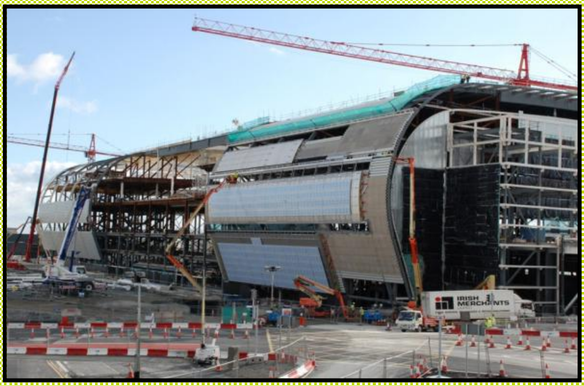

Dublin Airport Authority

Capital Investment Programme 2010 – 2014 Proposals for Consultation

DAA/CIP05

helping you on your way

Contents

Foreword

Declan Collier
Chief Executive
Dublin Airport Authority

The DAA has a statutory mandate to manage and develop Dublin Airport. Development of airport infrastructure is by its nature a long-term activity. As airports comprise such vital elements of national infrastructure and are gateways into the country, a long-range plan with in excess of a twenty-year horizon is important to ensure that the airports can expand and develop. The implementation of successive long-range Master Plans that set out the infrastructure requirements in all elements of the airport system - runways, airfield, terminals, roads, car parks, commercial etc. – ensures that the airport has capacity to expand and develop appropriately. The Master Plan is then translated into a series of more short-term development plans which set out the actual projects to be undertaken and the estimated cost associated with same.

DAA's approach has therefore been to implement a series of capital investment programmes that will deliver the appropriate assets at the right time to meet increasing long-term demand, while retaining the flexibility to make adjustments to cope with short-term fluctuations.

DAA's last CIP, which was 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 first phase of the Transforming Dublin Airport programme is now well under way and has been very successful. The highlights include:

- Pier D was delivered on time in October 2007
- The construction of Terminal 2 and Pier E was started in October 2007 as planned.

- Apron 6 was successfully completed, delivering 180,000 square metres of additional apron for use principally as remote aircraft stands
- Overall, over 100 projects have been completed and successfully handed over since 2006
- Our accident frequency rate since this Programme commenced is 0.49[1] and this compares very favourably with the overall Irish Construction Industry average of circa 1.5.

Our intention had been to submit the balance of the investment (circa €800 million) in the next CIP covering the 2010 – 2014 period. However, over the past 12 months, it has become increasingly apparent that the anticipated ongoing growth in passenger numbers will not transpire in the short-term. This change in demand, coupled with a forecasted continued downturn in our key commercial revenues in line with the prevailing domestic and international economic conditions, has caused us to review the timing of the next phase of the airport's investment plans. While the level of spend required to complete the full Transformation programme remains at circa €800 million, 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.

We are therefore presenting a reduced proposed programme for the 2010 – 2014 quinquennium, which 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. These works are valued at circa €51 million per annum, a spend which equates to circa 2.8% of the Regulated Asset Base[2].
- 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 timing of each enabling project is determined by reaching

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[1] January 2006 – January 2009. AFR is the ratio of reportable accidents to programme hours worked.

[2] Estimated 2010 RAB, in 2009 prices

certain demand triggers as outlined in Chapter 8. DAA is requesting that each is assessed and evaluated by CAR, with the intention of agreeing to their remuneration when the proposed trigger points are reached, without the need for an interim determination. The total value of the Tranche 3 projects is €353 million.

In all cases, the projects that are included in this Capital Investment Programme are the result of a thorough examination of all of the options available to DAA. They are proposed because they fulfil one or more of the following criteria:

- there is an absolute new requirement as current assets are already being fully utilised or a commercial opportunity exists
- current assets have become obsolete or time-expired
- a safety or regulatory requirement is driving the investment.

Since embarking on the Transformation programme in 2006, the DAA has provided an improved experience to its customers at Dublin Airport through the phased delivery of a range of new cost effective passenger and aeronautical facilities. This step change in investment has been achieved without any significant negative impact on either the travelling public or our airline customers.

The economic circumstances may have changed since we submitted our last CIP, however the core principle that Ireland needs an efficient modern aviation gateway remains steadfast.

The programme that we are submitting is therefore a prudent one, which focuses on the spend that is necessary in the short term whilst also incorporating triggers to enable Dublin Airport to expand in a manner that will facilitate growth in traffic and economic activity when conditions improve.

We look forward to consulting with users on our proposals and to receiving constructive feedback on the material contained in this document.

Declan Collier
Dublin Airport
27 February 2009

1. Document Summary

This Capital Investment Programme presents DAA proposals for capital spend at Dublin Airport for the period 2010 – 2014, which we expect to discuss with CAR and users during the anticipated series of consultation meetings in March and April 2009.

This CIP recognises the fact that we are in a difficult and uncertain economic environment. In this context, the key focus is the core expenditure required to maintain and operate the airport. However, the proposed programme also contains key enabling projects which will facilitate future growth, the timing of which is determined by a set of demand triggers.

As the DAA is wholly owned by the Irish Government under the auspices of the Department of Transport, it is important that Government Aviation Policy is clear and fully understood by all stakeholders, and so this policy is summarised in Chapter 2.

We are paying increasing attention to the issue of climate change and to our related responsibilities to ensure that we do all we can to minimise the environmental impact of our activities. DAA is operating well below the annual Carbon Allocation that has been assigned to us by the Environmental Protection Agency under the Emissions Trading Scheme. We have also recently signed up to the Aviation Industry Commitment to Action on Climate Change, and have a range of other initiatives to ensure that our developments and operations are as sustainable as possible. All of these issues are also set out in Chapter 2.

Chapter 3 outlines our draft traffic forecast for the next regulatory period, as well as the detailed processes we have gone through to produce them. At the time of writing, further information is still awaited from the airlines related to schedule changes for the coming year before the forecast scenarios can be finalised. Though traffic forecasts are an important consideration for capacity planning, the extent of the uncertainty in the current climate led DAA to develop proposals which are not simply based on a single forecast scenario or range of forecast scenarios, but which can be flexed to a significant extent in line with trends in traffic and congestion at the airport. .

DAA has always maintained a positive and proactive stance regarding consultation with airlines and other stakeholders on capital expenditure, and throughout 2008 we made significant fresh efforts to establish a functional consultation process. These efforts are described in detail in Chapter 4.

Airport planning and development is by its very nature a long term undertaking, and our strategy for such development is outlined in Chapter 5. In summary, this strategy remains to continue to develop the airport in the eastern campus around a twin parallel runway configuration. All major investments in Dublin Airport are considered in the context of the Dublin Airport Masterplan, the scope of which extends to 2035. This ensures that all significant additions and modifications to the airport infrastructure are coordinated to provide a cohesive investment programme, as part of a wider vision for Dublin Airport in the future.

Tranche 1 of the CIP, comprising Operational spend, is described in overview in Chapter 6. This tranche is divided into the following five workstreams :

1. Stands and airfield €59 million : The key project in this workstream is the overlay of existing Runway 10 / 28. This runway was built in 1989 and has been in continuous operation for the past 20 years. A structural evaluation carried out in 2007 has concluded that the remaining life of the pavement to be in the order of 4 to 6 years before significant intervention is required. This project has become even more critical in light of the postponement of the new North Runway.

   Other key projects in this workstream include the reconstruction of the heavily trafficked central area apron around Piers A and B, and advance property purchases for the North Runway house buy-out scheme, should such purchase opportunities arise.

2. Piers and Terminals €26 million : T2 project spending which is timed to take place in early 2010 is held in this workstream. In addition, The Pier B connectivity project is required to provide routes for passengers transferring from Pier B to T2 and vice versa, as well as for passengers arriving or departing from Pier B that are being processed in Terminal 2.

3. Airport Infrastructure €110 million : This workstream includes Airport Operations, which is a budget for modification, replacement and refurbishment works of a short planning nature that are essential to the efficient running of the airport. These projects are typically planned 12 months or less in advance due to the dynamic nature of the airport and the changing requirements of users.

Also included are Airport IT systems and Group IT, as well as Plant and Equipment, Utilities and smaller Landside Infrastructure projects. The key projects in this area are a new Combined Heat and Power plant and upgrades to Hold Baggage Screening equipment, the latter being driven by anticipated regulatory requirements.

4. Revenue Projects €25 million : This category covers investment which is required to facilitate commercial operations. The largest project relates to the creation of Cargo Distribution facilities by means of refurbishing buildings located on the North Apron.

5. Programme Fees and Contingency €35 million : This comprises an allowance for overall programme contingency and programme management fees.

Tranche 2 of the CIP contains Service Delivery Projects which are defined as 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 total value of projects in this tranche is €139 million. Key projects are a new MSCP for Terminal 2 (€41 million in the 2010 – 2014 period), Fuel Farm development and upgrade (€29 million), T1 passenger processing enhancements, which is a reconfiguration of elements of the T1 departures concourse (€16 million) and Retail Refurbishments (€17 million over the 5 years).

The Tranche 3 Enabling Projects and their associated triggers are set out in Chapter 8. Enabling Projects represent the spend required to enable future growth at Dublin Airport. The timing of each enabling project is determined by reaching certain demand triggers.

DAA is requesting that each Enabling Project is assessed and evaluated by CAR, with the intention of agreeing to their remuneration when the proposed trigger points are reached, without the need for an interim determination. The largest of these projects is the North Runway itself, but this tranche also includes a New Apron project, an Engine Testing Facility, and the installation of a Fuel Hydrant system to serve Pier E.

The justifications for and explanations of all the projects in the CIP are set out in the individual project summaries contained in Chapter 9. We have not included a description of all of the options considered for each project prior to the selection of a preferred solution as this would have proved too cumbersome. However, it is DAA's intention that this background will be provided as part of the anticipated consultation process on individual projects that will follow the publication of this document.

Finally, our approach to programme management and critical path analysis is set out in Chapter 10.

2. Aviation Policy Framework

2.1 Introduction

Government policy on aviation, regulation by the Commission for Aviation Regulation and laws concerning the Environment and Sustainable development all impact on the development of Dublin Airport.

2.2 Government Policy

DAA's vision for the future is to deliver a quality airport travel experience to the best international standards. One of the company's core objectives is the creation of new capacity and facilities at Dublin Airport following the five-fold increase in passenger numbers witnessed in the past 15 years. Meeting demand is also critical for the wellbeing of the Irish economy.

DAA is wholly owned by the Irish Government. Our vision is shared by our key shareholder as evidenced by the following excerpts from the Department of Transport's third *Statement of Strategy* 2008 - 2010[3]

> *"As an island nation on the western fringes of Europe, international air links are of much greater importance for Ireland than countries with land connections to their neighbours and trading partners. Ireland's aviation strategy is therefore to promote regular, safe, cost-effective and competitive air services linking the country with key business and tourism markets."*

> *"To enable further increases in passenger numbers and freight throughput at Dublin Airport, it will be necessary to improve and expand its infrastructure, terminal facilities and surface transport access".*

[3] Published 16 April 2008

The Statement of Strategy paper's chapter on Aviation states as its first objective [to have] "Better Airports" and a key element of its stated strategy for achieving this objective is to:

> *"Facilitate the provision of additional terminal, runway and pier capacity at Dublin Airport required to cater for continuing passenger growth.*

Support for the development of Dublin Airport has also been explicitly set out in Ministerial directions issued to the Commission for Aviation Regulation (CAR) in the past and was a driving force behind some of the amendments made to the Commission's objectives under the 2004 State Airports Act.

> *"The amendments made to the Commission's remit were in keeping with overall Government policy in relation to the development needs of the aviation sector and in particular reflected the importance attached to a strong networks of air links and modern infrastructure as essential requirements for developing our trade and tourism sectors particularly having regard to our island status and peripheral location."*[4]

The Government also sees investment in economic infrastructure to address existing deficits as a key factor in the promotion of competitiveness and the generation of sustainable economic growth and employment. As part of this investment programme the development of world class airports is seen as crucial to Ireland's future economic competitiveness[5].

As airports comprise such vital elements of national infrastructure and are gateways into the country, the adoption of a long-term view is critical to ensure that they are properly integrated into the wider national planning and development process i.e. National Development Plans, County Development Plans etc.

DAA has been mindful of Government Policy on Aviation as summarised above in the preparation of this Capital Investment Programme.

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[4] 18th August 2005, Ministerial Direction to CAR

[5] 3rd April 2007, Ministerial Direction to CAR

2.3 Regulation of Dublin Airport

Airport charges at Dublin Airport have been regulated since 2001. As part of the process undertaken to produce a Determination on the maximum level of airport charges that may be levied by DAA, the Commission for Aviation Regulation takes a keen interest in the capex plans proposed by the airport authority.

The CAR's objectives when determining Airport Charges are set out in the State Airports Act 2004, section 33 and are as follows:

(a) To facilitate the efficient and economic development and operation of Dublin Airport which meet the requirements of current and prospective users of Dublin Airport,

(b) To protect the reasonable interests of current and prospective users of Dublin Airport, and

(c) To enable DAA to operate and develop Dublin Airport in a sustainable and financially viable manner.

CAR's view is that "the essence of its statutory mandate is to promote economic efficiency",[6] and that equal weight should be given to all three objectives - one does not have precedence over the others. It interprets economic efficiency as covering productive efficiency, dynamic efficiency and allocative efficiency. Its view that it is required to promote economic efficiency was strengthened by the changes introduced by the State Airports Act.

In addition to these statutory objectives, there are nine statutory factors to which CAR must have due regard in making a determination. In particular CAR is obliged to take cognisance of

(b) The level of investment in airport facilities at Dublin Airport, in line with safety requirements and commercial operations in order to meet the needs of current and prospective users at Dublin Airport.

"User" is later defined as any person –

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[6] Section 4 of CP9/2004.

(a) For whom any services or facilities the subject of airport charges are provided at Dublin Airport

(b) Using any of the services for the carriage by air of passengers or cargo provided at Dublin Airport, or

(c) Otherwise providing goods or services at Dublin Airport.

There are two different aspects to the remuneration of capex for regulated firms:

- the capex forecast that the regulator adopts in its forward looking projections at the time of each price cap review; and
- the figures that are used, retrospectively, to update the RAB at the next price cap review – these could be the regulator's original forecasts, the firm's actual expenditure, or some combination of the two.

DAA has been mindful of CAR's requirements in the consultation process leading up to the publication of this document and in the drafting of same.

2.4 The Environment and Sustainability Policies

Dublin Airport is committed to delivering airport facilities and operations that meet the changing needs of all its stakeholders while incorporating best international practice in terms of sustainability.

In order to meet the demands of sustainable development and to continually improve the protection of the natural environment Dublin Airport has put in place an extensive programme aimed at improving environmental practices and preventing pollution.

Part of this commitment is for us to participate in the Emissions Trading Scheme (ETS) as administered in Ireland by the Environmental Protection Agency. The ETS is a transposition of the EU Emissions Trading Directive, which is an allowance trading scheme designed to act as a mechanism to reduce Greenhouse gases. Under the scheme Dublin Airport, along with over 100 other Irish Installations, has been given an allocation to emit a certain level of Carbon Dioxide. DAA's current allocation is contained in the second National Allocation Plan (NAP2) and runs for the period 2008 – 2012. We are subject to ongoing audits by the EPA related to our compliance with this allocation which we have passed in all cases.

It is at present unclear whether there will be a third National Allocation Plan post 2012, or whether this system will be replaced by a new arrangement whereby all allocations are purchased. In any event it is likely that there will be legislative pressure brought to bear on all significant producers of Carbon to reduce their levels. In this context DAA proactively seeks to reduce its Carbon Footprint by a range of measures including:

- Signing the recently-published Aviation Industry Commitment to Action on Climate Change, which commits its signatories to an action plan that will delivery carbon-neutral growth and aspire to a carbon-free future.

- Appointing a dedicated Mobility Manager to plan and implement sustainable transport policies for employees and other airport users.

- Incorporating best practice in the operation of the Airport, with a range of measures including installation of a Combined Heat and Power (CHP) plant which reduces carbon emissions by using the heat produced in power generation to heat the building, natural exhaust systems, high efficiency boilers, variable heat pumps and intelligent lighting. Out on the airfield we have changed over from halogen to LED lighting, which has resulted in a significant power saving as well as a ten-fold increase in bulb life.

- Incorporating best practice in the *Transforming Dublin Airport* development and construction programme including designing in minimum carbon-emission materials and energy and resource recovery measures into new-build, non-exportation of demolished and excavated materials where possible and the bussing of construction workers (2,000 at peak) to and from the site.

- Proactively monitor and trend report energy consumption.

- Operate standby electricity plant in peak periods to reduce imported electricity.

We will continue to develop future projects in as sustainable a manner as possible and to renew assets that help reduce our Carbon footprint. This and future Capital Investment Programmes will reflect this approach.

3. Dublin Airport Traffic Forecasts

3.1 Introduction

An important consideration in developing the CIP is the preparation of the passenger growth forecasts. The Dublin Airport Authority's forecasting methodology is a best-practice approach, similar to that used in many airports. It has also been extensively reviewed and endorsed by external consultants in recent years. In 1999 it was analysed by SH&E, as part of the Warburg Dillon Read review of the Aer Rianta Strategy for the Minister for Public Enterprise. In 2005 the Commission appointed Mott MacDonald to evaluate the DAA approach and concluded that the process was "considered to be appropriate for the purposes for which it is intended and represent the application of 'best practice"[7]. CAR has accepted the Dublin Airport official forecasts as the basis for each of its determination processes to date.

The forecasting model is primarily driven in the longer term by GDP, with adjustments in the shorter term based on market information received internally or externally. The methodology used has been comprehensively described in many consultation meetings, and is also outlined in each forecast report, and so will only be briefly described here.

3.2 Typical Forecasting Process:

Historical Update: The first step involves the input of the historical data into the model on a route-by-route basis.

Model Parameter update: for each new forecast, the exogenous model parameters are re-evaluated and updated as required. GDP values are generally based on ESRI projections for Ireland and on NIESR values for other countries. GDP elasticities are updated as deemed necessary based on review of currently available material. Airfare information where used is derived from market research data or airline data when provided.

Internal Consultation: A cross-functional internal Forecasting group is convened to review the set of assumptions to be used.

[7] Mott MacDonald: Preparation and Evaluation of Dublin Airport Traffic Forecast May 2005

Consultation with airlines: Each time the forecast is prepared, DAA undertakes consultation meetings with its major airline customers and those who wish to be consulted, to ensure that it has a full and up to date view of airline plans for development at the airport.

3.3 DACC Consultation Process:

The process of consultation with airlines in preparation of the forecast has been somewhat more protracted than usual in the past year, for two main reasons:

1. As the global and Irish economies suddenly began to deteriorate sharply from the end of the first quarter last year, it became clear that the projections in the forecast finalised in January 2008 (DAPF08/01) were no longer achievable in the short term. On this basis it was decided to undertake another forecast towards the end of the year.

2. A priority for DAA was the need to ensure that the level of user support for the CIP was maximised, with the forecast preparation being an important element of this. Thus DAA launched its initial consultation process, which (to satisfy airline requirements) was then converted into a DACC chaired process. DAA further agreed to participate in a forecasting sub-group as a subsidiary work-stream of the DACC process, which continued even when the DACC capex consultation process itself stalled. This involved an extended and comprehensive series of interactions which are further discussed below, with the terms of reference as finalised between all parties attached as Appendix 11.1.

In the context of the capital investment consultation process, DAA was anxious to engage in a constructive way with airline customers firstly to ensure that they understood and accepted the forecasting methodology used by the DAA, and secondly that in their turn the airlines would be afforded ample opportunity to provide as much information as possible so that the DAA had the best information available on which to develop the forecast. The key objective on all sides was as far as possible to arrive at a forecast scenario or scenarios which both parties accepted, or at least that any differences between the views of the various parties would be clearly understood in terms of differing assumptions, rather than being an amalgam of the effects of varying models, methodologies and assumptions.

In this regard, DAA has met extensively with the DACC forecasting sub-group and its consultant Louise Congdon of York Aviation, as can be seen by reference to the graphic below. During the course of this process, DAA has provided an enormous amount of information to address specific queries raised by the DACC, and has tried to engage in a very constructive manner to develop an updated forecast. DAA has been willing to undertake very time-consuming exercises to assist the DACC in understanding the DAA methodology, and has endeavoured to respond positively to all requests for additional sensitivity analyses. At this stage (end February 2009), it appears that the underlying DAA assumptions on GDP and elasticities are fully understood by the DACC. The Commission has also participated in all consultation meetings, and so is aware of the level of engagement on all sides.

This input from the airlines is particularly critical in the context of the level of market uncertainty in the current year, which is very much greater than previous years. Regrettably, the experience in this regard does not suggest that all airlines are as engaged in this process as DAA has endeavoured to be. It can be noted specifically that despite having raised no concerns about updated projections circulated on 2 February 2009, Ryanair announced significant and substantial changes to the summer schedule just over a week later, although no further details on the specifics have been forthcoming in the intervening period.

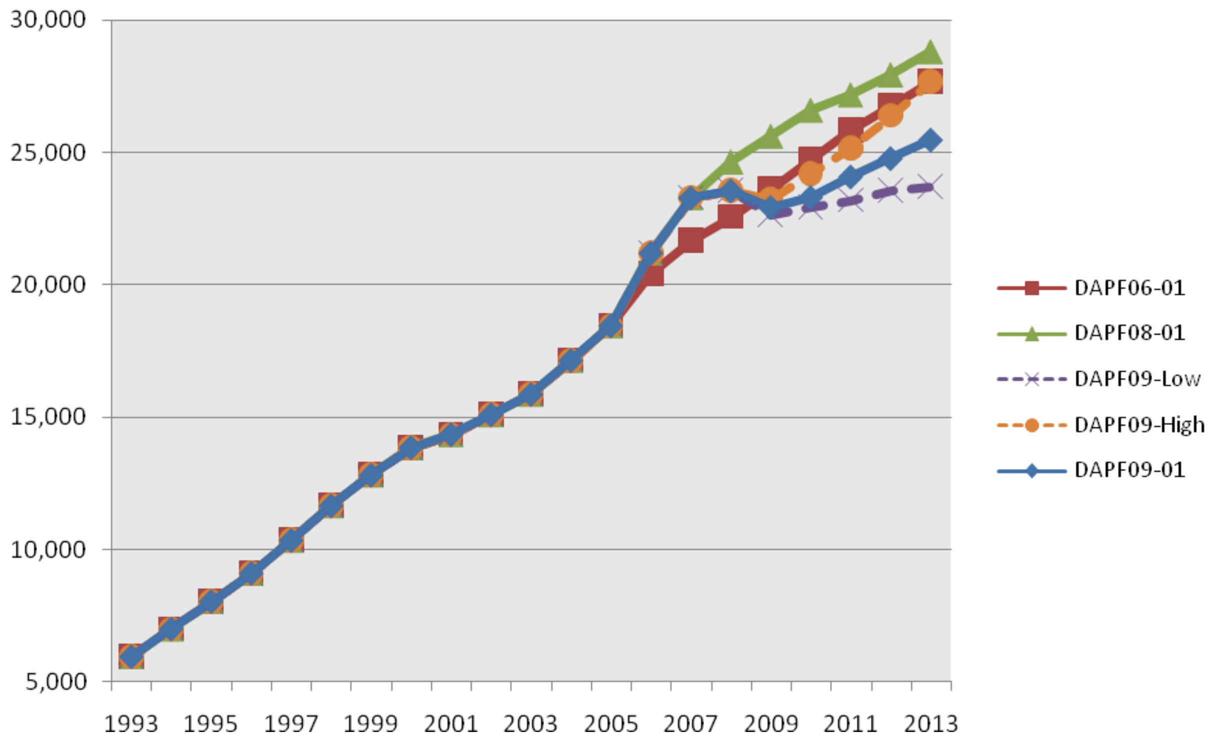
Date	DACC Action	DAA Action
01/08/08	1st DACC Forecast Subgroup Meeting: DACC request further details on forecast model & DAA request feedback on terms of reference, assumption matrix	
08/08/08	DACC request	DAA supply info on: airfare elasticities, presentations, aviation research, traffic by route & operator from 2000
20/08/08	2nd DACC Forecast Subgroup Meeting: Technical discussion of Forecast Model & output drivers. Agreement to carry out detailed calibration exercise	
	3rd DACC Forecast Subgroup Meeting: Progress review & Model's GDP elasticity assumptions discussed	
16/10/08	DACC request	DAA send results of calibration exercise
24/10/08	4th DACC Forecast Subgroup Meeting: Calibration work reviewed & discussion on impact of airport charges / taxes upon airline yield	
	5th DACC Forecast Subgroup Meeting: Implications of cost increases on airlines & constrained airport on demand forecast discussed	
30/10/08	DACC request	DAA supply info on Air Fare Survey through Dublin & historic GDP
12/11/08	6th DACC Forecast Subgroup Meeting: Discussed airline fare data access & airfare elasticity research, how extra costs are passed to passenger, implications of other effects on traffic growth, e.g. market fragmentation, model competition	
	7th DACC Forecast Subgroup Meeting: Discussed how DAA would forward initial forecast results, inc info on airline specific assumptions. Discussed what GDP & airfares to use. Noted York had looked at DAP capacity based on one runway	
19/11/08	DAA send projected Irish GDP figures	
26/11/08	DAA send projected worldwide GDP figures (after NIESR October report)	
02/12/08	DAA supply Forecast passenger output, inc. three scenarios-low, centreline & high	
03/12/08	DAA supply Forecast passenger output, inc assumption document by each airline	
08/12/08	DAA send Forecast output by route to York Aviation	
19/12/09	Conference Call 1: GDP figures & elasticities discussed. Output from current draft on airline basis discussed.	
09/01/09	DACC request	DAA send forecast sensitivity checks (after using BAA elasticities.
26/01/09	DAA send revised Irish GDP figures	
28/01/09	DAA supply revised world GDP figures	
02/02/09	DAA send new draft Forecast output DAPF 09-02	
03/02/09	Conference Call 2: Discussed revised Forecast output & reached agreement that output was reasonable	
12/02/09	Ryanair press conference details major Dublin Airport schedule changes, previously not communicated to DAA	

3.4 Forecast Output:

Due to the level of volatility of the economic environment, there have been two iterations of the data at this stage, issued to airlines and the Commission as draft forecasts DAPF09/01 AND DAPF09/02, which can be re-issued if required.

In relation to finalising the forecast (as far as this can be done at present), further information is currently awaited from the airlines on some further changes to the schedule for the coming year. Also to be delivered is detailed specification of a range of cost sensitivities which the DACC specifically wish DAA to undertake. As soon such information is available, additional scenarios will be prepared and circulated to all concerned as quickly as possible.

It is, however, clear in the current environment that, rather than trying to fix on a single point outcome, the most prudent approach is to consider a range of scenarios - baseline, high and low, to take into account the various directions which are possible in relation to the traffic. In the final DAA forecast report, all scenarios will be documented.



3.5 Impact of forecasting on CIP

The rate and level of change of the economic climate over the past six months is a vivid reminder of the difficulties of planning long term infrastructure. The forecast graphics above indicate that whereas in 2005-2007 Dublin Airport saw a sudden and substantial increase in its traffic well in excess of average historical growth rates, it now appears likely that 2009 and 2010 are likely to show a fall in passenger numbers. The airport must be able to accommodate either outcome while seeking to try to avoid either investing too early, or delaying investment until there is the kind of levels of congestion which were the source of such problems in recent years. In either case, existing assets must be maintained so that current levels of traffic can be handled in line with safety and other legal and regulatory requirements.

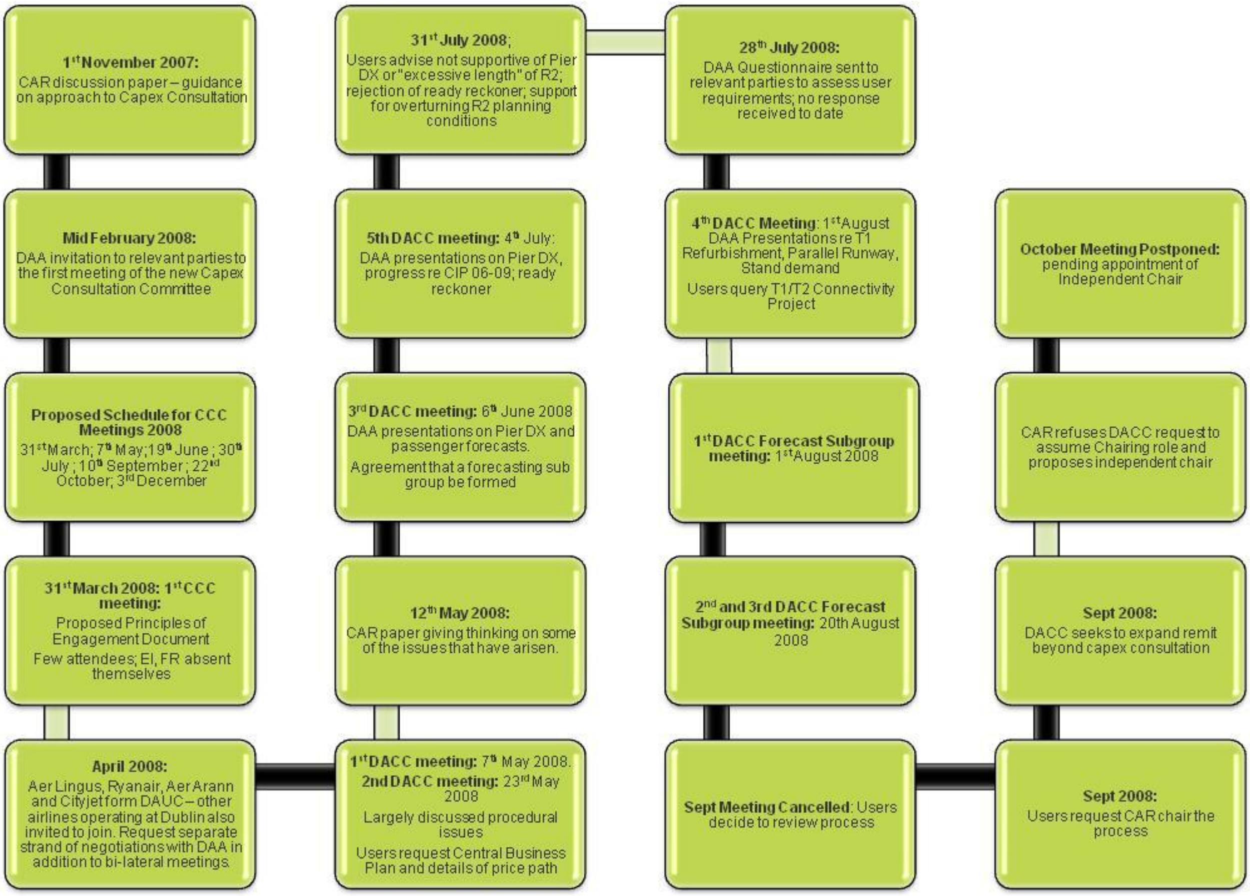
On this basis, DAA has developed proposals which are not simply based on a single forecast scenario or range of forecast scenarios, but which can be flexed to a significant extent in line with trends in traffic and congestion at the airport. Thus the forecast is, in relation to the capital investment plans, an indicative growth profile rather than a strict timeline for development.

4. User Consultation

DAA has always maintained a positive and proactive stance regarding consultation with airlines and other stakeholders on capital expenditure.

DAA sympathises with customer airlines in the face of the ongoing traffic slowdown as it too is being hit by this trend, facing traffic effects directly proportional to theirs, as well as significant reductions in key commercial revenues. However, while the airlines can take such immediate measures as grounding aircraft, reducing frequency or closing routes, such short term options are not open to DAA as the nature of infrastructure provision means that it must continue to plan for the long term requirements of all airport users. In this context, considered and mature consultation on appropriate capital requirements at Dublin Airport is more important than ever.

In preparation for the current regulatory review, CAR issued a guidance paper (CP8/2007) outlining its preferred approach to Capital Expenditure consultation. The key related events which have taken place since then are outlined in the flow chart below:



Throughout 2008, DAA made significant and genuine efforts to establish a constructive consultation process, the key elements of which are explained below.

Following the publication of CAR's Guidelines Document in November 2007, DAA was first to propose a new process of engagement with users on capex. Following internal review and preparatory work DAA's *Principles of Engagement* Document was prepared and issued to users in March 2008. The document outlined DAA's intentions as regards the process:

> *"we are committed to a successful engagement process in the belief that it should produce a better outcome to the regulatory review for all parties. We also intend to use the progress we make for the 2009 review as the basis for development of more consistent and productive relationships going forward"*

DAA proposed establishing a series of meetings to discuss capital expenditure proposals with users whilst also enabling DAA to meet CAR's deadline for submission of the CIP by February 2009. DAA proposed that meetings be held every six weeks from March to December 2008. The first meeting was scheduled for 31 March 2008. Ultimately, however few users attended and three of the four home-based carriers were absent.

On 17 April we received a letter from the newly formed Dublin Airport Capex Consultation Committee (DACCC[8]) informing us that its members had

> *".. individually decided not to attend the DAA's meeting on 31 March last because of a lack of confidence in both the DAA's consultation process, and your [DAA's] stated aim that you will "work together in a positive, open and constructive manner" in a context where the regulated monopoly is incentivized to ignore users' reasonable requirements and over spend on capex".*

In the same letter, DAA was invited by DACCC to attend their inaugural capex meeting on 2nd May 2008. Despite the airlines' unwillingness to engage in the consultation process that the company had sought to establish, DAA readily agreed to engage in consultation under DACC's chairmanship, in the interests of engaging with users, complying with CAR's requirements and supporting any form of open and constructive process.

[8] The DACCC subsequently became the DACC

From the outset it was DAA's understanding that the focus of the DACC-chaired consultation would be on the future capital investment programme and the requirements of users in that regard. However, it emerged that the DACC wanted to establish what the future price level would be in advance of any capex discussions. In contrast, DAA continues to see this task as being the sole responsibility of the Commission for Aviation Regulation, given that it was appointed by the Government to set the maximum levels of airport charges at Dublin Airport, taking into account a range of factors including its statutory objectives. As DAA understands it, the purpose of the consultation process is to provide a focus for user input into future capex plans, not to engage in a general price negotiation on overall airport charges, nor would this be possible in the regulatory environment. From the outset DAA noted that many elements of the central business plan requested by users up front, had historically been incorporated in the CIP documentation as an output of the engagement and indeed are incorporated in this document.

In addition, it was apparent from early in the process that there were significant inadequacies with regard to procedural issues which DAA perceives as having hindered the process of constructive engagement under the auspices of the DACC. Specific difficulties related to

- The production of draft agendas and minutes in a timeframe that would facilitate adequate preparation of material and result in effective addressing of the issues during the meetings

- Receiving responses to letters and other correspondence within a reasonable time period

- Ensuring effective representation from all current users and their representative bodies (specifically IATA and a number of foreign carriers that had played active roles in previous DAA-led consultation processes).

In DAA's view, getting the process and approach right is a necessary pre-requisite for a successful process.

Despite these difficulties, a number of presentations were made by DAA to users in the period from late spring to the end of the summer, addressing projects such as Pier DX and the new runway. DAA also attempted to establish sub-groups comprising DAA and DACC representatives to collectively address three areas impacting on the CIP for the next regulatory period:

1. Passenger forecasts,

2. The future of Check-in, and

3. Terminal 1 refurbishment requirements.

Only the first of these sub-groups became active as the airlines failed to nominate representatives to the other two. In the case of the passenger forecast sub-group, users had asked that a collaborative review of traffic forecasts prepared at the end of 2007 / start of 2008 be undertaken to take cognisance of the intervening increases in fuel prices and the weakening economic climate. DAA subsequently invested a significant level of resources to work with the airlines to generate a range of scenarios to address the current uncertainty in the market (further details on this interaction is set out in the Forecasting Section of this document).

Furthermore, in response to the CAR's request in its Guidelines document, DAA developed and issued a "ready reckoner" which enables the airlines to evaluate the impact of various levels of project capex spend on regulated charges. In accordance with CAR's stated requirements, that the airlines be *"informed of the cost implications <u>of a given project</u> in terms of the impact on charges and possible alternatives." (emphasis added),* the model assists users to develop informed views on various options and can facilitate decisions regarding the prioritisation of projects in the capital programme. Users were not supportive of the model as presented as it did not enable them to calculate an overall price outcome – an output that was never intended. In contrast, the airport charges outcome is dependent on the interplay of a range of variables and policy decisions on the part of CAR and others which will be resolved in the course of the price cap review. Notwithstanding this, CAR made some amendments to the Ready Reckoner based in part on the assumptions incorporated in its Interim Review 2007 that provided users with an estimate of the overall Airport Charge and DAA also circulated this version to users.

DAA issued a questionnaire to all airlines in July 2008 to obtain structured feedback on key airport development issues, but despite written and verbal reminders no completed responses were received and DACC's reaction to this attempt at consultation was negative. The questionnaire has been referred to as "irrelevant" which appears inconsistent with previous allegations that DAA ignores the requirements of users.

On the contrary, over the past number of months DAA has shown itself to be responsive to what little feedback that has been received from the DACC, for example:

- DAA withdrew proposals for an extension to Pier D following representations that users did not require the additional stand capacity envisaged in that project.

- DAA facilitated the DACC request to apply for planning permission to retain the Temporary Boarding Gates located at the end of Pier D until Pier E is commissioned.

- DAA reduced the scope of the T1X project by excluding the works that were due to be undertaken on Area 13.

- DAA withdrew proposals to undertake a major refurbishment of Terminal 1 once T2 opens.

DAA was disappointed that both the scheduled September and October consultation meetings were cancelled as this hampered DAA's ability to finalise its CIP in a timely fashion having taken on board comments provided by users. Despite users' requests for consultation, DAA was also requested not to make presentations on specific project proposals. Furthermore, from early autumn, DACC tried to shift the focus from capex consultation by introducing ancillary concerns which would traditionally either been dealt with by the long-established Airline Operating Committee or which were not in DAA's remit but the responsibility of other bodies such as Government.

In the latter months of 2008, CAR proposed the prospect of engagement with users through the auspices of an independently chaired process. Again DAA unreservedly supported this option as one that might facilitate constructive consultation on capex requirements and confirmed this view to the DACC, to the proposed Chairman and to CAR. We had understood that DACC also expressed initial support for this initiative. Unfortunately, however, a commitment to proceed with the meetings was not forthcoming from users and the initiative lapsed.

The Commission then proposed that it would organise and host a series of meetings on the capex needs at Dublin Airport. At time of writing the first meeting is scheduled for 18th March. Though the company is disappointed that this CIP documentation will now necessarily become the focus of consultation rather than an output from it, DAA hopes that it will facilitate a constructive interaction on the requirements for the future and enable delivery of airport infrastructure in a timely manner. DAA looks forward to the commencement of the consultation process and welcomes constructive feedback on all aspects of the proposals contained in this document, including project specifications, triggers etc.

5. Development Strategy for Dublin Airport

5.1 Master Planning Context

Dublin Airport is the principal gateway to Ireland and represents the most significant single economic entity in Fingal County and the Dublin region. The number of passengers using Dublin Airport has increased from 3 million passengers per annum (mppa) in 1982 to over 23 mppa by the end of 2008.

The ability of an airport to expand and evolve with the growth of its traffic is greatly influenced by proper long-term planning for airport development. Previous master plans for Dublin Airport together with a professional approach to development planning on the part of the Local Authority have enabled the airport to grow to its current level and have created the potential for it to continue to grow to meet demand for years to come. It is important that future plans maintain the farsighted approach to infrastructure development adopted heretofore so that future generations can also benefit.

If Dublin Airport's key role is to be sustained in the future, it is vital that its future development is not constrained. The adoption of a long-term view is critical and it is essential that Master Plans are properly integrated into the wider planning process i.e. National Development Plan, County Development Plan and the National Spatial Strategy. For example, approaches to runways can be kept free of inappropriate development, adequate drainage and sewerage services can be assured and allowances can be made for access and public transport.

To function efficiently and realise its potential, an airport needs to be balanced across all its systems. The runways and airfield systems must have adequate capacity, and terminals and piers must have the ability to efficiently process that capacity. In turn, these assets must be supported by the landside access systems in terms of roads, public transport and car parking.

5.2 Development Strategy

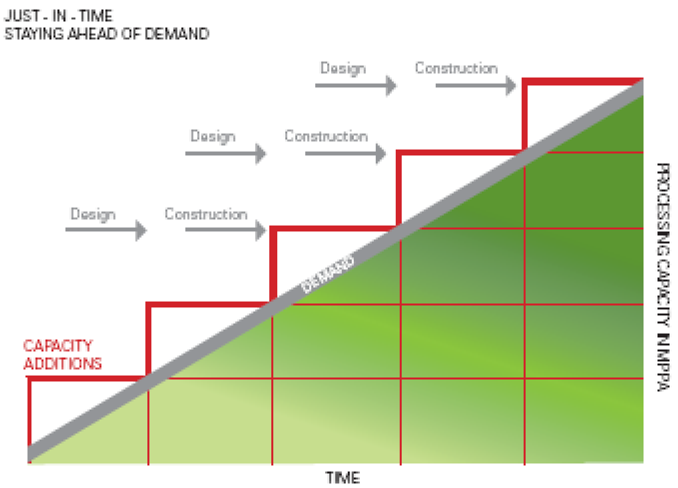
The development strategy for Dublin Airport is to deliver cost effective airport infrastructure in a timely manner to handle the forecasted volume and profile of traffic, thereby meeting the needs of current and prospective users.

Successive master plans are in effect roadmaps through the various stages of the development strategy. They establish a guiding framework and sequence for the various development projects but not necessarily a timeline. Trigger points relating to demand and capacity balance determine the timing of the various elements of the masterplan.

On completion of the Airfield Programme of works, Terminal 2 and Terminal 1 extension north, the Dublin Airport passenger handling capability will have "caught up" in terms of redressing a severely out of balance system. The surface access and terminal facilities at this stage will no longer be a constraint on activity. This balanced condition will remain until the runway demand becomes the constraint on the system. The latest passenger and traffic forecasts are indicating that a new runway will not now be required in the short term. However, because of the long lead times required for such infrastructure, prior to construction, it is essential to complete the planning and design phase currently in progress, and a budget for this work has been included in this CIP.

Capacity will then be added only as required to the main systems; airfield, terminal and piers and landside access, guided by the Master Plan and all in accordance with trigger points for various elements or phases as discussed in Chapter 8.

The requirement for any given piece of infrastructure can be related to demand for that particular element. Though the demand curve may be relatively smooth, capacity provision can only happen in step changes as indicated overleaf :



Master Planning has been carried out at Dublin Airport since the 1960s with plans being prepared generally every decade to the 1990s largely in the context of sluggish passenger growth. Accelerating passenger growth since then initiated a major review of the master planning process in 2002, resulting in a detailed Baseline Study followed by a master planning solution to redress the out of balance situation, particularly in Piers and Terminals, highlighted, in the Baseline Study. It was also acknowledged that such plans need to be reviewed and redrafted on a 5 year cyclical basis.

Following a review of the 2002 plan in 2005 and a comprehensive consultative process across the full spectrum of stakeholders including all on-airport operators and relevant key external parties, a comprehensive development programme was initiated, resulting in the construction of Pier D and significant airfield infrastructure. The construction of Terminal 2, Pier E, and Terminal 1 Extension North started and the planning process for a new runway was commenced. Extensive preparatory work for the proposed Metro North has been carried out with the Railway Procurement Agency, leading to finalisation of the alignment of the Metro and the determination of requirements for the safeguarding of the location of the station box. Further work will be required once the timetable for commencement of the Metro construction becomes clearer.

5.3 Current Masterplan Study

DAA is currently in the process of finalising an updated Master Plan; this work is being carried out by Pascall and Watson Architects. This Master Plan, building on previous master plans, will provide greater clarity on the direction of the DAA's future Capital Investment Plans. A time scale of 2035 has been selected as the design year as this provides a suitably distant horizon, which ensures that long term planning strategies are adequately tested and short term investment decisions do not dominate the process. Furthermore, at this horizon, the twin runway system will be beginning to approach its ultimate capacity under foreseeable operating regimes.

In accordance with the Local Area Plan, the focus of the Master Plan has been to establish the optimal development opportunities between the main runways. The resultant overall Master Plan will accommodate a variety of different scenarios, well beyond 2035. This Master Plan safeguards for a range of alternative scenarios and represents a significant degree of flexibility to respond to possible different traffic mixes, growth patterns and future operating regimes. In the context of these alternative scenarios, the plan also provides a roadmap for near term development, and the sequencing of elements of development for airfield, terminal, piers and road access systems in response to the traffic growth triggers.

The Master Plan is therefore the cornerstone for future Capital Investment Plans. The result should be a series of projects to be implemented over the lifetime of the plan. The projects, if implemented at the right time on the growth curve, should be operational just in time to meet demand.

The basis for successful airport Masterplanning is founded upon the inherent characteristics and capacity of an optimised airfield layout.

The Masterplan will therefore provide a 20 to 30 year blueprint for the airport based on the capacity provided by a two runway system. Benchmarking studies show that in the context of a twin runway system, European airports typically maximise the existing campus before creating new major infrastructure.

In generating planning options for evaluation, Piers and Satellites were considered initially as discrete elements to ensure that all realistic options were identified and the process was not constrained by the development of adjacent terminal facilities. A detailed evaluation of each option was carried out by a cross-functional expert group working to an agreed set of criteria based around functionality, deliverability and cost.

With Pier D completed and Pier E in progress, this study of discrete piers and satellites resulted in 5 viable options for consideration which could be delivered with different sequencing alternatives determined by demand:

1. redeveloped Pier A

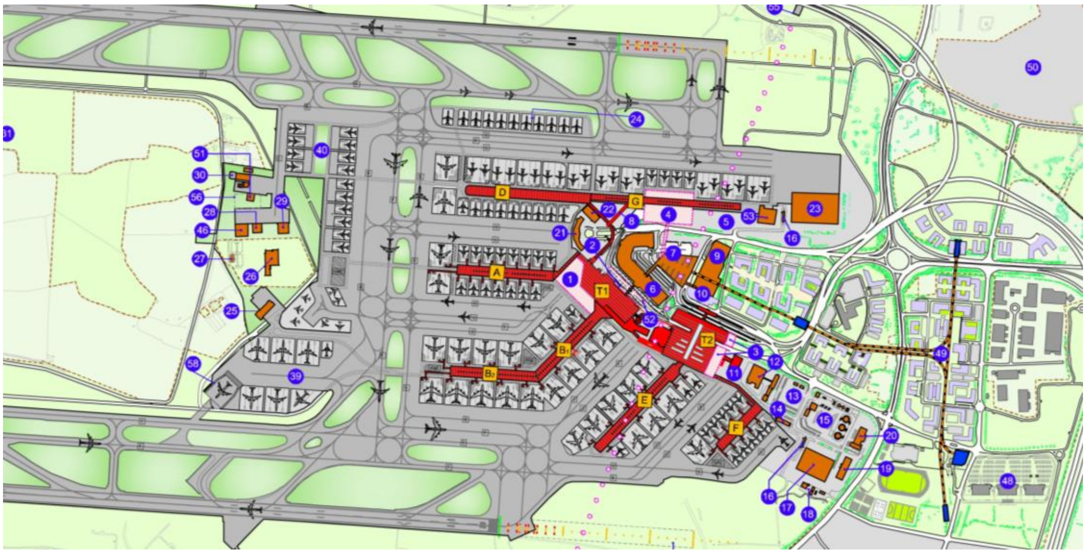
2. redeveloped Pier B

3. new Pier F

4. new Pier G

5. a further extension of a redeveloped Pier B.

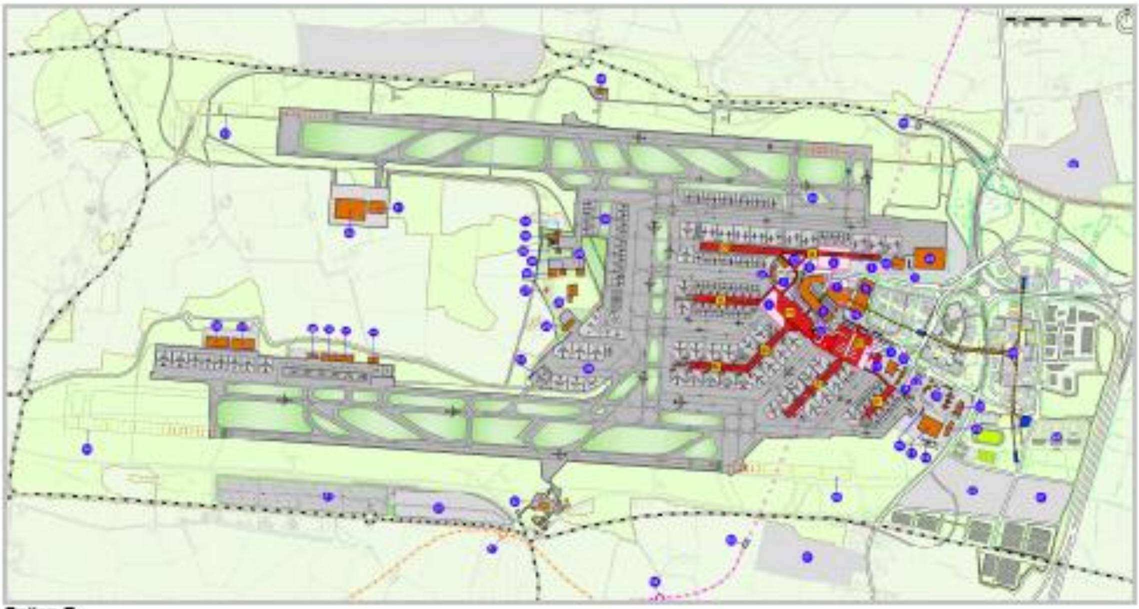
As Pier G and an extended Pier B will not be required until beyond 2022, the sequencing alternatives were reduced to the first 3 options listed above.



Viable options for terminal development were then prepared for evaluation, combining those pier and satellite elements previously investigated. The final options selected for evaluation were tested for various business scenarios to take into account the possibility that the airport may develop into a hub or an expanded hub at a future date and to safeguard for these eventualities.

One of the possible alternative scenarios envisaged circa 2035 is as laid out in the drawing below. It envisages a concentrated development of the facilities in the eastern campus up to a capacity of approximately 50 mppa. The further developed terminal facilities would ultimately be supported by 6 piers, A, B, D, E, F and G, supported by a twin parallel runway system, a metro light rail system and upgraded surface access connectivity.

In the context of maximising existing infrastructure and arriving at the most cost effective solution and operationally flexible facilities, this option safeguards for the balanced, cost effective, future development of the airport.



Possible Dublin Airport layout circa 2035.

6. CIP Tranche 1 : Operational Projects

The Operational tranche of the CIP mainly 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. These works are valued at an average €51 million per annum, a spend which equates to circa 2.8% of the Gross Book Value of the Regulated Asset Base[9].

The projects that are included here are the result of a thorough examination of all of the options available to us, and are only proposed because they fulfil one or more of the following criteria:

- There is an absolute new requirement as current assets are already being fully utilised or a commercial opportunity exists.
- current assets have become obsolete or time-expired
- a safety or regulatory requirement exists to make the investment.

The Operational CIP is divided into five workstreams as set out below.

Detailed summaries for all the projects contained in the Operational CIP can be found in Chapter 9 of this document.

6.1 Stands and airfield (€ 59 million)

Operational Projects 2010 - 2014 : Stands and Airfield

	Code	Project		Primary Driver		2010 - 2014 Spend €
	CIP 2.009	Control Tower Facilitation works		Capacity		1,400,000
	CIP 6.009	Engine Testing Facility fees only		Safety / Compliance		400,000
	CIP 6.017	Overlay Runway 10/28		Repair / replace		23,000,000
	CIP 6.019	North Runway House Buy-Out		Capacity		8,000,000
	CIP 6.052	Central apron reconstruction		Repair / replace		15,000,000
	CIP 6.054	Taxiway C L lights Runway 16 / 34		Safety / Compliance		6,300,000
	CIP 6.055	B7 Taxiway Overlay		Repair / replace		3,000,000
	CIP 6.056	Apron Road Reconstruction		Repair / replace		1,800,000
	CIP 6.057	Airfield Generators Replacement		Repair / replace		500,000
	Total					**59,400,000**

[9] Estimated 2010 RAB, in 2009 prices

Dublin airport's main runway 10/28 was completed in 1989 and has been in continuous operation for the past 20 years. The frequency of maintenance on the runway, in the form of slab replacements, has steadily increased over the past number of years. A structural evaluation carried out in 2007 has concluded that the remaining life of the pavement to be in the order of 4 to 6 years before significant intervention is required. It is therefore intended to carry out the runway overlay over the period 2010 to 2011. Every year the overlay is delayed beyond this date, the extent of the rehabilitation required will increase significantly. This project has become even more critical in light of the postponement of the new North Runway.

Similarly, the pavement located between Pier A (Constructed 1949) and Pier B (Constructed 1969) is life expired and in a very distressed state due constant heavy trafficking in these areas. The area has been subject to ongoing discrete slab replacements, but now requires complete replacement to ensure continuous contact stand availability. The budget figure of €15 million included in this workstream will cover the cost of carrying out this work and also a contingency to allow for replacement of other critical areas of apron that may be required in the 2010 – 2014 period.

In light of the forecasted reduction in passenger numbers in 2009 and general economic downturn, we are postponing the commencement of runway construction until airport activity starts to grow again and the demand triggers as discussed in section 7 of this CIP document are reached. However, noise mitigation measures associated with the planning permission for the new Runway include a voluntary house buy-out scheme for residents whose houses lie within the 69 dBA Leq[10] 16 hour noise contour. The Operational tranche includes a €8 million allowance for the advance purchase of some residential properties within the 69dBA contour, should such purchase opportunities arise.

6.2 Piers and Terminals (€26 million)

Operational Projects 2010 - 2014 : Piers and Terminals

	Code	Project		Primary Driver		2010 - 2014 Spend €
	CIP 7.030	Terminal 2 Completion		Capacity		10,000,000
	CIP 7.035	Pier B Connectivity		Capacity		11,000,000
	CIP 7.036	T1 Life Safety Systems upgrade				5,000,000
	Total					**26,000,000**

T2 project spending which is timed to take place in early 2010 is held in this workstream. The €10 million sum to be spent in the first quarter of 2010 was included in the original

[10] Noise measurement standard.

cost estimate and was always intended to be spent post 2009. The investment relates to payments associated with the R132 road upgrade works and final planning contributions to Fingal County Council.

The Pier B connectivity is project required to provide routes for passengers transferring from T1 to T2 and vice versa, as well as for passengers arriving or departing from Pier B that are being processed in Terminal 2. This project is at the final design and consultation phase. It is anticipated that construction will commence in the second half of 2009 and finish in early 2010. Total cost is estimated at €11 million, of which half will be spend in 2010.

6.3 Airport Infrastructure (€110 million)

Operational Projects 2010- 2014 : Airport Infrastructure

Code	Project	Primary Driver	2010 - 2014 Spend €
CIP 2.017	Hangars Maintenance	Repair / replace	4,200,000
CIP 8.001	Airport Operations	Repair / replace	40,000,000
CIP 8.008	Corporate IT	Repair / replace	10,700,000
	Airport Ops Total		**54,900,000**
CIP 4.014	Replace CHP 2	Repair / replace	3,300,000
CIP 4.017	Upgrade HBS	Safety / Compliance	10,800,000
	Plant and equipment Total		**14,100,000**
CIP 9.019	Divert and Increase Cuckoo Culvert capacity	Safety / Compliance	11,000,000
CIP 9.020	MV Network Renewal Works A	Repair / replace	2,500,000
CIP 9.021	Airfield Drainage upgrade (3km)	Capacity	3,000,000
CIP 9.022	Airfield Pollution Control	Safety / Compliance	7,500,000
	Utilities Total		**24,000,000**
CIP 1.016	Refurbishment of existing MSCP.	Repair / replace	3,000,000
CIP 2.008	Maintenace of listed buildings	Safety / Compliance	500,000
CIP 3.014	Upgrade Airside / Landside Perimeter Fence	Safety / Compliance	2,000,000
CIP 3.033	Repairs to Departures Road	Repair / replace	4,300,000
CIP 3.034	External Roads upgrade	Repair / replace	2,200,000
CIP 3.035	Internal Secondary Campus Roads upgrade	Repair / replace	5,000,000
	Landside Infrastructure total		**17,000,000**
	Airport Infrastructure Grand Total		**110,000,000**

6.3.1 Airport Operations

A major element of this workstream is a budget for Airport Operations, which covers modification, replacement and refurbishment works of a short lead time that are essential to the efficient running of the airport. These projects are typically planned 12 months or less in advance due to the dynamic nature of the airport and the changing requirements of the airlines.

The Airport Operations budget also includes Airport IT and Technology, which covers ongoing investment in mission-critical IT systems which are central to airport operations and passenger movement around the airport. The key areas of investment for the 2010 – 2014 period include:

- Replacement of Airport Operational Database ("AOS" system currently provided by IBM): The AOS system effectively runs the airport operations, by controlling activities including arrivals, aircraft parking, gate allocation and the scheduling and running of the airfield. The current system was installed in 2001 and urgently requires replacement with a new system that will provide better functionality and reliability.

- CCTV upgrade: this project involves the phased migration to the next generation of CCTV technology. This will improve airport security across the entire campus.

- Enhancement of airport communications ducting: this work is necessary to facilitate the future growth of IT systems around the airport. The current cable ducting system is at capacity.

- Integration Broker (IB) technology: this new software will improve the interface with all airport systems.

- Replacement of Public Address system: the T1 PA system is up to 30 years old in places, is the source of many complaints from the airlines and urgently requires replacing.

Corporate IT within DAA provides key systems infrastructure, processes and controls which are critical to the safe and efficient running of the Airport operations and the overall business. The CIP Capex for Corporate IT amounts to €10.7m for the five years ended 2014. This represents a reduction of over 30% per annum on the previous CIP for the period to 2009 in real terms.

Corporate IT capital expenditure for 2010 – 2014 is broken down into four categories:

1. Enterprise Software: This is the largest element of the Corporate IT budget and includes the following –

a. The upgrade to the underlying ERP systems software. This software processes all payroll, HR, expenses, fixed asset, non resale inventory, payables, receivables and other ERP transactions which number hundreds of thousands of individual transactions per annum. DAA has a highly efficient shared services centre and is among the fastest commercial semi state bodies to publish its accounts on an annual basis. We provide automated services to suppliers & customers including electronic invoices, statements and remittances. This is indicative of the quality of the Back office system. DAA needs to maintain this efficiency and, in that regard, will upgrade its existing Oracle ERP in 2010. It is standard industry practice to complete one major ERP upgrade in a five year period.

b. The upgrade of Business Intelligence Software to the next generation which will allow for expanded real-time management reporting including operational, financial & project datasets. This software improves the quality and timeliness of management information & assists in the efficient running of the airports.

c. Capex for IT security: It is imperative that DAA systems are secure and resilient: as well as the highly sensitive airport environment, DAA's Retail, web and car park systems process and hold personal credit card and other passenger data. DAA will operate to PCI compliance security level and this capital will provide for ISO 27001 requirements including firewalls, encryption, intrusion detection and other mandatory & recommended IT security during the five year period.

d. Allowance for additional Retail tills to be deployed during the five year period together with one EPoS / Retail Back office application upgrade during the same period. The Retail Systems process circa 4.5 million transactions per annum - a critical component of Airport profitability. Allowance has been made for some additional retail till deployments together with one application upgrade in compliance with industry best practice.

e. Expanded database software. Databases are the data stores on an IT technology stack. In an Airport context, these hold the Airport Operations, ERP, Access Control, Retail and other transactional and standing data.

Provision has been made for database expansion to cater for transaction and capacity increases for five years worth of data.

f. Provision for the redevelopment and re-platforming of airport, retail and corporate websites. These platforms have grown in importance in recent years (for example, car park pre-booking) and allowance has been made for their re-platforming and ongoing development to continue to provide useful passenger information and further sources of revenue generation during the period.

2. Enterprise Hardware :The Enterprise Hardware constitutes the enterprise storage area network (SAN) on which most of DAA's main systems run including ERP, Retail, Access Control, Business Intelligence etc. This system will not be replaced during the 2010 - 2014 year period but provision has been made for additional servers and storage to be applied for expansion of processing and storage capacity in the latter part of the period. This will extend the useful life of the existing equipment beyond a six year period. This budget also includes upgrades to the Mechanical and Electrical infrastructure which serves the airport campus data centres which are in turn replicated to an offsite facility in compliance with best practice disaster recovery.

3. Desktop and Windows Backend Services: Investment in Desktop IT covers the ongoing replacement and upgrade programme for circa 1,200 PCs and laptops deployed across all departments within the company. As well as hardware replacement, this budget includes licensing for all desktop software, as well as the labour costs associated with carrying out the physical replacement, transfer of hard disk data etc. In addition, Windows backend infrastructure and software is provided for such functions ranging from content filtering to email archiving to backend server virtualisation. The industry standard is a four year replacement policy and DAA is allowing for a longer five year replacement policy within this budget.

4. Business and Technology Initiatives: This is an allowance for various business sponsored projects to improve processes, generate efficiencies and improve service resilience or compliance which will emerge over the next CIP period.

Recent projects under this heading in the current CIP have included provision of document image scanning within the airport police, retail warehouse and shared services centre, automation of complex rosters for Airport Search Unit, launch of Car Park Customer Pre Booking facility, automation of supplier remittance process etc.

One of the initiatives planned for the 2010 – 2014 period is the implementation of Enterprise Content Management, which involves moving structured data from shared drives into a secure, searchable and resilient database. This project will allow us to comply with statutory, regulatory and commercial requirements, as well as saving cost in terms of reduced storage, data backup and management. There are other business lead initiatives at early planning stage ranging from E-HR to automation of contracts & sourcing for which provision has been made in this budget.

6.3.2 Plant and Equipment

There are just two Plant and Equipment projects contained in the Operational tranche :

1. A replacement Combined Heat and Power (CHP) Plant and new air conditioning equipment which will replace assets that are up to 30 years old. Ongoing investment in CHP is a key element of our strategy to reduce our energy costs while simultaneously lowering the level of fossil fuels that we burn at the airport.

2. We anticipate that under European Commission Regulations we will be legally obliged to upgrade our existing Terminal 1 Hold Baggage Screening systems to CT scanner (“Standard 2”) technology by 2012 and this will require an investment of €10.8 million.

6.3.3 Utilities

The majority of the Utilities investment contained in this CIP relates to Airfield Drainage and Pollution Control.

As the runway, taxiway and apron network has become more extensive over time, the ability of the remaining uncovered airfield to naturally absorb and filter surface water has reduced. The increase in the number of aircraft using the airfield has also resulted in an increased use of de-icing chemicals in wintertime.

In line with tightening of environmental legislation at EU and National level, the latest Dublin Airport Local Area Plan (LAP) now requires

> *"..the implementation of a storm water management system in compliance with the recommendations of the Greater Dublin Strategic Drainage Study (GDSDS) in respect of new developments and redevelopments of brownfield sites to inter alia, attenuate at pre-development "greenfield" rates"*

One of the objectives of the Dublin Airport LAP is to

> *" intercept and collect, for separate treatment and disposal, runoff contaminated with de-icing chemicals in a manner that aims to achieve and maintain salmonoid water quality in the receiving waters"*

These objectives are consistent with current water legislation (principally the Water Framework Directive and the Water Pollution Acts).

In simple terms, all of the above requirements mean that surface water run-off must in future be segregated either into clean water, which can be discharged directly into the streams (expect in storm conditions when it must be captured in attenuation tanks and subsequently released in a controlled manner), or polluted water, which must be captured in separate attenuation tanks and pumped into the North Ring Sewer during times of low flow, for treatment at Ringsend treatment plant.

In response to these requirements DAA initially commissioned a report in by RPS Burks Green entitled "Drainage and Pollution Strategy", and this report recommended the construction of a comprehensive series of attenuation and other water management and retention facilities, including diversion chambers and water quality monitors for the segregation of clean and polluted water in each of the four catchment areas.

Much of the required attenuation and pollution control investment related to <u>new</u> airfield developments was contained in the CIP 2006 – 2009, including all the essential water quality monitoring and segregation equipment which was commissioned in late 2008.

The remaining three projects required to bring the balance of the legacy airfield infrastructure into line with the requirements of the LAP and the RPS recommendations are contained in this CIP. These comprise the diversion and upgrade of the Cuckoo Stream Culvert, Phase 3 of Airside Pollution control and the upgrade of Airfield Drainage at various vulnerable locations. These projects are essential in order to ensure that airport activities comply with all EU directives on water quality and do not contribute to either airfield or downstream flooding in an increasingly unpredictable climate.

In addition to the above, this category includes refurbishment works to the existing Multi-Storey Car Parks once T2 opens, and a small budget for essential maintenance works required for various listed buildings which DAA has a legal responsibility to preserve.

6.3.4 Landside Infrastructure

Most of the primary access roads which provide access to and egress from the airport campus are in the process of being upgraded as part of the Terminal 2 capital programme, and the cost of these projects was included in the CIP 2006 – 2009. There are however, four further projects which require urgent investment:

1. Repairs to Terminal 1 departure Ramp: This spend is urgently required because the existing bridge structure which forms the Departures Road adjacent to Terminal 1 leaks during wet weather and water frequently finds its way into the arrivals hall below. Various patching and drainage works have been undertaken to provide short-term fixes, but a long term solution involving resurfacing and resealing of the departures ramp is required. These works cannot be undertaken without causing major disruption until Terminal 2 opens, following which the traffic volumes on the Terminal 1 departures ramp will fall.

2. External Roads Upgrade: This project involves the upgrading of external public roads around the airport boundary which are still in the ownership of DAA.

3. Internal secondary campus roads: This investment will provide for the repair of 3 km of the internal airport roads which are outside of the main access and egress routes.

4. Upgrade of Airside / Landside perimeter fence: This project is required to upgrade the airside perimeter fence to ensure that it fully conforms to ICAO recommendations and independent advice from Dublin Airport's security advisors.

6.4 Revenue Projects (€25 million)

Operational Projects 2010- 2014 : Revenue

Code	Category		2010 - 2014 Spend €
CIP 2.014	DAA Office Accommodation	Repair / replace	2,500,000
CIP 2.015	DAA Tenant Accomodation	Cost Reduction	5,000,000
CIP 2.018	Cargo Distribution Centre	Repair / replace	14,300,000
CIP 2.019	Retail Logistics Centre	Capacity	3,100,000
	Commercial Total		**24,900,000**

This category covers essential works to existing buildings and facilities that typically generate commercial rental. The largest project relates to the creation of Cargo Distribution facilities by refurbishing existing buildings located on the North Apron. These works are required in order to relocate certain airside activities in order to facilitate the ongoing Transformation Programme, specifically Terminal 2 and Pier E.

6.5 Programme Contingency and Management (€35 million)

Operational Projects 2010 - 2014 : Programme Management and Contingency

Code	Project	Primary Driver	2010 - 2014 Spend €
CIP 8.100	Programme Contingency	n/a	20,000,000
CIP 8.200	Programme Management	n/a	15,000,000
Total			**35,000,000**

This category principally comprises an overall programme contingency and programme management fees.

Programme contingency is intended as an allowance to cover risks and unforeseen events not covered by the individual project contingencies, such as changes to legislation, levies, planning requirements and so on.

Programme management covers a mix of DAA staff costs and outside consultants as required to manage the programme of projects contained in the Operational CIP.

7. CIP Tranche 2 : Service Delivery Projects

The Service Delivery tranche 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.

Service Delivery Projects 2010 - 2014

Code	Project	Primary Driver	2010 - 2014 Spend €
CIP 6.018	North Runway Fees	Capacity	4,200,000
CIP 7.018	New Pier Design Fees	Capacity	7,000,000
CIP 7.032	T1 Passenger Processing enhancements	Cost Reduction	16,000,000
CIP 3.012	Taxi Holding Area	Capacity	4,000,000
CIP 8.300	Metro and GTC Design Fees	Capacity	2,000,000
CIP 9.024	Fuel Farm Development	Capacity	28,800,000
CIP 5.013	Retail Refubishments	Repair / Replace	16,800,000
CIP 1.006	Multi-storey car park	Capacity	40,500,000
CIP 2.016	Refurbishment of airside property	Capacity	3,000,000
CIP 8.100	Programme Contingency	n/a	7,000,000
CIP 8.200	Programme Management	n/a	10,000,000
Total			**139,300,000**

The key projects contained in the Service Delivery tranche are as follows:

7.1 Multi Storey Car Park

Additional short term car parking located close to Terminal 2 is required in order to serve the needs of users of the new terminal when it opens in 2010. The Multi Storey Car Park project contained in the Service Delivery CIP provides 1,706 such short term car parking spaces for passengers, delivered on a phased basis during 2010 and 2011, as well as 456 for use by car hire companies. This facility will make the airport experience better for passengers, with less congestion and easier access to conveniently located short term parking. Aside from greater choice, this solution will reduce walking distances and improve facilities for passengers. In addition, the provision of an integrated, privately funded and operated Four Star Hotel into the scheme will further enhance the customer experience, as well as maximising DAA's commercial return from this prime site located opposite the new Terminal (and adjacent to the future Metro) .

The MSCP concept which was outlined in the last CIP 2006 – 2009 was a much more basic, stand-alone facility without any complex interfaces, which would have provided 1500 parking spaces. Since that time DAA has developed the offer to improve the customer experience and maximise the return from the site. As Dublin Airport is severely under-served by hotel beds in comparison with other similar airports, it has been possible to attract private sector investment to build a new 400-bed four star hotel. 400 car parking spaces, for the sole use of the hotel, will also be built and paid for by the developer as part of the agreement.

Although this new and improved car park solution will be more complex, DAA will receive substantially more annual revenue into the single till from the operation of the Hotel, as well as extra car parking revenue in line with current levels, in return for this extra investment. Under current assumptions, the overall NPV of the project is in line with commercially acceptable levels.

7.2 Fuel Farm development

The Fuel Farm redevelopment project involves the expansion of jet fuel storage capacity at the current fuel depot at Dublin airport. The existing Jet fuel storage facilities comprise three above-ground storage tanks with a total 2.2 million litres operational storage capacity. While the average daily fuel demand is circa 2 million litres, during the summer months this increases to 3 million litres, and the peak daily demand recorded in 2008 was 3.4 million. The IATA recommendation is that typically 3 – 4 days of fuel storage capacity is required during peak demand periods. At less than one day's supply, Dublin Airport is operating at less than a quarter of the recommended capacity, and this project will address that infrastructural deficit. The major airlines have expressed interest in service quality metrics which are more airline-orientated than those initially presented by the Commission[11][12]. The stated reason for this is that such service quality measures would ensure the minimisation of delayed and cancelled flights.

This project also includes the installation of a new airside "into-plane" fuel tanker filling point, fed directly from the fuel depot by underground fuel pipes. This asset will facilitate the fuelling of aircraft on all Piers via tanker truck as before, but in a much more efficient

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[11] Page 2, Ryanair Response to CP6/2008,

[12] Page 10, Aer Lingus's Response to CP6/2008,

manner, with much shorter fuelling distances and without the need for the trucks to travel back to the landside Fuel Farm to refill.

The Fuel Farm redevelopment offers a concrete example of a development by DAA which has the potential to mitigate delays.

7.3 T1 Passenger Processing Enhancements

The existing Terminal 1 building has developed over a series of phases during the past 30 years. When Terminal 2 opens and circa 40% of passengers transfer to the new facility, an opportunity to reconfigure the departures floor layout in order to improve passenger flows and make better use of the available space will present itself. These improvements are contained in the T1 passenger processing enhancement project.

7.4 Retail Refurbishments

Airport Retailing is one of the DAA's core sources of revenue and contributes a significant proportion of DAA income supporting the funding of the DAA's Capital Investment Programmes and operations. Strong retail revenue into the single till helps to keep airport charges low.

As part of the CIP 2006 – 2009, DAA is investing in new and refurbished retail space that will help to retain existing revenue levels in an increasingly challenging environment:

- Terminal 1 Extension : 2,900 m^2 of airside space opening May 2009
- Terminal 2: 6,800 m^2 airside space (including Pier E), and 1,700m^2 landside space due to open in 2010.

DAA has drawn on over 20 years' extensive national and international experience of airport retailing and of passenger shopping behaviour to design and build these facilities.

Once T2 opens, retail space[13] across both of the Terminals and associated Piers will total circa 22,600 m^2. This is will bring the amount of retail space per passenger more in line with European norms[14].

The main focus of the airport's retail strategy during the 2010 – 2014 quinquennium will be on:

1. Launching and promoting a new airport retail environment, including the replacement of the "Travel Value" brand for direct retail goods.

2. Concentration of direct retail's activities on the "core" categories of liquor, tobacco, perfumes and confectionary.

3. Converting much of DAA's remaining non-core directly-operated shops to concessionaire-operated high street branded outlets.

Most airports, have a mix of direct (core product ranges managed by the airport operator) and concession (high street brands typically manned by outside staff) retail activities. Most non-core specialist categories, including the growth areas of fashion and accessories, but also watches, electronics and many other product areas, tend to be operated by concessionaires under well recognised high street retail brands.

In addition to the obvious boost from instantly recognised and trusted national or international brands, fit-out capital costs at concession units are much lower for the airport operator as the concessionaire pays for all of the shelving, Point of Sale material, shop fronts, signage and so on, while the airport operator provides the basic infrastructure (lighting, air conditioning, ceilings etc). The assessment of capex requirements for retail in the 2010 – 2014 period reflects a move towards more concession outlets over the next five year period. This shift will start with the launch of T1X later this year, will continue with the opening of T2 retail in 2010 and conclude with the conversion of the original T1 retail ("The Street" and Piers A and B) thereafter.

The requirement to regularly refresh all retail space in order to keep the offer fresh will remain, and is also allowed for in the next CIP. Retail space at Dublin Airport has historically been refurbished on a five year cycle, in order to react to changes in customer

[13] Including Food and Beverage

[14] As recommended by Commission for Aviation Regulation Consultants ASA in "Dublin Airport Assessment of Commercial Revenue 2005-2014", August 2005

demands and to counteract the wear and tear associated with such a high level of customer traffic[15]. Furthermore, in recent years the average number of trips taken by passengers travelling through Dublin airport has increased to 5.5 per annum. The risk of passenger "shopping-fatigue" obviously increases in proportion to the average trip frequency, further underlying the need for regular retail refurbishment.

The Commercial capital requirement also includes two budgets for the fitting out of DAA internal Office and commercial tenant accommodation. This work is required on an ongoing basis, principally to fit out office and general airport property (stores, ramp accommodation etc) in advance of occupation by DAA and rent-paying tenants.

7.5 Design Fees for future key projects.

As discussed in Chapter 5, three main options for Pier development were actively considered as part of the Masterplanning process, namely :

1. redeveloped Pier A
2. redeveloped Pier B
3. new Pier F

The optimum sequencing of these developments will not be known until traffic development patterns become clearer. Indications are that a pier development will be required, to add contact stand capacity, in the 2015 – 2019 quinquennium. To be in a position to respond to this anticipated demand, it will be necessary to carry out the design of the selected pier, obtain planning permission and prepare the tender documentation towards the end of the next Capital Investment Programme period. A budget of €7 million has been included for this purpose.

The new North Runway remains the largest project in the remainder of the Transformation Programme. While Runway construction has been postponed until it becomes apparent that the airport has returned to a growth phase, the lead time from commencement to

[15] Airport retail units are typically open from 5:00 am to 10:00 pm seven days per week, which represent much longer hours and therefore much higher wear and tear than equivalent high street units.

completion of construction is circa 2.5 years, and so it is essential to continue with detailed design and cost planning during the 2010 – 2014 period. Furthermore, DAA is preparing a fresh planning application in a bid to improve on the restrictive operating conditions that were attached to the August 2007 An Bord Pleanala decision. For these reasons the Service Delivery spend includes €4.2 million to cover North Runway fees. As outlined by the Commission in the course of its interaction with the 2008 Appeals, the provision of significant runway and terminal capacity simultaneous presents a costly, if not insurmountable challenge. With the completion of T2 in 2010, and the long term forecast increase in passenger numbers the development of additional runway capacity is the next logical step in the development of Dublin Airport.

This tranche also contains an overall programme contingency and programme management costs. Programme contingency is intended as an allowance to cover risks and unforeseen events not covered by the individual project contingencies, such as changes to legislation, levies, planning requirements and so on. Programme management covers a mix of DAA staff costs and outside consultants as required to manage the programme of projects contained in the Operational CIP.

8. CIP Tranche 3 : Enabling Projects.

The Operational tranche of the CIP as outlined in Chapter 6 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. The Service Delivery tranche outlined in Chapter 7 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.

However, it is the responsibility of DAA to also plan for the long term asset requirements at Dublin Airport in order to avoid returning to a cycle of underinvestment leading to congestion or to bottlenecks which inhibit growth. For these reasons we are proposing a third tranche of "Enabling" projects, which together represent the spend required to enable future growth at Dublin Airport. The timing of each enabling project is determined by reaching certain demand triggers as outlined below.

Tranche 3 comprises the following four projects, which DAA is requesting are assessed and evaluated by CAR, with the intention of agreeing to their remuneration when the proposed trigger points are reached, without the need for an interim determination.

	Code	Project	Primary Driver	Value €m		**Proposed Trigger**
8.1	CIP 6.051	North Runway	Capacity	305.0		Trigger for commencement of construction is either : 1. Increasing airside delay : Two consecutive 30 minute periods of excess delay, with an adjacent 30 minute period of runway pressure, or 2. Increasing demand for runway slots : If the weekly summary of planned movements shows 18 occasions or more of demand meeting or exceeding capacity.
8.2	CIP 6.047	New Apron Development	Capacity	22.7		Trigger for commencement of New Apron Construction is when stand availability in the peak week is shown to have dropped to a surplus of 10 stands or less.
8.3	CIP 6.053	Engine Testing Facility	Safety / Compliance	13.8		Trigger is when North Runway construction commences and / or airlines are asking for a new facility
8.4	**CIP 9.023**	Fuel Hydrant System phase 2	Cost Reduction	6.0		Trigger is when aviation fuel demand increases to such an extent that refuelling solely by tanker becomes impractical.
		Enabling Programme Management		5.0		n/a
		TOTAL		**352.5**		

The justification for each Enabling Project is set out below, along with a full description of the proposed triggers and the rationale in each case. It is hoped that DAA will have the opportunity to consult with CAR and users on each Enabling project, and to discuss the merits of the triggers proposed. These trigger proposals represent a genuine attempt by DAA to ensure the delivery of the necessary infrastructure to meet the requirements of current and prospective users, while taking cognisance of concerns about the challenges facing the industry in the short term.

8.1 North Runway

8.1.1 Introduction

Master planning studies undertaken in the 1960's concluded that the potential to develop two east-west runways should be safeguarded at Dublin Airport to accommodate future growth in air traffic and to maximise the potential of the airport site. This resulted in the incorporation of plans for two such parallel runways in the 1972 County Development Plan, and all subsequent Development Plans. The first of these runways (Runway 10L/28R) was opened in 1989 to meet the demand for the following circa 20 years. It is currently planned to build the second runway (North Runway 10L/28R) when the demand dictates.

The current runway system has a capacity of 48 movements in the peak hour and the potential to increase this further is very limited, without the addition of additional runway capacity. The provision of a new North Runway at Dublin Airport is essential if constraints on growth are not to be experienced in the medium to long term.

Prior to applying for planning permission for a new runway at Dublin Airport, other options were considered to significantly increase runway capacity. These options, documented in two separate reports[16], included;

1. Increased use of existing infrastructure at Dublin Airport
2. An extension to runway 11/29
3. Increased use of other airports
4. Provision of additional runway capacity in the greater Dublin area

[16] Dublin Airport – Runway 10L/28R Alternatives Report, December 2004 (Scott Wilson) (Ref: Appendix 11.2.1)
Dublin Airport – Options for Delivering Additional Runway Capacity, April 2003 (Scott Wilson) (Ref: Appendix 11.2.2)

The consultants concluded that the construction of a new runway parallel to the existing Runway 10/28 was the most cost effective option to significantly increase runway capacity and would provide operational flexibility into the future, and was the preferred solution.

On this basis and following consultation with the airlines, planning permission for a 3,110 metre long runway was applied for in 2004 and was granted by An Bord Pleanala in August 2007.

However, some of the conditions attached to this permission are highly restrictive from an airfield operations point of view, particularly the restrictions on aircraft night time movements to 65, and the prohibition of the use of the new runway between 23:00 hrs and 07:00 hrs. These conditions represent a new restriction on night-time aircraft movements, and so a new planning application is currently being prepared in order to seek to have these restrictions revised.

8.1.2 Existing runway capacity and demand

The declared runway capacity at Dublin airport has increased from 44 movements in the peak hour for 2004 to 48 movements in the peak hour for 2008. These capacity increases are the result of work carried out by the Dublin Airport Runway Capacity Group as detailed below ;[17]

Year	Peak Hour Runway Capacity Increases
2004	Peak hour capacity is **44** mvts p/hr.
2005	Changes to IAA separation procedures implemented and modeled by NATS to deliver a peak hour capacity of **46** mvts p/hr.
2006	Peak hour capacity remains at **46** mvts p/hr
2007	Coordination committee agrees to amend the runway delay criterion from 8 to 10 mins. The impact is modeled by NATS resulting in a peak hour capacity of **47** mvts p/hr declared.
2008	Shifting schedule demand, increased pilot efficiencies and continued ATC efficiencies allow a peak hour capacity of **48** mvts per hour to be declared within the agreed 10 minute delay criterion.

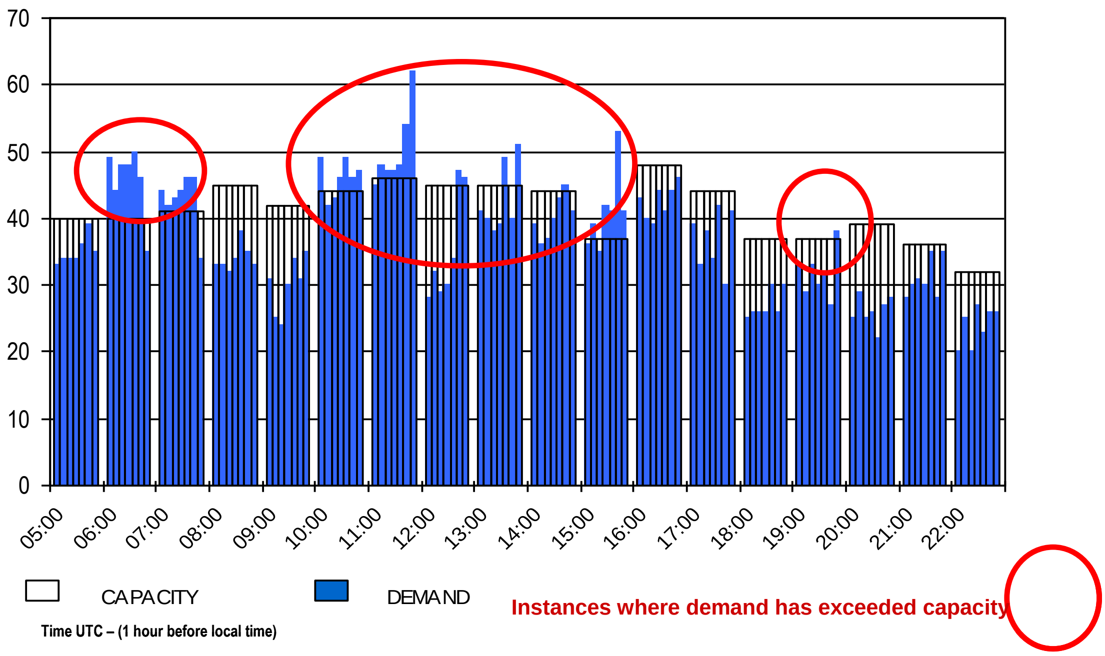
[17] Membership includes DAA, IAA, Airlines ACL(Air Coordinators Limited)

As a result of the increases achieved in peak hour capacity, 50 extra slots per day have been added since 2004.

Currently the demand for runway capacity, beyond 48 movements in the peak hour, is being managed through the 'Slot Co-ordination' process by UK firm Air Coordinators Limited (ACL) who are appointed by the Commission for Aviation Regulation. The graph below indicates the current situation, with demand plotted by UTC hour for each day of a typical week in Summer 2008 (white bars) against raw demand, i.e. the summation of all the slots that airlines would like to fly in and out of Dublin airport (indicated by the blue bars).

This analysis indicates that runway capacity is currently insufficient to meet airlines' raw demand in 9 out of the 18 operational hours each day.

Summer 2008 : Total Runway demand and capacity



This current under capacity is handled in practice by "coordinating" (moving around) the slots asked for by the airlines to fit in with available empty slots at other times of the day. This is obviously a sub-optimal solution because the airlines are often not allocated slots at times that they have requested. This process is sufficient to manage demand in the very short term where there are small increases, however for the medium to long term demand, additional runway capacity is essential.

8.1.3 Physical requirements of new runway

Runway Length

Consultation with the airlines has led DAA to conclude that there are two broad sets of requirements for runway length, namely Prospective long-haul carriers, and current users (incumbent airlines).

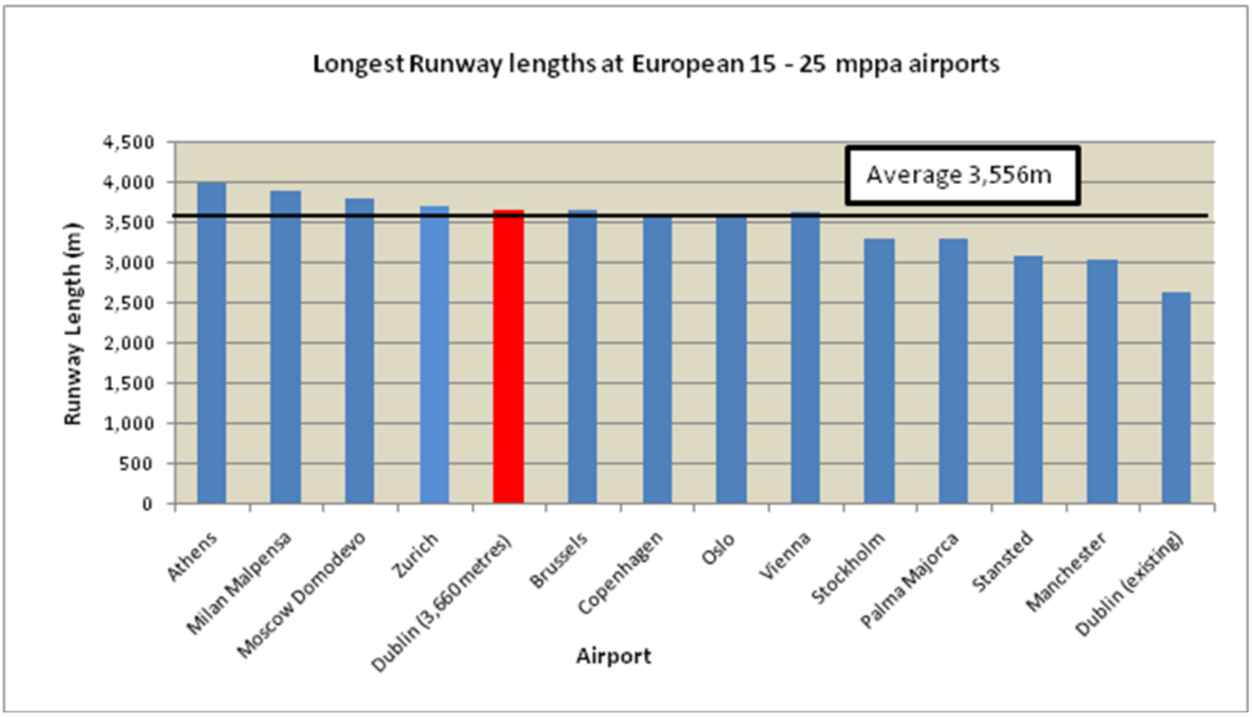
Prospective long-haul carriers have indicated a preference for a runway length of circa 3,660 metres (12,000 feet), and this requirement has become clearer since 2007. Current user airlines, and particularly the home-based carriers, have indicated a preference for a shorter runway. Runway consultation is documented in Appendix 11.5.3.

An analysis of all of the options led to the development of a design based on 3,110 metres, which formed the basis of our 2004 planning application. This scheme has been costed at a total of €255 million.

DAA has a responsibility to develop and foster aviation at Dublin Airport, and one of the central tenets of that responsibility is the provision of appropriate infrastructure to cater for direct access to existing and emerging trading partners. Bearing this in mind and having considered all likely current and future requirements viz runway length, DAA's preferred option is to proceed, when the demand trigger point is reached, with a new runway length of 3,660 metres. The incremental cost of the longer option is circa €70 million, and this is felt to represent a very worthwhile investment bearing in mind the broader long term benefits to the Irish economy.

Taking the 13 airports with passenger numbers between 15 – 25 million per annum as the most appropriate peer group for Dublin Airport, the average[18] longest runway at these airports is 3,556 metres. Furthermore, 7 of these airports have at least one runway in excess of 3,600 metres.

[18] Excluding Dublin



Similarly, taking <u>all</u> major European airports used by Dublin-based carriers and ranking them in order of decreasing runway length, it is evident that there are 18 airports with at least one runway longer than the 3,660 metres planned for Dublin, and a further 23 with at least one runway longer than Dublin's existing Runway 10 / 28.

The full data sets for benchmarking runway lengths appear in Appendix 11.2.4. While runway length is partially influenced by air temperature and airfield elevation, this data supports the conclusion that the preferred length for the new North Runway is within the appropriate range for airports of Dublin's size.

<u>Other Runway characteristics</u>

A summary of all of the key technical parameters for the proposed runway is set out below. As indicted in Appendix 11.2.3, these parameters have been influenced through consultation with the current and prospective airlines.

Item		Runway 28R	Runway 10L
ICAO Runway Code (safeguarded to Code F)		4E	4E
Runway Operational Category		ILS Precision Approach CAT III	
Offset from existing Runway 10/28		1690.6m	
Paved Length of Full Runway Construction		3,660m	3,660m
Paved Stopway		0m	0m
Length of Declared Clearway		190m	190m
Displacement of Threshold		450m	160m
Runway End Safety Areas (RESA)		240m long x 150m wide	240m long x 150m wide
Runway Strip Dimensions		3,780m x 300m	
Take-Off Run Available (TORA)		3,660m	3,660m
Take-Off Distance Available (TODA)		3,850m	3,850m
Accelerate Stop Distance Available (ASDA)		3,660m	3,660m
Landing Distance Available (LDA)		3,210m	3,500m

8.1.4 Cost estimates

The overall cost estimate for the North Parallel Runway, including design and planning fees already spent or committed, is €325 million, broken down into the following main categories :

	€m
Fees (incl. planning costs)	12
Runway enabling costs	46
Runway construction costs	170
Statutory levies	41
Mitigation costs	56
Total Costs €m	325

This estimate is based on the following key cost assumptions:

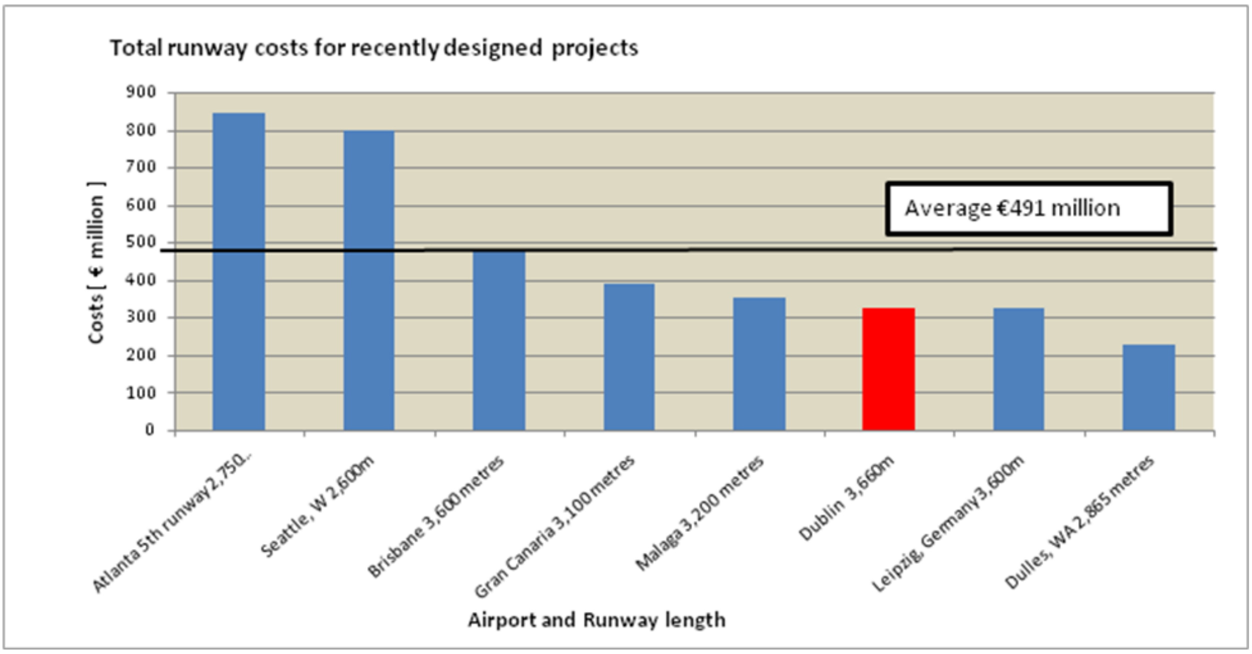
- 3,660m long runway x 60m wide (Safeguarded for future possible extension to 75m)
- CAT III instrumentation and lighting at both Ends
- Assumes 2 RETs at each end (total 4 RETs)
- 7 Access taxiways
- Assumes concrete pavement construction
- Assumes a full take up in the House buy-out scheme

DAA presented a cost comparison during the 2002 consultation on the option of extending runway 11/29 versus the construction of the parallel runway. This costing exercise was based on a nominal length of 2640m to demonstrate, that even at the existing runway length the option of extending runway 11/29 was more expensive, and any increase in this length would only make the option of extending runway 11/29 substantially more expensive, due to the requirement to purchase additional land.

Cost benchmarking of runway projects is notoriously difficult to carry out in a meaningful manner as there is such a wide disparity between cost inputs. These inputs are influenced by geographical location, proximity of runway site to neighbouring buildings and associated mitigation costs, whether land purchase is required, at what cost, and so on.

Notwithstanding these difficulties, in order to give some guidance we have presented some total cost benchmark data below[19] pertaining to recently designed runways around the world, of varying lengths.

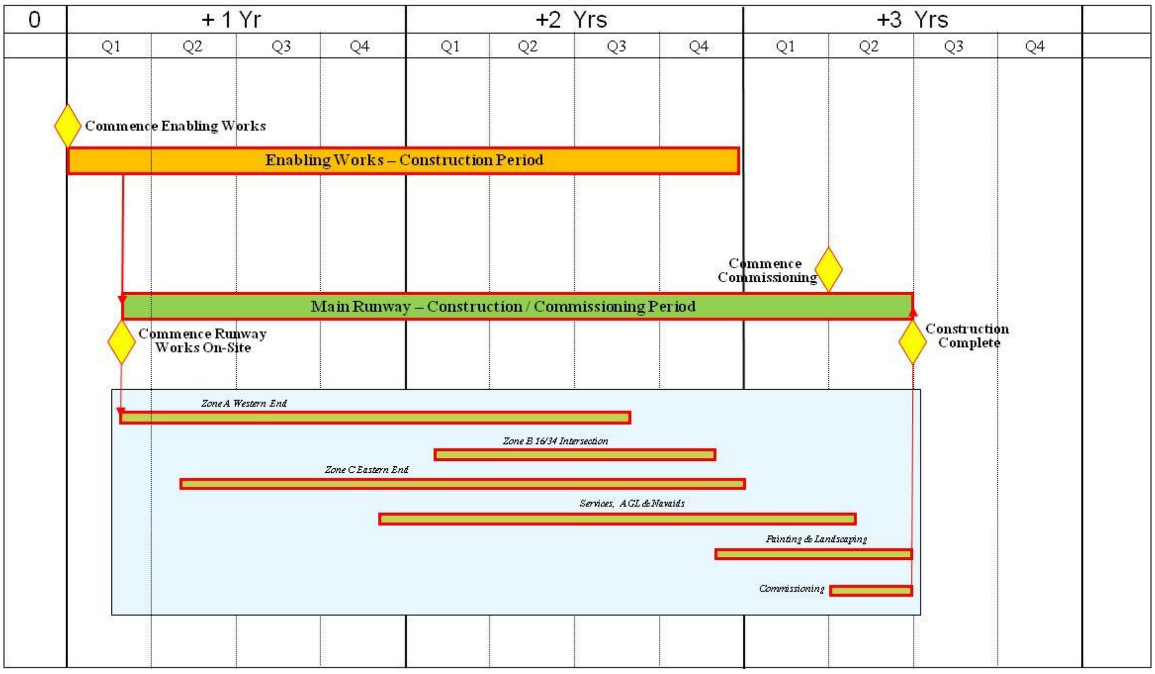
[19] Average cost excludes Dublin.



Notwithstanding the small sample size, the above analysis helps to support the conclusion that the total cost of the proposed new North Runway at Dublin airport represents good value for money.

8.1.5 Project programme

It is proposed to complete the full design and tender documentation and seek revised planning permission immediately, so that once the appropriate 'trigger' is reached (see below), the runway can be tendered and construction can commence. It is estimated that it will take two and a half years to deliver the runway once a decision is made to proceed with the project. An indicative programme is shown below;



8.1.6 Proposed Triggers for North Runway commencement

The current capacity[20] of the existing runway is 48 movements in the peak hour and there is very little scope for providing additional runway capacity short of a new North runway. In the current volatile market circumstances, DAA believes that the most prudent approach to determining the commencement date for construction for the new runway is to adopt a trigger mechanism. The following two triggers, either of which could serve to initiate the construction of the North Runway, are being proposed for consultation. It should be noted that in proposing these triggers DAA is assuming that the funding for planning and design work for the runway (CIP 6.018) is approved and detailed design is therefore completed. DAA would then be in a position to commence the project when either of the triggers are met.

[20] The capacity of a runway is defined by National Air Traffic Services (UK) as "the number of aircraft movements that may be scheduled to use that runway such that their average delay, measured over a period of a given length, does not exceed a specified value."

Runway Trigger 1 : Increasing Airside Delay

The Dublin Airport Coordination Committee (representing Airlines, Air Traffic Control, Dublin Airport's Slot Coordinator and the Dublin Airport Authority) has agreed and set the maximum delay criterion for accessing the runway at 10 minutes [21] [22]. In addition, the current average pushback and taxiing time without delay in the peak hours averages approximately 8 minutes. Adding the maximum agreed delay criterion of 10 minutes to the un-delayed taxiing time of 8 minutes yields the maximum average total time from pushback to airborne of 18 minutes.

Delays above these levels will breach the Dublin Airport Coordination Committee's maximum delay criterion for the runway.

For the purposes of defining a sensible runway trigger, historic pushback to airborne average times have been analysed, by month, over the years 2006 – 2008. These times are presented in 30 minute slots in the three matrices below, for the busy times 06:30 – 08:30 hrs. The following colour coding has been adopted to indicate periods of constraint:

Red : "Excess Delay" - pushback to airborne time equals or exceeds 18 minutes

Amber : "Runway Pressure" - pushback to airborne times between 17.0 and 17.9 minutes (i.e. almost at agreed limit)

White : "Unconstrained" - pushback to airborne times under 17.0 minutes.

[21] Busy airports in the UK (Heathrow, Stansted, Gatwick and Manchester) also set the maximum delay criterion for their runways at 10 minutes.

[22] **refers to Runway 28, the main operational runway at Dublin Airport**

2008	06:30	07:00	07:30	08:00	08:30
January	15.0	17.8	16.8	15.2	11.8
February	15.2	17.2	17.1	13.9	13.5
March	14.2	15.9	17.2	15.8	12.7
April	12.9	13.5	16.2	13.2	10.0
May	13.6	13.9	15.1	13.6	11.0
June	14.2	15.0	17.5	18.6	15.8
July	13.2	15.6	16.5	15.4	12.3
August	14.5	16.1	19.9	18.6	14.8
September	14.0	15.4	17.4	16.6	15.2
October	14.4	16.9	18.6	17.9	13.6
November	15.0	20.1	16.8	13.9	10.8
December	14.0	18.1	19.7	15.9	13.7

2007	06:30	07:00	07:30	08:00	08:30
January	13.9	14.3	12.3	10.3	9.9
February	13.1	15.8	13.4	10.6	10.5
March	14.7	17.2	13.1	12.4	10.8
April	11.9	11.2	10.7	10.6	10.0
May	13.2	13.3	15.1	16.4	12.1
June	12.6	14.5	15.2	17.2	14.9
July	13.2	14.1	14.8	15.5	11.1
August	12.4	13.9	15.7	15.2	12.9
September	13.0	13.2	16.0	15.9	12.1
October	12.5	13.3	12.7	13.9	11.1
November	14.2	15.9	17.0	13.3	10.2
December	12.5	15.5	17.9	14.6	12.4

2006	06:30	07:00	07:30	08:00	08:30
January	11.5	11.2	9.7	9.0	10.2
February	13.4	11.7	10.6	10.5	10.9
March	11.6	10.8	10.2	10.3	10.4
April	12.5	11.8	10.3	10.5	9.8
May	14.0	14.1	11.7	12.2	10.9
June	12.4	11.7	10.2	11.0	11.1
July	11.5	11.6	10.5	10.0	10.0
August	12.1	12.1	9.9	10.3	10.1
September	11.9	12.4	10.5	10.9	9.9
October	13.6	13.7	11.8	11.9	10.7
November	12.8	11.6	9.5	8.9	10.2
December	13.1	14.3	13.3	10.7	10.5

Legend
Offblocks to airborne time is between 17.0 and 17.9 mins
Offblocks to airborne time is equal to or greater than 18 mins

The following trigger is being proposed:

> Runway Trigger 1 : Two consecutive 30 minute periods of excess delay (red), with an adjacent 30 minute period of Runway Pressure (amber) .

The suggested process for monitoring this trigger is for the average pushback to airborne times to be calculated by DAA each month for each 30 minute period. DAA will verify that any change was not solely due to exceptional events (weather, IR issues, airside works etc). If the trigger is met, the airlines and CAR will be advised the following month.

If the trigger is not met, the data will be reported at the end of each season.

Runway Trigger 2 : Increasing Demand for Runway Slots

Twice a year, runway capacity limits are also discussed and agreed by the Dublin Airport Coordination Committee, bearing in mind the agreed 10 minute delay criterion. Limits are set for the maximum arrivals, departures and total movements on the runway for each hour throughout the day. Consultants from National Air Traffic Services UK (NATS) are contracted to evaluate runway capacity at Dublin Airport, and the limits change from season to season to best match demand.

For the purposes of developing a sensible trigger, the movements for the peak week[23] in Summer 2008 have been analysed, and planned movements have been compared to the agreed capacity limits for each UTC hour of that week. A separate analysis has been carried out for Arrivals, Departures and Total movements. The following colour coding has been adopted to indicate periods of constraint for each hour:

[23] Meaning the week with peak traffic movements: For 2008 this was the week commencing 28 July 2008

Red : Runway demand meets or exceeds the agreed capacity limit

Amber : Runway demand is within two movements of the agreed capacity limit

White : Runway demand is three or more movements below the agreed capacity limit.

Based on the above definitions, each instance of Red or Amber constraint that occurred in any given hour is recorded in the matrix below, and the summary position appears in the right hand "weekly summary" columns. The total number of instances of Red or Amber constraint for the week is indicated at the bottom row of the matrix.

Summer 2008 Busy Week Planned Movements

UTC Hour	Arrivals Analysis		Departures Analysis		Total Mvts Analysis		Weekly Summary	
00								
01								
02								
03								
04								
05			3	1			3	1
06			1		2	4	3	4
07	1				3	1	4	1
08								
09	1				1		2	
10	1				2	4	3	4
11			1		1	1	2	1
12	1				1		2	
13	1				3		4	
14						1		1
15			1		2		3	
16	1				1		2	
17								
18								
19					2		2	
20								
21		1						1
22	2	1					2	1
23								
Total	8	2	6	1	18	11	32	14

The following trigger is being proposed:

Runway Trigger 2 : If the weekly summary of planned movements shows 18 occasions or more of demand meeting or exceeding capacity (Red).

The figure of 18 occasions is proposed because 14 occasions were experienced and handled in Summer 2008, with significant constraints appearing especially in the early morning 05:00 to 08:00 period (UTC) and the late morning 10:00 to 12:00 period (UTC). A further increase of 25% to 18 occasions would likely represent the maximum level of runway pressure that could be managed before commencement of Runway construction should occur, given that the constraints would only increase in the following 2.5 years.

The suggested process for monitoring this trigger is for the above analysis to be carried out at the end of each summer season by DAA. DAA will verify that any change was not solely due to exceptional events (weather, IR issues, airside works etc). The airlines and CAR will be advised the following month whether the trigger has been met.

8.2 New Apron Development

Apron 6 was one of the major airfield projects contained in the last CIP 2006 – 2009, and was delivered on time and under budget. Also contained in the last CIP was a further 65,000 square metre new apron project – Apron 5A – which was subsequently not built as the demand for further remote stands did not materialise as expected. The management and monitoring of aircraft stand supply and demand is complex for many reasons, including:

- Contact versus remote stand types
- Airline pier preferences
- Varying size of stands available
- Varying size of aircraft types within flight schedules
- The towing of aircraft from stand to stand i.e. contact to remote and back to contact
- Presence of stand-by aircraft
- Presence of long-stay aircraft
- Immigration / security requirements

A surplus of stands is always needed in order to deal with unexpected or unplanned circumstances such as general disruption to flight schedules, significant sporting events, diversions and also for commercial reasons to facilitate requirements from existing / new airline customers.

Previous gating analyses have identified that peak aircraft parking demand typically occurs overnight (generally between 0000 – 0630hrs local time), primarily due to the size of the based airlines aircraft fleets, charter airlines based aircraft during summer months, early morning arrivals prior to departures and cargo operations. There is currently no evidence to suggest that this pattern is likely to change in the near future.

The monitoring of stand demand versus availability also assesses the utilisation of contact stands in terms of ability to process approximately 90-95% passengers / aircraft through pier served stands (to date this has been achieved with the cooperation of the airlines through the use of towing of aircraft where feasible).

Current passenger forecasts translated into likely stand demand indicate that it is unlikely that further significant apron development will be required in the next quinquennium. However, in the event that this situation changes, DAA is proposing a trigger related to actual (historic) surplus stand availability.

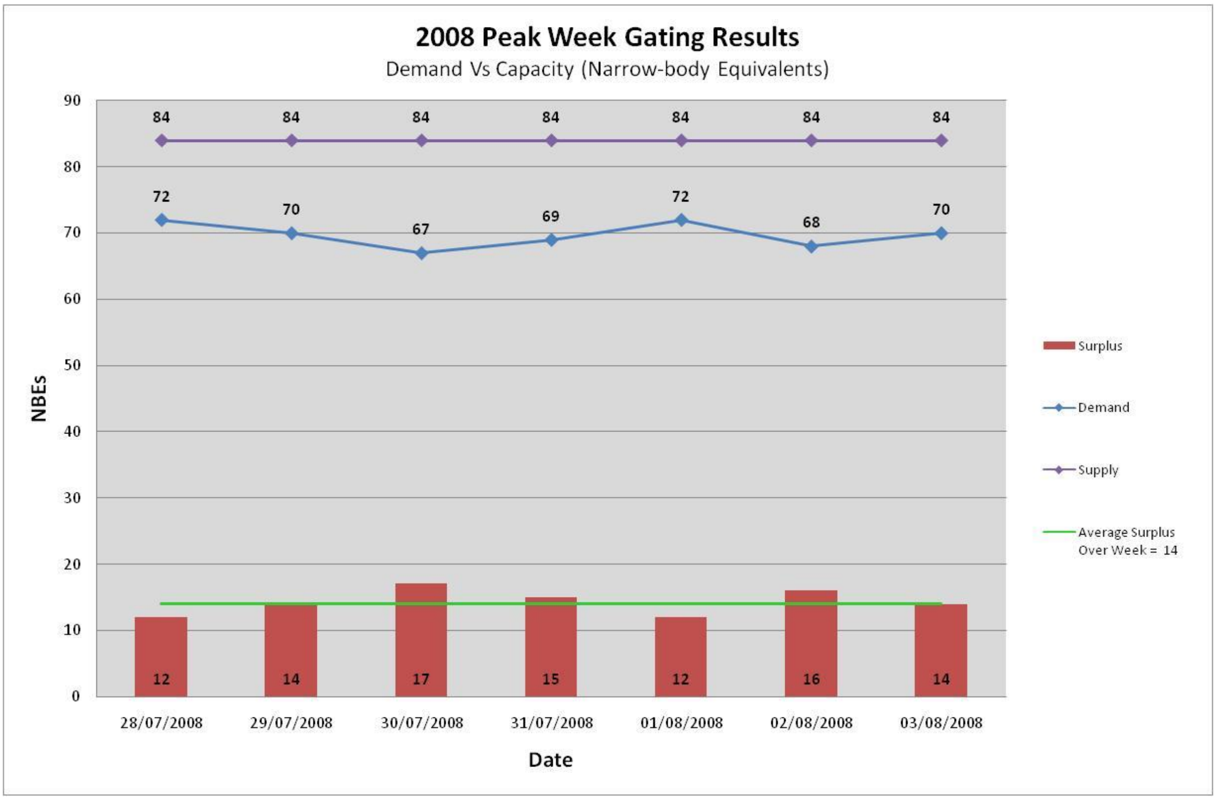
For the purposes of developing this trigger, it is considered reasonable to assess the actual stand demand associated with the aircraft movements for the planned peak week[24] of each year, an approach that is consistent with that adopted for Runway Trigger 2. By assessing actual historical demand it is possible to capture more effectively the various operational issues surrounding the allocation of stands on a day to day basis.

The table below identifies the stand supply (availability) for the peak week commencing 28 July 2008:

Year	Pier A	Pier B	Pier D	TBG	TOTAL CONTACT	Remote Nth.	Remote West	Remote Centre	Remote Sth.	TOTAL REMOTE
2008	10	10	11	8	39	0	21	9	15	45

Total (i.e. contact plus remote) stand supply and demand (i.e. utilisation) for this week and the resultant stand surplus is presented in the chart below:

[24] Defined as Peak Traffic Movements



It is evident that the average number of surplus stands during the peak traffic week in summer 2008 was 14. Since summer 2008, 2 further stands have been brought into operation on the west apron. Furthermore, four additional stands are planned as part of the Cargo Distribution Centre project.

The following trigger for construction of further remote stands is proposed:

New Apron Development Trigger : Construction of a new Apron Development will commence when stand availability in the peak week is shown to have dropped to a surplus of 10 stands or less.

Ten surplus stands is considered to be the minimum number required from an airfield operational viewpoint. Such a surplus would enable 3 – 4 existing stands to be taken out of service to facilitate construction of the new apron, would facilitate growth requirements from existing / new airline customers over the construction period, and allow for some contingency.

8.3 Engine Testing Facility

The current engine testing facility at Dublin Airport is located at the Northern Boundary of the airfield on the old Runway 23 threshold. Typically most major airports provide a location for airlines to carry out engine test runs following maintenance/overhaul of engines, or following voluntary engine wash-downs which are carried out to improve fuel efficiency. This current site at Dublin Airport is located within the footprint of the new North Runway. Once construction of the North runway commences it will not be possible to access this site and an alternative location will be required.

It is an objective in the Fingal County Council Local Area Plan (LAP 2006) to relocate the engine testing facility away from the north of the airfield to a sound controlled area.

It is also one of the planning conditions for the new Runway, that

"Prior to the commencement of construction of the new runway, aircraft engine testing at the northern end of the airfield shall cease and shall be relocated away from populated neighbouring areas to a sound controlled area in accordance with the objectives of the Dublin Airport LAP,2006."

However, should the airlines wish to have the ability to carry out 'engine washes' and subsequent engine tests on a 24 hour basis, then a dedicated sound-proofed engine testing enclosure, as provided for in this project, will be required.

<u>Engine Testing Facility Trigger</u> : Construction of an Engine Testing facility will commence when North Runway construction commences, and / or the majority of airlines request a new engine testing facility.

8.4 Fuel Hydrant System

The current aircraft fuelling operation at Dublin Airport involves the trucking of all aviation fuel from the Fuel Farm on South Corballis Road, through the landside / airside security gate and then out onto the apron to fuel the airplanes. This arrangement generates a very large volume of tanker truck journeys within the airport, and as such is inefficient and environmentally unfriendly.

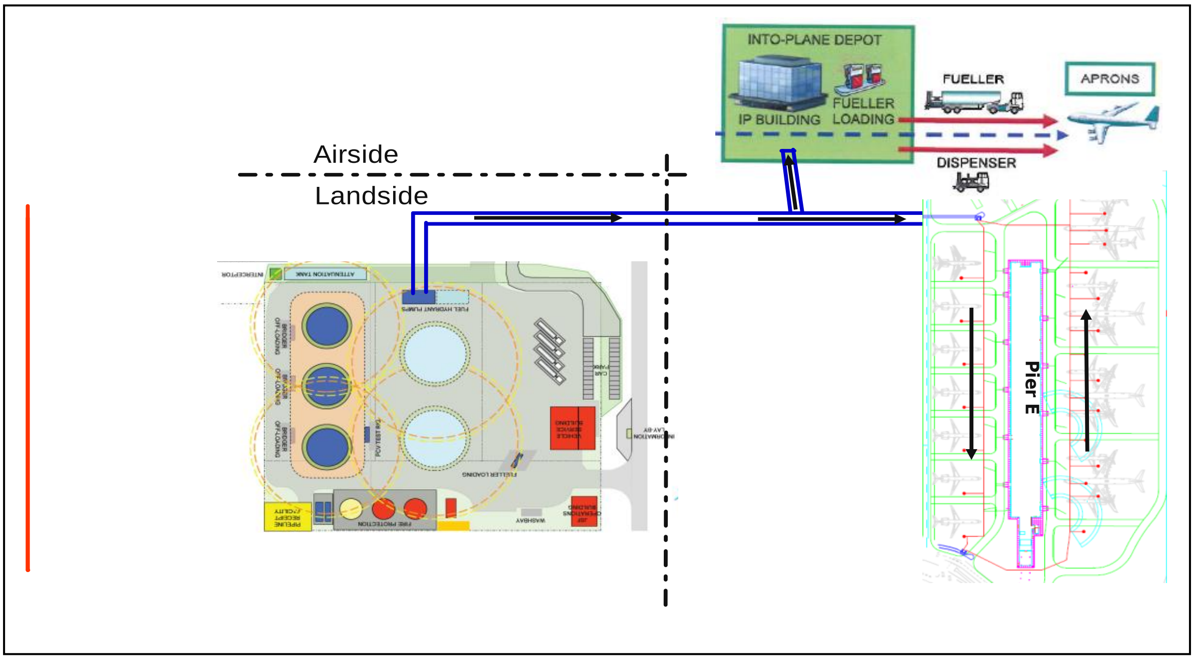
The Fuel Farm project contained in the Service Delivery tranche of the CIP includes the installation of a new airside into-plane fuel tanker filling point. This asset will facilitate the fuelling of aircraft on all Piers via tanker truck as before, but in a much more efficient manner, with much shorter fuelling distances and without the need for the trucks to travel back to the landside Fuel Farm to refill.

The Fuel Hydrant project builds on this investment, and involves the connection of an underground hydrant system via fuel pipes running from the airside into-plane facility and out onto the apron near Pier E in order to feed the Pier E fuel hydrant system directly.

The advantages to the airlines from this investment will be:

- Direct hydrant system for Pier E aircraft (principally long haul)
- Less ramp congestion for all users
- More efficient, faster aircraft fuelling service
- Less fuelling-related schedule delays

This project will enable the expansion of the hydrant system to Piers B, D and A, and / or the relocation of the tanker filler point to Pier A / Pier D apron in a subsequent phase.



Fuel Hydrant System Trigger : The Fuel Hydrant system will be commenced by DAA when aviation fuel demand increases to such an extent that refuelling solely by tanker becomes impractical.

9. Project Summary Sheets

A separate Project Summary sheet is provided for all CIP 2010 – 2014 projects. The key facts about each project are set out in each Summary sheet with references to supporting documentation where appropriate.

In contrast to the 2006-09 CIP where many of the projects were at detailed design stage or had obtained planning permission, due to the current position on the investment cycle, a large number of the projects in this CIP are at early stages of development. As a result there is by definition greater uncertainty surrounding the cost estimates, but we have made extensive use of external and internal benchmarking in order to assess the reasonableness of the costs proposed.

We have not included a description of all of the options considered for each project prior to the selection of a preferred solution as this would have proved too cumbersome. However, such background will be provided as part of the anticipated consultation process to follow the submission of this document.

Explanations for each of the key fields contained in the Project Summaries are provided in the following pages.

The individual project sheets are located at the back of this chapter.

CIP 0.000: Project Title

CIP x.xxx : Unique number generated by the DAA programme office for the purposes of CIP project control.

Project Description :	Summary of the project including background, justification, main purpose and statement of the scope.
Classification :	One of (1) Runway (2) Airfield (3) Piers and Terminals (4) Airport Infrastructure and (5) Revenue
Primary Driver : One of capacity; quality of service etc.	Secondary Driver(s) : One or more of of capacity; quality of service etc.
Project Graphic	
Project Commencement :	Year of construction commencement.
Project Completion :	Year of construction completion.
Total Project Capital Expenditure :	GPCP
Historic Expenditure (pre 2009)	GPCP
Expenditure in current CIP (2010 - 2019)	GPCP
Project Stage	One of 5 DAA Gateway stages : 1. Inception 2. Feasibility 3. Outline design 4. Detailed design 5. Construction

CIP 0.000: Project Title

Project Output	Technical description of the asset to be provided in terms of size, rated output, capacity etc.
Project Justification	Summary of the reason/validation for the investment
Capital cost assumptions	Key assumptions that impact the primary cost metrics for the project.
Cost Benchmarks	External or internal benchmarks as appropriate
Stakeholder evaluation and consultation status	Details of discussion or consultation with stakeholders, e.g. presentation to DACC meeting
Extent of airlines' support for project :	Level of support emanating from consultation with airlines. One of : 1. Airlines fully supportive 2. Airlines not supportive 3. Airlines partially supportive.

Project Drivers

The project driver is a definition of the key underlying rationale for making an investment in the project. Following a review of the Commission's Guidance Paper on Capex Consultation (CP8/2007) it has been decided to increase the number of project drivers from three to five in the current CIP as follows:

Project Drivers used in CIP 2006 - 2009	Project drivers adopted for CIP 2010 - 2014
1. Refurbishment / Replacement / Upgrade 2. Capacity 3. Safety / Regulatory / Environmental	1. Repair / Replace 2. Capacity 3. Quality of Service 4. Cost Reduction 5. Safety / Compliance

Many of the projects in this CIP have more than one driver, and in order to highlight this the Project Summary sheets have been modified to capture the "Primary Driver" and also "Secondary Driver(s)" where they apply. An example which illustrates this point well is the replacement of the CHP 2 unit contained in the Airport Infrastructure workstream. This new unit will replace both CHP 1 and 2 (time expired) and will have a combined output greater than both of them. It will also be more efficient as it make use of newer technology. Therefore the primary driver is "Repair / replace", and the secondary drivers are "cost reduction" and "capacity".

1. Repair / Replace

This Driver refers to the upgrade/refurbishment and replacement of existing facilities, infrastructure, systems and equipment, including:

- Replacement of infrastructure, facilities and equipment at the end of their useful life.

- Upgrade, refurbishment and replacement deriving from surveys or inspections of facilities, which are fully depreciated, or near end of useful life, but whose working life can be extended based on defined levels of investment.

- Upgrade or refurbishment deriving from failure to meet declared service level standards due to increased intensity of use or change of use from original design.

2. Capacity

Capacity[25] is defined as the provision of new or extended facilities, infrastructure, systems or equipment, in compliance with regulatory standards and to an appropriate level of service in support of increasing activity (passenger, cargo and/or aircraft movement), regulatory requirements and changing conditions.

3. Quality of Service

This driver relates to investment undertaken to either maintain existing quality of service levels or increase them from a currently inadequate level to one that reflects the needs of airport users.

The issue of the appropriate service level standard continues to be a subject of significant debate and lack of consensus with users, with clear conflict between expectations of passengers as the ultimate user and that of the airlines. The situation is further exacerbated by the failure of the airlines to communicate a consensus view, with divergent views being expressed in some cases.

4. Cost Reduction

This project driver relates to a reduction in Operating Costs as a result of the relevant investment being made. Ongoing reductions in Operating Costs without compromising on safety or on the provision of an acceptable Quality of Service remains a key objective of DAA as well as the user Airlines.

Operating Costs are often, although not always, correlated to the Quality of Service which is required.

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[25] an <u>increase</u> in Capacity is implied

5. Safety / Compliance

Projects which fall into this category, are required in order to comply with licensing standards or regulations, to meet environmental standards or to meet general safety responsibilities.

Investment can take the form of the provision and/or modification of facilities, equipment or systems as required by legislative imperative or regulatory authority, including:

- The Air Navigation and Transport Act (Amendment) Act, 1998 and previous acts.
- International Civil Aviation Organisation (ICAO)
- Irish Aviation Authority (IAA)
- Local Authority / An Bord Pleanala (in particular Local Area Plans and Planning Permission conditions)
- Environmental Protection Agency (EPA)
- Garda National Immigration Bureau (GNIB)
- Department of Justice
- Department of Transport (Aviation safety and security)
- National Civil Aviation Security Committee (NCASC)
- EU regulations: Slot Allocation, Ground Handling etc.
- Provision of Hold Baggage Screening as defined by ECAC

10. Critical Path and Programme Management

As we draw to a successful close on the first phase of the Transforming Dublin Airport Programme at the end of 2009, the programme emphasis will move from a stage where a highly complex series of projects revolve around the construction of the new Terminal 2 to a programme that reflects the current economic climate and consolidates the airports infrastructure, improves passenger experience within existing facilities and prepares for the delivery of the next key piece of critical infrastructure, the North Parallel Runway.

The proposed Operational CIP reflects a minimum level of investment driven by the current economic climate and associated impact on demand (contained in Tranche 1, Operational, and certain key Service Delivery projects (tranche 2). In addition, a number of demand sensitive Enabling projects have been identified and are presented as Tranche 3. It is proposed that these projects will commence when a trigger point (or key indicator) is reached. These triggers are driven by economic recovery creating additional demands for capacity enhancement at the airport.

The critical path can only accurately address the tranche 1 and 2 projects, as by definition the current economic uncertainty does not allow the Enabling projects to be programmed. The mechanism to trigger these projects is described in Chapter 8.

The high level critical path summary is underpinned by a series of comprehensive and detailed project schedules within the DAA's Primavera toolkit.

The critical path for the 2010-14 Programme has determined:

- The scope and scale of the project elements
- The sequencing and timing of projects
- Sequencing of projects consistent with the economic climate, passenger demand and the need to maintain a major piece of strategic infrastructure

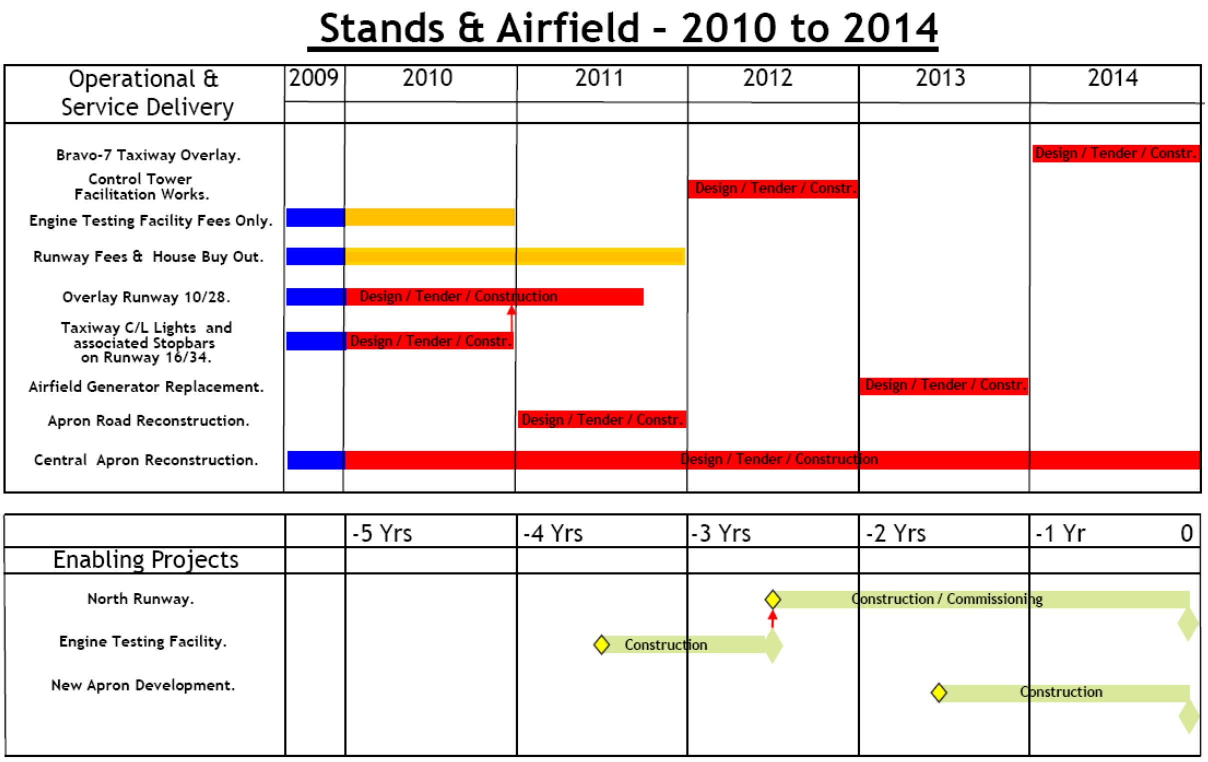
Looking at the key drivers for each workstream in turn:

Stands and Airfield

The planned scope is driven by two main factors, firstly the need to maintain the airfield and secondly planning for the future North Runway.

The major element of maintenance is the requirement to overlay the existing runway, 10/28, which due to the delayed start of the new northern runway, will now have to be overlaid whilst it remains operational affecting both time and cost. This will be coupled with the ongoing programme of replacing areas of life expired apron and equipment such as taxiway centre line lights to runway 16/34.

In addition and in an aim to secure the optimum facility for the airport and its airlines, the runway design will be progressed to ensure that when the economic and airline demand requires, it can be delivered as promptly and economically as possible. As part of the design, the existing planning permission will be challenged with the aim of securing the maximum flexibility for the future operation of the new runway.

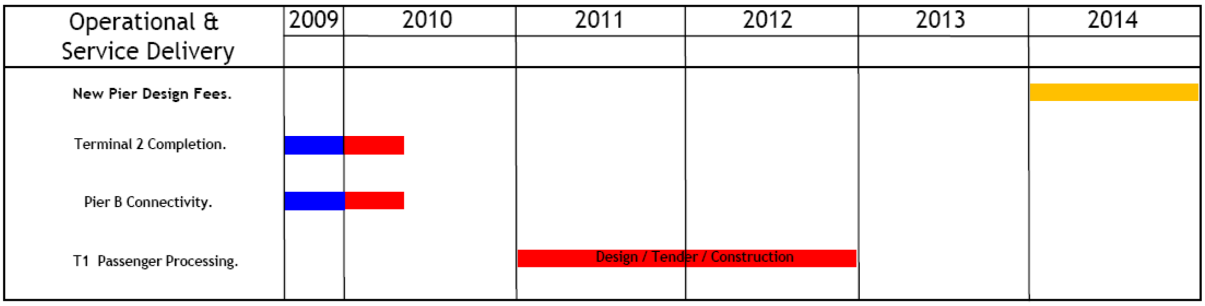


Terminal and Piers

The existing Terminal 1 building has developed over a series of phases during the past 30 years. When Terminal 2 opens and circa 40% of passengers transfer to the new facility, an opportunity to reconfigure the departures floor layout in order to improve passenger flows and make better use of the available space will present itself. These improvements are contained in the T1 passenger processing enhancement project.

Based upon the current gating studies, Demand and Capacity analysis for contact stands and the Masterplan, it is clear that additional contact stands will be required in the future. In common with the approach to the new Northern Runway, the planning and design of additional contact stands will be progressed to provide additional capacity in response to airline demand.

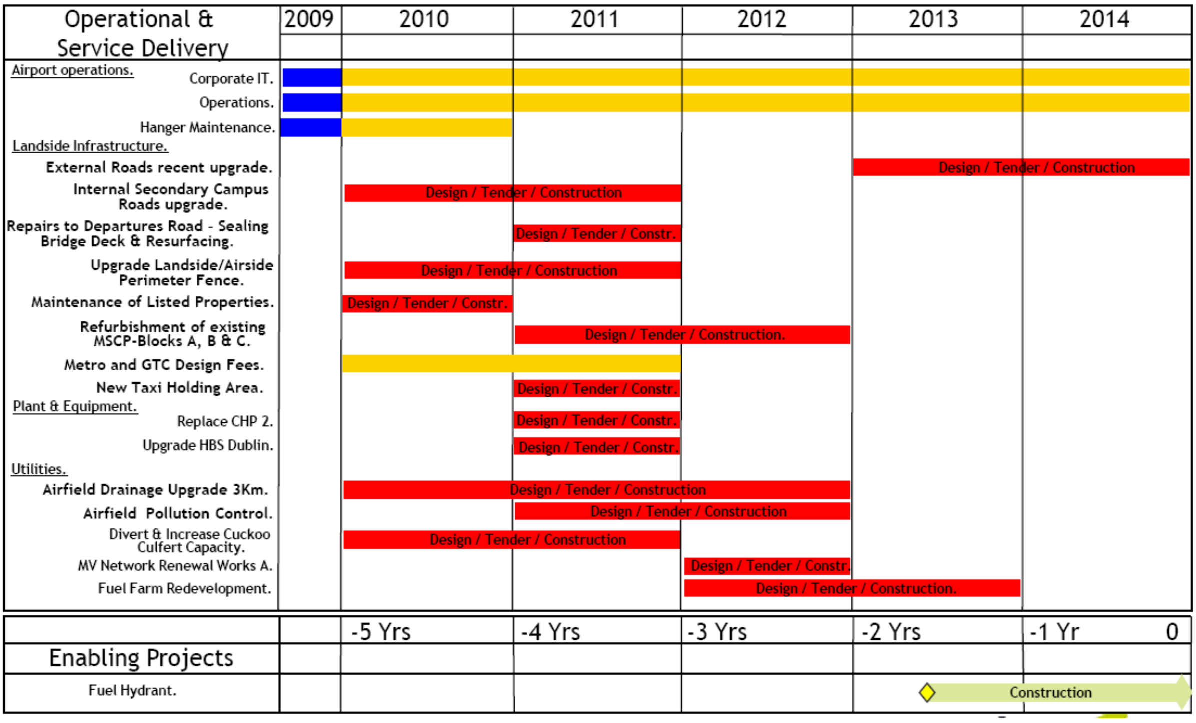
Piers & Terminals - 2010 to 2014



Airport Infrastructure

Within the existing airport infrastructure, there is an ongoing programme of works to maintain the existing terminal and upgrade the IT infrastructure with notable pieces of work including the upgrading of the HBS, replacing the CHP, repairs and upgrades to a number of roads. The spend on utilities to meet airport requirement and satisfy statutory requirements and commitments to Fingal City Council, continues from Phase 1 of the programme, the key projects being the diversion of the cuckoo culvert and increased pollution control on the airfield.

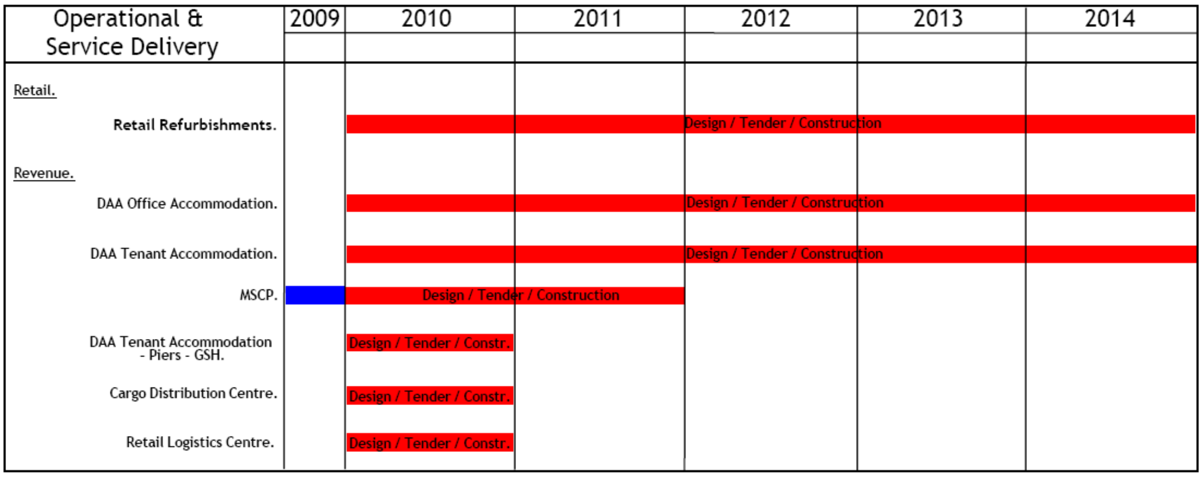
Airport Infrastructure - 2010 to 2014



Revenue Projects

The key Revenue projects in this workstream include the completion of the MSCP (commenced under Phase 1 of the Programme) and the construction of a cargo distribution centre facilitating the relocation of the Integrated Cargo operations.

Revenue Projects - 2010 to 2014



Enabling Projects

With regard to the additional projects which have been termed 'Enabling' or 'Growth Projects' above that may need to be completed or commenced during the next quinquennium to meet increased capacity requirements identified above, clearly—from a schedule or critical path point of view, given the uncertainty on demand—it is difficult to plan their implementation. The dates indicated are therefore only indicative and show key critical links should the planed workload need to be reviewed to meet an increase in demand.

Chapter 8 details the rationale and describes the 'triggers' that would require the airport to respond to the increased demand. The most significant variation to the plan would be the early commencement of the North Runway which as shown above, would in turn trigger the need for a new Engine Testing facility, Control Tower and various related projects.

The planned projects within the 2010 -14 CIP have been sequenced to ensure that all project interrelationships are accommodated and the overall airport masterplan is respected with flexibility maintained to meet the prevailing economic conditions.

Programme Management

All DAA projects within the CIP will continue to be delivered using the Programme Management toolkit which received accreditation to ISO9001 during the currency of the 2006-09 CIP. The various procedures which cover all aspects of project delivery have, and will ensure, a consistent approach across the various projects forming the CIP.

The Gateway process will continue to form a key part of the Programme Management procedures during the next phase of the Capital Management Programme. The deployment of the Gateway process will enable:

- Continuous scrutiny of the various projects by the Board of DAA and other stakeholders.
- Visibility of the management and delivery of individual projects against pre-defined objectives.
- Staged approval of the project ensuring proper deployment of front end optioneering and value management to develop an optimal solution coupled with progressive release of capital funding in a structured and standardised manner.
- Creation of an audit trail through the various stages of a project culminating in a review by all parties to the project.

The Gateway process will enable the continued efficient delivery of this large scale capital programme as it progresses through the various stages ensuring informed decision-making through every step whilst providing flexibility and auditability to meet variations in the airports and its user's requirements.

11. Appendices

11.1 Terms of Reference for DACC Forecast Working Group:

The Working Group will work together to develop a traffic scenario for Dublin Airport which both DAA and DACC consider reasonably represents traffic projections in the light of current market position. In the event that a traffic scenario cannot be agreed, the Working Group will identify substantive points of disagreement.

Each party will nominate a delegate or delegates to the Working Group with sufficient authority to represent their company. Participants shall commit to attending meetings and participating fully in the process.

The Working Group will review the current DAA forecasts contained in its Forecast Report (January 2008), the input assumptions and the calibration of DAA's forecasting model against current market performance and demand segmentation. The CAR may need to be involved if there are legitimate "proprietary" issues involved.

The Working Group will review the historical traffic profile at the airport at route level, except if airlines consider that there are issues of commercial sensitivity at stake.

The DAA will require that if data is requested during the course of this project which may have previously been considered by any airline to be commercially sensitive that the DACC member of the airline concerned is willing to confirm in writing to the DAA and CAR that it is happy for this information to be released to the group.

Both DAA and DACC will propose input assumptions for the forecast scenario for relevant future years, including, but not limited to:

- fuel prices;
- airport charges;
- the extent of cost pass through into air fares;
- GDP, airfare, fuel, and exchange rate elasticities;
- exchange rates;
- GDP assumptions

- tourism and demographic growth projections;
- modal competition assumptions;
- the development of services at regional airports;
- technological changes which may impact on traffic projections;
- route groups used for forecasting;
- fleet assumptions;
- the basis of any unmodelled adjustments to the forecasts.

Input assumptions advised by either party should be quantified, where relevant, and supported by evidence. In the event that revised assumptions are not capable of being accommodated within DAA's forecasting model, DAA will advise on alternative means of taking such factors into account in the forecast scenario.

Both parties will discuss and consider the outputs available from the DAA model and discuss these in terms of the profile by route group and traffic segment; Irish/non- Irish; business/leisure; point to point/connecting.

Any output data produced from this working group process is working draft data and may not be released for distribution to parties other than those involved in the group unless and until this has been agreed by the group.

The Working Group will consider how the passenger forecasts are converted into projections of air transport movements and/or vice versa. This will involve airlines giving detailed information on their fleet plans for Dublin airport and assumptions regarding aircraft trends at Dublin in the future, and the DAA discussing its assumptions regarding load factors aircraft types and fleet rationalization.

Upon successful development of an agreed forecast scenario accepted by all parties, the group will consider the issue of reviewing the conversion of these forecasts into the busy day and busy hour design parameters used for capacity planning

CAR will be invited to attend all full Working Group meetings as an observer.

11.2 North Runway Supporting Documentation

11.2.1 : Dublin Airport - Runway 10L/28R Alternatives Report, December 2004 (Scott Wilson)

11.2.2 : Dublin Airport - Options for Delivering Additional Runway Capacity, April 2003 (Scott Wilson)

11.2.3: Summary of DAA Consultation with airlines regarding construction of New North Runway

Introduction

There have been four separate periods of specific formal consultation between DAA / Aer Rianta and user airlines related to a new runway at Dublin airport.

In addition, prospective long-haul carriers were consulted in 2008 in order to ascertain their requirements for any new Runway.

These five consultation periods are:

1. 1997 Consultation as part of the sub-group of DAOPG (Dublin Airport Operations Planning Group)
2. 1999 Airline consultation as documented in the "North Runway Planning Study" by Halcrow Consultants dated March 2002.
3. 2002 Masterplan Consultation as summarised below.
4. Prospective long-haul airlines
5. DACC presentations and discussions during 2008

In general the requirement for a new runway has been largely accepted by existing stakeholders, with consultation tending to focus on technical options related to runway dimensions and the exact location on the airfield.

1. 1997 Consultation as part of the sub-group of DAOPG

The terms of reference of this group were, "To identify and list the possible requirements for a northern parallel runway at Dublin Airport and all issues related thereto". The sub-group comprised all members of the DAOPG .

Submissions were received from the IAA, IALPA and Aer Lingus in relation to issues to be discussed as part of this sub-group.

Comments tended to be limited to detailed technical issues rather than any questioning of the requirement to provide a new runway:

- The IAA submitted comments in relation to Runway Capacity, Airspace, ANVAIDS, Lighting and Runway Geometry.
- IALPA also submitted general suggestions in relation to Mode of Operation, Runway Length and Overall Layout.
- Aer Lingus submitted comments in relation to taxiway layout, obstacles, operational availability and runway length, where it suggested 10,000ft (3,048m) as the ideal length.

2. 1999 Airline Consultation

Halcrow Consultants undertook a planning study in relation to the new runway in 1999, which focussed on an examination of runway capacity, runway length, declared distances and taxiway layout.

The following are the main points which emerged from the 1999 consultation with the existing user airlines following the completion of this study:

The short-haul airline operators felt that a runway length similar to that presently offered by runway 10/28 (2,637 metres) was sufficient to meet their requirements, and so emphasis during this consultation was placed on obtaining the runway length requirements of long-haul operators.

At the time of the consultation, airlines with long-haul services to or from Dublin were mainly limited to Aer Lingus, two UK based charter carriers (Air 2000 and Britannia) and two US scheduled airlines (Delta and Continental).

Aer Lingus noted that the current runway 10 /28 did not offer sufficient take-off distance to enable maximum gross weight operations for the A330-200 aircraft to Los Angeles, and stated that this distance was 2,745 metres. It further stated that it might consider flying A340 aircraft in the future, and the required runway length for such an aircraft fully loaded was 3,325 metres.

Air 2000 and Britannia were satisfied with a runway length similar to the current 10/ 28 runway.

Delta and Continental who operate B767 aircraft from Dublin both stated that a runway length of 3000 metres was “desirable for their current and future operations”.

These points were taken into account at the subsequent planning design stage.

3. 2002 Masterplan Consultation

This consultation comprised a series of workshops and presentations, coupled with the issue and subsequent analysis of questionnaires to the incumbent airlines, handlers and cargo operators.

Six airlines, including Ryanair and Aer Lingus, took part in the consultations and questionnaires.

The dates on which the key meetings took place are as follows:

- 5 September 2002 : Scott Wilson and NATS presentation to airlines and handlers on the Dublin Airport capacity study and future capacity.
- 19 September 2002 : Scott Wilson and NATS presentation on the Comparison of Options – extend runway 11 / 29 or build a new parallel runway. A questionnaire was also issued as this meeting.
- 20 November 2002 : Scott Wilson presentation of questionnaire responses.
- 14 January 2003 : Scott Wilson presentation to Dublin Airport Cargo Operators on the Dublin airport Capacity Study.

In general the airlines agreed with the principal NATS conclusion that additional runway capacity was required at Dublin Airport . The consultation discussion focused on the merits or demerits of various options to address the capacity deficit such as the expansion of Runway 11/29. As a result of these discussions, further optioneering work was carried out and presented.

A summary of the questionnaire responses is as follows:

In response to what should be considered as the 'design aircraft'

- 1 airline said A380
- 2 airlines said A330
- 2 airlines said B737 / A321 range
- 1 airline said 'Airbus Range'

In response to 'Operational Availability', all airlines agreed that the new runway should be installed with Precision Approach CAT III Navigational Aids. 3 airlines requested Runway Visual Range (RVR) of <200m (CAT III b).

In response to' what minimum length of runway should be provided'

- 4 airlines expressed a preference for the same length as runway 10/28 (2,637meters)
- 2 airlines required a longer runway than existing 10 / 28 – (one asked for 2,745 metres and the other for 3,500 metres).

Other specific design requirements that airlines requested in relation to the design of the new runway were:

- 2 airlines requested that all obstacles within the departure surfaces are removed
- 1 airline requested adequate taxiways
- 1 airline requested multiple runway entrances/exits
- 1 airline requested adequate strength (PCN)
- 1 airline requested that the runway be designed to avoid the need for backtracking

All of these comments were taken into account in the design of the runway which was subsequently submitted for planning during 2004.

4. Consultation with prospective Long-haul carriers during 2007

DAA and its consultants Scott Wilson engaged in a consultation process with prospective long-haul operators during 2007. These airlines were questioned about the runway requirements that they deemed necessary in order to operate long-haul routes into Dublin from the Far East. Among the airlines that informed us that their requirements regarding runway length ranged from 3,444m to 4,000m were :

- Malaysia Airlines
- Singapore Airlines

- Thai Airlines
- Cathay Pacific

5. DACC presentations and discussions during 2008

In addition to the above there were more recent presentations made to airlines which covered other aspects of DAA's proposals for the north runway:

- Presentation to DACC on Developing CIP No. 5 (4th July 2008)
- Further presentation at DACC meeting 1 August 2008.

At these presentations details were provided in relation to the demand for runway capacity and it was highlighted that in Summer 2008 there were 9 instances whereby the raw demand exceeded the available runway capacity.

Details were also provided in relation to the physical layout of the runway such as the runway length, taxiway separation, taxiway layout, declared distances, the provision of Runway End Safety Areas, the location of Rapid Exit Taxiways and Navigational Aids. The airlines were generally satisfied with the physical layout of the runway, subject to consultation at detail design stage. Some queries related to Runway width were raised and discussed.

An update was also provided in relation to the planning permission and the associated conditions. In particular, DAA's proposed strategy to obtain amendments to the onerous conditions, 3 & 5 which imposed restrictions on night time operations were discussed. The airlines were requested to provide support to DAA's application to the planning authorities to have theses restrictions amended.

11.2.4 Runway lengths: benchmark data

Airport	Longest Runway length [m]
Madrid	4,350
Paris (CDG)	4,215
Frankfurt	4,000
Munich	4,000
Athens	4,000
Lyons (LYS)	4,000
Milan	3,915
Basel (BSL)	3,900
Rome (FCO)	3,900
Geneva (GVA)	3,900
London Heathrow	3,900
Lisbon	3,805
Moscow	3,800
Amsterdam (AMS)	3,800
Budapest (BUD)	3,707
Zurich (ZRH)	3,700
Warsaw (WAS)	3,690
Hamburg	3,665
Dublin (3,660 m)	3,660
Brussels	3,638
Vienna (VIE)	3,600
Oslo	3,600
Copenhagen	3,600
Sofia	3,600
Bucharest (OTP)	3,500
Marseille (MRS)	3,500
Toulouse (TLS)	3,500
London Gatwick	3,316
Stockholm	3,300
Venice (VCE)	3,300
Palma Majorca (PMI)	3,270
Almeria (LEI)	3,200
Tenerife (TFS)	3,200
Malaga (AGP)	3,200
Riga	3,200
Billund (BLL)	3,100
Gran Canaria (LPA)	3,100
London Stansted	3,048
Manchester	3,048
Dusseldorf	3,000
Nice	2,960
Bologna (BLQ)	2,800
Dublin (Existing Runway)	2,637
Faro	2,610
Vilnius (VNO)	2,515
Paris Beauvais	2,430

CIP Project Listing 2010 - 2014

Sum of Value				Tranche		
Level 1 Description	Level 2 Description	Ref	Level 3 Description	1 - Operations	2 - Service Delivery	3 - Enabling Projects
6.1 Stands and airfield	6.1 Stands and airfield	CIP 2.009	Control Tower Facilitation Works	1,400,000		
		CIP 6.047	New Apron Development			22,700,000
		CIP6.009	Engine Testing Facility fees only	400,000		
		CIP6.017	Overlay Runway 10/28	23,000,000		
		CIP6.018	North Runway Fees		4,200,000	
		CIP6.019	North Runway house buy-out	8,000,000		
		CIP6.051	North Runway Construction works			305,000,000
		CIP6.052	Central apron reconstruction	15,000,000		
		CIP6.053	Engine Testing Facility			13,800,000
		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		
		CIP6.056	Apron Road Reconstruction	1,800,000		
		CIP6.057	Airfield Generator replacement	500,000		
	6.1 Stands and airfield Total			59,400,000	4,200,000	341,500,000
6.1 Stands and airfield Total				59,400,000	4,200,000	341,500,000
6.2 Piers and Terminals	6.2 Piers and Terminals	CIP 7.018	New Pier Design Fees		7,000,000	
		CIP7.030	Terminal 2 Completion - CIP declared	10,000,000		
		CIP7.032	T1 Passenger Processing Enhancements		16,000,000	
		CIP7.035	Pier B Connectivity	11,000,000		
		CIP7.036	T1 Life Safety Safety System Upgrade	5,000,000		
	6.2 Piers and Terminals Total			26,000,000	23,000,000	
6.2 Piers and Terminals Total				26,000,000	23,000,000	
6.3 Airport Infrastructure	Airport Operations	CIP2.017	Hangar Maintenance	4,200,000		
		CIP8.001	Operations	40,000,000		
		CIP8.008	Corporate IT	10,700,000		
	Airport Operations Total			54,900,000		
	Landside Infrastructure	CIP1.016	Refurbishment of existing MSCP - Blockas A,B &C	3,000,000		
		CIP2.008	Maintenance of listed properties	500,000		
		CIP3.012	New Taxi Holding area		4,000,000	
		CIP3.014	Upgrade Airside / Landside Perimeter Fence	2,000,000		
		CIP3.033	Repairs to Departures Road - Sealing bridge deck, repairs & resurfacing. Incl. new footpath pavement along length of road.	4,300,000		
		CIP3.034	External Roads upgrade	2,200,000		
		CIP3.035	Internal Secondary Campus Roads upgrade	5,000,000		
		CIP8.300	Metro and GTC Design Fees		2,000,000	
	Landside Infrastructure Total			17,000,000	6,000,000	
	Plant & equipment	CIP4.014	Replace CHP 2	3,300,000		
		CIP4.017	Upgrade HBS Dublin	10,800,000		
	Plant & equipment Total			14,100,000		
	Utilities	CIP9.019	Divert and Increase Cuckoo Cultert capacity	11,000,000		
		CIP9.020	MV Network Renewal Works A	2,500,000		
		CIP9.021	Airfield Drainage upgrade (3km)	3,000,000		
		CIP9.022	Airfield Pollution Control	7,500,000		
		CIP9.023	Fuel Hydrant System phase 1			6,000,000
		CIP9.024	Fuel Farm Redevelopment		28,800,000	
	Utilities Total			24,000,000	28,800,000	6,000,000
6.3 Airport Infrastructure Total				110,000,000	34,800,000	6,000,000
6.4 Revenue Projects	Retail	CIP5.013	Retail Refurbishments		16,800,000	
	Retail Total				16,800,000	
	Revenue	CIP1.006	MSCP		40,500,000	
		CIP2.014	DAA Office Accommodation	2,500,000		
		CIP2.015	DAA Tenant Accomodation	5,000,000		
		CIP2.016	DAA Tenant Accomodation - Piers _ GSH		3,000,000	
		CIP2.018	Cargo Distribution Centre	14,300,000		
		CIP2.019	Retail Logistics Centre	3,100,000		
	Revenue Total			24,900,000	43,500,000	
6.4 Revenue Projects Total				24,900,000	60,300,000	
6.5 Programme Delivery	Programme Contingency	CIP8.100	Programme Contingency	20,000,000	7,000,000	
		CIP8.200	Programme Management (DL)	15,000,000	10,000,000	5,000,000
	Programme Contingency Total			35,000,000	17,000,000	5,000,000
6.5 Programme Delivery Total				35,000,000	17,000,000	5,000,000
Grand Total				**255,300,000**	**139,300,000**	**352,500,000**

CIP 1.006 Multi Storey Car Park for Terminal 2

Additional short term car parking located close to Terminal 2 is required in order to serve the needs of users of the new terminal when it opens in 2010. The Multi Storey Car Park project contained in the Service Delivery CIP provides 1,706 such short term car parking spaces for passengers, delivered on a phased basis during 2010 and 2011, as well as 456 for use by car hire companies.

This facility will make the airport experience better for passengers, increasing choice and making access easier to conveniently located short term parking. In addition, this car park will reduce walking distances and improve facilities for passengers.

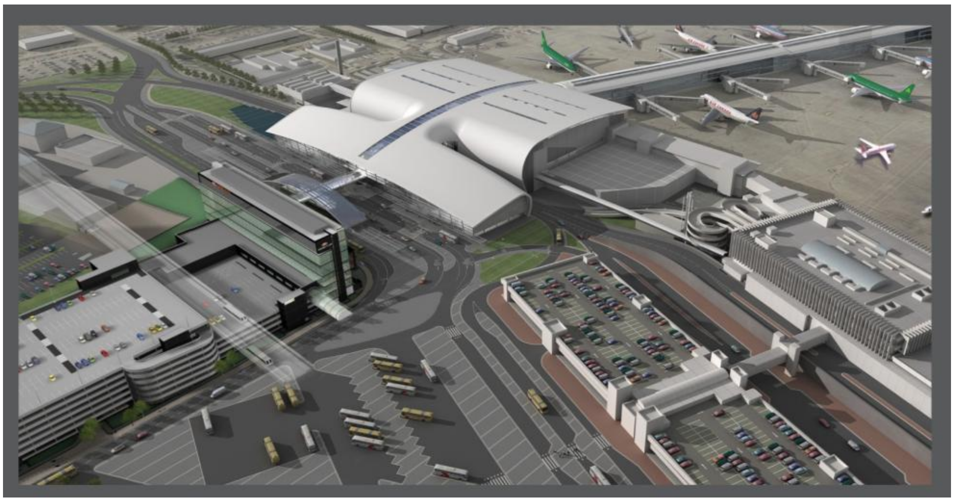
Furthermore, the provision of an integrated, privately funded and operated Four Star Hotel in the scheme will enhance the customer experience, as well as maximising DAA's commercial return from this prime site located opposite the new Terminal (and adjacent to the future Metro) . The overall NPV and IRR are in line with already accepted commercial levels.

CIP 2006 cost estimate (1500 space stand-alone MSCP)	27.5
inflate to 2009 prices	30.5
increase to 2,126 spaces	43.2
	7.4
Section 49 Metro planning levies (not applicable in 2006)	1.1
Land, fees and DAA operational costs	11.4
estimated Total project cost	63.1

Classification : Commercial

Primary Driver : Capacity	Secondary Driver(s) : Quality of Service

CIP 1.006 Multi Storey Car Park for Terminal 2



Project Commencement :	2009
Project Completion :	2011
Total Project Capital Expenditure :	€63.1 million
Historic Expenditure (pre 2010)	€22.6 million (anticipated spend to Dec 2009)
Expenditure in current CIP (2010 – 2019)	€40.5 million
Project Stage	Gateway 3
Project Output	• High spec 2,162 space Multi story car park integrated with Four Star hotel, car parking facilities and terminal operations. • Integration into GTC, Metro & future APM
Project Justification	• Additional short term car parking located close to Terminal 2 is required in order to serve the needs of users of the new terminal when it opens in 2010. • DAA's commercial return from a prime site

	will be maximised by enabling the integration of a privately funded and operated Four Star Hotel into the scheme.
Capital cost assumptions	Costs are based on tender price of preferred bidder who will develop the scheme once planning permission is obtained.
Cost Benchmarks	Cost obtained through OJEU competitive tender process
Stakeholder evaluation and consultation status	In a letter to DACC dated 9th September 2008, DAA proposed a process to obtain users views on projects. The company wished to consult with users on various commercial projects at a DACC meeting scheduled for 5th December. DAA would have anticipated that the MSCP would have been discussed as part of that session; however, users subsequently advised that they did not wish to engage with DAA at project level. As a consequence consultation with users on this project is via this document.
Extent of airlines' support for project :	See above.

The existing short-term Multi Storey Car Parks (MSCPs) were built in the years 1993 – 1998 as follows:

MSCPs	Opened	Capacity
Block A	1993	500 spaces
Block B	1996	600 spaces
Block C	1998	1,250 spaces

All three blocks are in poor condition due to heavy use and lack of investment since they were originally opened. Refurbishment of the car parks has not been possible in recent years as very high demand has precluded closing them even one at a time for short periods. The opening of the T2 MSCP will finally allow their sequential temporary closure to facilitate phased refurbishment without adversely affecting customer service or overall car parking revenue.

It is vital that this work is carried out promptly after T2 MSCP opens, when there will be some capacity headroom available.

The following refurbishment works will be carried out :

- Upgrading all car park lighting to ensure long life, energy efficient, high quality illumination throughout with particular emphasis on pedestrian areas, routes and lobbies.
- Re-painting all internal and external walls, columns, ceilings, rails, doors and other exposed surfaces.
- Replacing all internal and external flat and light box signage in line with new way-finding scheme.
- Remarking of all parking bays, directional arrows, lines, markings and pedestrian routes other than in the Block B disabled parking area and including re-numbering of Blocks B & C bays
- Repairing and making good all damaged, corroded or degraded concrete surfaces, tiles, structural elements
- Dust proofing all internal floor surfaces in traffic circulation areas in the older Blocks A & B
- Checking and, where required, replacing/repairing all drainage pipes, expansion joints, ACCO drains.
- Replacing all power cables, switches, boards, panels, trays to ensure a 20/25 year life. Replacing all fire safety equipment – extinguishers, detectors, alarms, fire panels, hose reels, emergency lighting etc
- Replacing/upgrading the car park public address system

Classification : Commercial

Primary Driver : Repair/ Replace	Secondary Driver(s) : Quality of Service

CIP 1.016 : Refurbishment of MSCP Blocks A, B & C

Project Commencement :	2011
Project Completion :	2012
Total Project Capital Expenditure :	€3 million
Historic Expenditure (pre 2009)	Nil
Expenditure in current CIP (2010 – 2019)	€3 million

Project Stage	
Project Output	Three MSCPs refurbished to appropriate standards in order to protect substantial car parking revenue into single till.
Project Justification	The three MSCPs have become run down due to pressure of demand and impracticality of closure due to capacity constraints. The planned refurbishment is essential to restore and maintain these key assets so that car parking revenue is protected.
Capital cost assumptions	Assume complete blocks are closed in sequence. No restriction on day-time working.
Cost Benchmarks	Based on the tender cost for each block received in 2004 and inflated.
Stakeholder evaluation and consultation status	DAA has envisaged consultation with DACC and other stakeholders via formal presentation of projects valued at €5 million and over. As this project is valued at under €5 million, consultation is via this document.
Extent of airlines' support for project :	See above

CIP 2.008: Maintenance of listed buildings

The Dublin Airport Authority (DAA) is responsible for three buildings, which have been placed on the Record of Protected Structures (RPS), namely the Old Central Terminal Building (OCTB), Castlemoate House and Cloghran Glebe House (and walled garden). In addition, the company is responsible for the maintenance of a Holy Well which is also listed on the RPS.

Under the Planning and Development Act, 2000, there is a statutory requirement on the owners of such buildings for their ongoing care and maintenance. This budget represents the minimum spend necessary for DAA to discharge those duties in the CIP period 2010 - 2014.

The OCTB is one of the earliest examples a building in the International Modern style in Ireland, and is regarded as one of the finest buildings of the 20th Century in Ireland. It is currently in use mainly as DAA offices and as such is maintained to a reasonable standard.

Castlemoate House was built in 1822. It is a 19th Century country residence typical of the time. In 1877 the house and gardens were given an Italianate look and this layout and style to the house are basically unchanged since then. The gardens are no longer in existence. The 2 storey house has elaborate plaster decoration both externally and internally. Currently it is in use as a DAA training centre but requires significant maintenance each year.

Cloghran Glebe House is from the Georgian era and was most recently used as a stud farm house but is currently derelict and in poor repair. It was placed on the RPS in 2003. While it is not necessary to restore the building until such time as the immediate area is being redeveloped, DAA is obliged to prevent further deterioration by making it weather tight, stable and controlling damage by encroaching vegetation. A conservation specialist is required, to assess the condition of the building and the scope of works required, to halt its deterioration.

The Holy Well located at the eastern side of the airport lands needs to be fenced off and protected from damage by vegetation, and subjected to an annual inspection.

Classification : Airport Infrastructure

Primary Driver : Safety / Compliance	Secondary Driver(s) : Repair / Replace

Castlemoate House

Cloghran Glebe House

CIP 2.008: Maintenance of listed buildings

Project Commencement :	2010
Project Completion :	2010
Total Project Capital Expenditure :	€500 k
Historic Expenditure (pre 2009)	€229k in CIP 2006 – 2009 (CIP 3.022)
Expenditure in current CIP (2010 – 2019)	€500 k
Project Stage	Gateway 1
Project Output	Maintenance works to the OCTB and Castlemoate House. Conservation survey of Cloghran Glebe House leading to works required to arrest the dilapidation of the building. Minimal protection to the Holy Well.
Project Justification	DAA is legally obliged to protect and maintain the buildings it owns which are on the RPS. In the case Cloghran Glebe House Fingal County Council have requested that the present dilapidated state of the building and its environs be addressed.
Capital cost assumptions	No restrictions on hours of work.
Cost Benchmarks	Rates based on similar building and consultancy work carried out by DAA in the past.
Stakeholder evaluation and consultation status	DAA has envisaged consultation with DACC and other stakeholders via formal presentation of projects valued at €5 million and over. As this project is valued at under €5 million, consultation is via this document.
Extent of airlines' support for project :	See above

CIP 2.009: Control Tower facilitation works

The IAA (Irish Aviation Authority) has a proposal to construct a new 80m high control tower at Dublin Airport. As part of this project DAA is required to :

a) Extend DAA existing AGL control system into new tower:

   The IAA requires control of the Aerodrome Ground Lighting systems from the new tower as exists with the existing tower. The existing AGL Control System is owned and maintained by DAA and operated via Touch Screens in the Visual Tower Cab by IAA staff, and this arrangement will be replicated in the new tower.

b) Future proof for secondary DAA MV Ring:

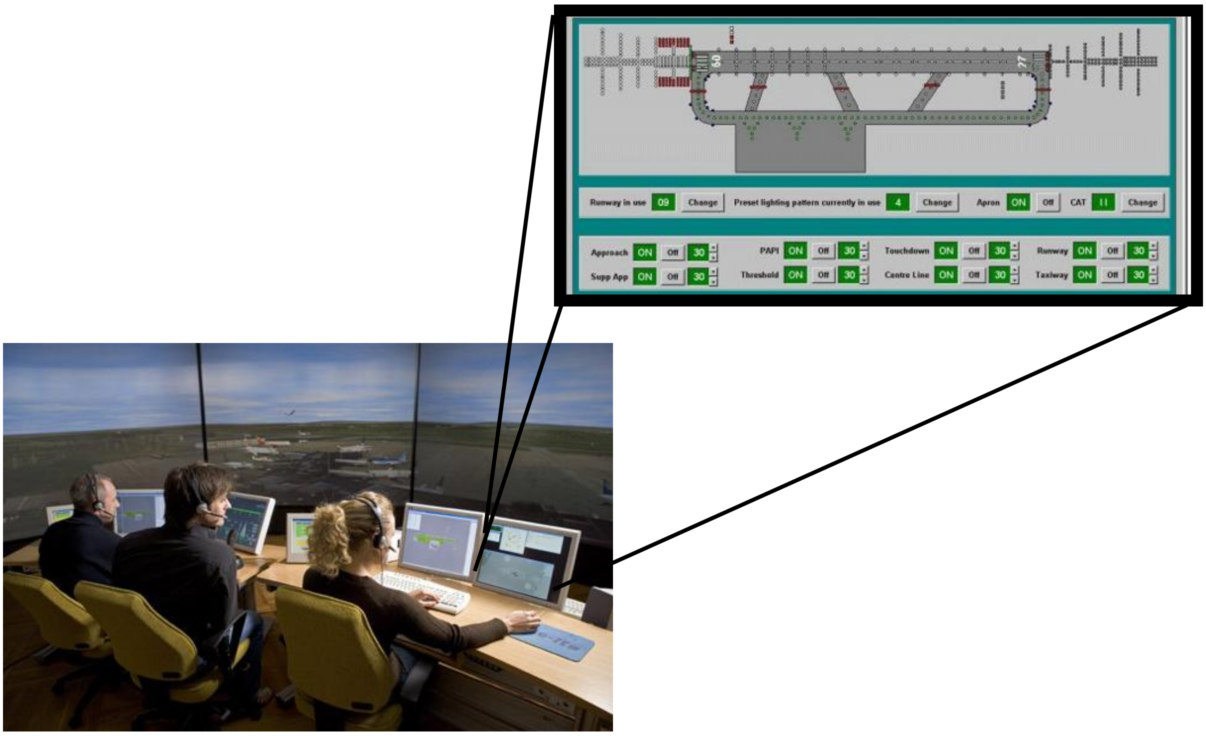
   The IAA new Tower will need to be connected to the existing DAA Medium Voltage Power system. DAA's power supply masterplan includes the installation of a secondary MV ring to enhance redundancy to the ATC Tower Campus. To minimise disruption to ATC operations at a later date, this project includes the fit out of facilities (Medium Voltage Switchgear & infrastructure) to enable interconnection of existing MV and future MV Network rings.

This project provides the hardware, panels and cabling to enable control of the DAA airfield lighting systems to be carried out in the new Tower CAB. It also increases redundancy to the new tower and airfield MV ring.

Classification : Airfield

Primary Driver : Capacity	**Secondary Driver(s) :** Quality of service

New Visual Control System



CIP 2.009: Control Tower facilitation works

Project Commencement :	Timing related to the delivery of the new control tower.
Project Completion :	See above.
Total Project Capital Expenditure :	€1,400,000
Historic Expenditure (pre 2009)	Nil
Expenditure in current CIP (2010 – 2014)	€1,400,000
Project Stage	Pre Gateway 1
Project Output	Extension of DAA AGL control system: • Provision of Human Machine Interface systems (Touch screens) in the new control tower's visual room for I.A.A. use. • Installation of associate PCs, AGL control panels including PLCs (Industrial Computer), software, switchgear, PSU's (Power Supply Units), etc. in the new Tower Sub Cab room • Installation of communication/Fibre Optic cabling (including patch panels) by the new towers contractor to allow for local communication between new and old towers. Future proofing for connection to secondary DAA MV Ring: • Provision of additional Medium Volt Switchgear and infrastructure to enable seamless installation and minimum operational disruption to IAA operations during connection to D.A.A's secondary MV Ring. • Final arrangement provides four separate power supply routes to ATC Campus Site and enhances redundancy options.
Project Justification	Enables control of the DAA airfield lighting systems to be carried out in new Tower CAB. Increases redundancy to tower and airfield MV ring.

	Provides future proofing for the North Runway.
Capital cost assumptions	• The console configuration of the control system will be similar to the current control system. • This will operate as a stand alone system. • Assumes sub – station will be provided as part of tower project.
Cost Benchmarks	Based on term contract rates and listed equipment prices.
Stakeholder evaluation and consultation status	DAA has envisaged consultation with DACC and other stakeholders via formal presentation of projects valued at €5 million and over. As this project is valued at under €5 million, consultation is via this document.
Extent of airlines' support for project :	See above

Provision for the relocation and decanting of airport staff between various buildings on the airport campus for one or more of the following reasons :

- To achieve operational efficiency by consolidating the locations in which DAA staff are based.
- To free up space occupied by DAA staff when opportunities emerge to lease such property to paying airport tenants.
- Temporarily relocation of staff in order to facilitate the Transforming Dublin Airport capital programme.

Investment typically includes fitting out of offices, furniture, mechanical and electrical services and IT.

These projects are usually required at relatively short notice and so a detailed schedule of works for 2010 – 2014 does not exist at this time. However, example projects from the current CIP (2006 – 2009) include the conversion of a warehouse to office space (called Silloge House) and the upgrading of break rooms at various locations around the airport.

Classification : Revenue

Primary Driver : Repair / replace	Secondary Driver(s) :Quality of Service
Project Commencement :	2010
Project Completion :	2014
Total Project Capital Expenditure :	€2,500,000
Historic Expenditure (pre 2010)	nil
Expenditure in current CIP (2010 – 2019)	€2,500,000
Project Stage	Gateway 1
Project Output	• Fitted out office space • Refurbished or altered office space
Project Justification	• Required in order to achieve operational efficiency and release office space for rental to paying third party customers.
Capital cost assumptions	Cost estimates based on previous completed projects around the airport
Cost Benchmarks	Cost vary in range €600 - €1,500 per square metre depending on occupancy of the building, leasehold agreements or quality of finish specified.
Stakeholder evaluation and consultation	*In a letter to DACC dated 9th September 2008, DAA proposed a process to obtain users views on*

status	*projects. The company wished to consult with users on Commercial Property projects at a DACC meeting scheduled for 5th December. DAA would have anticipated that this project would have been discussed as part of that session, however, users subsequently advised that they did not wish to engage with DAA at project level. As a consequence consultation with users on this project is via this document.*
Extent of airlines' support for project :	See above.

CIP 2.015 : DAA Tenant accommodation

Provision for the fitting out of office and general airport property across the airport campus in advance of occupation by non-DAA rent-paying tenants. Investment typically includes fitting out of offices, furniture, mechanical and electrical services and IT. Property types include office, stores and ramp accommodation. These projects are typically required at short notice once a tenant has been found for a specific area and commercial terms agreed. For this reason a detailed schedule of works for 2010 – 2014 does not exist at this time.
Classification : Revenue

Primary Driver : Cost Reduction	Secondary Driver(s) :Quality of Service
Project Commencement :	2010
Project Completion :	2014
Total Project Capital Expenditure :	€5,000,000
Historic Expenditure (pre 2010)	nil
Expenditure in current CIP (2010 – 2019)	€5,000,000
Project Stage	Pre gateway 1
Project Output	• Fitted out office space • Refurbished or altered office space • Fitted out ramp accommodation located in Pier buildings
Project Justification	• Investment required in order to generate commercial rent from various airport-related tenants.
Capital cost assumptions	Cost estimates based on previous completed projects around the airport
Cost Benchmarks	Cost vary in range €600 - €1,500 per square metre depending on occupancy of the building, leasehold agreements or quality of finish specified.
Stakeholder evaluation and consultation status	In many cases the tenants involved are airlines or ground handlers that require space and consultation takes place as part of the negotiation process.
Extent of airlines' support for project :	See above.

CIP 2.016: Refurbishment of airside property

This project seeks to refurbish commercial airside accommodation located in Piers A,B and C vacated after the opening of Terminal 2, to bring it up to a standard to allow it to be let to new tenants.

There is also a provision for the fitting out of Terminal 2 & Pier E ramp accommodation (the Terminal 2 project includes finishing of these areas to only a shell and core level.

The scope of this work is

- Installation or renewal of general power distribution and lighting
- Installation or update of life safety systems, Fire Alarms, Fire Suppression systems and Emergency Lighting.
- Installation or update if IT / Data / Comms infrastructure
- Provision or renewal of finishes, blinds, general decor.

The following accommodation areas located in Piers A, B & C will be refurbished :

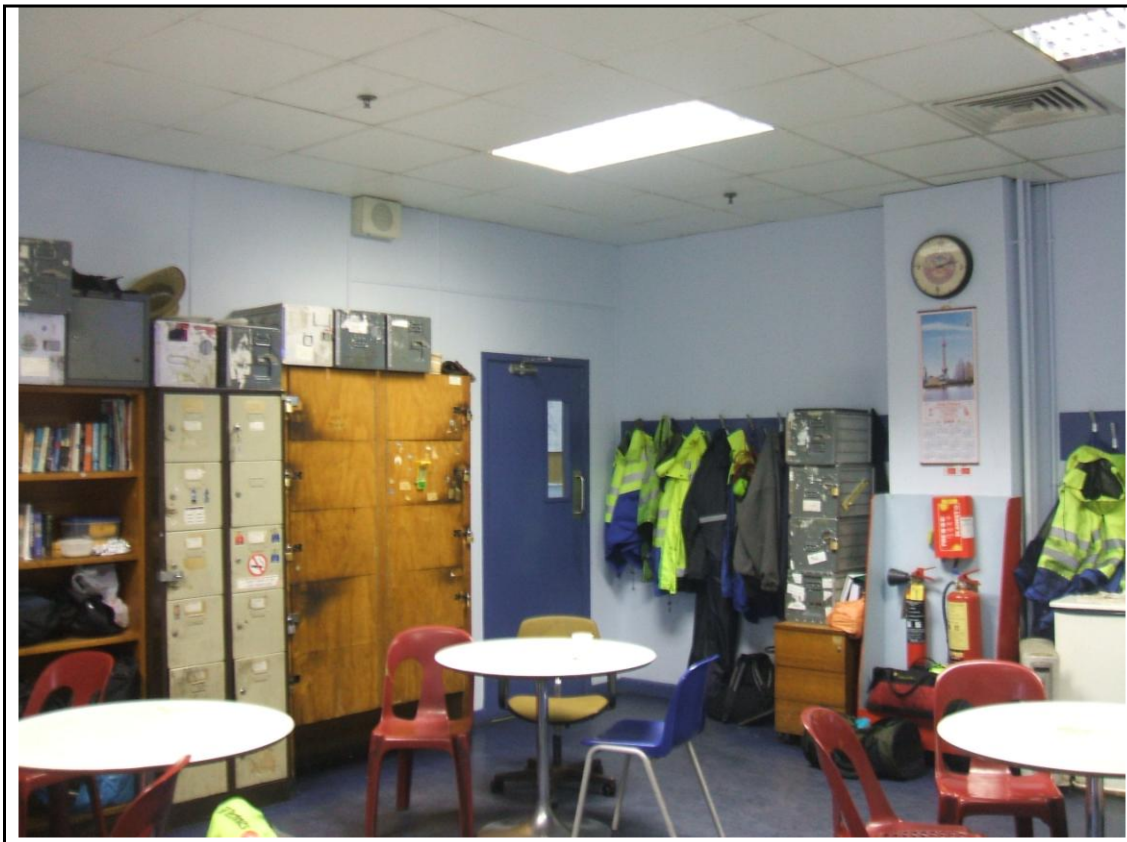
BUILDING	Current Tenant	LOCATION NAME
PIER A/ LINK	SR TECHNICS SKY HANDLING PARTNERS AER LINGUS DELTA AIRLINES	RAMP ACCOM DISPATCH AREA OFFICE OFFICE
PIER A /LINK SUM		
PIER B	SR TECHNICS SR TECHNICS	RAMP ACCOM STORE
PIER C	MUTLI-USER AIRLINE GNIB REVENUE/CUSTOMS	CUSTOMER SERV. DESK OFFI CE OFFI CE

In addition, ramp accommodation located in Terminal 2 and Pier E and comprises circa 1,000 square metres and will be fitted out as tenants are found and terms agreed.

Classification : Revenue

Primary Driver : Capacity	Secondary Driver(s) : n/a

CIP 2.016: Refurbishment of airside property



Project Commencement :	2011
Project Completion :	2014
Total Project Capital Expenditure :	€3M
Historic Expenditure (pre 2010)	None
Expenditure in current CIP (2010 – 2014)	€3M
Project Stage	various
Project Output	• Commercial accommodation in Piers A,B,C refurbished to current standards allowing it to be let at market rates. • To provide fitted out ramp accommodation at T2 & Pier E as required.
Project Justification	• The Pier A,B,C accommodation identified has had no significant refurbishment for more than 10 years. It is currently configured for its present or last occupant. Electrical distribution, comms and general decor all require attention before it can be let to a new tenant. Failure to refurbish this accommodation will limit DAAs ability to let it and to achieve market rates.

	• T2 / Pier E Ramp accommodation. This is a revenue generating item. It enables full utilisation of T2 / Pier E. It further accommodates the reduction in current temporary ramp accommodation in Pier D and Sth Apron village, as required by planning.
Capital cost assumptions	Standard airside construction rates
Cost Benchmarks	Rates currently achieved for similar refurbishment projects & rate currently applied by T2 project for fit-out.
Stakeholder evaluation and consultation status	DAA has envisaged consultation with DACC and other stakeholders via formal presentation of projects valued at €5 million and over. As this project is valued at under €5 million, consultation is via this document.
Extent of airlines' support for project :	See above.

CIP 2.017 : Hangars Maintenance

This project involves the repair and maintenance of hangars 1,2,3,6 which are located adjacent to the North Apron at Dublin Airport and which generate commercial rent.

The Hangars range in age from circa 18 – 68 years old. Their respective construction dates and size are shown in the table below.

Property	Approx. Construction Date	Size (M^2)
Hangar 1	1941	7,800
Hangar 2	1942	4,365
Hangar 3	1990	4,045
Hangar 6	1991	20,000

DAA recently commissioned a dilapidation report of these buildings (available on request). This report concluded that the buildings require investment to secure their long term integrity and their short term commercial rental prospects.

This work is essential in order to maintain existing commercial rent or to attract new commercial tenants.

The intention is to program this essential work over a number of years, which will cause minimum disruption to potential/existing tenants.

Classification : Revenue

Primary Driver : Repair/Replacement	Secondary Driver(s) : Safety/ Compliance

Project Commencement :	2009
Project Completion :	2010
Total Project Capital Expenditure :	€5.6 m
Historic Expenditure (pre 2010)	€1.4m
Expenditure in current CIP (2010 - 2014)	€4.2 m
Project Stage	Gateway 1
Project Output	Repair/replacement of building elements for Hangar 1,2,3 and 6 to leave them in a fit for purpose condition. Weather tightness: Roof repairs/Replacement Gutter Repairs/ Replacement Cladding repairs/ Replacement Mechanical/Electrical: Replacement of Mechanical installations Replacement of Electrical Installations
Project Justification	The repair and maintenance investment in these buildings is essential for their integrity and for the structures to be fit for purpose. In the absence of maintenance investment Hangars 1,2 and 3 would become unfit for purpose in the medium term.
Capital cost assumptions	The buildings are brought up to a level to the

	satisfaction of existing/potential tenants.
Cost Benchmarks	Rates for the cladding, Gutters and structure repair were acquired from industry and benchmarked against existing internal costs or reference prices from the dilapidation report. The Mechanical and Electrical cost were provisional based on a assessment by dilapidation engineers.
Stakeholder evaluation and consultation status	For reasons of commercial sensitivity it has not been possible to consult with the airlines prior to submission of this to CIP
Extent of airlines' support for project :	See above.

Transit Shed and Cargo Apron:

Currently integrated cargo is processed in an operationally restricted transit shed within Cargo Terminal 2 and the adjacent south apron is used by cargo to facilitate this.

The stands traditionally used by cargo aircraft will be in use as Pier E contact stands in future.

An alternative location is therefore required for parking cargo aircraft and the associated "Transit Shed" cargo activities. Two locations were considered, namely the Westlands and the North Apron.

The Westlands option involved developing a transit shed and stands on the west side of the airfield. Due to the lack of infrastructure (Roads, Utilities and other services) in this part of the airfield, the upfront investment required was prohibitive, particularly in the current economic environment, and would have resulted in a total project capital requirement of over €40 million.

Since this analysis was carried out, DAA has developed an alternative scheme in the North Apron that will involve the provision of broadly the same facilities at a much lower level of capital expenditure. The preferred scheme also includes the construction of 24,000m^2 of apron for adjacent stand capacity.

Cargo Distribution Centre:

Dublin Airport currently has limited cargo processing facilities on campus, with the large majority of Dublin Airport cargo handled, processed off site. This situation represents a loss of potential revenue to the DAA. This project also involves the provision of a "fit for purpose" cargo processing warehouse located in the North Apron. This facility will be operationally and commercially a very attractive proposition for several of the logistics companies currently operating in a more limited capacity at Dublin Airport.

Classification : Revenue	
Primary Driver : Repair / Replace	Secondary Driver(s) : cost reduction
Project Commencement :	2010
Project Completion :	2011
Total Project Capital Expenditure :	€14.3 m
Historic Expenditure (pre 2010)	NIL
Expenditure in current CIP (2010 – 2014)	€14.3 m
Project Stage	Pre gateway 1
Project Output	• Provision of 2,600m^2 of existing hangar into a fit for purpose Transit Shed used by cargo operators. (The transit shed will be made up of c.200m^2 of office space and welfare

	facilities and 2,400m^2 of warehouse to process integrated cargo). • 24,000m^2 of new apron for 4 Cargo aircraft stands • 9,000m^2 of refurbished warehousing with associated trucking yard and dock levellers, plus 400m^2 of office and welfare facilities. • New security post (part apportionment of costs to this project)
Project Justification	• There is a requirement to relocate certain activities to facilitate ongoing airport expansion and this proposal represents the lowest cost option in this case. • Cargo Distribution Centre represents a commercial opportunity to earn rent from existing assets by converting them into fit for purpose cargo logistic facilities
Capital cost assumptions	• The cost is based on a recent engineering survey with an added contingency.
Cost Benchmarks	• The apron cost is based on recent DAA projects. • The building costs are based on a schedule of works, internal projects and 2008 external figures.
Stakeholder evaluation and consultation status	A number of consultation meetings have been held about the requirements of the Cargo operators and these have established a requirement for a solution. Recent developments have facilitated the development of the proposal outlined above and due to the timescales involved consultation is via this document.
Extent of airlines' support for project :	There has been some degree of acceptance that the expansion of the airport meant that provision would need to be made for cargo operations in the short term.

This project involves the development of a retail warehouse facility at Dublin Airport, by refurbishing and extending an existing industrial building, to store and replenish stock for direct and concession retail operations at Terminals 1 and 2.

Currently retail warehousing is located across two existing sub-optimal facilities:

1. Direct Retail is served from a stand alone warehouse building near the Ryanair Head office building
2. Concession Retail is served from a storage facility in the basement of Terminal 1 (near Area 14).

The T1 facility is already near full capacity and this situation will be exacerbated when T1X is scheduled for completion by the summer 2009. As a result it will not be able to service the additional T2 retail requirements, as there are no retail storage facilities located in T2.

Terminal	Retail Space (m^2)	Logistics Space (m^2)	Storage as a % of Retail
Terminal 1	11,310	4,127	36%
Terminal 1X	2,773	312	11%
Terminal 2	8,525	0	0%
Overall Total	22,608	4,439	20%

Table 1 – Current retail space & warehousing facilities

It is estimated that the increased space required for T1X and T2 will be in the order of 20 - 30% (in line with best practice). The actual mix will be determined by the eventual mix of retailers for T2. It is recommended that the new facility with improved storage methods (including mezzanine floor) should have a 3,300m^2 footprint with c.6,000m^2 of storage space. The additional space will provide additional capacity for a third party to service additional business.

There will be a large saving to DAA if they develop their own warehousing over the next cheapest option (joint venture option) and a further saving on a third party option per square metre. A number of potential locations for the new retail facility at the airport are currently being analysed in order to decide the optimal location.

This solution is in line with the recommendations of a 2006 Ove Arup and Partners Retail Logistics Study. DAA will own the new warehouse, which will be purpose built to a "cross docking" configuration to allow faster processing and security screening. The facility will be jointly operated by the DAA and a third party specialist retail logistics company who will provide all airport retailing logistics across the airport, serving both direct and concession operations.

The benefits to the retail operations from the project include the following:

- Operational requirement to provide essential additional warehousing capacity to service T1/T1X/T2
- Reduced storage costs due to economies of scale and consolidation of activities into one location
- Greater potential for bulk buying with reduced costs due to increased storage capacity

CIP 2.019 : Retail Logistics Centre

- Improved security screening efficiencies will reduce bottlenecks and reduce delivery time of goods
- Potential new revenue streams from the use of the basement space in T1 and current Direct Retail warehouse premises

An interim solution involving contracting with an outsourced third party retail logistics centre has been planned and will be implemented in time for the opening of the new terminal.

Classification : Revenue

Primary Driver : Capacity	Secondary Driver(s) : Cost Reduction

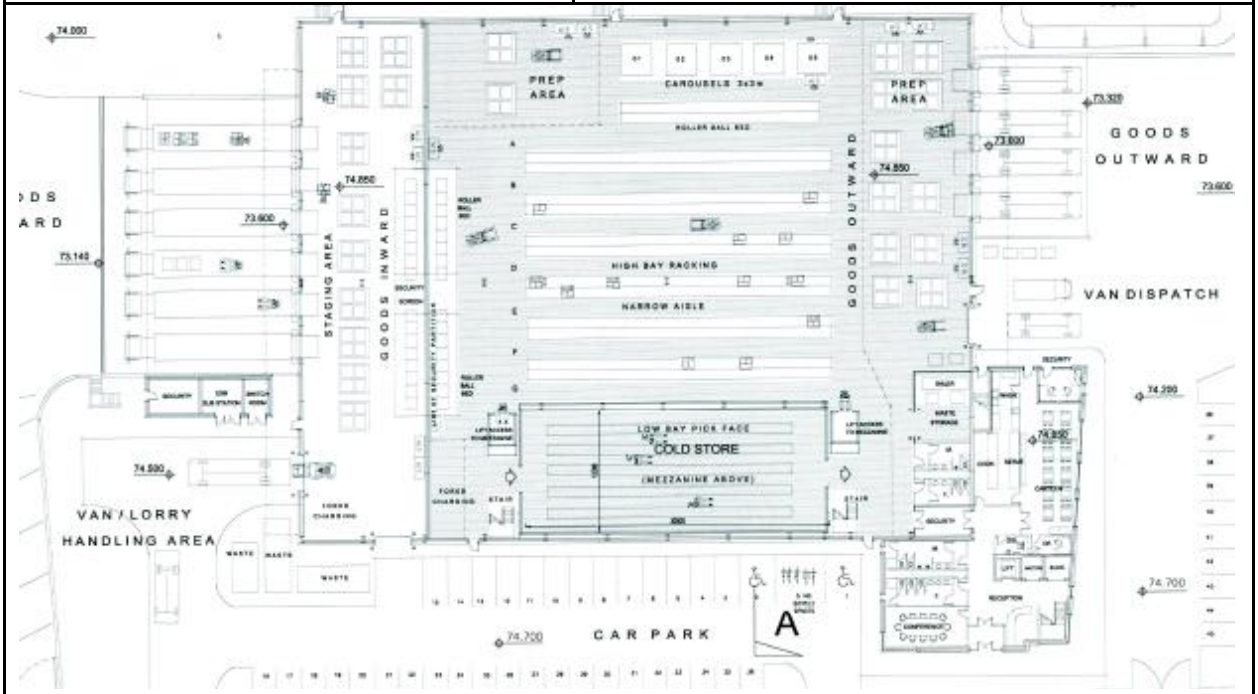


Figure 1 – Potential layout of retail logistics centre

Project Commencement :	2010
Project Completion :	2011
Total Project Capital Expenditure :	c.€3.1m refurbishment
Historic Expenditure (pre 2010)	nil
Expenditure in current CIP (2010 – 2014)	c.€3.1m refurbishment
Project Stage	Gateway 1
Project Output	• The refurbishment and extension to an existing warehouse on campus at a location yet to be finalised. The extension will include dock levellers, a loading bay / yard suitable for use. • Refurbishment of office accommodation included in the footprint • Upgrade of mechanical & electrical services

	• New security post (part apportionment of costs to this project)
Project Justification	• Operational requirement to provide additional warehousing capacity • Reduced storage costs due to economies of scale and consolidation of activities into one location. • Greater potential for bulk buying with reduced costs due to increased storage capacity • Improved security screening efficiencies will reduce bottlenecks and reduce delivery time of goods • Potential new revenue streams from the use of the basement space in T1 and current Direct Retail warehouse premises.
Capital cost assumptions	• The existing building is in a good condition and does not require significant repairs /alterations • Fit out costs excluded • The refurbishment / extension have been evaluated using industry standard rates of similar works
Cost Benchmarks	• Benchmark of extension costs are from industry and airport campus projects • The yard and leveller costs are based on supplier quotes • Refurbishment costs of warehouse are taken from previous airport campus projects
Stakeholder evaluation and consultation status	For commercially sensitive and time constraint reasons it has not been possible to consult with the airlines prior to submission of this to CIP. Consultation is therefore via this document.
Extent of airlines' support for project :	See above.

CIP 3.012: New Taxi holding area.

The Taxi Holding area allows taxis to queue for access to the Terminal Arrivals Kerb in a location remote from the terminal. Taxis are "called" up to the Terminal kerb to collect passengers in manageable batches as demand dictates.

The existing Taxi Holding Area can accommodate circa 140 vehicles within the fenced area. Typically an additional 160 vehicles are seeking to gain access to the Holding Area, and this results in a queue of taxis around the perimeter of the purple zone car park and Corballis Way. At very busy times this queue of slow moving or stationary vehicles spills out onto the East Link Road which is the main airport access route.

This current situation represents a road safety hazard and also often results in blocking access to and from the Radission Hotel and Purple Zone Car Park (see photos below).

It is therefore imperative that the Taxi Holding Area be enlarged to be able to safely accommodate the existing demand and to serve future growth in demand from Terminal 1 and Terminal 2. This project comprises building a larger facility at a new location in the Eastlands. This new facility is planned to cater for 450 taxis and will include washroom and canteen facilities. It is assumed that the new facility will displace existing long term car parking spaces. Provision has also been made for an intermediate holding area between the Eastlands and the Terminal Area.

Classification : Airport Infrastructure

Primary Driver : Capacity	Secondary Driver(s) : Quality of service, safety / compliance.

Project Commencement :	2011
Project Completion :	2011
Total Project Capital Expenditure :	€4m
Historic Expenditure (pre 2009)	Nil

CIP 3.012: New Taxi holding area.

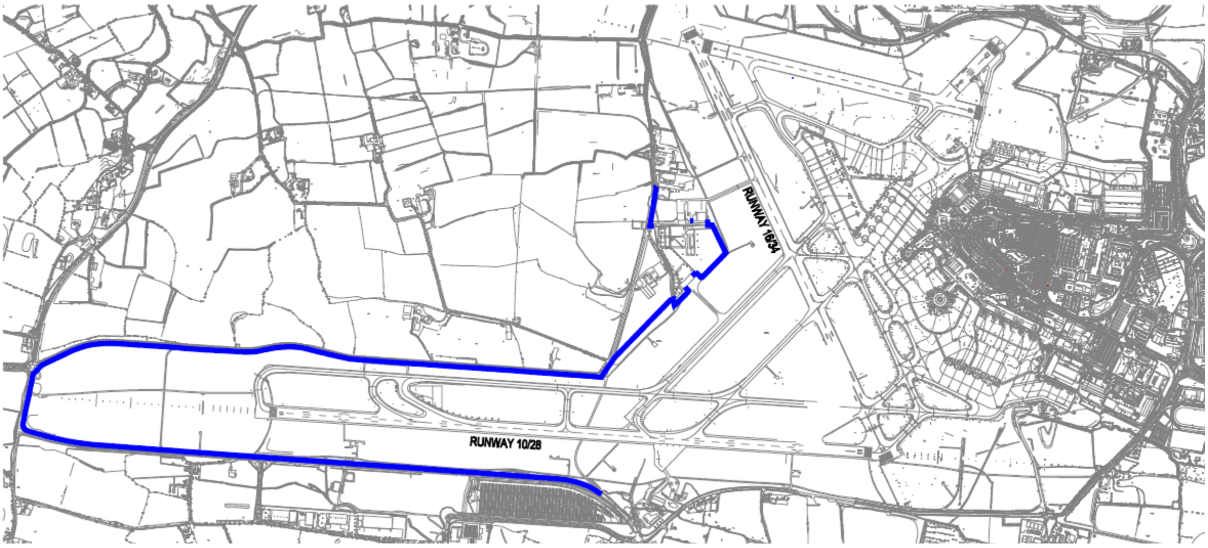
Expenditure in current CIP (2010 – 2019)	€4m
Project Stage	Gateway 1
Project Output	• Provision of an enlarged Taxi Holding Facility with capacity for 450 taxis which will serve both T1 and T2 operations. • Facilities: Washroom, canteen, FIDs, call up system and DAA staff office. • 450 spaces replacement long term car park • Intermediate holding area for taxis.
Project Justification	The existing taxi holding area is significantly undersized. The overspill of taxis queuing around the surrounding roads and at peak times back out onto East Link Road represents a traffic and pedestrian safety risk.
Capital cost assumptions	• New facility will displace existing long term car park spaces and provision is included in the project cost for the replacement of circa 450 long term spaces on a granular surface. • Provision included for intermediate holding area between the Eastlands and the Terminal Area. • Bituminous surfaced car park to be provided in new Taxi Hold Area
Cost Benchmarks	• €1,500 per space for replacement long term parking • €2,000 per space for new taxi parking area • €200,000 provision for canteen / breakroom • €200,000 provision for washrooms / toilet facilities & DAA staff office. • €500,000 provision for intermediate hold area • Preliminaries: 15%
Stakeholder evaluation and consultation status	DAA has envisaged consultation with DACC and other stakeholders via formal presentation of projects valued at €5 million and over. As this project is valued at under €5 million, consultation is via this document.
Extent of airlines' support for project :	See above.

CIP 3.014: Airside / Landside Perimeter Fence Upgrade

The project consists of the upgrading of the perimeter fencing at Dublin Airport to (i) ensure that it fully conforms to ICAO recommendations and (ii) to provide a more secure type of fencing. To date approx. 4.9km of the perimeter fencing has been upgraded and this project includes for the upgrading of a further 6.4km of fencing. Total secured perimeter at Dublin Airport is 16.2km. It is not planned to replace the remaining 4.8 km of fencing, as the construction of the new northern runway will necessitate the removal of this section of fence at a future date.

This project was contained in CIP 2006 – 2009 (CIP 3.014) but was not carried out.

Classification : Airport Infrastructure	
Primary Driver : Safety / Compliance	Secondary Driver(s) :Repair / Replace



Project Commencement :	2010
Project Completion :	2012
Total Project Capital Expenditure :	€2 million
Historic Expenditure (pre 2009)	€517,529
Expenditure in current CIP (2010 – 2019)	€2 million
Project Stage	Pre Gateway 1
Project Output	• Upgraded Security Fencing in accordance with ICAO recommendations and recommendations of independent security consultant. • Fencing is specifically designed for high security application and comprises welded mesh complete with rhs box section and security entanglements

	• Minimum height 2.44m including "Y" crank on top section. • Sections of fencing may to be in excess of 2.44m due to location of fence e.g. through ditches.
Project Justification	• Mandatory security requirement. • Standardisation of perimeter fencing at Dublin Airport. • More secure type of fencing
Capital cost assumptions	Primarily landside works with temporary fencing in place to form airside / landside boundary during working hours.
Cost Benchmarks	• €240/m for 2.44m high fence. • €3,000 per new airfield gate. • Preliminaries: 15%
Stakeholder evaluation and consultation status	DAA has envisaged consultation with DACC and other stakeholders via formal presentation of projects valued at €5 million and over. As this project is valued at under €5 million, consultation is via this document.
Extent of airlines' support for project :	See above

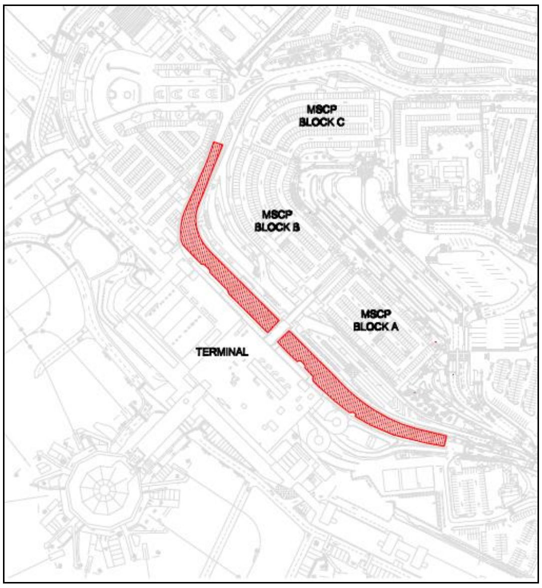
CIP 3.033: Repairs to departures road

The existing bridge structure which forms the T1 Departures Road is leaking and water is getting into the Arrivals Hall located underneath. Both the transverse and longitudinal joints in the structure have failed, mainly due to their age. As a consequence refurbishment of the Departures Road pavement and bridge structure is essential in order to prevent extensive damage to the Terminal building and services, and to avoid operational disruptions.

This project involves a complete refurbishment of the Departures Road ramp :

- Exposing and repairing all transverse and longitudinal joints.
- Application of a new mastic asphalt tanking to the entire surface area of the bridge deck below both the road and footpath pavements in order to waterproof the concrete bridge deck / Arrivals Hall roof.
- Removal of all existing road gullies and replacement with a new proprietary drainage system suitable for pavements with flat gradients. This type of drainage system will also allow for the removal of most if not all of the down pipes within the Arrivals Hall.
- Resurfacing of the concrete bridge structure with 100mm Dense Bitumen Macadam Base Course and 50mm Stone Mastic Asphalt wearing course including reprofiling the crossfalls etc where possible.
- Replacement of concrete paving slabs in footpaths with a pavement suitable for withstanding the loading from scissors hoist used for the windowing cleaning.
- Provision of pedestrian lights opposite entry to MSCP access point.

Classification : Airport Infrastructure	
Primary Driver : Repair / Replace	Secondary Driver(s) :



Project Commencement :	2011

CIP 3.033: Repairs to departures road

Project Completion :	2011
Total Project Capital Expenditure :	€4.3 million
Historic Expenditure (pre 2009)	Nil
Expenditure in current CIP (2010 – 2019)	€4.3 million
Project Stage	Pre Gateway 1
Project Output	• Repaired bridge structure – approx 6,850m^2. • Resurfaced departures ramp road - approx. 4,700m^2. • New paving in pedestrian areas – approx. 2,150m^2 • Pedestrian lights
Project Justification	The departures ramp forms the roof of the Terminal 1 Arrivals Hall below and it is leaking, regularly resulting in water damage to the internal areas.
Capital cost assumptions	• Night time working will be required for the majority of the work. • Ramp will need to be repaired in sections in order to minimise the impact on traffic flow. • Provision in the cost estimate for the replacement of the structural screed – however this requirement can only be determined following detailed survey work. • Exact extent of works can only be confirmed following detailed survey and investigation works and as a consequence a significant contingency sum has been included in the estimate. • Includes 30% contingency as work required in respect of repair methodology, access, working hours etc.
Cost Benchmarks	• Scabbling & removal offsite of existing pavement: €30/m^2 • New bituminous road pavement on bridge deck: €100/m^2 • Heavy duty footpath pavement: €50/m^2 • Preliminaries: 15%
Stakeholder evaluation and consultation status	DAA has envisaged consultation with DACC and other stakeholders via formal presentation of projects valued at €5 million and over. As this project is valued at under €5 million, consultation is via this document.
Extent of airlines' support for project :	See above

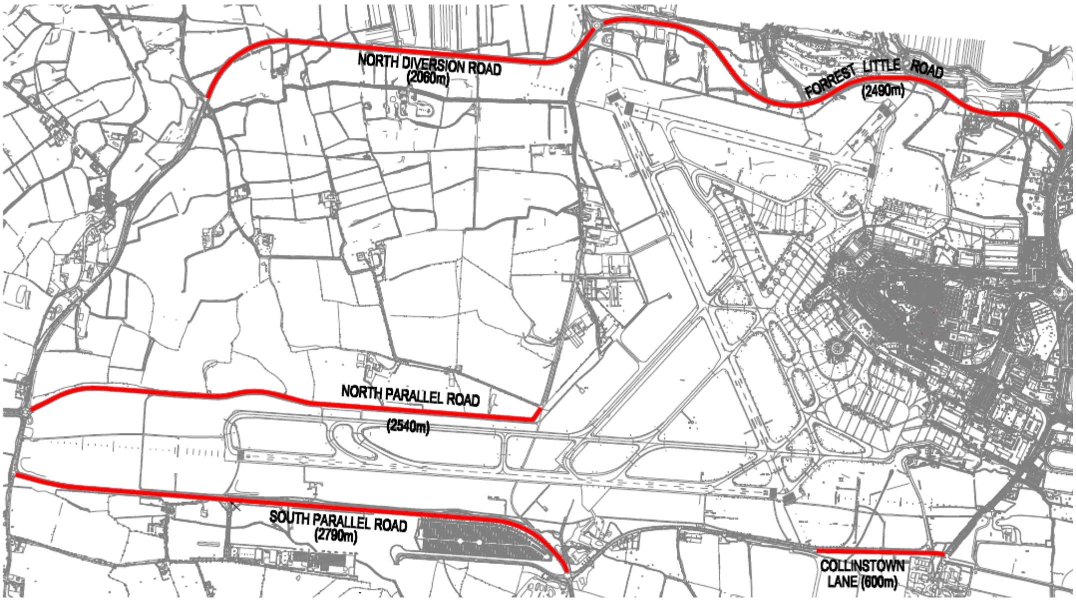
CIP 3.034 : External Roads upgrade

This project provides for upgrading the external airport roads (South and North Parallel Roads, Northern Diversion Road, Collinstown Lane and Forrest Little Road). These roads remain in the ownership of the DAA as Fingal County Council has not yet taken them in charge.

The above roads were upgraded in 2007 (excluding the North Parallel Road), but the work undertaken was of a short term nature and only intended to extend the pavement life by approximately 5 years. It has been planned to negotiate with FCC to have these roads taken in charge in the context of agreeing the capital contributions for the new northern runway and other major airport developments (e.g. T1 extension and T2). If this is unsuccessful however further provision will need to be made for maintenance work.

Classification : Airport Infrastructure

Primary Driver : Repair / Replace	Secondary Driver(s) :Safety / Compliance



Project Commencement :	2013
Project Completion :	2014
Total Project Capital Expenditure :	€2.2 million
Historic Expenditure (pre 2009)	Nil
Expenditure in current CIP (2010 – 2019)	€2.2 million
Project Stage	Pre Gateway 1 stage
Project Output	Upgraded roads comprising new bituminous overlay and new road marking (circa 11km of roads, approx 7.5m wide). In addition the upgraded pavement will have improved skid resistance and surface profile.

Project Justification	Essential upgrade works to (i) strengthen the road pavement, (ii) prevent structural damage to lower construction layers and (iii) maintain the road surface in a safe condition for vehicular traffic.
Capital cost assumptions	• Primarily daytime work, however night-time work will be required at junctions. • No modifications to services • Basic overlay to roads
Cost Benchmarks	• 75mm overlay: €20 /m^2 • Preliminaries: 15%
Stakeholder evaluation and consultation status	DAA has envisaged consultation with DACC and other stakeholders via formal presentation of projects valued at €5 million and over. As this project is valued at under €5 million, consultation is via this document.
Extent of airlines' support for project :	See above

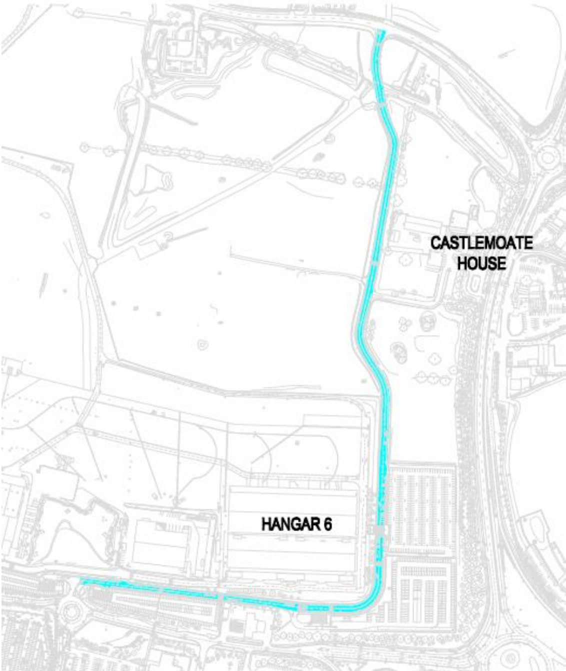
CIP 3.035 : Internal secondary campus roads upgrade

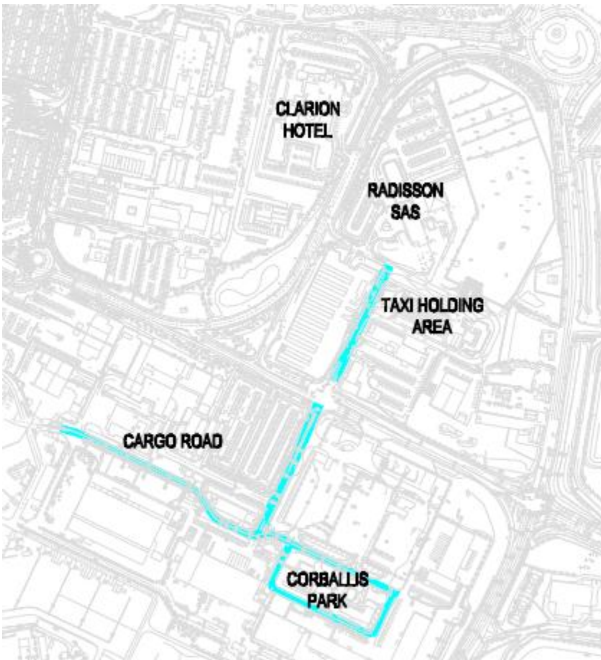
This project primarily involves the upgrading of the internal Secondary Campus Roads i.e. roads outside of the main access and egress routes to the main terminal area.

The Eastlink Road, South and North Corballis Roads are being upgraded as part of the CIP 2006 – 2009; these form the main routes for passenger traffic to and from the main terminal area. However outside of these routes there is a network of roads serving the Cargo, Hangars and other operational areas. Significant upgrading works is required to elements of this network including the Cargo Road to Police Post 4, Castlemoate Road, Arrivals Road, Corballis Park, and Corballis Way (see graphic below). Visual inspection has shown that the road pavement in places is showing signs of distress. The aforementioned roads consist of both concrete and bituminous road pavement. The Castlemoate Road from Hangar 6 to the Forrest Little Road comprises of bituminous pavement and the original road is circa 30-40 years old although it was widened around 15 years ago. The upgrade of this road will also require the provision of kerbing, drainage and attenuation. The Cargo Road to Police Post 4 is a concrete road in excess of 30 years old and upgrade works will include for strengthening the pavement through the provision of a bituminous overlay. The Arrivals Road upgrade will include for concrete hard standing in bus set down areas and road strengthening with bituminous overlays in other areas.

The exact nature and extent of all the remedial works will depend on the findings of pavement evaluation surveys.

Classification : Airport Infrastructure	
Primary Driver : Repair / Compliance	Secondary Driver(s) :Safety / Compliance





Project Commencement :	2010

CIP 3.035 : Internal secondary campus roads upgrade

Project Completion :	2011
Total Project Capital Expenditure :	€5.0 m
Historic Expenditure (pre 2009)	None
Expenditure in current CIP (2010 – 2019)	€5.0 m
Project Stage	Gateway 1
Project Output	The Cargo Road to Police Post 4, Castlemoate Road, Corballis Park and Corballis Way will be overlayed with bituminous surfacing. The pavement strength of the roads will be significantly increased and the pavement life will be extended by 15 to 20 years. In addition the upgraded pavement will have improved skid resistance and surface profile. The works will also include for raising kerbs and gullies and relaying footpaths along sections of roads that are currently kerbed and drained. In addition new kerbing, drainage and attenuation & footpaths will be provided along the Castlemoate Road from Hangar 6 to the Forrest Little Road. In summary approx. Length of roads to be upgraded is 3km with an average width of 7.5m. The Arrivals Road upgrade will include for concrete hard standing in bus set down areas and bituminous overlays in other areas.
Project Justification	The remedial / upgrading works are necessary because: • Current road condition is poor with visual signs of distress. • Poor surface condition – safety issue • Remedial work required now before underlying layers are damaged and more extensive remedial works required. Visual inspection has shown that the road pavement is showing signs of distress. The exact nature and extent of the remedial works will depend on findings of a pavement evaluation survey. In addition the Castlemoate Road is the main route for construction traffic for a significant number of projects in the current CIP. As a consequence a significant volume of construction traffic is currently using the road and will continue to use it over the next couple of years. This traffic will have a significant detrimental impact on the condition of the road.

Capital cost assumptions	• Cost based on upgrading (i) approx. 2,200m of internal campus secondary roads and (ii) approx. 5000m^2 of pavement on the Arrivals Road. There is also provision for future upgrades to roads not yet identified. • Costs primarily based on daytime work however elements of work at critical junctions and other critical locations will be undertaken at night-time e.g. Arrivals Roads. • Rates reflect restrictive working environment.
Cost Benchmarks	• Overlays to existing roads incl. modifications to kerbs, services and footpaths: €90/m^2 • Complete reconstruction of road incl. drainage, attenuation, kerbing, footpaths etc: €175/m^2 • Preliminaries: 15%
Stakeholder evaluation and consultation status	In a letter to DACC dated 9th September 2008, DAA proposed a process to obtain users views on projects. The company wished to consult with users on key infrastructure projects at a DACC meeting scheduled for 5 December. DAA would have anticipated that this project would have been discussed as part of that session, however, users subsequently advised that they did not wish to engage with DAA at project level. As a consequence consultation with users on this project is via this document.
Extent of airlines' support for project :	See above

CIP 4.014: Replacement of CHP2

DAA Project code :

Combined Heat and Power (CHP) or Cogeneration is the simultaneous production of usable heat and electricity in the same power plant. In this way CHP systems require less fuel than equivalent separate heat and power systems to produce the same amount of energy, which typically achieves a 35% reduction in energy use.

Dublin Airport had three CHP plants in service up to 2008 as follows :

CHP	Year of installation	Energy rating	Status
1	1994	600 kWe	Taken out of service in 2008
2	1998	1,000 kWe	Theoretical end of life in 2008 but will remain in service hopefully until 2011
3	2002	2,700kWe	In service

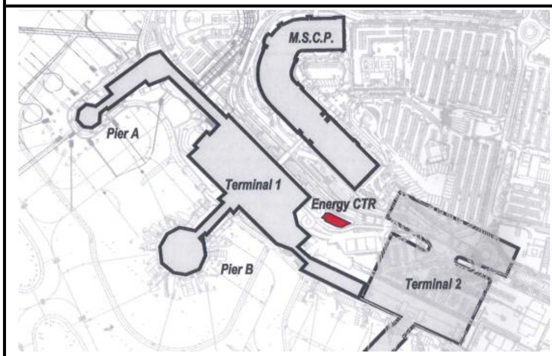
The T2 project includes the installation of an additional CHP plant rated at 3,000 kWe which will serve the needs of that Terminal only.

The above three plants supplied about half the Airport's power requirement with the balance purchased from ESB. It is financially and environmentally attractive to keep the proportion of CHP as high as is practical.

This project involves the purchase and installation of one new CHP plant rated at circa 2,700 kWe in order to replace the loss of CHP1 and CHP2, as the latter plant will not be serviceable beyond 2011 at the latest.

Classification : Plant & Equipment

Primary Driver : Repair / Replace	Secondary Driver : Cost Reduction



Project Commencement :	2011
Project Completion :	2011
Total Project Capital Expenditure :	€ 3,300,000
Historic Expenditure (pre 2009)	Nil
Expenditure in current CIP (2010 – 2019)	€ 3,300,000

CIP 4.014: Replacement of CHP2

Project Stage	Pre Gateway 1
Project Output	New Combined, Heat and Power Plant, with rated output 2MW to 3MW. The system will generate embedded electricity to displace grid electricity and will generate heat to displace gas boiler operation.
Project Justification	Asset replacement : CHP#1 has reached 60,000 hours and is 14years old and has reached the end of its useful life. CHP#2 has c.50,000 hours served and is 10years old (2008). With good care and attention it is hoped, if possible, to sweat this asset to 2011. In the context of rising energy costs, possible energy taxes (from which CHP schemes will likely be exempt) and CO2 emission restrictions, the case for CHP deployment is ever strengthening. The project will be configured to realise a payback of four years. Self generation by CHP generates lower cost electricity & heat compared to Utilities service provider's energy costs. CHP deployment also significantly contributes to reduction in global CO2 production.
Capital cost assumptions	Space availability and handling/offloading access
Cost Benchmarks	T2 has been designed to have a CHP capacity of 3MW, the cost estimate above is line with competitive tendered costs for CHP at T2.
Stakeholder evaluation and consultation status	DAA has envisaged consultation with DACC and other stakeholders via formal presentation of projects valued at €5 million and over. As this project is valued at under €5 million, consultation is via this document.
Extent of airlines' support for project :	See above

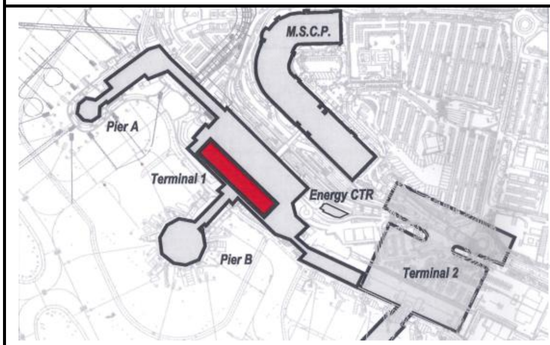
CIP 4.017 : Upgrade HBS to CT scanners

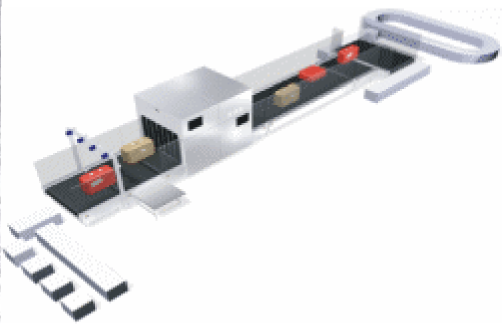
The existing Hold Baggage Screening (HBS) Systems at Dublin Airport are based on X Ray technology. These “Standard 1” machines were installed at various locations in 2000, 2002 and 2007. The current draft European Commission Regulation of 2006, Amending Commission Regulation (EC) No 622/2003 lays down measures for the implementation of the common basic standards on aviation security which, if implemented, would involve the compulsory upgrading of all existing screening machines to CT Scanners (“Standard 2”). It is currently anticipated that Standard 2 Hold Baggage screening will be a legal requirement at all airports by 2012.

Should the new law not be implemented as anticipated then this capital project will be required.

Classification : Plant and Equipment

Primary Driver : Safety / Compliance	Secondary Driver(s) : Quality of Service





Project Commencement :	2011
Project Completion :	2011
Total Project Capital Expenditure :	€ 10,800,000
Historic Expenditure (pre 2009)	Nil
Expenditure in current CIP (2010 – 2019)	€ 10,800,000
Project Stage	Pre Gateway 1
Project Output	Upgraded hold baggage screening security systems to Level 2
Project Justification	The regulations pertaining to the standards for existing hold baggage screening, X-ray security systems are under review. It is anticipate that all Explosive Detection Systems will be obliged to comply with standard 2 by 2012. Existing systems at Dublin Airport are generally standard 1 and therefore will require upgrade before 2012.

	The life cycle of the existing T1 scanning machines is circa 10 years and so the older machines (installed in 2000 and 2002) may have been due for replacement in any event by the time the new laws are introduced.
Capital cost assumptions	Disruption to operational systems can be reasonably be managed.
Cost Benchmarks	T2 has been designed to have a HBS standard 2 system and so the competitive tendered costs for HBS at T2 have served as a benchmark for this project.
Stakeholder evaluation and consultation status	In a letter to DACC dated 9th September 2008, DAA proposed a process to obtain users views on projects. The company wished to consult with users on Local Operations Projects at a DACC meeting scheduled for 7 November. DAA would have anticipated that this project would have been discussed as part of that session, however, users subsequently advised that they did not wish to engage with DAA at project level. As a consequence consultation with users on this project is via this document.
Extent of airlines' support for project :	See above

CIP 5.013: General Retail Refurbishments

Most airports, including Dublin Airport, have a mix of direct (core product ranges managed by the airport operator) and concession (high street brands typically manned by outside staff) retail activities. Most non-core specialist categories, including the growth areas of fashion and accessories, but also watches, electronics and many other product areas, tend to be operated by concessionaires under well recognised high street retail brands.

In addition to the obvious boost from instantly recognised and trusted national or international brands, fit-out capital costs at concession units are much lower for the airport operator as the concessionaire pays for all of the shelving, Point of Sale material, shop fronts, signage and so on, while the airport operator provides the basic infrastructure (lighting, air conditioning, ceilings etc). The assessment of capex requirements for retail in the 2010 – 2014 period reflects a move towards more concession outlets over the next five year period. This shift will start with the launch of T1X later this year, will continue with the opening of T2 retail in 2010 and conclude with the conversion of the original T1 retail ("The Street" and Piers A and B) thereafter.

The requirement to regularly refresh all retail space in order to keep the offer fresh will remain, and is also allowed for in the next CIP. Retail space at Dublin Airport has historically been refurbished on a five year cycle, in order to react to changes in customer demands and to counteract the wear and tear associated with such a high level of customer traffic[1]. Furthermore, in recent years the average number of trips taken by passengers travelling through Dublin airport has increased to 5.5 per annum. The risk of passenger "shopping-fatigue" obviously increases in proportion to the average trip frequency, further underlying the need for regular retail refurbishment.

Classification : Revenue

Primary Driver : Repair / Replace	Secondary Driver : n/a

[1] Airport retail units are typically open from 5:00 am to 10:00 pm seven days per week, which represent much longer hours and therefore much higher wear and tear than equivalent high street units.

CIP 5.013: General Retail Refurbishments

Project Commencement :	2010
Project Completion :	2014
Total Project Capital Expenditure :	€16,800,000
Historic Expenditure (pre 2010)	Regular annual expenditure
Expenditure in current CIP (2010 – 2019)	€16,800,000
Project Stage	Ongoing programme of works
Project Output	Phased refurbishment of DAA's Direct and Concession Retail outlets. Output varies by project but includes replacement of internal partition walls, floors, ceilings, M&E adjustments, gondolas and other display material, POS and so on. Rebranding of exiting retail areas consistent with DAA retail strategy.
Project Justification	All retail space requires refurbishment every 4 – 5 years in order to keep up with ever changing shopping trends and product lines. This programme of investment is required in order to protect and enhance retail revenue into the single till.
Capital cost assumptions	Daytime working. Phased programme of refurbishment.
Cost Benchmarks	Per square metre rates in range €1,500 - €3,000 depending on type of facility required and whether operator is DAA or Concessionaire.
Stakeholder evaluation and consultation status	In a letter to DACC dated 9th September 2008, DAA proposed a process to obtain users views on projects. The company wished to consult with users on Retail projects at a DACC meeting scheduled for 7 November. DAA would have anticipated that this project would have been discussed as part of that session, however, users subsequently advised that they did not wish to engage with DAA at project level. As a consequence consultation with users on this project is via this document.
Extent of airlines' support for project :	See above

The current engine testing facility at Dublin Airport is located at the Northern Boundary of the airfield on the old Runway 23 threshold. All major airports provide a facility for airlines to carry out engine test runs following maintenance/overhaul of engines. This current site is located within the footprint of the new North Runway. Once construction of the runway commences it will not be possible to access this site and an alternative location will be required.

It is an objective in the Fingal County Council Local Area Plan (LAP 2006) to relocate the engine testing facility away from the north of the airfield to a sound controlled area.

It is also one of the planning conditions for the new Runway, that

> *"Prior to the commencement of construction of the new runway, aircraft engine testing at the northern end of the airfield shall cease and shall be relocated away from populated neighbouring areas to a sound controlled area in accordance with the objectives of the Dublin Airport LAP,2006."*

Furthermore, some airlines have indicated that they wish to have the ability to carry out 'engine washes' and subsequent engine tests on a 24 hour basis.

All of the above necessitates the provision of a dedicated sound-proofed engine testing enclosure, which is provided for in this project

The construction of a new Engine Testing facility will be triggered, as discussed in Chapter 7 of this document. However, it will be necessary to carry out a detailed design of the facility in 2010 in order to ensure that DAA is ready to commence construction once the trigger point is reached.

Classification : Airfield

Primary Driver : Safety / Compliance	Secondary Driver(s) : Repair / Replace

Typical Engine Testing Facility

CIP 6.009 : Engine Testing Facility - fees

Project Commencement :	2008
Project Completion :	2010
Total Project Capital Expenditure :	€645 k
Historic Expenditure (pre 2010)	€245k
Expenditure in current CIP (2010 - 2014)	€400 k
Project Stage	Gateway 2
Project Output	• Detailed design for a new engine testing and wash down facility with associated apron and access taxiway located to minimise environmental impact and maximise usability.
Project Justification	• Design fees only required as part of this CIP submission. This will give DAA the ability to start construction without delay once the project trigger is reached. • Objective in the LAP 2006 • Runway Planning Condition to relocate engine testing facility to sound controlled area.
Capital cost assumptions	Fees are based on a percentage cost of the overall project.
Cost Benchmarks	Based on tendered prices for similar design projects.
Stakeholder evaluation and consultation status	Questionnaire issued to airlines during summer 2008. Consultation also took place via 2006 CIP as the project was included there in the look ahead 2010 - 2015.
Extent of airlines' support for project :	Airlines have the requirement to carry out Engine testing and associated engine washes, and are supportive of a facility that enables them to carry out those activities.

CIP 6.017: Runway 10/28 Overlay

DAA Project code :

Dublin airport's main runway 10/28 was constructed in 1989 and has been in continuous operation for the past 20 years. The frequency of maintenance on the runway, in the form of slab replacements, has steadily increased over the past number of years.

A full structural evaluation was carried on the runway in May 2007 and this estimated the remaining life of the pavement to be in the order of 4 to 6 years before significant intervention is required. It is therefore recommended to carry out the runway overlay over the period 2010 to 2011. Every year the overlay is delayed beyond this, the extent of the rehabilitation required could increase significantly.

This project also includes for the replacement of the runway inset light fittings which are also 20 years old and nearing the end of their useful life.

The project provides for approximately 180mm asphalt overlay with grooving or porous wearing course, installation of inset lights and replacement runway markings.

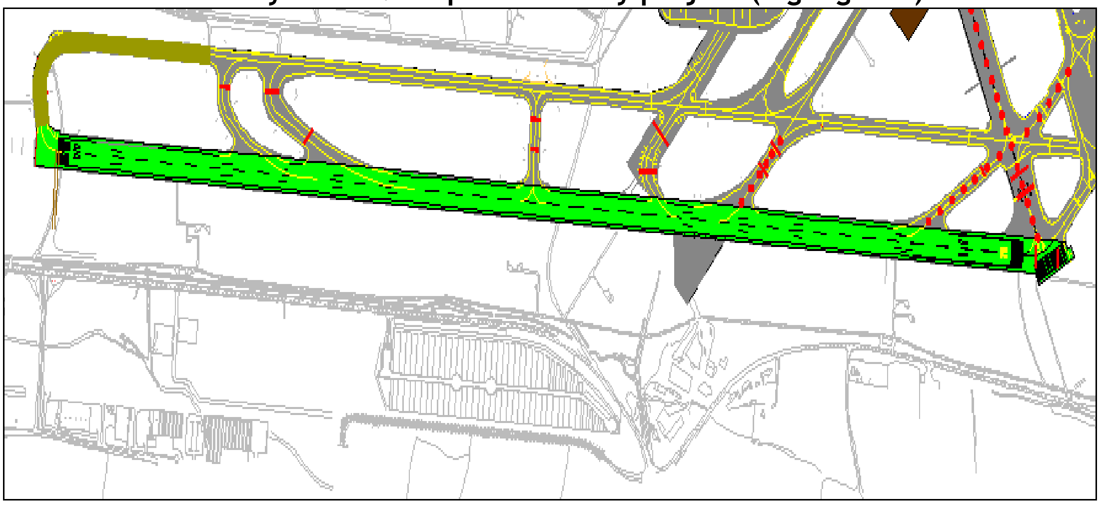
An allowance of €546k for carrying out a pavement study was included in the CIP 2006 - 2009. The estimated project cost was lower in that CIP because a thinner pavement thickness was planned based on the pavement evaluation at that time. Also, it was envisaged that these works would be carried out after the North Runway had opened, which would have allowed for a longer night-time work period.

An allowance of €400k to replace runway centre line lights was also included in the CIP 2006 – 2009. These works have now been incorporated into this project.

Classification : Airfield

Primary Driver : Repair / Replace	**Secondary Driver(s) :** Quality of service

Runway 10/28 : Scope of Overlay project (highlighted)



Project Commencement :	2010
Project Completion :	2011

CIP 6.017: Runway 10/28 Overlay

Total Project Capital Expenditure :	€23m
Historic Expenditure (pre 2009)	€80k (Structural Evaluation Report)
Expenditure in current CIP (2010 – 2014)	€23m
Project Stage	Gateway 2
Project Output	• 173,000m2 of runway rehabilitation: minimum overlay thickness of 180mm. • Replacement of defective slabs where necessary. • Replacement of Inset lights on runway 10/28 • Runway markings.
Project Justification	• The runway surface is showing signs of distress and the rate of surface deterioration is increasing in recent years in line with increased traffic, and so it is anticipated that by 2010/2011 it will require a complete overlay. • The structural evaluation report carried out in 2007 supports this justification
Capital cost assumptions	• Night time working • Based on consultant's runway evaluation report advising 180mm thickness. • Assume no attenuation required. • Multi phased construction. • (Runway restored to full operational condition at the end of each work period)
Cost Benchmarks	• Bravo taxiway overlay 2008 / D.A.A Costs Database. • Overall rate for 180mm overlay including AGL is € 132/m2
Stakeholder evaluation and consultation status	• Jan 2005 Capex plan • May 2005 CIP • 2006 CIP
Extent of airlines' support for project :	No substantive comments received during above consultations.

The concept of two east - west parallel runways was established for Dublin Airport in the 1960s. The necessary lands were acquired and the first of these two runways (10/28) was opened in 1989. Passenger numbers have since increased almost five-fold, from 5 million in 1989 to over 23 million in 2008.

Over the past five year period runway demand has exceeded capacity at busy times, but it has been possible to squeeze incremental capacity from the existing assets by a range of measures including changes to IAA separation procedures, amendments to runway delay criterion and increased pilot efficiencies.

Meanwhile, DAA submitted a planning application to Fingal County Council in December 2004, and planning permission for a new North Runway was finally granted by An Bord Pleanala in August 2007. However, some of the conditions attached to this permission are highly restrictive from an airfield operations point of view, particularly the restrictions on aircraft movements to 65 between 23:00 hrs and 07:00 hrs. This represents a reduction from the current allowable level of night-time aircraft movements, and so a new planning application is currently being prepared in order to seek to have these restrictions revised.

In any event, in light of the likely reduction in passenger numbers in 2009 and general economic downturn, we are postponing the commencement of runway construction until airport activity starts to grow again. We are proposing that construction commencement be linked to the agreed demand triggers as discussed in chapter 8 of this CIP document.

This project allows for planning fees and detailed design fees to deal with the processing of a new runway planning application, as well as allowances for the progression of detailed design. This work will enable DAA to be in a position to commence construction without delay once the demand triggers are reached. The lead time from this point to the completion and commissioning of the runway is estimated to be 2.5 years.

Classification : Airfield	
Primary Driver : Capacity	Secondary Driver : Quality of Service

CIP 6.018: North Runway Pre-Construction Fees.

Project Commencement :	2010
Project Completion :	2011
Total Project Capital Expenditure :	€10.1 m
Historic Expenditure (pre 2010)	€5.9m
Expenditure in current CIP (2010 – 2014)	€4.2 million
Project Stage	Gateway 3
Project Output	• Renewed planning application including Environmental Impact Assessment • Detailed design and contract documents • Detailed cost plan
Project Justification	• Medium / Long term passenger growth forecasts indicate that additional runway capacity will be required. • It is imperative that the current planning restrictions on night-time aircraft movements be revised. • DAA need to progress design and cost planning so that we are ready to commence construction as soon as trigger points are reached.
Capital cost assumptions	Fees included: • Runway Design Consultants • Runway Cost Consultants. • Planning Consultants. On the basis of Institute of Engineers Ireland & Society of Chartered Surveyors conditions.

Cost Benchmarks	• Tender prices, plus benchmarks against fee costs for other projects.
Stakeholder evaluation and consultation status	Numerous events of stakeholder consultation have taken place : • 1999 Airline consultation • 2002 Masterplan consultation • 2005 as part of CIP submission • 2006 as part of CIP submission • 2008 consultation
Extent of airlines' support for project :	Airlines partially supportive : Short haul carriers supportive of a new parallel runway similar in length to existing runway 10/28. Long haul carriers supportive of a new runway of 3,660 metres or longer in some cases.

The concept of two east - west parallel runways was established for Dublin Airport in the 1960s. The necessary lands were acquired and the first of these two runways (10/28) was opened in 1989. Passenger numbers have since increased almost five-fold, from 5 million in 1989 to over 23 million in 2008.

Over the past five year period runway demand has exceeded capacity at busy times, but it has been possible to squeeze incremental capacity from the existing assets by a range of measures including changes to IAA separation procedures, amendments to runway delay criterion and increased pilot efficiencies.

Meanwhile, DAA submitted a planning application to Fingal County Council in December 2004, and planning permission for a new North Runway was finally granted by An Bord Pleanala in August 2007. However, some of the conditions attached to this permission are highly restrictive from an airfield operations point of view, particularly the restrictions on aircraft movements to 65 between 23:00 hrs and 07:00 hrs. This represents a reduction from the current allowable level of night-time aircraft movements, and so a new planning application is currently being prepared in order to seek to have these restrictions revised.

In any event, in light of the likely reduction in passenger numbers in 2009 and general economic downturn, we are postponing the commencement of runway construction until airport activity starts to grow again. We are proposing that construction commencement be linked to the agreed demand triggers as discussed in section 7 of this CIP document.

Dublin Airport Authority (DAA) received planning permission from An Bord Pleanála in August 2007 for the construction of a new east-west runway 10L/28R.

As part of the planning application the DAA submitted details of and were conditioned to carry out a number of noise mitigation measures outlined in the Environmental Impact Statement. These mitigation measures related to schools and houses which will be most affected by the construction of a new runway at the airport.

Mitigation measures include a voluntary house buy-out scheme for residents whose house lies within the 69 dBA Leq 16 hour noise contour.

This project allows for the advance purchase of some residential properties within the 69dBA contour, should purchase opportunities arise.

Classification : Airfield	
Primary Driver : Capacity	Secondary Driver : Quality of Service

Indicative Buyout Contour For Proposed North Runway

Project Commencement :	2010
Project Completion :	Dependent on when opportunity for house purchase arises.
Total Project Capital Expenditure :	€10m
Historic Expenditure (pre 2010)	€2 m
Expenditure in current CIP (2010 – 2014)	€8 m
Project Stage	Gateway 2
Project Output	• Advanced purchase of some residential properties within the house buyout contour, should purchase opportunities arise
Project Justification	• Environmental mitigation as part of the North Runway planning conditions.
Capital cost assumptions	• In the event of potential house buyouts, pertinent market prices will be adopted.
Cost Benchmarks	• Benchmarked against current market prices of similar properties.
Stakeholder evaluation and consultation status	Numerous events of stakeholder consultation in relation to the north runway have taken place: • 1999 Airline consultation • 2002 Masterplan consultation • 2005 as part of CIP submission • 2006 as part of CIP submission

	• 2008 consultation with DACC.
Extent of airlines' support for project :	Airlines supportive of principal of increasing runway capacity. Views differ on optimum length and width required, and on exact timing of the project.

CIP 6.047 : New Apron Development

Project code :	

Various master planning and gating studies have identified the future need for additional Apron development at Dublin Airport. This project will provide an additional 9 remote stands (Narrow Body Equivalents) when built.

The requirement for remote stands is driven by a growth in passenger numbers, which leads to an increase in aircraft. The trigger for the commencement of construction of the next phase of development is related to the forecasted number of remote stands as discussed in section 8 of this document.

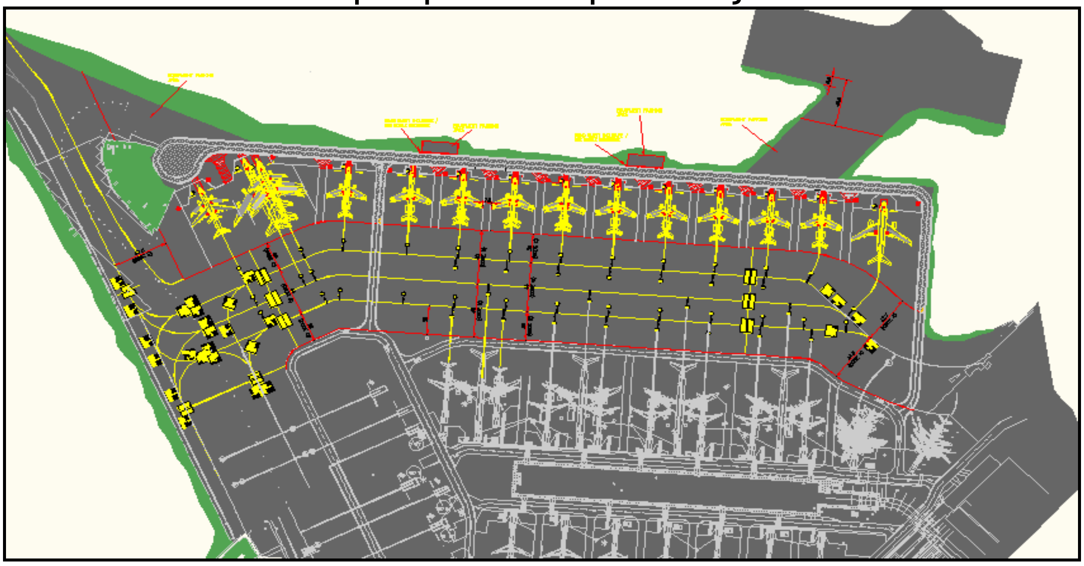
The lead-in time for the delivery of the next phase of Apron development is 18 months, including tender, construction and commissioning.

A similar project (named Apron 5A) was contained in CIP 2006 – 2009 but was deferred due to subsequent reworking of the Gating study following submission of that capital programme.

Classification : Airfield

Primary Driver : Capacity	Secondary Driver(s) :

Sample Apron Development Project



Project Commencement :	Project commencement to be determined by Trigger as outlined in Chapter 8.
Project Completion :	See above
Total Project Capital Expenditure :	€23.0 million
Historic Expenditure (pre 2009)	€282k
Expenditure in current CIP (2010 – 2014)	€22.7million

Project Stage	Gateway 3
Project Output	• 71,651 sq m of aircraft parking • 10 Code C stands • 2 Code D stands • 1 Code E stand • This apron will provide a net 9 additional NBE stands
Project Justification	• This apron will provide additional aircraft stand capacity when the demand materialises as detailed in Section 7. • Increase in apron taxiway efficiency around the north side of Pier D with the installation of a dual Code C apron taxiway thereby removing a current bottleneck.
Capital cost assumptions	• Apron to be constructed with concrete finish. • Apron to be provided with AGL, Floodlighting, ground power and pavement markings. • Attenuation also provided
Cost Benchmarks	D.A.A Cost Database - Derived from tenders received in 2008
Stakeholder evaluation and consultation status	*In a letter to DACC dated 9th September 2008, DAA proposed a process to obtain users views on projects. The company wished to consult with users on stands and airfield projects at a DACC meeting scheduled for 5 December. DAA would have anticipated that this project would have been discussed as part of that session, however, users subsequently advised that they did not wish to engage with DAA at project level. As a consequence consultation with users on this project is via this document.*
Extent of airlines' support for project :	See above

DAA project code :	
The concept of two east - west parallel runways was established for Dublin Airport in the 1960s. The necessary lands were acquired and the first of these two runways (10/28) was opened in 1989. Passenger numbers have since increased almost five-fold, from 5 million in 1989 to over 23 million in 2008. Over the past five year period runway demand has exceeded capacity at busy times, but it has been possible to squeeze incremental capacity from the existing assets by a range of measures including changes to IAA separation procedures, amendments to runway delay criterion and increased pilot efficiencies. The scope for further advances from the existing infrastructure is minimal. Meanwhile, DAA submitted a planning application to Fingal County Council in December 2004, and planning permission for a new North Runway was finally granted by An Bord Pleanála in August 2007. However, some of the conditions attached to this permission are highly restrictive from an airfield operations point of view, particularly the restrictions on aircraft movements to 65 between 23:00 hrs and 07:00 hrs. There are currently no restrictions on night-time aircraft movements, and so a new planning application is currently being prepared in order to seek to have these restrictions removed. In any event, in light of the likely reduction in passenger numbers in 2009 and 2010, and general economic downturn, DAA is proposing that construction commencement for this project be linked to the demand triggers as discussed in section 7 of this CIP document. Since the original planning application was lodged, further consultation has taken place with prospective long haul airlines and the runway length now being proposed is 3,660m to accommodate direct services to the Far East. This project allows for the construction costs, mitigation costs and statutory levies associated with the North Runway extension. It also includes a road tunnel to accommodate St. Margaret's Bypass.	
Classification : Airfield	
Primary Driver : Capacity	Secondary Driver : Quality of Service

Project Commencement :	Trigger Dependent
Project Completion :	Trigger Dependent + 2.5 years construction
Total Project Capital Expenditure :	€305 million Above total excludes : €10 million – fees (see separate project) €10 million – advance property purchase (see separate project)
Historic Expenditure (pre 2009)	No construction expenditure to date.
Expenditure in current CIP (2010 – 2014)	€305 m assuming triggers are reached
Project Stage	Gateway 3
Project Output	• New Parallel runway 3,660 metres in length, 60 metres in width and associated parallel taxiways. • Clearway 190 metres • Runway End Safety Area 240 metres • 4 Rapid Exit Taxiways, 2 at either end. • 7 Access Taxiways. • Associated drainage, attenuation & pollution control. • Navigational aids and associated aircraft ground lighting to provide for CAT III ILS at both ends.
Project Justification	• Capacity justification as per Section 8. • Markets to long haul destinations such as Far East

Capital cost assumptions	• 3660m x 60m runway with two rapid exit taxiways at each end and seven access taxiways.
	• Concrete pavement construction.
	• Attenuation included.
	• Cat III instrumentation at both ends.
	• Two RETs at each end (4 RETs total)
	• 2/3 of the site to be landside during construction.
	• No significant archaeological finds.
	• This estimate includes for:
	  • Runway Construction Costs
	  • Enabling Works, Road diversions etc.
	  • Statutory Levies
	  • Mitigation Costs

Cost Benchmarks	• Estimate prepared by consultants. • Cost below average when compared with similar runways in Europe, Australia and U.S.A.
Stakeholder evaluation and consultation status	Numerous events of stakeholder consultation have taken place : • 1999 Airline consultation • 2002 Masterplan consultation • 2005 as part of CIP submission • 2006 as part of CIP submission • 2008 consultation
Extent of airlines' support for project :	Airlines partially supportive : Short haul carriers supportive of a new parallel runway ranging in length from 2,637m to 3,500m. Prospective long haul carriers supportive of a new runway of 3,660 metres or longer in some cases.

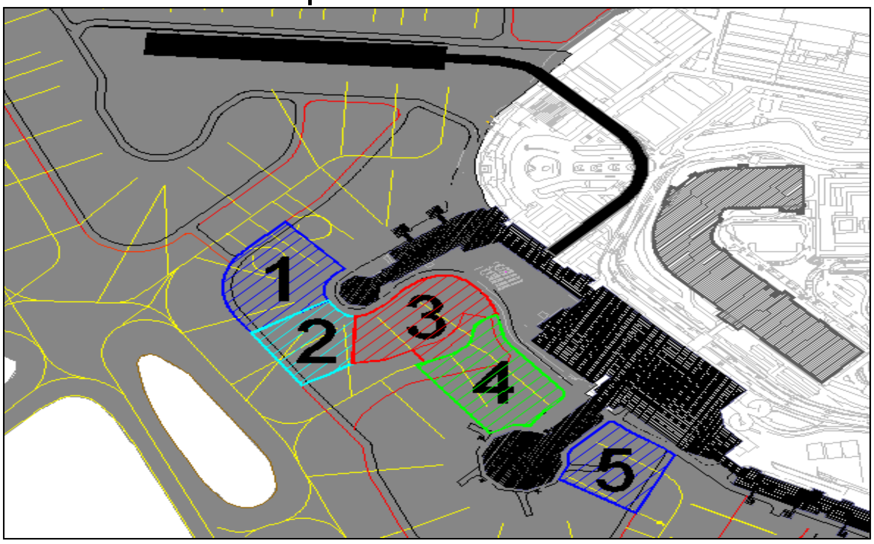
CIP 6.052 : Central Apron Reconstruction

The pavement located between Pier A (Constructed 1949) and Pier B (Constructed 1969) is life expired and in a very distressed state due constant heavy trafficking in these areas. The area has been subject to ongoing discrete slab replacements, but now requires complete replacement to ensure continuous contact stand availability. The area in question represents some of the most utilised contact stands at Dublin Airport and is therefore operationally critical.

This section of the project comprises the reconstruction of approximately 42,000m^2 of apron pavement carried out on a phased basis (approximately five phases in total as indicated in sketch below over a five year period) in order to reduce the impact on airside operations. Also included is the installation of apron taxiway centreline lights between Pier D and Pier A in line with the DAA policy of providing taxiway centreline lights on apron taxiways.

Classification : Airfield	
Primary Driver : Repair / Replace	**Secondary Driver(s) :** safety

Apron Reconstruction



Project Commencement :	2010
Project Completion :	2014
Total Project Capital Expenditure :	€15 m
Historic Expenditure (pre 2009)	€0
Expenditure in current CIP (2010 – 2014)	€15 m
Project Stage	Pre Planning – Gateway 1
Project Output	• Approximately 42,000m^2 of apron

	reconstruction to extend the life of existing stands by 20 years. • Replacement of High Mast Lighting – 1 per phase. • Apron taxiway centreline lights between Pier A and Pier D
Project Justification	• Pavement is life expired and in a distressed state. • Area critical for continued operational use.
Capital cost assumptions	• Construction carried out on a phased basis with a maximum of 2 stands at a time taken out of service.
Cost Benchmarks	• Based on recent and similar projects (North Apron works). • D.A.A Costs Database.
Stakeholder evaluation and consultation status	In a letter to DACC dated 9th September 2008, DAA proposed a process to obtain users views on projects. The company wished to consult with users on stands and airfield projects at a DACC meeting scheduled for 5 December. DAA would have anticipated that this project would have been discussed as part of that session, however, users subsequently advised that they did not wish to engage with DAA at project level. As a consequence consultation with users on this project is via this document.
Extent of airlines' support for project :	See above

The current engine testing facility at Dublin Airport is located at the Northern Boundary of the airfield on the old Runway 23 threshold. All major airports provide a facility for airlines to carry out engine test runs following maintenance/overhaul of engines. This current site is located within the footprint of the new North Runway. Once construction of the runway commences it will not be possible to access this site and an alternative location will be required.

It is also an objective in the Fingal County Council Local Area Plan (LAP 2006) to relocate the engine testing facility away from the north of the airfield and to a sound controlled area.

It is also one of the planning conditions for the new Runway, that

> *"Prior to the commencement of construction of the new runway, aircraft engine testing at the northern end of the airfield shall cease and shall be relocated away from populated neighbouring areas to a sound controlled area in accordance with the objectives of the Dublin Airport LAP,2006."*

Furthermore, some airlines have indicated that they wish to have the ability to carry out engine tests on a 24 hour basis without restriction.

All of the above necessitates the provision of a dedicated sound-proofed engine testing enclosure, which is provided for in this project.

The commencement of construction of a new Engine Testing facility will be linked to demand triggers, as discussed in section 8 of this document.

Classification : Airfield

Primary Driver : Safety / Compliance	Secondary Driver(s) : Repair / Replace

Typical Engine Testing Facility – Code E

CIP 6.053 : Engine Testing Facility

Project Commencement :	Project commencement to be determined by Trigger as outlined in Chapter 8.
Project Completion :	See above. Construction period is estimated at 18 months
Total Project Capital Expenditure :	€13.8 million
Historic Expenditure (pre 2010)	Nil
Expenditure in current CIP (2010 - 2014)	€13.8 million
Project Stage	Gateway 2
Project Output	• Construction of a new engine testing and wash down facility to accommodate aircraft up to Boeing 747-400 type. • Access taxiway
Project Justification	• Objective in the LAP 2006 • Runway Planning Condition to relocate engine testing facility to sound controlled area. • Requirement to carry out engine testing on 24hour basis.
Capital cost assumptions	• Size of facility to accommodate Boeing 747-400. • Assumes using existing apron on West Apron area. • Includes 300m access taxiway.
Cost Benchmarks	Based on DAA data base for apron works and manufacturers estimates for specialised structure.
Stakeholder evaluation and consultation status	Questionnaire issued to airlines during summer 2008. Consultation also took place via 2006 CIP as the project was included there in the look-ahead 2010-2015.
Extent of airlines' support for project :	Airlines have the requirement to carry out Engine testing after maintenance, and are supportive of a facility that enables them to carry out those activities on a 24 hour basis.

CIP 6.054 : Taxiway centreline lights & associated stopbars

An airside simulation study carried out in 2007 identified the need to use Runway 16/34 as a taxiway in order to reduce the congestion and delay on the ground to an acceptable level. It also recommended using standard taxiing routes to/from runway 10/28.

ICAO Annex 14 Clause 5.3.17.2 states “Taxiway edge lights shall be provided on a runway forming part of a standard taxi-route and intended for taxiing at night where the runway is not provided with taxiway centreline lights”. However, it is DAA policy to provide taxiway centreline lighting as the primary means of guidance in order to reduce the ‘sea of blue’ effect on the airfield. The use of taxiway centreline lighting will make routing more conspicuous and improve efficiency.

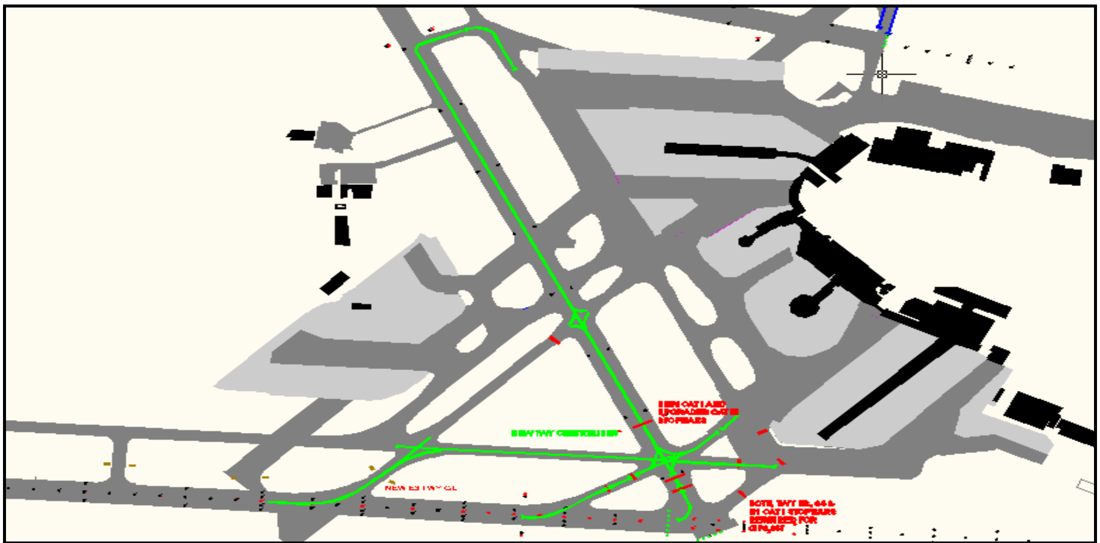
It is therefore proposed to install taxiway centreline lights in compliance with ICAO Annex 14 clause 5.3.16.4, which states “Taxiway centre line lights shall be provided on a runway forming part of a standard taxi-route and intended for taxiing in RVR (runway visual range) less than a value of 350m.” This will future proof the possibility of using runway 16/34 as a low visibility route to/from Runway 10/28.

This project comprises the installation of taxiway centreline lights on runway 16/34 and associated taxiways including the installation of Stopbars at the CAT I holding points for Runway 16/34 in line with best international practice to reduce incursions.

Classification : Airfield

Primary Driver : Safety / Compliance	**Secondary Driver(s) :** Quality of Service

Taxiway Centreline Lights on Rwy 16/34



Project Commencement :	2010
Project Completion :	2010
Total Project Capital Expenditure :	€6.3 m
Historic Expenditure (pre 2009)	€0

Expenditure in current CIP (2010 – 2014)	€6.3 m
Project Stage	Pre Gateway 1
Project Output	• Installation of AGL inset fittings along 16/34, Taxiway A,B2,B3,E2,E3 & G including associated civil works i.e. Manholes, ducts, saw cuts etc.
Project Justification	• Compliance with ICAO recommendations on taxiway guidance systems. • Enhance the efficiency and improve safety of the airside taxiway system in accordance with the recommendations of the airside simulation study. • Reduce the 'Sea of Blue' effect.
Capital cost assumptions	• New centreline lighting on runway 16/34 and associated taxiways. • New stopbars on associated taxiways / link taxiways. • New civil infrastructure. • Modifications to control system.
Cost Benchmarks	• Based on recent and similar electrical works/DAA Data Base.
Stakeholder evaluation and consultation status	In a letter to DACC dated 9th September 2008, DAA proposed a process to obtain users views on projects. The company wished to consult with users on stands and airfield projects at a DACC meeting scheduled for 5 December. DAA would have anticipated that this project would have been discussed as part of that session, however, users subsequently advised that they did not wish to engage with DAA at project level. As a consequence consultation with users on this project is via this document.
Extent of airlines' support for project :	See above

CIP 6.055 : B7 Taxiway Overlay

Taxiway B7 was constructed as part of Runway 10/28 in 1989 and has been in continuous operation for the past 20 years. This taxiway provides the only access to Runway 10 and therefore represents a critical piece of airfield infrastructure.

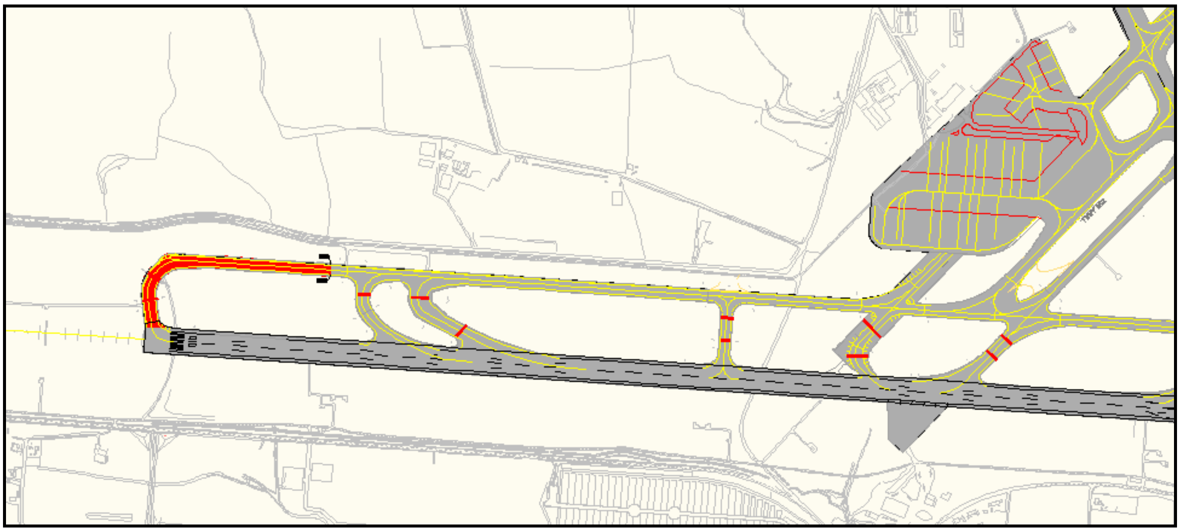
This pavement has showed signs of surface deterioration over the past number of years and it is estimated that its useful life is approximately 4 to 5 years before significant intervention is required.

Taxiways B4, B5 and B6 were overlaid in 2008 as they are the most heavily trafficked taxiways for both Runway 10 and Runway 28 and had been experiencing significant deterioration over the past few years. Taxiway B7 is the only remaining taxiway on this route to be overlaid. It is essential that this overlay work is carried out before complete structural failure requires the taxiway to be closed which would cause serious disruption to the Runway 10 operation. It is proposed to carry out the full taxiway overlay by 2014 to ensure access to the threshold of Runway 10 is maintained.

Classification : Airfield

Primary Driver : Repair / Replace	Secondary Driver(s) : Safety / compliance

Extent of B7 Taxiway Overlay



Project Commencement :	2014
Project Completion :	2014
Total Project Capital Expenditure :	€3m
Historic Expenditure (pre 2009)	€0
Expenditure in current CIP (2010 - 2014)	€3m
Project Stage	Pre-gateway 1

CIP 6.055 : B7 Taxiway Overlay

Project Output	• Full pavement evaluation to confirm remaining structural life. • 590 metre length of taxiway refurbishment • 180mm Marshall Asphalt overlay and refurbishment of Taxiway B7 to extend the life by over 20 years. • Reinstatement of Airfield Lighting equipment. • Reinstatement of Taxiway markings
Project Justification	• Taxiway B7 was constructed as part of Runway 10/28 in 1989. • The pavement is currently 20 years old and is nearing the end of its useful working life due to continuous heavy trafficking. • Taxiway B7 represents the only access to Runway 10 and represents a critical piece of airfield infrastructure.
Capital cost assumptions	• Assumes 180mm overlay thickness. • No surface water attenuation. • No new electrical fittings. • Night time working. • Multi construction phasing.
Cost Benchmarks	• Based on recent taxiway overlay projects.
Stakeholder evaluation and consultation status	DAA has envisaged consultation with DACC and other stakeholders via formal presentation of projects valued at €5 million and over. As this project is valued at under €5 million, consultation is via this document.
Extent of airlines' support for project :	See above

CIP 6.056 : Apron Road Reconstruction

The Apron Roadway between South Apron Post 4 and Hangar 1 has been carrying the bulk of service vehicles for over 40 years. It forms the spine of the apron roadway system allowing fuel, cargo, catering as well as construction and other traffic to route to apron areas.

The roadway is life expired and is in a very distressed state due constant trafficking in these areas. The area has been subject to ongoing discrete slab replacements, but now requires complete replacement to ensure continuous safe access for all users. The area in question represents some of the most utilised access at Dublin Airport and is therefore operationally critical.

The project comprises the reconstruction of approximately 8250 m^2 (1,100m x 7.5m) of road pavement to be carried out on a phased basis over 3 years in order to reduce the impact on airside operations.

Classification : Airfield

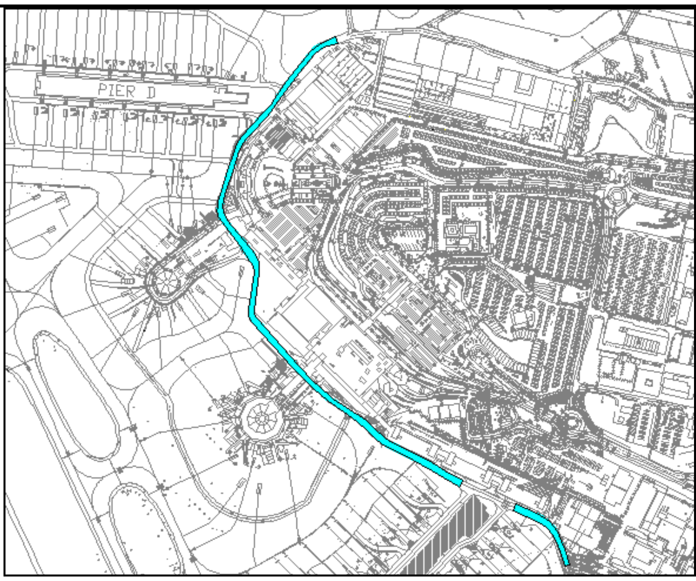
Primary Driver : Repair / Replace

Secondary Driver(s) : safety

Existing Apron Road Condition

Extent of Apron Road Upgrade

CIP 6.056 : Apron Road Reconstruction



Project Commencement :	2011
Project Completion :	2011
Total Project Capital Expenditure :	€1.8 m
Historic Expenditure (pre 2009)	€0
Expenditure in current CIP (2010 – 2014)	€1.8 m
Project Stage	Pre gateway 1
Project Output	• 8,250m^2 (1,100m x 7.5m) of apron road reconstruction.
Project Justification	• Road is life expired and in a distressed state. • Area critical for continued operational use. • Reduce the amount of ad hoc maintenance required on this roadway.
Capital cost assumptions	• 1,100m long x 7.5m Wide Road. • Minimal road diversion required. • Minimal cable diversion required. • Work based on a phased basis.
Cost Benchmarks	• Based on recent and similar projects (North Apron works). • DAA Costs Database
Stakeholder evaluation and consultation status	DAA has envisaged consultation with DACC and other stakeholders via formal presentation of projects valued at €5 million and over. As this project is valued at under €5 million,

	consultation is via this document.
Extent of airlines' support for project :	See above

To ensure the reliability of power supplies for the safe functioning of air navigation facilities, as required in ICAO Annex 14, Chapter 8 it is necessary to replace three generators including the control panel and fuel tanks in airfield substations E(East), W(West) & T(Tower).

The two generators in Sub E and W date back to the mid 1980's, while the generator in Sub T is from circa 1985. By 2012, the generators will have surpassed their normal operational life span (approx 25 years). The engines and alternators on all three generator sets are no longer in current production. Replacement parts are becoming increasingly difficult to source which could lead to extended downtime in the future and reliability of the generators would be compromised.

The existing generators in airfield substations have two functions:

- In normal conditions, the ESB mains supplies primary power to Navaids and airfield ground lighting equipment used for the movement of aircraft. The generators provide standby secondary power in case of mains failure within ICAO specified time of 15 seconds, ensuring continual operations.

- In low visibility conditions, the generators provide primary power to Navaids and airfield ground lighting equipment, while the ESB mains supply is used as standby secondary power. If a generator fails, transfer to the ESB is virtually instantaneous and complies with ICAO's specified time of 1 sec or less.

Replacing all three generator sets with new units will provide increased reliability, greater operational efficiency thus reducing running costs.

Classification : Airfield

Primary Driver :	Secondary Driver(s) :
1. Repair / Replace	1. Safety

Existing Airfield Generator

Typical New Airfield Generator

CIP 6.057 : Airfield generator replacements

Project Commencement :	2013
Project Completion :	2013
Total Project Capital Expenditure :	€0.5 m
Historic Expenditure (pre 2009)	€0
Expenditure in current CIP (2010 - 2014)	€0.5 m
Project Stage	Pre-gateway 1
Project Output	• Three new Generators to replace current life expired generators.
Project Justification	• Airfield efficiency and safety • Ensure reliability of Navaids and Airfield ground lighting systems at all times. • Reduced running costs. • Reduced maintenance
Capital cost assumptions	Supply and install: • 1 - 525KVA generator at tower sub-station. • 1- 415KVA generator at east sub-station. • 1-415KVA generator at west sub-station. • Modifications to existing control system.
Cost Benchmarks	Based on 2008 supplier prices.
Stakeholder evaluation and consultation status	DAA has envisaged consultation with DACC and other stakeholders via formal presentation of projects valued at €5 million and over. As this project is valued at under €5 million, consultation is via this document.
Extent of airlines' support for project :	See above

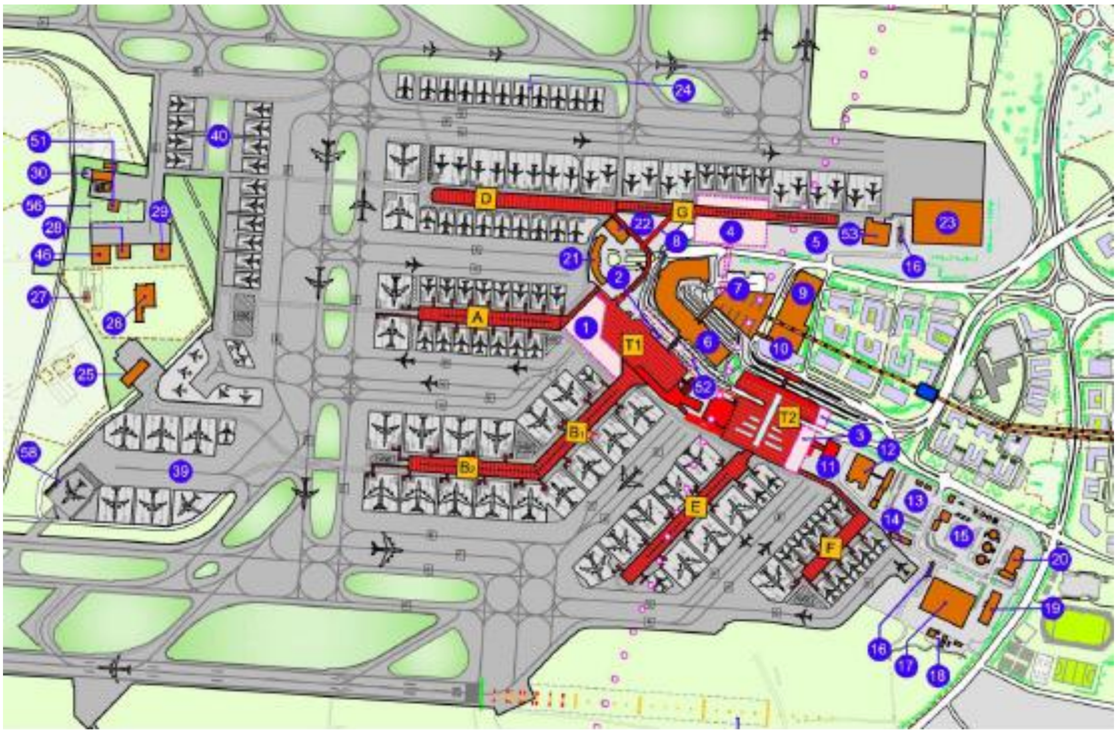
CIP 7.018 : New Pier Design Fees

In order to be ready to add pier capacity in the 2015 – 2019 quinquennium in line with the Masterplan, it will be necessary to carry out preliminary design and commence the planning process towards the end of the next CIP period, and so a budget of €7 million has been included for this purpose.

The budget relates to Professional design fees for the design of a new Pier, including processing of a planning application and production of tender drawings. Carrying out this work in advance of immediate requirement for this asset would remove at least 12 to 18 months of lead-in time leading to a much more predictable “just in time” provision of the agreed facility when required.

The optimum sequencing of future Pier developments will not be known until traffic development patterns at the airport become clearer.

Classification : Piers and Terminals	
Primary Driver : Capacity	Secondary Driver(s) :Quality of Service



Project Commencement :	2014
Project Completion :	2014
Total Project Capital Expenditure :	€7,000,000
Historic Expenditure (pre 2010)	nil
Expenditure in current CIP (2010 – 2019)	€7,000,000
Project Stage	Pre Gateway 1

Project Output	• Preliminary design of a new pier • Planning submission • Professional advice during planning process.
Project Justification	Forecast schedules are developed from general forecasts in consultation with airlines. When incorporated into gating studies, the demand for aircraft contact stands is determined. Current forecasts and forecast schedules indicate that additional aircraft contact stands will not be required until beyond the next regulatory period. However, in the context of the long lead times for a pier development project, particularly in terms of permitting and design, it is considered that it would be prudent to carry out this part of the development work towards the end of this next regulatory period. This would remove planning risk, minimise design risk and create a situation where the normally lengthy lead-in time is drastically reduced
Capital cost assumptions	This estimate is based on a traditional form of procurement, requiring detailed drawings and specifications for tender, to improve cost certainty. Assuming the requirement for the provision of a pier facility to handle 14 narrow body equivalent aircraft with full segregation of arriving and departing passengers, associated ramp accommodation and interface connections with either Terminal 1 or 2
Cost Benchmarks	Previous rates for Professional fees obtained from numerous projects contained in CIP 2006 - 2009
Stakeholder evaluation and consultation status	In a letter to DACC dated 9th September 2008, DAA proposed a process to obtain users views on projects. The company wished to consult with users on Piers and Terminals projects at a DACC meeting scheduled for 5 December. DAA would have anticipated that this project would have been discussed as part of that session, however, users subsequently advised that they did not wish to engage with DAA at project level. As a consequence consultation with users on this project is via this document.
Extent of airlines' support for project :	See above

CIP 7.030: Terminal 2 projects

Design and construction of a new terminal, pier and associated landside and airside infrastructure adjacent to the existing terminal.

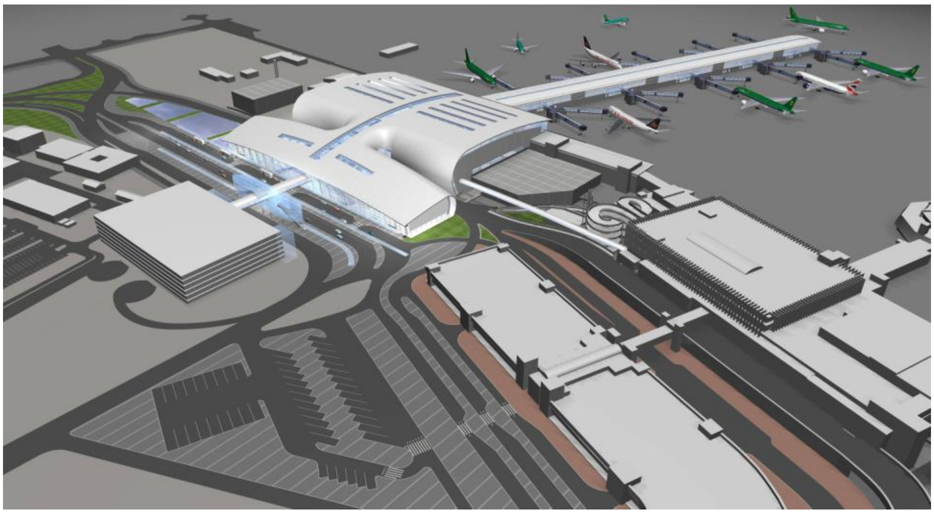
The terminal, which will have Aer Lingus as the 'Anchor'' tenant, is circa 75,000m^2. The pier which will provide air bridge service to 19 stands for code 'C' aircraft or to 8 code 'E' stands is circa 24,000m^2.

The project also includes apron re-grading, dedicated landside roads for arrivals and departures on elevated links from the terminal to the Car Park and PAX connection to Terminal 1, both airside and landside.

The €10,000,000 sum to be spent in the first quarter of 2010 is spend included in the original cost estimate which was always planned to be spend post-2009, and represents payment associated with the R132 road upgrade works and final planning contributions to Fingal County Council.

Classification : Piers and Terminals

Primary Driver : Capacity	Secondary Driver(s) :Quality of Service



Project Commencement :	2006
Project Completion :	2010
Total Project Capital Expenditure :	€690 m (outturn)
Historic Expenditure (pre 2010)	€680 m (outturn)
Expenditure in current CIP (2010 – 2014)	€10 m
Project Stage	Gateway 4 - construction
Project Output	• New Terminal building of circa 75,000m^2 of new space with 58 check- in desks, 22 security search points, departure lounge and

	circa 10,000 m^2 of retail and food and beverage outlets, large immigration area with 18 desks and 6 arrivals carousels and a single baggage hall for arrivals and departures baggage sorting. • A new Pier of circa 24,000m^2 with 19 air bridge served aircraft stands for code C or 8 air bridge served stands for code E aircraft offering complete segregation of arriving and departing passengers.
Project Justification	• Provide additional capacity to handle 4200pph in the busy hour. • Improve customer service by providing additional processing capacity in a modern facility.
Capital cost assumptions	• Cost basis forecast at August 2006 prices
Cost Benchmarks	• Benchmarked against similar developments. Costs reviewed by independent consultants appointed by the Government. • PKS Cost Plan
Stakeholder evaluation and consultation status	• Significant and ongoing consultation throughout the T2 design development phases. Form and function agreed and signed off with DAA. Circa 300 stakeholder engagement events took pace during brief development, option development and form development.
Extent of airlines' support for project :	Partial support.

The existing Terminal 1 building has developed over a series of phases during the past 30 years. The reactive nature of the Terminal's growth means that its layout is not optimal, which adversely affects passenger flows and the overall passenger experience. When Terminal 2 opens and circa 40% of passengers transfer to the new facility, an opportunity to reconfigure the departures floor layout in order to improve passenger flows and make better use of the available space will present itself.

Earlier in the current planning cycle a more comprehensive refurbishment of T1 had been considered. However, in light of the current economic difficulties facing DAA and the airlines, much of this work has been deferred in the short term. This project represents the scope of works required in the next quinquennium in order to achieve the maximum possible improvement in passenger processing efficiency, at the sametime increasing retail revenue by providing considerably improved "footfall".

The following is a summary of the scope of and justification for the main works proposed :

1. Consolidation of the two existing passenger screening areas into one new area to be located at the southern end of the departures floor. This change will allow DAA to achieve savings in opex by increasing the efficiency of the passenger screening operations. One combined passenger search facility will be more efficient than running a split operation.
2. Construction of an appropriately sized dedicated passenger queuing area adjacent to the new passenger screening location, and the creation of a new one-directional route for checked-in passengers to join this area. A dedicated queuing area separates checked-in passengers from the check-in locations,leading to more efficient passenger flows. Also, a dedicated single queuing area can be more efficiently managed with far fewer staff which leads to further operational efficiencies.
3. Creation of a dedicated Self-Service Kiosk (SSK) zone by the shortening of check in islands 1/2, 3/4 and 5/6 (retaining back of house baggage handling systems). This will further improve flows by contributing to the separation of checked-in from queuing passengers.
4. Creation of an additional 550 m2 retail space on the site of the existing two passenger screening areas. This new space will generate incremental retail revenue into the single till. The proposed location of the consolidated security area will allow the full length of the Airside retail area to be available to post screened passengers.
5. Refurbishment of all passenger toilets on the departures floor.

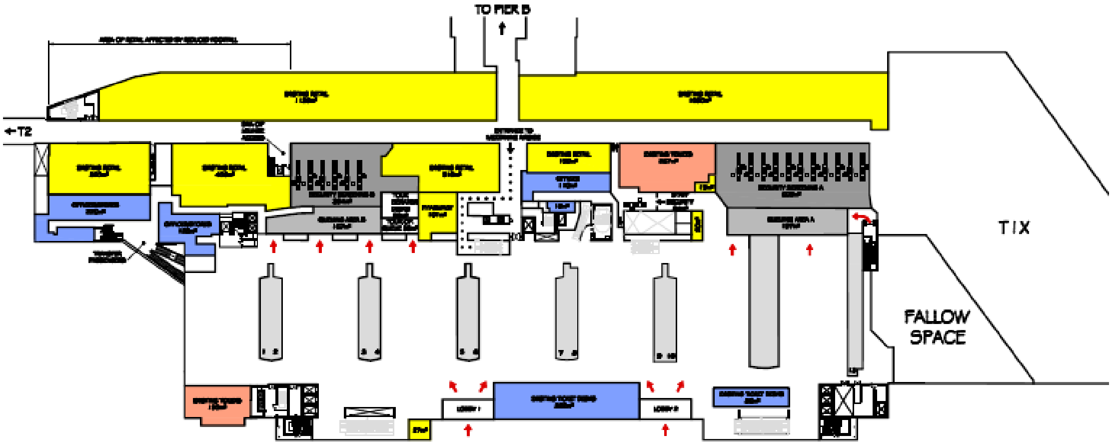
The above works will result in a rationalisation of the existing check in and bag drop arrangements, and will provide a configuration in which all security-cleared passengers will be routed through the full length of "The Street" in order to reach Piers B, A or D. This will result in a higher footfall and greater retail revenue from all shops located on The Street.

These modifications have been designed to be consistent with future phases of improvement at Terminal 1 which may eventually include the reorientation of the check in islands to a "shoreline" arrangement. This in turn will create more space for passenger circulation as passenger numbers grow.

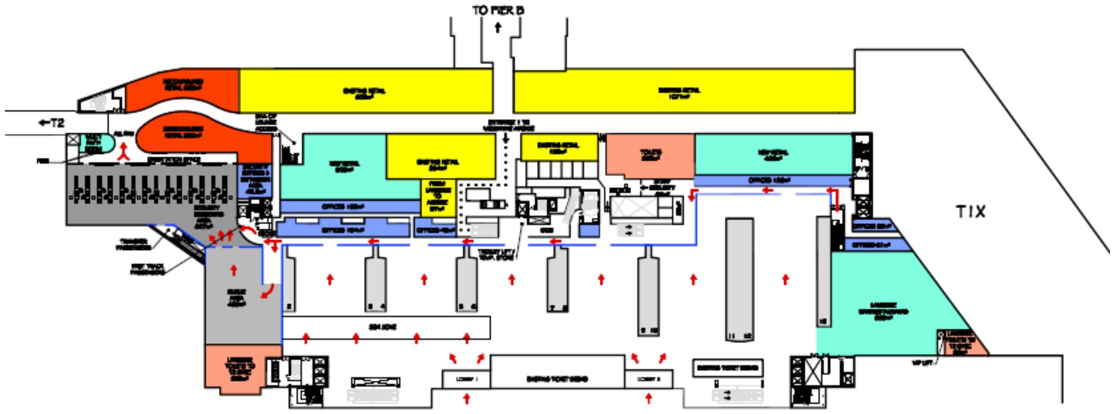
CIP 7.032 : T1 passenger processing enhancements

Classification : Piers and Terminals	
Primary Driver : Cost Reduction	Secondary Driver(s) : Quality of Service

Existing T1 departures level layout



Proposed T1 departures level layout



Project Commencement :	2011
Project Completion :	2012
Total Project Capital Expenditure :	€16,000,000
Historic Expenditure (pre 2010)	nil
Expenditure in current CIP (2010 - 2014)	€16,000,000
Project Stage	Gateway 1
Project Output	1. New passenger screening area located at south end of Terminal 1 departures floor.

	2. Dedicated passenger queuing area 3. Dedicated SSK zone. 4. Additional 550 m^2 retail space. 5. Refurbishment of passenger toilets on departures floor.
Project Justification	1. Efficiency improvement via reduced opex associated with passenger screening. 2. Incremental retail revenue from increased passenger footfall along The Street, and an additional 550m^2 retail area.
Capital cost assumptions	The works will be delivered as a single project however a phased delivery approach will be taken to reduce impact on operations, retail and the passenger experience. Works both Landside and Airside will generally take place during normal working hours behind construction/security hoardings. Out of hours works will be kept to a minimum but will be required as identified post detailed stakeholder consultation and agreed delivery programme with DAA.
Cost Benchmarks	Costs based on historic spend on similar airport operations projects in current and previous CIPs
Stakeholder evaluation and consultation status	In a letter to DACC dated 9th September 2008, DAA proposed a process to obtain users views on projects. The company wished to consult with users on Local Operations Projects at a DACC meeting scheduled for 7 November. DAA would have anticipated that this project would have been discussed as part of that session, however, users subsequently advised that they did not wish to engage with DAA at project level. As a consequence consultation with users on this project is via this document.
Extent of airlines' support for project :	See above

In order to provide maximum operational flexibility once T2 opens, it will be necessary to provide passenger routes for passengers transferring from T1 to T2 and vice versa, as well as for passengers arriving or departing from Pier B that are being processed in Terminal 2.

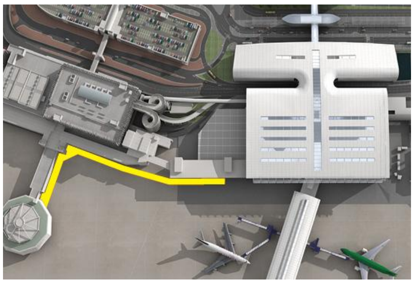
This project provides segregated passenger routes of an acceptable quality by building a new elevated walkway from Pier B to T2, and also by modifying the northern most section of the existing Pier C and interface with T1, which will remain in place after T2 is finished. An upgraded vertical circulation Centre (lifts and escalators) will also be provided at Pier B, as well as new corridors, glazed screens and other works at both ends of the route.

The passenger routes will be as follows :

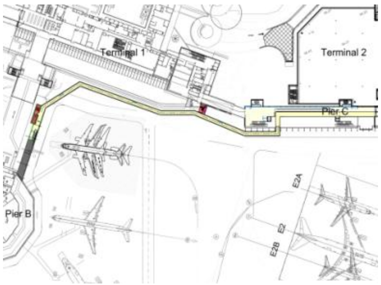
- T2 passengers arriving from Pier B : Rise a 6.675m level change (to Pier C arrivals level) via a new VCC and progress through new elevated walkway to Pier C, Gate C41 and then continue into T2 arrivals level (L20)
- T2 passengers departing through Pier B: Proceed along Pier C arrivals level, down to street level via Gate C41, into T1 building and out to Pier B.
- Passengers transferring from T2 to T1: Route similar to above. Passengers are processed in T2 transfer facility, and then proceed along Pier C arrivals level, down to street level via Gate C41, into T1 building from where they can transfer to Piers B, A or D.
- Passengers transferring from T1 to T2 : Passengers leave the baggage reclaim hall, proceed through security onto The Street, access Pier C departure level with direct access to Pier E departure level or option to go to T2 departure lounge.

Classification : Terminals and Piers

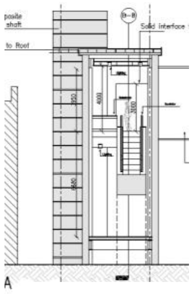
Primary Driver : Capacity	Secondary Driver(s) :Quality of Service



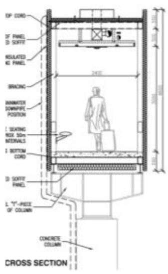
Passenger Route



Plan



VCC Section



Tube Section

Tube Elevation

Project Commencement :	2010
Project Completion :	2010
Total Project Capital Expenditure :	€11 m
Historic Expenditure (pre 2010)	€ nil
Expenditure in current CIP (2010 - 2014)	€11 m
Project Stage	Gateway 3
Project Output	1. Pier B internal works 2. Apron works 3. Pier B to T2 external; New VCC, elevated walkway (175 m in length) 4. Pier C module 2 works - new deck at arrivals level and segregation screens, new lift at gate C41
Project Justification	While the airline assignment between T1 and T2 is such that a significant proportion of passenger transfers will be on an intra-terminal basis, there is a business requirement to provide for airside transfers between the two terminals. Design transfer passenger flows of 5% of the T2 peak hour rate have been assumed for transfers in both directions between T1 and T2. Additionally during peak periods Pier B will be used for flights serving passengers from T2 as well as T1 passengers and both departure and arrivals routes are required to and from T2 whilst maintaining the existing T1 Operations. This facility will allow for the maximum use of the existing Pier B facility and will also ensure an acceptable level of service.
Capital cost assumptions	Assume similar standard of construction to Terminal 2
Cost Benchmarks	Assume similar rates to Terminal 2
Stakeholder evaluation and consultation status	Project was presented to DACC at meeting of 1 August 2008.
Extent of airlines' support for project :	Airlines were supportive of the need for the project but had assumed that it was included in original T2 budget.

CIP 7.036 : T1 Life Safety Systems upgrade

The existing Fire Detection and Alarm system at Dublin Airport (T1, Piers A, B and remainder of C) is up to 20 years old in some places. The many additions and alterations to the Fire Alarm System have now resulted in a very complex and inefficient system which is difficult and expensive to maintain. Although the existing system is intact it has reached the end of its life cycle and needs to be replaced.

Replacing this system will allow DAA to deliver a new fire strategy which will significantly reduce disruption to the business and passengers. The new system will incorporate fire zones to enable a fully phased evacuation of all public areas if necessary, rather than the existing "all out" strategy. In the event of a fire it will also provide defined "compartment lines" which will control the development of fire and smoke, and restrict and sustain the level of damage to a single compartment only, while allowing the rest of the airport to remain operational. The new system will also fully integrate with the interface requirements for T2 and all current T1 projects, and provide capacity within the system to cater for any new developments to T1.

The existing emergency lighting system at Dublin Airport is inadequate in terms of the minimum lux levels it is capable of providing during a power outage. Recent surveys have indicated that all Public Areas except Area 14 and Pier D are inadequately lit during emergency evacuations. Furthermore, the system is not addressable, which means that routine testing and logging of faults has to be done manually at a much higher cost. The unit cost of replacement parts is also higher due to obsolescence.
This project includes for the replacement of the existing system with a new fully addressable one that will also increase lux levels to a 5 rating, which will meet both current requirements and the incoming IS 3217 standard. It will be possible to routinely test this system and log faults from a single point.

In order to save capital costs, it is planned to consolidate these two life safety systems into a single larger project. This will achieve economies of scale in the cost of design and installation as well as providing a single point of responsibility for each of these activities. Dependencies between contractors will be eliminated thereby mitigating disruption and programme delay risk. As a further cost saving measure it is intended to make as much use as possible of existing cabling, software and hardware.

Classification : Piers and Terminals

Primary Driver : Repair / Replace	Secondary Driver(s) :Safety / Compliance

CIP 7.036 : T1 Life Safety Systems upgrade

Project Commencement :	2009
Project Completion :	2011
Total Project Capital Expenditure :	€8,000,000
Historic Expenditure (pre 2010)	€3,000,000
Expenditure in current CIP (2010 – 2014)	€5,000,000
Project Stage	Gateway 2
Project Output	Replacement Fire Alarm System for Terminal 1 and associated piers. Replacement of existing emergency lighting with full compliant, addressable system with increased Lux levels to IS3217 standards.
Project Justification	The existing Fire Detection and Alarm system at Dublin Airport (T1, Piers A, B and remainder of C) is up to 20 years old in some places. It has reached the end of its life cycle and requires replacing. The new system will provide fire zones and defined compartment lines which would result in reduced disruption and damage to the airport in the event of a fire. This fire strategy approach will also support DAA business continuity planning. The existing emergency lighting system provides insufficient lux levels in all public areas (except area 14 and Pier D). Maintenance and testing costs are unnecessarily high due to obsolete design of existing system.
Capital cost assumptions	Consolidation of Fire System and Emergency lighting systems leading to design and

	installation savings. It has been assumed in the development of the budget that not all backbone cabling will need to be replaced and it is intended to retain as much existing infrastructure as possible.
Cost Benchmarks	Projected cost of this project is benchmarked on received tender returns for new installations for T2
Stakeholder evaluation and consultation status	In a letter to DACC dated 9th September 2008, DAA proposed a process to obtain users views on projects. The company wished to consult with users on Piers and Terminals projects at a DACC meeting scheduled for 5 December. DAA would have anticipated that this project would have been discussed as part of that session, however, users subsequently advised that they did not wish to engage with DAA at project level. As a consequence consultation with users on this project is via this document.
Extent of airlines' support for project :	See above

The provision for Airport Operations for the period 2010 – 2014 relates to an ongoing programme of works designed to facilitate the changing business needs of customer airlines and commercial tenants whilst improving the operational environment of Dublin Airport.

These projects consist of numerous small value projects that arise on an annual basis and therefore it is not possible to provide a detailed list of projects for the 2010 – 2014 period at this time. Spend in this area for the past three years, broken down by main category is set out below in order to provide a flavour of the types of projects undertaken.

Airport Operations

Project Category	Total actual spend 2007 - 2009 €	Average annual spend 2007 - 2009 €
Airport Development	13,937,767	4,645,922
Airport IT & T	11,205,000	3,735,000
Airside works	4,294,000	1,431,333
Fire	2,914,000	971,333
M&E Maintenance	1,865,393	621,798
Airport Police and Security	1,295,000	431,667
TOTAL		11,837,053

However, it is anticipated that the annual spend in the 2010 – 2014 period will be significantly reduced to circa €7 million per annum, which is reflective of the new assets that are being delivered as part of the current CIP.

In addition, an allowance of €5 million has been included for operational alterations to Terminal 2 that will be required once it has opened. Experience of all new terminal buildings worldwide support the view that such works will be necessary. Such works have been undertaken at recently opened new terminal buildings at Cork and Heathrow T5.

1. **Airport Development.** Typical projects include :

- General upkeep / upgrade and refurbishment of the external and internal elements of the Main Terminal Building, Piers, Airside and Landside operational buildings
- Ensure DAA building compliance with current regulatory standards relating to Health & Safety, Fire Strategy and Management systems and Building Regulations
- Response to ongoing operational / security infrastructural requirements
- Upkeep and development of Landside roads network

2. **Airport IT and T**

Ongoing investment in mission-critical IT systems which are central to airport operations and passenger movement around the airport. The key areas of investment for the 2010 – 2014 period include :

- Replacement of Airport Operational Database ("AOS" system currently provided by IBM) : The AOS system effectively runs the airport operations, by controlling activities including arrivals, aircraft parking, gate allocation and the scheduling and running of the airfield. The current system was installed in 2001 and urgently requires replacement with a new system that will provide better functionality and reliability.
- CCTV upgrade : this project involves the phased migration to the next generation of

CCTV technology. This will improve airport security across the entire campus.
- Enhancement of airport communications ducting : this work is necessary to facilitate the future growth of IT systems around the airport. The current cable ducting system is at capacity.
- Integration Broker (IB) technology : this new software will improve the interface with all airport systems.
- Replacement of Public Address system : the T1 PA system is up to 30 years old in places, is the source of many complaints from the airlines and urgently requires replacing.

3. Airside Operations

This allocation provides for unforeseen reactive works including maintenance, refurbishment and/or upgrades to the Runway, taxiways, aprons, parking stands or critical services in the Airside Operational area.

Such works are by their nature, urgent and in the majority of cases, carried out at night to suit the airfield operation. Further works may also be required on foot of annual audits carried out by the IAA.

4. Fire

This is a general provision for the Fire Department that ensures that Dublin Airport maintains Category Nine status as per ICAO Annex 14. This is a condition of the license granted to the DAA to operate Dublin Airport Aerodrome and compliance is audited annually by the Irish Aviation Authority.

5. M&E Maintenance

This allocation anticipates unplanned and reactive works including maintenance, refurbishment and / or up grades to critical services within the Terminal Buildings.

6. Airport Police and Security

This is a general provision for the Airport Police & Security Department that ensures compliance with all applicable regulatory security standards on both the Irish and EU level. This is achieved through upgrade and replacement of equipment and facilities.

In harmony with these requirements, the Airport Police & Security capital programme is designed to achieve the targets set by the service level agreements agreed with Dublin Airport's customer airlines and in accordance with their business needs.

Classification : Airport Infrastructure	
Primary Driver : Repair / Replace	Secondary Driver(s) :Safety / Compliance

Project Commencement :	2010
Project Completion :	2014
Total Project Capital Expenditure :	€40 m or €7 m per annum average, plus €5 total allowance for T2 post-opening works.
Historic Expenditure (pre 2010)	Circa €12 m per annum
Expenditure in current CIP (2010 – 2014)	€40,000,000
Project Stage	Not applicable
Project Output	• Repair / replacement of existing Terminal Operation facilities. • Maintenance / Expansion / Upgrade / Replacement of AITT Equipment and Infrastructure. • Fully serviceable runways, taxiways, aprons and stands. • Replacement facilities and equipment for the Airport Fire Service • Fully functioning mechanical and electrical services operating to provide an appropriate service level to the airlines and travelling public. • Replacement facilities and equipment for the Airport Police and Securing including passenger screening and Hold Baggage Systems. • Operational Alterations to Terminal 2 post-opening.
Project Justification	• Cater for business needs of airlines / commercial tenants and other stakeholders • Maintain service quality • Ensure compliance with all applicable regulatory standards including ICAO category Nine status, Department of Transport guidelines and EU regulations.
Capital cost assumptions	• Cost consultancy or in-house quantity surveying of proposed works, case by case basis • Assume competitive tender process where appropriate

	• Assume existing or improved level of finishes
Cost Benchmarks	Costs based on historic spend on similar airport operations projects in current and previous CIPs
Stakeholder evaluation and consultation status	In a letter to DACC dated 9th September 2008, DAA proposed a process to obtain users views on projects. The company wished to consult with users on Local Operations projects at a DACC meeting scheduled for 7 November. DAA would have anticipated that this project would have been discussed as part of that session, however, users subsequently advised that they did not wish to engage with DAA at project level. As a consequence consultation with users on this project is via this document.
Extent of airlines' support for project :	See above

CIP 8.008: Corporate IT

Corporate IT within DAA provides key systems infrastructure, processes and controls which are critical to the safe and efficient running of the Airport itself and the overall business. Corporate IT is responsible for centrally hosted shared systems and their associated technological infrastructure to include enterprise hardware, databases and storage, wide area networks, enterprise applications including ERP, retail, access control, time & attendance, business intelligence etc. IT security and desktop services also fall within this arena.

Most of the capital spend contained in this budget is driven by the replacement and upgrading of existing IT assets, which is carried out on a four to five year cycle for desktop IT and a five to eight year cycle for enterprise level IT.

Corporate IT is a separate budget line to Airport IT & T (which is contained within the airport operations budget).

The capital required for 2010 – 2014 totals €10.7 million and is broken down into four categories :

	Category	€m
1	Enterprise Hardware	1.4
2	Enterprise Software	4.0
3	Desktop	1.9
4	Business and Technology Initiatives	3.4
	Total	10.7

Enterprise Hardware includes additional servers & storage to be applied for expansion of processing and storage capacity in the latter part of the period. This will extend the useful life of the existing equipment beyond a six year period. Provision is also made for a small investment in data centre upgrades at the airport.

Enterprise Software includes a range of database software, IT security software (including compliance with ISO 27001 and PCI), software upgrades for retail EPOS and back office, business intelligence software upgrades, redevelopment of the DAA's commercial websites and upgrades to Oracle ERP software.

Desktop involves the replacement of circa 1,200 PCs / laptops, software applications and associated IT services.

Business and Technology initiatives are projects designed to improve processes, generate efficiencies and improve service resilience or compliance.

Classification : Airport Infrastructure

Primary Driver : Repair / Replace	Secondary Driver(s) : Quality of Service, Cost Reduction

CIP 8.008: Corporate IT


Project Commencement :	2010
Project Completion :	2014
Total Project Capital Expenditure :	€10.7 million
Historic Expenditure (pre 2009)	Ongoing investment (€9.8 million in CIP 2006 – 2009)
Expenditure in current CIP (2010 – 2019)	€10.7 million
Project Stage	n/a
Project Output	See above.
Project Justification	Ongoing investment in key IT systems & infrastructure, processes and controls is critical to the safe and efficient running of the Airport itself and the overall business. The IT investment proposed in this CIP is the minimum required in order to replace or upgrade hardware and software at the end of recommended life cycle. Any new IT initiatives are justified on the basis that they will deliver greater efficiencies, reduce costs or increase the robustness of the airports IT infrastructure.
Capital cost assumptions	Capital cost assumptions are based on market pricing where available or internal technical expert opinion where recent market pricing was not available. All projects are competitively tendered and discounts of approximately 60% + on software list price can be obtained through this process.
Cost Benchmarks	SITA index, benchmarked across 163 airports worldwide indicates that airports spend on IT & T Capex and Opex in the period from 2004 to 2008 averaged 3.9% of turnover. DAA spend was within these limits. Market prices and industry standards.
Stakeholder evaluation and consultation	*In a letter to DACC dated 9th September 2008,*

status	*DAA proposed a process to obtain users views on projects. The company wished to consult with users on IT projects at a DACC meeting scheduled for 7 November. DAA would have anticipated that this project would have been discussed as part of that session, however, users subsequently advised that they did not wish to engage with DAA at project level. As a consequence consultation with users on this project is via this document.*
Extent of airlines' support for project :	See above

CIP 8.300 : Metro North and GTC Technical fees.

DAA Project code :

The arrival of Metro North will increase the percentage of passengers and staff using public transport allowing the airport to grow to meet future demands in a sustainable fashion and is a key feature of the airport, region and national strategic development strategy.

DAA has been actively engaging with the Metro North team since December 2006, to plan the route alignment at the airport. This route alignment and airport station have been used by the RPA to develop their Rail Order application.

Final design, construction, and operation of Metro North will be completed by a third party who will be selected through a PPP process scheduled for completion in late 2009. Prior to the selection of this supplier DAA will agree a development agreement and draft lease which will be used to control how the Metro will be designed and constructed at the section through DAA lands. DAA will then assemble a project team to advise on the PPP contractors design and construction proposals. In addition, expertise to ensure the assessment of ground movement, vibration and asset response will be required in order to minimise any risk to airport assets and airport operations.

This work may extend to carrying out structural assessment of existing assets and carrying out active monitoring to mitigate any risk during the construction. In addition DAA needs to ensure that the proposed station is designed and constructed in a manner which will facilitate future development above ground.

The Ground Transportation Centre (GTC) at Dublin Airport currently consists of an at grade bus and coach station serving the Central Area. When work commences on the Metro North project, the GTC in its current form will be relocated to facilitate the Railway Procurement Agency requirements for the construction of the new underground Airport Metro Stop and associated tunnels.

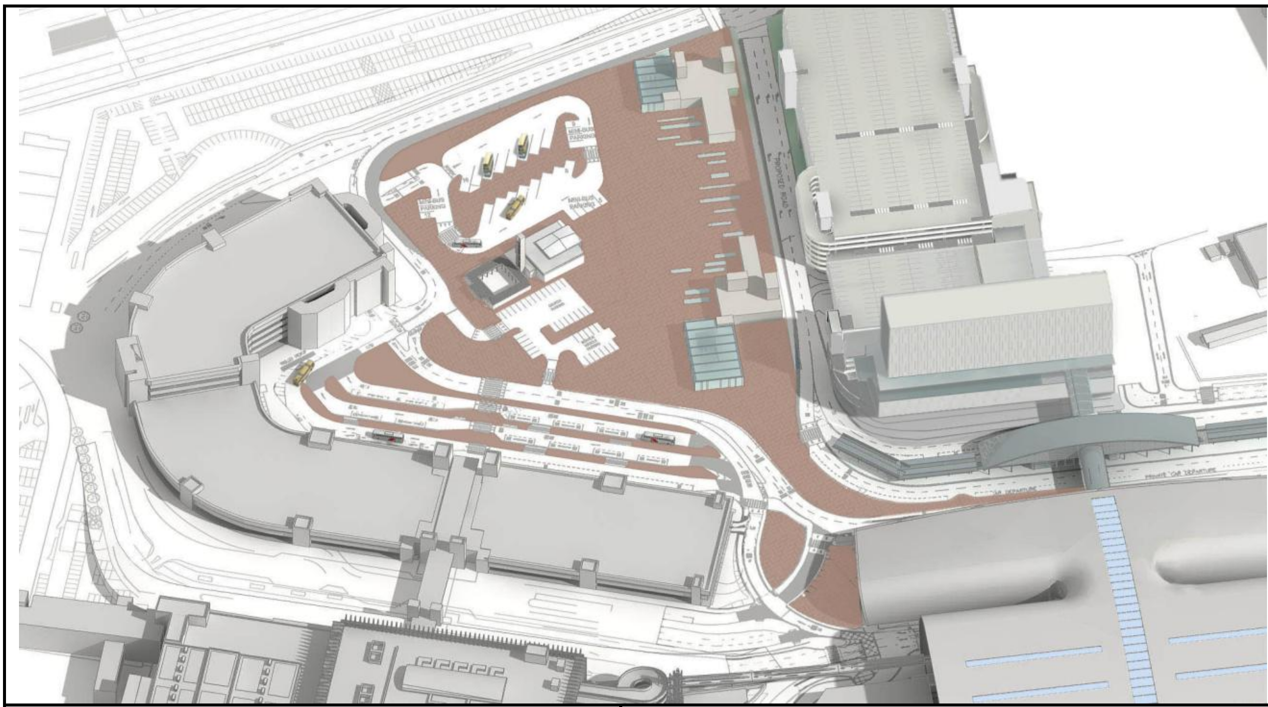
It is a requirement of the Local Authority and other transportation bodies, that Terminals 1 and 2 are properly interlinked with the Metro Stop and integrated with bus and coach facilities. In addition, it is anticipated that in the future, an Automated People Mover (APM) will be required to provide an efficient two way link with planned developments in the lands east of the Old Swords Road (R132). In keeping with good planning practice and to safeguard adequately for future eventualities, an integrated design will be required to ensure that these facilities are properly interlinked and can be safely and efficiently constructed to interface with the Metro underground systems.

In addition to the work required for direct interface with the Metro North project, this project also covers the appointment of a multidisciplinary team to engage with the DAA in the design of the GTC facilities planned to be built directly above and adjacent to the underground metro station. It is critical that the proper planning and design of these facilities is commenced in advance of the completion of the construction of the Metro system.

Classification : Airport Infrastructure

Primary Driver : Capacity	Secondary Driver(s) : n/a

CIP 8.300 : Metro North and GTC Technical fees.



Project Commencement :	2010
Project Completion :	2014 (dependant on completion of Metro North Construction)
Total Project Capital Expenditure :	€2.0 million
Historic Expenditure (pre 2010)	Nil
Expenditure in current CIP (2010 – 2019)	€2.0 million
Project Stage	Gateway 1
Project Output	• Technical advice related to RPA Contractor's design and construction of Metro North station and associated tunnel and track works. • Expertise to monitor and assess ground movement, vibration and response of buildings as construction of Metro North proceeds. • Design of GTC facilities to be located directly above and adjacent to Metro North Station.
Project Justification	• Ensure that airport buildings and related assets are protected from damage during major construction activities associated with Metro North project. • Design of GTC facilities to be built over and adjacent to Metro North station so that these facilities can be incorporated into Metro scheme.

Capital cost assumptions	Standard consultancy rates.
Cost Benchmarks	Costs based on professional fees associated with previous CIP projects.
Stakeholder evaluation and consultation status	DAA has envisaged consultation with DACC and other stakeholders via formal presentation of projects valued at €5 million and over. As this project is valued at under €5 million, consultation is via this document.
Extent of airlines' support for project :	See above.

CIP 9.019 : Cuckoo Culvert Diversion - Upgrade

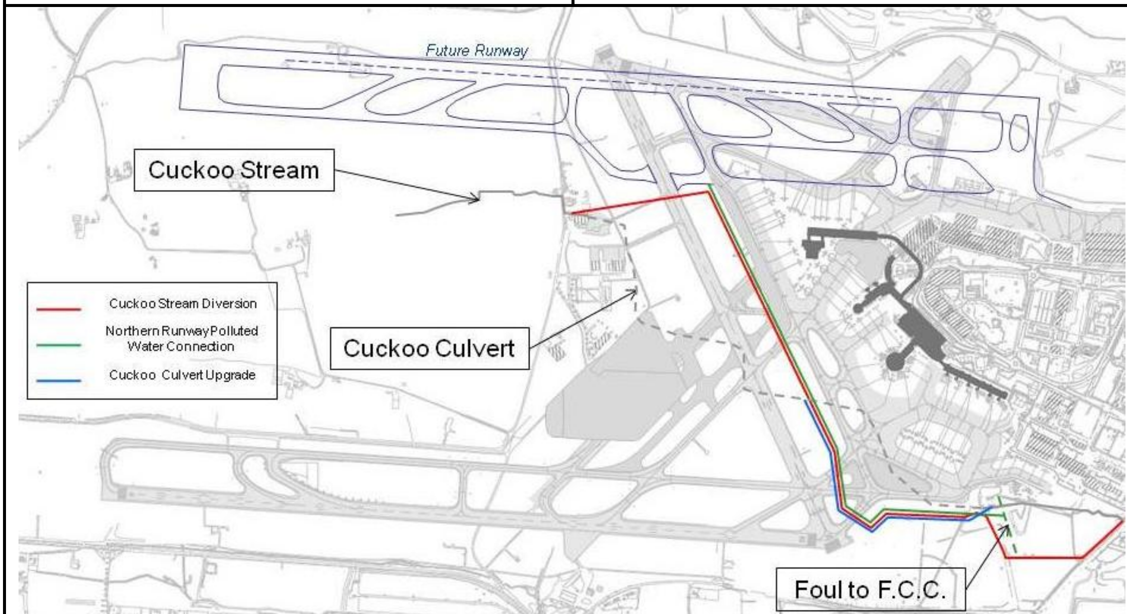
Currently the cuckoo stream runs through the centre of the airfield. Historically the airport has used this stream (in the form of a culvert) to drain the majority of the paved areas. This was first sized and built in 1947 and essentially extended over the years in a piecemeal fashion as paved areas were added to the airfield.

- FCC and the Eastern Region Fisheries Board now require DAA to separate the cuckoo stream from airfield drainage which may contain pollutants from aircraft and de-icing operations. This requires DAA to intercept the Cuckoo Stream as it enters airport lands (Westlands), run it in its own dedicated pipe through the airfield (approx. 3km) and exit the airport at the R132.
- Additionally to cater for the storm water runoff from existing and potential future paved areas, it has been identified in the RPS Burks Green 2007 Drainage Report that the culvert is under-sized and capacity will need to be increased. This will be in the form of a new pipe through a section of the airfield (approx. 1.2km).
- The proposed Northern Runway will need to be connected to the FCC foul sewer to deal with de-icing pollutants when it becomes operational – as directed in the runway planning conditions. It would be prudent to construct the foul sewer alongside the aforementioned surface water pipes in order to (i) minimise airfield disruption and to (ii) benefit from economies of scale.

This project will provide three pipelines through the centre of the airfield delivering a foul sewer connection pipe, a diverted Cuckoo Stream free from pollutants from the airport as well as a greatly enhanced drainage capacity which is required in this increasingly unpredictable climate.

Classification : Airport Infrastructure

Primary Driver : safety / compliance	Secondary Driver : capacity

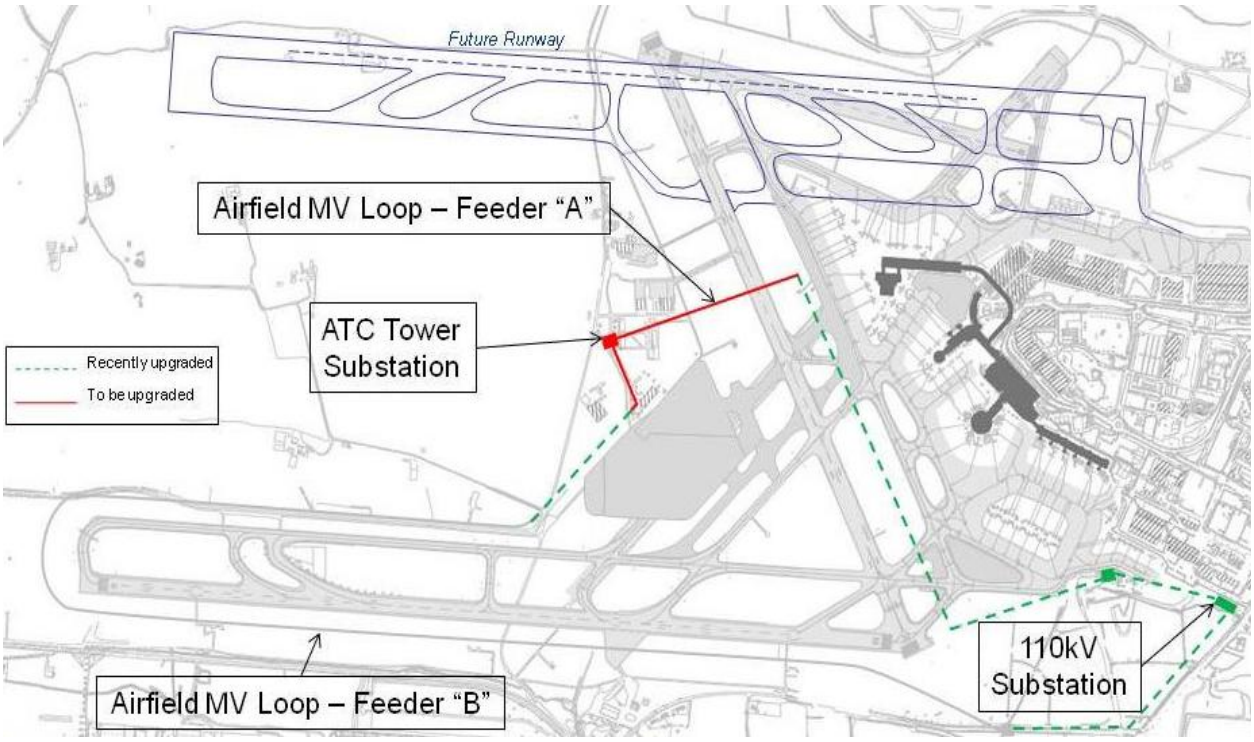


Project Commencement :	2010
Project Completion :	2011

CIP 9.019 : Cuckoo Culvert Diversion - Upgrade

Total Project Capital Expenditure :	€11 million
Historic Expenditure (pre 2009)	0
Expenditure in current CIP (2010 – 2019)	€11 million
Project Stage	Gateway 2 - Feasibility
Project Output	Three pipes through the centre of the airfield • Diverted Cuckoo Stream (3km) • Upgraded culvert (1.2km) • Foul connection to proposed northern runway (2km)
Project Justification	To meet FCC/ERFB requirements with regard to water quality in local watercourses and increase capacity of the cuckoo culvert which has been extended over the years in a piecemeal fashion.
Capital cost assumptions	• Airside Works • To achieve economies of scale the utilities will be installed as one construction project. • Pipejacking below existing taxiways • Nightwork required in certain locations • Rates reflective of restrictive working environment
Cost Benchmarks	• 300mm dia foul sewer: €150/m • Pipe jacking (300 mm foul sewer): €870 /m • 1200mm dia culvert: €1000/m • Pipe jacking (1200mm dia pipe): €2000 /m • Preliminaries: 15%
Stakeholder evaluation and consultation status	*In a letter to DACC dated 9th September 2008, DAA proposed a process to obtain users views on projects. The company wished to consult with users on utilities projects at a DACC meeting scheduled for 3 October. DAA would have anticipated that this project would have been discussed as part of that session, however, users subsequently advised that they did not wish to engage with DAA at project level. As a consequence consultation with users on this project is via this document.*
Extent of airlines' support for project :	See above

CIP 9.020 : MV renewal works A

DAA Project code :	
Dublin Airport Authority currently owns, operates and maintains, a 'private wires' 10 kV electricity distribution system at the airport which serves all airport operations. This enables the DAA to purchase power from the ESB at the cheaper High Voltage tariff and then sell it on to individual users through a re-charge system which results in cost savings for those users. Up to recently much of this supply is delivered through an ageing cable network (up to 40 years' old in places) which is at or near the end of its design life. The landside section of this distribution system has been upgraded as part of the CIP 2006-2009. Also a substantial section of the Airfield loop (40%) has been upgraded in recent years through various Apron projects (dotted green line below). This project will replace the remaining 20% of the "Feeder A" airfield loop which will complete the most critical leg of the network which serves both runway 10/28 and 16/34 lights, navigational aids, the Air Traffic Control Tower and the Fire Station (see graphic below). Replacement of the "Feeder B" loop, while required, has been deferred to a later CIP.	
Classification : Airport Infrastructure	
Primary Driver : Repair / Replace	Secondary Driver(s) :Capacity
	
Project Commencement :	2012

CIP 9.020 : MV renewal works A

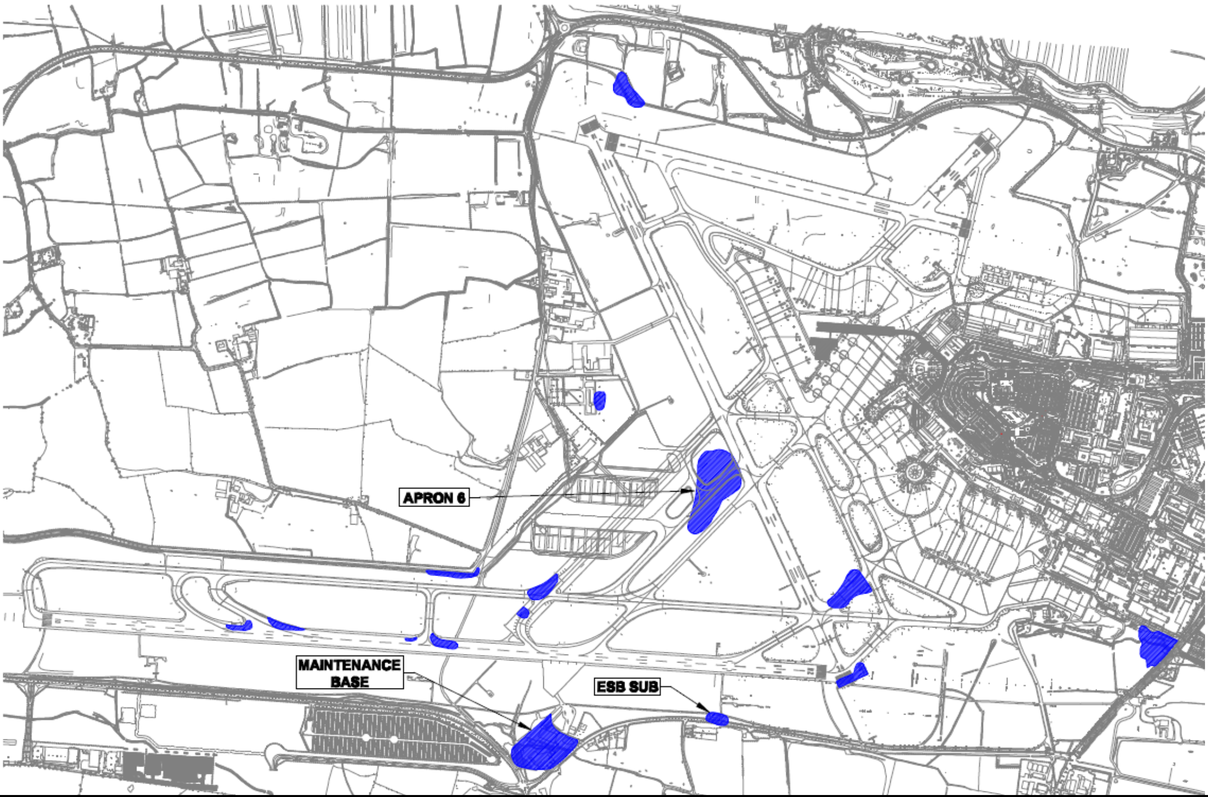
Project Completion :	2012
Total Project Capital Expenditure :	€2.5 m
Historic Expenditure (pre 2009)	0
Expenditure in current CIP (2010 - 2019)	€2.5 m
Project Stage	Gateway 3 - Outline Design
Project Output	• Final section of "Feeder A" cable (approx 1000 metres). • Key switchgear units and transformers replaced
Project Justification	Replacement of the remaining 20% of the "Feeder A" airfield loop which will complete the most critical leg of the network which serves both Runways 10/28 and 16/34 lights, navigational aids, the Air Traffic Control Tower and the Fire Station (see graphic above). On completion of this work a completely upgraded Feeder A loop will be in place providing a reliable and dependable supply.
Capital cost assumptions	• Airside Works • Pipejacking under Rwy 16/34 • Some night-time work but primarily daytime works
Cost Benchmarks	• 3 x 400mm^2 A1 and earth cables: €225/m • Pipejacking: €870/m • Switchgear Provision: €350,000 • Preliminaries: 15%
Stakeholder evaluation and consultation status	DAA has envisaged consultation with DACC and other stakeholders via formal presentation of projects valued at €5 million and over. As this project is valued at under €5 million, consultation is via this document.
Extent of airlines' support for project :	See above

CIP 9.021 : Airfield Drainage upgrade

Various localised areas of the airfield are prone to flooding as identified in a consultant's 2007 drainage report and as evidenced during summer 2008 storm events. These areas have not benefitted from investment in drainage infrastructure as part of the current Capital Investment Programme, and include zones which are critical to the operation of the airport such as the East Sub (power to runway lights), Apron 6 and the Airfield Maintenance Base as well as some areas of the runway. This project will address the flooding issues in these areas by way of a number of local drainage upgrades to protect the operation of the airfield in an increasingly unpredictable climate.

Failure to provide enhanced drainage to these zones will result in an increased risk of airfield infrastructure failure in the future.

Classification : Airfield	
Primary Driver : Capacity	Secondary Driver(s) n/a



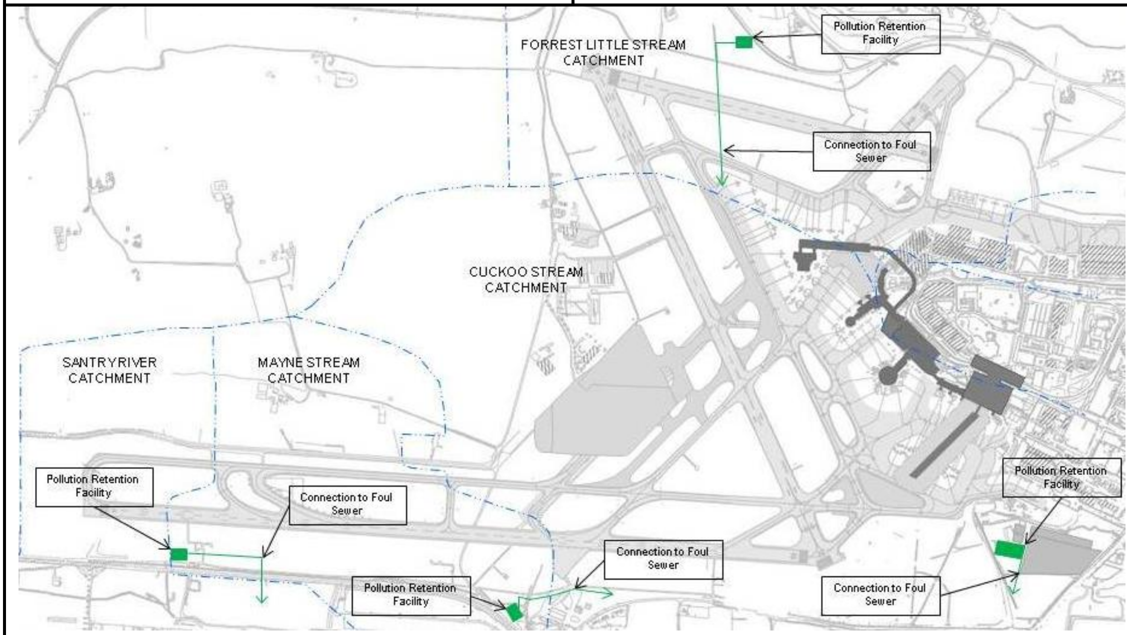
Project Commencement :	2010
Project Completion :	2013
Total Project Capital Expenditure :	€3.0 m
Historic Expenditure (pre 2009)	€0
Expenditure in current CIP (2010 – 2019)	€3.0 m
Project Stage	Gateway 1

Project Output	Various local drainage solutions in areas prone to flooding. Approx. 1500m of drainage pipes – varying diameters. 3 No. 1,000m^3 attenuation tanks.
Project Justification	As above. To protect critical operational areas from known flood risk exacerbated by climate change.
Capital cost assumptions	Airside works. Primarily daytime works but night-time work may be required in some locations.
Cost Benchmarks	• Attenuation tanks: €220/m^3 – small tanks • Manholes: €5,000 ea • Fuel Interceptors: €15,000 ea. • Pipe jacking (300mmm to 600mm dia): €870 to €1150/m • 300 – 600mmm dia pipes: €150 - €300/m • Preliminaries: 15%
Stakeholder evaluation and consultation status	DAA has envisaged consultation with DACC and other stakeholders via formal presentation of projects valued at €5 million and over. As this project is valued at under €5 million, consultation is via this document.
Extent of airlines' support for project :	See above

CIP 9.022 : Airfield Pollution Control	daa Dublin Airport Authority

The 'Dublin Airport Master Plan (Local Area Plan), Strategic Environmental Assessment Report' states "the operation of Dublin Airport is significantly impacting on surface water bodies draining the developed lands in terms of both quality and quantity of runoff. The issue of quantity of run-off has been dealt with under the CIP 2006-2009. To achieve good water status, the DAA is obliged to implement pollution control measures within each catchment where apron de-icing activities occur. There are 4 such catchments: Cuckoo, Santry, Mayne and Forrest Little. As part of the 2006-2009 CIP DAA has begun addressing this in the Cuckoo catchment and installed 10,000m³ of polluted water attenuation (under 9.014 Phases 1 and 2). This project will extend this facility in the Cuckoo catchment and construct discrete facilities in the other catchments to bring the DAA into compliance with FCC requirements in respect of polluted water control.
Classification : Airport Infrastructure

Primary Driver : Safety / Compliance	Secondary Driver(s) :N/A



Project Commencement :	2011
Project Completion :	2012
Total Project Capital Expenditure :	€10.5 million
Historic Expenditure (pre 2010)	€3.0 million
Expenditure in current CIP (2010 – 2019)	€7.5 million
Project Stage	Gateway 3
Project Output	Polluted water control facilities in each catchment to achieve Fingal County Council's objectives.

	Assets delivered will be: Cuckoo - 18,000m³ tank Mayne - 3,500m³ tank & connect to foul sewer Santry - 1,200m³ tank & connect to foul sewer Forrest Little - 4,000m³ tank
Project Justification	DAA is obliged under the Dublin Airport Local Area Plan to deal with apron & aircraft de-icing events which could pollute watercourses in the vicinity of Dublin Airport. These events are a direct result of airport operations.
Capital cost assumptions	Airside work. Primarily daytime work. Section of foul sewer from Forrest Little Catchment may be constructed at night-time.
Cost Benchmarks	• €160/m^3 of tank (large tanks) • Preliminaries: 15%
Stakeholder evaluation and consultation status	In a letter to DACC dated 9th September 2008, DAA proposed a process to obtain users views on projects. The company wished to consult with users on utilities projects at a DACC meeting scheduled for 3 October. DAA would have anticipated that this project would have been discussed as part of that session, however, users subsequently advised that they did not wish to engage with DAA at project level. As a consequence consultation with users on this project is via this document.
Extent of airlines' support for project :	See above

9.023 : Fuel Hydrant System

The current aircraft fuelling operation at Dublin Airport involves the trucking all aviation fuel from the Fuel Farm on South Corballis Road, through the landside / airside security gate and then out onto the apron to fuel the airplanes. This arrangement generates a very large volume of tanker truck journeys within the airport, and as such is inefficient and environmentally unfriendly. This project involves improving this situation by constructing a Fuel Hydrant system to serve Pier E directly.

Pier E will generate a high proportion (*30 – 40%*) of the total demand for fuel once it opens due to the fact that it will be the principal long-haul Pier. For this reason an underground hydrant system that will serve each stand individually without the need for any fuel trucks was designed and is being installed as part of the Pier E works.

This project represents the remainder of Phase 1 of the overall Fuel Hydrant System project, and involves the installation of an underground hydrant system running from the airside into-plane facility and out onto the apron near Pier E in order to feed the Pier E fuel hydrant system directly.

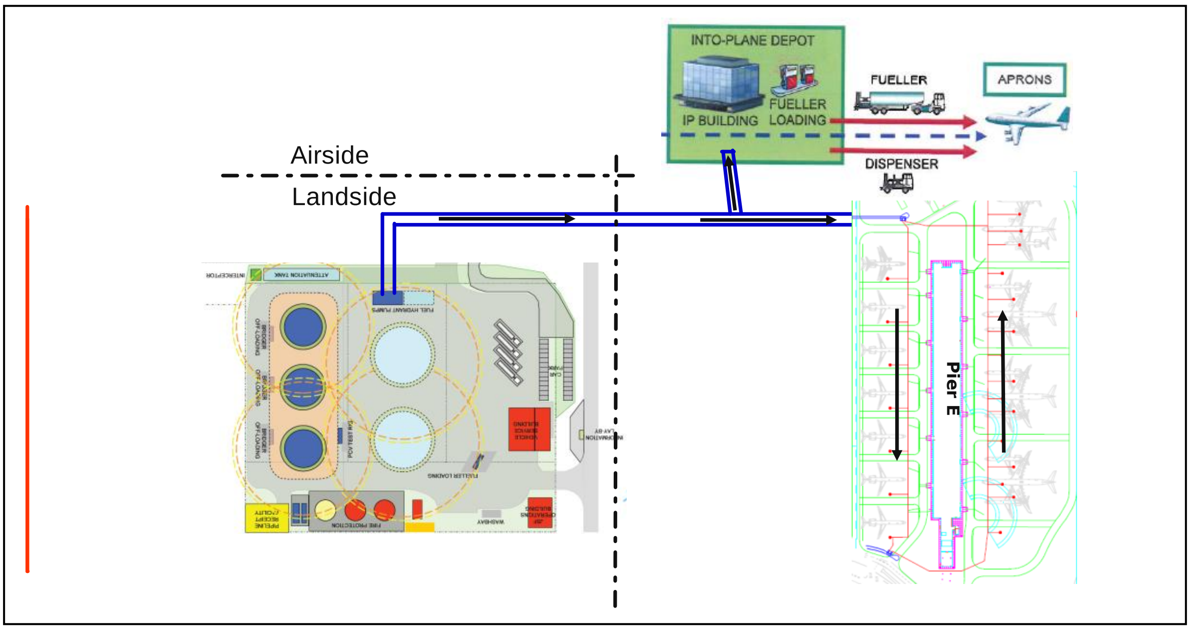
The advantages to the airlines from this investment will be :

- Direct hydrant system for Pier E aircraft (principally long haul)
- More efficient, faster aircraft fuelling service
- Less fuelling-related schedule delays

This project will enable the expansion of the hydrant system to Piers B, D and A, and / or the relocation of the tanker filler point to Pier A / Pier D apron in a subsequent phase.

Classification : Airport Infrastructure

Primary Driver : Cost Reduction	Secondary Driver(s) : Quality of Service



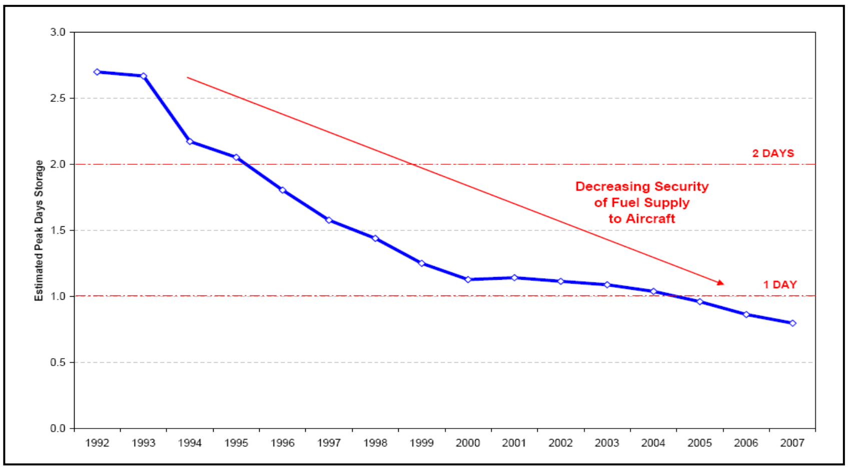
Project Commencement :	Project commencement to be determined by Trigger as outlined in Chapter 8
Project Completion :	See above
Total Project Capital Expenditure :	€6.0 million
Historic Expenditure (pre 2010)	nil
Expenditure in current CIP (2010 - 2014)	€6.0 million
Project Stage	Gateway 1
Project Output	• 0.65km of underground twin feeder pipe • Direct connection to Pier E hydrant system
Project Justification	• Direct hydrant system for Pier E aircraft (principally long haul) • Less fuelling-related schedule delays
Capital cost assumptions	Original cost plan prepared in 2006 by contractors who have experience of airside working at Dublin Airport. The cost plan has subsequently been reviewed and updated by T&T Energy in 2008.
Cost Benchmarks	Pier E fuel hydrant system: circa 1200m installed for €2,500m.
Stakeholder evaluation and consultation status	This project has been presented to CAR by DAA. In a letter to DACC dated 9th September 2008, DAA proposed a process to obtain users views on projects. The company wished to consult with users on Fuel related projects at a DACC meeting scheduled for 5th December. DAA would have anticipated that the fuel hydrant system would have been discussed as part of that session, however, users subsequently advised that they did not wish to engage with DAA at project level. As a consequence consultation with users on this project is via this document.
Extent of airlines' support for project :	See above.

This project involves the expansion of jet fuel storage capacity at the current fuel depot at Dublin airport, and the installation of a new airside "into-plane" fuel tanker filling point, fed directly from the fuel depot by underground fuel pipes.

The Dublin Airport Fuel depot, located off South Corballis Road, opened in 1972 and currently comprises three above-ground storage tanks with a total 2.2 million litres operational storage capacity for jet A-1 fuel, filtration and fueller loading pumps and three into-plane service loading racks.

The average daily fuel demand is circa 2 million litres, however, during the summer months this increases to circa 3 million litres. The peak daily demand recorded in 2008 was 2,804,984 litres on 1st June.

The IATA recommendation is that typically 3 – 4 days of fuel storage capacity is required during peak demand periods at a major international airport to counter the temporary loss of fuel supply to the fuel depot. At less than one day's supply, Dublin Airport is operating at less than a quarter of the recommended capacity and this situation is no longer sustainable (see graph below).



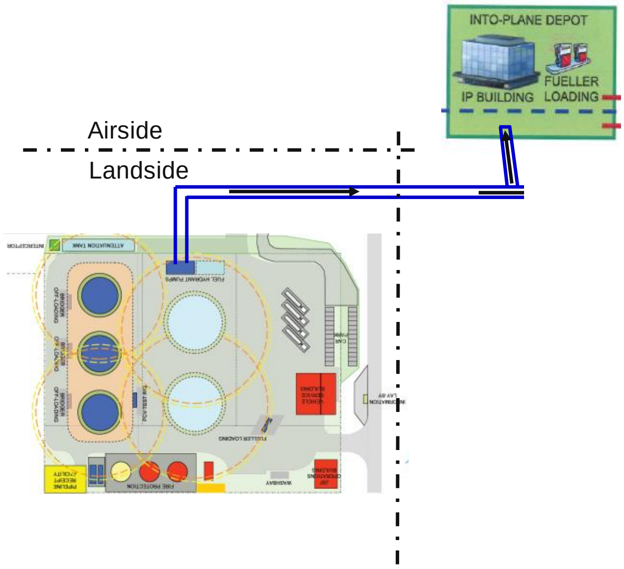
There were two "NOTAMs" issued in 2008 in respect of refuelling at Dublin Airport and these instances will increase in line with further demand for fuel from the airlines.

This project will increase the fuel storage capacity at the fuel farm to 15 million litres (over 4 days supply) by replacing the existing storage tanks with three larger new ones, each with a storage capacity of 5 million litres.

There will also be the facility on the redeveloped site to further increase storage capacity to accommodate forecasted demand to 2040 once the fuel hydrant system is completed (separate project).

In addition, this project also includes the installation of a new airside into-plane fuel tanker filling point. This asset will facilitate the fuelling of aircraft on all Piers via tanker truck as before, but in a much more efficient manner, with much shorter fuelling distances and without the need for the trucks to travel back to the landside Fuel Farm to refill.

CIP 9.024 : Fuel Farm Redevelopment



Classification : Airport Infrastructure	
Primary Driver : Capacity	Secondary Driver(s) : Quality of Service Repair / Replacement
Project Commencement :	2012
Project Completion :	2013
Total Project Capital Expenditure :	€28.8 million
Historic Expenditure (pre 2009)	nil
Expenditure in current CIP (2010 – 2014)	€28.8 million
Project Stage	Gateway 1
Project Output	• 3 no. aviation fuel storage tanks each 5,000 m3 capacity with associated bunding and civil engineering works • Fuel pipework internal to fuel depot boundary • Buildings 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
Project Justification	• Current aviation fuel storage capacity at less than one day’s demand is completely insufficient to provide the requisite security of supply of fuel to the airlines.

	• IATA recommendation is 3 – 4 days' supply. • Replacement of time-expired assets • More efficient, faster aircraft fuelling service.
Capital cost assumptions	The oil companies' original 2006 cost plan is robust. The cost plan has subsequently been reviewed and updated by Consultants T&T Energy in 2008.
Cost Benchmarks	Skytanking, a fuel storage concessionaire, validated the oil companies original cost plan, which has subsequently been updated.
Stakeholder evaluation and consultation status	This project has been presented to CAR by DAA. In a letter to DACC dated 9th September 2008, DAA proposed a process to obtain users views on projects. The company wished to consult with users on Fuel related projects at a DACC meeting scheduled for 5th December. DAA would have anticipated that the fuel farm project would have been discussed as part of that session, however, users subsequently advised that they did not wish to engage with DAA at project level. As a consequence consultation with users on this project is via this document.
Extent of airlines' support for project :	See above.

Dublin Airport Authority

Dublin Airport - Runway 10L/28R Alternatives Report

Final

December 2004

DUBLIN AIRPORT AUTHORITY

DUBLIN AIRPORT - RUNWAY 10L/28R
ALTERNATIVES REPORT

FINAL

Issue No.	Status	Date	Prepared by	Reviewed by	Approved for Issue
1	Initial Draft	13/3/03	AI Evans	Not Reviewed	
2	Final	08/12/04	AI Evans	AJ Stacey	*AI Evans*

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D106146/December 2004

DUBLIN AIRPORT AUTHORITY

DUBLIN AIRPORT - RUNWAY 10L/28R
ALTERNATIVES REPORT

FINAL

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FIGURES INCLUDED IN THE REPORT

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MAPS INCLUDED IN APPENDIX B

Executive Summary

Introduction

1. The concept of a second parallel 10L-28R runway at Dublin Airport has been identified in the Master Plan for Dublin Airport since the 1960's and the land required has been protected in the Fingal County Plan since the 1970's.

2. This concept has been regularly validated and Aer Rianta (now the Dublin Airport Authority) has undertaken a number of previous studies into alternatives to provide additional runway capacity. As part of the production of the Environmental Statement for the proposed runway, this report documents the alternative proposals considered to the second parallel runway concept.

Alternative Concept Options

3. The following alternative Concept Options were identified and assessed:

- Increased use of other Airports
- Improved Use of the Existing Infrastructure at Dublin Airport
- Alternative locations for the second runway at Dublin Airport
- Provision of a single runway elsewhere in the greater Dublin Ares
- Replacement of Dublin Airport on a new site.

4. The key characteristics of the above concept options were identified and compared to the second parallel 10L-28R runway concept. The summary of the comparison is as follows:

- ***Increased use of other Airports***
  Other airport locations are not in locations that best suit the origins or destinations of the majority of passengers that currently use Dublin Airport. They would therefore either not serve the demand or require increased surface access provision.

- ***Improved Use of the Existing Infrastructure at Dublin Airport***
  A study carried out by National Air Traffic Services (NATS) of the existing three-runway system concluded that there are no improvements to infrastructure or procedures that could deliver significant additional capacity without building or replacing a runway.

- ***Alternative locations for the second runway at Dublin Airport***
  The extension of runway 11-29 was considered as the only option sufficiently compatible with the local development plan to be a feasible alternative. This, however, provides less capacity and operational flexibility, has more impact on other airport facilities and no less environmental impact and is less likely to be given planning permission as it would extend the footprint of the aerodrome beyond that set out in the County Plan.

- ***Provision of a single runway elsewhere in the greater Dublin Area***
  This would either take the form of a new single runway airport or change the use of an existing airfield to civil use. In both cases substantial investment in airfield infrastructure would be required which is unlikely to cost less than the proposed parallel runway at Dublin. Environmentally, impacts on land use would be increased and noise impacts may be less but only at the expense of increased travel distance and road use.

- ***Replacement of Dublin Airport on a new site.***
  Due to the high costs involved in this option it would only be justifiable if the environmental benefits were very significant. This is not likely as sites close enough to Dublin to minimise access impacts would have similar impacts on the surrounding communities and any undeveloped sites away from developed areas often have high ecological value.

Conclusion

5. None of the alternative concept options were found to be preferable to the concept of a northern parallel runway at Dublin Airport.

1. INTRODUCTION

1.1 Background

1.1.1 In the 1960's, Master Plan was developed for Dublin Airport based on pair of parallel runways. The first of these, the southern parallel runway, was opened in 1989 and replaced the former main runway 05-23. At the same time, the land required for the northern parallel runway (10L-28R) was purchased by Aer Rianta (now the Dublin Airport Authority) and identified and protected within the Fingal County Plan.

1.1.2 Traffic at Dublin Airport has grown very substantially since the construction of the southern parallel runway reaching 15.9 million passengers and 178 thousand aircraft movements in 2003. At these levels of traffic, and current rates of growth, the capacity of the runway system at Dublin Airport will be exceeded within the planning horizon for the design and construction of the northern parallel runway.

1.1.3 However, since the initial safeguarding restrictions were put in place, there have been a number of changes regarding environmental legislation (particularly EC EIA Directives) that require the Dublin Airport Authority to reappraise whether or not other, preferable options exist taking into account environmental effects.

1.2 The Need for an Alternatives Study

1.2.1 EC EIA regulations, as implemented within Ireland as the *European Community (Environmental Impact Assessment (Amendment) Regulations, 1999*, require project proponents to document the alternatives which they have considered for the development they are proposing within the Environmental Statement. The Second Schedule, Part 1, d states:

'An outline of the main alternatives studied by the developer and an indication of the main reasons for his choice, taking into account the environmental effects.'

must be included.

1.2.2 The proposed development has been under consideration for many years, during which a number of apparent alternatives have been either implicitly or explicitly considered. In order to satisfy both its responsibilities with respect to the requirements identified at paragraph 1.2.1 above and emerging best practice, the Dublin Airport Authority has chosen to not only summarise the earlier consideration given to alternatives, but to also review their potential attractiveness, particularly with respect to their likely environmental impact in the present context.

1.2.3 While the "Guidelines on the Information to be contained in Environmental Impact Statements" prepared by the Environmental Protection Agency (updated March 2002) state:

'*Site Specific Issues: The consideration of alternatives also needs to be set within the parameters of the availability of land (it may be the only suitable land available to the developer) or the need for the project to accommodate demands or opportunities within a stage, e.g. design, layout.'*

this review has been extended to include a brief consideration of broader options beyond the lands in the beneficial ownership or control of the Dublin Airport Authority.

1.3 Objectives

1.3.1 The main objective of this study is to investigate whether there are any alternative options to provide additional runway capacity in proximity to Dublin and assess whether these proposals are better than the currently preferred development option at the existing airport site, particularly taking into account environmental factors.

1.3.2 The aim is not to rank all alternatives generated against each other but to undertake comparative analyses, utilising a robust set of criteria. The full range of options to be assessed, which shall be discussed later, include the redevelopment of existing military facilities and the construction of new 'Greenfield' options.

1.3.3 A key element of this alternatives study will be to logically set out a robust and transparent methodology with a clear audit trail.

1.4 Assumptions

1.4.1 In order to be able to achieve the report's objectives set out above, it was necessary to set out a number of broad assumptions, which are summarised as follows:

- The long term predicted capacity requirements cannot be achieved using the existing runway system at Dublin Airport, even with operational or infrastructure changes. (This analysis was carried out by National Air Traffic Services (NATS) and is discussed in the report "Dublin Airport – Options for Delivering Additional Runway Capacity" (Scott Wilson, 2003).
- The study will not include a review of offshore options due to the significant additional capital expenditure required to reclaim land or provide semi-floating facilities
- For existing aerodromes, the runway system has been assumed to have adequate usability (that is the ability to allow operations in a sufficient range of wind conditions).
- For new aerodromes, runway orientations between 05-23 and 10-28 are likely to be acceptable in principle to give a sufficient level of usability (subject to relationship of any specific site to the existing Dublin Airport runways).
- The land-take required for a complementary airport (i.e. to provide only the additional second Runway) would be 2km by 4km.
- The land-take required for a complete replacement airport would be 3km by 4km

1.5 Functional Requirements for the Facility to be provided

1.5.1 In order to be considered as reasonable alternatives to the proposed development, each alternative option must provide benefit and functionality equivalent to that of the proposed development in terms of runway length, instrumentation and terminal facilities etc. This may be achieved in many ways ranging from full replacement of Dublin airport through to assessing a number of scenarios that could provide complementary functionality.

1.5.2 However, in certain instances (such as development of a second runway located at a site other than the existing Dublin Airport), there may be more than one way in which the new facility may complement the existing Airport, in order to jointly achieve the required functionality and benefit. For example this may include balancing the commercial needs of airports and airlines to provide a split facility with the supplementary airport proving specialist services either through a single carrier of group of freight integrators.

1.6 References

1.6.1 This study draws upon and summarises a number of previously considered options and studies. These include:

- "Dublin Airport - Origin and Destinations Study" Dublin Transportation Office (2001)

- “Dublin Airport - Runway Capacity Study” NATS (2003)
- "Dublin Airport - Options for Delivering Additional Runway Capacity" Scott Wilson (2003)
- "Position on the Proposals for the Development of a Second Commercial Airport for Dublin" Aer Rianta (1995)
- "Gormanston Aerodrome Master Plan 1984-1994" Aer Rianta (1984)

2. METHODOLOGY

2.1 Introduction

2.1.1 As defined previously, a key requirement of the study methodology is that it be robust. As such, a range of alternatives has been considered, which has complicated the study process. Hence, to simplify the methodology the study was broken down into four key stages that are described below.

2.2 Outline Methodology

2.2.1 The methodology employed within this study is outlined in Figure 1

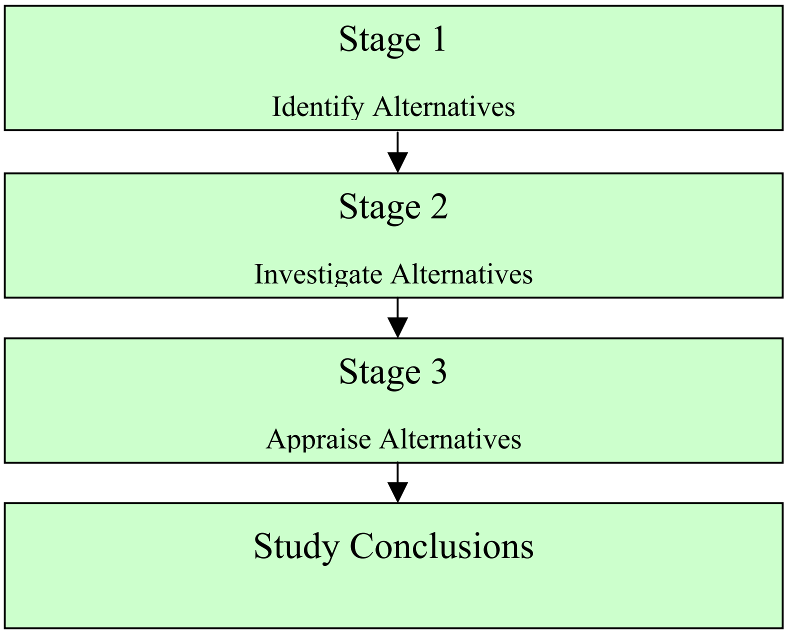


FIGURE 1 OUTLINE METHODOLOGY

2.3 Stage 1: Identify the options to be assessed

2.3.1 This stage outlines the range of alternative options considered within the study. These options were identified in a brainstorming session, and cover a broad range of concepts. These include the provision of a new site, the redevelopment of military sites as well as the provision of an alternative development at the existing Dublin Airport.

2.4 Stage 2: Investigate alternative options

General

2.4.1 In order to appraise the alternative options in Stage 3, it is necessary to determine a clearly defined set of characteristics for each option. To provide consistency with other current studies, such as the UK's South East Regional Airport Study, the following criteria were adopted to provide the basis for evaluating the options.

- Physical, operational and safety
- Catchment and accessibility
- Environment
- Regional Planning Guidance
- Capital cost
- Commercial

2.4.2 As the process for evaluating an established site is fundamentally different to considering a new site, two different approaches have been used to evaluate these criteria.

Existing Sites

2.4.3 This stream enabled the key criteria to be reviewed for specific alternative options which had 'fixed' locations. This included options at the existing Dublin Airport as well as at the Gormanston and Baldonnel military aerodromes. The aim was to review each of the critical characteristics utilising desk study research coupled with discussions with Aer Rianta (now the Dublin Airport Authority). At this stage, no input was obtained directly from external stakeholders.

New Sites

2.4.4 This parallel process permitted the critical criteria to be applied, not to a specific airport site, but to notional 'zones of opportunity' for potential runway development. This was necessary to evaluate the potential for reviewing new build facilities operating in tandem or in full replacement to the existing Dublin Airport.

2.4.5 The principal tool for this element of the process was a geographical information system (GIS) linked to a comprehensive electronic database of constraint data. The tool enabled 'zones of opportunity', (i.e. areas containing minimum constraint) to be identified using spatial analysis, layering airport development and constraint data.

2.4.6 Since not all criteria could be mapped in this way, several criteria had to be discussed in narrative form with respect to the key 'zones of opportunity' highlighted (see Figure 2).

2.5 Stage 3: Appraisal of alternative options

2.5.1 The output from Stage 2 investigated the key characteristics for each of the options considered. Stage 3 provides a comparison of each of the alternative options against the preferred option of a northern parallel runway. This process was simplified using a number of tabular summaries derived from the stage 2 analyses.

2.5.2 In order to account for varying weights of impact on the attractiveness of a given alternative, each criteria has been assessed against a three tiered scale based upon the investigation from the previous stage. This allows the criteria to be quantitatively assessed based on whether it has a minimal, moderate or significant impact on an option's attractiveness.

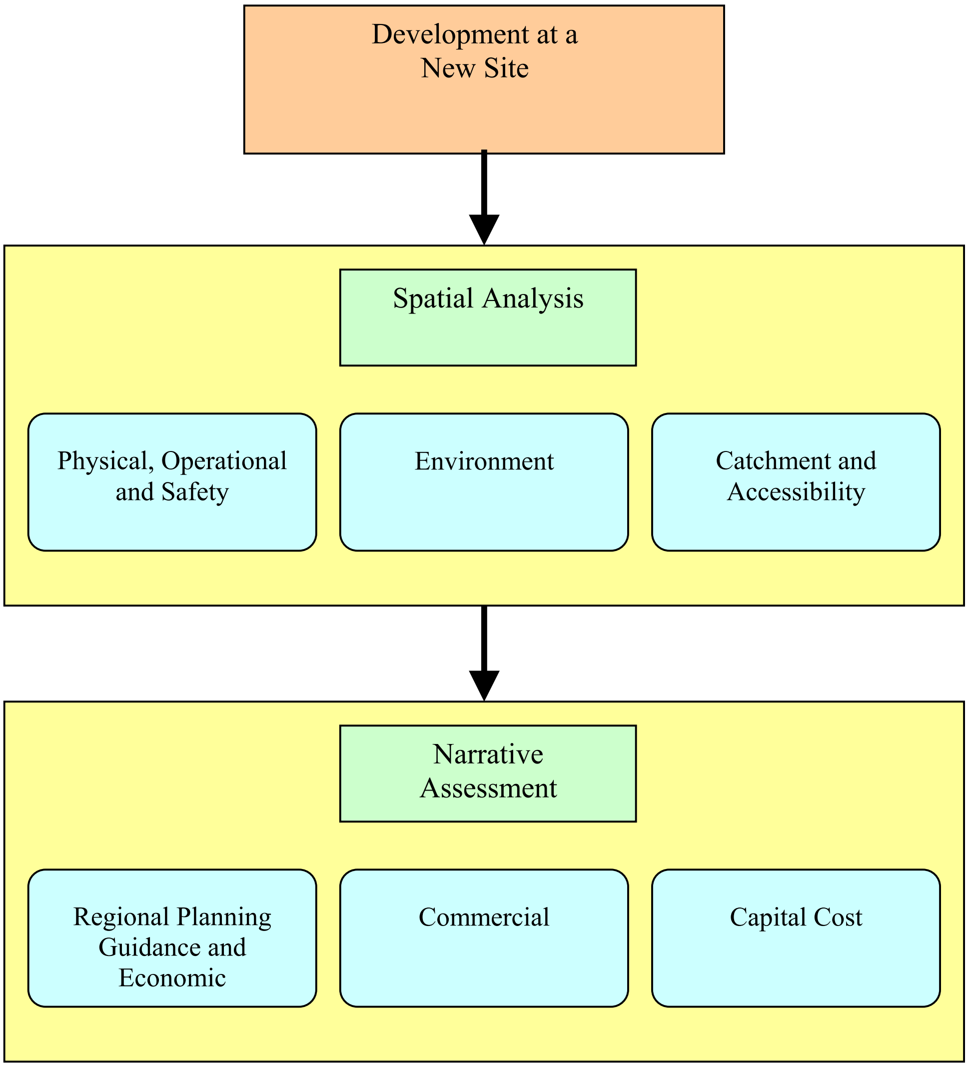


FIGURE 2 STAGE 2B PROCESS

Stage 1

Objective

The aim of this stage is to identify the alternative concept options to the long term plan for a northern parallel runway.

3. CONCEPT OPTIONS

3.1 Broad Concepts

3.1.1 A number of alternative concepts for the development of additional runway capacity that could be considered have been identified. These are:

- Increased use of other Civil Airports in Ireland.
- Improved use of the infrastructure (including additional developments short of a major runway project) at Dublin Airport to give levels of capacity broadly similar to that of a pair of parallel runways.
- Alternative locations for the second runway at Dublin Airport.
- Provision of a single runway elsewhere in the greater Dublin Area.
- Replacement of Dublin Airport on a new site

3.2 Concepts Developed for Study

3.2.1 Within the broad concepts identified in Section 3.1.1 above there are a number of significant sub-options. The particular options taken forward for study are set out in the following Table.

Concept Options	Sub-Options Chosen for Investigation in Stage 2	Notes
Increased use of other Civil Airports in Ireland	Development of Shannon and/or Cork Airport	Aer Rianta owned these Airports and therefore had some influence over future development. These Airports already have significant traffic and route structures. The arguments in relation to these airports will be similar to any other existing civil airport.
Improved use of the existing infrastructure at Dublin Airport to give levels of capacity broadly similar to that of a pair of parallel runways.	All options to be investigated	This work was undertaken by NATS as part of a major capacity study for Dublin Airport. The NATS Study is summarised in "Dublin Airport – Options for Delivering Additional Runway Capacity" (Scott Wilson 2003). Includes additional infrastructure short of a significant runway development.
Alternative locations for the second runway at Dublin Airport	Proposed Parallel Runway	These two sub options arise out of the NATS Study and an assessment of options that might have some realistic chance of being delivered within the constraints of Local Planning Policy. A detailed study of these two concepts is contained within "Dublin Airport – Options for Delivering Additional Runway Capacity" (Scott Wilson 2003).
	Extension of Existing Runway 11-29	
Provision of a single runway elsewhere in the greater Dublin Area.	Baldonnel Airport	Change the use of existing infrastructure to satisfy demand.
	Gormanston Airport	
	New single Runway Site	Provide a new site complementary to the operation of Dublin Airport
Replacement of Dublin Airport on a new site	Military Aerodromes	
	New 2 Runway Site	

TABLE 1 CONCEPT OPTIONS CONSIDERED WITHIN THIS STUDY

Stage 2

Objective

The aim of this stage is to identify the characteristics of each of the options identified in Stage 1 in sufficient detail so that a comparison can be made against the long term plan for a northern parallel runway.

4. INCREASED USE OF OTHER STATE AIRPORTS

4.1 Origin and Destination Survey

4.1.1 The Dublin Transportation Office (DTO) carried out an Origin and Destination Survey of passengers using Dublin Airport in August 2001. The survey involved interviews with passengers at the departure gates.

4.1.2 The survey sample is set out in Table 2.

Date	Day of Week	Interviews Conducted	Passengers Surveyed	Total Passenger Throughput	Survey Sample
13/08/2001	Monday	1,868	4,423	25,428	17%
14/08/2001	Tuesday	2,262	4,769	20,323	23%
17/08/2001	Friday	2,478	5,490	28,962	19%
18/08/2001	Saturday	2,314	6,434	30,018	21%
19/08/2001	Sunday	1,977	5,017	34,657	14%
29/08/2001	Wednesday	1,113	2,651	20,222	13%
03/09/2001	Monday	954	1,870	26,449	7%
Total		**12,966**	**30,654**	**186,059**	**16%**

TABLE 2 SAMPLE DETAILS OF DTO ORIGIN AND DESTINATION SURVEY

4.1.3 Details of origins and destinations of passengers using Dublin Airport is given Table 3.

Region		Trip Origins	% of Total	Trip Destinations	% of Total
Greater Dublin					
	North City	5,977	20%	6,086	20%
	South City	5,046	17%	5,007	16%
	Fingal	2,466	8%	2,189	7%
	South Dublin	2,240	7%	2,129	7%
	Dun Laoghaire / Rathdown	1,788	6%	1,720	6%
	Meath	840	3%	852	3%
	Kildare	1,411	5%	1,325	4%
	Wicklow	827	3%	872	3%
	Total – Greater Dublin	**20,595**	**67%**	**20,180**	**66%**
Rest of Ireland					
	South East (N11 corridor)	942	3%	1,027	3%
	South/South West (N81, N7 corridors)	3,040	10%	3,241	11%
	West (N4 corridor)	2,408	8%	2,633	9%
	North West (N3 corridor)	664	2%	673	2%
	North / North West (N2 corridor)	845	3%	836	3%
	North (N1)	2,086	7%	2,064	7%
	Total – Rest of Ireland	**9,985**	**33%**	**10,474**	**34%**
	Grand Total	**30,580**		**30,654**	

TABLE 3 DUBLIN AIRPORT – PASSENGER ORIGINS AND DESTINATIONS

4.1.4 On the assumption that the sample is representative of all passengers at Dublin Airport, this survey shows:

- ✈ 67% of passengers have origins or destinations in the greater Dublin Area
- ✈ A further 12% have origins or destinations to the north of Dublin (N1 to N3 corridors). Dublin Airport is almost certainly the most convenient of the Irish state airports for these passengers.

4.1.5 The summary of the survey did not differentiate between those passengers with origins or destinations only just outside the Greater Dublin area and those further afield. It is possible only with difficulty to determine what proportion of those passengers allocated to the other corridors are nearer to Dublin Airport than any other Airport.

4.1.6 However, making no allowance for either those passengers to the south and west who:

- ✈ Might be located nearer to Dublin Airport than any other airport
- ✈ Are travelling on routes not served, nor likely to be served, from the nearer airport.

some 79% of passengers would be best served by Dublin Airport, leaving a maximum of 21% would be better served by other Irish Airports.

4.1.7 At 2003 levels of traffic this figure of 21% represents 3.3 million passengers or approximately 3 years growth at Dublin Airport should all this traffic be accommodated at other Irish Airports.

4.2 Summary

4.2.1 The DTO origin and destination survey shows that the great preponderance of passengers using Dublin Airport have origins or destinations best served by an airport in the Greater Dublin Area.

4.2.2 Aer Rianta did in the past undertake a number of schemes to encourage traffic at the other State Airports at Shannon and Cork, together with investment in infrastructure to increase capacity. However, demand at Dublin is still forecast to grow such that additional capacity will be required. If this demand were to be met elsewhere, then the environmental impact of surface access between the airport and the source of the demand would be increased.

4.2.3 In carrying out its functions Aer Rianta (now the Dublin Airport Authority) is required to have regard for the development of air transport (Air Navigation and Transport (Amendment) Act 1998 Clause 24(3)(a)). Therefore, this option, which restricts the development of air transport to serve Dublin, is not preferred over the parallel runway concept.

5. DEVELOPMENT AT DUBLIN AIRPORT

5.1 Introduction

5.1.1 The options for development at Dublin Airport are considered in “Dublin Airport – Options for Delivering Additional Runway Capacity” (Scott Wilson).

5.1.2 The following is a brief summary of the findings of that report.

5.2 Existing Facilities and Planning

5.2.1 At present, Dublin Airport has three runways. These are the Main Runway (10-28), which is 2,637m long; a Cross Runway (16-34), which is 2,072m long and a Short Runway (11-29), which is 1,357m long and suitable only for aircraft up to the size and weight of a BAe 146.

5.2.2 The planning of Dublin Airport has been based on the assumption that the existing cross and short runways cannot provide long-term sustainable additional capacity.

5.2.3 In the case of the cross runway, this is because, in certain modes of operation, it provides no more additional capacity than that of a single runway. In the case of the short runway, this is because improvements to the runway comparable with the construction of a new runway are required to provide a runway long enough, strong enough and with appropriate visual and navigational aids to act as an appropriate complement to the current main runway.

5.2.4 The Master Plan therefore included for the provision of a new runway parallel to the Main Runway to increase capacity when required.

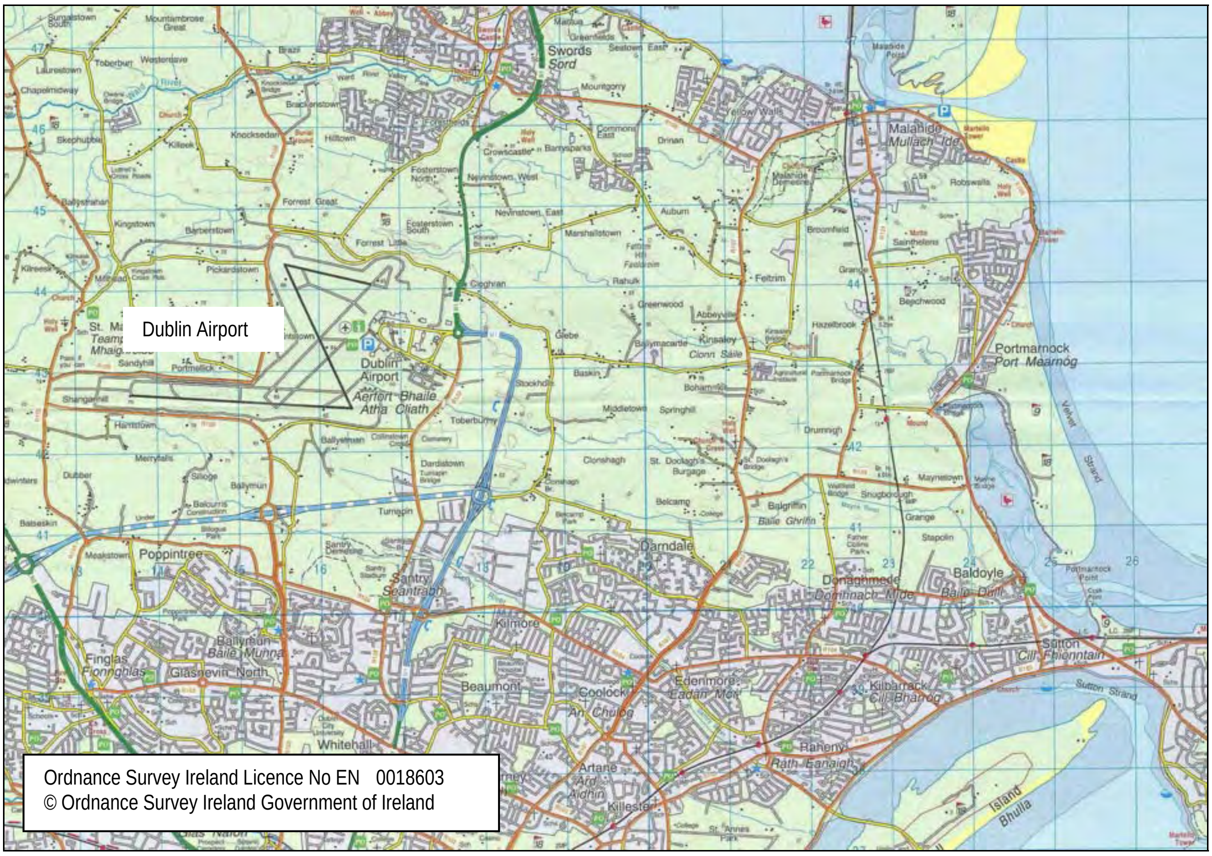


FIGURE 3 DUBLIN AIRPORT

5.3 NATS Capacity Study

5.3.1 To validate the long-term planning assumption and quantify the capacity of the airfield, National Air Traffic Services (NATS) carried out a detailed study of the airfield. This study showed that there are no improvements that can be made, either in infrastructure or procedures, short of a major runway extension or a new runway, which can deliver significantly more capacity than is available from the existing Main Runway. Estimates of the additional capacity available from the existing runway system range from 4 to 10 additional declarable movements per hour. The capacity achieved is dependent on a number of improvements in procedures by both Air Traffic Control and Airlines and the adoption of complex procedures. Therefore the upper limit of the range may not be achievable in practice.

5.3.2 The primary factors limiting the existing capacity are:

- The restriction that the length of Runway 11-29 imposes on aircraft that can use it;
- The inability to overcome the visual requirement on Runway 11-29; and
- The complexities of the procedures to operate in mixed mode operation on Runways 10-28 and 11-29 that arise because the runways converge.

5.3.3 In addition, the current pavement of Runway 11-29 does not have the strength to carry the full range of traffic and very significant strengthening measures would be required to achieve such strength.

5.3.4 The conclusion of the NATS study is that to significantly increase runway capacity major investment in runways is required. Two possible concepts for this investment were identified for further review. These were:

- Extension and upgrading of the existing near parallel runway 11-29, which overcomes the first two items listed in 5.3.2 above.
- Provision of a replacement of runway 11-29 parallel to the existing main runway, which overcomes all the limitations above and, therefore, has a higher ultimate capacity.

5.3.5 The second of these options is that contained within the Master Plan for Dublin Airport and the concept protected in the County Plan.

5.4 Comparison of Concept Options

5.4.1 These two concepts were compared, taking into account all relevant factors. The analysis shows that apart from the potential for reuse of the existing pavement and associated infrastructure in the case of the option to extend Runway 11-29, and therefore the potential possible reduction in capital cost, the option to provide a parallel runway is an equal or better option over a wide range of criteria.

5.4.2 In particular, a parallel runway has a greater ultimate capacity (43 movements per hour compared with 30 for an extension to Runway 11-29); greater operational flexibility; less impact on existing developments and facilities both inside and outside the airport; has no greater environmental impact; and is more likely to be given planning permission, as it does not extend the footprint and impact of the aerodrome beyond areas set out in Local Planning Guidance.

5.4.3 The significance of the potential cost reduction was examined by comparison of a number of options. In all cases, when the extent of improvement to the existing Runway 11-29, the land purchase required, and the replacement of other airport facilities were taken into account, the option to extend Runway 11-29 was found to be at least as expensive as a new parallel runway. The additional capacity deliverable from the parallel runway option for similar level of cost to that of the alternatives means that the parallel runway option is significantly (over 40%) more cost-effective.

6. DEVELOPMENT OF OTHER EXISTING AIRFIELDS

6.1 Introduction

6.1.1 This part of the report reviews the characteristic requirements for potential redevelopment of existing military facilities, in proximity to Dublin, to cater for commercial civil aviation usage. The sites assessed include the Baldonnel and Gormanston Aerodromes.

6.1.2 This part of the study focuses on the restrictive characteristics at Baldonnel and comments more generally on the redevelopment issues at Gormanston.

6.2 Baldonnel Aerodrome

Description

6.2.1 Baldonnel Aerodrome is situated to the South West of Dublin and has been the State's principal military aerodrome since 1922. Aer Lingus used it for civilian operations for a short period, in the late 1930s, until Dublin airport became fully operational. Since that time it has remained as a dedicated military facility and is presently operated and staffed under the aegis of the Department of Defence.

6.2.2 Due to its perceived strategic importance to national security the local Dublin population currently tolerates Baldonnel's operations. However, as noted during the recent planning enquiry for Doncaster Finningley airport in the UK, the transfer of an airport from military to civil operations, and likewise, public to private use, will undoubtedly be met by some objection. This is principally due to the perception that civil operations are not the "necessary evil" that military operations are, and that the increased frequency of operations will result in a significant increase in noise pollution despite the fact that many modern civil aircraft are significantly quieter than the military fleets.

6.2.3 By nature of the limited existing facilities and restricted development opportunities at the site it is considered that the airport will only be capable of providing supplementary airport capacity and would not be appropriate as a replacement for Dublin airport. Operations at such a facility would usually be expected to cater for a single resident carrier or group of cargo operators with typical aircraft being code D (B757/A320) or smaller.

Physical

6.2.4 Baldonnel's facilities currently comprise of two cross-runways each served by a parallel taxiway and connected by link taxiways. Runway 11-29 is 1829m long and 45.7m wide whilst runway 05-23 is 1463m long and 45.7m wide. The taxiways are 15m wide. The aprons taxiways and runways are over 40 years old and it is understood that they have recently been overlaid.

6.2.5 At present runways are wide enough to cater for code D aircraft. However, both runway lengths fall significantly below the levels required for fully laden B737 aircraft. This would mean that extensions to at least one runway would be required if a lowcost operator or freight company (using typically code D) were to move to the airport. The length required would be dependent on sector length and thus requires further analysis.

6.2.6 In addition to the runway improvements, a new civil airport at Baldonnel would require upgrading of the taxiway and apron network to accommodate civil aircraft. Works could include widening of taxiways and junctions and strengthening of all pavements for revised aircraft types and increased levels of traffic as well as the provision of radio and visual navigational aids (such as ILS) to civil standards. In addition, full terminal and associated landside facilities would be required to meet its functional and capacity requirements.

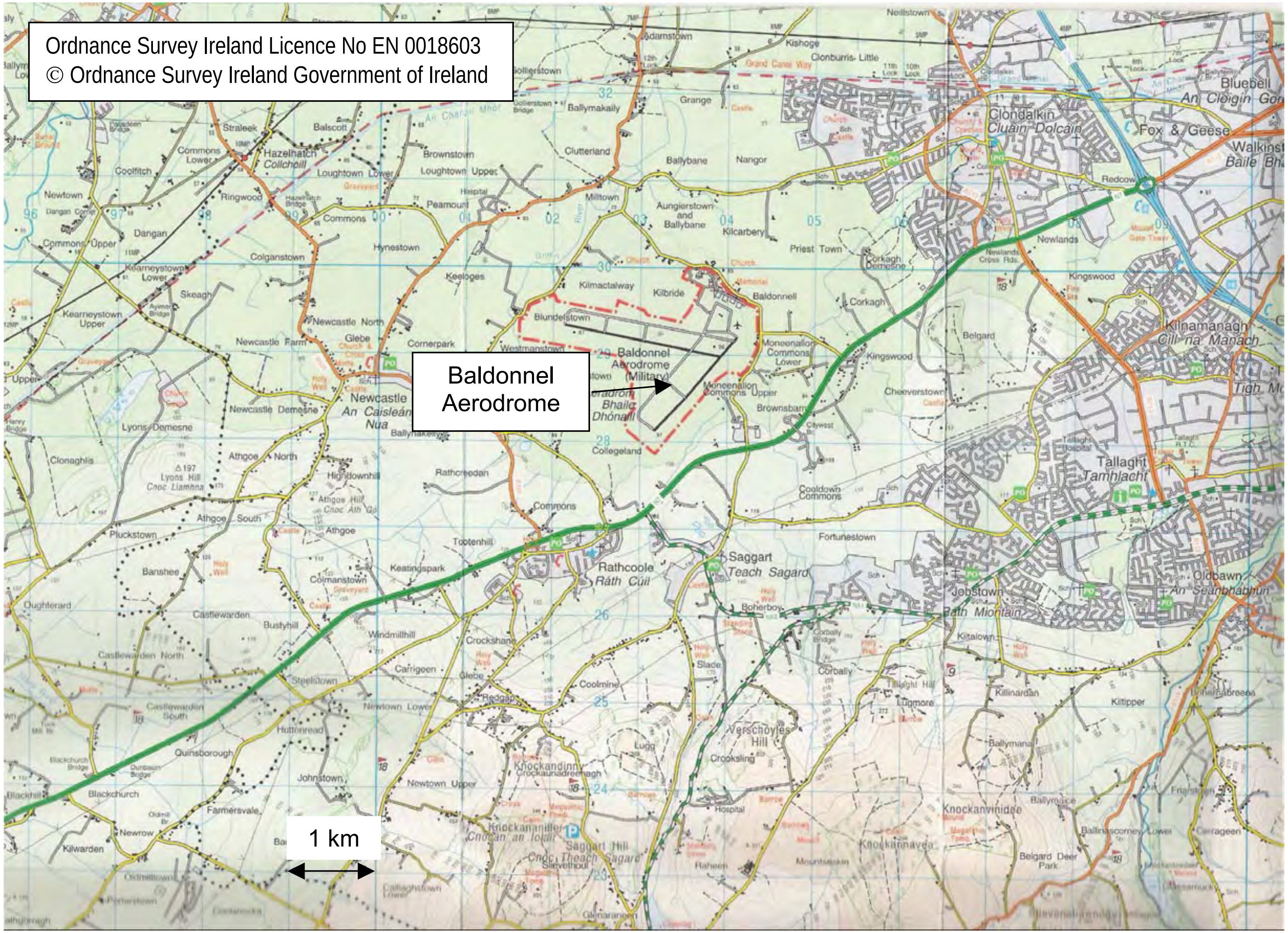


FIGURE 4 BALDONNEL AERODROME

Operational

6.2.7 Dublin airspace, and specifically the departure routes for Dublin Airport, is at present curtailed by the military restricted airspace to the north around Gormanston and to the South around Baldonnel. Although converting the airspace at Baldonnel to civil use would eliminate the southern restriction, an expanded operation at Baldonnel, with landings and take offs primarily on the east/west runway, would have a significant effect on the existing airspace sectorisation. In this respect both approach and holding areas would need to be examined and redesigned to provide for the second city airport.

6.2.8 The analysis of lower airspace interactions between major and supplementary airport facilities has recently been a focus of the UK's Airport Capacity Consultation Document (e.g. Gatwick/Redhill and London City/ Cliffe). In the majority of these cases, modelling results have shown that there is usually a reduction in air traffic movement capacity when airports are in relatively close proximity. Due to its remote location it is unlikely that such interactions of convergent aircraft would be problematic at Gormanston aerocentre. However, if Baldonnel were to be redeveloped it is most likely that more complex air traffic procedures would be necessary which in turn may promote higher fuel costs for airlines due to less direct airways being employed.

Safety

6.2.9 There are significant safety issues to be taken into account if the Baldonnel site were to be developed for civil activities.

6.2.10 Increasing the frequency of air traffic would have an associated increase in the amount of aircraft over-flying the densely populated central areas of Dublin. Whilst this is currently normal procedure at major airports, such as London Heathrow, there is a strategic move by aviation authorities, planning authorities and environmental lobbyists to avoid such operating policies, particularly with regard to the provision of new or redeveloped airport facilities.

6.2.11 Civil Aviation Authorities are increasingly adopting the approach of determining public safety zones using a risk approach rather than by empirical calculation. If this is to be applied to the Irish airports there will be issues with developments along the extended centre-lines of the runways at Baldonnel as these cross very densely populated areas.

6.2.12 Other issues regarding safety would include whether the site would be developed as mixed-use facility (Civil/ Military) whereby national security may be compromised unless careful and expensive segmentation of processes is achieved.

Catchment

6.2.13 Baldonnel airport is currently situated a similar distance from the central business district of Dublin as Dublin Airport. It therefore has a similar catchment based on the 90 minute travel isochrone used by airlines but does not take account of detailed information regarding propensity to travel from the north, south and west of Dublin.

Accessibility

6.2.14 At present the only access to Baldonnel is via the existing public roads. The road from Baldonnel leads southwards to the N7 (Dublin/Naas) and towards the N4 (Dublin/Galway). In both directions the access road is in poor condition and would require significant and costly improvements to strengthen and widen it. It is understood that the county council have medium and long term plans to improve and provide new routes and junctions in this area. However, at present there is no major access to Baldonnel and this obviously results in a constraint to future development and growth.

Regional Planning Guidance

6.2.15 Since 1972, the development of the region has been guided by Statuary County Development Plans that ensure that the bulk of the population to the west and south of Dublin have adequate housing. As such, the development around Dublin airport has been controlled. Development in the immediate vicinity (within 2 miles) has also been controlled at Baldonnel.

6.2.16 Recent programmes developed through EU operational programmes have specifically recognised the importance for speedy airport access to eastern regional travellers and the consequent planning of the strategic transport infrastructure network has been based on the premise that Dublin airport alone shall dominate the provision of civil airport infrastructure for the foreseeable future.

Economic

6.2.17 The economic impact of development at Baldonnel depends upon whether the development represents a complement to or a replacement of Dublin Airport.

6.2.18 In both cases, the same total economic benefit of air transport would be brought to the Dublin area as in the case of development of Dublin Airport. Economic inefficiencies due to duplication of facilities might be offset by increased competition.

6.2.19 If Baldonnel were operated as a complement to Dublin Airport, then local economic benefit associated with the airport would be spread to other parts of the Dublin Area. If, on the other hand, Baldonnel were to replace Dublin Airport then those local benefits would be transferred from the existing area to the new airport locale.

Environmental

6.2.20 Policies to minimise noise disturbance have been a main planning priority for both Aer Rianta (now the Dublin Airport Authority) and the Local Authorities since the major development of the airport. These plans over time have proven to be successful in meeting this objective.

6.2.21 Portmarnock is 7km from the threshold of the proposed Runway 28L at Dublin Airport and occupies a strip of land approximately 1km wide whereas the approaches to Runway 29 at Baldonnel pass over some 15km of south Dublin and the nearest community, Tallaght, is 3.5km from the runway threshold.

6.2.22 Although policies to limit the impacts of noise at Baldonnel are in place, the impact of the increased operations associated with a high throughput civil airport would be felt by many more people.

6.2.23 There would be additional environmental impacts should the military move to a separate site.

Commercial

6.2.24 The development of multiple airport systems within a single urban area has been seen as a way to deal with rapidly increasing demand for air travel and its associated environmental disbenefits. However, in the past, reliever airports have tended to flounder through only attracting a small fraction of the overall traffic (Origin and Destination in particular). The primary issue is of convincing the airlines to move to the secondary location. This is due to the competitive disadvantages of either splitting and thus duplicating services, or moving to a facility without established infrastructure or air transport network or which is further from the centre of the catchment area. These issues have been very apparent in cases such as Italy's

Malpensa, Canada's Mirabel, Brazil's Campinas (Viracopos) and Scotland's Glasgow Airports.

6.2.25 From a commercial standpoint, and in the absence of Low Cost Carriers, in order for a secondary airport to be successful in a metropolitan system, the following conditions must be present:

- the original airport must be closed (as in the cases of Riem, Germany and Norway's Fornebu airports); or
- the original airport must be severely constrained (as in the case of the London and New York airport systems); or
- the airlines must be forced to move by law (as in the case of Gatwick and Charles de Gualle Airports).

6.2.26 In recent years, the Low Cost Carriers have added another dimension to metropolitan systems. The business model of Low Cost Carriers makes use of spare capacity at secondary airports with airport charges based on marginal costs. Low ticket prices have attracted passengers from the main airport(s) as well as inducing a significant amount of demand for air travel. The success of low cost airports, very much depends on there being no real price competition from the original airport and continued spare capacity at the secondary airport. As such, as long as Ryanair or other similar airlines such as bmi Baby continue to operate successfully at Dublin Airport, it is unlikely that they would move, or that another Low Cost Carrier would provide much competition.

6.2.27 Of the three conditions set out in paragraph 6.2.25 above, closure of Dublin Airport would be unlikely to bring significant environmental benefits (see Chapter 7); the site at Dublin is not constrained, although infrastructure will need to continue to be developed in line with demand, and in the current regulatory environment within the EU it seems unlikely that airlines could be forced to move from Dublin Airport if they did not want to. Any secondary airport would, therefore, struggle to be commercially successful without low cost operators.

6.2.28 However, to accommodate Low Cost Operators at Baldonnel, significant investment would be required to provide the appropriate airfield and terminal facilities as those developed for military use are not generally appropriate for civil use and accommodate displaced military uses. There is not therefore the spare capacity at Baldonnel to allow an investor to make the immediate returns to fund development.

6.2.29 Baldonnel Airport is not considered a viable alternative for the Dublin Airport Authority from a commercial standpoint. It is also considered to be unlikely to be commercially attractive in competition with an unconstrained Dublin Airport.

Capital Cost

6.2.30 The existing buildings and other facilities on the Baldonnel site will not significantly reduce the extent or cost of the additional infrastructure required to be developed on this site, compared with the preferred option of development at Dublin Airport.

6.2.31 Costs would also include provision for displaced military activity.

6.2.32 If redevelopment were to occur the airport developer may become fully liable, under recent movements in legislation and planning, to provide full noise insulation measures around the airport and along the line of the approach/departure routes.

6.3 Gormanston Aerodrome

Description

6.3.1 Gormanston Aerodrome is located in County Meath some 35 km (22 miles) north of central Dublin and lies between the Dublin to Belfast Railway line and the N1. The area of the site is approximately 110 ha (270 acres).

6.3.2 The aerodrome was developed for military use and designed for trainer aircraft. There is a paved runway (designated 08-26) that is 750m long by 23m wide with a 75m long by 23m wide starter extension for 26 operations. There is a paved taxiway 7.5m wide to the 08 threshold.

6.3.3 There are also grass runways designated 13-31 and 18-36 and some grass taxiways.

6.3.4 The built infrastructure is suitable to support a military flying school.

Physical

6.3.5 The existing aerodrome site is too small to accommodate the facilities for commercial civil operations. The area of the site at 110ha is compared with operational area at Dublin Airport of 535ha, approximately 480ha at Shannon Airport and 258ha at Cork Airport.

FIGURE 5 GORMANSTON AERODROME

6.3.6 The existing site is constrained by the railway line and sea to the east and the N1 to the west. To extend the runway on the existing orientation (which is near optimal for wind considerations) would require substantial works such as one or more of the following:

- ✈ Raise runway levels to allow it to pass over the N1 and/or railway.
- ✈ Divert N1 either around the end of an extension or into a tunnel under the runway
- ✈ Reclamation of part of the Irish Sea.

Operational

6.3.7 With a similar orientation to Dublin Airport, there are no obvious reasons why development of this site would be constrained by limitations on airspace.

6.3.8 None of the existing operational facilities are suitable for commercial civil operations without substantial extension or improvement.

Safety

6.3.9 The location of the aerodrome is good from a public safety point of view with the main approach direction over the Irish Sea.

Catchment

6.3.10 Although further from the centre of Dublin than Dublin Airport, it would be capable of serving the Dublin catchment.

Accessibility

6.3.11 The site is well served by major transportation corridors being adjacent to both the Dublin-Belfast railway line and the N1.

6.3.12 However, these corridors also serve the existing Dublin Airport, so development at this site would not redistribute traffic away from the M1 and N1 to any great extent.

Regional Planning Guidance

6.3.13 The Meath County Plan has protected the use of Gormanston Aerodrome for military flying, but the extent of lands impacted by a commercial civil aerodrome would be very much larger.

Economic

6.3.14 The economic impact of development at Gormanston depends upon whether the development represents a complement to or a replacement of Dublin Airport.

6.3.15 In both cases, the same total economic benefit of air transport would be brought to the Dublin area as in the case of development of Dublin Airport. Economic inefficiencies due to duplication of facilities might be offset by increased competition.

6.3.16 If Gormanston were operated as a complement to Dublin Airport, then local economic benefit associated with the airport would be spread to other parts of the Dublin Area, although still concentrated on the M1/N1 corridor. If, on the other hand, Gormanston were to replace Dublin Airport then those local benefits would be transferred from the existing area to the new airport locale.

Environmental

6.3.17 The traffic induced environmental impacts would be limited for this site because of the coastal location and consequent limited population affected by operations.

6.3.18 On the other hand, extensive construction would be required to overcome the constraints of the site, including possibly extensive filling, reclamation and tunnelling all of which would have both short and long term impacts on the site.

Commercial

6.3.19 The weaknesses of split site operations have been discussed in connection with Baldonnel Aerodrome and would apply equally to Gormanston Aerodrome.

Capital Cost

6.3.20 The capital cost would be greater than at Dublin Airport because:

- Runway development costs would be comparable as the existing runway would need to be completely replaced as it is not long enough, wide enough or strong enough for civil commercial operations.
- Other airside infrastructure such as taxiways and aprons would need to be provided to support what is essentially a new runway.
- The constraints on the site would require substantial works to enable them to be overcome.
- Terminal infrastructure would need to be provided.
- Surface Access infrastructure would need to be improved.
- Both the site and adjacent lands would need to be purchased.

6.4 Other Aerodromes

6.4.1 Other aerodromes in the Dublin area are considered likely to have similar drawbacks to the military aerodromes considered in this chapter.

7. DEVELOPMENT OF A NEW SITE

7.1 General

7.1.1 As defined previously the purpose of this part of study was NOT to identify specific sites for major airport development in proximity to Dublin. Instead the aim was to identify the characteristics of the principal "zones of opportunity" which might conceivably sustain major airport development. In turn this would enable a comparative assessment with the other options discussed in this document.

7.1.2 This process to develop these 'Zones of opportunity' was based on the Geographical Information System (GIS) methodology that has been successfully employed in assessing alternative airport options both in the UK and Mainland Europe. This GIS based methodology for the determination of these areas is illustrated in Figure 6 and cross-referenced to an explanation thereafter.

7.1.3 As mentioned earlier, not all of the criteria could be readily represented within a GIS compatible format. As such, this analysis was split into two elements: Spatial Analysis and Narrative Assessment.

7.2 Spatial Analysis

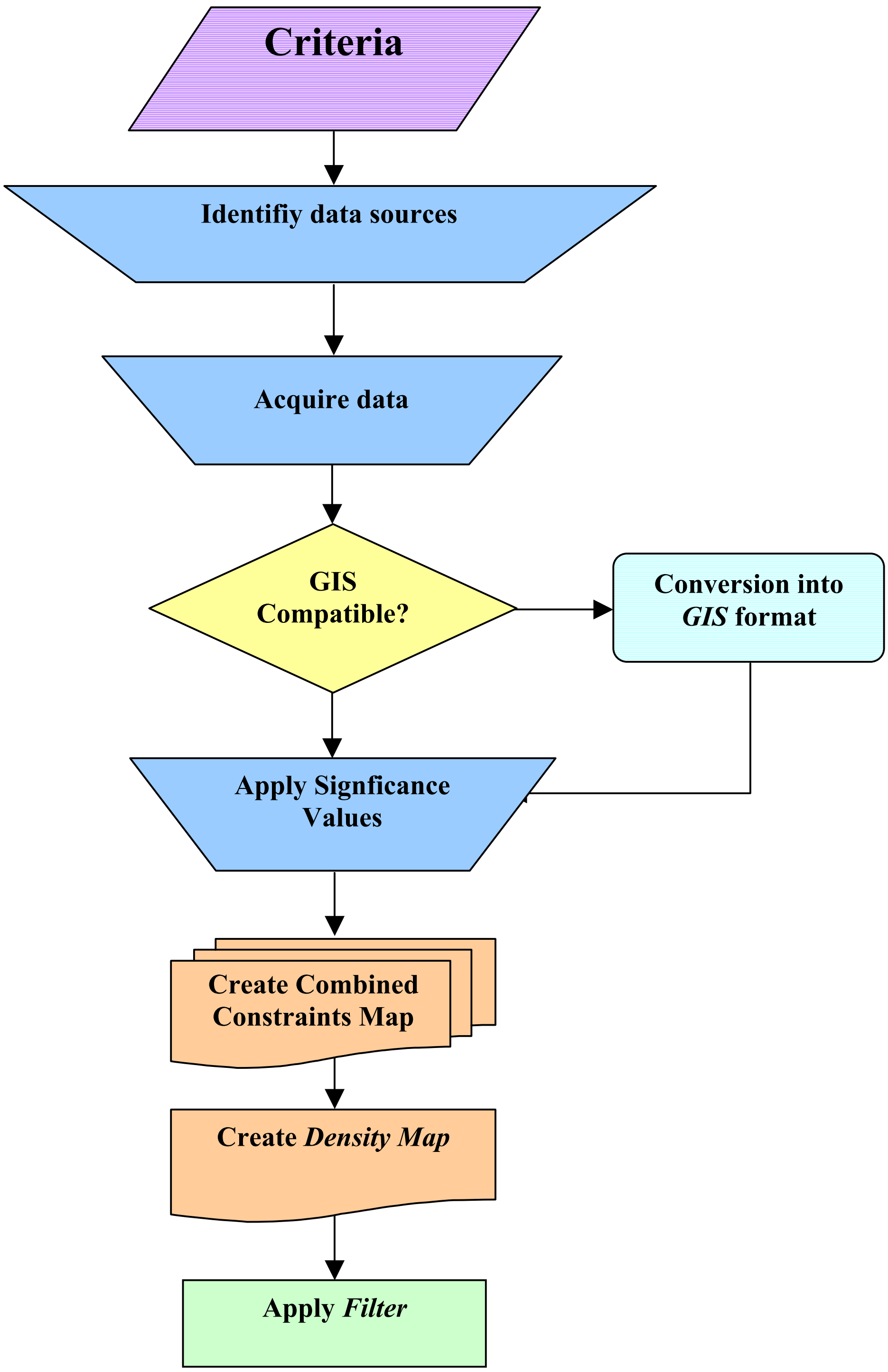


FIGURE 6 SPATIAL ANALYSIS OVERVIEW

Establish Critical Criteria for GIS Input

7.2.1 The criteria selected in Stage 2, which could easily be represented in GIS format, were as follows:

- **Physical/Operational/Safety**
- **Catchment, Accessibility**
- **Environment**

7.2.2 Due to the relative complexity it was decided that the following critical characteristics would be better suited to qualitative discussion:

- **Regional Planning Guidance**
- **Commercial**
- **Capital Cost**

7.2.3 The specific criteria within each of the established core issues were identified. These included:

- **Physical, Operational, Safety**
  - Topographical issues (Slope Constraints)
  - Urban Areas
  - Military activity
  - Avoidance of major power lines
- **Catchment, Accessibility**
  - Proximity to road and rail
  - Proximity to the centre of Dublin
- **Environment**
  - Designated Conservation Areas
  - Water Resources
  - Noise templates to avoid over-flying built up areas
  - National Heritage and National Monuments

Identification of Data Sources

7.2.4 Suitable data on all of the above constraints were needed for the entire area around Dublin in GIS format. The data had to be presentable as spatial maps to demonstrate geographic locations and had to be quantifiable so that potential airport zones could be analysed and ranked.

Acquisition of Data

7.2.5 After identifying the information that was required, their sources were investigated and the data sets were procured from specific organisations, from paper mapping, spreadsheet sources or through consultation.

Apply Significance Values to Constraints

7.2.6 Each of the key evaluation criteria listed in section 7.2.3 were mapped in GIS format as a constraint/opportunity map. As each constraint exists at varying degrees around the region, values were assigned to allow for a comparison between zones. These values are referred to as Significance Values.

7.2.7 It was assumed that the scoring of significance values for each constraint between 1 and 5 would provide adequate differentiation.

Produce Spatial Maps for each Constraint

7.2.8 The significance values are represented graphically in the spatial maps by standard colours that highlight the areas with differing values. The colours representing these values as well as a description of each value is given in Table 4.

Value	Description	Colour
5	Maximum attractiveness/ minimum constraint impact.	Red
4	Above average attractiveness/ Below average constraint impact.	Orange
3	Average attractiveness/ Average constraint impact.	Yellow
2	Below average attractiveness/ Above average constraint impact.	Green
1	Minimum attractiveness/ maximum constraint impact.	Blue
-1000	Constraint which precludes site/ area from any further consideration (i.e. “Showstopper”)	Black

TABLE 4 SIGNIFICANCE VALUES

7.2.9 Spatial maps for each of the specific constraints derived from the basic strategic evaluation criteria were produced as Maps 1 to 11 inclusive, which are included in Appendix C.

Create Combined Constraints Map

7.2.10 The various opportunity/constraint maps were layered allowing specific zones for airport development to be derived, based on the total density of the overlapping polygons. The real strength in this approach was the ability to highlight the areas with fewest constraints to pinpointing potential new zones for potential aviation development.

7.2.11 Critical ‘Showstopper’ areas, which precluded areas from any further analyses are summarised as follows:

Map	Description of Critical Constraint
A1	Ground slope greater than 2.0%
D1	Urban areas (typically with population densities greater than 50 persons per hectare)

TABLE 5 CRITICAL ‘SHOWSTOPPER’ CONSTRAINTS

7.2.12 These constraints are shown as black areas on the Combined Constraint Map (see Table 4 above).

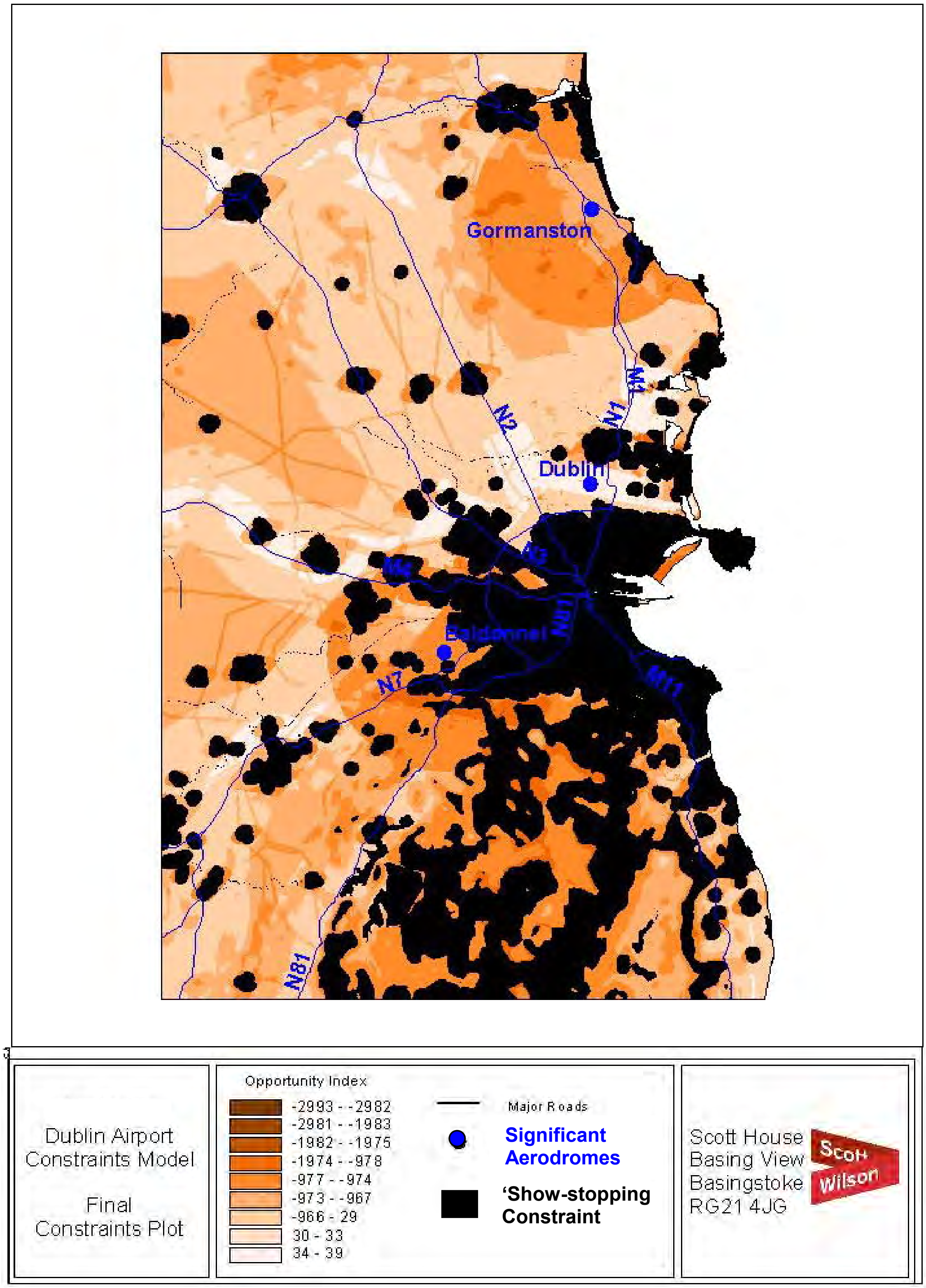


FIGURE 7 COMPOSITE CONSTRAINTS MAPPING

Apply Filter to Zones of Opportunity

7.2.13 All of the areas highlighted through the analysis were brought forward in their exact form. These included not only large groupings and clusters of smaller groupings that could easily be identified as areas of opportunity, but also some very small, isolated areas that would not normally be identified as appropriate for siting a significant airport development.

7.2.14 A filter was therefore applied to the output, to remove any small areas of opportunity, which were not part of a larger grouping. This was carried out subjectively and the effect of this process was to smooth out the rough edges of the larger groupings, as well as to remove any unreasonably small areas (see Figure 8).

Interpretation

7.2.15 Figure 8 shows a composite graphic on which all show-stopping constraints are combined and shaded dark brown. Lesser constraints are shaded light brown. In order to illustrate the way in which the GIS output will be used, this figure is annotated with 6 areas. Areas 1,3 and 5 do not contain show stopping constraints and contain only limited areas of lesser constraints. On the other hand, Areas 2, 4, 6 are largely covered by light shading indicating the presence of lesser constraints. Areas 1,3 and 5 would represent potential zones of opportunity. The characteristics of these areas have been identified to form the set of characteristics to be used for appraisal as the alternative option for development on a new site.

7.3 Qualitative Assessment

Regional Planning Guidance

7.3.1 All of the zones of opportunity are within close proximity to Dublin hence have similar planning guidance. However, locating a new major facility with a throughput of say 20 million will roughly require an additional workforce in excess of 17,000 employees. The majority of these will be low cost unskilled labour. The provision of such labour is a constraint but one which, although important, cannot be a decisive factor.

Commercial

7.3.2 History has shown us that one of the only ways that a second full-service metropolitan airport could be commercially viable i.e. attract airlines, is through the closure of the original facility. However, this is a difficult option to justify when considering the development potential and environmental benefits that must be present to outweigh the enormous cost in developing the new facility and transferring the activities directly related to the airport's operations.

7.3.3 As discussed previously the development of a complementary airport to operate in tandem with the existing Dublin facility may experience problems in attracting airlines. As considered in the UK (Gatwick/Redhill) there could be alternatives to connect the two airports using high speed transportation infrastructure but the cost benefit to provide this type of transfer traffic would be difficult to argue against the relative cost of providing the preferred option.

7.3.4 However, as discussed previously, the second new airport could develop niche services such as those provided by Low Cost Carriers. Such services however, would be difficult to justify so long as Dublin continues to provide competitive charges and minimal delays. If such a niche market was to be exclusively pursued by the secondary airport, the length of the runway may be rationalised and thus require marginally less landtake.

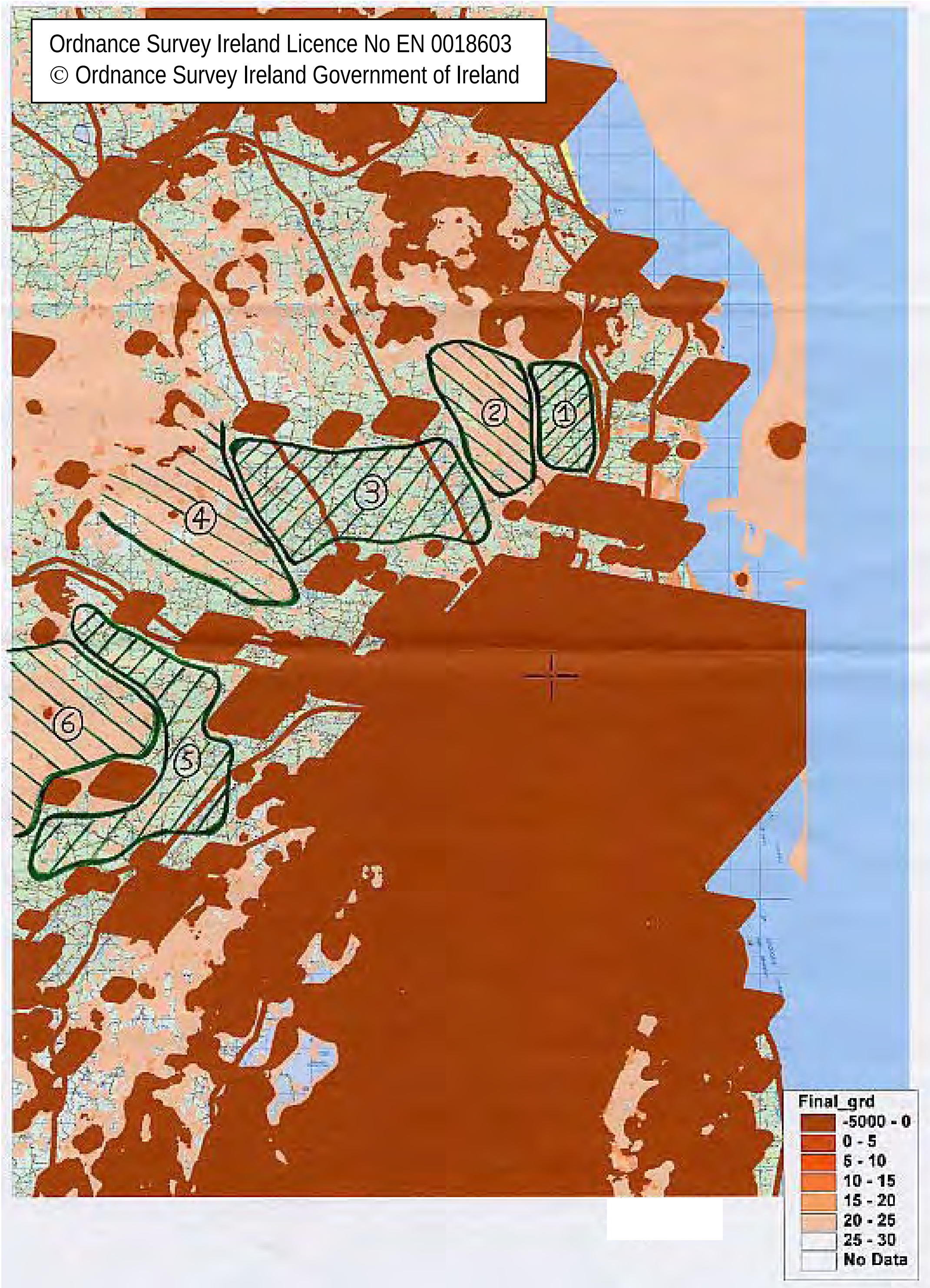


FIGURE 8 INTREPRETATION OF GIS WORK

Cost

7.3.5 Recent Studies by the British Government for the 2002 White Paper on Aviation suggests that the cost of a new "greenfield" twin runway airport facility would be in the region of €7 billion to include both land and airside facilities.

7.3.6 Similarly the cost of a new minor (complementary) airport facility would (according to the UK's Department for Transport cost in the region of €5.5 billion.

Stage 3

Objective

The aim of this stage is to compare the concept options against the proposal for a northern parallel runway to establish if any other concept is more favourable overall.

8. REVIEW OF ALTERNATIVE OPTIONS

8.1 Approach

8.1.1 Each Alternative will be appraised against a range of criteria, to see if they offer advantages over and above the preferred option or, alternatively, provide the required capacity and functionality at a reduced environmental impact cost. Each alternative will be appraised against the following criteria:

- Physical, Operational and Safety Issues
- Catchment and Accessibility
- Regional Planning and Economic
- Cost
- Environmental Impact
- Commercial

8.1.2 Assessment of environmental impacts will be undertaken at a high level, and in less detail than that required for the full Environmental Impact Assessment being prepared for the proposed scheme. The aim of appraisal within this Alternatives Study is to identify the general nature, magnitude and importance of the impacts likely to result from development of the alternative concept option concerned.

8.2 Development at Other Commercial Airports

8.2.1 The concept of developing operations at other commercial civil airports in Ireland is compared with the parallel runway concept in Table 6.

Characteristic	Other Commercial Airports	10L/28R Concept
Physical, Operational and Safety Issues	The basic infrastructure exists.	The basic infrastructure exists.
Catchment and Accessibility	Access systems are in place, but would need strengthening at all locations to accommodate the increases in traffic.	Access systems are in place, but would need strengthening to accommodate the increased traffic.
	Not accessible from the source of demand which is predominately from the Dublin area.	A survey carried out by the DTO shows that over 80% of traffic through Dublin Airport would be best served by an airport in the Dublin area.
Regional Planning and Economic	Might increase economic activity in other parts of Ireland.	Continues to support economic activity within a global economy.
Cost	Many investment projects required to deliver additional capacity at other Airports.	
Environmental	Would increase surface access related environmental impacts.	
Commercial	Services may not be commercially viable away from the main sources of demand.	

TABLE 6 COMPARATIVE ASSESSMENT OF COMMERCIAL AIRPORT CONCEPT

8.3 On-Site Options

8.3.1 The concepts of maximising the infrastructure at Dublin Airport or alternative runway options at Dublin Airport are compared with the parallel runway concept in Table 7.

Issue	Concept of Using Existing Infrastructure	10L-28R Concept
Physical, Operational and Safety Issues	Existing Infrastructure has limited capacity, such that to provide capacity comparable with the parallel runway concept a major extension to runway 11-29 would be required together with strengthening of 11-29 pavements.	
	The ultimate operational capacity of Runway 11-29 is less than of a parallel runway owing to the convergence of the runways.	43 additional movements compared with only 30 for extension of Runway 11-29.
	The provision of instrument approaches on an extended 11-29 in the current location so as to be able to reuse the pavements would require the demolition of Hangar No 6.	Planned for instrument approaches.
	Public Safety Zones for an extended 11-29 would extend into areas not identified in the County Plan.	Public Safety Zones already established for a parallel runway and the existing Runway 11-29 only.
Catchment and Accessibility	There is no difference between these options in terms of either catchment or accessibility.	
Regional Planning and Economic	The impact of either scheme on the local economy would not be significantly different.	
Cost	Budget cost analysis shows that the parallel runway option is cheaper because of the extent of reconstruction required, land and other compensation costs.	Land already in Aer Rianta (now the Dublin Airport Authority) ownership.
Environmental	There is limited flexibility to operate 11-29 to mitigate noise impacts because the convergence of the two runways imposes operational constraints on its use.. There is unlikely to be a significant difference in populations affected by operations.	10L-28R could be operated in a number of modes to mitigate noise impacts
	The potential overall footprint of the airport would be increased in the 11-29 concept, increasing land use related environmental impacts.	
Commercial	In the short term, there are no significant differences in the operational costs of the two concepts, nor in commercial revenues available.	In the long term additional capacity is available and consequently there is an improved return on the investment.

TABLE 7 COMPARATIVE ASSESSMENT OF DEVELOPMENT AT DUBLIN CONCEPT

8.4 Development of Other Airfields in the Dublin Area

8.4.1 The concept of redeveloping another existing airfield in the Dublin area is compared with the parallel runway concept in Table 8.

Characteristic	Redeveloped Airfield Concept	10L-28R Concept
Physical, Operational and Safety Issues	The basic non-runway infrastructure does not exist for passengers.	The basic non-runway infrastructure is in place for passengers.
	Extensions and improvements to the runway infrastructure would be required to cater for commercial operations.	
	The potential cost of purchasing property in extended Public Safety Zones could be significant due to the recent developments around the airport	Public Safety Zones are already established for a parallel runway and development has been limited through Planning Policy.
	Apron facilities are restrictive	Apron facilities are fully developed
Catchment and Accessibility	Propensity to travel for local population will be lower than the preferred option in the short term.	Due to the historical location of the airport propensity to travel in close proximity to the airport will be higher than either of the military options in the short term.
	Road and Rail access to Baldonnel airport is currently unsuitable for civil passengers	Transportation links to the existing site are well developed
Regional Planning and Economic	The impact of either scheme on the local economy would not be significantly different.	
Cost	The cost for redevelopment will be of the airside facilities is of the order €100-200 million based on the cost of a similar European developments **excluding** the purchase of the facility, compensation of the existing users and the provision of appropriate terminal facilities.	Cost is of the order of €130 million. Land is already owned and terminal facilities in place.
Environmental	Baldonnel has a number of considerable noise issues particularly as aircraft would over fly substantially populated areas of Dublin	10L-28R could be operated in a number of modes to mitigate noise impacts. The population affected would be smaller.
Commercial	Opportunity for competition.	
	Risk that traffic would not develop at the second airport to a sufficient level either to meet national needs or disperse the environmental impacts as anticipated.	

TABLE 8 COMPARATIVE ASSESSMENT OF DEVELOPMENT OF EXISTING AERODROMES

8.5 New Site Alternative Options

8.5.1 The concept of providing a complementary airport in the Dublin area is compared with the parallel runway concept in Table 9.

Characteristic	New Complementary Airport	Preferred On site Option 10L/28R
Physical, Operational and Safety Issues	No current aviation infrastructure exists	The basic non-runway infrastructure is in place for passengers but will need enhancement for future passenger numbers.
	Operational airspace would have to be redesigned and, depending on location, may be restricted by military airspace. This may form a critical constraint.	Upper and lower airspace routes are already operational and established but would require new procedures
	The potential cost of purchasing property in extended Public Safety Zones could be significant	Public Safety Zones are already established for a parallel runway.
Catchment and Accessibility	By nature of how the Zones of opportunity were developed the catchment areas of both options is similar	
	Similarly access links to both road and rail infrastructure would be within around 2-4 kms but would require substantial capital investment.	Transportation infrastructure to the existing Dublin airport is established although continued expansion and improvement would be required.
Regional Planning and Economic	Could strengthen the local economy in other parts of Dublin.	The preferred option has been within regional planning focus for many years. Its development would continue to strengthen the local economy surrounding the airport.
Cost	The cost of a new complementary airport facility would be very substantial and require duplication of certain elements of infrastructure. A figure of approximately €5.5 million was used in the analysis supporting the White Paper on Aviation in the UK.	The cost of the runway is of the order of €130 million.
Environment	Two airport sites would occupy more land than a single airport and therefore a larger area would be subject to the adverse impacts of aviation (albeit at a lower level).	
Commercial	Opportunity for competition.	
	Risk that traffic would not develop at the second airport to a sufficient level either to meet national needs or disperse the environmental impacts as anticipated.	

TABLE 9 COMPARATIVE ASSESSMENT OF DEVELOPMENT OF A COMPLEMENTARY AIRPORT

8.5.2 The concept of providing a replacement for Dublin Airport is compared with the parallel runway concept in Table 10.

Characteristic	New Replacement Airport	Preferred On site Option 10L/28R
Physical, Operational and Safety Issues	No current aviation infrastructure exists	The basic non-runway infrastructure is in place for passengers but will need enhancement for future passenger numbers.
	Operational airspace would have to be redesigned and, depending on location, may be restricted by military airspace.	Upper and lower airspace routes are already operational and established but would require new procedures
	The potential cost of purchasing property in Public Safety Zones could be significant	Public Safety Zones are already established for a parallel runway.
	In the case of a major facility two runways would need to be provided with substantial land take (see environment).	Only one single runway needs to be provided
Catchment and Accessibility	By nature of how the Zones of opportunity were developed the catchment areas of both options is similar	Similar
	Similarly access links to both road and rail infrastructure would be within around 2-4 kms but would require substantial capital investment.	Transportation infrastructure to the existing Dublin airport is established although improvements will be required as traffic grows.
Regional Planning and Economic	The impact of a new major airport facility is not currently within regional planning and could potentially have disruptive effects on local established economies. In particular the closure of the existing site could result in causing a significant change in deprivation index and to the prosperity of businesses in the area surrounding the business and indirect job losses.	The preferred option has been within regional planning focus for many years. It development would continue to strengthen the local economy surrounding the airport.
Cost	The cost of a new "greenfield" twin runway airport facility would be very substantial and would need to include general both land and airside facilities. A figure of approximately €7 million was used in the analysis supporting the White Paper on Aviation in the UK.	The cost of a new runway and the associated infrastructure would have a lower capital cost as it could make use of existing asests.
Environment	No difference in extent of impact, although impact would be significant in new location.	Existing impacts.
Commercial	No difference in competition or overall benefits if relocation costs are neglected.	No transitional costs.

TABLE 10 COMPARATIVE ASSESSMENT OF DEVELOPMENT OF A REPLACEMENT AIRPORT

8.6 Summary of Evaluation

8.6.1 The summary of the evaluation has been arranged by allocating the comparisons made into three tiers as follows.

Tier 1: Factors that are of such significance and magnitude of negative impact for the site being assessed that, even taken in isolation, this results in the alternative option being assessed as being less attractive that the Proposed Development. In some cases, there may be more than one such factor.

Tier 2: Factors that have a significant impact on the attractiveness of the option, but do not necessarily constitute a principal reason for rejecting the option (i.e. options that do not fall within Tier 1 for the site being considered.

Tier 3: Factors which though not necessarily insignificant, do not play a substantial part in rejecting the Option and fall outside Tiers 1 and 2.

Option	Sub Options	Tier 1: Principal reason(s) for rejection of this Option Compared with Preferred Concept	Tier 2: Secondary Disadvantages	Tier 3: Other Issues	Notes
Increased use of other Civil Airports in Ireland		✈ Does not meet the demand forecast in the location where it arises.		National Spatial Strategy	
Improved use of the existing infrastructure at Dublin Airport (short of construction of a new or extended runway)		✈ Does not meet the demand forecast.			
Alternative locations for the second runway at Dublin Airport	Extension of Runway 11-29	✈ Cost effectiveness. ✈ Inferior capacity and aeronautical performance. ✈ No significant environmental advantages in realistic and comparable operational modes.	✈ Impact on existing facilities; ✈ Impact on development potential of maintenance area. ✈ Reduced flexibility of operation ✈ Not compatible with county plan.	✈ Cost, but detailed analysis shows no savings.	
Provision of a single runway elsewhere in the greater Dublin Area.	Baldonnel Aerodrome	✈ Not in the ownership of Dublin Airport. ✈ No obvious environmental benefit with the impact of both noise and hazard being worse than a parallel runway at Dublin Airport. ✈ Cost.	✈ Split site operations ✈ Duplication of Costs ✈ Greater overall land take ✈ Commercial viability. ✈ Costs associated with displacing military facilities.	✈ Competition might be possible, but in practice the dominant position of any existing airport limits the opportunity for a secondary airport to compete. ✈ Environmental impact associated with displaced military facilities.	Cost of developing existing aerodromes remains high as existing facilities are unsuitable

Option	Sub Options	Tier 1: Principal reason(s) for rejection of this Option Compared with Preferred Concept	Tier 2: Secondary Disadvantages	Tier 3: Other Issues	Notes
Provision of a single runway elsewhere in the greater Dublin Area.	Gormanston Aerodrome	✈ Not in the ownership of Dublin Airport. ✈ Cost of development. ✈ Cost of overcoming constraints on site.	✈ Split site operations ✈ Duplication of Costs ✈ Greater overall land take ✈ Commercial viability.	✈ Competition might be possible, but in practice the dominant position of any existing airport limits the opportunity for a secondary airport to compete.	Cost of developing existing aerodromes remains high as existing facilities are unsuitable
	New Aerodrome	✈ Not in the ownership of Dublin Airport. ✈ Cost. ✈ No clear environmental benefits.	✈ Split site operations ✈ Duplication of Costs ✈ Greater overall land take ✈ Commercial viability.		
Replacement of Dublin Airport on a new site	Baldonnel Aerodrome	✈ Not in the ownership of Dublin Airport. ✈ Cost. ✈ No obvious environmental benefit overall.	✈ Interim arrangements. ✈ No increase in competition.	✈ Acquisition of the Land.	Cost of developing existing aerodromes remains high as existing facilities are unsuitable
	Gormanston Aerodrome	✈ Not in the ownership of Dublin Airport. ✈ Cost	✈ Limited environmental benefits. ✈ Interim arrangements. ✈ No increase in competition.	✈ Acquisition of the Land.	Cost of developing existing aerodromes remains high as existing facilities are unsuitable
	New Aerodrome	✈ Not in the ownership of Dublin Airport. ✈ Cost. ✈ No obvious environmental benefit overall.	✈ Interim arrangements. ✈ No increase in competition.	✈ Acquisition of the Land.	

9. CONCLUSIONS

9.1 Introduction

9.1.1 The concept of parallel runways was established in the development of the Master Plan for Dublin Airport in the 1960's. This concept has been validated at each subsequent update of the Master Plan and is incorporated within the provisions of the county plan.

9.1.2 In addition, Aer Rianta (now the Dublin Airport Authority) has carried out a number of studies over the years into alternative approaches for runway capacity. As part of the process of preparing the Environmental Statement, these alternatives have been reviewed and updated.

9.2 Concept Options

9.2.1 The following Concept Options as an alternative to the provision of a northern parallel runway have been identified:

- Increased use of Other Airports
- Improved Use of the Existing Infrastructure
- Alternative locations for the second runway at Dublin Airport
- Provision of a single runway elsewhere in the greater Dublin Area
- Replacement of Dublin Airport on a new site

9.3 Assessment of Concept Options

9.3.1 These concept options have been identified, their key characteristics identified and compared with the northern parallel runway concept.

9.3.2 A summary of the comparison follows:

Increased use of Other Airports

9.3.3 The recent survey undertaken by the DTO confirms that most (approximately 80%) of the passengers using Dublin Airport have origins or destinations such that an Airport in greater Dublin would be more convenient than other airports.

9.3.4 Relying on the growth of other airports would therefore either not serve the demand or would require increased surface access provision, together with the associated environmental impacts.

9.3.5 This concept is therefore not preferable to the parallel runway concept.

Improved Use of the Existing Infrastructure

9.3.6 The existing three runway system at Dublin Airport was studied by NATS. The conclusion of this study was that there are no improvements to infrastructure or procedures that can deliver significant additional capacity without a major runway development project.

9.3.7 This concept therefore does not provide the capacity required and is therefore not preferable to the parallel runway concept.

Alternative locations for the second runway at Dublin Airport

9.3.8 Although, in theory, there are many options for a second main runway at Dublin Airport, in practice only two options are considered sufficiently compatible with the local development plan to be feasible. These are the extension of Runway 11-29 and the replacement of the existing 11-29 with a parallel runway 10L-28R as set out in the County Plan.

9.3.9 These two options were compared in Scott Wilson's report "Dublin Airport - Options for Delivering Additional Runway Capacity" (2003).

9.3.10 This report concluded that there are no obvious environmental benefits of the 11-29 extension option.

9.3.11 In addition, the extension of 11-29 has a number of significant disadvantages compared with the preferred option which include:

- Less capacity;
- Less operational flexibility
- More impact on other facilities within the airport
- Less likely to be given planning permission, as it has been part of the County Plan since 1972 and therefore does not extend the footprint and impact of the aerodrome beyond areas set out in Local Planning Guidance.

9.3.12 The Runway 11-29 extension option therefore provides an inferior facility, with neither environmental nor cost benefits. The option to extend 11-29 is not preferable to the parallel runway concept.

Provision of a single runway elsewhere in the greater Dublin Area

9.3.13 Provision of a runway elsewhere in the Dublin area could either take the form of a new single runway airport or change of use of an existing airfield to civil use. In either case, to provide the benefits to air transport of the preferred scheme, substantial investment in the runway would be required together with supporting infrastructure. It is very unlikely that the costs of any such scheme would be less than the proposed scheme.

9.3.14 In terms of the environment, land use related impacts such as archaeology and ecology would be greater than the preferred scheme of development of a parallel runway at Dublin Airport, because the total combined area of land devoted to airport use would be increased. Noise impacts might be less than the preferred option in the case of a new airfield, but only at the expense of increased travel distances and road use as the site would be further from central Dublin.

9.3.15 This option is therefore not preferable to the parallel runway concept because of its total cost and because those increased costs bring no significant environmental gain overall.

Replacement of Dublin Airport on a New Site

9.3.16 This option would seek to substitute the environmental impacts of the existing airport by moving the whole airport to another site. This would only provide a net environmental gain should there be a site where:

- the impacts of operations, such noise, would affect fewer people,

- the value of the site, including, for example, its setting, history and ecology, would be of lower value than the value of the land released from the airport,

- the impact of access, such as travel distances, would not be increased.

9.3.17 To justify the costs of such a development, which would be very large, the environmental benefits would have to be very significant. This is not likely because:

- any site sufficiently close to Dublin to offset increased access impacts would be likely to have a similar impact on the surrounding communities as the existing airport,

- sites away from developed areas often have high ecological value, and conversely sites of low ecological value are those where there is development.

9.3.18 This option is therefore not preferable to the parallel runway concept because of its total cost and because those increased costs bring no significant environmental gain overall.

9.4 Summary of Findings

9.4.1 In all cases the alternative concepts were not found to be preferable to the northern parallel runway option.

Appendix A
Glossary of Terms for Constraint Mapping

GLOSSARY

Areas of Opportunity (AOO's):

Areas of minimal constraint, defined by an agreed threshold, suitable for supporting a major airport development.

Buffer

An equidistant envelope boundary of a specified distance around a point or linear feature.

Constraint:

A physical/social/economic variable that affects site location.

Constraint Mapping:

Within each criteria a specific location or pixel will present a certain amount of benefit in terms of locating an airport. In order to allow comparisons of locations, values of one to five are applied to each pixel for each criteria. One indicates that the site is poor with respect to the given criteria, and five indicates the site is good.

Each constraint is stored in its own GIS layer.

When a constraint is presented in a constraint map, a geographic location with a high value is interpreted as a better site for the location of an airport as compared to a location with a lower value.

Conservation Areas

Includes such as

AONB	Area of Outstanding Natural Beauty
Ramsar	Wetland of International Importance (designated under the Ramsar Convention)
SPA	Special Protection Area
SAC	Special Area of Conservation
SSSI	Site of Special Scientific Interest

Density Mapping:

Information on how constraints vary around a zone of opportunity is illustrated through density mapping. Contours of decreasing values (or opportunity) at the periphery of zones of opportunity illustrate the best directions in which to expand the site search.

Discipline:

Disciplines are the broad groupings used in the sensitivity analysis to weight the individual criteria. An analysis is run for each Sensitivity Discipline where the associated criteria are weighted by doubling their value within the analysis. The Sensitivity Disciplines consist of:

- Environment

- Construction Cost
- Commercial
- Socio-economic
- Access

Filter Matrix:

A pixel size of 500m x 500m is an insufficient area within which to build an airport. To eliminate small zones of opportunity of just a few pixels a filter matrix is applied. For each pixel this analyses the surrounding pixels within a 1500m radius, if the majority of these are not classed as zones of opportunity the pixel is removed.

GIS:

A Geographical Information System, which stores data by geographic location. Each variable is held as one GIS layer. Multiple layers can be overlain with one another.

Data is stored for this study as two feature types: Points and Polygons.

Each item of data may have other information attached; in effect each layer has a database related to it.

Occurrence Index:

Zones of opportunity from the weighted constraint mapping developed in the sensitivity analysis are overlain. By counting the number of times these zones appear in the same location an occurrence index can be built. A high result indicates that a single location produces a zone of opportunity in all weighted analyses and it is therefore a robust zone.

Opportunity Index:

A numeric value that is derived from the sum of total constraint values for a geographic location. This may be expressed as an absolute value or as a percentage of the maximum possible score (maximum value in each constraint).

Pixel Size:

To analyse a combination of constraints a grid of pixels is produced in the spatial analysis software. Each pixel represents an area on the ground and is assigned a value based on a constraint value or sum of constraints. The pixel size is crucial in determining the following:

Accuracy…a larger pixel size averages boundaries to a greater extent.

Speed…The smaller the pixel, the more time the computer will take during analysis and the larger the resulting files will be.

A pixel size of 500m x 500m is used in this study.

Robust Areas:

To evaluate the methodology of the combined constraint mapping a series of sensitivity tests are carried out. This involves combining constraints into five disciplines, and producing a combined constraint map for each. A different discipline is given greater weighting in each of these maps. Areas of opportunity from each analysis are then compared to see the effect of weighting and therefore give an indication of robustness.

Significance Values:

Each criterion exists in varying degrees. Significance values are applied to signify this variance and enable a comparison between sites.

Showstopper:

A geographic location which contains a constraint that precludes it from further consideration.

Spatial Maps:

Cartographic illustration of the distribution of constraint values or sum of constraints over the South East and East Region. Hardcopy maps are the output. All of the data is stored within the GIS and can be interrogated on demand and printed at any desired scale or format.

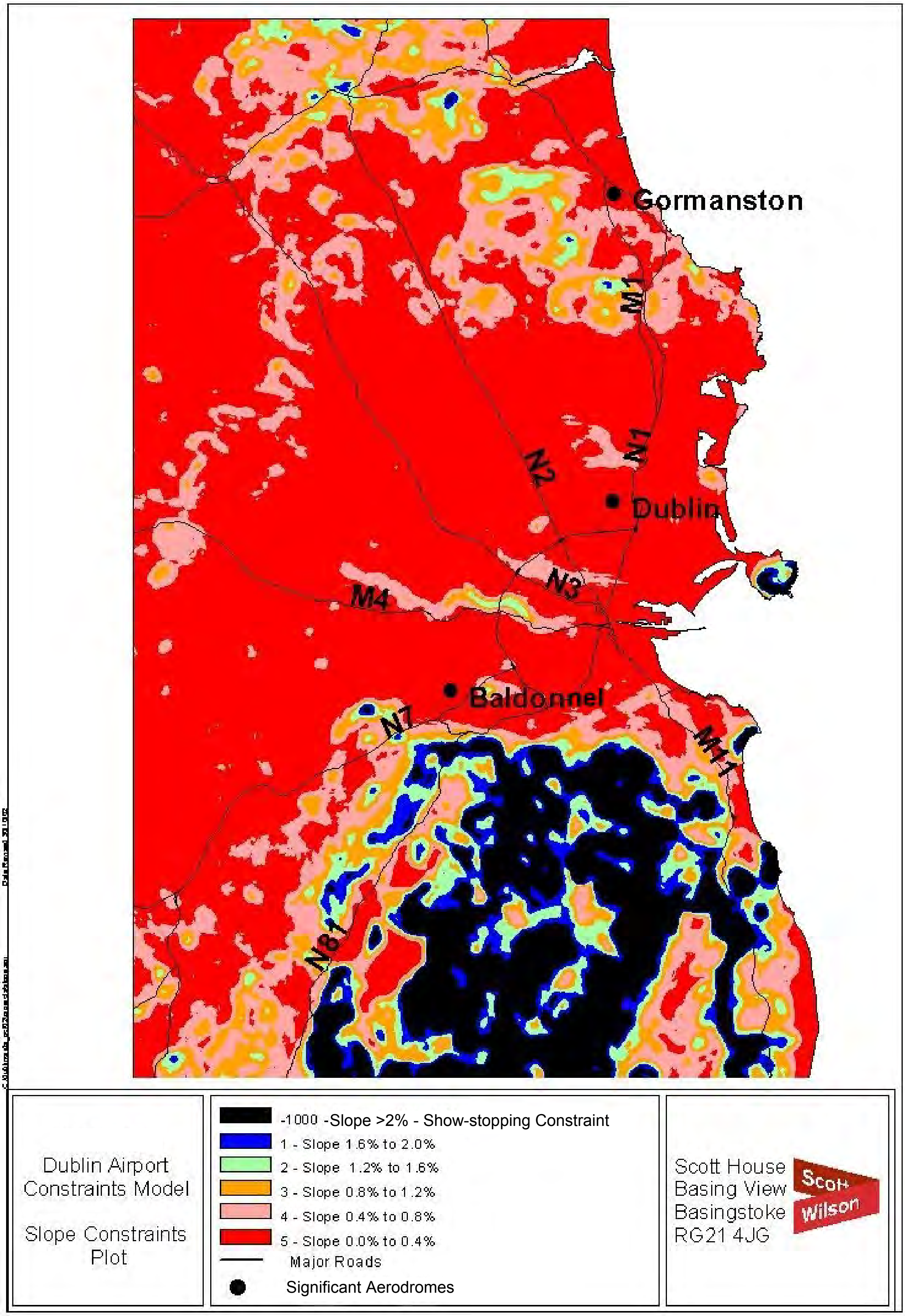
Weighting:

It is necessary to weight specific constraints within individual disciplines in the sensitivity tests. By increasing the importance of specific constraints simply by doubling the constraint values (1=2, 2=4, 3=6, 4=8, 5=10) they will have a more significant effect on the weighted combined constraint map.

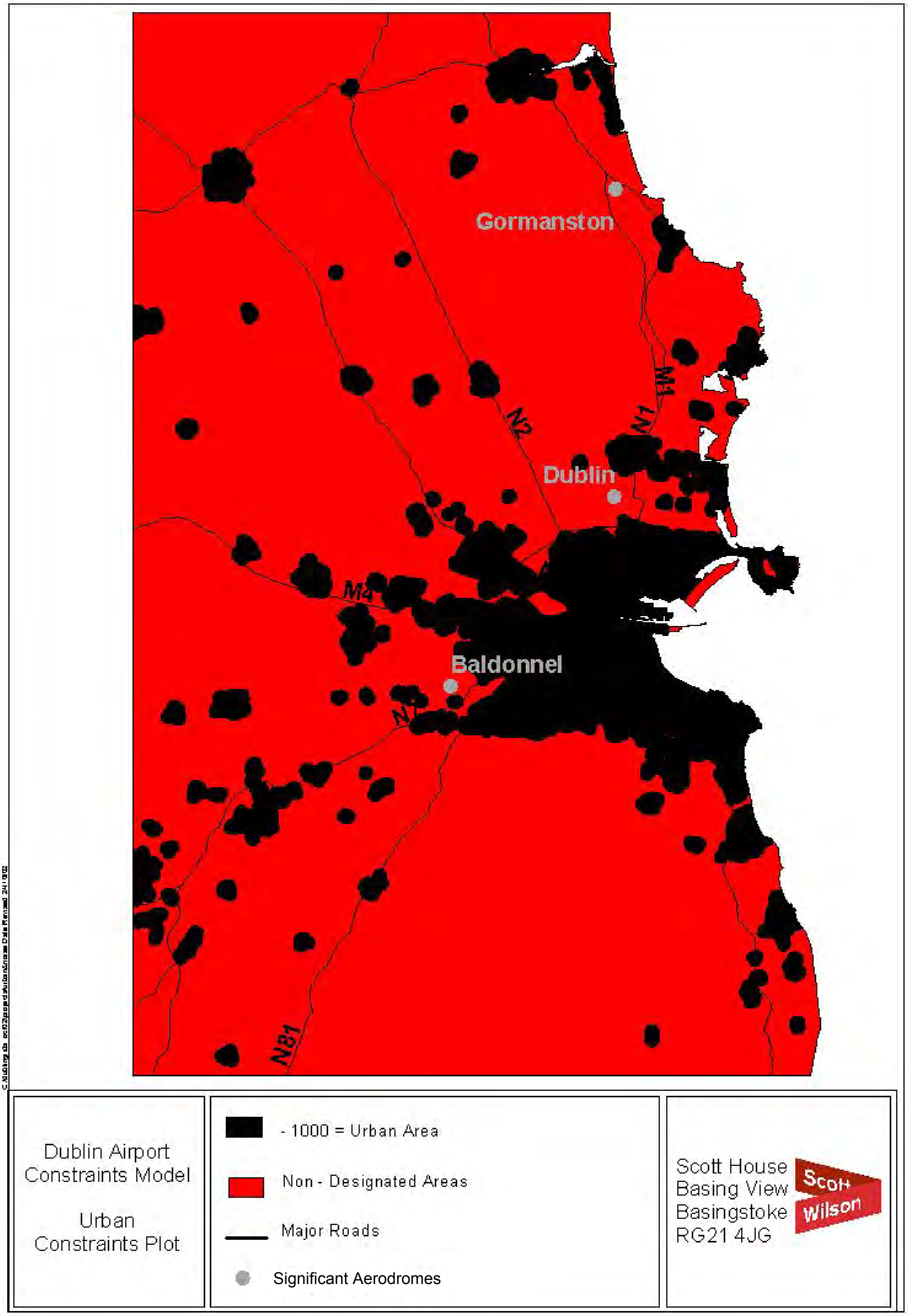
Zones of Opportunity :

Areas of least constraint and therefore good areas, relatively speaking, for the location of an airport facility.

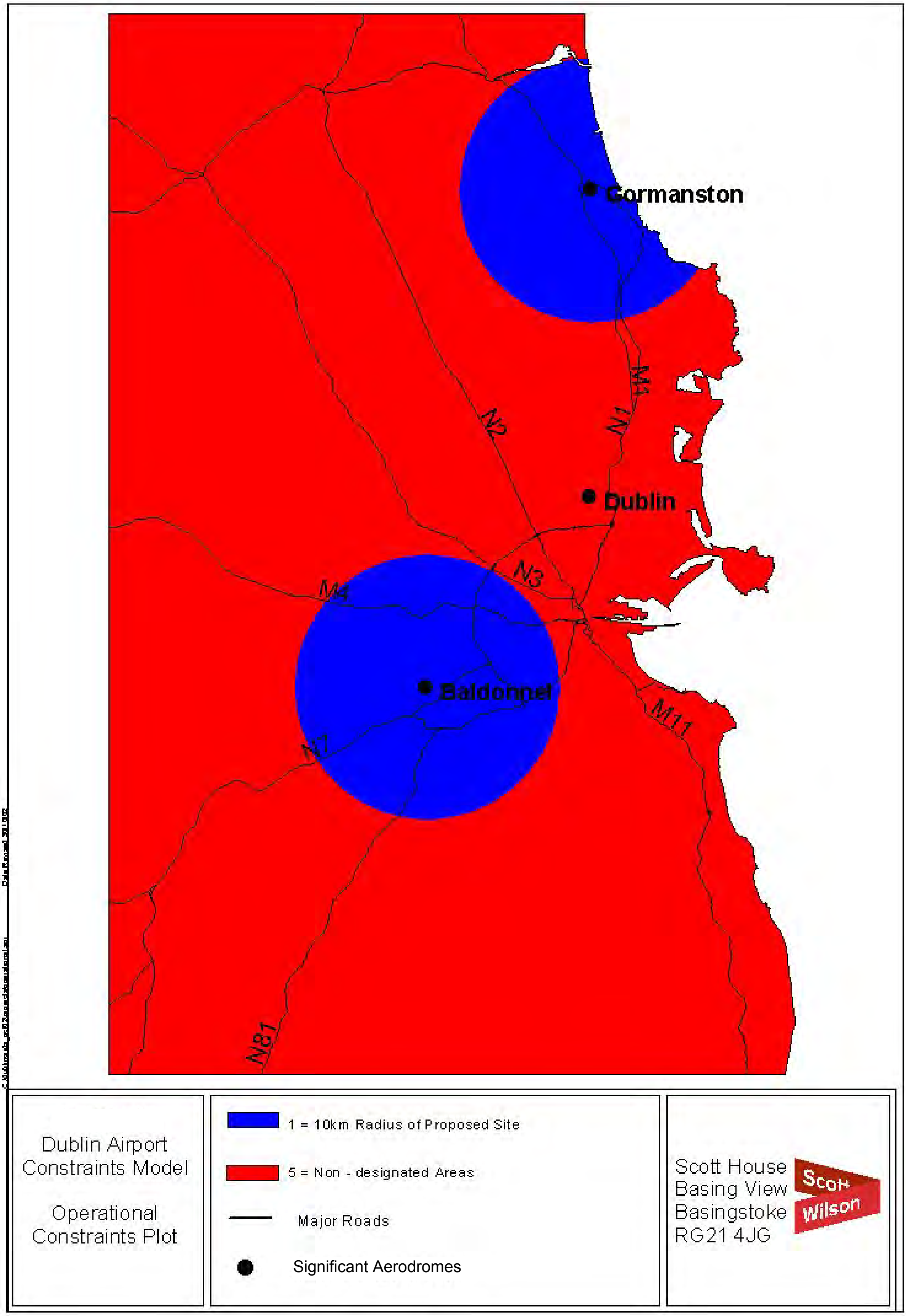
Appendix B
Constraint Mapping



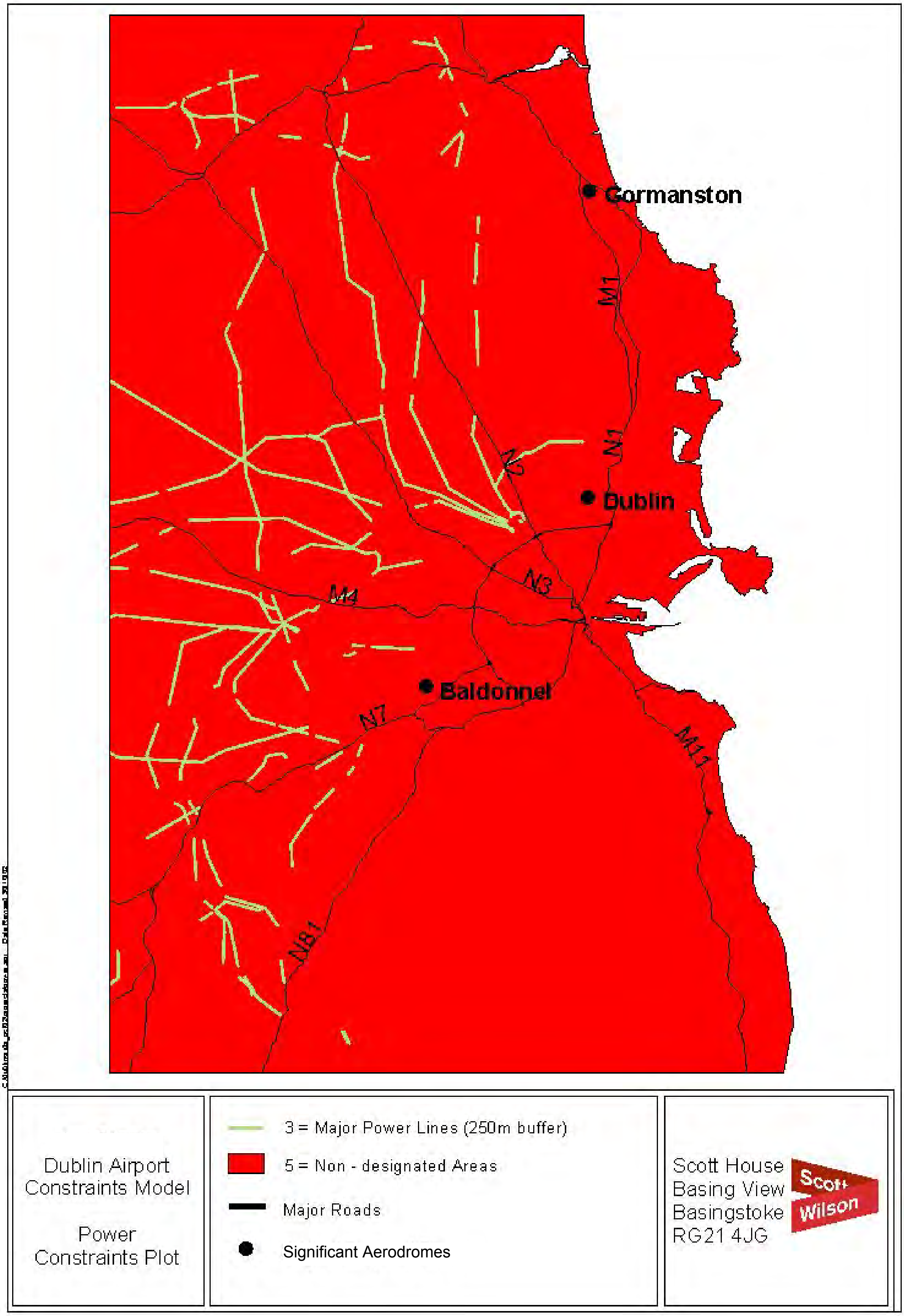
MAP 1 SLOPE CONSTRAINTS



MAP 2 URBAN CONSTRAINTS

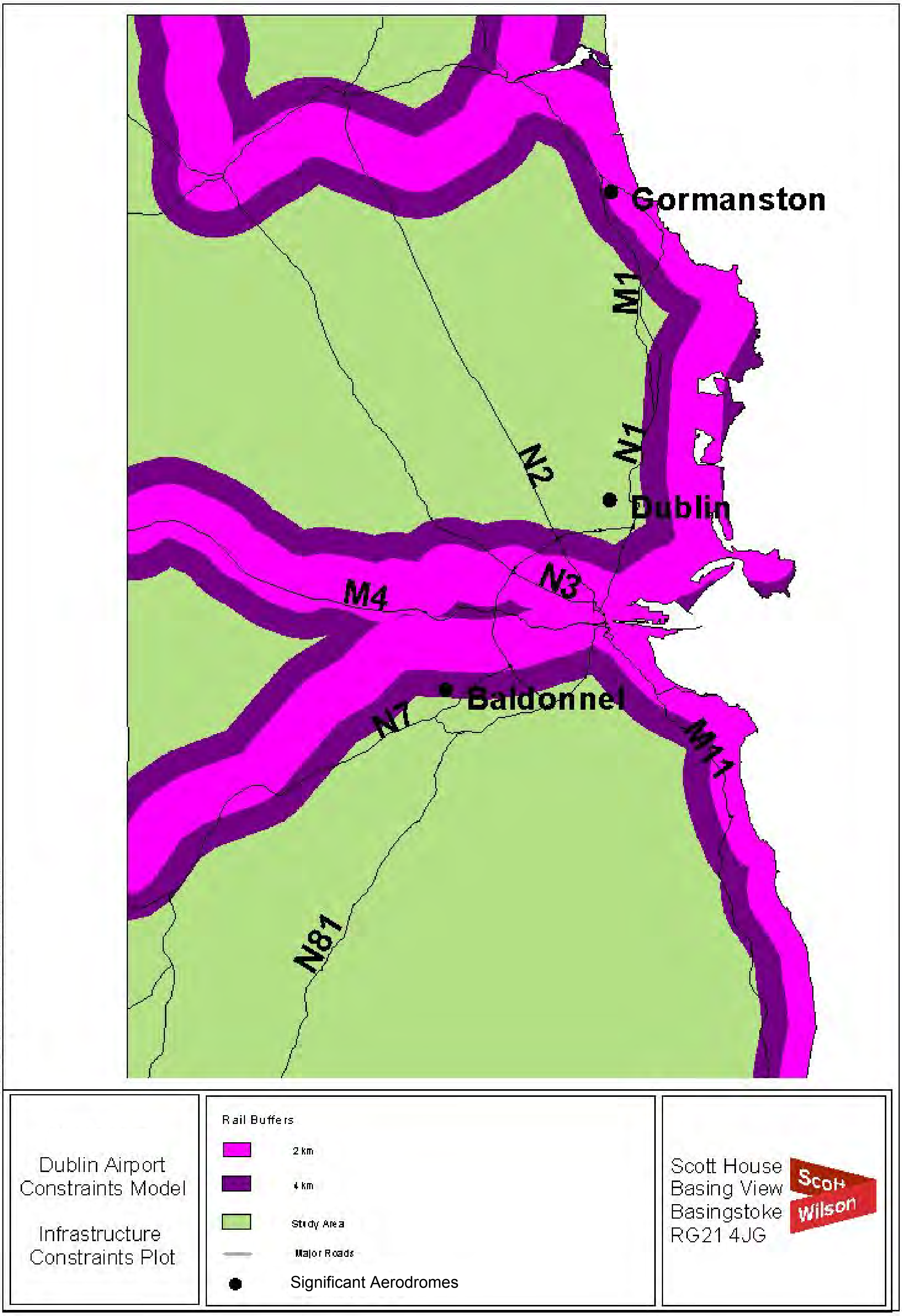


MAP 3 BALDONNEL AND GORMANSTON SIGNIFICANT AIRFIELDS

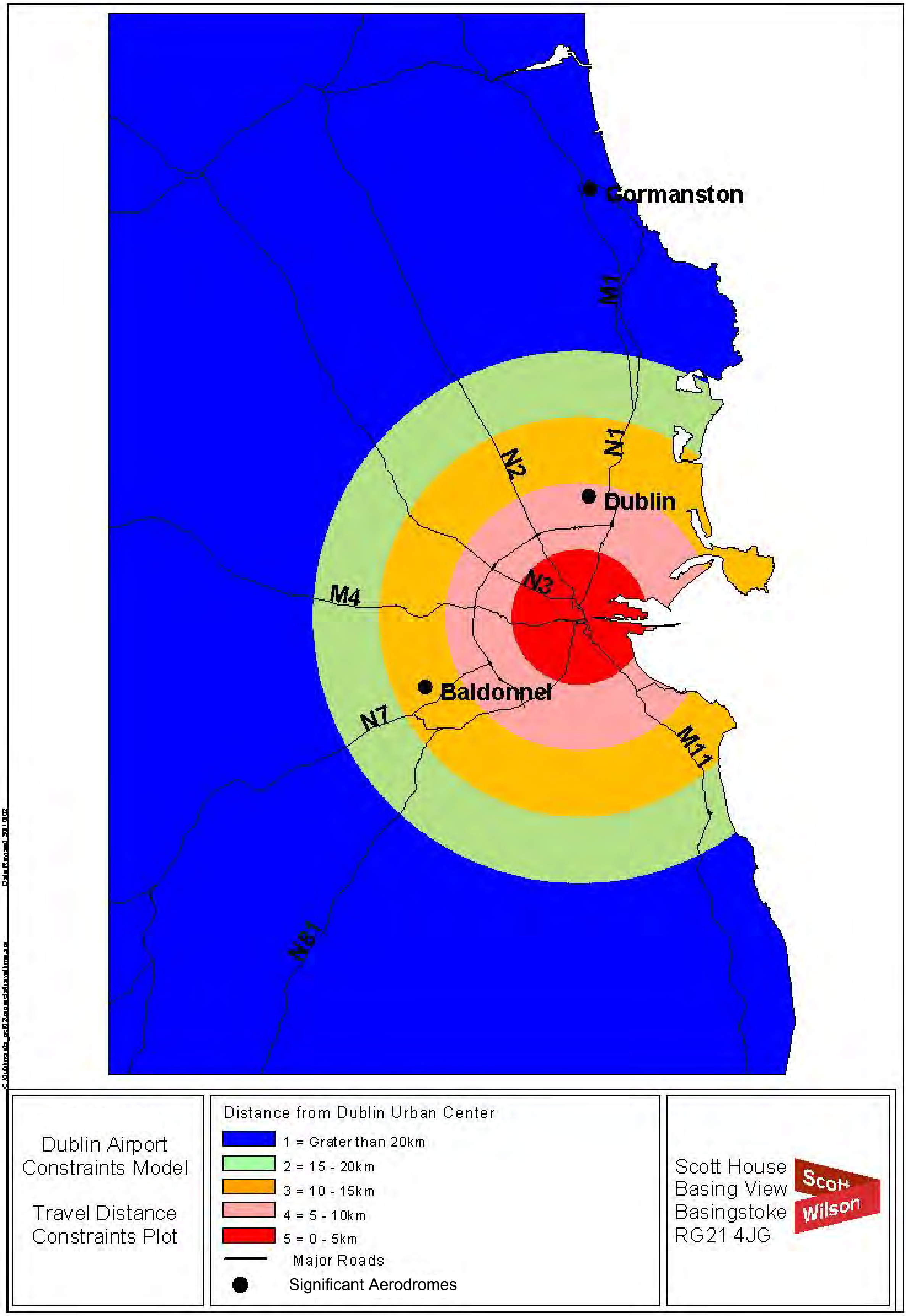


MAP 4 OVERHEAD POWER TRANSMISSION LINES

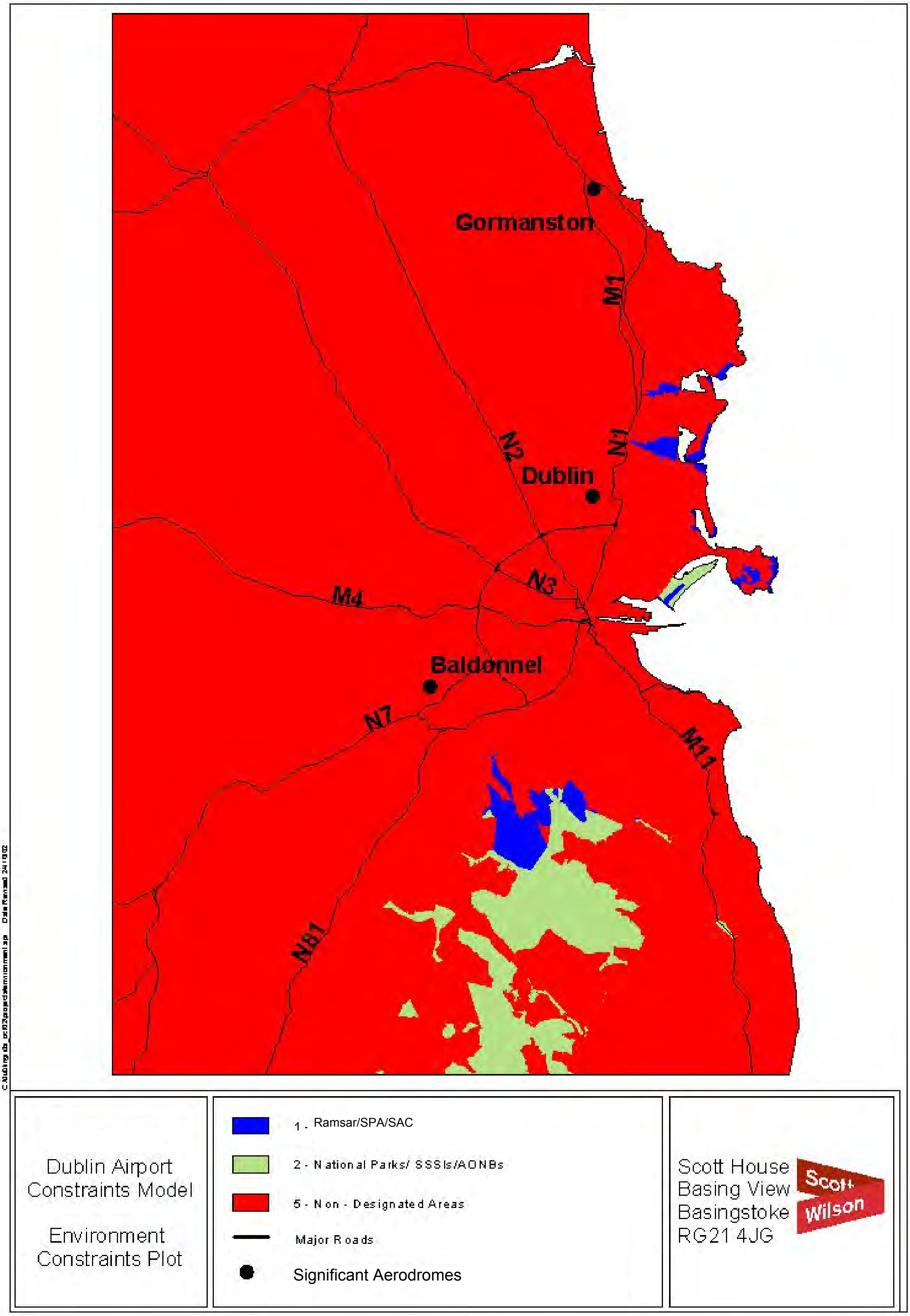
MAP 5 MAJOR ROADS



MAP 6 RAIL NETWORK

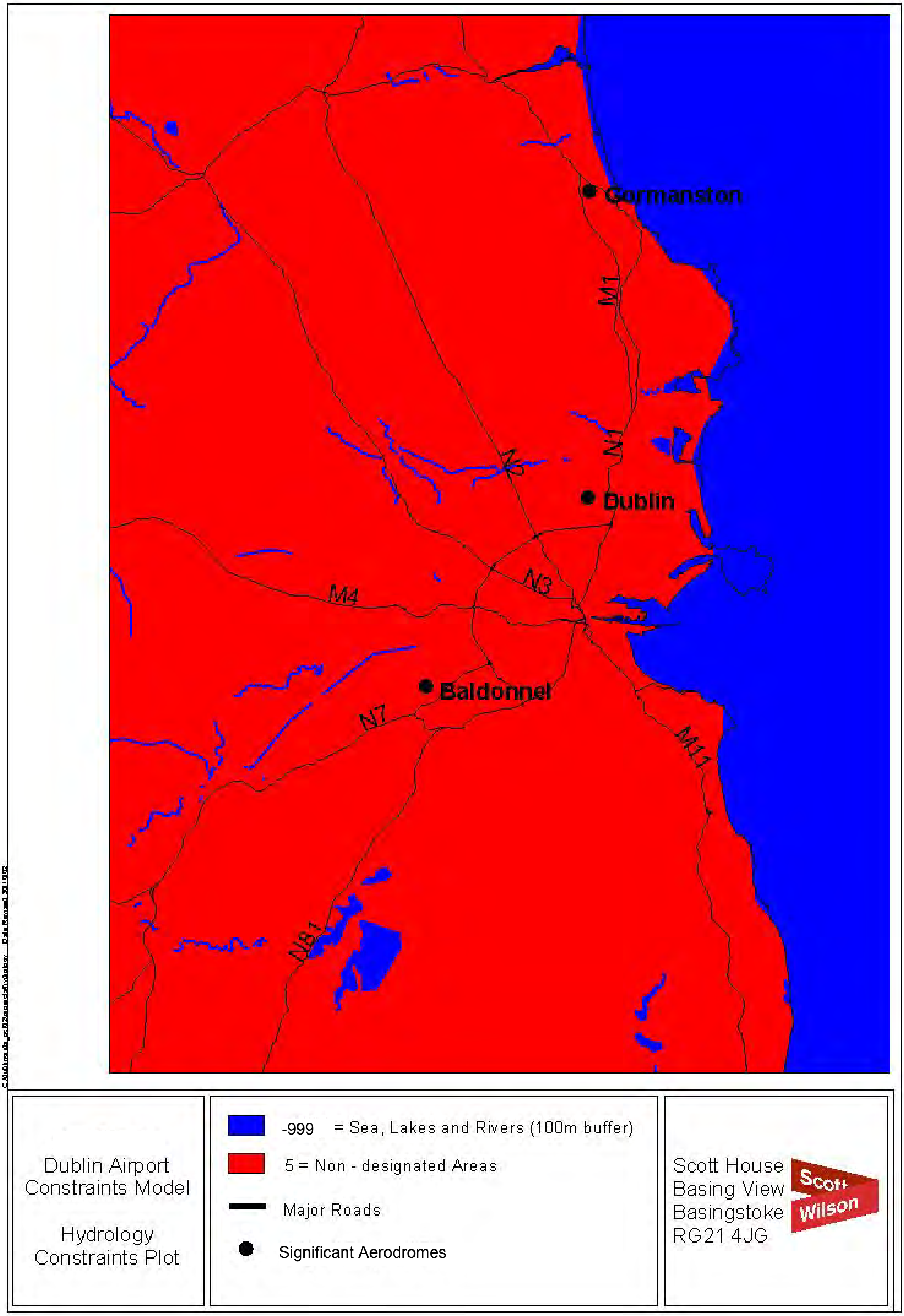


MAP 7 PROXIMITY TO CENTRAL DUBLIN

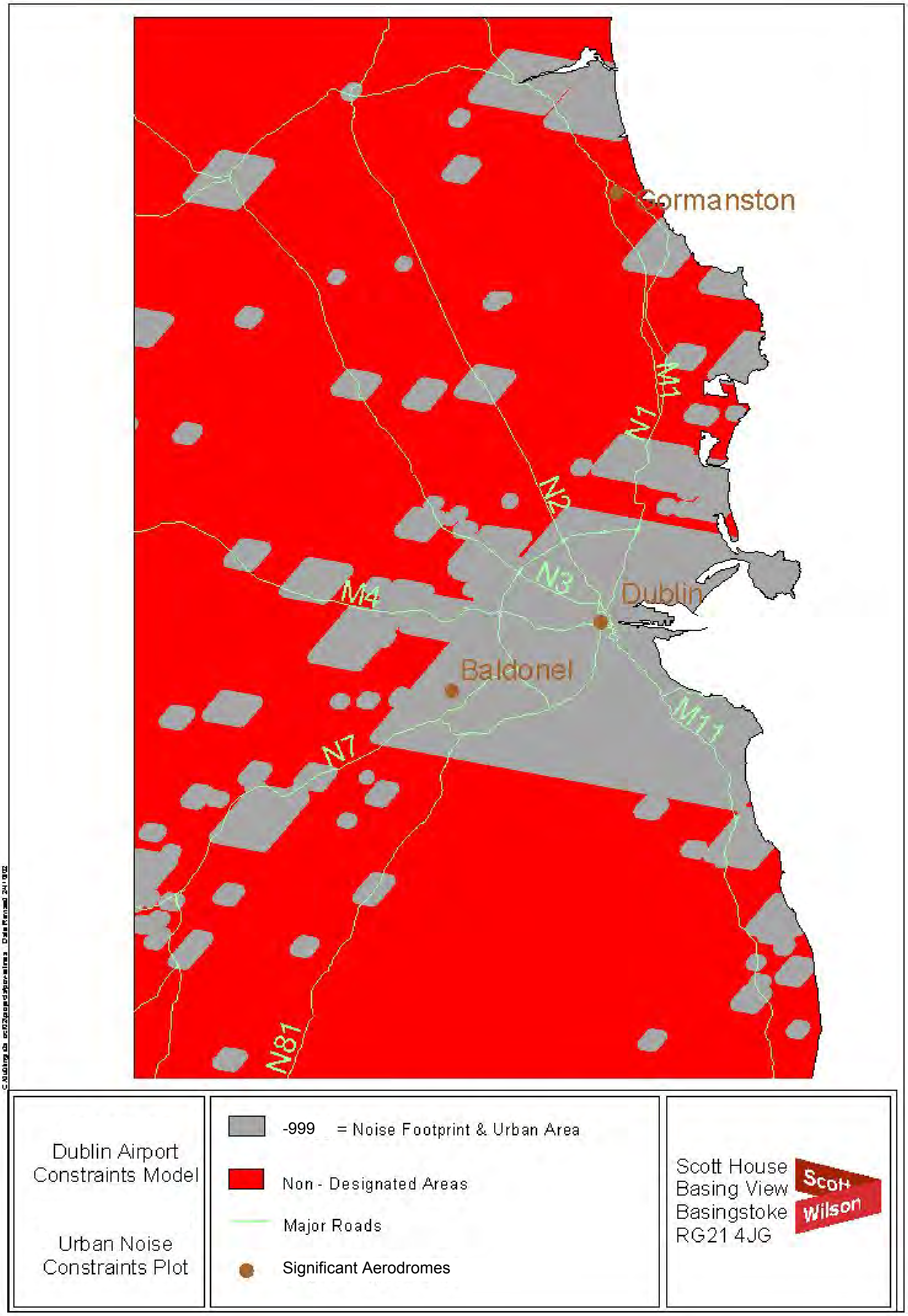


MAP 8 DESIGNATED CONSERVATION AREAS

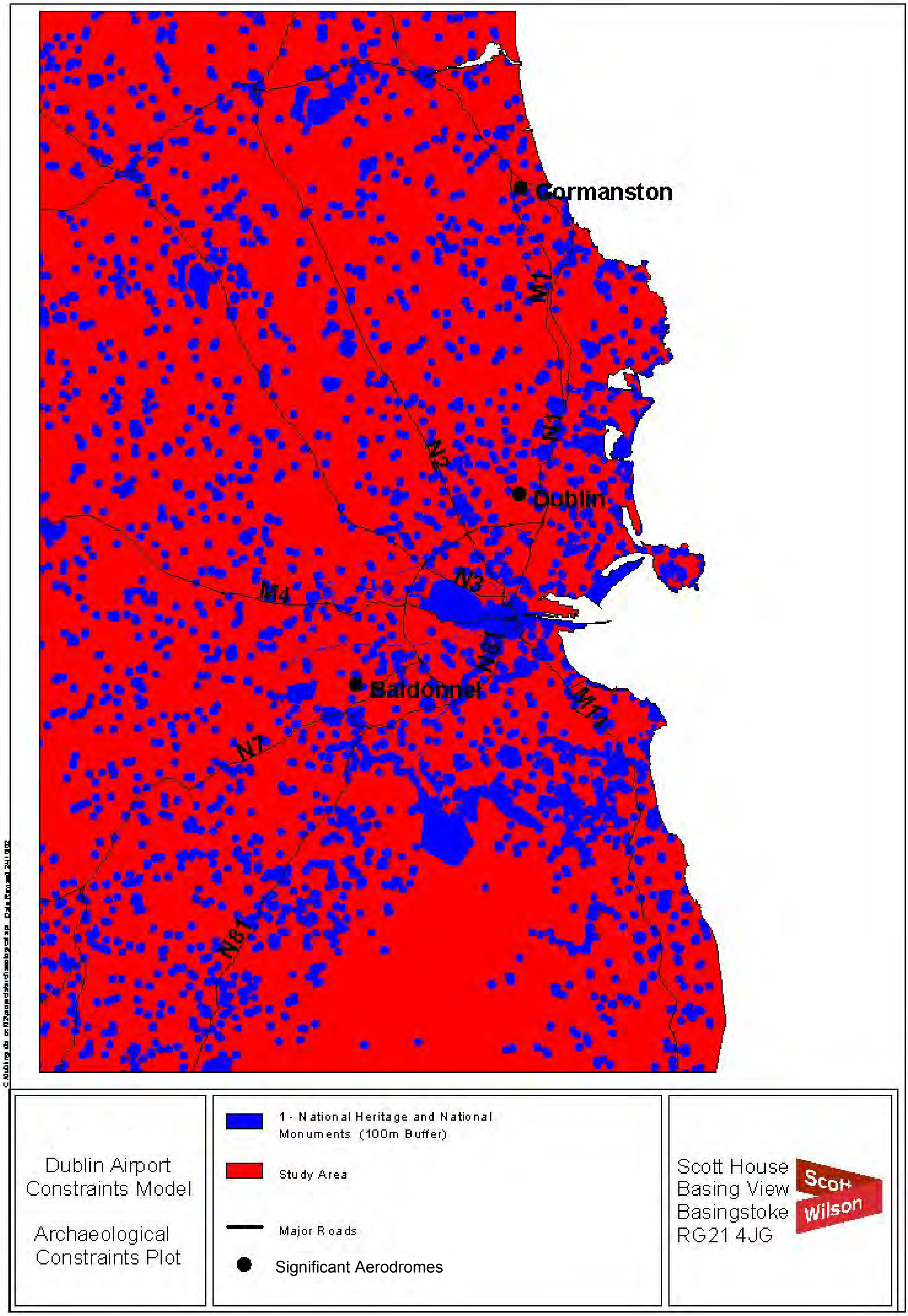
Note – Abbreviations for Conservation Areas included in Appendix A



MAP 9 WATER RESOURCES



MAP 10 URBAN NOISE CONSTRAINT



MAP 11 HERITAGE CONSTRAINTS

Aer Rianta

Dublin Airport
Options for Delivering Additional Runway Capacity

Final

April 2003

AER RIANTA

DUBLIN AIRPORT
OPTIONS FOR DELIVERING ADDITIONAL RUNWAY CAPACITY

FINAL

Issue No.	Status	Date	Prepared by	Reviewed by	Approved for Issue
1	Draft	21/01/03	AI Evans	AJ Stacey	AI Evans
2	Draft Final	26/02/03	AI Evans	CE Hudson	AI Evans
3	Draft Final	06/03/03	AI Evans	AI Evans	AI Evans
4	Final	25/04/03	AI Evans	AI Evans	

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KECSB/April 2003

AER RIANTA

DUBLIN AIRPORT
OPTIONS FOR DELIVERING ADDITIONAL RUNWAY CAPACITY

FINAL

CONTENTS

TABLES INCLUDED IN THE REPORT

FIGURES INCLUDED IN THE REPORT

EXECUTIVE SUMMARY

Existing Situation

1. Dublin Airport has three runways. These are the Main Runway (10-28), which is 2,637m long; a Cross Runway (16-34), which is 2,072m long and a Short Runway (11-29), which is 1,357m long and suitable only for aircraft up to the size and weight of a BAe 146.
2. The planning of the airport has been based on the replacement of the short runway with a new runway parallel to the Main Runway to increase capacity when required.

Existing Capacity

3. To validate the approach to long-term planning and quantify the capacity of the airfield, National Air Traffic Services (NATS) carried out a detailed study of the airfield. Estimates of the increase in capacity available from the existing runway system without major investment in runway infrastructure range from 4 to 10 additional declarable movements per hour. The value actually achieved depends on improvements in procedures by Air Traffic Control and Airlines some of which are complex. Therefore the higher value may not be deliverable in practice.
4. The primary factors limiting the existing capacity are:
   - ✈ The restriction that the length of Runway 11-29 imposes on aircraft that can use it;
   - ✈ The inability to overcome the visual requirement on Runway 11-29; and
   - ✈ The complexities of the procedures to operate in mixed mode operation on Runways 10-28 and 11-29 that arise because the runways converge.
5. The NATS study therefore showed that there are no improvements that can be made, either in infrastructure or procedures, short of a major runway extension or a new runway, which can deliver significantly more capacity than is available from the existing Main Runway.

Options to Deliver Significant Additional Capacity

6. Two possible concepts for developing significant additional capacity were identified by the NATS Study for further review. These were:
   - ✈ Extension and upgrading of the existing near parallel runway 11-29, which overcomes the first two items listed in 4 above.
   - ✈ Provision of a replacement of runway 11-29 parallel to the existing main runway, which overcomes all the limitations above and, therefore, has a higher ultimate capacity.
7. These two concepts were compared, taking into account all relevant factors. The analysis shows that apart from the potential for reuse of the existing pavement and associated infrastructure in the case of the option to extend Runway 11-29, and therefore the potential reduction in capital cost, the option to provide a parallel runway is an equal or better option over a wide range of criteria.
8. In particular, a parallel runway has a greater ultimate capacity (43 movements per hour compared with 30 for an extension to Runway 11-29); greater operational flexibility; less impact on existing developments and facilities both inside and outside the airport; has no greater environmental impact; and is more likely to be given planning permission, as it does not extend the footprint and impact of the aerodrome beyond areas set out in Local Planning Guidance.

Cost Comparison

9. The significance of the potential cost reduction was examined by comparison of a number of options. In all cases, when the extent of improvement to the existing Runway 11-29, the land purchase required, and the replacement of other airport facilities were taken into account, the option to extend Runway 11-29 was found to be at least as expensive as a new parallel runway.

Conclusion

10. The parallel runway option has a greater capacity and a similar level of cost to that of the alternative of extending Runway 11-29. This means that the parallel runway option is significantly (over 40%) more cost-effective and it is recommended that this approach be adopted.

1. INTRODUCTION AND BACKGROUND

1.1 Introduction

1.1.1 Dublin Airport has experienced a period of sustained growth in traffic over the last decade. This has taken passenger throughput from 5.8 million passengers and some 123,000 ATM in 1990 to 13.8 million passengers and 180,000 ATM in 2000.

1.1.2 Master planning studies undertaken in the 1960's concluded, on the basis of substantial increases in air traffic during the 1960's and growth forecasts, that two parallel runways, orientated East/West, should be constructed at Dublin Airport. Accordingly, the land acquisition process was commenced and the necessary consultative process initiated with Dublin County Council. This resulted in the incorporation of the plans for two parallel runways in the 1972 County Development Plan. As such, planning restrictions have been in place since 1972, safeguarding the development of two parallel runways and restricting other development.

1.1.3 The Southern Parallel Runway was constructed in 1989 to meet forecasted demand for the following 10/15 years. On the basis of continued forecast growth, it is now appropriate to set in hand plans to construct the Northern Parallel Runway contemplated in the 1960's.

1.2 Purpose of this Report

1.2.1 As part of the Northern Parallel Runway project, other options to increase capacity at Dublin Airport have been considered as part of the process to validate the concept set out in the Master Plan.

1.2.2 This report has been prepared to consolidate the various pieces of work that have been carried out to validate the preferred concept for providing additional runway capacity at Dublin Airport.

1.3 Arrangement of this Report

1.3.1 In Chapter 2, the existing runway system is described. Benchmarking with other airports has also been undertaken to compare the facilities provided to accommodate similar levels of traffic.

1.3.2 Chapter 3 provides a summary of the detailed study undertaken by NATS to establish the capacity of the existing main runway, the capacity of the existing aerodrome and the capacity potential of improvements in procedures and infrastructure. The options that could develop significant additional capacity are identified.

1.3.3 A qualitative appraisal of the alternatives identified in the NATS Study is set out in Chapter 4. This appraisal takes into account both aeronautical and non-aeronautical factors.

1.3.4 In Chapter 5 outline schemes are developed for costing purposes and the costs and cost-effectiveness compared.

1.3.5 The conclusions and recommendations of the study are set out in Chapter 6.

2. THE EXISTING FACILITIES AT DUBLIN AIRPORT

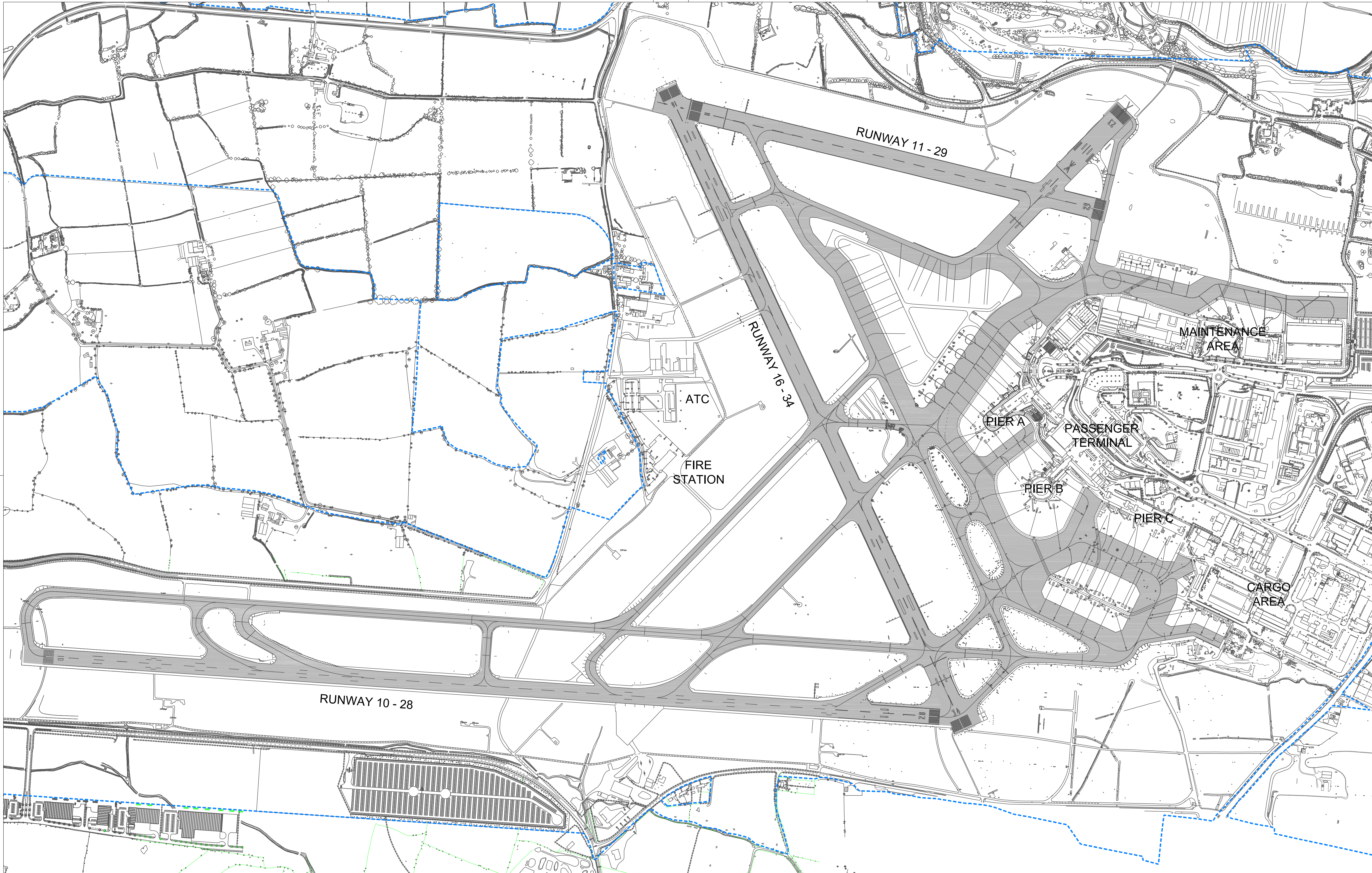
2.1 Introduction

2.1.1 Dublin Airport currently has three active runways. The layout of these is shown on Figure 1 and the characteristics of each given in Table 1.

Characteristic	Runway 10-28	Runway 16-34	Runway 11-29
Principal Use	Main Runway	Cross Wind Operations	Small and light aircraft
Construction History	Constructed in **1989** to replace Runway 05-23. No significant rehabilitation works	Constructed in **1946/7** and extended in 1949, 1959 and 1964. Rehabilitated in both the 1974/75 and 1999.	Constructed in **1946/7**. No significant rehabilitation works.
Paved Area (Length x Width) (m)	2637 x 45	2072 x 61	1357 x 61
Take Off Distance Available (TODA) (m)	2637	2072	1357
Take Off Run Available (TORA) (m)	2850	2255 (R/W 16) 2133 (R/W 34)	1418
Landing Distance Available (LDA) (m)	2637	2072	1254 (R/W 11) 1357 (R/W 29)
Strip Dimensions (m)	2757 x 300 wide	2192 x 300 wide	1479 x 213 wide
Pavement Classification (PCN)	70/R/B/W/T	75/R/D/W/T	26/R/D/W/T
Construction	370mm pavement quality concrete on 150mm dry lean concrete on 700mm unbound subbase and capping.	250mm concrete on subgrade with nominal 300mm bituminous overlay.	250mm concrete on subgrade. Overlaid at both ends to match levels of adjacent pavements.
Visual Approach Aids	Precision Approach Lighting System 900m long (High Intensity) PAPI	Precision Approach Lighting System 900m long (High Intensity) (R/W 16) Simple Approach Lighting System 455m long (Low Intensity) (R/W 34) PAPI	Simple Approach Lighting System 455m long (Low Intensity) PAPI
Instrumentation	Cat II (R/W 10) Cat IIIa (R/W 28)	Cat I (R/W 16)	Visual Operations only.

TABLE 1 – EXISTING RUNWAY CHARACTERISTICS AT DUBLIN AIRPORT

2.1.2 As can be seen from inspection of this table, Runway 11-29 is substantially shorter than the main runway. The impact of this is that only small aircraft can operate from this runway at commercially viable loadings. In broad terms, commercial operations on this runway are restricted to aircraft similar to the BAe 146 and smaller.



KEY

EXISTING LAND BOUNDARY

Revision Details	By / Check	Date	Suffix
RE-DRAWN	AP/ AIE	26.02.03	A

DUBLIN AIRPORT
RUNWAY 10L – 28R

Drawing Title

EXISTING AIRPORT LAYOUT

THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED AND ONLY WRITTEN DIMENSIONS SHALL BE USED

Drawing Number: KECSB/SK/20

FIGURE 1

Scale at A1: 1:5000

Drawn	Detailed		Approved
AP			A.I.EVANS
Checked	Tech Chk	Det Chk	Date
AIE			21.01.03

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AutoCAD File Name : K:\AIRPORTS\DUBLIN\KECSB\SK_20

DB1H

2.1.3 The Table also shows that the PCN of Runway 11-29 is 26/R/D/W/T compared with 70/R/B/W/T and 75/R/D/W/T for the main and cross runways respectively. The numerical value of PCN is a measure of the pavement strength and the difference in this case means that the weight of aircraft that can use Runway 11-29 without restriction is significantly more limited than for the other runways. In practice, this again restricts operations on this runway to aircraft with weights no greater than the BAe 146.

2.1.4 Runway 11-29 also has limited visual and navigational aids and is restricted to use when the weather conditions allow visual flight rules.

2.1.5 The flight paths of Runway 11-29 and Runway 10-28 intersect as shown on Figure 2 at approximately 4.5 nautical miles from the 28 threshold and this imposes limitations on the simultaneous use of the two runways.

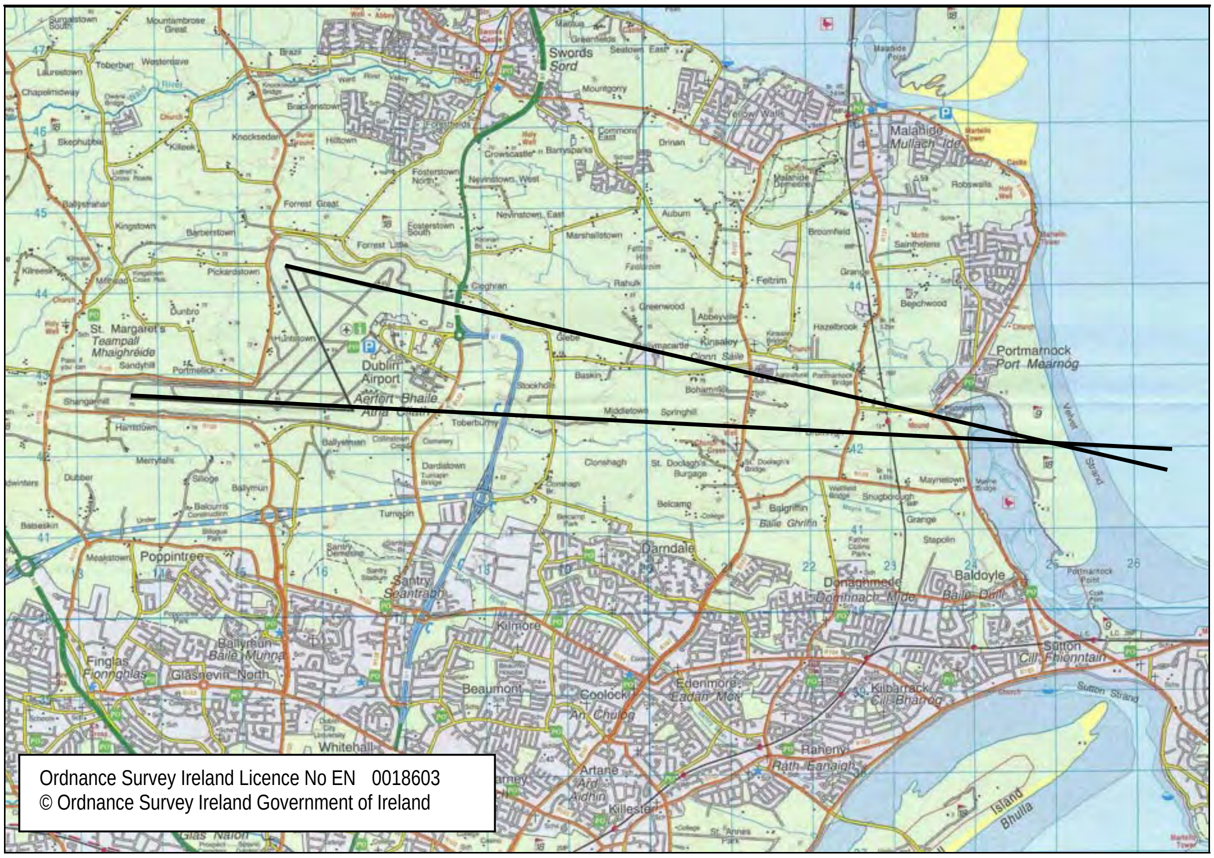

FIGURE 2 – CONVERGENCE OF RUNWAYS 10-28 AND 11-29

2.1.6 The usage of each of the runways between 1997 and 2001 is given in Table 2 and the breakdown of traffic on Runway 11-29 in Table 3. This shows the current very limited use of Runway 11-29 for commercial operations.

Runway	Movements 1997		Movements 1998		Movements 1999		Movements 2000		Movements 2001	
	Number	%	Number	%	Number	%	Number	%	Number	%
10	30,406	20.23	21,470	13.25	35,501	20.83	32,292	17.92	37,054	19.95
11	**2,595**	**1.73**	**1,067**	**0.66**	**2,463**	**1.45**	**2,413**	**1.34**	**2,038**	**1.10**
16	11,610	7.72	11,073	6.83	11,114	6.52	17,513	9.72	10,772	5.80
28	91,278	60.72	112,684	69.52	109,142	64.04	109,826	60.93	124,646	67.12
29	**7,491**	**4.98**	**7,380**	**4.55**	**5,425**	**3.18**	**6,697**	**3.72**	**4,478**	**2.41**
34	4,987	3.32	6,102	3.76	3,656	2.15	7,951	4.41	3,746	2.02
Helicopters	1,968	1.31	2,310	1.43	3,120	1.83	3,553	1.97	2,968	1.60
Total	150,335	100.00	162,086	100.00	170,421	100.00	180,245	100.00	185,702	100.00
Total 11-29	**10,086**	**6.71**	**8,447**	**5.21**	**7,888**	**4.63**	**9,110**	**5.05**	**6,516**	**3.51**

TABLE 2 – RUNWAY USAGE AT DUBLIN AIRPORT 1997-2001

Runway	Total Movements	Training		GA	Scheduled	Cargo	Positioning	Others	Typical Aircraft	
		Airline	GA						C150-182	PA23-34
11	2,038	104	1,369	373	143	19	17	13	955	598
29	4,481	89	2,839	988	363	92	65	45	1,991	1,343
Total	6,519	193	4,208	1361	506	111	82	58	2,946	1,941
% of Runway Movements	100.00%	2.96%	64.55%	20.88%	7.76%	1.70%	1.26%	0.89%	45.19%	29.77%
% of Overall Movements	3.51%	0.10%	2.27%	0.73%	0.27%	0.06%	0.04%	0.03%	1.59%	1.05%

TABLE 3 – USAGE OF RUNWAY 11-29 AT DUBLIN AIRPORT 2001

Abbreviations

GA – General Aviation C – Cessna Aircraft PA – Piper Aircraft

2.2 Planning for Increased Capacity at Dublin Airport

2.2.1 The concept of east-west parallel runways was established for Dublin Airport in the 1960's and provision was made for this development in subsequent County Plans. The first of these runways was opened in 1989.

2.2.2 Since that time the capacity of the existing runway system has been assessed, within the ongoing Master Planning process, as being that of a single runway. This is because:

- Simultaneous use of Runways 10 and 16 provides no increase in capacity, because of the converging nature of operations in easterly winds. Such operations would be required at least 20% of the time.
- The length and strength of runway 11-29 limit the size and weight of aircraft that can use it to the smaller commercial types such as BAe 146. This does not provide capacity for the bulk of the commercial traffic, which is Boeing 737 or equivalent and larger. The convergence of the runways also limits capacity.

2.2.3 To provide additional capacity beyond that of a single runway, the Master Plan continues to protect the ability to construct the northern parallel runway when it is required.

2.2.4 Other studies indicate that if current trends in traffic growth continue, then more runway capacity than that provided by a single runway will be required before 2010.

2.3 Benchmarking

2.3.1 Table 4 sets out the runway configuration for peer group airports.

2.3.2 As can be seen, those peer airports with higher levels of activity than Dublin, with the exception of London Gatwick, all have parallel runway configurations. London Gatwick is exceptional in so far as it serves one of the most densely populated parts of Europe and consequently has a mix of aircraft and services that gives an average uplift per movement very much greater than the average of the peer airports.

2.4 Summary

2.4.1 Should growth in traffic exceed the capacity of a single runway, as is forecast, then the Master Plan assumption is that the existing cross and short runways cannot provide long-term sustainable additional capacity.

2.4.2 In the case of the cross runway, this is because for approximately 20% of the time, when winds are from the east, it provides no more capacity than a single runway.

2.4.3 In the case of the short runway, this is because improvements to the runway comparable with the construction of a new runway are required to provide a runway long enough, strong enough and with appropriate visual and navigational aids to act as an appropriate complement to the current main runway.

2.4.4 This assumption has been subject to detailed scrutiny in a capacity study carried out by National Air Traffic Services (NATS). This study is summarised in Chapter 3.

2.4.5 A benchmarking review of peer airports indicates that the provision of parallel runways with similar capability is generally adopted at airports with levels of traffic higher than that experienced at Dublin today.

2.4.6 The parallel runways at all the peer airports do not have the 10 degree convergence that exists between the existing Main Runway 10-28 and the short runway 11-29 at Dublin.

Airport	pax ATM (year)	pax per ATM	Number of Runways	Mode of Operation and Configuration	Lengths (paved)	Comments
Dublin (DUB)	13.8M 180k (2000)	77	3	Complex 10-28 16-34 11-29	2637m 2072m 1357m	But capacity is effectively constrained by the physical limitations of Runway 11/29
Manchester (MAN)	18.3M 178k (2000)	103	2	Segregated 06R-24L 06L-24R	3048m 3048m	Second runway brought into use in 2000.
Birmingham (BHX)	6.9M 99k (1999)	70	2	Single 06-24 15-33	1315m 2605m	Cross runway use is rare for commercial traffic.
Gatwick (LGW)	30.4M 247k (1999)	123	1	Single 08R-26L 08L-26R	3159m 2565m	Parallel taxiway available for use as a runway to accommodate maintenance etc at these traffic levels.
Brussels (BRU)	20.0M 313k (1999)	64	3	Complex 07L-25R 07R-25L 02-20	3638m 3211m 2984m	
Copenhagen (CPH)	17.4M 299k (1999)	58	3	Complex 04L-22R 04R-22L 12-30	3570m 3300m 2800m	
Dusseldorf (DUS)	16.6M 194k (2000)	82	2	Parallel 05R-23L 05L-23R	3000m 2700m	
Glasgow (GLA)	6.8M 101k (1999)	67	2	Single 05-23 10-28	2658m 1104m	
Stansted (STN)	9.5M 155k (1999)	61	1	05-23	3048m	11.9m pax 166k movements in 2000 with 72pax per ATM.
Oslo (OSL)	14.1M 221k (1999)	63	2	Parallel 01R-19L 01L-19R	2950m 3600m	
Vienna (VIE)	11.9m 207k (2000)	57	2	Intersecting 11-29 16-34	3500m 3600m	

TABLE 4 – BENCHMARKING WITH COMPARABLE AIRPORTS

3. NATS STUDY

3.1 Approach

3.1.1 To reconfirm the Master Planning assumptions on capacity described in Chapter 2, a detailed capacity study was undertaken by NATS to quantify the specific capacity gains that might be possible at Dublin Airport.

3.1.2 The objectives of the NATS Study were as follows:

- To determine the declarable capacity of the existing Main Runway (Runway 28)
- To examine additional capacity available from the other existing runways at Dublin Airport without improvements and with improvements short of major runway extensions or new runways.
- To examine additional capacity available from a major extension to Runway 11-29 or a new parallel runway.
- To examine the capacity of the ground infrastructure to support increased use of the runway system.

3.1.3 The work undertaken by NATS is summarised in the following sections.

3.2 Capacity of the Existing Main Runway

Approach

3.2.1 The capacity of the Main Runway at Dublin Airport (Runway 28) was established by NATS using simulation modelling. This used the methodology that NATS currently adopts in carrying out regular runway capacity assessment studies at five major London and UK regional airports and is built around NATS' fast-time simulation model, **HE**uristic **R**unway **M**ovement **E**vent **S**imulation (HERMES).

3.2.2 The study was conducted over three months and comprised the following principal stages.

- **Study Initiation** comprising a series of meetings in Dublin with representatives of Aer Rianta and the Irish Aviation Authority (IAA) to discuss capacity assessment criteria, data requirements and the arrangements for agreeing and declaring capacity, conducting observations of aircraft movements and collecting supplementary data.
- **Data Collection** comprising visual observation of movements on and near the runway and from radar screens for 7 hours per day over two working weeks. Supplementary data for the same days was obtained from Aer Rianta and IAA systems.
- **Model Building** using data from the above sources.
- **Model Validation** by comparing the delays simulated by HERMES for the observed level of demand with the delays that were actually observed.
- **Analysis and Reporting** of the modelling work including presentation, on 4 October 2001, of the final results to Aer Rianta, the Runway Project Team, IAA, Airport Co-ordination Limited (ACL) and representatives of the airlines.

Conclusions

3.2.3 The capacity of the system was defined as that level of activity such that the average delay in any half hour period would not exceed 8 minutes.

3.2.4 Two approaches to declaring the runway capacity were considered by NATS: the first was a constant capacity for every hour, and the second was to profile the capacity to follow a demand profile based on the actual demand observed in summer 2001. The benefit of the second approach is that by accepting a lower capacity in hours where demand is lower the declarable capacity in hours of higher demand can be increased.

3.2.5 Using a constant level of capacity, the declarable capacity was assessed to be 39 movements per hour. As observed demand in some hours exceeded that level of demand, the capacity established was based on a variable number of movements per hour.

3.2.6 The declarable capacity is set out in the following Table, which also indicates the demand profile from which the capacity profile was generated. It should be noted that there are some restrictions on the balance between departures and arrivals within these overall capacity limits and that if demand between arrivals and departures were very unbalanced then the actual capacity would be reduced or the delays would be increased.

Start of Hour Universal Coordinated Time (UTC)	Max Scheduled Movements (Summer '01)	Declared Capacity
0	11	32
1	11	32
2	7	32
3	4	32
4	10	32
5	22	32
6	33	33
7	42	44
8	32	32
9	35	37
10	46	44
11	40	40
12	31	32
13	40	41
14	42	42
15	30	32
16	39	43
17	39	43
18	38	42
19	38	42
20	31	32
21	27	32
22	20	32
23	12	32

TABLE 5 – CAPACITY OF MAIN RUNWAY

3.2.7 This data is plotted in Figure 3 together with the constant capacity limit of 39 movements per hour.

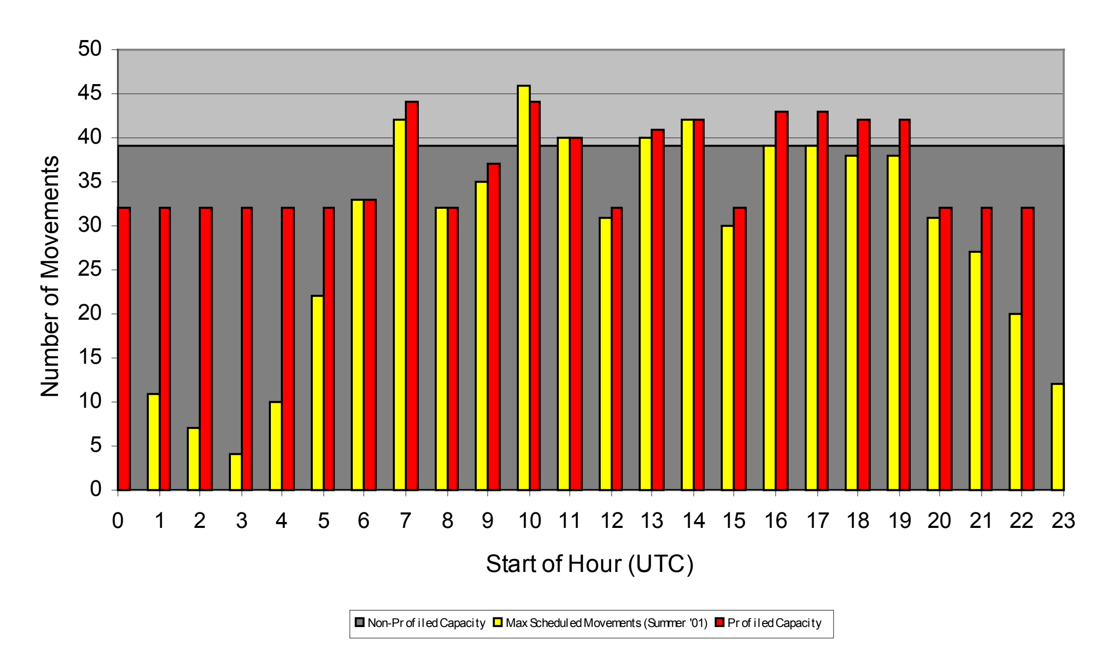

FIGURE 3 – COMPARISON OF CAPACITY AND DEMAND

3.2.8 Examination of the figure indicates that the use of a profiled declared capacity limits the opportunity for additional demand to be accommodated in the so-called 'shoulder' periods. This is because the capacity of these periods has been reduced to levels approximating to the current demand to allow increases in the peak hour above that which could be declared on a constant level of capacity basis.

3.2.9 The study also compared operational statistics for aircraft on and near the runway with statistics for two similar UK airports. It concluded that Dublin's runway occupancy times and departure line-up times demonstrate comparable operational efficiency in these respects. However when fitting one or two departures between arrivals, this is achieved within smaller gaps between arrivals at the two UK airports than is the case at Dublin.

3.3 Maximum Capacity of the Existing Runway System

Approach

3.3.1 This part of the study considered the additional capacity that could be delivered from the existing airfield. It considered two sources of additional capacity and quantified the increases available. These sources were:

- Additional capacity from existing infrastructure and procedures; that is by using the other runways at Dublin in conjunction with the Main Runway.

- Additional capacity from improvements to infrastructure and procedures short of major runway development.

3.3.2 This phase of the study commenced with a two-day workshop held with representatives of Aer Rianta, the Runway Project team, IAA and the airline community to brainstorm all possible options for the operation of the runway system that could provide capacity benefits.

3.3.3 The various feasible operational scenarios were taken forwards and analysed using the same modelling approach and Dublin specific data as used in the first stage of the study described at Section 3.2 above.

3.3.4 Where different capacities are available under different operational conditions (such as differences between easterly and westerly operations) then the "declarable capacity" is taken as a weighted average of the various available capacities.

Making Full Use of the Existing Infrastructure

3.3.5 The conclusion of the study was that additional capacity from existing infrastructure and procedures is limited to 4 extra movements per hour above declared capacity. This is based on the use of Runways 10-28 and 11-29 in combination, with weighted average[1] delays across easterly and westerly operation and limitations imposed by height of cloud ceiling.

3.3.6 This additional capacity was based on:

- Only Category A&B aircraft on Runway 11-29 owing to the limitations on the capability of that runway.
- Only North turning departures on Runway 11-29 to avoid conflicts between newly airborne aircraft and in line with existing procedures.

3.3.7 Realisation of the capacity depends upon:

- Mixed mode operation on both runways when cloud ceiling at least 1500 feet. This mode of operation is procedurally complex.
- Mixed mode operation on Runway 10-28, departures only on Runway 11-29 when cloud ceiling below 1500 feet
- Acceptable go-around procedures on all runways (except assumed not possible for Runway 10)
- Pilot acceptance of Shorter Runway (Runway 11-29)

3.3.8 If any of these conditions cannot be achieved in practice then the additional capacity would be reduced.

Improve infrastructure and procedures - no runway extensions

3.3.9 The next level of capacity improvement considered were those achieved by improving procedures and infrastructure short of extending the runways.

3.3.10 The maximum increase in capacity quantified was **10** extra movements per hour**[2]** above the declared capacity on the basis of weighted average[1] delays.

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[1] Consideration of the weighted average delay is required to take account of the fact that, for the options considered in this part of the NATS Study, the capacity for westerly operations is greater than that for easterly operations. The effective capacity is therefore reduced from the capacity in a westerly direction to take account of the proportion of easterly operations required.

[2] The NATS Study identified the possibility of an increase of 15 extra movements per hour if a procedure to switch between instrument approaches on Runways 28 and 29. There is neither any precedent for such operations nor any known research programme into such operations and therefore this assumption has been excluded.

3.3.11 Realisation of this increase in capacity depends upon:

- Mixed Mode Operation on Runways 10-28 & 11-29 which is procedurally complex
- 3nm arrival separations throughout Dublin CTR
- Acceptable go-around procedures on all runways
- ILS on Runways 11 and 29
- Pilot acceptance of shorter runway
- Holding areas allowing Tower Controller selection from 3 departures
- Reduced Arrival-Departure-Arrival (ADA) separations

3.3.12 If any of these conditions cannot be achieved in practice then the additional capacity would be reduced.

3.3.13 It should be noted that a key element in any improvement is the removal of the limitations associated with visual operations.

3.3.14 It should also be noted that the majority of these items are related to the adoption of procedures by either Airlines or Air Traffic Services provided by the Irish Aviation Authority or both. These are therefore outside the direct control of the Airport Authority.

3.4 Capacity gains from Runway Investment

Introduction

3.4.1 Having exhausted the possibilities of the existing runways, the study proceeded to consider the capacity gains that could be achieved by investing in major runway improvements. Given that the key restrictions on capacity were because of the shortcomings of the existing Runway 11-29, this part of the study considered two possible options.

3.4.2 The first option was the extension of Runway 11-29 to allow operation by most of aircraft types currently operating at Dublin. The second is a parallel runway option.

Extension of Runway 11-29

3.4.3 The additional capacity that can be achieved if Runway 11-29 is extended is **30** movements per hour.

3.4.4 The conditions that need to be met to achieve this are:

- (Near-) Segregated Mode Operation
- Extension of Runway 11-29 to accommodate at least to Category C aircraft which represent 99% of the current aircraft mix at Dublin Airport.
- Pilot acceptance of shorter runway (unless extension provides the same length as Runway 10-28)
- Acceptable go-around procedures on arrival runways
- For westerly operations, arrivals on Runway 28 (otherwise ILS required on Runway 29)

- ✈ For easterly operations, arrivals on Runway 11 and consequently an ILS for Runway 11. (It is considered unlikely that appropriate go-around procedures can be can be developed for arrivals on Runway 10 and departures on Runway 11 because of the convergence of the runways.)
- ✈ 3nm arrival separations on approaches to arrival runways
- ✈ Arrival sequencing
- ✈ Holding areas allowing Tower Controller selection from 3 departures.

Capacity from two Parallel Runways

3.4.5 The construction of a parallel runway allows an additional declarable capacity of **43** extra movements per hour.

3.4.6 The conditions that need to be met to achieve this are:

- ✈ Segregated Mode Operation (arrivals and departures interchangeable)
- ✈ 3nm arrival separations throughout Dublin CTR
- ✈ Arrival sequencing
- ✈ Acceptable go-around procedures on all runways (considered feasible owing to the runways being parallel)
- ✈ ILS on all runways
- ✈ Holding areas allowing Tower Controller selection from 3 departures

3.5 Summary

3.5.1 Without building or extending runways, the maximum future capacity could not exceed 10 extra movements per hour above the current declared capacity.

3.5.2 The primary factors limiting this capacity are:

- ✈ The restriction that the length of Runway 11-29 imposes on the categories of aircraft that can use it.
- ✈ The inability to overcome the visual requirement on Runway 11-29.
- ✈ The complexities of the procedures to operate in mixed mode operation on Runways 10-28 & 11-29.

3.5.3 This means that major investment in runways will be required to meet demand in the long term.

3.5.4 Therefore the only realistic options to provide significant additional capacity at Dublin Airport are:

- ✈ Extend Runway 11-29
- ✈ Build a new Runway – 10L-28R

4. RUNWAY DEVELOPMENT CONCEPTS AT DUBLIN AIRPORT

4.1 Introduction

4.1.1 The NATS Study confirmed that there are no improvements that can be made at Dublin Airport, either in infrastructure or procedures, short of a major runway extension or a new runway, which can deliver significantly more capacity than is available from the existing Main Runway. This Section therefore examines in detail the alternative approaches to providing that additional runway capacity at Dublin.

4.1.2 Although, in theory, there are many options for a second main runway at Dublin Airport, only two concept options are considered sufficiently compatible with the local development plan to be feasible. These are the extension of Runway 11-29 and the replacement of the existing 11-29 with a parallel runway 10L-28R as set out in the County Plan.

4.1.3 These two concepts have been illustrated on Figure 4 and have been assessed qualitatively in this Chapter.

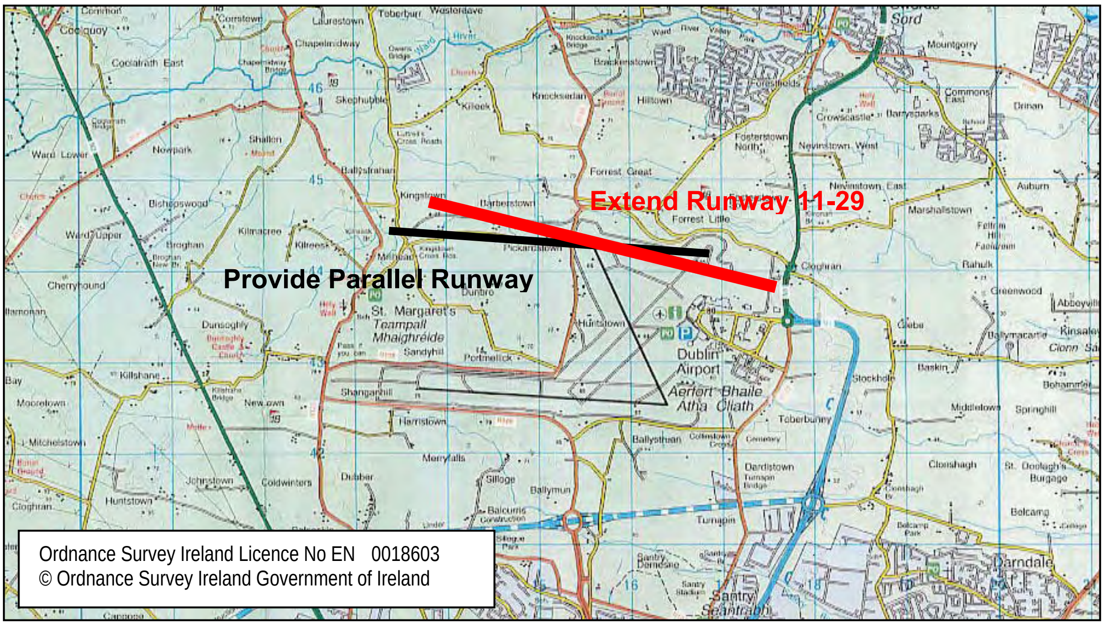

FIGURE 4 – CONCEPT OPTIONS FOR RUNWAY DEVELOPMENT

4.2 Physical, Operational and Safety Issues

Physical

4.2.1 As can be seen from Figure 4, both concepts occupy sites along the northern edge of the airfield. The centrelines intersect approximately at the existing threshold of Runway 16, but the parallel runway has a bearing of 95 degrees/275 degrees True compared with 105 degrees/285 degrees True for the extended Runway 11-29. This means that the extended Runway 11-29 lies to the south of the parallel runway adjacent to the existing maintenance area. This reduces the land available for development in the existing developed area of the airfield, but with a corresponding increase to the west.

4.2.2 Owing to the nearness of the extended centreline of an extended Runway 11-29 to existing hangars and aprons in the maintenance area, this concept has the potential to limit the use of existing facilities in certain operational scenarios.

4.2.3 With both concepts occupying approximately the same area of land at the north of the airfield, the existing major non-runway systems, such as aprons, terminals, roads and car parks, can be used to service operations on either. However, by extending an existing runway, there is a greater opportunity for reuse of existing pavements and other infrastructure in the Runway 11-29 concept.

Operational

4.2.4 The ultimate operational capacity of Runway 11-29 is less than of a parallel runway as established in the NATS study.

4.2.5 It should be noted that, because the two concepts occupy the same lands they are mutually exclusive alternatives. The adoption of the Runway 11-29 concept would limit the capacity of the airfield forever because it would not be possible to construct a parallel runway in the current planned location once an extended Runway 11-29 was in operation, because the loss of capacity during construction would be unacceptable.

4.2.6 The provision of a fully instrumented Runway 11-29 to overcome the visual requirement identified by NATS as a key constraint on capacity would have significant impacts on other existing airfield facilities.

4.2.7 To provide an instrument approach on Runway 29 would require the demolition of Hangar 6 to avoid penetration of either the transitional surface or the approach surface or a very substantial displacement of the threshold as shown on Figure 5. This Hangar is already identified as an obstacle for Take-Off operations on Runway 11 on the Type A Chart[3].

---

[3] The Irish Aviation Authority (IAA) confirms that no proposal that resulted in an object penetrating one of the obstacle limitation surfaces would be acceptable (ref letter to Aer Rianta of 6 Dec 2002).

KEY

- AER RIANTA LAND BOUNDARY
- APRON AND TAXIWAY AREAS SUBJECT TO RESTRICTION
- HANGAR INFRINGEMENT OF INSTRUMENT APPROACH SURFACE

Revision Details	By / Check	Date	Suffix

DUBLIN AIRPORT
RUNWAY 10L–28R

Drawing Title

IMPACT OF 29 INSTRUMENT APPROACH ON HANGAR 6

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FIGURE 5

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Safety

4.2.8 The Public Safety Zones (PSZs) for an extended 11-29 would extend into areas not identified in the County Plan whereas those for a parallel runway have been included for a number of years, although the populations lying within the PSZs are small in either case. The possible extent of Public Safety Zones is shown on Figure 6.

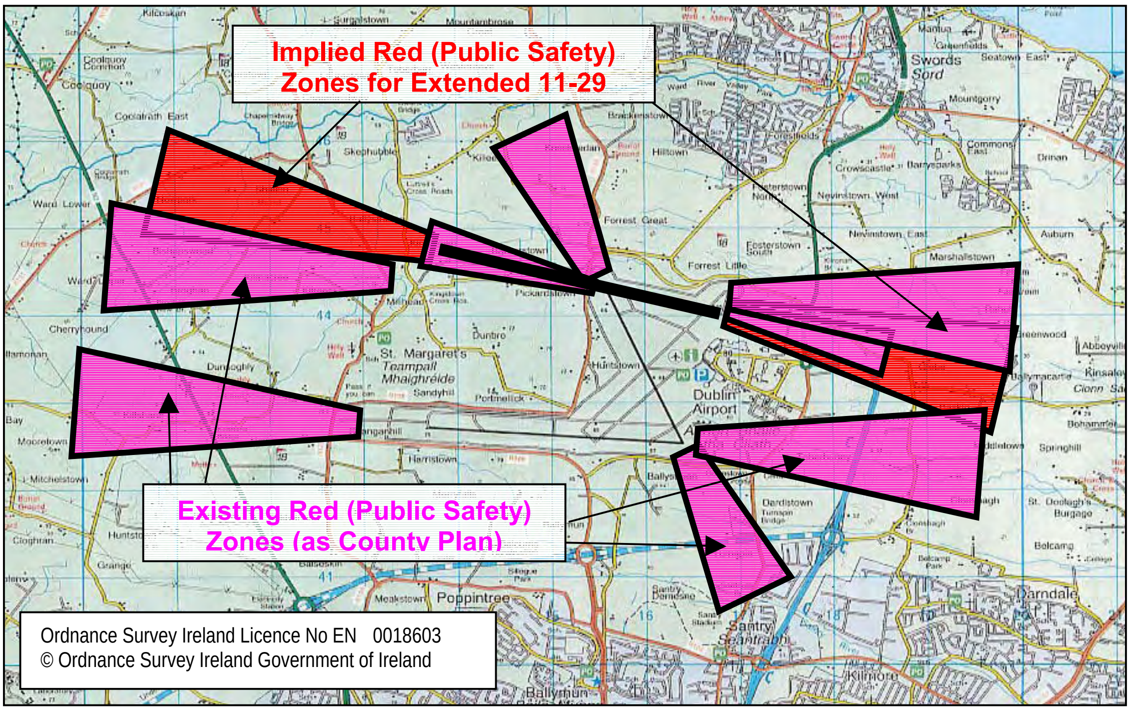


FIGURE 6 – COMPARISON OF POSSIBLE EXTENT OF CURRENT PUBLIC SAFETY ZONES

4.3 Catchment and Accessibility

4.3.1 There is no difference between these concepts in terms of either catchment or accessibility.

4.4 Environment

4.4.1 Runway 10L-28R could be operated in a number of modes to mitigate or share the noise impacts. There is, on the other hand, limited flexibility to operate Runway 11-29 to mitigate noise impacts because of the limitation on the operational modes. However, a significant difference in populations affected by operations is unlikely.

4.4.2 The overall footprint of a notional airport site between the northern and southern runways would be increased in the 11-29 concept because the runways diverge to the west increasing the separation. This increases environmental impacts related to land use such as landscape, ecology, agriculture and heritage.

4.5 Planning

4.5.1 The Local Development Plan has signalled the possible development of a northern parallel runway for many years, and the development of South Fingal has proceeded on this basis.

4.6 Economic, Commercial and Cost

Economic and Commercial

4.6.1 In the short to medium term, the impact of either scheme on the local or national economy would not be significantly different as they both represent developments at Dublin Airport.

4.6.2 In the long-term, the additional capacity available with the parallel concept would provide for increased economic benefits without the cost of further runway development (either at Dublin Airport or elsewhere).

4.6.3 Similarly, in the short to medium term, there are no significant differences in the commercial revenues available for the two concepts, nor in operational costs.

4.6.4 In the long term, however, commercial revenues could continue to increase with the parallel runway concept using the additional capacity with no significant increase in operational costs. With the concept of extending Runway 11-29, revenues would be limited by capacity or operational costs would increase with the development of additional runways (either at Dublin Airport or elsewhere) to provide the capacity.

Cost and Programme

4.6.5 The costs of the schemes may be different as there is some infrastructure available for re-use. However, it must be noted that the infrastructure is not suitable for the operations required to generate the capacities established in the NATS study without significant extension and strengthening.

4.6.6 A more detailed exploration of the comparative costs of these two concepts is the subject of Chapter 5.

4.6.7 The potential for reduced construction work could lead to earlier delivery of the scheme (or delayed cash flow) in the case of 11-29[4]. This would be offset to some extent because obtaining planning permission for a scheme at variance with the County Plan would be likely to be more problematic and therefore take longer.

4.7 Summary

4.7.1 A summary of the qualitative comparison of the concept options is set out in Table 6.

4.7.2 Apart from the potential for reuse of the existing pavement and associated infrastructure in the case of the option to extend Runway 11-29, and therefore the potential reduction in capital cost, the option to provide a parallel runway is equal or better on each of the parameters considered.

4.7.3 More detailed work on costings has therefore been undertaken to assess if the cost savings are significant enough to offset all the benefits of the parallel runway concept. This is set out in the following Chapter.

---

[4] As will be seen in Chapter 5, there is limited saving in construction cost and therefore the construction periods are likely to be similar. The concept of extending Runway 11-29 is therefore likely to take longer to deliver because it is inconsistent with current planning policy.

Issue	Comparison	Remarks
Physical, Operational and Safety Issues	The basic non-runway infrastructure for both schemes exists.	
	Some of the runway infrastructure can be re-used in the 11-29 concept.	The re-use of the runway infrastructure represents the key opportunity of the 11-29 concept
	The ultimate operational capacity of Runway 11-29 is less than a parallel runway	Only 30 additional movements per hour compared with 43.
	The provision of instrument approaches on an extended 11-29 in the current location so as to be able to reuse the pavements would require the demolition of Hangar No 6.	A displaced 29 threshold would remove approximately half the current usable landing distance. (See Figure 5)
	Displacements of an extended 11-29 would reduce the possible cost advantages of reuse of pavements (for movements to the west) or sterilize parts of the north apron for movements to the east.	
	Public Safety Zones for an extended 11-29 would extend into areas not identified in the County Plan. Public Safety Zones already established for a parallel runway and the existing Runway 11-29 only.	The potential cost of purchasing property in extended Public Safety Zones could be significant.
Catchment and Accessibility	There is no difference between these options in terms of either catchment or accessibility.	
Regional Planning and Economic	The impact of either scheme on the local economy would not be significantly different.	
Cost	The costs of the schemes may be different.	A budget cost comparison is required for these two concepts. Factors that need to be considered are: Construction Cost; Highway Diversion Costs; Land Costs; Relocation of Existing Facilities; External Compensation Costs.
Environmental	10L-28R could be operated in a number of modes to mitigate noise impacts whereas there is limited flexibility to operate 11-29 to mitigate noise impacts. There is unlikely to be a significant difference in populations affected by operations.	
	The potential overall footprint of the airport would be increased in the 11-29 concept, increasing land use related environmental impacts.	
Commercial	In the short term, there are no significant differences in the operational costs of the two concepts, nor in commercial revenues available.	In the long-term the additional potential capacity would allow greater total revenues without increasing costs.
	The potential for reduced construction work could lead to earlier delivery of the scheme (or delayed cash flow) in the case of 11-29.	Any reduced construction period could be offset by increases in the approvals process because the 11-29 concept is not indicated in the County Plan.

TABLE 6 – QUALATIVE ASSESSMENT OF RUNWAY CAPACITY ENHANCEMENT CONCEPTS

5. BUDGET COST COMPARISON OF CONCEPT OPTIONS

5.1 Approach and Assumptions

Approach

5.1.1 Although the benefits of the parallel runway set out in Chapter 4 are in all cases greater than or equal to the concept of extending Runway 11-29, there is the possibility that re-use of the existing infrastructure could provide a significant cost saving.

5.1.2 A budget cost comparison of the two concept options has, therefore, been carried out on a series of notional schemes that are intended to gauge the cost effectiveness of the options. It should be noted that whilst the schemes have been developed in sufficient detail to obtain reasonable order of magnitude cost estimates, they do not represent detailed schemes taking into account all development issues, nor do they represent a view of the scheme that should be presented for Planning Permission.

Assumptions

5.1.3 The assumptions common to all scheme options are:

- The physical dimensions of the runway are the same for all options.
- For this cost comparison a length similar to that of the existing runway has been adopted as this ensures adequate capability for take-off operations on the new runway, which is essential to realise the capacity gains sought. This is also the minimum length identified by users in the recent stakeholder consultation.[5]
- The supporting taxiway network would the same for all options, as similar operational modes could be adopted.
- The same level of instrumentation would be provided in all cases to provide for operations in low visibility as required to realise the capacity gains sought.
- The strength of pavement provided is the same in all cases and similar to that of the existing runway.

Accuracy of the Estimates

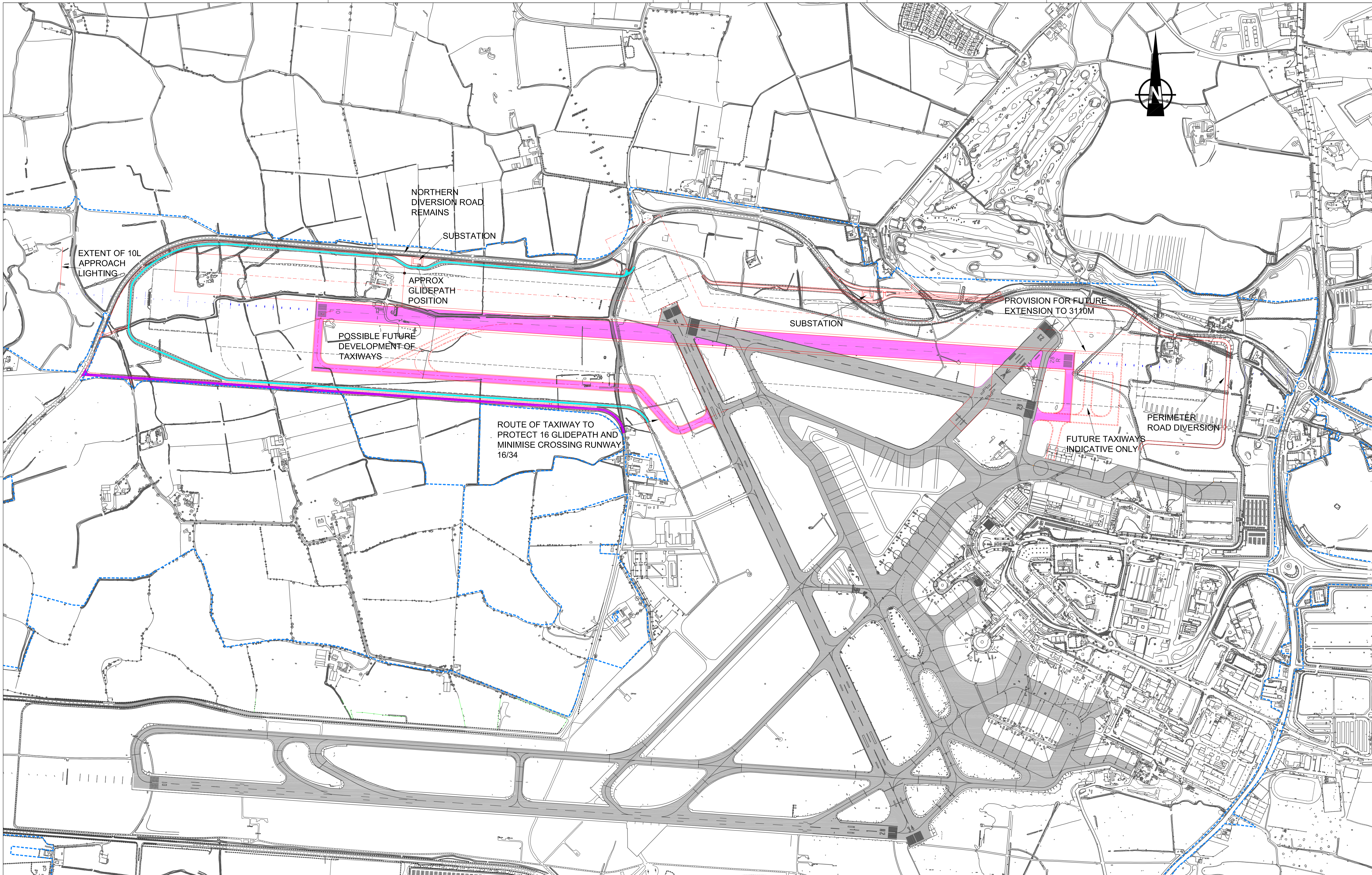
5.1.4 The cost estimates are based on outline design and budget estimating techniques and are therefore accurate to plus or minus 15%.

5.2 Parallel Runway Option

5.2.1 The Parallel Runway Option considered for this budget costing exercise is illustrated in Figure 7.

5.2.2 The scheme shown and costed provides a 2640m long runway parallel to the existing main runway.

[5] Cost comparisons for longer runways would be more favourable to the Parallel Runway Option because of increasing Land Take and Costs (see Table 12)



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RE-DRAWN	AP/ AIE	26.02.03	D
RE-DRAWN	AP/ AIE	20.01.03	C
RE-DRAWN	AP/ AIE	18.11.02	B
RE-DRAWN	AP/ AIE	12.11.02	A

DB1H

KEY

- MINIMUM EXTENT OF PAVEMENT
- PUBLIC HIGHWAY DIVERSIONS
- PERIMETER ROAD
- EXISTING LAND BOUNDARY

DUBLIN AIRPORT
RUNWAY 10L–28R

Drawing Title

RUNWAY 10L – 28R
OPTION FOR COSTING

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FIGURE 7

Scale at A1
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5.2.3 The costed scheme includes:

- ✈ 2640m runway with parallel taxiway and single entrance taxiways at each end including an estimate of the earthworks required to provide acceptable gradients on the runway and an appropriate drainage system. The alignment of the parallel taxiway has been chosen to limit the impact on the instruments of Runway 16-34.
- ✈ A perimeter road around the boundary of the airfield positioned to allow for the provision of ILS.
- ✈ Diversion of the Forrest Little and Naul Roads to allow for runway and perimeter road development.
- ✈ ILS systems for both directions.
- ✈ Other airfield services including aviation ground lighting, substations, HV and Communications ring mains, fire hydrant system.
- ✈ Allowances for General and Preliminary items, Fees, Charges, Mitigation and Risk.

5.2.4 Analysis of this option is given in Table 7 with the more detailed build-up of the cost in Table 12.

Elements	**Appraisal**	**Notes**
Description of Option	Parallel Runway 2640m long with provision for operation with Instrument Flight Rules.	
Description of the Impact on the Airfield	Limited impact on airfield as recent developments have taken this option into account. Fire Training ground and Engine Running Facilities require relocation.	
Description of the Impact on the Environment	The principal impact arises from the increasing levels of traffic rather than from the land take issues as this land has been identified for a runway for many years.	
Description of Impact on Surrounding Lands and Property.	Lands have been purchased for this option. Diversions of the Naul Road and Forrest Little Road are required.	
Capital Cost	€101.1 Million	Including relocation of facilities above.
Land Purchase Cost	Nil	Land has already been purchased.
Total Cost	€101.1 Million	
Capacity Potential (Additional Movements)	43 movements	In ultimate development
Cost per Potential Capacity Movement	€2.4 Million/movement	In ultimate development

TABLE 7 –ASSESSMENT OF PARALLEL RUNWAY OPTION

5.3 Extensions to Runway 11-29

Introduction

5.3.1 For the extension of Runway 11-29, there are a number of possible sub-options. These include:

- An extension to the west on land outside Aer Rianta's ownership;
- An extension to the east that involves the need to divert or provide a bridge over the N1, or
- A combination of extension to east and west[6].

5.3.2 These three sub-options are illustrated on Figures 8 to 10. The option with extensions at both ends has been chosen to minimise the extent of land required at the west, before the eastern extension reaches the N1.

5.3.3 The key assumptions in the cost estimate are as follows:

- Substantial improvement in the structure of 11-29 is required to improve the existing PCN of 26 to a value of 70, which is comparable with the existing Main Runway. It should be noted that sections of the Runway 16-34 needed to be replaced during the recent upgrade of that runway.
- The existing drainage system on Runway 11-29 needs to be replaced owing to its age and the increasingly stringent nature of environmental and flooding protection legislation and best practice.

Western Extension Option

5.3.4 The Western Extension Option of Runway 11-29 considered for this budget costing exercise is illustrated on Figure 8.

5.3.5 The costed scheme includes:

- 2640m runway with parallel taxiway and single entrance taxiways at each end including an estimate of the earthworks required to provide acceptable gradients on the runway and an appropriate drainage system. The alignment of the parallel taxiway has been chosen to limit the impact on the instruments of Runway 16-34.
- A perimeter road around the boundary of the airfield positioned to allow for the provision of ILS.
- Diversion of the northern diversion road and Naul Roads to allow for runway and perimeter road development.
- ILS systems for both directions.
- Other airfield services including aviation ground lighting, substations, HV and Communications ring mains, fire hydrant system.

---

[6] The maximum length of runway that can be provided without modification of the adjacent Highway network is approximately 1650m allowing for the recommended Runway End Safety Areas. This length is substantially shorter than the minimum established as desirable from user questionnaires.

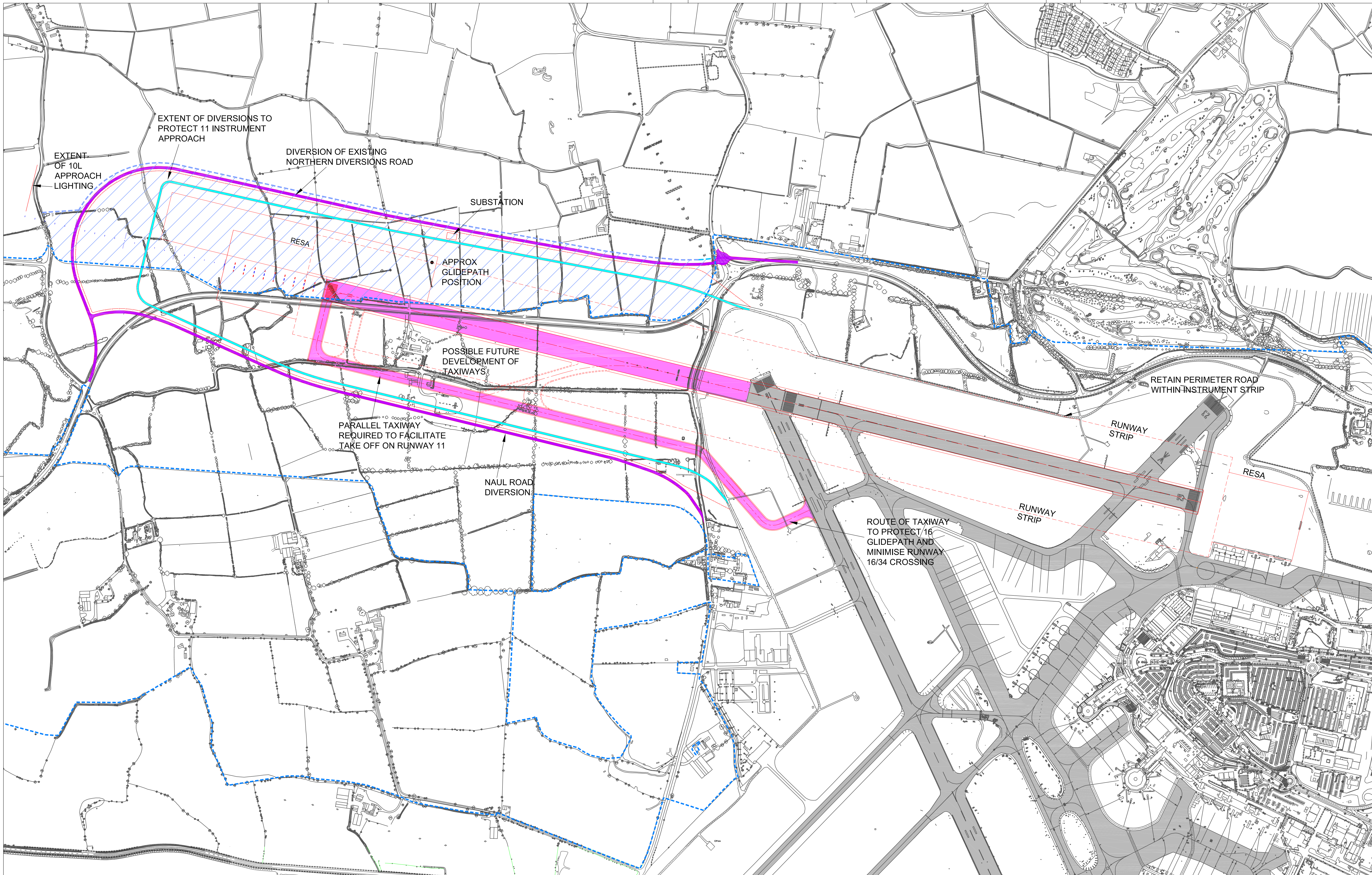
- Allowances for General and Preliminary items, Fees, Charges, Mitigation and Risk.
- Allowance for Land Purchase based on recent market transactions.

5.3.6 Analysis of this option is given in Table 8 with the more detailed build-up of the cost in Table 12.

Elements	Appraisal	Notes
Description of Option	Extension of Runway 11-29 to 2640m long by extending to the west with provision for operation with Instrument Flight Rules.	
Description of the Impact on the Airfield	Provision of Instrument Approach on Runway 29 sterilizes the use of stands 5,6 and 7 and would require the demolition of Hangar 6. Engine Running Facilities require relocation.	Cost comparison ignores the impact on Hangar 6.[7]
Description of the Impact on the Environment	The impacts arise both from the increasing levels of traffic and the additional land take compared with that identified in the Local Development Plan. The limitations on operational modes restrict the opportunities for mitigation of noise impacts.	
Description of Impact on Surrounding Lands and Property.	Extends into lands not owned by Aer Rianta (approx 47 ha to be purchased). Naul Road and Northern Diversion Roads require diversion.	
Capital Cost	€92.6 Million	Including re-provision of apron but excluding replacement of Hangar 6.
Land Purchase Cost	€11.3 Million	Recent Market Values.
Total Cost	€103.9 Million	
Capacity Potential (Additional Movements)	30 movements	In ultimate development
Cost per Potential Capacity Movement	€3.5 Million/movement	In ultimate development

TABLE 8 –ASSESSMENT OF 11-29 EXTENSION TO WEST

[7] The cost of replacing Hangar 6 has been neglected in the cost estimate because some operational modes can be conceived that would not require it to be demolished. However, these would impose significant limitations on operations. Furthermore, for the same level of provision, the parallel runway option would not be more expensive as can be seen from inspection of Table 12.



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RE-DRAWN	AP/ AIE	21.01.03	B
RE-DRAWN	AP/ AIE	12.11.02	A

DB1H

KEY
- MINIMUM EXTENT OF PAVEMENT
- PUBLIC HIGHWAY DIVERSIONS
- PERIMETER ROAD
- EXISTING LAND BOUNDARY
- FUTURE LAND BOUNDARY
- LAND TO BE PURCHASED

DUBLIN AIRPORT
RUNWAY 10L – 28R

Drawing Title
EXTENSION OF RUNWAY 11 – 29
(WESTERN OPTION)

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FIGURE 8

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Eastern Extension Option

5.3.7 The Eastern Extension Option of Runway 11-29 considered for this budget costing exercise is illustrated on Figure 9.

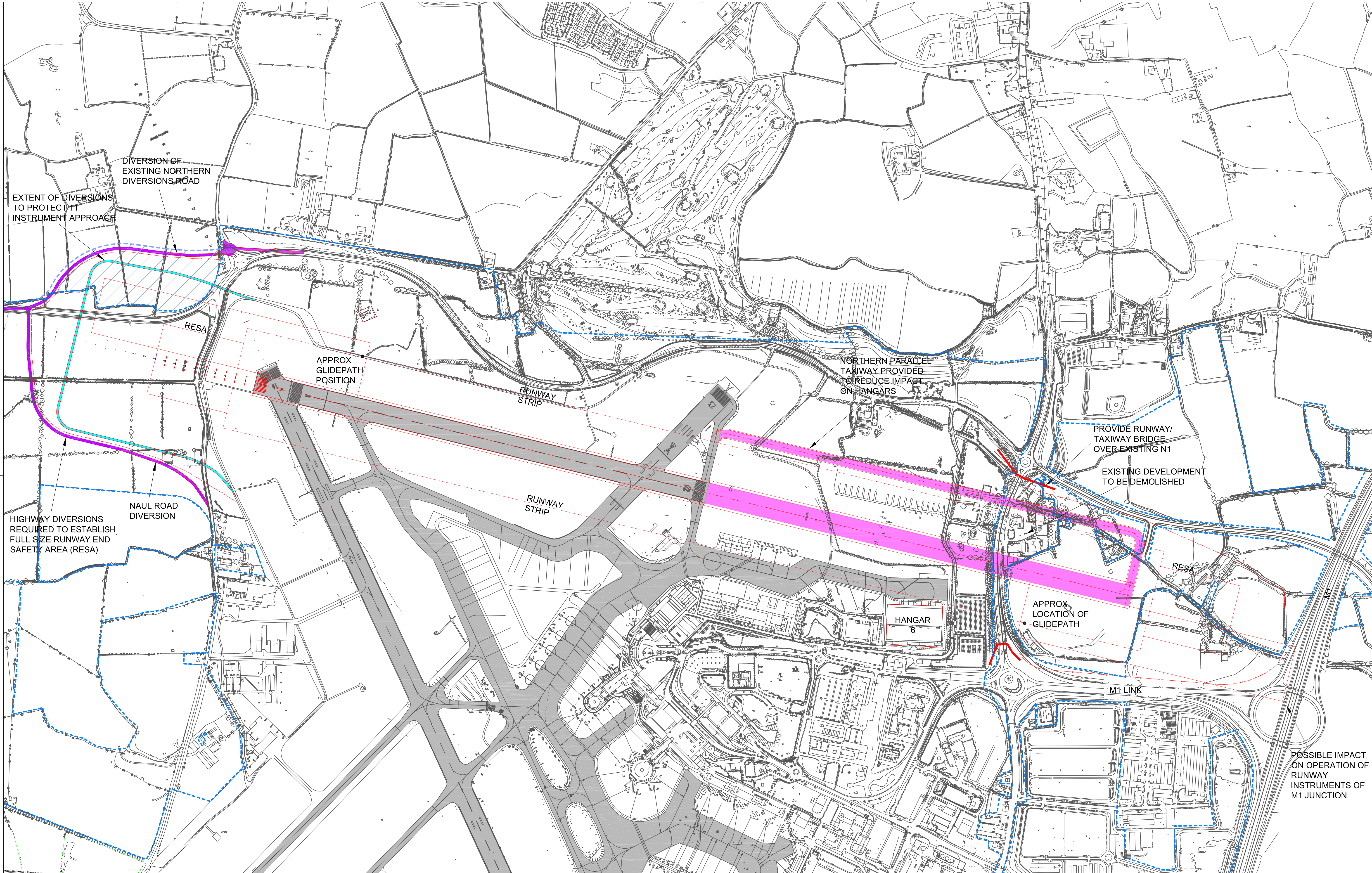
5.3.8 The scheme shown and costed provides a 2640m long runway by extension at the eastern end of the runway.

5.3.9 In this option the runway extends over the N1 and almost to the M1. In the costed option a tunnel has been assumed for the N1 as the levels are favourable and a diversion option would require sufficient additional roadworks and land to offset the cost of the tunnel. The access to the eastern end of the runway has been assumed to be from the north of the runway to minimise the impact on the Maintenance Area. A southern parallel taxiway would require the demolition of Hangar 6.

5.3.10 The costed scheme includes:

- 2640m runway with parallel taxiway and single entrance taxiways at each end including an estimate of the earthworks required to provide acceptable gradients on the runway and an appropriate drainage system.
- A perimeter road around the boundary of the airfield positioned to allow for the provision of ILS.
- Diversion of the Northern Diversion and Naul Roads to allow for the recommended Runway End Safety Area at the western end of the runway.
- Diversion of the N1 through a tunnel under the runway.
- ILS systems for both directions.
- Other airfield services including aviation ground lighting, substations, HV and Communications ring mains, fire hydrant system.
- Allowances for General and Preliminary items, Fees, Charges, Mitigation and Risk.
- Allowance for Land Purchase based on recent market transactions.
- Allowance for the replacement of stands rendered unusable as they lie within the instrument strip of the extended runway.

5.3.11 Analysis of this option is given in Table 9 with the more detailed build-up of the cost in Table 12.



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KEY
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- PUBLIC HIGHWAY DIVERSIONS
- PERIMETER ROAD
- EXISTING LAND BOUNDARY
- FUTURE LAND BOUNDARY
- LAND TO BE PURCHASED

DUBLIN AIRPORT
RUNWAY 10L – 28R

Drawing Title
EXTENSION OF RUNWAY 11 – 29
(EASTERN OPTION)

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FIGURE 9

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Elements	Appraisal	Notes
Description of Option	Extension of Runway 11-29 to 2640m long by extending to the east with provision for operation with Instrument Flight Rules.	
Description of the Impact on the Airfield	Provision of Instrument Approach on Runway 29 sterilizes the use of stands 5,6 and 7 and restricts access to Hangars. Provision of fully instrumented runway would require the demolition of Hangar 6. Engine Running Facilities require relocation.	Cost comparison ignores the impact on Hangar 6.[8]
Description of the Impact on the Environment	The impacts arise both from the increasing levels of traffic and the additional land take compared with that identified in the Local Development Plan. The limitations on operational modes restrict the opportunities for mitigation of noise impacts.	The tunnel option has been costed because this minimises the severance and land take impacts.
Description of Impact on Surrounding Lands and Property.	Extends into lands not owned by Aer Rianta (approx 14 ha to be purchased). Naul Road and Northern Diversion Roads diverted. N1 diverted into tunnel. Properties such as the Coachman's Inn, the Ulster Bank, Garden Centre, Castlemoate House and a number of private dwellings would need to be removed or purchased. Lighting on the M1 may need to be modified.	Naul Road and Northern Diversion Road diversions required to accommodate recommended Runway End Safety Area at western end of runway.
Capital Cost	€155.2 Million	Including re-provision of apron but excluding replacement of Hangar 6.
Land Purchase Cost	€3.4 Million	Recent Market Values for Land. Property compensation excluded.
Total Cost	€158.6 Million	
Capacity Potential (Additional Movements)	30 movements	In ultimate development
Cost per Potential Capacity Movement	€5.3 Million/movement	In ultimate development

TABLE 9 –ASSESSMENT OF 11-29 EXTENSION TO EAST

[8] The cost of replacing Hangar 6 has been neglected in the cost estimate because some operational modes can be conceived that would not require it to be demolished. However, these would impose significant limitations on operations. Furthermore, for the same level of provision, the parallel runway option would not be more expensive as can be seen from inspection of Table 12.

Option to Extend at Both Ends

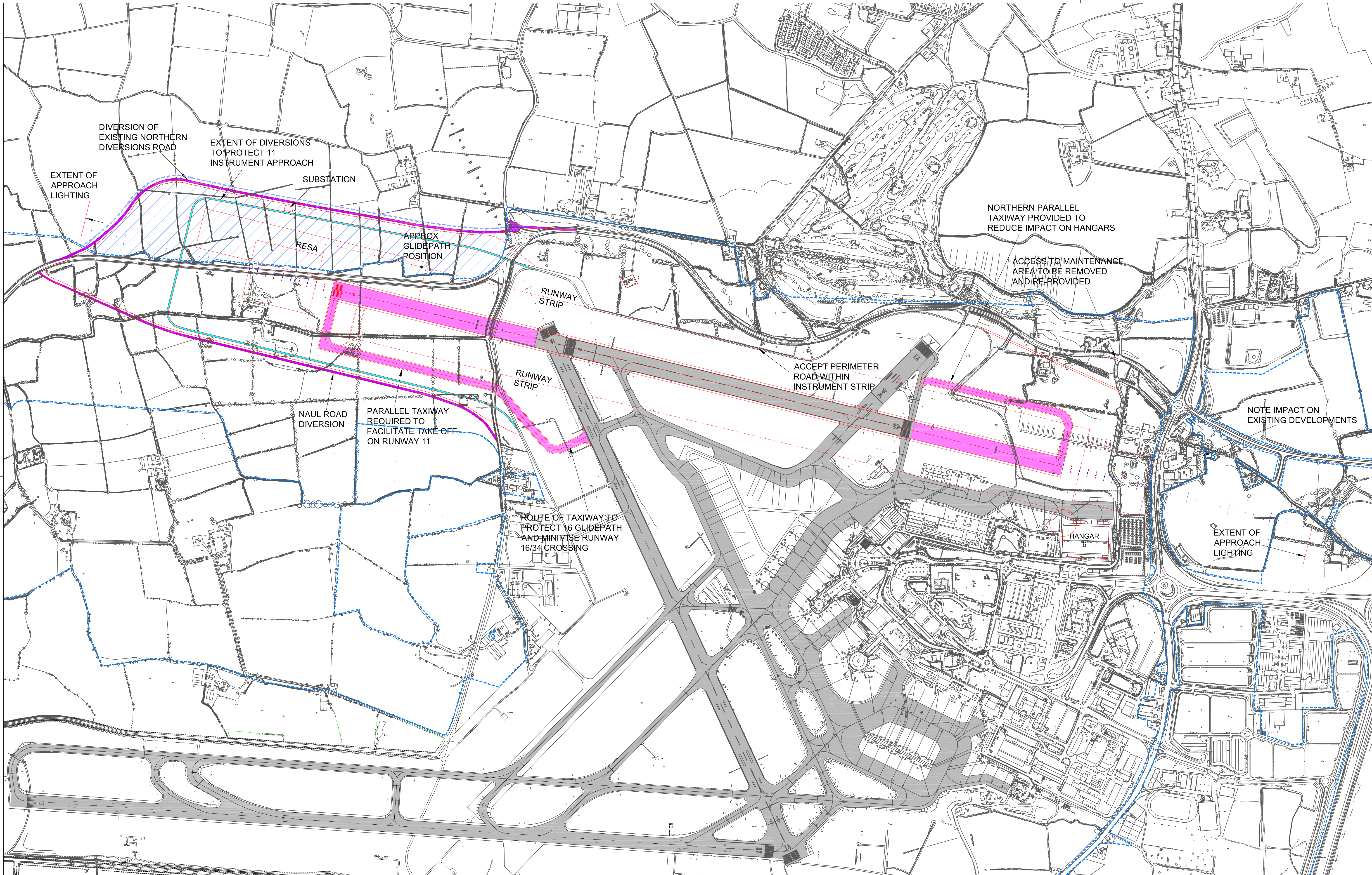
5.3.12 The Option of extending Runway 11-29 at both ends considered for this budget costing exercise is illustrated on Figure 10.

5.3.13 The scheme shown and costed provides a 2640m long runway by extension at both ends of the runway. In this option the runway extends to the east such that the runway does not have any impact on the N1, with the remainder of the extension to the west.

5.3.14 The costed scheme includes:

- 2640m runway with parallel taxiway and single entrance taxiways at each end including an estimate of the earthworks required to provide acceptable gradients on the runway and an appropriate drainage system.
- A perimeter road around the boundary of the airfield positioned to allow for the provision of ILS.
- Diversion of the Northern Diversion and Naul Roads to allow for the recommended Runway End Safety Area at the western end of the runway.
- ILS systems for both directions.
- Other airfield services including aviation ground lighting, substations, HV and Communications ring mains, fire hydrant system.
- Allowances for General and Preliminary items, Fees, Charges, Mitigation and Risk.
- Allowance for Land Purchase based on recent market transactions.
- Allowance for the replacement of stands rendered unusable as they lie within the instrument strip of the extended runway.

5.3.15 Analysis of this option is given in Table 10 with the more detailed build-up of the cost in Table 12.



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KEY

- MINIMUM EXTENT OF PAVEMENT
- PUBLIC HIGHWAY DIVERSIONS
- PERIMETER ROAD
- EXISTING LAND BOUNDARY
- FUTURE LAND BOUNDARY
- LAND TO BE PURCHASED

DUBLIN AIRPORT
RUNWAY 10L – 28R

Drawing Title

EXTENSION OF RUNWAY 11 – 29
(EXTENSION TO EAST AND WEST)

THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED AND ONLY WRITTEN DIMENSIONS SHALL BE USED

Drawing Number
KECSB/SK/17

FIGURE 10

Scale at A1 1:6000

Drawn	Detailed		Approved
AP			A.I.EVANS
Checked	Tech Chk	Det Chk	Date
AIE			21.11.02

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Elements	Appraisal	Notes
Description of Option	Extension of Runway 11-29 to 2640m long by extending to both the east and west with provision for operation with Instrument Flight Rules.	
Description of the Impact on the Airfield	Provision of Instrument Approach on Runway 29 sterilizes the use of stands 5,6 and 7 and would require the demolition of Hangar 6. Engine Running Facilities require relocation. Possible wind shear issues associated with the proximity of Hangar 6.	Cost comparison ignores the impact on Hangar 6[9].
Description of the Impact on the Environment	The impacts arise both from the increasing levels of traffic and the additional land take compared with that identified in the Local Development Plan. The limitations on operational modes restrict the opportunities for mitigation of noise impacts.	
Description of Impact on Surrounding Lands and Property.	Extends into lands not owned by Aer Rianta (approx 31 ha to be purchased). Naul Road and Northern Diversion Roads require diversion.	Extension to east limited to that which avoids impacts on N1 and Hangar 6.
Capital Cost	€95.8 Million	Including re-provision of apron but excluding replacement of Hangar 6.
Land Purchase Cost	€7.4 Million	Recent Market Values for Land. Property compensation excluded.
Total Cost	€103.2 Million	
Capacity Potential (Movements)	30 movements	In ultimate development
Cost per Potential Capacity Movement	€3.4 Million/movement	In ultimate development

TABLE 10 –ASSESSMENT OF 11-29 EXTENSION AT BOTH ENDS

[9] The cost of replacing Hangar 6 has been neglected in the cost estimate because some operational modes can be conceived that would not require it to be demolished. However, these would impose significant limitations on operations. Furthermore, for the same level of provision, the parallel runway option would not be more expensive as can be seen from inspection of Table 12.

5.4 Summary

5.4.1 The description of the impacts of each option are summarised in Table 11.

5.4.2 Outline costs of Construction and Land, broken down by major element, are tabulated for comparison in Table 12.

5.4.3 Examination of the budget costs shows that the capital cost of the works is similar, at between €90M and €100M, in the parallel runway option and the two extension options involving extensions to the west. The costs of the modifications to the main highway network from an eastern extension make this option prohibitively expensive even before land and other costs are included.

5.4.4 However, when land and other compensation costs are added to the capital costs, the extensions to 11-29 become slightly more expensive. This is because the western portion of the extension requires land outside Aer Rianta's ownership. If the extent of the western portion of the extension is reduced to reduce the amount of land required, then existing apron space would need to be replaced and mitigation of the impacts to property at the eastern boundary of the Airfield would be required.

5.4.5 Furthermore, with respect to the replacement of other facilities, these costs do not include replacement of Hangar 6. Hangar 6 penetrates the Obstacle Limitation Surfaces for Instrument Approaches in each option considered for the extension of 11-29. The IAA in their letter to Aer Rianta of 6 December 2002 have indicated that they would not approve a proposal that would give rise to penetrations of the obstacle limitation surfaces. For Take Off Operations on Runway 11, it would form a significant obstacle and would have to be declared on the Type A Chart (as at present). The presence of such an obstacle could significantly reduce the capability of Runway 11 for Take-Offs. The cost of replacing this facility is estimated to be in excess of €50M. If such a cost were to be added to any of the schemes, then they would be ruled out on cost grounds.

5.4.6 The significantly greater functionality and ultimate capacity (over 40% more additional capacity can ultimately be delivered), coupled with a similar level of cost, makes the parallel runway option significantly superior in cost-effectiveness terms. If replacing Hangar 6 is required to give the capability for instrument operations, as requested by airlines, then the parallel runway option becomes even more overwhelmingly attractive.

Elements	**Parallel Runway Option**	**Options to Extend Runway 11-29**		
		Extension to West	**Extension to East and West**	**Extension to East**
Description of Option (Runway Length)	Parallel Runway 2640m long with provision for operation with Instrument Flight Rules.	Extension of Runway 11-29 to 2640m long by extending to the west with provision for operation with Instrument Flight Rules.	Extension of Runway 11-29 to 2640m long by extending to both the east and west with provision for operation with Instrument Flight Rules.	Extension of Runway 11-29 to 2640m long by extending to the east with provision for operation with Instrument Flight Rules.
Description of the Impact on the Airfield	Limited impact on airfield as recent developments have taken this option into account. Fire Training ground and Engine Running Facilities require relocation.	Provision of Instrument Approach on Runway 29 sterilizes the use of stands 5,6 and 7 and would require the demolition of Hangar 6. Engine Running Facilities require relocation.	Provision of Instrument Approach on Runway 29 sterilizes the use of stands 5,6 and 7 and would require the demolition of Hangar 6. Engine Running Facilities require relocation. Possible wind shear issues associated with the proximity of Hangar 6.	Provision of Instrument Approach on Runway 29 sterilizes the use of stands 5,6 and 7 and restricts access to Hangars. Provision of fully instrumented runway would require the demolition of Hangar 6. Engine Running Facilities require relocation.
Description of the Impact on the Environment	The principal impact arises from the increasing levels of traffic rather than from the land take issues as this land has been identified for a runway for many years.	The impacts arise both from the increasing levels of traffic and the additional land take compared with that identified in the Local Development Plan. The limitations on operational modes restrict the opportunities for mitigation of noise impacts.	The impacts arise both from the increasing levels of traffic and the additional land take compared with that identified in the Local Development Plan. The limitations on operational modes restrict the opportunities for mitigation of noise impacts.	The impacts arise both from the increasing levels of traffic and the additional land take compared with that identified in the Local Development Plan. The limitations on operational modes restrict the opportunities for mitigation of noise impacts.
Description of Impact on Surrounding Lands and Property.	Lands have been purchased for this option. Diversions of the Naul Road and Forrest Little Road are required.	Extends into lands not owned by Aer Rianta (approx 47 ha to be purchased). Naul Road and Northern Diversion Roads require diversion.	Extends into lands not owned by Aer Rianta (approx 31 ha to be purchased). Naul Road and Northern Diversion Roads require diversion.	Extends into lands and over property not owned by Aer Rianta (approx 14 ha to be purchased and properties affected include Coachman's Inn, the Ulster Bank, Garden Centre, Castlemoate House and a number of private dwellings). Naul Road and Northern Diversion Roads require diversion to accommodate recommended RESA at western end of runway. N1 diverted into tunnel. Possible modifications to M1 lighting.
Provision in County Plan	Included in County Plan.	No provision for a runway of this length or activity in the County Plan		
Total Cost (inc Land) (see Table 12)	€101.1 Million	€103.9 Million	€103.2 Million	€158.6 Million
Capacity Potential	43 movements	30 movements	30 movements	30 movements
Cost per Potential	€2.4 Million/movement	€3.5 Million/movement	€3.4 Million/movement	€5.3 Million/movement

TABLE 11 – COMPARISON OF ALTERNATIVE CONCEPT OPTIONS

Element	Provide Parallel Runway		Extend Runway 11-29						Notes
	Principal Quantity	Cost (€M)	Western Extension		Eastern and Western Extensions		Eastern Extension		
			Principal Quantity	Cost (€M)	Principal Quantity	Cost (€M)	Principal Quantity	Cost (€M)	
General and Preliminaries	17.5%	10.3	17.5%	8.5	17.5%	8.5	17.5%	11.0	
Fencing, Crash Gates etc	6,500m	1.4	4,324m	0.9	3,650m	0.8	4,500m	0.9	
Site Clearance and Demolitions	146.5ha	1.9	86 ha	1.8	100 ha	1.8	100 ha	2.5	Differences related to extent of property affected.
Earthworks	item	10.4	item	7.6	item	5.7	item	25.1	Major embankment to cross over N1.
New Runway Construction		12.3		6.0		6.0		6.0	
Runway Refurbishment		0		5.0		5.0		5.0	
New Taxiway Construction		5.6		4.9		6.7		4.7	Replace stands lost outside hangars.
Drainage	7,780m	9.1	3,780m	7.1	4,480m	7.7	3,780m	7.1	
Services, AGL, Navaids etc	item	10.9	item	10.9	item	10.9	item	10.9	No significant difference.
Perimeter Road	5,500m	1.6	3,941m	1.1	4,500m	1.3	1,500m	0.4	Limitations on extent of Perimeter Road in eastern extension options.
Highway Diversions	2,750m	4.0	4,950m	7.3	3,750m	5.6	1,850m	39.5	Allows for Tunnel for N1 in full eastern extension.
Miscellaneous Works	item	2.9	item	2.6	item	6.2	item	5.0	Allows for some re-provision of lost facilities in eastern extension options.
Landscaping & Associated Mitigation	item	3.7	item	3.7	item	3.7	item	3.7	No significant difference.
Fees, Charges, Other Mitigation and Risk	item	27.0	item	25.2	item	25.9	item	33.4	
Total Works Cost		**101.1**		**92.6**		**95.8**		**155.2**	
Land (Current Market Value)	0ha	0	47 ha	11.3	31 ha	7.4	14 ha	3.4	
Total Including Land		**101.1**		**103.9**		**103.2**		**158.6**	

TABLE 12 – BUDGET COST ESTIMATES OF ALTERNATIVE CONCEPT OPTIONS (EXC REPLACEMENT OF HANGAR 6)

5.5 Sensitivity to Runway Length

Introduction

5.5.1 The length of runway assumed in Sections 5.2 and 5.3 of this Chapter was chosen to:

- ensure adequate capability for departing aircraft as assumed in the assessment of capacity by NATS.
- provide the minimum length requested by users in Stakeholder Consultation in Autumn 2002.

5.5.2 This section considers the sensitivity to this assumption.

Longer Runway

5.5.3 Cost comparisons for longer runways would be more favourable to the Parallel Runway Option because of increasing Land Take and Costs (see Table 12).

Shorter Runway

5.5.4 A shorter runway would not completely fulfil the conditions set out in the NATS Study as set out in 3.4.4. In particular, not all Category C Aircraft could use it and if pilots would not accept the shorter runway when requested delays would increase or capacity reduce because the assumption of near segregated mode would not be achieved.

5.5.5 However, to test the sensitivity to runway length, a further budget costing exercise has been carried out to compare 2,100m runway options, which would be suitable for many European Short Haul services by adjusting the cost model for the 2640m runway options.

5.5.6 The cost comparison of these two options is set out in Table 13.

5.5.7 This comparison is based on:

- The extension of Runway 11-29 at both ends, because this option had the lowest cost of the Runway 11-29 options.
- The same assumptions as given in Section 5.3.14 but with a runway length of 2100m in each case.

5.5.8 The comparison assumes that the perimeter road and highway diversions would be shortened to minimise the land take outside Aer Rianta's ownership. This would either limit the ability to further extend Runway 11-29 in the future or increase future costs.[10].

5.5.9 This comparison does not take into account the possible savings that could be made on a parallel runway scheme to take advantage of the increased flexibility of operations possible with such a configuration.

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[10] If the land for an extension to 2640m is acquired and protected, then the cost comparison would be similar to that set out in Table 12 except the works costs would be reduced by the same amount in both cases. The cost comparison would, therefore, still favour the parallel runway option.

Element	Provide Parallel Runway		Extend Runway 11-29		Notes
	Principal Quantity	Cost (€M)	Principal Quantity	Cost (€M)	
General and Preliminaries	17.5%	9.0	17.5%	7.5	
Fencing, Crash Gates etc	6,500m	1.4	3,650m	0.8	
Site Clearance and Demolitions	146.5ha	1.9	100 ha	1.8	Differences related to extent of property affected.
Earthworks	item	8.2	item	5.0	
Pavements		14.4		13.9	Replace stands lost outside hangars.
Drainage	6,200m	7.9	3,480m	6.6	
Services, AGL, Navaids etc	item	10.8	item	10.8	No significant difference.
Perimeter Road	5,500m	1.6	4,500m	1.0	
Highway Diversions	2,750m	4.0	3,750m	5.6	
Miscellaneous Works	item	2.5	item	6.0	Allows for some re-provision of lost facilities in eastern extension options.
Landscaping & Associated Mitigation	item	3.7	item	3.7	No significant difference.
Fees, Charges, Other Mitigation and Risk	item	24.7	item	23.9	
Total Works Cost		**90.1**		**86.6**	
Land (Current Market Value)	0ha	0	15 ha	3.6	
Total Including Land		**90.1**		**90.2**	

TABLE 13 – COST COMPARISON OF 2100M RUNWAYS (SENSITIVITY)

5.5.10 The comparison shows that at a length of 2100m, there is still no saving against a comparable parallel runway option. The additional capacity and functionality of the parallel runway option would therefore still make it the preferred concept.

6. CONCLUSIONS & RECOMMENDATIONS

6.1 Conclusions

6.1.1 The planned approach to development of runway capacity at Dublin Airport was established in Master Plan Studies in the 1960's. The approach determined at that time was to provide parallel runways aligned east to west when the level of traffic was sufficient to require additional runway capacity.

6.1.2 The first of the parallel runways was opened in 1989 and the development of the Airport has continued to proceed on the basis that the northern parallel runway would be constructed when traffic levels required it. Underpinning this development strategy has been the assumption that the three runways 10-28, 11-29 and 16-34 do not together have significantly more capacity than a single runway.

6.1.3 To test and quantify this assumption, a detailed study of airfield capacity was carried out by NATS.

6.1.4 The NATS study shows that there are no improvements that can be made, either in infrastructure or procedures, short of a major runway extension or a new runway, which can deliver significantly more capacity than is available from the existing Main Runway. Estimates of the additional capacity available without major investment in runway infrastructure range from 4 to 10 additional declarable movements per hour.

6.1.5 The realisation of the higher value depends on the improvement of procedures and their acceptance by users. In particular, users would have to accept the use of a runway substantially shorter than the longest available and in-use at all times and some of the improvements involve complex procedures that may not be achievable in practice.

6.1.6 The primary factors limiting this capacity are:

- The restriction that the length of Runway 11-29 imposes on the categories of aircraft that can use it.
- The inability to overcome the visual requirement on Runway 11-29.
- The complexities of the procedures to operate in mixed mode operation on Runways 10-28 & 11-29.

6.1.7 The conclusion of the NATS Study is, therefore, that to significantly increase runway capacity major investment in runways is required, confirming the analysis underpinning the Master Planning.

6.1.8 Two possible concept options for runway investment were identified in the NATS Study. These were:

- Extension and upgrading of the existing near parallel runway 11-29, which overcomes the first two items listed in 6.1.6 above.
- Provision of a replacement for runway 11-29 parallel to the existing main runway, which overcomes all three items listed in 6.1.6 above.

6.1.9 These two concepts were compared, taking into account all relevant factors. The analysis shows that apart from the potential for reuse of the existing pavement and associated infrastructure in the case of the option to extend Runway 11-29, and therefore the potential reduction in capital cost, the option to provide a parallel runway is an equal or better option in all respects.

6.1.10 In particular, a parallel runway:

- Has a greater capacity
- Provides greater operational flexibility
- Has less impact on other facilities within the airport
- Has no greater environmental impact
- Is more likely to be given planning permission, as it has been part of the County Plan since 1972 and therefore does not extend the footprint and impact of the aerodrome beyond areas set out in Local Planning Guidance.

6.1.11 The significance of the potential cost reduction was examined by comparison of a number of options. In all cases, when the extent of improvement to the existing Runway 11-29, the land purchase required, and the replacement of other airport facilities were taken into account, the option to extend Runway 11-29 was found to be at least as expensive as a parallel runway.

6.1.12 The parallel runway remained no more expensive even when compared with a runway some 500m shorter than the existing main runway.

6.1.13 The additional capacity deliverable from the parallel runway option for similar level of cost to that of the alternative of extending Runway 11-29 means that the parallel runway option is significantly more cost-effective.

6.2 Recommendations

6.2.1 Additional capacity, beyond that of a single runway, should be provided by a new runway, parallel to the existing Main Runway 10-28, located as set out in the Master Plan and indicated in the County Plan.

6.2.2 This runway would replace the existing Runway 11-29.

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