booz&co.

Dublin Airport

Capital Expenditure Assessment

- This report was commissioned by, and prepared for, the Commission of Aviation Regulation ('CAR') by Booz & Company ('The Consultant'), supported by TPS. The findings and conclusions set forth in the report represent the best professional judgement of the Consultant based on information made available to it by the CAR and others. The Consultant has relied on, and not independently verified, data provided to it by such sources and on secondary sources of information cited in the report. We note that if the information provided to us by such sources or obtained from secondary sources proves to be incorrect, the conclusions stated in our report could also be incorrect.

- The report states a number of assumptions made during our analysis. While we have no reason to believe any of these assumptions are unreasonable, we note that if any prove incorrect, actual results could vary from those we have projected.

- Third parties to whom CAR may make this report available should not rely on the findings or conclusions set forth in this report without obtaining independent professional advice and undertaking their own due diligence reviews. Any reliance on this report by a third party or any decisions made by any such third party based on this report, are the sole responsibility of such third party. The Consultants have not had and do not acknowledge any duty of care to any such third party with respect to the report, and shall have no financial or other liability to any such party with respect to any matter related to any decisions made by any such party, in whole or in part, on this report.

Executive Summary and Key Findings

Introduction

Approach

Analysis and Findings

Appendices

The Capital Investment Programme presents DAA proposals for capital spend at Dublin Airport for the period 2010 – 2014

DAA CIP Background

- Last CIP, submitted in 2006, outlined a €2 billion programme designed to bring about a step change in the capacity and service levels available at Dublin Airport, following a five-fold increase in passenger numbers over the preceding 15 years.
- The initial investment of €800 million for the period 2010 – 2014 has been reduced in light of the change in expected demand coupled with a downturn in forecast revenues resulting from poorer domestic and international economic conditions.
- The full Transformation programme remains at circa €800 million but it is now appropriate for many of the individual projects be deferred in the short-term, thereby extending the timeframe during which the overall programme will be delivered.

CIP Projects Classification

- The reduced proposed programme for the 2010 – 2014 is divided into three tranches as follows:
  - **Tranche 1: Operational Projects** comprises the minimum spend which is needed to carry out the economic replacement or upgrade of life-expired assets, and to comply with specific regulatory or safety requirements. They are valued at circa €51 million per annum, a spend which equates to circa 2.8% of the Regulated Asset Base.
  - **Tranche 2: Service Delivery** represents the spend required to maintain customer service levels, protect and enhance single till commercial revenues and carry out the planning and design work necessary in order to reduce the lead times required for key items of infrastructure that will form part of future capital programmes. The overall value of the projects contained in this tranche is €139 million.
  - **Tranche 3: Enabling Projects** represents the spend required to enable future growth at Dublin Airport. The total value of the Tranche 3 projects is €353 million.

Booz and TPS were commissioned by CAR to assess the unit costs of DAA's capital investment project portfolio at Dublin Airport

Regulated Charges at Dublin Airport

- The CAR regulates the following charges at Dublin Airport (other airport functions are either regulated elsewhere or provided by a competitive market):
  - Runway landing and take-off charges
  - Aircraft parking charges
  - Charges for the use of an air bridge
  - Passenger processing charges
- The Commission uses price cap regulation.

CAR's Statutory Objectives in Setting the Cap

- The efficient and economic development of Dublin Airport
- The ability of the Dublin Airport Authority to operate in a financially viable manner
- The protection of the interests of users and potential users of the airport

Regulatory Building Blocks

Used to derive price cap

- regulatory asset base
- return on an efficient capital stock
- depreciation charge on capital stock
- estimate of efficiently incurred future operating expenditures
- estimate of future commercial revenues

- This requires the CAR to take a view on DAA's Capital Investment Programme

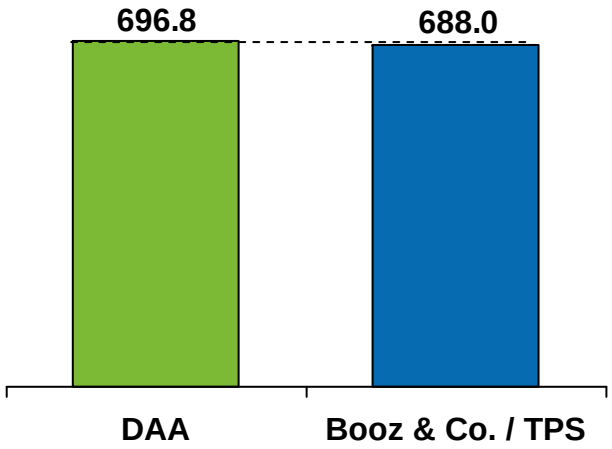
Utilising the data provided, we undertook capital investment analysis to examine the reasonableness of the unit cost data

Approach Summary

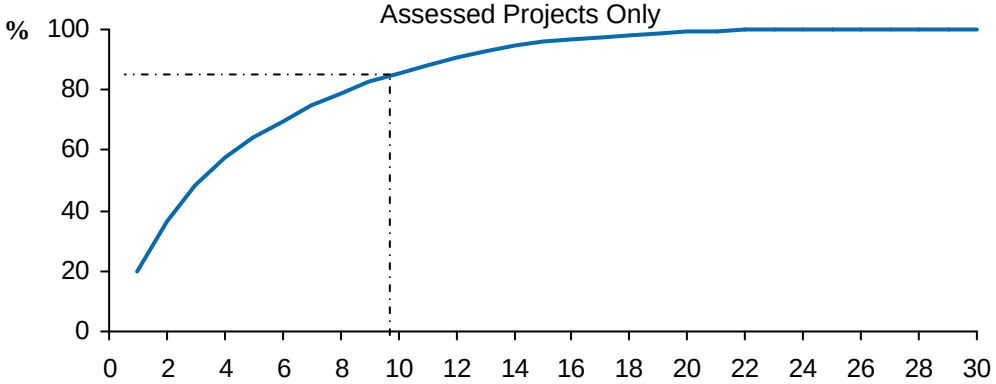
Project Kick Off and Confirm Projects	Review and Quantify Scope of Projects	Develop and Compare Cost Estimates	Variance Cost Data Review	Reporting
▪ Clarify scope and approach ▪ Confirm the projects to be reviewed ▪ Set up project administration ▪ Set up project data flows and data requests for follow up queries with DAA	▪ Review details of information provided, covering issues such as capital expenditure timing, definitions, level of contingencies ▪ Develop questions for submission to DAA via CAR ▪ Identify suitable benchmarks e.g. previous projects and published data at unit cost level (€/sq.m.)	▪ Based on our benchmarks and experience, develop independent cost estimates for each selected project ▪ Compare with DAA forecasts ▪ Identify cost variances between our independent estimates and DAA estimates	▪ Determine acceptable differences on a per project basis ▪ Develop explanations and rationale as to the reasons for differences ▪ Where material differences exist, undertaken additional analysis to reexamine our estimate ▪ Finalise the analysis	▪ Develop and finalise our report covering: – Background to the review of capital expenditure – Our analytical approach – Summary of findings – Detailed analysis and capital expenditure comparisons

Overall DAA's capex unit costs closely match our independent cost analysis, however material variation has been found

Comparison of Total Capex Costs
DAA vs Booz & Co Estimates: Assessed Projects Only



Cumulative Absolute Variation
Assessed Projects Only



Comments

- When the positive and negative cost variations are summed for all of the projects assessed, the total difference in costs is around €9m (1.26%)
- This analysis suggests that it would be difficult to implement any significant cost savings at the programme level
- Our analysis did not examine the need for or scope of any of the individual projects within the CIP. This work is being undertaken as a separate issue by the CAR in consultation with the airport users.
- There may be discrepancies in unit costs for the projects that were not included in this study, which could materially affect overall capex costs. However, these projects have not been considered in this study
- The top ten projects (ranked by absolute unit cost variance) account for around 86% of total absolute variance

Material variation, some significant, occurs at project group level, notably in contingency and project management costs

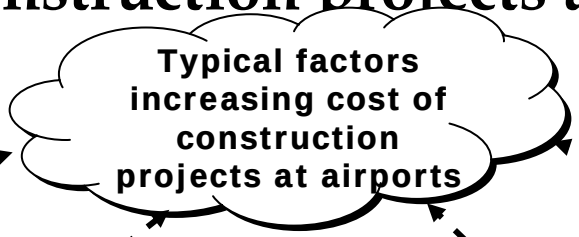
Top Individual Projects where the Booz/TPS assessment is less than the DAA estimate

Individual Projects Results

- Largest difference is in the CIP 8.200 (Contingency and Programme Management) assessment.
- The main reason for the higher DAA cost is the assumed level of staffing required for programme management. The DAA figure is much higher than expected, equating to some 40 staff. The Booz/TPS view is that a team of 20 to 25 is a more reasonable staffing level.
- The taxiway CL lights and associated stop bars on runway 16/34 is the second most significant individual contributor. However, the runway and taxiway overlay projects also included in this project group are, in our view, undercosted by DAA, so overall the group cost is lower than expected.
- The cost of the new engine testing facility is significantly larger than the Booz/TSP estimate; however it is noted that the description of works in the CIP and the project cost sheet in CIP are inconsistent as the latter allows for a new apron and more extensive runaway. Our estimate is based on the former.

Group	CIP Project Number	Project Name in the DAA's CIP	% Variation	Absolute Variation
Contingency and programme management	CIP 8.200	Programme Management	42	12,500,000
Overlay of existing runway and taxiways	CIP 6.054	Taxiway CL lights and associated stop bars on runway 16/34	78	4,900,000
New engine testing facility	CIP 6.053	Engine Testing Facility	31	4,300,000
Other Projects (costs greater than €5m)	CIP 1.006	Multi-story car park (MSCP)	7	3,000,000
Other Projects (costs greater than €5m)	CIP 5.013	Retail Refurbishment	13	2,250,000
Existing Terminal Maintenance	CIP 7.036	T1 Life Safety System Upgrade	53	2,650,000

In our experience, four factors can be identified as the main drivers for increased costs of construction projects at airports



1 High requirements for materials and design

- The client's requirement for materials and design is for high quality/performance, which drives up the costs
- Many internal stakeholders set requirements on the project but do not necessarily have responsibility for the costs associated with them
- Design is prioritised before costs in some situations
- Difficult to pool the different demands from all the stakeholders which creates a high level of change during all the project phases (including production)

2 Management in detail

- The client manages the project in detail
- The supporting tender documentation (specifications) is extremely detailed and everything is prefixed before a contractor is engaged
- Little freedom for the contractor to implement cost savings

3 Aggravating circumstances

- There exist aggravating circumstances when working in an airport that often increases costs, for example:
  - The regular operations are not to be disturbed (entails work during inconvenient hours)
  - Security and safety regulations
  - Environmental regulations
  - Regulations for documentation

4 Low level of competition

- The competition is low, i.e. the client has a limited pool of experienced contractors from which tenders can be received
- Contractors that don't have an established relationship with the client seldom participate in the tender processes
- Factors impeding competition include:
  - Complex demands when working in the airport (learning curve)
  - Distance to airport

Further analysis would be required to check the impact of these factors on the Dublin Airport Capex unit costs

Executive Summary and Key Findings

Introduction

Approach

Analysis and Findings

Appendices

The Capital Investment Programme presents DAA proposals for capital spend at Dublin Airport for the period 2010 – 2014

DAA CIP Background

- Last CIP, submitted in 2006, outlined a €2 billion programme designed to bring about a step change in the capacity and service levels available at Dublin Airport, following a five-fold increase in passenger numbers over the preceding 15 years.
- The initial investment of €800 million for the period 2010 – 2014 has been reduced in light of the change in expected demand coupled with a downturn in forecast revenues resulting from poorer domestic and international economic conditions.
- The full Transformation programme remains at circa €800 million but it is now appropriate for many of the individual projects be deferred in the short-term, thereby extending the timeframe during which the overall programme will be delivered.

CIP Projects Classification

- The reduced proposed programme for the 2010 – 2014 is divided into three tranches as follows:
  - **Tranche 1: Operational Projects** comprises the minimum spend which is needed to carry out the economic replacement or upgrade of life-expired assets, and to comply with specific regulatory or safety requirements. They are valued at circa €51 million per annum, a spend which equates to circa 2.8% of the Regulated Asset Base.
  - **Tranche 2: Service Delivery** represents the spend required to maintain customer service levels, protect and enhance single till commercial revenues and carry out the planning and design work necessary in order to reduce the lead times required for key items of infrastructure that will form part of future capital programmes. The overall value of the projects contained in this tranche is €139 million.
  - **Tranche 3: Enabling Projects** represents the spend required to enable future growth at Dublin Airport. The total value of the Tranche 3 projects is €353 million.

Booz was commissioned by CAR to assess the unit costs of DAA's capital investment project portfolio at Dublin Airport

Regulated Charges at Dublin Airport

- The CAR regulates the following charges at Dublin Airport (other airport functions are either regulated elsewhere or provided by a competitive market):
  - Runway landing and take-off charges
  - Aircraft parking charges
  - Charges for the use of an air bridge
  - Passenger processing charges
- The Commission uses price cap regulation.

CAR's Statutory Objectives in Setting the Cap

- The efficient and economic development of Dublin Airport
- The ability of the Dublin Airport Authority to operate in a financially viable manner
- The protection of the interests of users and potential users of the airport

Regulatory Building Blocks

Used to derive price cap

- regulatory asset base
- return on an efficient capital stock
- depreciation charge on capital stock
- estimate of efficiently incurred future operating expenditures
- estimate of future commercial revenues

- This requires the CAR to take a view on DAA's Capital Investment Programme

This assessment of capital investment unit costs will contribute to the process to determine airport charges at Dublin Airport

- The assessment of the unit costs of the elements of DAA's Capital Investment Programme (CIP) for projects above €5 million was the task required
- CAR did not require Booz & Co./TPS to assess or comment on the appropriateness of the projects in the CIP, their timing, etc.
- This work feeds into (and is therefore an essential component of) the process to determine airport charges at Dublin airport that will take effect on expiry of the existing determination at the end of 2009.
- A draft determination is scheduled for publication by the end of May 2009 (extended to mid-June). Accuracy of the cost evaluation input is essential as DAA will have the opportunity to respond to the draft determination.

Executive Summary and Key Findings

Introduction

Approach

Analysis and Findings

Appendices

We analysed the CIP using a unit cost approach covering selected DAA projects with a value greater than €5 million

Selected Projects

- We assessed the 32 selected projects (Value €696.8m) as requested within tender documentation from CAR. This includes all projects over €5 million, apart from Terminal 2
- Total capital expenditure of all projects totalled €747.1m as listed in the document *"Capital Investment Programme 2010-2014, Proposals for Consultation"* released by the DAA in late February 2009
- The capital expenditure analysis is therefore limited to selected projects although it considers 95% of the capital expenditure over the period

Information Provided

- The information available on each individual project is included in the DAA CIP document
- Key information within the CIP document focused on:
  - The estimated capital expenditure value of the individual projects.
  - Project timing
  - Project type in terms of facility and / or type of infrastructure development
- We also requested further clarification on the information provided during the assessment period

We classified projects for assessment (i.e. €5m or over in value) into main projects, smaller projects, and project management

Main projects

Group Heading	CIP project no.	Project name in the DAA's CIP	DAA's proposed cost (€)
New runway development	CIP6.051	North Runway Construction works	305,000,000
	CIP6.019	North Runway house buy-out	8,000,000
	CIP6.018	North Runway Fees	4,200,000
New fuel farm	CIP9.024	Fuel Farm Redevelopment	28,800,000
	CIP9.023	Fuel Hydrant System phase 1	6,000,000
Overlay of existing runway and taxiways	CIP6.017	Overlay Runway 10/28	23,000,000
	CIP6.054	Taxiway C L lights and associated stop bars on runway 16/34	6,300,000
	CIP6.055	B7 Taxiway Overlay	3,000,000
Apron works	CIP6.047	New Apron Development	22,700,000
	CIP6.052	Central apron reconstruction	15,000,000
Existing terminal maintenance	CIP7.032	T1 Passenger Processing Enhancements	16,000,000
	CIP7.036	T1 Life Safety System Upgrade	5,000,000
New engine testing facility	CIP6.053	Engine Testing Facility	13,800,000
	CIP6.009	Engine Testing Facility fees only	400,000
Airfield drainage facilities	CIP9.022	Airfield Pollution Control	7,500,000
	CIP9.021	Airfield Drainage upgrade (3km)	3,000,000
	CIP9.019	Divert and Increase Cuckoo Culvert capacity	11,000,000

Smaller projects

CIP1.006 Multi-storey car park (MSCP)	40,500,000
CIP8.001 Operations	40,000,000
CIP5.013 Retail Refurbishments	16,800,000
CIP2.018 Cargo Distribution Centre	14,300,000
CIP7.035 Pier B Connectivity	11,000,000
CIP4.017 Upgrade HBS Dublin	10,800,000
CIP8.008 Corporate IT	10,700,000
CIP7.018 New Pier Design Fees	7,000,000
CIP2.015 DAA Tenant Accomodation	5,000,000
CIP3.035 Internal Secondary Campus Roads Upgrade	5,000,000

Contingency and PM

Programme Management (Tranche 1 - operational)	15,000,000
Programme Contingency (Tranche 1 - operational)	20,000,000
Programme Management (Tranche 2 - service delivery)	10,000,000
Programme Contingency (Tranche 2 - service delivery)	7,000,000
Programme Management (Tranche 3 - enabling projects)	5,000,000

Utilising the data provided, we undertook capital investment analysis to examine the reasonableness of the unit cost data

Approach Summary

Project Kick Off and Confirm Projects	Review and Quantify Scope of Projects	Develop and Compare Cost Estimates	Variance Cost Data Review	Reporting
▪ Clarify scope and approach ▪ Confirm the projects to be reviewed ▪ Set up project administration ▪ Set up project data flows and data requests for follow up queries with DAA	▪ Review details of information provided, covering issues such as capital expenditure timing, definitions, level of contingencies ▪ Develop questions for submission to DAA via CAR ▪ Identify suitable benchmarks e.g. previous projects and published data at unit cost level (€/sq.m.)	▪ Based on our benchmarks and experience, develop independent cost estimates for each selected project ▪ Compare with DAA forecasts ▪ Identify cost variances between our independent estimates and DAA estimates	▪ Determine acceptable differences on a per project basis ▪ Develop explanations and rationale as to the reasons for differences ▪ Where material differences exist, undertaken additional analysis to reexamine our estimate ▪ Finalise the analysis	▪ Develop and finalise our report covering: – Background to the review of capital expenditure – Our analytical approach – Summary of findings – Detailed analysis and capital expenditure comparisons

Our assessment of unit costs included an assessment of the allowance for contingency and other additional costs

LEVEL OF ASSESSMENT

Given the size and number of the projects to be assessed and the timescale available, the level of assessment carried out was necessarily at a relatively high level.

The majority of assessments have been carried out in terms of overall cost/m2 or cost/functional unit. Where this has been impossible or inappropriate some assessments have been carried out using approximate quantities.

Any assessments which show significant discrepancy from the costs included in the CIP may warrant further assessment.

FEES, CONTINGENCY AND PRELIMINARIES

The fees added to each project are for professional design, management and cost control. The level varies dependant on the type, value and complexity of each project as drawn from our historic costs.

Contingency level included also varies with the type, value and complexity of the each project. This has generally been included at 10% but adjusted where appropriate dependant on the level of detail included in the CIP.

Preliminaries have been included separately only where the CIP showed them separately. For these assessments, the comparative cost information excludes preliminaries. For assessments where preliminaries are not show separately in the CIP, the comparative cost information includes preliminaries

Preliminaries are part of the contractors costs when the project starts on site. They cover such things as contractors management and supervisory staff, site accommodation, tools & plant and insurance. They are the things that don't feature as part of the completed project, but do have a cost.

SOURCES OF COMPARABLE COST INFORMATION

The cost information used in the assessment has been taken from the following sources:

- Various Estimates, Cost Plans and Projects at BAA airports provided by our own TPS QS staff.
- Individual projects from TPS Aviation's portfolio of airport redevelopments.
- Davis and Langdon Cost Models for Airports and Airport Terminal 1999, 2008 and 2009.
- Davis and Langdon Cost Model for Car Parks 2007.
- Gardiner & Theobold International Construction Cost Survey 2008.
- Building Cost Information Service - Cost Analyses (The cost information service provided by the Royal Institution of Chartered Surveyors)
- The Bruce Shaw Handbook 2009 (8th Edition).
- Costs/m2 and costs per functional units from published sources.
- Other individual TPS projects relevant to those being assessed.
- Specific costs obtained from specialist suppliers or contractors.

PROJECT AND PROGRAMME CONTINGENCY

Project Contingency is for project related risks. The contingency is added to reflect the limited design details available and the global level of cost estimating/assessment.

Programme contingency is for unknowns that cannot be currently identified but would generate a requirement for a new project or a major change in scope to an existing CIP project. Factors such as infrastructure failure, change of legislation, change to operating procedures and the airlines' changing requirements.

There is no double-counting in allowing for project and programme contingency

An important aspect of our approach was to ensure that our cost benchmarks were adjusted for comparability

ADJUSTMENT OF SOURCE INFORMATION

All source costs have been adjusted to First Quarter 2009, to be comparable with the costs in the CIP. Our chosen source of updating is the Building Cost Information Services All-in Tender Price Index, which currently stands at 238 for 1Q09.

As the majority of our source information is UK based and in £ sterling, we have carried the following adjustments to allow for the location at Dublin Airport:

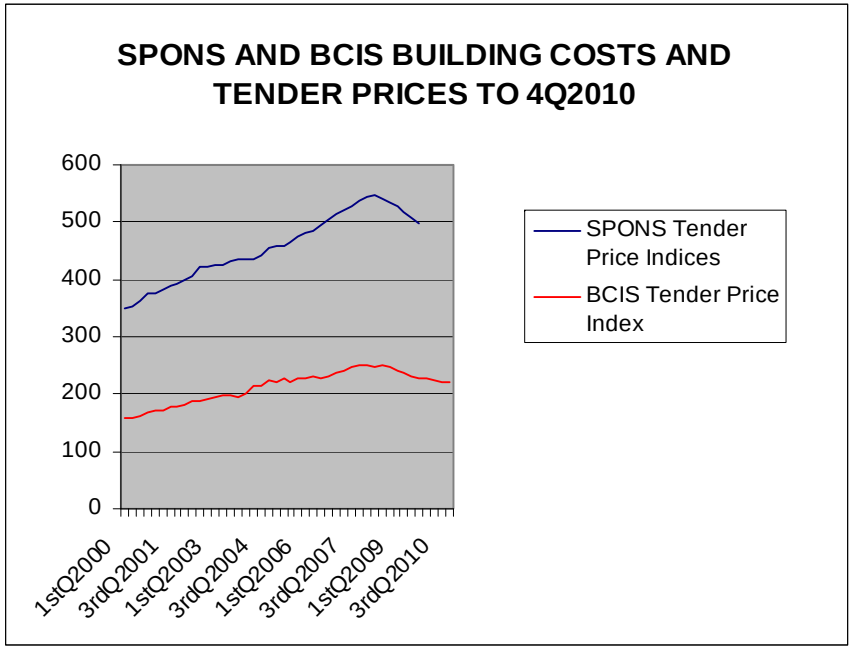
UK to Ireland adjustment - a factor of 0.87 (Bruce Shaw Handbook 2009)

Location factor for Dublin within Ireland - a factor of 1.05 (Bruce Shaw Handbook 2009)

Conversion from £ to € - a factor of 1.10 (BBC Financial Services)

The projection for the BCIS tender price indices is that they will fall for the foreseeable future. The tender price indices included in Spon's A&B Price book also predict a decline, which is steeper than the BCIS.

The graph below shows the projected indices. The length and depth of this reduction in tender prices in an unknown, but given that the CIP spans 2010 to 2014, it will be a significant factor in determining the accuracy of the CIP.



Executive Summary and Key Findings

Introduction

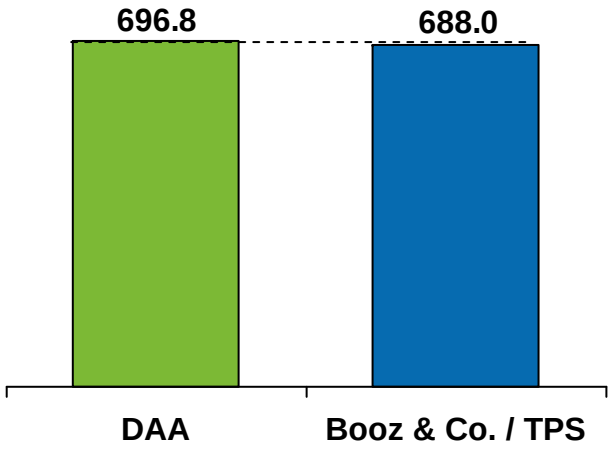
Approach

Analysis and Findings

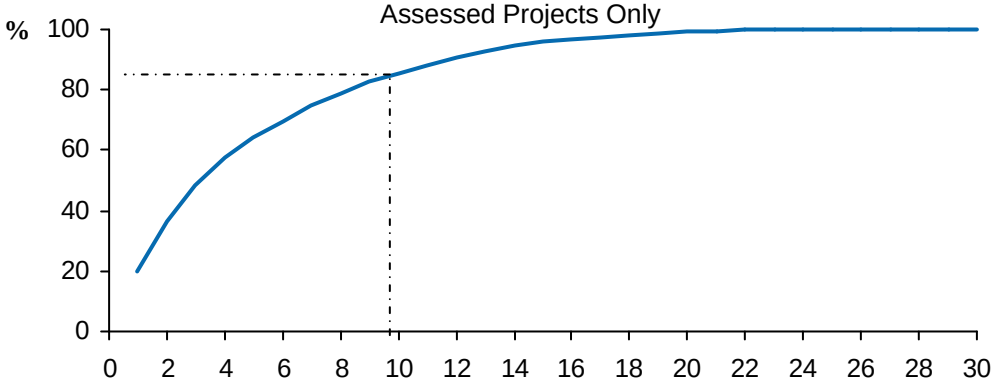
Appendices

Overall DAA's capex unit costs closely match our independent cost analysis, however material variation has been found

Comparison of Total Capex Costs
DAA vs Booz & Co Estimates: Assessed Projects Only



Cumulative Absolute Variation
Assessed Projects Only



Comments

- When the positive and negative cost variations are summed for all of the projects assessed, the total difference in costs is around €9m (1.26%)
- This analysis suggests that it would be difficult to implement any significant cost savings at the programme level
- Our analysis did not examine the need for or scope of any of the individual projects within the CIP. This work is being undertaken as a separate issue by the CAR in consultation with the airport users.
- There may be discrepancies in unit costs for the projects that were not included in this study, which could materially affect overall capex costs. However, these projects have not been considered in this study
- The top ten projects (ranked by absolute unit cost variance) account for around 86% of total absolute variance

Material discrepancies in unit cost are evident at the project group level

Project Group Results

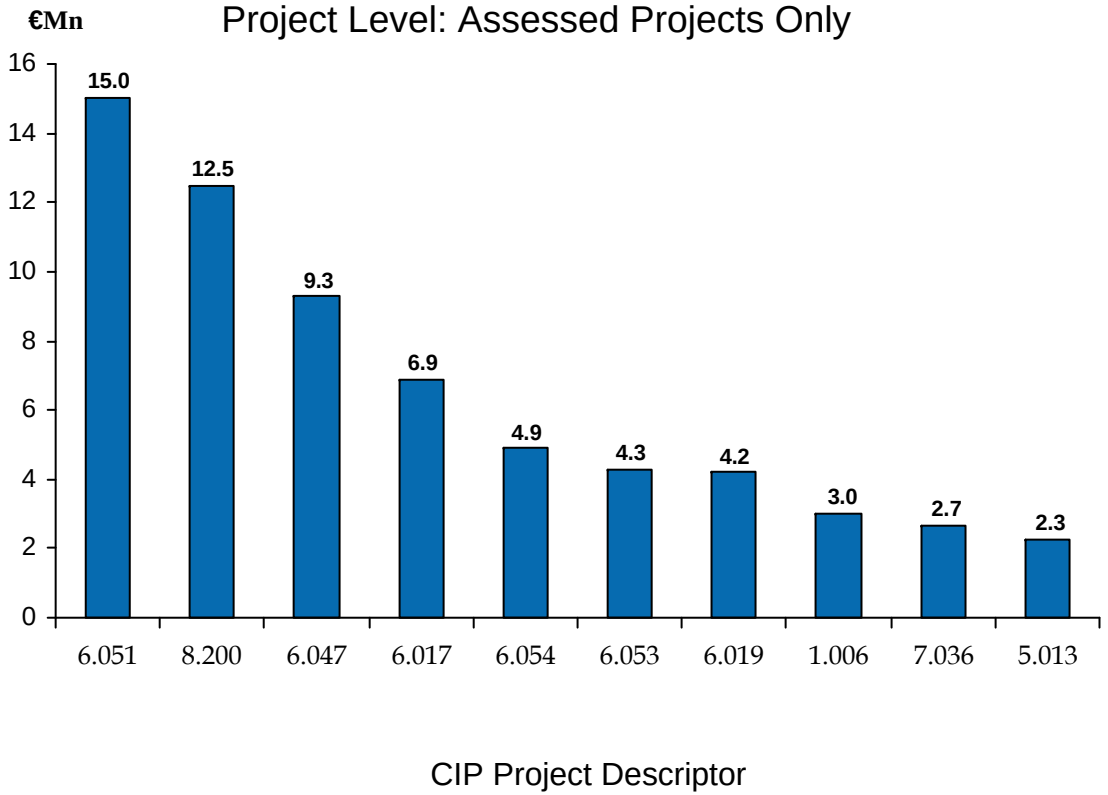
- The key groups that overrun our capex estimate are:
  - Contingency and programme management
  - New engine testing facility
  - Existing terminal maintenance
  - New fuel farm
  - Other projects
- There is also a group of projects whose capex is less than expected. These projects are the following:
  - Airfield drainage facilities
  - Overlay existing runway and taxiways
  - Apron works
  - New runway development
- The overall variation between the proposed DAA cost and Booz estimate is 1.24% which corresponds to around €9 million

Overall Ranking Results by Group

Group	Projects (CIP)	Group	DAA's Proposed cost (€)	Booz/TPS Estimate	% Unit Cost Variance	Unit Cost Variance (when summed)
Contingency and programme management	8.100, 8.200	Contingency and programme management	57,000,000	44,500,000	21.93	12,500,000
Other projects (costs greater than € 5 million)	1.006, 2.015, 2.018, 3.035, 4.017, 5.013, 7.018, 7.035, 8.001, 8.008	Other projects (costs greater than € 5 million)	161,100,000	151,555,000	5.92	9,545,000
New engine testing facility	6.009, 6.053	New engine testing facility	14,200,000	9,660,000	31.97	4,540,000
Existing terminal maintenance	7.032, 7.036	Existing terminal maintenance	21,000,000	18,350,000	12.62	2,650,000
New fuel farm	9.023, 9.024	New fuel farm	34,800,000	32,760,000	5.86	2,040,000
Airfield drainage facilities	9.019, 9.021, 9.022	Airfield drainage facilities	21,500,000	22,780,000	-5.95	-1,280,000
Overlay of existing runway and taxiways	6.017, 6.054, 6.055	Overlay of existing runway and taxiways	32,300,000	34,100,000	-5.57	-1,800,000
Apron works	6.047, 6.052	Apron works	37,700,000	45,800,000	-21.49	-8,100,00
New runway development	6.018, 6.051, 6.019	New runway development	317,200,000	328,500,000	-3.56	-11,300,000
TOTALS / Net Variance		**TOTALS / Net Variance**	**696,800,000**	**688,005,000**	**1.24**	**8,795,000**

The discrepancies in unit costs are concentrated in a small number of individual projects

Top 10 Absolute Unit Cost Variations
Project Level: Assessed Projects Only



Comments

- When looking at individual projects, it is evident that material variations in unit costs are prevalent in a small number of projects

Material variation, some significant, occurs at project group level, notably in contingency and project management costs

Top Individual Projects where the Booz/TPS assessment is less than the DAA estimate

Individual Projects Results

- Largest difference is in the CIP 8.200 (Contingency and Programme Management) assessment.
- The main reason for the higher DAA cost is the assumed level of staffing required for programme management. The DAA figure is much higher than expected, equating to some 40 staff. The Booz/TPS view is that a team of 20 to 25 is a more reasonable staffing level.
- The taxiway CL lights and associated stop bars on runway 16/34 is the second most significant individual contributor. However, the runway and taxiway overlay projects also included in this project group are, in our view, undercosted by DAA, so overall the group cost is lower than expected.
- The cost of the new engine testing facility is significantly larger than the Booz/TSP estimate; however it is noted that the description of works in the CIP and the project cost sheet in CIP are inconsistent as the latter allows for a new apron and more extensive runaway. Our estimate is based on the former.

Group	CIP Project Number	Project Name in the DAA's CIP	% Variation	Absolute Variation
Contingency and programme management	CIP 8.200	Programme Management	42	12,500,000
Overlay of existing runway and taxiways	CIP 6.054	Taxiway CL lights and associated stop bars on runway 16/34	78	4,900,000
New engine testing facility	CIP 6.053	Engine Testing Facility	31	4,300,000
Other Projects (costs greater than €5m)	CIP 1.006	Multi-story car park (MSCP)	7	3,000,000
Other Projects (costs greater than €5m)	CIP 5.013	Retail Refurbishment	13	2,250,000
Existing Terminal Maintenance	CIP 7.036	T1 Life Safety System Upgrade	53	2,650,000

Executive Summary and Key Findings

Introduction

Approach

Analysis and Findings

Appendices

TPS Report: Individual Assessments

Data Sources

CIP Ref 1.006: Multi Storey Car Park

Information from CIP

Total Project Capital Exp (including € 22.6m historic spend) CIP 2010-2014 includes €40,500,000	€ 63,100,000
Functional Unit (car park spaces)	2,162
Cost per car park space (incl fees and contingency)	€ 29,186
Contingency Costs	8%
Abnormals (see assumptions)	€19,900,000

Comparative cost information – per car park space

From previous projects	€ 11,500 - 14,000
From Davis & Langdon Airports Cost Model	€ 10,750 - 18,500
From BCIS Cost Analysis	€ 8,800 - 16,500
Published price data	€ 10,900 - 18,200

(above figures all include fees and contingency)

From the various comparative cost data above the cost for multi-storey car parks is in the range of €7,600 - 16,000 per car park space. This is quite a wide range and reflective of the different requirements of multi storey car parks at different locations. The requirements of the MSCP at Dublin airport will be in excess of the requirements of a city centre car park in terms of lighting, space per bay and general quality of finish. Compared to the state of the existing MSCP Blocks, which are due for refurbishment, we understand the new MSCP will represent a significant improvement on the existing facilities. This would all suggest the cost should be towards the top of the stated range. However, the cost in the CIP is significantly in excess of the top of the range. It is difficult to substantiate the cost per car park space included in the CIP unless it included for basement car parks including mechanical ventilation.

Assumptions made during the cost assessment:

- All costs are based on 2,162 car park spaces
- Costs relate only to the multi storey car park, not the integrated hotel
- There is €19.9m for abnormals referred to in the CIP, comprising € 7.4m (not annotated) € 1.1m (Section 49 Metro Planning) and € 11.4 (Land, Fees & DAA costs) which has not been assessed. It has been included in our total below to achieve a proper comparison.

€57,400,000 (TPS estimate) v €63,100,000 (DAA estimate)

Summary

2,162 spaces	€ 32,500,000
Fees 5%	€ 1,600,000
	€ 34,100,000
Contingency 10%	€ 3,400,000
	€ 37,500,000
Abnormals (see above assumptions)	€ 19,900,000
Total	€ 57,400,000

Given there is €40,500,000 expenditure in CIP 2010-2014 of total project expenditure €63,100,000, if we reduce our €57,400,000 in the same ratio to assess the expenditure in CIP 2010-2014, we get €36,800,000.

Our assessment suggests that the cost in the CIP for expenditure in 2010-2014 is more than would be expected.

The cost of this car park should be in the region of €37,500,000 (allowing €17,345 per car park space) plus abnormals.

CIP Ref 2.015: DAA Tenant Accommodation

Information from CIP

Cost included in CIP	€ 5,000,000
Cost/m2 (including fees and contingency)	€ 600 - 1,500
Approximate potential area which could be refurbished within the given budget	3,300 - 8,300 m2
Contingency Costs	13%

Unable to comment on total budget because the actual area to be refurbished is an unknown.

Comparative cost information – cost/m2

From Davis & Langdon Office Refurbishment Cost Model	
Minor Refurbishment	€ 300 - 800
Medium Refurbishment	€ 800 - 1,400
Major Refurbishment	€ 1,400 -2,000
From Davis & Langdon Airport Cost Model	
New Build Air Conditioned Office	€ 1350 - 1750
From BCIS Cost Analysis	
Minor Refurbishment	€ 300 - 850
Medium Refurbishment	€ 850 - 1,200
Major Refurbishment	€ 1,200 - 1,500
Published price data	€ 500 - 700
Other Sources (Aylesbury Office Block)	€ 1,200

From the various comparative cost data above, the cost of refurbishment is in the range of €300 - 2,000/m2. This is a very wide range and reflective of the different levels and extent of refurbishment. Referring to the Davis & Langdon Office Refurbishment Cost Model, the aim of a major refurbishment is to deliver a top grade space while maintaining the building's advantages such as a distinctive façade and we believe that this is in excess of Dublin Airport's requirements. In effect this reduces the applicable range to € 300 - 1,500/m2.

Assumptions made during the cost assessment:

- No particular areas can yet be identified for these refurbishment works.
- There is range of refurbishment levels required, but the level of high quality projects is limited.

3,600 - 11,000m2 (TPS estimate) v 3,300 - 8,300m2 (DAA estimate)

There are two relevant points to highlight in relation to the range of costs in the CIP:

- For some projects, the level of refurbishment may well fall below the €600/m2 level.
- Refurbishment works carried out in excess of around €1,300/m2 are still of high quality and would probably include air-conditioning. The scope of works suggests that this level of quality refurbishment may not be required too often.

From the Davis & Langdon Airport Cost Model it's possible to build good quality new office space with air conditioning for between € 1350 - 1750/m2.

Given all of the above, the range of refurbishment costs could be reduced to € 400 - 1,200/m2. This would better reflect a greater amount of refurbishment in the minor and medium categories.

Our assessment suggests that the range of cost/m2 in the CIP is more than would be expected.

The range should be in the region of € 400 – 1,200/m2, excluding fees and contingency. Including fees and contingency, this would be € 460 – 1,390/m2

The potential area of refurbishment at our reduced rates would increase to 3,600 - 11,000m2

CIP Ref 2.018: Cargo Distribution Centre

Information from CIP

Cost included in CIP	€ 14,300,000
Functional units - warehousing	11,400 m2
- office/welfare facilities	600 m2
- new apron	24,000 m2
- security post	1 nr
Cost/m2 - unable to split between warehouse and apron	
Contingency Costs	8%

Comparative cost information – warehouse including office/welfare – new build cost/m2

▪ From Davis & Langdon Airports Cost Model	€ 650 – 1050
▪ From BCIS Cost Analysis	€ 550 – 850
▪ Published price data	€ 400 – 650
▪ Other Sources (Project Evaluation of storage facility at Humberside International Airport)	€ 650

The above costs represent a new build project. Without knowing the full extent of the planned refurbishment or the condition of the existing hangar/warehouse it is difficult to apply a particular rate to this project. However, if we assume the level and quality of the refurbishment will be approximately 65% of the new build cost and that the project will be above the middle of the range stated, say €750/m2, the new warehousing facilities will be in the region of €5,850,000

Comparative cost information - aprons - cost /m2

▪ From previous projects	€ 225
▪ From Davis & Langdon Airports Cost Model	€ 95 - 190
▪ Published price data	€ 100 - 185
▪ Other Sources (Project Evaluation of additional) aprons at Humberside International Airport)	€ 215

The range of costs above can be narrowed down by our knowledge of the project at Humberside International Airport and previous projects at Heathrow. The cost of the new aprons will be in the region of €5,280,000 at a rate of € 220/m2

Assumptions made during the cost assessment:

- Level of refurbishment required is approximately 65% of new build.
- Security post is an assumed figure of €100,000.

€13,100,000 (TPS estimate) v €14,300,000 (DAA estimate)

Security Post
There are no details on the scope of this building. It could be a prefabricated booth/kiosk or a more substantial building. We have included a sum of €100,000.

Summary

Refurbished warehousing including offices and welfare	€ 5,850,000
New Aprons	€ 5,280,000
Security Post	€ 100,000
	€ 11,230,000
Fees 6%	€ 670,000
	€ 11,900,000
Contingency 10%	€ 1,200,000
Total	€ 13,100,000

Our assessment suggests that the cost in the CIP is of the right magnitude.

CIP Ref 3.035: Internal Secondary Campus Road Upgrade

Information from CIP

Cost included in CIP	€ 5,000,000
Total area to be upgraded (m2)	22,500
Cost per m2 for overlays	€ 90
Cost per m2 for complete reconstruction	€ 175
Preliminaries	15%
Contingency Costs	15%

The split between overlay and complete reconstruction included in the CIP is unknown. It should also be noted that CIP includes reference to provision for future upgrades of roads not yet identified.

Comparative cost information - Overlays per m2

From previous project	€ 90
From Davis & Langdon Urban Design & Infrastructure Cost Model	
Urban Location	€ 125 - 165
Published price data	
Civils projects	€ 110 - 140
Building projects	€ 80 - 100

From the various comparative cost data above, the cost of overlaying the internal roads is in the range of € 80 - 165/m2. Given the nature and use of the roads at an airport and in particular the limitations and restrictions imposed, it was anticipated that the costs in the CIP would be towards the higher end of the range. Given that the CIP costs are only just above the lower end of the range, we feel it could be justified increasing the cost of complete reconstruction to around € 120/m2

Comparative cost information - Complete reconstruction per m2

From previous confidential project	€ 175
From Davis & Langdon Urban Design & Infrastructure Cost Model	
Urban Location	€ 250 - 325
Published price data	
Civils projects	€ 220 - 275
Building projects	€ 160 - 200

From the various comparative cost data above, the cost of the complete reconstruction of the internal roads is in the range of € 160 - 325 / m2. Given the nature and use of the roads at an airport and in particular the limitations and restrictions imposed, it is anticipated that the costs in the CIP would be towards the higher end of the range. Given that the CIP costs are only just above the lower and of the range, we feel it could be justified increasing the cost of complete reconstruction to around € 225/m2

CIP Ref 3.035: Internal Secondary Campus Road Upgrade

Assumptions made during the cost assessment:

Assumptions made during the cost assessment:
- Overlay is assumed to be 75% of total area
- Complete reconstruction is assumed to be 25% of total area
- No allowance included for future upgrades not yet identified

€4, 930,000 (TPS estimate) v €5,000,000 (DAA estimate)

Summary

Overlay		€ 2,025,000
Complete reconstruction		€ 1,520,000
		€ 3,545,000
Preliminaries (15%)		€ 530,000
		€ 4,075,000
Fees 10%		€ 405,000
		€ 4,480,000
Contingency 10%		€ 450,000
	Total	€ 4,930,000

With an assumption that 25% of the total area is complete reconstruction our assessment suggests that the cost in the CIP is of the right magnitude

CIP Ref 4.017: Upgrade HBS Dublin

Information from CIP

Cost included in CIP	€ 10,800,000
Cost per machine	€ 700,000 for Computer Tomography (CT) € 232,000 for MVT (multi view tomography)
Contingency Costs	15%

Comparative cost information – cost/m2

From previous projects:

Hold baggage screening (HBS) Level 1&2	€390,000
HBS Level 3	€1,225,000

From Davis & Langdon Airport Cost Model:

X ray MVTHR scanner	€ 200,000
CT Examiner	€ 600,000

Assumptions made during the cost assessment:

Build up of CIP cost is unclear. Project cost sheets refer to 15 Nr X ray machines at approx € 500k per machine. Answers to queries refer to € 700k for CT machines and € 232k for MVT machines.

€ 11,275,000 (TPS estimate) v €10,800,000 (DAA estimate)

Summary

Given the contradiction highlighted in the assumptions above, we have assumed the worse case and allowed for 15 Nr CT machines

15 CT machines (@ € 650k each)		€ 9,750,000
Fees 5%		€ 500,000
		€ 10,250,000
Contingency	10%	€ 1,025,000
	Total	€ 11,275,000

Our assessment suggests the cost in the CIP is of the right magnitude.

CIP Ref 5.013: Retail Refurbishments

Information from CIP

Cost included in CIP	€ 16,800,000
Area to be refurbished	6,800 m2
Cost/m2 (including fees and contingency)	€ 2,470
Contingency Costs	12%

Comparative cost information – cost/m2 (excluding fees and contingency)

From Davis & Langdon Retail Refurbishment Cost Model

Limited Refurbishment	€ 950 - 1,350
Comprehensive Refurbishment	€ 1,150 - 1,700

From Davis & Langdon Retail Refurbishment Cost Model

New Build Shopping Centre / Mall; Comfort Cooled	€ 2,850 - 4,100

From BCIS Cost Analysis

Minor Refurbishment	€ 850 - 1,300
Medium Refurbishment	€ 1,300 - 1,750
Major Refurbishment	€ 1,750 - 2,200

Published price data	€ 660 - 810

From the various comparative cost data above, the cost of refurbishment is in the range of €660 - 2,200/m2. This is quite a wide range and reflective of the different levels and extent of retail refurbishment options. These figures suggest the cost in the CIP is right at the top of this range.

From the Davis & Langdon Retail Refurbishment Cost Model it's possible to build good quality new retail space with air conditioning for between € 2,850 - 4,100/m2. This would reinforce the view that the cost in the CIP is higher than would be expected.

Assumptions made during the cost assessment:

- There is a range of refurbishment levels required, but the level of high quality projects is limited due to the scope of works required.

€14,550,000 (TPS estimate) v €16,800,000 (DAA estimate)

An important point to highlight is that, as described within the CIP itself, usually the airport operator is only responsible for the basic infrastructure of the shops and the concessionaires are responsible for the entire shop fit out. The CIP points out that 'fit out capital costs at concession units are much lower than for the airport operator'. This does not appear to be reflected in the CIP cost/m2.

Within the airport terminal it is likely that there will be costs across all of the € 660 - 2,200/m2 range. Given all of the above, costs at the higher end of this range should be more than sufficient for any retail refurbishment within the airport. Assuming there are a range of projects spread across this range, the average figure should be in the region of € 1,800/m2 (excluding fees and contingency)

Summary

6,800m2	€ 12,240,000
Fees 8%	€ 980,000
	€ 13,220,000
Contingency 10%	€ 1,330,000
Total	€ 14,550,000

Our assessment of cost is lower than the CIP and the cost of this project should be in the region of € 14,550,000, allowing € 2,139/m2 (including fees and contingency), which still provide a budget for high quality retail refurbishment. Our estimate would be lower if we assumed a lower level of refurbishment.

CIP Ref 6.017: Overlay Runway 10/28

Information from CIP

Cost included in CIP	€ 23,000,000
Functional Unit - runway overlaid	173,000m2
Cost per m2 (including fees, contingency and allowance for replacement slabs)	€ 133/m2
Contingency Costs	12%

Comparative cost information – cost/m2

From previous projects	€ 70
From Davis & Langdon Airports Cost Model	€ 95-190
Published price data	€ 100 - 185
Other Sources	
Major resurfacing: Glasgow, Jersey, Edinburgh, Heathrow S	€ 125 – 160
Major resurfacing: Luton (2006), Bristol (2007)	€ 128 – 145

Given the nature of this project and the number of specific projects we have to draw information from, though we have given rates from the cost models and published price data we have not used them as the prime source in assessing this project.
The minor and intermediate resurfacing projects are not applicable to this scope of this particular project.

The range for major resurfacing can be refined with particular reference to resurfacing projects at Bristol and Luton. These two projects cost €128 and €145/m2 respectively and the works are comparable to the proposed overlay at Dublin. The average of these two is €137/m2 excluding fees and contingency. The cost of €133/m2 in the CIP includes fees and contingency and is therefore less than expected.

It should be noted that the CIP also includes reference to 'replacement of defective slabs where necessary'. The exact extent of the defective slabs is unknown, but as many as 130 have been identified by DAA. Given the above, the €133/m2 is insufficient for the overlay of the runway and would not allow the replacement of any defective slabs.

Assumptions made during the cost assessment:

3750m2 of defective slabs taken from CIP project cost sheets

€26,600,000 - €31,500,000 (TPS estimate) v €23,000,000 (DAA estimate)

Summary

Low end of range (Bristol)	
173,000m2 overlay	€ 21,100,000
3750m2 replacement slabs	€ 975,000
	€ 22,000,000
Fees 10%	€ 2,200,000
	€ 24,200,000
Contingency 10%	€ 2,400,000
Total	€ 26,600,000
High end of range (Luton)	
173,000m2 overlay	€ 25,000,000
3750m2 replacement slabs	€ 975,000
	€ 26,000,000
Fees 10%	€ 2,600,000
	€ 28,600,000
Contingency 10%	€ 2,900,000
Total	€ 31,500,000

Our assessment suggests that the cost in the CIP is less would be expected.

DAA's cost appears to be very competitive and we consider a value towards the higher end of the Luton/ Bristol range might be more appropriate.

CIP Ref 6.018: North Runway Fees

Information from CIP	
Cost included in CIP	€ 4,200,000
Construction cost of North Runway	€ 305,000,000
Contingency Costs	0%

Comparative cost information – fees		
Design for planning (10% of detailed design)		€ 220,000
Planning Consultants with environmental support		€ 440,000
Detailed design fee		€ 2,200,000
Cost Consultancy		€ 500,000
Project Management		€ 500,000
Enabling works design		€ 500,000
	Sub Total	€ 4,360,000
Contingency		
5% for design, cost and project management		€ 218,000
25% for planning		€ 110,000
	Total	€ 4,688,000

Assumptions made during the cost assessment:

- The cost of the North Runway is in the order of € 305,000,000 as detailed in CIP 6.051

€4,700,000 (TPS estimate) v €4,200,000 (DAA estimate)

Our assessment suggests that the cost in the CIP is slightly less than would be expected.

The cost of this project should be in the region of € 4,700,000

However it should be noted that the 25% contingency for planning consultancy work to take the project through to a revised application for the 3,660m runway may be insufficient. If this is a controversial application then there may be additional fees (including legal ones) to proceed to a successful outcome.

CIP Ref 6.019: North Runway House Buyout

Information from CIP

Cost included in CIP € 8,000,000

Mitigation for the north runway includes a voluntary house buy-out scheme for residents whose house lies within the 69 dBA Leq 16 hour noise contour. This projects allows for advance purchase of houses which come on the market.

Subsequent information from DAA:
•Number of houses within 69 dBA contour for 3660m runway is 45
•The increase in houses affected compared with 3110m runway is 6
•The average house price assumed is €728,000, so DAA expecting to buy 11 houses in advance
•Ultimate house buyout costed at over €32 million

Comparative cost information

Noise contour maps at sufficient detail to identify the specific properties affected have not been provided. The areas affected contain dispersed houses, varying in size and quality. There are 9 houses on the market in St Margaret's and the neighbouring areas of The Ward and Cloughran. Asking prices range from €400,000 (2-bed cottage) to €1,500,000 (5-bed house with pool etc). The average asking price is €766,000.

Selling price is reported to be 15% below asking price at present, implying the average selling price at €650,000. Commentators (Sunday Independent 12 April 2009) now expect house prices not to rise until 2011, mid-way through the 2010-2014 period.

Given the currently stagnant property market, the number of properties coming onto the market may be less than the 11 (or 25% those affected by the 3660m runway) estimated by DAA.

Assumptions made during the cost assessment:

It would be prudent to only buy houses affected by the runway proposal for which the DAA currently has permission, not for the longer runway proposal, so the cost allowed should be based on the 3110m runway, not the 3660m runway proposal.

The average house price is too high, given that houses are selling below asking price.

The proportion of houses required that come on the market should be revised downwards to reflect current property market.

DAA's estimate of the number of properties affected by the 3110m (39) is correct (it fits with noise contour information contained in the planning application), but it is noted that residents of the St Margarets area anecdotally mention 15-20 houses.

€3,800,000 (Booz estimate) v €8,000,000 (DAA estimate)

Summary

Average house price	€ 650,000
No. in 69 DBA Leq contour for 3110m runway	39
Total buyout for 3110m runway	€ 25,350,000
Advance purchase of 15%	**€ 3,800,000**

In summary, our assessment is that the DAA estimate should be reduced from €8,000,000 to around €3,800,000

CIP Ref 6.047: New Apron Development

Information from CIP

Cost included in CIP	€ 22,700,000
Functional Unit – aircraft parking	71,651m2
Cost per m2 (including fees and contingency)	€ 317/m2
Contingency Costs	12%

Comparative cost information – Apron cost/m2

From previous projects	€ 225
From Davis & Langdon Airports Cost Model	€ 95 - 190
Published price data	€ 100 - 185
Other Sources (Project Evaluation of storage facility at Humberside International Airport)	€ 215

The range of costs above can be narrowed down by our knowledge of the project at Humberside International Airport and previous projects at Heathrow. The cost of the new aprons will be in the region of €16,000,000 at a rate of € 220/m2

Comparative cost information – other items

AGL	€ 270/m
Power/lighting/barriers	€ 380k/stand
Breaking up existing aprons	€ 30 - 50/m2

Assumptions made during the cost assessment:

- Approximately 1800 linear metres of AGL included.
- Complex planning and multiple phases will be required.
- Substantial breaking up of existing taxiways and apron required.

€32,000,000 (TPS estimate) v €22,700,000 (DAA estimate)

Breaking up existing	€ 3,600,000
New Apron	€ 16,000,000
AGL	€ 380,000
Power/lighting to each stand	€ 5,000,000
	€ 24,980,000
Fees 6%	€ 1,640,000
	€ 26,620,000
Contingency 20% (to reflect complexity of project)	€ 5,380,000
Total	€ 32,000,000

Our assessment would suggest that the cost in the CIP is significantly less than would be expected.

The cost of this project should be in the region of € 32,000,000.

The notes in the CIP make no reference to the breaking up of approximately 90,000m2 existing taxiway/apron. It is also not apparent from the CIP that this is a very complex project which will require careful planning and multiple phasing. The CIP gives the impression of a new apron, on a 'greenfield' site with little disruption to the airport's daily operation. This will not be the case. If it were, the €22,700,000 in the CIP would be much more appropriate.

CIP Ref 6.051: North Runway Construction Works

Information from CIP

Cost included in CIP	€ 305,000,000
Functional Unit – Runway	3660m
Contingency Costs	12%

Comparative cost information - SWK Cost Plan June 2007 for new runway at Dublin Airport

Total Project Cost at 2Q05 for 3110m runway, including fees and contingency	€ 202,000,000
Updating to 1Q09	€ 9,000,000
	€ 211,000,000
Increase for 3660 runway length	€ 37,000,000
	€ 248,000,000
Less €4m in fees included in CIP 6.018	€ 4,000,000
	€ 244,000,000

Based on the information in the SWK Cost Plan, the cost of the new north runway should be in the region of €244,000,000

Comparative cost information – Stansted Airport Second Runway Overall Costs

Construction costs at 3Q05 for 3068 runway		€113,500,000
Additional items not included in the above:		
NAVAIDS	5,000,000	
Fencing and crash gates	1,100,000	
HV Ring main	400,000	
HV substations	600,000	
Fire hydrant	500,000	
Pumping stations	300,000	
Perimeter roads	3,400,000	
Road diversions	2,300,000	
Planting	400,000	
Development contribution	21,500,000	
Tower modifications	5,600,000	
Offsite landscaping	3,000,000	
Radar modifications	1,000,000	
Displaced facilities	3,000,000	
Other highways works	2,500,000	
Other mitigation	3,000,000	
Sub Total	€ 53,600,000	
		€ 167,100,000
Update to 1Q09		€ 12,900,000
		€ 180,000,000
Increase for 3660 runway length		€ 35,000,000
		€ 215,000,000
Fees 10% (less €4m included in CIP 6.018)		€ 17,500,000
		€ 232,500,000
Contingency 15%		€ 35,000,000
		€ 267,500,000

Based on the information from Stansted Second Runway, the cost of the new north runway should be in the region of €267,500,000

CIP Ref 6.051: North Runway Construction Works

Comparative cost information – Manchester Runway 2 Overall Costs

Total project cost at 1Q97 for 3050m runway, Including partial fees and contingency		€ 172,000,000
Update to 1Q09		€ 108,000,000
		€ 280,000,000
Increase for 3660m runway length		€ 56,000,000
		€ 336,000,000
Less 'abnormals' included in Manchester not applicable to Dublin		
Diversion of River Bollin and infilling of Bollin Valley. Dismantling and rebuilding elsewhere of listed buildings. Relocation of newts and bats. Draining all AGL pits Ecological/environmental/security issues		€ 35,000,000
		€ 301,000,000
Add Additional taxiways for New North Runway		€ 15,000,000
compared to Manchester		€ 316,000,000
Fees 5% (Contract management, site supervision and cost control only - design is included. Also less €4m included in CIP 6.018)		€ 12,000,000
		€ 328,000,000
Contingency 3.5% (reflects 'tender' quality of source information)		€ 11,500,000
	Total	€ 339,500,000

Based on the information from Manchester Runway 2, the cost of the new north runway should be in the region of €339,500,000

Assumptions made during the cost assessment:

- See comparative cost information for each source project.

€300,000,000 to € 340,000,000 (TPS estimate) v € 305,000,000 (DAA estimate)

Based on Stansted the cost of the new north runway should be in the region of € 267,500,000.
Based on Manchester the cost of the new north runway should be in the region of € 339,500,000.
Based on SWK Cost Plan the cost of the new north runway should be in the region of € 244,000,000, although this would need to be increased slightly to allow for a road tunnel which we understand may be required.

Given the global level of this assessment and the scale of any new runway project, we feel this range of costs is a better way to express our assessment than a specific figure.
It is relevant to point out that the information used from the Manchester project are real tendered costs on a project which proceeded to completion and was in fact the last major new runway project in the UK.
Costs from Stansted and SWK Cost Plan are only estimates and though they represent the best information available they are still only untested theoretical estimates.

As such we would give the assessment based on the Manchester information more credence than the Stansted and SWK assessments.

As result we would assess the total cost for the new North Runway at Dublin to be in the region of € 300,000,000 to € 340,000,000 and o**ur assessment suggests that the cost in the CIP is at the lower end of the expected range.**

A figure of €320,000,000 mid way in the range is taken forward.

CIP Ref 6.052: Central Apron Reconstruction

Information from CIP	
Cost included in CIP	€ 15,000,000
Functional Unit – new apron	42,000m2
Cost per m2 (including fees and contingency)	€ 357/m2
Contingency Costs	10%

Comparative cost information – aprons - cost/m2 (excluding fees and contingency)	
From previous projects	€ 225
From Davis & Langdon Airports Cost Model	€ 95 - 190
Published price data	€ 100 - 185
Other Sources (Humberside International)	€ 215

The range of costs above can be narrowed down by our knowledge of the project at Humberside International Airport and previous projects at Heathrow. The cost of the new aprons will be in the region of €9,250,000 at a rate of € 220/m2

Comparative cost information -other items	
AGL	€ 270/m
Breaking up existing aprons	€ 30 - 50/m2
High mast lighting (for approx 8500m2)	€ 70,000

Assumptions made during the cost assessment:

- Approximately 350 linear metres of AGL included

€13,800,000 (TPS estimate) v €15,000,000 (DAA estimate)

Breaking up existing aprons		€ 1,700,000
New Apron		€ 9,250,000
AGL (Pier A to Piers D)		€ 100,000
Highmast lighting		€ 350,000
		€ 11,400,000
Fees 10%		€ 1,150,000
		€ 12,550,000
Contingency 10%		€ 1,250,000
	Total	€ 13,800,000

This would suggest that the cost in the CIP is of the right magnitude.

CIP Ref 6.053: Engine Testing Facility

Information from CIP

Cost included in CIP		€ 13,800,000
Functional Unit	- facility for Boeing 747-400	1Nr
	- access taxiway	300m
	- washdown facility	
Cost per m2		€ n/a
Contingency Costs		12%

Comparative cost information – engine test/GRE's

Blast Deflectors Inc	€ 5,300,000
Noise barriers/Sound reduction walls	€ 800/m2

Comparative cost information – other items

Refurbishment to existing apron	€ 70 – 135/m2
New taxiway	€ 95 – 220/m2
Lighting to new taxiway	€ 135 – 270/m

Assumptions made during the cost assessment:

- New taxiway is 23m wide.
- Ugrading the existing apron and the GRE are 100 x 80m
- AGL required to taxiway
- Floodlighting required to GRE
- Location of GRE requires no demolition of existing buildings, stands or taxiways etc

€9,500,000 (TPS estimate) v €13,800,000 (DAA estimate)

Summary

Blast Deflectors Inc incl foundations	€ 5,600,000
Refurbishment to existing apron	€ 800,000
New taxiway	€ 1,400,000
AGL and flood lighting	€ 150,000
Washdown facility	€ 500,000
	€ 8,450,000
Fees (5% - on project value less specialist costs i.e. €8.45m less €5.3m. Also note further fees are included CIP 6.009)	€ 160,000
	€ 8,610,000
Contingency	€ 890,000
Total	€ 9,500,000

The CIP refers to re-use of the west apron for this new facility with a new 300m taxiway. The project cost sheet appears to refer to a new apron and an upgrade of over 13,600m2 of taxiway, which is inconsistent with the CIP. Our assessment is based on the information included in the CIP.

Our assessment suggests that the cost in the CIP is higher than what would be expected. In our view, the cost of this project should be in the region of €9,500,000. If a taxiway is required, it will cost more.
It is noted that the €13,800,000 in the CIP appears to include approximately €4,000,000 for upgrading 13,600m2 of taxiway that is not referred to in the scope of works described in the CIP.

CIP Ref 6.009 Engine Test Fees

Information from CIP

Cost included in CIP	€ 400,000
Construction cost of engine test facility	€ 13,800,000
Fees as percentage of construction cost	2.9% (€400k)
Note that pre 2010-2014 CIP expenditure of €245k has already been incurred	1.8% (245k)
Note that CIP 6.053 Engine Test Facility also includes €556k for design & management fees.	4% (€556k)

Total fee for this project is 8.7% of €13,800,000 which totals €1,200k

Comparative cost information - fees

It is important to note that the fees for this particular project will be split into two parts. We would expect that the engine test facility blast deflectors will be designed by the specialist providing them and that these costs are subsumed within their supply and erect costs. The remaining apron, taxiway and other works will be designed separately and a separate fee allowance will be required for this.

The cost of the engine test facility has been assessed at € 8,450,000, excluding fees and contingency, under CIP 6.053

Assumptions made during the cost assessment:

- The Engine Test Facility estimated at € 13,800,000 in CIP 6.053 has been assessed as a € 9,500,000 project. The assessment of CIP 6.009 has been undertaken using this reduced figure.

€160,000 (TPS estimate) v €400,000 (DAA estimate)

From the assessment in CIP 6.053, the cost of the specialist installation element of the engine testing facility is approx €5,300,000. Given that this includes for specialist design, the cost of the remaining work to which fees should apply is only €3,150,000.

The remaining design work for this project appears reasonably straight forward, we would expect this fee for the remaining works to be in the order of 10%. We have included 5% fees for construction supervision and contract administration within the assessment of CIP 6.054, leaving the remaining 5%, or €160,000, to be allocated here.

This is significantly less than the €400,000 included for Expenditure in the Current CIP.

Using our assessment of the value of CIP 6.053 This would suggest that the cost in the CIP is higher than what would be expected.

CIP Ref 6.054: Taxiway Centreline Lights & Associated Stopbars

Information from CIP

Cost included in CIP Includes approx €3.2m for AGL equipment & €1.8m for AGL civil work excluding fees and contingency	€ 6,300,000
Functional Unit -	n/a
Cost per m2	€ n/a
Contingency Costs	12%

Comparative cost information – other items

Previous projects € 135 - 270/m
or € 1,600 – 2,300 each light

Using the rates above, as we have on other assessments, gives a project cost of € 1,400,000. This is significantly less than the cost included in the CIP.

Further comparison with the following overall AGL projects also appears to confirm that the cost in the CIP is excessive.

SWK Cost Plan for New Runway at Dublin Airport – new AGL installation complete	€ 2,300,000
Isle of Man runway and taxiways – replacement of AGL equipment only excluding civils work	€ 1,500,000

These projects indicate that €6,300,000 for centreline lights on 4,800m of taxiway is also excessive.

It is possible that the scope of works and cost included in the CIP are not consistent with the details on the project cost sheet.

Assumptions made during the cost assessment:

- No removal of existing AGL required
- Approximately 550 Nr lights required
- Approximately 4,800m of taxiway

€1,400,000 (TPS estimate) v €6,300,000 (DAA estimate)

In any case, there are some significant points to be made about the cost build up included on the project cost sheet.

The project cost sheet includes € 924,930 for new stop bars. The total for this item in our assessment is around €100,000.
The project cost sheet refers to the supply of primary cable at € 2,004/km. This item is priced at €438,094 which means there are almost 219km of primary cable included in the project.
The project cost sheet refers to supply of CCR's totalling € 392,256, which suggests there are an excessive number of CCR included in the project.

Summary

AGL	€ 1,100,000
Fees 10%	€ 110,000
	€ 1,210,000
Contingency 15%	€ 190,000
Total	€ 1,400,000

This would suggest that the cost in the CIP is higher than what would be expected.

Given the scope in the CIP, in our view, the cost of this project should be in the region of €1,400,000.

CIP Ref 6.055: B7 Taxiway Overlay

Information from CIP

Cost included in CIP	€ 3,000,000
Functional Unit - taxiway overlaid	590m
Cost per m	€ 5,085
Cost/m2 (including fee and contingency)	€ 203
Contingency Costs	12%

Assumptions made during the cost assessment:

- Taxiway area is 15,000m2
- Replacement of 2.5% of slabs
- Removal and re-use of existing AGL

Comparative cost information – cost/m2

From previous projects	€ 70
From Davis & Langdon Airports Cost Model	€ 95-190
Published price data	€ 100 - 185
Other Sources	
Minor resurfacing (RAF Valley, Tiree)	€ 30
Intermediate resurfacing (Newcastle, Liverpool, RAF St. Athan, Aberdeen)	€ 50 - 85
Major resurfacing (Glasgow, Jersey, Edinburgh, Heathrow S, Luton, Bristol)	€ 125 - 160

The comparative rates used in CIP 6.017 have been used here, due to the similarity of the works.

The CIP does refer to some refurbishment of B7 in addition to the 180mm overlay, though this does not appear to be in the project cost sheet. The project cost sheet also makes no reference to AGL. We have included both these items in our assessment.

It should also be noted that the project cost sheet refers to an area of 18,800m2. This has not been verified and from the information available to us, the area of B7 is only 15,000m2

€2,800,000 (TPS estimate) v €3,000,000 (DAA estimate)

Summary

15,000m2 @ € 140/m2 overlay	€ 2,100,000
375m2 replacement slabs	€ 100,000
Remove and reuse lights	€ 100,000
	€ 2,300,000
Fees 10%	€ 230,000
	€ 2,530,000
Contingency 10%	€ 270,000
Total	€ 2,800,000

Our assessment suggests that the cost in the CIP is of the right magnitude.

CIP Ref 7.018: New Pier Design Fees

Information from CIP	
Cost included in CIP	€ 7,000,000
Construction cost of new pier	€ n/a
Fees as percentage of construction cost	% n/a
Contingency Costs	0%

Comparative cost information – fees	
Typical design fee to tender stage in our assessment for various projects in the CIP	5%
Design for planning fee used CIP 6.018 North Runway assessment	10% of total design fee
Planning consultant fee used CIP 6.018 North Runway assessment	20% of total design fee

There is a fundamental discrepancy between the information in the CIP and that in the project cost sheet. See box opposite for details.

Assumptions made during the cost assessment:

- The scope described in the CIP is incorrect
- The scope described in the Project Cost Sheet is correct

€1,750,000 or €7,000,000 (TPS estimate) v €7,000,000 (DAA estimate)

The CIP refers to fees for the following:

- Preliminary design of a new pier
- Planning submission
- Professional advice during planning process.

Using the comparative cost information above, these services would amount to approximately 30% of the design fee, or 1.5% of the project cost. It would be prudent to add a contingency to this given the nature of planning submissions for substantial airport infrastructure works. Even if this contingency was an additional 25%, the fee would still only amount to €1,875,000 on a €100,000,000 project.

The €7,000,000 in the CIP is clearly excessive and incorrect for the stated scope of services.

The Project Cost Sheet refers to fees for the following:

- Develop brief
- Complete detailed design to tender level
- A new build pier project of €100,000,000

The fee for these services would be expected by TPS to be in the region of 7%. This calculates at 7% x €100,000,000 equals € 7,000,000.

Our assessment suggests that the cost in the CIP is of the right magnitude if it applies to the scope described in the Project Cost Sheet not the scheme described in the CIP. If it applies to the scope in described in the CIP, the cost should be €1,750,000

CIP Ref 7.032: T1 Passenger Processing Enhancements

Information from CIP

Cost included in CIP	€ 16,000,000
Functional Unit - New passenger Screen area - Dedicated passenger queuing area - Dedicated SSK zone - Additional retail space - Refurb of passenger toilets on departures floor	550m2
Cost per m2 (Assuming 8,000m2) (Including fees and contingency)	€ 2,000
Contingency Costs (15% of Construction Costs)	11.5%

Comparative cost information – cost/m2 (excluding fees and contingency)

From previous projects	€ 1,600 - 2,300
From Davis & Langdon Airports Cost Model (adjusted for refurb)	€ 1,700
Published price data (adjusted for refurb)	€ 1,100 - 2,400

From the various cost comparative data above the cost for terminal refurbishment/passenger enhancements is in the range of €1,100 to € 2,400. This reflects the potential scope of works in projects of this type.
Given the information included in the CIP, the area affected by this project is in the region of 8,000/m2.

Assuming 10% for fees and 15% for contingency, the costs in the CIP would include a budget of €1,580/m2 for this project. This is marginally less than the mid point of the range above. Given the extent of the works involved and the potential restrictions on work in this area described in the CIP, the cost in the CIP would appear to be lower on the range than would be expected.

Assumptions made during the cost assessment:

- Approximate area affected is 8,000m2

€16,000,000 (TPS estimate) v €16,000,000 (DAA estimate)

8,000m2 @ € 1580/m2	€ 12,650,000
Fees 10%	€ 1,265,000
	€ 13,915,000
Contingency 15%	€ 2,085,000
Total	€ 16,000,000

Our assessment suggests that the cost in the CIP is of the expected order of magnitude and €2000/m^2 including fees and contingency is appropriate.

Close cost control of this project would be essential to ensure it could be delivered within the budget in the CIP.

CIP Ref 7.035: Pier B Connectivity

Information from CIP

Cost included in CIP	€ 11,000,000
Functional Unit	
Link Bridge	€ 4,500,000
Pier B VCC	€ 3,000,000
Dems and alts Pier B	€ 600,000
Dems and alts Pier C	€ 1,200,000
Other items (fees, contingency, planning)	€ 1,700,000
Cost per m2 (link bridge)	€ 8,416
Cost per m2 (VCC)	€ 7,177
Contingency Costs	8%

Comparative cost information – link bridge cost/m2

From previous confidential projects	€ 2,500 - 5,400
From Davis & Langdon Airports Cost Model	€ 2,200 - 4,800
Published price data	€ 2,600 - 3,300

Comparative cost information - VCC's cost /m2

From previous projects	€ 5,050
Published price data	€ 2,300 - 5,100

The cost/m2 in the CIP for the two main elements of this project are both in excess of the comparative cost information by some margin. The piecemeal nature of the works and the working restrictions could mean that costs could exceed the top end of the range, but on the information available, it is difficult to substantiate the costs/m2 included in the CIP.
The remaining modification works to Piers B & C and the other costs have been assessed as appropriate for this project. For the purposes of calculating our total costs, they have been left unchanged

Assumptions made during the cost assessment:

We have included an additional 20% in the link bridge and VCC costs to reflect the restrictive conditions of phased construction that would be required so as not to impede aircraft operations

€9,200,000 (TPS estimate) v €11,000,000 (DAA estimate)

Summary

Link Bridge	€ 3,450,000
Pier B VCC	€ 2,250,000
Dems and alts Pier B	€ 600,000
Dems and alts Pier C	€ 1,200,000
Other items (fees, contingency, planning)	€ 1,700,000
Total	€ 9,200,000

Our assessment would suggest that the cost in the CIP is higher than what would be expected.

CIP Ref 7.036: T1 Life Safety System Upgrade

Information from CIP

Cost included in CIP	€ 5,000,000
Functional Unit	-Replacement of Fire Alarm System for Terminal 1 and associated piers - Replacement of existing emergency lighting
Cost /m2	€n/a
Contingency Costs	9%

Comparative cost information – cost/m2

Comparative cost information – fire alarm system - cost/m2

From Davis & Langdon Airports Cost Model	€ 30
Published price data	€ 30

Comparative cost information – emergency lighting system - cost/m2

From Davis & Langdon Airports Cost Model	€ 15
Published price data	€ 12

The above costs allow for new works. Given that the works are carried out in an existing terminal, the costs are could be as much as double these rates.

Assumptions made during the cost assessment:

- 16,000m2 of Terminal 1 affected
- Fire compartmentation cost of € 1.5m in the CIP is difficult to substantiate, without knowing full extent of the works

€2,350,000 (TPS estimate) v €5,000,000 (DAA estimate)

Summary

Fire alarms	@ **€60m2**	€ 960,000
Emergency lighting	@ €30/m2	€ 480,000
Fire compartmentation		€ 500,000
		€ 1,940,000
Fees 10%		€ 195,000
		€ 2,135,000
Contingency 10%		€ 215,000
Total		€ 2,350,000

Our assessment suggests that the cost in the CIP is significantly more than would be expected.

The cost of this project should be in the region of € 2,350,000.

CIP Ref 8.001: Operations

Information from CIP

Cost included in CIP		€ 40,000,000
Functional Unit	-	
Average annual expenditure 2010 – 2014	€ 7,000,000 pa	
-T2 operational alterations	€ 5,000,000	
Cost per m2	€ n/a	

Not included in Project Cost Sheets

From answers to queries the €7,000,000 pa is broken down as follows:

Airport development	€ 1,500,000
Airside	€ 1,800,000
Fire	€ 400,000
M&E Maintenance	€ 500,000
Airport Police	€ 200,000
Other minor items	€ 1,000,000
AIT&T	€ 3,500,000
Total	€ 8,900,000

It is unclear why CIP refers to € 7,000,000 pa but the answers to our queries produces as total of € 8,900,000 pa

Comparative cost information

Minor projects and maintenance to response to airline needs, adjusted to be comparable to Dublin Airport

Airport Source 1	€ 6,500,000 pa
Airport Source 2	€ 8,000,000 pa

Assumptions made during the cost assessment:

•The €7,000,000 pa included in the CIP is the figure that has been assessed, not the € 8,900,000 referred to in the answers to queries

€40,000,000 (TPS/Booz estimate) v €40,000,000 (DAA estimate)

Summary

The € 7.0m pa for minor projects and maintenance included in the CIP sits comfortably within the € 6.5m to € 8.0m pa range identified in our source information.

The € 5.0m included in the CIP operational alterations in T2 represents € 1.0m pa. This would appear to be at the top of the range we would expect given that T2 will be a brand new building.

Overall, our assessment is that the total € 40,000,000 included in the CIP is of the right magnitude.

CIP Ref 8.008: Corporate IT

Information from CIP

Cost included in CIP		€ 10,700,000
Cost per m2		€ n/a
The € 10,700,000 a is broken down as follows:		
Enterprise Hardware	€ 1,400,000	
Enterprise Software	€ 4,000,000	
Desktop	€ 1,900,000	
Business and Technology Initiative	€ 3,400,000	
Total	€ 10,700,000	

Comparative cost information

From other confidential Booz & Co. European projects and Gartner IT benchmark reports, adjusted to be comparable to Dublin Airport

Source 1- Transportation Benchmark: IT expenditure represents between 3% and 8% of total revenue
Source 2 - Other Industries

IT cost best practice suggests that the overall IT expenditure should be around 8% of the revenue.

Assumptions made during the cost assessment:

• The procurement process to acquire the IT services is being performed efficiently and therefore the best possible price obtained

€9,000,000 (Booz estimate) v €10,700,000 (DAA estimate)

Summary

The total expenditure of on Corporate IT from the CIP represents approximately a 5% of the overall revenue. This sits comfortably in the mid range of the Transportation and Other Industries benchmark and slightly below the Best Practice Benchmark

Taking the average IT expenditure figure for the transportation industry, the cost would be estimated at € 9,000,000.

Overall, our assessment of the total € 10,700,000 included in the CIP is of the right magnitude on the higher end.

CIP Ref 8.100: Programme Contingency

Information from CIP

Costs included in CIP

Tranche 1		€ 20,000,000
Tranche 2		€ 7,000,000
	Total	€ 27,000,000

Value of projects in Tranche 1		€ 189,000,000
Value of projects in Tranche 2		€ 113,300,000
	Total	€ 302,300,000

Programme Contingency as % of Value of projects

Tranche 1	10.6%
Tranche 2	6.2%
Combined	8.9%

Comparative cost information

Comparison with other airport operators suggests that these percentages are not unreasonable.

Assumptions made during the cost assessment:

N/A

€27,000,000 (TPS estimate) v €27,000,000 (DAA estimate)

Summary

TPS Value of projects in Tranche 1		€ 181,195,000
TPS Value of projects in Tranche 2		€ 106,350,000
	Total	€ 287,545,000

Our assessment suggests that the cost in the CIP is of the right magnitude.

CIP Ref 8.200: Programme Management

Information from CIP

Costs included in CIP

Tranche 1		€ 15,000,000
Tranche 2		€ 10,000,000
Tranche 3		€ 5,000,000
	Total	€ 30,000,000
Value of projects in Tranche 1		€ 189,000,000
Value of projects in Tranche 2		€ 113,300,000
Value of projects in Tranche 3		€ 347,500,000
	Total	€ 649,800,000

Programme Management as % of Value of projects

Tranche 1	7.9%
Tranche 2	8.8%
Tranche 3	1.4%
Combined	4.6%

Comparative cost information

Given that Programme Management comprises a team of salaried staff, the most suitable way of assessing these sums is to look at the number of staff these sums would allow for, rather than comparing against the value of projects.

Assumptions made during the cost assessment:

N/A

€ 15,000,000 to €20,000,000 (TPS estimate) v €30,000,000 (DAA estimate)

Summary

If we assume an average level of salary of € 60,000 per person and an allowance for salary burden, overheads and profits, the typical cost per person could be € 150,000 per person per annum.

The € 30,000,000 included in the CIP would equate to 40 full time staff for the 5 years of CIP 2010 – 2014.

This level of staffing is much higher than we would expect and, based on our experience, it is likely than a team of between 20 and 25 would adequate to run a €750m 5-year works programme, bearing in mind that contract administration and project management is undertaken within the individual CIP project costs. This is based upon a team of 15-20 programme managers and integrators overseeing €150m of work per annum (€7.5 to €10m per FTE) being supported by an administrative team of 5 (processing accounts, producing high level reports and undertaking office secretarial and support duties)

Our assessment, suggests that the cost in the CIP is higher than what would be expected.

The values of this item should be in the region of €15,000,000, to €20,000,000 spread across all three tranches. €17,500,000 the mean of the range is taken forward to the summary table.

CIP Ref 9.019: Divert and Increase Cuckoo Culvert Capacity

Information from CIP

Cost included in CIP	€ 11,000,000
Diverted Cuckoo Stream	3,000 m
Upgraded culvert	1,200 m
Foul Connection	2,000 m
300mm diameter foul sewer	€ 150/m
Pipe Jacking (300mm diameter foul sewer)	€ 870/m
1200mm diameter culvert	€ 1,000m
Pipe Jacking (1200mm diameter culvert)	€ 2,000/m
(all including fees and contingency)	
Preliminaries	15%
Contingency Costs	13%

Comparative cost information - 300 mm Diverted Cuckoo Stream (3km) and 300 mm foul Connection to Proposed Northern Runway (2km)

Published price data	
300mm pipe	€ 55/m
Pipe Jacking	€ 750/m
Published price data	
Establishing thrust pit	€ 32,000
Establishing reception pit	€ 23,000
Mobilise & Set-up	€ 45,400

Comparative cost information -1,200 mm Upgraded Culvert (1.2km)

Published price data	
1,200mm culvert	€ 380/m
Pipe Jacking	€ 1,400/m
Published price data	
Establishing thrust pit	€ 32,000
Establishing reception pit	€ 23,000
Mobilise & Set-up	€ 45,400

Assumptions made during the cost assessment:

Assumptions made during the cost assessment:

- A 300 mm diameter pipe to be used for the diversion of the Cuckoo Stream
- That a thrust pit, a reception pit and the mobilising & set-up of the pipe jacking equipment is required at each change of direction in each pipe/culvert run.

€11,650,000 (TPS estimate) v €11,000,000 (DAA esimatet)

Summary

Diverted Cuckoo Stream (3km)	€ 3,520,000
Upgraded Culvert (2km)	€ 2,740,000
Foul Connection to Proposed Northern Runway	€ 2,110,000
	€ 8,370,000
Preliminaries (15%)	€ 1,260,000
	€ 9,630,000
Fees 10%	€ 963,000
	€ 10,593,000
Contingency 10%	€ 1,057,000
Total	€ 11,650,000

Our assessment suggests that the cost in the CIP is of the right magnitude.

CIP Ref 9.021: Airfield Drainage Upgrade

Information from CIP

Cost included in CIP	€ 3,000,000
Drainage pipes (varying diameters)	1,500 m
1,000 m3 attenuation tanks	3 nr
Attenuation tanks	€ 220 / m3
Manholes	€ 5,000 ea
Fuel interceptors	€ 15,000 ea
300 – 600 mm diameter pipes	€ 870 - 1,150/m
Pipe Jacking (300 – 600 mm diameter pipes) (all including fees and contingency)	€ 150 - 300 / m
Preliminaries	15%
Contingency Costs	13%

Comparative cost information – cost/m

Published price data

300mm pipe	€ 55/m
Pipe Jacking 300 pipe	€ 750/m
600mm pipe	€ 75/m
Pipe Jacking 600 pipe	€ 900/m
Tank	€ 85,000
Interceptors	€ 25,000
Manholes	€ 5,500
Establishing thrust pit	€ 32,000
Establishing reception pit	€ 23,000
Mobilise & Set-up	€ 45,400

Assumptions made during the cost assessment:

- 1,500m of pipework is sufficient for the complete system(s) including connection to existing
- 1,500m of pipe is split 50/50 between 300 and 600mm diameter
- There is one fuel interceptor per tank

€3,130,000(TPS estimate) v €3,000,000(DAA estimate)

Summary

Pipework		€ 97,500
Pipe Jacking		€ 1,237,500
Tanks		€ 645,000
Interceptors		€ 150,000
Manholes		€ 110,000
		€ 2,240,000
Preliminaries (15%)		€ 340,000
		€ 2,580,000
Fees 10 %		€ 260,000
		€ 2,840,000
Contingency 10%	€ 290,000	
	Total	€ 3,130,000

Our assessment suggests that the cost in the CIP is of the expected magnitude.

CIP Ref 9.022: Airfield Pollution Control

Information from CIP

Cost included in CIP	€ 7,500,000
Functional Unit -Cuckoo	18,000 m3 tank
- Mayne	3,500 m3 tank
- Santry	1,200 m3 tank
- Forrest Little	4,000 m3 tank
Cost per m3 of tank	€ 160
Contingency Costs	13%

Comparative cost information – cost/m

Published price data

300mm pipe	€ 55/m
Pipe Jacking 300 pipe	€ 750/m
600mm pipe	€ 75/m
Pipe Jacking 600 pipe	€ 900/m
Tanks	€ 2,000,000
Chambers/penstocks/controls	€ 100,000
Manholes	€ 5,500
Establishing thrust pit	€ 32,000
Establishing reception pit	€ 23,000
Mobilise & Set-up	€ 45,400

Assumptions made during the cost assessment:

- The locations of tanks and connections to existing foul drainage included in the CIP are reasonably accurate
- Fuel interception is required on the system (not mentioned in CIP)
- Underground storage tanks may not be the only solution for this project. Other alternatives may be considered.
- Historic costs of €3,000,000 to deliver works included in the project scope.

€8,000,000 (TPS estimate) v €7,500,000 (DAA estimate)

Summary

Pipework	€ 120,000
Pipe Jacking	€ 1,485,000
Tanks	€ 5,310,000
Chambers/penstocks/controls	€ 450,000
Manholes	€ 110,000
	€ 7,475,000
Preliminaries (15%)	€ 1,120,000
	€ 8,595000
Fees 12 %	€ 1,030,000
	€ 9,625,000
Contingency 15%	€ 1,375,000
Total	€ 11,000,000
Less Historic spend	€ 3,000,000
Total	€ 8,000,000

The total of our assessment is €11,000,000. This is more than the total in the CIP, but there is Historic Expenditure of €3,000,000 in the CIP which gives a total project capital expenditure of €10,500,000. An alternative and more appropriate comparison in the circumstances is to reduce the TPS estimate in line with the historic spend.

Our assessment suggests that the cost in the CIP is of the expected magnitude.

CIP Ref 9.023: Fuel Hydrant System Upgrade

Information from CIP

Cost included in CIP		€ 6,000,000
Functional Unit	- Underground twin feeder pipe - Direct connection to pier E hydrant system	0.65km
Cost per m		n/a
Contingency Costs		17%

Comparative cost information – cost/m

Previous projects (300mm pipework)	€ 700
Pier E 300mm pipework overall cost including pits, hydrant valves and hydrant pits	€2,100

Assumptions made during the cost assessment:

CIP includes typing error - Pier E cost should be €2,500k not €2,500m for 1200m of pipe. This is equivalent to €2,100/m including pits, hydrant valves and hydrant pits or € 1,800/m excluding pits, hydrant valves and hydrant pits

€6,160,000 (TPS estimate) v €6,000,000 (DAA estimate)

Summary

Connection Depot to Pier D	€ 2,300,000
Pier E pipeline including valves and Vent pits	€ 2,520,000
High/low pits	€ 50,000
	€ 4,870,000
Fees 10%	€ 490,000
	€ 5,360,000
Contingency 15%	€ 800,000
Total	€ 6,160,000

Our assessment suggests the cost in the CIP is of the right magnitude

CIP Ref 9.024: Fuel Farm Redevelopment

Information from CIP

Cost included in CIP	€ 28,800,000
Functional Unit - 3 fuel storage tanks with 5,000m3 each - Fuel pipework internal to fuel depot boundary - Building for joint fuel operations, vehicle servicing and into plane operations - New airside into plane tanker filling point fed from enlarged fuel depot by underground fuel pipes	
Cost per m	n/a
Contingency Costs	17%

Comparative cost information – cost/m & /litre

Previous projects

Cost per litre of storage (complete depot)	€ 1.2
450mm pipework	€ 2,000

Assumptions made during the cost assessment:

•350m between depot and new filling point

€26,600,000 (TPS estimate) v €28,800,000 (DAA estimate)

Summary

Storage tanks/depot	€ 18,000,000
Fuel pipework	€ 700,000
Civils/building work	€ 1,500,000
	€ 20,200,000
Fees 10%	€ 2,000,000
	€ 22,200,000
Contingency 20%	€ 4,400,000
Total	€ 26,600,000

Our assessment suggests the cost in the CIP higher than would be expected.

Executive Summary and Key Findings

Introduction

Approach

Analysis and Findings

Appendices

TPS Report: Individual Assessments

Data Sources

Summary of Source Information

CIP Nr.	1 Various sources	2 TPS/Booz projects	3 Davis & Langdon Airport Terminals	4 Davis & Langdon Car Parks	5 Gardiner & Theobold	6 BCIS	7 The Bruce Shaw Handbook 2009	8 Published sources	9 Other TPS/ Booz projects	10 Specialist suppliers or contractors
1.006	✓			✓	✓	✓	✓	✓		
2.015			✓		✓	✓	✓	✓	✓	
2.018			✓		✓	✓	✓	✓	✓	
3.035	✓		✓		✓		✓	✓		
4.017	✓	✓	✓		✓		✓			
5.013			✓		✓	✓	✓	✓		
6.009		✓			✓		✓	✓		✓
6.017	✓	✓			✓		✓	✓	✓	
6.018		✓			✓		✓			
6.019	✓									
6.047	✓	✓	✓		✓		✓	✓	✓	
6.051		✓			✓		✓	✓	✓	
6.052	✓	✓	✓		✓		✓	✓	✓	
6.053	✓		✓		✓		✓	✓	✓	✓
6.054	✓	✓					✓	✓	✓	

Summary of Source Information

CIP Nr.	1 Various sources	2 TPS /Booz projects	3 Davis & Langdon Airport Terminals	4 Davis & Langdon Car Parks	5 Gardiner & Theobold	6 BCIS	7 The Bruce Shaw Handbook	8 Published sources	9 Other TPS/ Booz projects	10 Specialist suppliers or contractors
6.055	✓	✓	✓		✓		✓	✓	✓	
7.018		✓			✓		✓	✓		
7.030										
7032	✓	✓	✓		✓		✓	✓		
7035	✓		✓		✓		✓	✓		
7.036			✓		✓		✓	✓		
8.001		✓			✓		✓			
8.008	✓	✓						✓		
8.100	✓				✓		✓			
8.200		✓			✓		✓			
9.019	✓				✓		✓	✓		
9.021					✓		✓	✓		✓
9.022					✓		✓	✓		✓

Summary of Source Information

CIP Nr.	1 Various sources	2 TPS/Booz projects	3 Davis & Langdon Airport Terminals	4 Davis & Langdon Car Parks	5 Gardiner & Theobold	6 BCIS	7 The Bruce Shaw Handbook	8 Published sources	9 Other TPS/Booz projects	10 Specialist suppliers or contractors
9.023		✓			✓		✓			
9.024		✓			✓		✓			

Executive Summary and Key Findings

Introduction

Approach

Analysis and Findings

Appendices

TPS Report: Individual Assessments

Data Sources