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Appendix F: Scheme Costs

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MetroLink

Scheme Costs

ML1-JAI-LSI-ROUT_XX-RP-Y-00003 | P01

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Contents

1. Scheme Costs

1.1 Introduction

The costs presented cover the required capital, operations and maintenance (O&M) and whole life cycle costs and costs associated with land ownership and purchase, utilities and excavation. A robust approach to the estimation of capital expenditure has been developed by the cost surveyors (London Bridge Associates Limited) and is based on benchmarked values and professional experience within the industry. Further detail is provided in "D574-LBA-REFD-ROUT_XX-TN-Z-A06-2017 Cost Estimate - Yearly Spend" and "Dublin Metro 60 year Forecast of OM and Life Cycle Costs".

1.2 Do Minimum Costs

At this stage, it is assumed that there are no Do Minimum costs.

1.3 Scheme costs

The scheme costs are categorised under capital and O&M expenditures. Under each category are sub-elements. Some elements will be delivered via a Service Delivery Partner under a PPP arrangement. A PPP opens the opportunity to transfer risks to the private sector that would otherwise rest with TII. Further, under a PPP scheme there are reduced upfront exchequer funding requirements as payments are deferred until the start of operations. This is discussed further in the procurement strategy (ML1-JAI-PRC-OTHE_XX-ST-Y-00003).

The main cost elements are detailed below:

- Construction Costs
    - Advanced Enabling Works (AEW) – These consist of various works conducted prior to the main works required to de-risk the programme. This includes, for example, environmental baseline monitoring, traffic works, demolition and removal or remediation of any contaminants etc.;
    - Main Works Contractors (MWC) - The MWCs will construct all major civil engineering works. This includes; station structures, station 'boxes', retaining walls,

portals, embankments and cuttings, viaducts, drainage, access shafts, bored and cut & cover tunnels;

- Public Private Partnership (PPP) – A delivery partner will deliver the train systems, signals and line side wiring, along with mechanical and electrical elements of the stations. These costs will be borne by the delivery partner and will be reimbursed through the public purse at a later date.

- Client Costs
  - Indirect Costs – The fees associated with setting up the project, design costs and other legal fees.
  - Land & Property Costs- This cost element covers the land required for MetroLink itself and during construction stage, as well as for any necessary worker accommodation.

O&M costs comprise of the following cost elements:

- Operation and Maintenance Costs: This consists of labour costs, propulsion, utilities, materials, casualty and liability and services and miscellaneous costs.
- Asset Renewals: This is split by fleet and infrastructure renewals such as station facility works.

1.3.1 Base Capital Costs (Excluding Nominal Inflation and VAT)

Scheme cost for the MetroLink programme were estimated by London Bridge Associates (LBA) Limited. These base costs incorporate capital costs, contractor preliminary costs and contingency risk, based on a Quantitative Cost Risk Analysis (QCRA) or Quantitative Schedule Risk Analysis (QSRA), dependent on the cost item. These costs are expected to be incurred over a period of 2016 – 2031. Client costs prior 2020 were provided by TII.

As stated above, the overall scheme cost includes contributions made by the private sector to the project. The delivery partner will provide monies to help deliver the construction of the scheme through the years 2022-2031.

The base cost (2019 prices, undiscounted) to the public purse by cost item (excluding inflation and VAT) is presented in Table 1–1. This is the cost of the scheme if it could all be paid for now.

Table 1–1: Base Capital Cost Summary Excluding Inflation and VAT (2019 Prices, Undiscounted)

	Cost Estimate (€m, Undiscounted)
AEW	190
MWC	2,935
Construction Costs Total	3,125
Indirect Costs	605
Land & Property Costs	415
Client Costs Total	1,020
Delivery Partner Costs Total	1,323
Total	5,468

Source: LBA Costs

Risk has been summarised separately in Table 1–2. These totals incorporate the risk for all costs, including the delivery partner costs, in Table 1–1.

Table 1–2: Base Risk Cost Summary Excluding Inflation and VAT (2019 Prices, Undiscounted)

	Cost Estimate (€m, Undiscounted)
QCRA in line with Exposure Windows	518
QSRA Prolongation / Adjustments	1,101
Unknown Unknowns	1,094
Estimating Uncertainty	269
Additional Assumptions	49
Total Risk (2019 Prices)	3,030

Source: Jacobs' Analysis of LBA Costs

The totals in Table 1–2 include risk assumed to be attributable to already incurred costs of years 2016 – 2019. This has been apportioned and excluded in further analysis, as presented Table 1–3. The total costs from hereon therefore may appear to be different to the totals as seen in source document "D574-LBA-REFD-ROUT_XX-TN-Z-A06-2017 Cost Estimate - Yearly Spend" due to this adjustment.

Table 1–3: Adjusted Base Risk Cost Summary Excluding Inflation and VAT (2019 Prices, Undiscounted)

	Cost Estimate (€m, Undiscounted)
QCRA in line with Exposure Windows	517
QSRA Prolongation / Adjustments	1,100
Unknown Unknowns	1,091
Estimating Uncertainty	268
Additional Assumptions	49
Total Risk (2019 Prices)	3,025

Source: Jacobs' Analysis of LBA Costs

The overall cost of the scheme has been summarised in Table 1–4 below.

Table 1–4: Total Capital & Risk Cost Summary Excluding Inflation and VAT (2019 Prices, Undiscounted)

	Cost Estimate (€m, Undiscounted)
Construction Costs	3,125
Client Costs	1,020
Delivery Partner Costs	1,323
Risk	3,025
Capital & Risk Total Costs	8,494

Source: Jacobs' Analysis of LBA Costs

1.3.2 Capital Costs (Including Nominal Inflation, Excluding VAT)

Annual inflation has been applied to all the cost components, with the inflation indices used varying by scheme component where available. For client costs, a sector-specific inflation rate was not provided by LBA Ltd, however the inflated totals in this section were provided. For these cost items, the inflation rate was derived for each year by Jacobs.

Table 1–5 gives the cost of the scheme as it will be once inflation over the construction period is taken into account.

Table 1–5: Capital Cost Summary Including Inflation, Excluding VAT (Nominal Prices, Undiscounted)

	Cost Estimate (€m, Undiscounted)
AEW	219
MWC	3,567
Construction Costs	3,786
Indirect Costs	719
Land & Property Costs	499
Client Costs	1,218
Delivery Partner Costs	1,696
Total Capital Costs	6,700

Source: Jacobs' Analysis of LBA Costs

Risk is also subject to inflation during the life of the project. This is shown in Table 1–6.

Table 1–6: Risk Cost Summary Including Inflation, Excluding VAT (Nominal Prices, Undiscounted)

	Cost Estimate (€m, Undiscounted)
QCRA in line with Exposure Windows	636
QSRA Prolongation / Adjustments	1,353
Unknown Unknowns	1,356
Estimating Uncertainty	330
Additional Assumptions	60
Total Risk Costs	3,736

Source: Jacobs' Analysis of LBA Costs

With inflation applied, the summation of the capital construction costs with the risk costs is detailed in Table 1–7.

Table 1–7: Total Capital & Risk Cost Summary Including Inflation, Excluding VAT (Nominal Prices, Undiscounted)

	Cost Estimate (€m, Undiscounted)
Construction Costs	3,786
Client Costs	1,218
Delivery Partner Costs	1,696
Risk Costs	3,736
Capital & Risk Total Costs	10,436

Source: Jacobs' Analysis of LBA Costs

1.3.3 Capital Costs (Including Nominal Inflation and VAT)

Table 1–8 shows total outturn costs including VAT. Respective VAT rates were applied for construction costs (13.5%), land and property costs (13.5%) and indirect client costs (23%).

Table 1–8: Unadjusted Capital Cost Summary Including Inflation and VAT (Nominal Prices, Undiscounted)

	Cost Estimate (€m, Undiscounted)
AEW	249
MWC	4,048
Construction Costs	4,297
Indirect Costs	884
Land & Property Costs	567
Client Costs	1,450

	Cost Estimate (€m, Undiscounted)
AEW	249
Delivery Partner Costs	1,925
Total Capital Costs	7,673

Source: LBA Costs

It should be noted that for costs incurred in 2016-2018, TII were previously not liable to pay VAT on public transport projects. This ruling was changed in May 2019; hence VAT has been applied from thereon. This results in a minor reduction in client costs totals, as seen in Table 1–9, noting that all client costs from hereon will be marginally lower than the unadjusted figure in Table 1–8.

Table 1–9: Adjusted Capital Cost Summary Including Inflation and VAT (Nominal Prices, Undiscounted)

	Cost Estimate (€m, Undiscounted)
AEW	249
MWC	4,048
Construction Costs	4,297
Indirect Costs	883
Land & Property Costs	567
Client Costs	1,450
Delivery Partner Costs	1,925
Total Capital Costs	7,672

Source: Jacobs' Analysis of LBA Costs

The risk total has been estimated against construction costs therefore the same VAT rate has been applied (13.5%), as seen in Table 1–10.

Table 1–10: Risk Cost Summary Including Inflation and VAT (Nominal Prices, Undiscounted)

Element (Inc. Nominal Inflation and VAT)	Cost Estimate (€m, Undiscounted)
QCRA in line with Exposure Windows	722
QSRA Prolongation / Adjustments	1,536
Unknown Unknowns	1,539
Estimating Uncertainty	375
Additional Assumptions	69
Total Risk Costs	4,241

Source: Jacobs' Analysis of LBA Costs

With both inflation and VAT applied, the summation of the capital construction costs with the risk costs is detailed in Table 1–11.

Table 1–11: Total Capital & Risk Cost Summary Including Inflation and VAT (Nominal Prices, Undiscounted)

Element (Inc. Nominal Inflation and VAT)	Cost Estimate (€m, Undiscounted)
Construction Costs	4,297
Client Costs	1,450
Delivery Partner Costs	1,925
Risk Costs	4,241
Capital & Risk Total Costs	11,912

Source: Jacobs' Analysis of LBA Costs

1.4 Operating, Maintenance and Renewals Costs

1.4.1 Base Operating and Maintenance Costs (Excluding Nominal Inflation and VAT)

Operating, maintenance and lifecycle costs have been calculated using a bespoke forecasting model. The model has built in contingency allowances for each category of operating, maintenance and renewal expenditures. The model also provides a framework to project the impact of inflation on future expenditures. Detailed derivation of these costs can be found in "Dublin Metro 60 Year Forecast of OM and Life Cycle Costs V3 November 6, 2020". Only the first 30 years of the base costs (2019 prices, undiscounted) are relevant for financial appraisal. Subsequent years up to 2090 are used to inform economic analysis. All operating, maintenance and lifecycle costs within this report cover a 62-year period (2029 – 2090).

Table 1–12: Base Operating and Maintenance Cost Summary Excluding Inflation and VAT (2019 Prices, Undiscounted)

	Cost Estimate (2019 prices, €m, Undiscounted)

Wages, Salaries, Payroll Taxes and Benefits	1,704
Propulsion	295
Utilities	142
Materials	227
Casualty and Liability	268
Services and Miscellaneous	342
O&M Total	2,977

Source: Jacobs' Analysis

As well as ongoing operation and maintenance costs, there are period costs associated with expanding the fleet, and renewing infrastructure and rolling stock. Costs associated with this are shown in Table 1–13.

Table 1–13: Base Asset Renewals Cost Summary Excluding Inflation and VAT (2019 Prices, Undiscounted)

	Cost Estimate (2019 prices, €m, Undiscounted)
Infrastructure Renewal	587
Fleet Expansion, Renewal and Replacement	1,014
Asset Renewals Total	1,601

Source: Jacobs' Analysis

Table 1–14 shows a summary of the total O&M and renewal costs for MetroLink over the appraisal period.

Table 1–14: Total Base O&M and Asset Renewals Cost Summary Excluding Inflation and VAT (2019 Prices, Undiscounted)

Element (2019 Prices)	Cost Estimate (2019 prices, €m, Undiscounted)
O&M	2,977
Asset Renewals	1,601
O&M and Asset Renewal Total Costs	4,578

Source: Jacobs' Analysis

1.4.2 O&M Costs (Including Inflation, Excluding VAT)

The application of inflation has been applied to the base costs. Cost elements relating to fleet expansion, renewal and replacement were assumed to subject to the 'rolling stock' inflation rate (2% per annum) as sourced by LBA Ltd for the capital costs. As the inflation rate profile provided only spanned across 2020 – 2031, the inflation rate was assumed to be constant from 2032 onwards in the absence of more specific information.

The 'infrastructure renewal' cost basket encompasses an extensive number of construction elements; therefore, an average inflation rate has been assumed across the following categories as sourced by LBA Ltd: civil engineering, stations, M&E and railway systems. Similarly, to the above, the inflation rate was assumed to be constant from 2032 onwards in the absence of more specific information.

The National Development Finance Agency (NDFA) advises the application of an inflation rate to be equal to the Harmonised Index of Consumer Prices (HICP, 2%) + 1% for services with a labour component in excess of 50%. The O&M costs fall under this category; hence an inflation rate of 3% has been adopted.

Table 1–15 gives the O&M costs with inflation included.

Table 1–15: O&M Cost Summary Including Inflation, Excluding VAT (Nominal Prices, Undiscounted)

	Cost Estimate (€m, Undiscounted)
Wages, Salaries, Payroll Taxes and Benefits	6,604
Propulsion	1,246
Utilities	599
Materials	895
Casualty and Liability	1,185
Services and Miscellaneous	1,369
O&M Total	11,897

Source: Jacobs' Analysis

Table 1–16 gives the renewal costs with the inflation included

Table 1–16: Asset Renewals Cost Summary Including Inflation, Excluding VAT (Nominal Prices, Undiscounted)

	Cost Estimate (€m, Undiscounted)
Infrastructure Renewal	1,927
Fleet Expansion, Renewal and Replacement	2,674
Asset Renewals Total	4,600

Source: Jacobs' Analysis

Table 1–17 gives a summary of the total O&M and renewal costs with inflation included.

Table 1–17: Total O&M Cost Summary Including Inflation, Excluding VAT (Nominal Prices, Undiscounted)

	Cost Estimate (2019 prices, €m, Undiscounted)
O&M	11,897
Asset Renewals	4,600
Total O&M & Asset Renewals Costs	16,497

Source: Jacobs' Analysis

1.4.3 O&M Costs (Including Nominal Inflation and VAT)

The impact of VAT on the nominal O&M costs has been calculated. The VAT rate employed for O&M and fleet expansion costs was 23%, whilst infrastructure renewal used 13.5%. Table 1–18 gives the O&M costs inclusive of inflation and VAT.

Table 1–18: O&M Cost Summary Including Inflation and VAT (Nominal Prices, Undiscounted)

	Cost Estimate (€m, Undiscounted)
Wages, Salaries, Payroll Taxes and Benefits	8,122
Propulsion	1,532
Utilities	737
Materials	1,101
Casualty and Liability	1,458
Services and Miscellaneous	1,684
O&M Total	14,633

Source: Jacobs' Analysis

Table 1–19 gives the asset renewal costs inclusive of inflation and VAT.

Table 1–19: Asset Renewal Cost Summary Including Inflation and VAT (Nominal Prices, Undiscounted)

	Cost Estimate (€m, Undiscounted)
Infrastructure Renewal	2,187
Fleet Expansion, Renewal and Replacement	3,289
Asset Renewals Total	5,475

Source: Jacobs' Analysis

Table 1–20 shows gives the combined total for operations and maintenance and renewal costs for MetroLink, over the appraisal period, including inflation and VAT.

Table 1–20: Total O&M Cost Summary Including Inflation and VAT (Nominal Prices, Undiscounted)

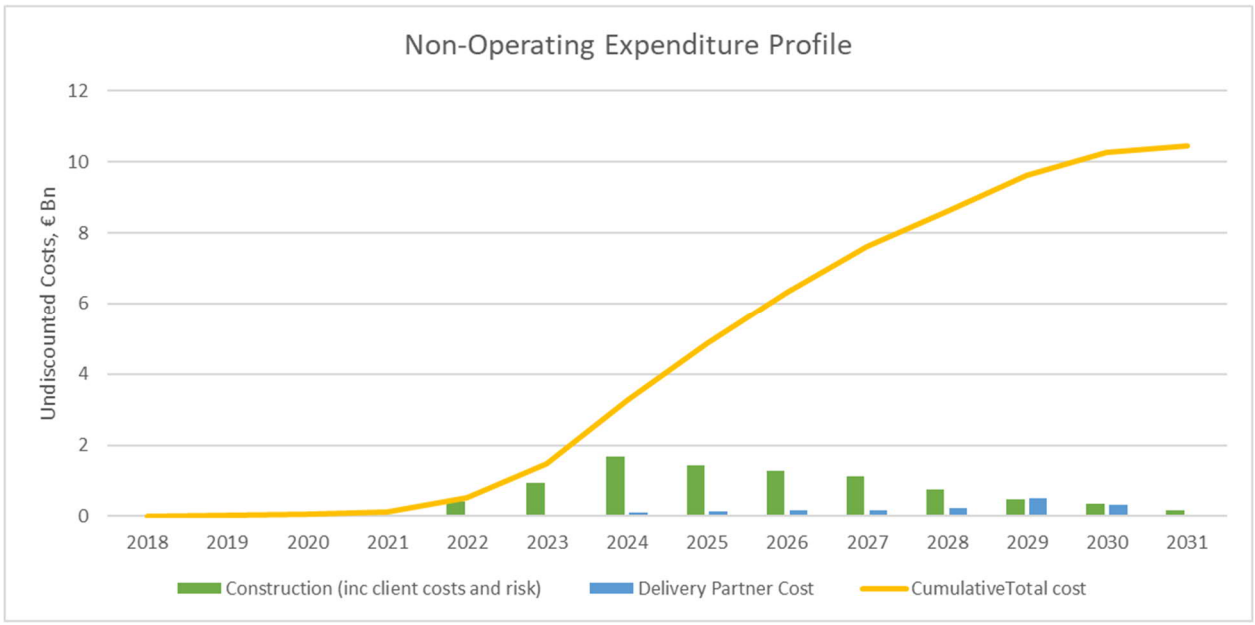
	Cost Estimate (€m, Undiscounted)
O&M	14,633
Asset Renewals	5,475
O&M & Asset Renewals Total	20,109

Source: Jacobs' Analysis

1.5 Spend Profile

Figure 1-1 shows the yearly non-operating spend profile, incorporating the PPP and non-PPP elements of the scheme (including inflation and excluding VAT). Please note that this reflects the project spend profile and not the public sector spend profile which is presented in the financial case.

Figure 1-1 Non-operating costs, year by year profile



Source: Jacobs' Analysis