.00 | 1.00 | | | |
| <i>Employer Risks on Planning & Design</i> | 1.00 | 1.00 | | | | | | | | |
| Subtotal (Excl Contingency & Inflation) | 99.50 | 18.00 | 97.00 | 1.00 | 1.00 | 13.00 | 34.00 | 27.00 | 16.00 | 5.00 |
| Target Cost With Inflation | Un-inflated Target Cost | Inflation Allocated to Target Cost | Target Cost Adjusted for Inflation | Target Cost With Inflation Profile | | | | | | |
| | | | | Pre 2010 | 2010 | 2011 | 2012 | 2013 | 2014 | Post 2014 |
| Main Contract Construction | 50.00 | 2.00 | 52.00 | | | | 20.80 | 20.80 | 10.40 | |
| Main Contract Supervision | 5.00 | 1.00 | 6.00 | | | | 2.40 | 2.40 | 1.20 | |
| Archaeology All Phases | 2.00 | 1.00 | 3.00 | | | 1.50 | 1.50 | | | |
| Advance Works | 10.00 | 1.00 | 11.00 | | | 5.50 | 5.50 | | | |
| Residual network | 5.00 | 1.00 | 6.00 | | | | | | | 6.00 |
| Land & Property | 20.00 | 2.00 | 22.00 | | | 5.50 | 5.50 | 5.50 | 5.50 | |
| Planning & Design (incl GI & Topo) | 5.00 | 1.00 | 6.00 | 1.20 | 1.20 | 2.40 | 1.20 | | | |
| Target Cost Totals | 97.00 | 9.00 | 106.00 | 1.20 | 1.20 | 14.90 | 36.90 | 28.70 | 17.10 | 6.00 |

| | | | |
|--------------------|-----------|------|---------------|
| TARGET COST | Cost / km | 7.07 | 106.00 |
|--------------------|-----------|------|---------------|

| | | |
|----------------------------------|----------------------------------|-------------------------|
| Base Cost | 106.00 | |
| Total Inflation | 12.00 | |
| Programme Risk | 10.00 | |
| TOTAL SCHEME BUDGET | 128.00 | |
| Head : Programme Management Unit | Regional Manager | Chief Executive Officer |
| | Head of Engineering & Prog. Mngt | |