



Programme of Airport Campus Enhancement

Submission to Commission for Aviation Regulation

December 2017

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01 EXECUTIVE SUMMARY



01. EXECUTIVE SUMMARY

Dublin Airport is applying to the Commission for Aviation Regulation (CAR) for the inclusion in the 2014 Determination of a supplementary capital expenditure (capex) allowance for the period 2018-2020, in accordance with the process as set out in Commission Paper 7/2016.

1.1. 2014 Determination

In its 2014 Determination, which covers the five-year period 2015-2019, CAR provided Dublin Airport with capital investment allowances to support growth in passenger volumes from 21.7 million (2014) to a forecast level of 24.8 million passengers per annum (mppa) in 2019.

However, since the publication of the 2014 Determination, both the global and local macroeconomic climates have dramatically improved across a broad range of key indicators, which has fuelled a surge in passenger demand to and from Dublin Airport from 18.4mppa in 2010 to 27.9m in 2016. During 2015 and 2016, passenger volumes at Dublin Airport increased by 15.4% and 11.4% respectively; significantly exceeding the consensus forecasts developed in 2014. Dublin Airport's current demand outlook for 2017-2019 remains positive, with 6% traffic growth recorded in the first half of 2017. The latest near-term forecasts indicate an unconstrained demand opportunity of up to 32 mppa by the end of this decade. This corresponds to an anticipated level of activity in 2019 that is approximately 7.2 mppa, or 29%, greater than the 2014 Determination.

This significant increase in annual activity (both in passenger and aircraft volumes) has placed an elevated strain on existing airport infrastructure, with certain facilities nearing or already operating at maximum capacity throughout 2017. Limited surplus capacity is available to support the unconstrained demand requirements for the period 2018-2020. The capital allowance granted in 2014 is insufficient to deliver the necessary infrastructure required to facilitate current and future customer demand to the end of this regulatory period.

1.2. Capacity Assessment

Dublin Airport undertakes a comprehensive assessment of capacity across the key processing facilities on an annual basis. This 2017 capacity assessment highlighted that immediate capacity enhancements are required in respect of the following operational processors:

- Aircraft parking stands.
- Taxiways.
- Gates and associated bussing routes.
- Terminal 2 check-in.
- US Preclearance.
- Terminal 1 Central Immigration.

1.3. Capacity Management Consultation

Dublin Airport commenced a review process in late 2016 to assess the levels of capacity headroom across the airport campus and undertook a mid-determination review of user requirements. We engaged with airport users to understand future customer demand requirements and the supplementary infrastructure required to deliver growth requirements for the remainder of the decade. All airport users were invited to respond to several key questions pertaining to airport infrastructure and their associated requirements as customers/users. A detailed consultation document was issued to approximately 115 individuals, representing a total of 45 organisations operating at Dublin Airport.

1.4. Programme of Airport Campus Enhancement (PACE)

Dublin Airport began a review to identify targeted solutions to address customer requirements and specific capacity deficits across the airport campus. This review focused on the core aeronautical business; specifically, passenger processing facilities and airfield efficiency. A number of possible solutions were identified and evaluated under a set of key principles:

- Drivers are to support additional demand opportunities, alleviate known capacity constraints, and improve user and customer experience.
- Conceptually, this is a 'Needs-Must' process. There is limited flexibility for opportunistic or 'nice to have' projects.
- Projects must maximise cross-usage, flexibility and interoperability.
- Projects must have an accelerated delivery profile.
- Projects must be cost efficient and effective.

A total of 28 projects were identified of which 16 were being proposed by Dublin Airport for consultation with

stakeholders. It should be noted a number of projects required acceleration in advance of formal consultation to ensure traffic demand requirements could be met in 2017. Support for these fast-tracked projects was received from users who would be using the accelerated infrastructure.

No.	Category	Project	Cost €m
1	Passenger Processing	Terminal 1 and Terminal 2 Common User Self Service (CUSS) Check-in	5.9
2		Terminal 1 and Terminal 2 Immigration Facilities	11.3
3		Pier 1 Extension	7.6
4		South Apron Pre-Boarding Zone (PBZ)	22.0
5	Stands and Associated Projects	South Apron Stands Phase I	10.5
6		Apron 5H and Taxiway Rehabilitation	52.0
7		Realignment of Stands 101-104	5.0
8		Hangar 1 and Hangar 2 Stands	14.3
9		West Apron Stands	2.5
10		Pier 2 Underpass Widening	5.0
11		Pier 3 Underpass Widening	0.2
12		West Apron Surface Access	3.0
13	Airfield/Taxiways	Link 3 Taxiway	4.0
14		Realignment of Taxiway A	5.7
15		Dual Taxiway F	15.5
16		Link 6 Taxiway	5.1
Total – 16 Projects			169.6

Pre-consultation was carried out with a number of key stakeholders during the summer period in 2017. Stakeholders were invited to meetings where detailed presentations were provided on infrastructure requirements, the options available and the rationale for specific projects being proposed. At these sessions, we received informal feedback with one stakeholder providing written feedback following the meeting.

1.5. Supplementary Capex Consultation

Following the pre-consultation stage, a detailed consultation document issued to all stakeholders. The document outlined full details and justification for these proposed projects and was circulated to a total of 50 airport users on 5 October

2017. This document is titled ‘Programme of Airport Campus Enhancement’ (PACE) dated October 2017 and is published alongside this document.

Dublin Airport held consultation meetings on 25 and 26 October 2017, which were attended by 12 stakeholders. CAR chaired these meetings and provided minutes of the two-day consultation meetings to stakeholders on 6 November 2017. These meetings provided an in-depth explanation of the proposals contained in PACE and provided airport users with an opportunity to fully consider the individual capital investment projects being proposed. Dublin Airport received final written comments from four airport stakeholders in relation to this PACE consultation process on 13 November 2017. Respondents expressed support for the proposed

projects but there was also dissatisfaction regarding a number of potential projects that had not been included in the PACE Consultation Document.

As part of the PACE consultation process on the 25 and 26 October 2017, the following seven specific capital investment projects were identified by airport users/stakeholders as being a specific immediate capacity requirement at Dublin Airport:

- Fixed Electrical Ground Power (FEGP).
- South Apron Stands Phase 2.
- South Apron Taxiway Widening (Dual Code E).
- Advanced Visual Docking Guidance System (A-VDGS)
- Additional Bus Gates.
- Runway 10 Line Up Points and Bypass Taxiway.
- Apron Wide CCTV.

In addition to the seven projects listed above, an airport user stated that it was necessary to amend the proposed Dual Taxiway F project in order to accommodate dual Code E – Code E operations.

Our PACE submission has been revised to incorporate feedback received from airport users during the consultation. In summary, the 16 projects originally proposed in October 2017 are included in this submission, albeit with a revised recommended option for Dual Taxiway F, and the 7 projects listed above have been added to comprise a suite of 23 capacity enhancing projects.



No.	Category	Project	Cost €m
1	Passenger Processing	Terminal 1 and Terminal 2 Common User Self Service (CUSS) Check-in	5.9
2		Terminal 1 and Terminal 2 Immigration Facilities	11.3
3		Pier 1 Extension	7.6
4		South Apron Pre-Boarding Zone (PBZ)	22.0
5		Additional Bus Gates	8.7
6	Stands and Associated Projects	South Apron Stands Phase I	10.5
7		Apron 5H and Taxiway Rehabilitation	52.0
8		Realignment of Stands 101-104	5.0
9		Hangar 1 and Hangar 2 Stands	14.3
10		West Apron Stands	2.5
11		Pier 2 Underpass Widening	5.0
12		Pier 3 Underpass Widening	0.2
13		West Apron Surface Access	3.0
14		Advanced Visual Docking Guidance System (A-VDGS)	5.0
15		Fixed Electrical Ground Power (FEGP)	4.6
16		South Apron Stands Phase 2	37.8
17		Apron Wide CCTV	1.1
18		Airfield/ Taxiways	Link 3 Taxiway
19	Realignment of Taxiway A		5.6
20	Dual Taxiway F (Dual Code E)		39.5
21	Link 6 Extension Taxiway		5.8
22	South Apron Taxiway Widening (Dual Code E)		14.7
23	Runway 10 Line-Up Points		16.8
Total – 23 Projects			283.9

Dublin Airport is seeking from CAR, an interim review of the 2014 Determination, to consider a supplementary capital investment allowance of €283.9m. Approval is necessary to proceed and complete the suite of capacity-enhancing capital investment projects listed above. In the absence of such, existing infrastructure at Dublin Airport cannot accommodate the level of passenger growth expected in the near term. Furthermore, passenger experience and service quality levels at Dublin Airport will suffer without the delivery of these necessary capital projects.

02 SUBSTANTIAL GROUNDS



02. SUBSTANTIAL GROUNDS

A substantial ground exists to review the 2014 Determination as existing capacity and infrastructure at the airport is not sufficient to accommodate the expected traffic levels to the end of the regulatory period, despite investment over the period 2015 to 2017 through the Capital Investment Plan (CIP).

CAR's statutory objectives are to:

1. *"To facilitate the efficient and economic development and operation of Dublin Airport which meet the requirements of current and prospective users of Dublin Airport;*
2. *To protect the reasonable interests of current and prospective users of Dublin Airport in relation to Dublin Airport; and*
3. *To enable Dublin Airport Authority to operate and develop Dublin Airport in a sustainable and financially viable manner.*

In line with these objectives and with specific regard to objective 1 above, we believe the current situation at Dublin Airport and that envisaged to the end of the regulatory period, is no longer in line with the objective and gives rise to a substantial ground to review the 2014 Determination for a supplementary capex allowance.

The substantial grounds upon which Dublin Airport is applying to CAR for the inclusion in the 2014 Determination of a supplementary capital allowance for the period 2018-2020 is demonstrated by:

- Capital Investment Allowance 2014 Determination.
- Traffic Growth at Dublin Airport.
- Changes to the Traffic Composition at Dublin Airport.
- Future Traffic Demand.
- Capacity Assessment and Shortages.

2.1. Capital Investment Allowance 2014 Determination

Dublin Airport's Capital Investment Plan (CIP) for the current pricing/regulatory period estimated that passengers, under a 'core' forecast, would grow gradually by 3% per annum from 21.2 million passengers per annum (mppa) in 2015 to 23.6mppa in 2019. Based on this traffic forecast, we determined that a non-trigger capital investment of €396m would be required to facilitate the expected level of activity in the period. This capital allowance acknowledged that the economic environment at the time remained fragile. In its 2014 Determination, CAR forecasted passenger volumes to

grow by 3% per annum from 22.1mppa in 2015 to 24.8mppa in 2019. In setting its 2014 Determination, CAR provided an allowance for a total of €341m non-triggered capital investment to accommodate 24.8mppa including a business development allowance of €67m to accommodate an additional 3mppa by the end of 2019.

The €341m allowance granted was mainly for essential airfield, landside, terminal and commercial maintenance and revenue generation projects. The Business Development allowance of €67m represented 20% of the overall capital allowance (€341m) and was geared towards capacity enhancing capital projects.

2.2. Traffic Growth at Dublin Airport

Since the publication of the 2014 Determination, both the global and local macroeconomic climates have dramatically improved across a broad range of key indicators, which has fuelled a post-recessionary surge in passenger demand to and from Dublin Airport. Double-digit traffic growth was delivered in the opening two years of the current regulatory period (15.4% in 2015 and 11.4% in 2016). Throughout this period, the level of activity at Dublin Airport crossed 25 mppa (million passengers per annum), with Dublin Airport maturing to the Airports Council International (ACI) Category One airport classification. Thus, Dublin Airport is now in the same category as other European airports with more than 25mppa, including London Heathrow, London Gatwick, Amsterdam and Paris CDG.

2.3. Changes to the Traffic Composition at Dublin Airport

A number of specific changes to the dynamics and composition of traffic at Dublin Airport have emerged since the 2014 Determination. While these changes – listed below – have positively contributed to passenger growth and aircraft movements, they have also placed a strain on certain modules of airport infrastructure during specific times of the day.

- Traffic growth at the airport since 2014 has largely been driven by base carriers (78% of the 6.2m incremental passengers in 2016 over 2014), resulting in a higher than anticipated level of demand for overnight aircraft parking stands and an elevated peak first wave of shorthaul departures between 06:00-08:00.
- Transfer passenger volumes have increased by 56% in 2016 over 2014. This expanding key segment of business is now a significantly larger share of overall traffic compared to what was anticipated in 2013 and 2014 in advance of finalising the Determination. The transfer model typically involves aircraft arriving from North America between 05:00-06:00, which by extension displaces short-haul aircraft from contact pier stands to remote or satellite locations for the first wave departure period. The development of the transfer

business is expected to continue, requiring an incremental supply of narrow-body aircraft stands by 2019.

- There has been a significant change to Ryanair's customer service model and the ownership structure of Aer Lingus (the two largest carriers based at Dublin Airport). This will impact on future business plans and facilities requirements of both airlines at Dublin Airport.
- The number of scheduled airlines at Dublin Airport in Summer 2017 has increased to more than forty carriers (an increase of ten since 2014).
- Scheduled movements have increased by 30% in Summer 2017 compared to 2014.
- Long-haul traffic has become a significant component of Dublin Airport's business in recent years and is projected to account for 15% of total traffic in 2017. Long-haul traffic has grown by 50% over the period 2013-2016, with further strong growth predicted for 2017. Growth in long haul traffic has generated a need for additional aircraft parking at peak times of the day.
- There has been an increase of 127% (50 vs. 22) in widebody movements on the peak summer day in 2017 compared to 2014.
- The strong resurgence in Irish outbound leisure demand has resulted in a 26% increase in peak 2016 summer capacity to Mediterranean resorts compared to in 2014.
- Three 5 star airlines at Dublin Airport now run ten daily services to and from the Middle East, which amounts to over one million annual seats.
- There have been increases in flight frequency and capacity to core European destinations such as Amsterdam, Hamburg, Paris Orly, Helsinki, Porto, Athens and Berlin, with one million additional passengers in 2017. Airlines contributing to the growth include Ryanair, KLM, Aer Lingus, Transavia, Finnair, Norwegian and SAS.
- Growth in traffic has been driven by 'Other' carriers over the last two years. This is a 4.2m increase on 2015. 68% of the growth is driven by 'Other' carriers and 32% by base carriers. This contrasts to annual growth in 2015, in which base carriers drove 77% of the growth.

2.4. Future Traffic Demand

Dublin Airport forecasts indicate a continuation of unconstrained demand growth at Dublin Airport through 2018 and 2019. The key components of growth in 2018 and 2019 are detailed below:

- Continuation of double-digit growth in transfer traffic (potentially new transfer business partnerships).
- Continuation of double-digit growth from non-base carriers.
- New long-haul services by new entrant carriers.
- Continuation of expansion on the North Atlantic, through up-gauging of aircraft equipment, additional frequencies (especially in the winter season), and the extension of the operating season.
- No growth expected in UK traffic.
- Increased capacity deployed to core Mediterranean destinations.

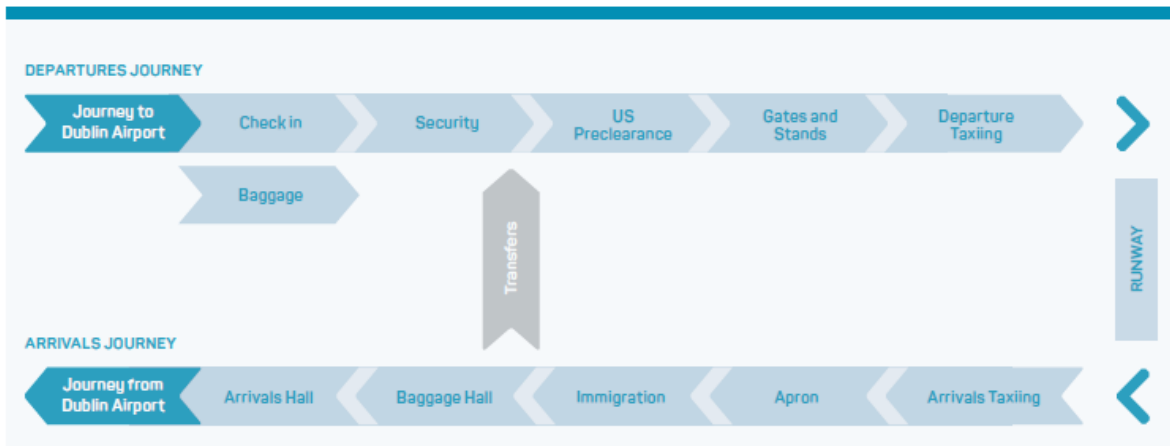
Substantial traffic growth combined with changes in the composition of the market have led to serious implications for the capacity of a number of operational processors at Dublin Airport.

2.5. 2017 Capacity Assessment

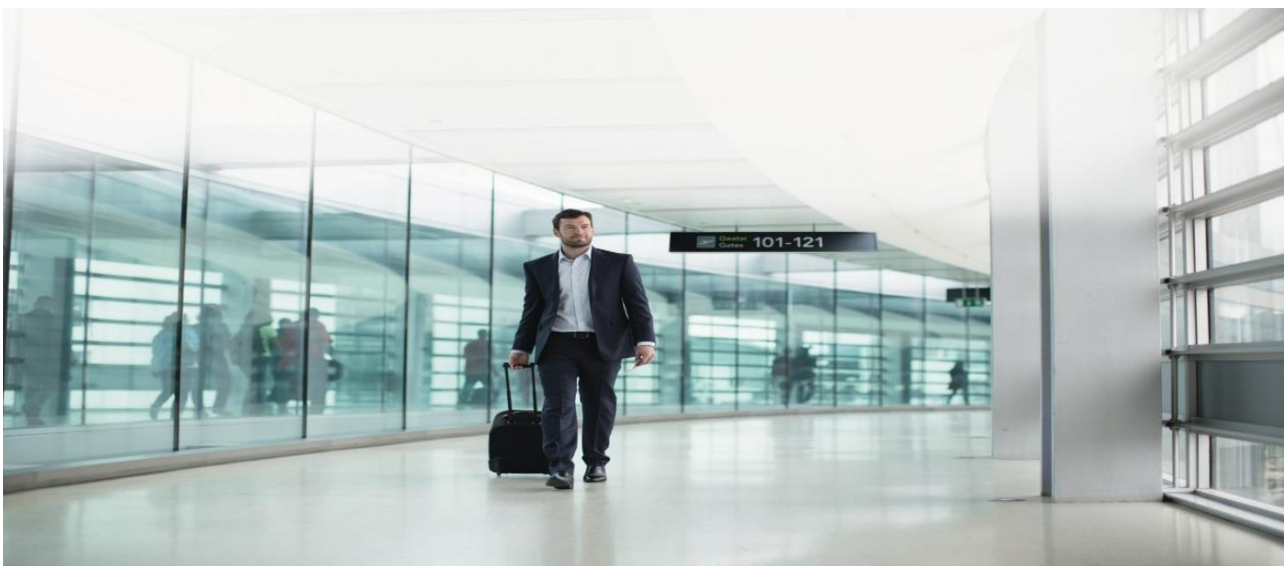
Dublin Airport undertakes a comprehensive assessment of capacity across the key processing facilities on an annual basis. This process ultimately identifies and flags operational processors that are currently at or nearing maximum capacity. Full details of this capacity assessment and its results can be found in the PACE consultation document.

The Dublin Airport capacity assessment process examines each of the airport's operational processors under the demand profile of the typical busy day and determines the relative capacity surplus or deficit through each module in the passenger and aircraft journey.

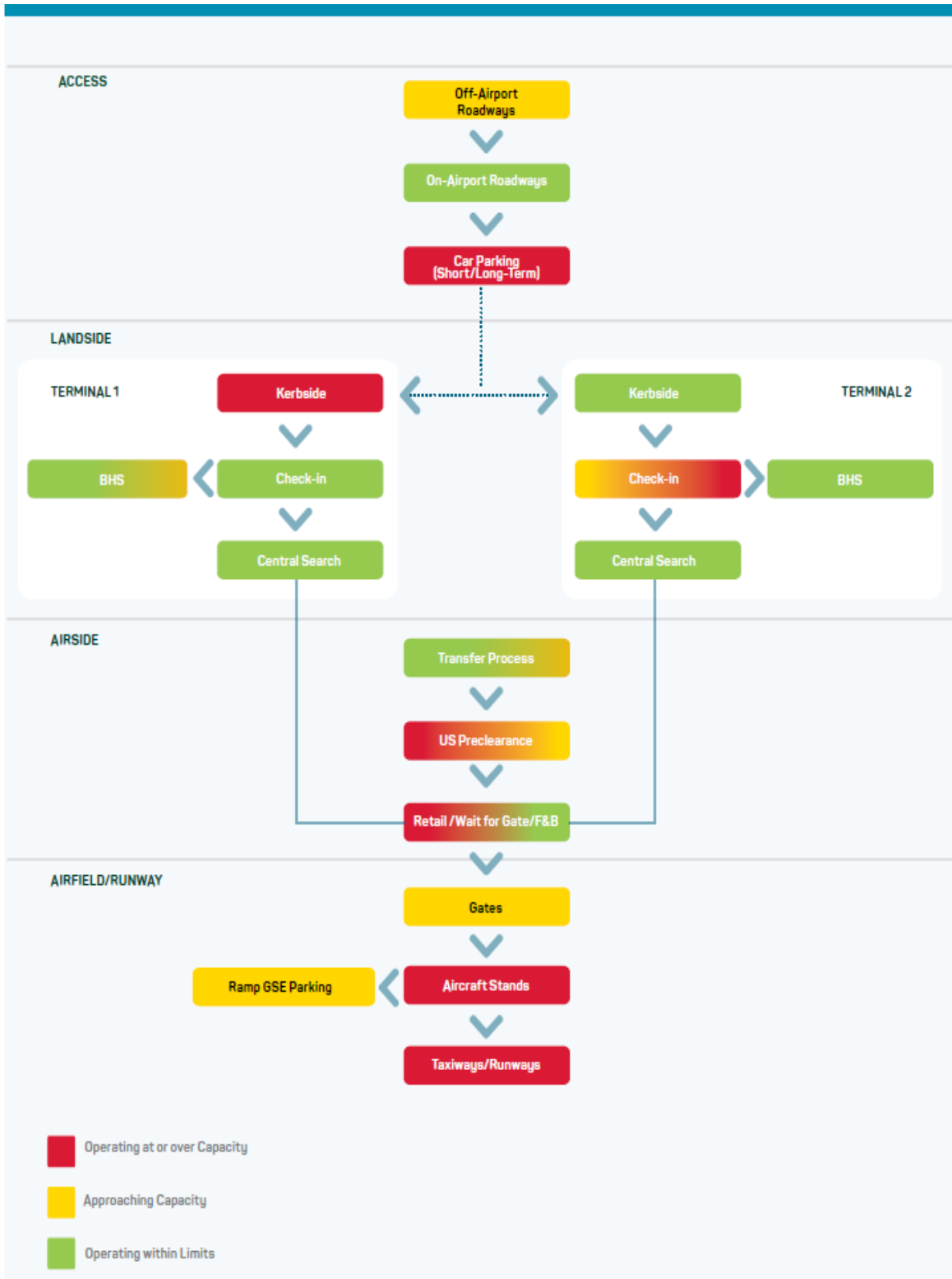




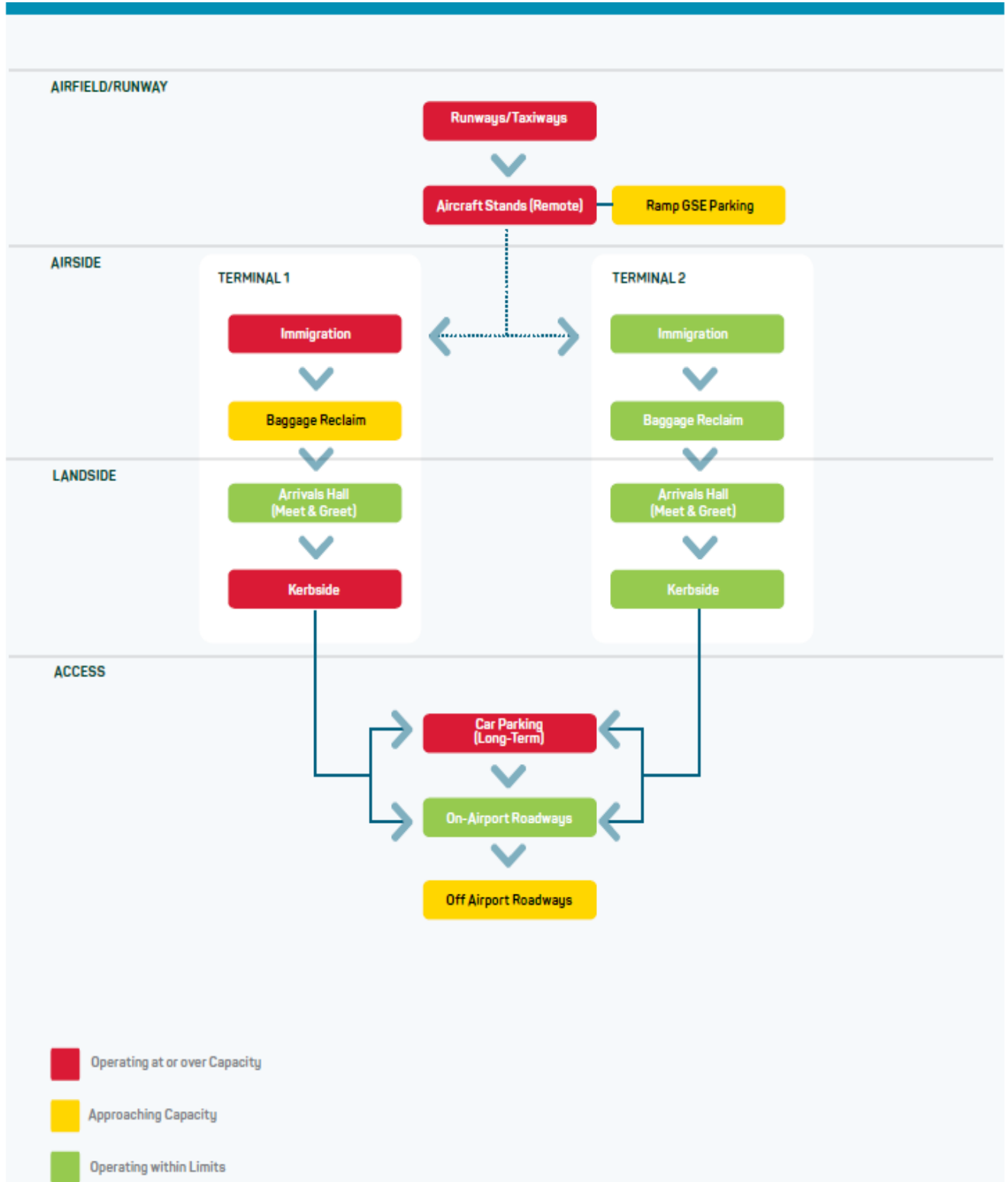
The following diagrams outline the primary departure and arrival processors at Dublin Airport. The colour coding identifies the output metrics from the 2017 capacity assessment; where green signifies a capacity surplus relative to current demand during the busy day in 2017; yellow signifies that the processor is operating at close to current capacity; and red flags where facilities are operating at capacity for their respective peak hours.



Departure Process - Design Day Capacity Summary



Arrivals Process - Design Day Capacity Summary



2.5.1. Capacity Shortages

The 2017 capacity assessment study highlights the following operational processors as critically requiring immediate capacity enhancements to maintain service quality levels and accommodate growth.

- **Aircraft parking stands** - There is an expected shortfall of eleven NBE stands to accommodate baseline 2019 demand. On this basis, a further twelve NBE stands are required to achieve the standard contingency ratio of 10% for medium-to-large airports.
- **Taxiways** - There is a requirement to improve the taxiway routing options (aircraft and tows); migrate traffic off the aprons, provide north-south two-way flows, design out taxiway restrictions and elevate operational safety.
- **Gates and associated bussing routes** - A gate shortage of seven for 2017. An additional four gates are required (on 2017) to accommodate 2019 demand levels.
- **Terminal 2 check-in** - Demand currently exceeds supply. Additional check-in capacity is required to support future growth.
- **US Preclearance** - Capacity constraints currently exist during peak periods, primarily resulting from a shortage in TSA processing capacity and a limitation in the number of contact stands adjoining the facility.
- **Terminal 1 Central Immigration** - The physical capacity of the Immigration facility serving Pier 1 and Pier 2 is inadequate to meet the current and forecast demand to 2019.

Limited surplus capacity is available to support the unconstrained traffic demand requirements at Dublin Airport for the near term. Dublin Airport urgently requires additional capacity if it is to accommodate traffic growth and continue to operate at current service standards during 2018-2020. The capital allowances granted in the 2014 Determination are now insufficient to deliver the appropriate infrastructure required to facilitate current and future customer demand to the end of this regulatory period.

Further information on all the above sections can be found in our PACE consultation document (pages 24-25).

2.6. Concluding Comment

The above factors all contribute to the existing infrastructure and capacity being limited and therefore unable to accommodate demand to the end of the regulatory period. This therefore constitutes the substantial grounds upon which Dublin Airport is applying to CAR for the inclusion in the 2014 Determination of a supplementary capital allowance

for the period 2018-2020 in accordance with the process as set out in CP7/2016.

03 CONSULTATION PROCESS



03. CONSULTATION PROCESS

In accordance with CP7/2016, Dublin Airport has consulted extensively with airport users and other relevant stakeholders on capacity requirements at Dublin Airport (to the end of the current regulatory period) and the associated necessary infrastructure. Our consultation involved the following three phases:

1. Capacity Management Consultation in Q3 2016
2. Pre-consultation (on Supplementary Capex Proposals) in Q2 and Q3 2017
3. Supplementary Capex Consultation in Q4 2017

Extensive engagement and information sharing has taken place between Dublin Airport and stakeholders to ensure all views are obtained and to ensure that the proposed projects identified in this submission reflect Dublin Airport and stakeholder requirements from a capacity enhancing perspective.

3.1. Capacity Management Consultation

In the second half of 2016, Dublin Airport undertook a mid-determination review of user requirements. A detailed consultation document was issued to approximately 115 individuals, representing a total 45 organisations operating at Dublin Airport. All airport users were invited to respond to several key questions pertaining to airport infrastructure and their associated requirements as customers/users. We encouraged detailed responses to the following key items:

- Do you consider that Dublin Airport has sufficient infrastructure and/or capacity to deliver your operational and service requirements for the period 2016-2019?
- Do you have any proposals regarding how the management of existing infrastructure at Dublin Airport could be improved?

We listed four potential tracks for addressing and alleviating any existing or emerging capacity constraints:

1. **Managed Solutions:** solutions that avoid the requirement to expand or create new infrastructure; i.e. investing in additional operating costs or technology expenditure to manage the constraint.
2. **Expand Infrastructure:** solutions which require an expansion to existing infrastructure or new infrastructure.
3. **Reduce Service Levels:** accepting a lower quality of service, as facilities would not be improved to accommodate higher volumes of activity.

4. **Constrain Demand:** an agreed acceptance not to expand infrastructure or increase capacity, which will constrain demand and limit growth.

Dublin Airport received eight written responses to the consultation (which represented a total of 11 individual organisations who operate at Dublin Airport). These organisations represented 84% of Dublin Airports traffic mix in 2016. We did not receive a unanimous response to a particular question or item, which is not unusual or unexpected, given the large number of diverse stakeholders represented and the degree of variation between business models and operating requirements. The detail of the responses varied from being general in nature to being highly specific considerations. In some cases, respondents focused on specific operational challenges and in some cases respondents made general remarks about Dublin Airport. Regarding capacity solutions, the responses received indicated a strong preference for progressing managed solutions and accelerating capital infrastructure projects. Based on this preference, Dublin Airport has implied that users are unwilling to accept a deterioration in service quality or an inability to grow their operations.

The below table summarises the airport facilities that users specifically flagged as either currently operating with capacity constraints or there is a view that capacity constraints will emerge before 2020.

Airport User	1	2	3	4	5	6	7	8
Facility/Processor:								
Terminal 1 Check-in Desks								
Terminal 1 Security								
Terminal1 Gates and Bus Lounges		•				•		
Terminal 1 Immigration	•							
Terminal 2 Check-in Desks	•			•	•	•		
Terminal 2 Security	•							
Terminal2 Gates and Bus Lounges	•		•	•	•			
Terminal 2 Immigration				•	•			
US Preclearance	•			•	•			
Transfer Facility	•		•					
Aircraft Parking Stands	•		•	•			•	•
Taxiway System	•			•				
Ground Service Equipment Parking	•		•			•	•	•
Baggage Hall						•		

A summary of stakeholder responses is provided below:

3.1.1. Passenger Processing

1. Check-in

A total of four responses were received specifically in relation to check-in facilities. All four responses focused on Terminal 2. Users expressed dissatisfaction with the current capacity and availability of check-in desks, which is creating congestion issues, delays in the processing of customers and in general and a poor level of customer experience. Users also expect the situation to worsen in the coming years if an enhancement solution is not immediately implemented.

Respondents also proposed the implementation of targeted managed solutions to address the capacity issues as opposed to investing in terminal infrastructure projects. The primary suggestion was the adoption of enhanced technology to facilitate self-service check-in and automated bag drop.

In parallel to this consultation process, a Shared Services Committee was set up to discuss Common User Passenger Processing (CUPP) and Common User Self-Service (CUSS) requirements. Eight airlines participated and continue to be involved in this process. They expressed an interest in adopting the latest technology, which is designed to improve passenger processing times, maximise the efficiency of the terminal floor-space and ultimately, enhance the customer experience.

2. Security

Dublin Airport received one response in relation to security screening in Terminal 2 and one response from a different user outside of this consultation process.

Dublin Airport had requested feedback from users on the capability of the screening processors to facilitate the unexpected introduction of the additional Explosive Trace Detection (ETD) requirements. The user responded that there is insufficient capacity in Terminal 2 to manage the current level of activity (the user also flagged that the implementation of Liquids, Aerosols & Gels (LAGS) Phase II is expected to decrease passenger processing times 'by as much as 15%'). Dublin Airport also requested feedback on how an airline's operation would be impacted if security screening capacity was reduced at peak times. The user responded that On Time Performance (OTP) would deteriorate due to late passengers arriving at the gate, which ultimately results in a poor passenger experience and customer proposition.

Outside of this consultation process, another airport user requested that Dublin Airport improve passenger processing rates in Terminal 1 through an improved usage of the existing resources. Based on the feedback received, only one operator considered there to be an existing or emerging capacity constraint at the passenger screening processor in Terminal 2.

3. Departure Gates and Bus Lounges

Six responses were received in relation to departure gates and bus lounges. All responses expressed a requirement for additional capacity across the airside campus. The proposals focused on managed solutions and additional infrastructure. In relation to piers, there was a specific request to extend Pier 1, a further request to re-use the lower gates on Pier 3 for bussing operations and a third request for the introduction of additional swing gates on Pier 4. There was also a specific request for the development of a pre-boarding zone (PBZ) in the South Apron and finally, a satellite building/pier on the

West Apron to better utilise the facility for passenger operations.

4. Immigration Facilities

Three responses were received in relation to the primary Immigration processing facilities in both terminals. One user commented that as an interim solution, they did not have an objection to passengers queuing along the Skybridge (Terminal 1), provided the queues were managed by either Dublin Airport or a handling agent. However, in the long-term, the user also noted that this situation would not be satisfactory or sustainable. One response was received in relation to Terminal 2 stated that congestion in Immigration was associated with passenger growth, which is a major concern. A final response stated that additional e-gates should be installed at the Immigration facilities.

5. US Preclearance Facility/Customs and Border Protection (CBP)

Three responses were received in relation to US Preclearance. All responses flagged that current capacity is an issue and options need to be considered to address this constraint. Users stated that they are not prepared to reschedule flights or consider remote stand operations as alternative mitigations. The solutions suggested were mainly procedural, but specific requests focused on introducing additional global entry kiosks, additional human resources and as a longer-term solution, expanded infrastructure to deliver a larger capacity facility.

6. Transfer Facilities

Two responses were received in relation to transfer facilities. One user requested the provision of dedicated bussing services for transfer passengers direct from the aircraft to the Transfer Facility on Pier 4. A second user requested that additional resources be introduced on the Dublin Airport Transfer Host Team, to facilitate increased interactions with connecting passengers.

3.1.2. Aircraft Parking Stands

A total of four responses were received in relation to aircraft parking. The feedback is summarised as follows:

- Lack of contingency stands.
- Additional infrastructure is required.
- Lack of available stands in certain piers is causing delays.
- Two respondents stated that any stands decommissioned must be replaced by an equivalent number of new stands. A further two respondents stated that the South Apron should be expanded, equivalent in size to the recently constructed apron 5G (which has the capacity to simultaneously accommodate 12 narrow-body aircraft).
- No user specifically noted a requirement for additional contact stands. However, one user did express the view

that Dublin Airport should strive to find suitable infrastructure to support the long-haul transatlantic product which includes US Preclearance facility and contact stand operations.

3.1.3. Taxiway System

Two responses were received in relation to the airport taxiway system. The responses stated that on-time performance is critical for an airport and that Dublin Airport's average taxiing time was unacceptable. Users suggested that solutions should focus on a mix of efficiency initiatives and also enhanced physical infrastructure projects. One user specifically provided a very detailed response with numerous managed solution and infrastructure projects suggestions which cross over between taxiway and runway solutions. Examples of suggestions included:

- Build more effective Rapid Exit Taxiways (RETs) and Rapid Access Taxiways (RATs); and
- Visual-docking guidance system and stand guidance systems could improve OTP and taxing times.

3.1.4. Runway/Air Traffic Management

The scope of this consultation focused on the existing primary Runway 10/28, as the new northern runway will deliver the longer-term capacity solution from 2021. Through the consultation process, one specific user provided feedback in relation to the runway system and air traffic management. A number of managed solutions were proposed, which predominantly relate to air traffic procedures. Responses addressing these proposals are included in Appendix A of the PACE consultation document.

3.1.5. Other Facilities

A number of users flagged issues with the availability of parking capacity for ground handling equipment on specific aprons. Finally, one user raised an issue in relation to the capacity of the Terminal 1 baggage hall.

3.1.6. Summary of Capacity Management Consultation

Eleven airport users (representing 84% of passenger traffic in 2016) responded in writing to this request for views and proposals. All 11 had specific concerns in relation to the current and projected levels of airport capacity over the remainder of the current regulatory period.

3.2. Pre-Consultation

Following the 'Capacity Management' consultation process, Dublin Airport commenced work on the Programme of Airport Campus Enhancement (PACE), taking into account feedback from the capacity assessment. Dublin Airport pre-consulted with a number of key available stakeholders over the summer

period in 2017. Stakeholders were invited to meetings where detailed presentations were provided on infrastructure requirements, the options available and rationale for specific projects being proposed. At these sessions, we received informal feedback with one stakeholder providing written feedback following the meeting. Dublin Airport considered all of the feedback received before taking a decision to proceed to a consultation with all stakeholders.

3.3. Supplementary Capex Consultation i.e. Dublin Airport's Programme of Campus Enhancement (PACE)

Following pre-consultation over the summer period, Dublin Airport finalised its consultation material for distribution to stakeholders. For PACE, Dublin Airport followed the Commission for Aviation Regulation's (CAR) policy paper – CP7/2016, which set out a number of requirements for Dublin Airport in paragraph 3.32 which are shown below.

Dublin Airport's consultation document totalled 193 pages and included information on the following:

- Capacity assessment results
- Stakeholder views
- Update on the current CIP and how those projects have any impact on available capacity
- Project Options
- Price cap impact of investment
- Masterplan compliance
- Environmental considerations
- Timelines for the proposed projects
- Programme management

The process for Dublin Airport is as follows:

- In advance of making a submission to the Commission, Dublin Airport shall consult with users on the following:
 - the need/merit of the project;
 - details on delivery of proposed project; and
 - timelines for the delivery of the proposed project.
 - Details on delivery of current Capital Investment Programme including which projects have been prioritised, added or dropped, together with a timeline for delivery of the Programme.
- Proposed projects to deliver additional capacity must be underpinned by a capacity assessment showing that existing infrastructure is being maximised. This assessment can be conducted by Dublin Airport or a third party.
- Detailed business cases and cost information must be provided to users. Costs must be worked up comprehensively to allow an assessment by users of the costs and benefits of projects.
- Where appropriate, Dublin Airport should present the costs and benefits of a number of options for addressing a need.
- Detailed timelines and milestones for projects should be consulted on.

The PACE Consultation document was distributed to stakeholders on 5 October 2017 allowing more than 5 weeks for stakeholders to review the material and submit their views to Dublin Airport (i.e. by 13 November 2017). Similar to the 'Capacity Management' consultation, this PACE document was distributed to the full stakeholder distribution list which represented approximately 50 organisations. The consultation document contained the necessary information for assessment and was summarised in presentations over two days on 25 and 26 October 2017. The consultation meeting, which was chaired by CAR, represented one element of the entire consultation process and provided

stakeholders with an opportunity to receive an overview of the proposed projects, seek clarification on any particular point and provide feedback to Dublin Airport.

Over the two days, a total of 11 organisations attended the consultation meetings. The majority of the discussions focussed on the proposed stand and taxiway/airfield projects. CAR chaired the meeting and provided minutes of the two-day consultation meetings to stakeholders on 6 November. The majority of comments from stakeholders either expressed support for the proposed projects or dissatisfaction with a number of projects not being included. Dublin Airport also took this opportunity to acknowledge during the consultation session that new stakeholder views on required projects had been obtained prior to the formal consultation process and these included the following:

Passenger Processing	Stands	Airfield
Enhanced Baggage System	South Apron Phase 2	Dual Code E Taxiway access
More satellite buildings	Additional airbridges	Design out taxiway restrictions
Additional bus lounges	Fixed Electrical Ground Power (FEGP)	Runway line-ups
Transfer security screening	Increased Ground Service Equipment (GSE)	
Larger transfer facility		

- Fixed Electrical Ground Power (FEGP).
- South Apron Stands Phase 2.
- South Apron Taxiway Widening (Dual Code E).
- Advanced Visual Docking Guidance System (A-VDGS)
- Additional Bus Gates.
- Runway 10 Line Up Points.
- Apron Wide CCTV.

In addition, support was given by one airport user to change the Dual Taxiway F project to accommodate for dual Code E operations.

Dublin Airport did not receive any clarification requests following the PACE consultation meetings. Subsequently, four stakeholders responded to the consultation on 13 November 2017. Submissions were brief and lacked specific commentary in relation to the proposed projects detailed in the PACE consultation document. Two users requested additional information before they could provide more substantial comments.

We noted that these projects/views continue to be classified into short and longer-term investments with the latter being considered for inclusion in the CIP for 2020 to 2024.

At the PACE consultation session Dublin Airport also committed to providing stakeholders with specific requested information following the session. Dublin Airport subsequently informed stakeholders on 8 November 2017 that the taxiway modelling would be provided on 24 November 2017 upon completion by consultants, ARUP. This document also advised stakeholders that based on feedback following the consultation meetings, we were amending our proposed projects to include the below addition projects:

A summary of comments received in relation to specific projects/areas are as follows:

Processor	User Reference	Area/Project	Comment
Passenger	4	Customs Boarder Protection (CBP)/US Preclearance	Accelerated solutions are required to address capacity constraints and support hub operations.
		Pre-Boarding Zone (PBZ)	Support for this project.
		Baggage Handling System	Calls to enhance system to reduce short-shipped bags and improve the transfer product.
	1	Platinum Security Process	Significant investment is required to effectively accommodate efficiencies and expectation from customers.
		Request for a facility on the West Apron	Facility desired to consolidate operations.
Stands & Associated Projects	1	Stands	Shortage of parking stands. Current location of parking is resulting in a “fractured operation” due to a drive time of 7-10 minutes.
	4	Advanced Visual Docking Guidance Systems (A-VDGS)	Supports daa’s Option 2 presented, however for type 1 A-VDGS, not type 2.
		South Apron Stands	Strong support for Phase 2 development and attention drawn to old Masterplan development.
		North Apron	Majority of focus is on North and West Aprons rather than South.
Taxiways	2	Line-Up Points (LUP)	Support Runway 10 LUP’s given Runway 10 is “severely constrained” and this project would bring benefits to reduce delays.
		Dual South Apron Taxiway	Supports widening of taxiways for Codes E-E in the vicinity of Taxiways B/Z south of Pier 4 subject to safety regulatory approval.
		Link 3	Support this project as it gives significant flexibility to ground operations.
		Taxiway at 5H	Advised there would be problems with a triple lane taxiway should one be included as part of this project.
		West Apron Access	Believe this project is likely be a hindrance to the efficiency of ground operations.
		Dual Taxiway F	Generally supports Codes E-E taxiways if it can be facilitated possibly through revision to EASA provisions.
		Link 6	Supports this project if simulations show sufficient extra ground movement flexibility is demonstrated. Noting it must also be future proofed for Parallel Runway Operations.
	4	Dual South Apron Taxiway	Strong support for this project.

04

SUPPLEMENTARY CAPEX PROJECTS



04. SUPPLEMENTARY CAPEX PROJECTS

Dublin Airport is formally requesting a supplementary capital expenditure allowance of €283.9m for 23 distinct projects that are capacity enhancing and have received varying degrees of support from airport users in 2017. These projects are required to ensure that there is sufficient and adequate infrastructure in place to accommodate sustained growth to the end of the current regulatory period at Dublin Airport, without compromising on quality of service or passenger experience. Approving this supplementary allowance will ensure that passenger growth is not constrained entering the next Determination 2020-2024.

This section details each of the 23 projects and emphasises the urgent need for progressing these projects given the sustained growth in passenger volumes. A number of projects could not be accommodated through the current CIP flexibility (refer to Section 5.8 of PACE) and required progression in advance of general consultation, to ensure an expedited delivery before the end of 2017. Dublin Airport pre-consulted with stakeholders/airport users to obtain their approval for immediate progression and upon this basis, Dublin Airport commenced construction at the earliest opportunity. This sub group of key projects are:

- Pier 1 Extension
- Pre-Boarding Xone (PBZ).
- Common User Self Service (CUSS) Check-in Phase 1 and Phase 2.
- South Apron Stands Phase 1
- Immigration e-gates.

Further details on all projects are contained in the individual Project Sheets – see Appendix A of this document.

4.1. Passenger Processing

Dublin Airport is seeking an allowance of €55.5m for five separate passenger processing projects, as follows:

- Check-in: Common User Self Service (CUSS)
- Gates: Pier 1 Extension
- Gates: South Gates (Previously known as Pre-Boarding Zone)
- Gates: Bus Lounges
- Immigration Facilities

4.1.1. Check-in: Common User Self Service (CUSS)

Dublin Airport is seeking an allowance of €5.9m (total cost of project €6.9m) for this project. This project is split into three phases:

- Phase 1 – €1.2m (i.e. €2.2m excluding €1m CIP allowance) for 65 units in Terminals 1 and 2
- Phase 2 – €1.7m for 46 units in Terminals 1 and 2
- Phase 3 – €3.0m for 65 units on the east side of Terminal 2

The first two phases of CUSS were implemented by Dublin Airport on foot of particularly strong demand from airport users. The allowance of €1m in the CIP was insufficient to accommodate the level of capital expenditure required to meet this demand from airport users and there was insufficient flexibility in the CIP to accommodate the shortfall¹. The installation of these units in both Terminal 1 and Terminal 2 has resulted in increased passenger processing rates, reduced queue times, improved customer experience and has alleviated check-in capacity constraints experienced in the west side of Terminal 2.

Phase 3 is now required to alleviate capacity constraints on the east side of Terminal 2 where the current demand for check-in desks is 38. We will continue to manage the capacity requirements through a demand driven allocation model. However, as outlined by airport users in their submissions to PACE, a managed solution is not deemed to be sufficient as additional capacity is required. Furthermore, our capacity assessment indicates that as growth continues in 2018 and 2019 the current check-in desk capacity of 28 will not be sufficient, which necessitates the progression of Phase 3 to meet expected check-in demand. The alternative solution is an extension to the check-in Building which is less cost efficient and cannot be delivered in time to support the capacity as detailed in Section 6.4.1 of the PACE document.

The benefits associated with the CUSS project are as follows:

¹ Please refer to Section 5 of PACE (October 2017) for more information on this.

- Reduction in queue times of up to 75%
- Average of 8,000 bags processed daily
- The Self-Service Bag Drop can process up to 60 passengers per hour, while 24 passengers are processed by a check-in agent.
- Delays the requirements for a Check-in Building extension
- Improved passenger experience across both terminals
- Common user technology and equipment is easily transportable

4.1.2. Gates: Pier 1 Extension

Dublin Airport is seeking an allowance of €7.6m for the extension to Pier 1, which was accelerated to accommodate capacity requirements for Summer 2017. The capacity assessment² showed a requirement for 68 gates in Summer 2017 and 72 gates for 2019. With only 61 available through the existing CIP infrastructure this leaves Dublin Airport with a shortfall of 11 gates by 2019. This project delivered 4 of the 11 gates required. This project also has strong support from one user to meet their demand requirements for the current regulatory period.

The benefits associated with the project are as follows:

- More pier-served aircraft can be simultaneously boarded
- Converts two remote stands into contact stands removing the requirement to bus passengers.
- Better and more efficient use of stands.
- Facilitates an increase in departures from Pier 1.
- Relieves congestion by providing a more favourable 'stand to gate' ratio.

4.1.3. Gates: South Gates - Also referred to as Pre-Boarding Zone (PBZ)

Dublin Airport is seeking an allowance of €22.0m for this project. The capacity assessment showed a requirement for 68 gates in Summer 2017 and 72 gates for 2019. With only 61 available through the existing CIP infrastructure allowance. The Pier 1 Extension added an additional 4 gates however there was still a shortage of 3 gates for Summer 2017 and 7 gates by Summer 2019. Thus, demand for

remote operations had to be managed through Pier 3 and the nodes of Pier 4 which has a number of restrictions as bussing operations can only be facilitated during the short time window when contact stands are free i.e. between consecutive departures and arrivals. The South Gates project was accelerated as a result and is now in operation to accommodate capacity from winter 2017/2018.

This project also had strong support from one user to meet their demand requirements for the current regulatory period.

The benefits associated with the project are as follows:

- Provision of 5 boarding gates for simultaneous use.
- Reduce the number of bussing required to service the 9 stands on the South Apron.
- Improved On-Time Performance (OTP) of these aircraft stands through greater predictability of embarking and disembarking passengers from aircraft.
- Provide a better passenger experience than remote as passengers can walk straight from gate facility to the aircraft.

4.1.4. Gates: Bus Lounges

Dublin Airport is seeking an allowance of €8.7m for this project. This project was not included in Dublin Airport's PACE consultation as there was a view that it would be possible to manage the additional bus gate requirement through nodes on Pier 4 for departing passengers when they were not in use for either CBP operations or another pier served aircraft. However, following consultation, there was challenge from users on how current bussing facilities would accommodate the increase number of remote and satellite stands. Having considered the views of respondents, we are of the view that there is merit with proceeding with this project rather than deferring it, particularly as options for bus gate facilities from Pier 4 nodes are becoming more difficult due to the increased CBP usage and the increased wide-body traffic using Pier 4.

In addition, there is very little predictability or consistency of product having to use different nodes on different days. We believe an additional bus lounge in Terminal 2 is required to accommodate the increase in remote stands that will have to be accommodated from Terminal 2. The proposed bus gates will provide a dedicated facility for carriers that operate from Terminal 2. The development requires the construction of 2 vertical circulation cores (VCCs) to route passengers from Level 15 (Departures level Terminal 2) to apron level. The facility will accommodate 4 Regional Jet type aircraft (e.g.

² Please refer to Section 3.3.3 of PACE (October 2017) for more information on this.

ATR-72) or alternatively, 2 full Code C (e.g. A320) and 1 Regional Jet (e.g. ATR-72).

The benefits associated with the project are as follows:

- Increased bus gate capacity from Terminal 2.
 - 4 bus gates dedicated for Terminal 2 users.
- Improved passenger experience with bus gate facilities located in heart of Terminal 2

4.1.5. Immigration Facilities

Dublin Airport is seeking an allowance of €11.3m to carry out the following capacity enhancing projects;

The €11.3m is split as follows:

- a) Phase 1 - Installation of e-gates - €1.7m (Terminal 1 & Terminal 2).
€1.3m in Terminal 1 due to the requirement to remove, replace and redesign the existing Terminal 1 immigration booths and €0.4m in Terminal 2.
- b) Phase 2 - Extension to Pier 1 and Pier 2 Immigration facility €9.6m.

Dublin Airport is seeking €1.7m to fund the cost to provide the infrastructure to support the E-gate immigration equipment (Equipment cost being funded by the Irish Naturalisation and Immigration Service (INIS) in both Terminal 1 and Terminal 2. Dublin Airport is also seeking to progress with an extension to the Pier 1 and Pier 2 immigration facility which is necessary to provide sufficient queuing capacity to maximise the extra processing capability delivered from the new e-gates. The capacity assessment³ identified a requirement for 2,481 passengers to be processed/hr in 2017, with the current capacity being 2,897 passengers per hour through the infrastructure delivered under the current CIP. The first phase of this project (e-gate installation) was accelerated as a result and 5 of the 10 e-gates are currently in operation with all 10 e-gates expected to be fully operational in January 2018.

An acute issue is emerging each night in Terminal 1, which is exacerbated when a number of aircraft arrive off-schedule in close proximity to each other. Higher processing times combined with a concentrated influx of arriving aircraft can quickly maximise the limited physical queuing space within the Immigration facility. This can result in large volumes of passengers queuing on approach to the Immigration facility, which backs onto the pier linked Skybridge. Dublin Airport deploy Customer Service Agents (CSAs) to manage the passenger queues, which can also require the temporary closure of the traveller and escalators into the Immigration

facility for safety reasons to regulate the passenger flow into the immigration facility and prevent congestion. These long queues are impacting on customer service quality and we have received a high volume of complaints and negative publicity this year. Both elements of this project will alleviate this congestion and provide a significant improved passenger experience.

4.2. Stands and Associated Projects

Dublin Airport is seeking an allowance of €140.9m for 12 projects in this category, as follows:

- South Apron Stands Phase 1
- Apron 5H and North Apron Taxiway Rehabilitation
- Upgrade and Realignment of Stands 101 to 104
- Hangar 1 and Hangar 2 Stands
- West Apron Stands
- South Apron Stands Phase 2
- Pier 2 Underpass
- Pier 3 Underpass
- West Apron Surface Access
- Advanced – Visual Docking Guidance Systems (A-VDGS)
- Fixed Electrical Ground Power (FEGP)
- Apron Wide CCTV

The capacity assessment⁴ highlighted that for Summer 2019, we expect demand for 116 narrow-body equivalent (NBE) aircraft parking stands (excluding contingency requirement). The current capacity is 105 NBE parking stands (having exhausted all current CIP allowances) and this results in a shortfall of 11 stands. The figure of 116 does not include any contingency and industry standards would suggest a 10% contingency should be provided in addition to the raw demand, which would require a total of 128 stands (shortfall of 23 stands). We have assessed various locations and options, and are seeking an allowance for the locations proposed at consultation and an allowance for further development of the South Apron Stands Phase 2 based on strong user support for stands to be provided in this location.

In addition to the capacity assessment results, a number of users specifically highlighted the requirement for more aircraft parking and contingency stands to deal with unexpected changes with schedule, rehabilitation works and weather conditions etc.

³ Please refer to Section 3.3.4 of PACE (October 2017) for further information.

⁴ Please refer to Section 3.4 of PACE (October 2017) for more information on this

4.2.1. South Apron Stands Phase 1

Dublin Airport is seeking a capital expenditure allowance of €10.5m for this project to provide 4 Code C aircraft parking stands on the South Apron. This project was accelerated to meet the expected 2017 stand demand. This project provides 4 of the 23 stands required to satisfy the 2019 stand demand. Furthermore, the project complements the South Gates facility which was discussed under the Passenger Processing section. The south apron stand has enhanced the utility of the South Gate facility by enabling 9 stands to be serviced by the South Gates.

4.2.2. Apron 5H and North Apron Taxiway Rehabilitation

Dublin Airport is seeking an allowance of €52.0m for this project. This project will provide 12 additional Code C stands (including 3 Code E in MARS configuration) of the 23 stands required to satisfy the 2019 aircraft parking stand demand. It is also futureproofed for a pre-boarding zone satellite facility to the north of Apron 5H. This project includes the rehabilitation of sections of the North Apron taxiway. This rehabilitation benefits the realignment of stands 101 to 104 and the Hangar 1 & Hangar 2 Stands.

4.2.3. Upgrade and Realignment of Stands 101 to 104

Dublin Airport is seeking an allowance of €5.0m for this project. This project will increase the number of stands available for passenger operations on the east side of the campus, by converting 6 existing Code C stands to full operational stands, with no net overall gain in capacity. Currently these stands accommodate Business aviation and Maintenance Repair and Overhaul (MRO) operations, which will relocate to the West Apron when stands 101 – 104 are required by commercial aircraft. This project gains maximum utility from existing infrastructure.

4.2.4. Hangar 1 and Hangar 2 Stands

Dublin Airport is seeking an allowance of €14.3m for this project. This project will provide 3 additional Code C stands of the 23 stands required satisfy the aircraft parking stand count to 128 and gains maximum utility from existing infrastructure.

4.2.5. West Apron Stands

Dublin Airport is seeking an allowance of €2.5m for this project. This project will provide 2 additional Code C stands of the 23 stands required satisfy the 2019 stand demand of 128 NBE, and gains maximum utility from existing infrastructure. These stands will enable maximum use of the West Apron to facilitate cargo operations, business aviation, parking of standby aircraft, MRO and transit operations to

ensure other infrastructure on the East Apron is maximised for use by passenger operations.

4.2.6. South Apron Stands Phase 2

Dublin Airport is seeking an allowance of €37.8m for this project. This project will provide 5 additional Code C stands of the 23 stands required to satisfy the 2019 stand demand of 128 NBE. This project was not initially proposed in the original PACE document as the South Apron is a constrained and challenging location which has many complexities and risks associated with the delivery of these stands. The project requires the relocation of multiple facilities, the diversion of a sensitive watercourse (Cuckoo Stream) and the construction of a c.3m high embankment. The sequencing of these activities including the requirement for planning permission results in an extended timeline and is high-risk. It is expected that this project would not be delivered until 2022. However, there has been strong support from one user to proceed with the project regardless of timeline for completion as there is a requirement for more aircraft stand parking adjacent to the Terminal 2 passenger processing facility. These 5 additional remote stands on the south side of the South Apron can be used for towing aircraft to/from Pier 4 to free up capacity on the pier and also can be used in a remote capacity with bussing from Terminal 2 new bus gates proposed under Passenger Processing above. This project will increase the South Apron capacity from 9 NBEs to 14 NBEs.

4.2.7. Stand Summary

The above stand projects amounting to €122.1m (sections 4.2.1 – 4.2.6) will add 26 stands bringing the stand count to 131. This is 5 more than the 126 required for summer 2019 however, it should be noted not all stands will be in place for summer 2019 and will be delivered in phases, with the final phase of stands (South Apron Phase 2) being delivered in 2022. If all these projects were to proceed, we expect the increase in stands to be delivered as follows:

Year	Incremental Stands
CIP	105
2017	109
2018	111
2019	120
2020	126
2021	126
2022	131
Total	131

4.2.8. Pier 2 & Pier 3 Underpass

Dublin Airport is seeking an allowance of €5.0m and €0.2m to proceed with the Pier 2 & Pier 3 underpass project respectively. The widening of the Pier 2 & 3 underpasses is essential to allow for unrestricted movement of passenger bussing operations to and from remote stands in the North Apron including Apron 5G and the proposed PACE stand development in the North Apron. In the absence of this project, bussing times are inconsistent and can vary greatly which does not support an efficient remote passenger operation. In addition, there is a significant safety risk with busses interfacing with aircraft taxiing on stand and aircraft pushing back off stand around Pier 2 & Pier 3.

4.2.9. West Apron Surface Access

Dublin Airport is seeking an allowance of €3.0m to proceed with this project. Maximising the use of the West Apron is a key element of the overall stand strategy, thereby relocating non-passenger activity from the East Apron to the West Apron, to free aircraft parking stands for essential passenger operations. Currently passenger operations are not possible on the West Apron. This project is required to provide a shorter (1.5km/approximately 4-minute journey time) and predictable access route for aircraft servicing vehicles to access the West Apron. The current journey time is some 8 minutes and once the North Runway is constructed this will become an 8km (25 minute) journey time.

4.2.10. Advanced – Visual Docking Guidance Systems (A-VDGS)

Dublin Airport is seeking an allowance of €5.0m to proceed with this project. The total cost of this project is €10.4m and €4.65m funding has been received through the SESAR⁵ funding programme. In addition, €0.75m is covered in the IT allowance received in the 2014 Determination, with the residual funding requirement being €5.0m.

This project was not included in Dublin Airport's PACE Consultation however preliminary feasibility results were presented during the consultation meeting on stands on 25th October 2017. We have since considered feedback from airport users and received considerable support for this project with one user specifically noting that they supported full A-VDGS across the campus, albeit for Type 1 units and not Type 2 units. A-VDGS will enhance capacity through more efficient use of stand infrastructure by displaying critical information. This will lead to improved OTP and support A-CDM.

The allowance of €5.0m (total cost of €10.4m) would cover the cost of A-VDGS in the following locations:

- Pier 1
- Pier 2
- Pier 3
- Pier 4
- South Apron
- Triangle
- Apron 5G.

The benefits associated with the project are as follows:

- Faster and more efficient turnaround times for airlines
- Better OTP through display of key turnaround information
- Improved predictability through display of critical A-CDM operational data, automated real-time data.
- Greater visibility in reduced visibility conditions
- Reduced ramp congestion
- Reduced fuel burn and emissions
- Enhanced safety at gates
- Resolution of existing EASA Deviation Acceptance Action Documents (DAADs) on Pier 4 where airbridge to aircraft clearance is non-compliant with EASA CS.

4.2.11. Fixed Electrical Ground Power (FEGP)

Dublin Airport is seeking an allowance of €4.6m to proceed with this project. This project was request by Users during the PACE consultation on the 25 & 26th of October 2017.

On review of the elevated support from airport users for FEGP on contact stands during consultation. Dublin Airport agree with users that it is logical to accelerate the installation of FEGP for stands that have the enabling civil infrastructure to support and fix the Ground power units. For other stands, a wider project will be included as part of the 2020 to 2024 CIP.

⁵ Single European Sky ATM Research

The allowance would cover the cost of FEGP for the following locations:

- Pier 1
 - Stands 108 to 111 – 8 units
 - Stands 121 to 127 – 7 units

- Pier 3
 - Stand 318C/R – 2 units (airbridge mounted)
 - Stand 317 – 2 units (airbridge mounted)
 - Stand 315C – 2 units (airbridge mounted)
 - Stand 314 – 2 units (airbridge mounted)
 - Stand 313C – 2 units (airbridge mounted)
 - Stand 312 – 1 unit (airbridge mounted)
 - Stand 311C/R – 1 unit (airbridge mounted)
 - Stand 311L – 1 unit (pit and duct system)

The benefits associated with the project are as follows:

- Efficiency and Safety:
 - The provision of FEGP will reduce the level of airside traffic & ramp congestion through the removal of mobile Ground power units (GPU) and elevate safety in the aircraft turnaround process.
 - The removal of the GPU will reduce the requirement for GSE parking in the vicinity of the piers.

- Airline & ground handler performance:
 - Providing FEGP on stands will benefit airlines through providing a more reliable power source to the aircraft, less airline and ground handling maintenance costs and operational expenditure (fuelling etc)
 - It can better meet the requirements of next generation aircraft which have a higher power demand (e.g. B787 Dreamliner & A350 etc), and this high-power demand cannot be reliably supported by ground power units

- Health & Environmental benefits:
 - Air quality improvement through less fuel burning, to benefit staff, passengers and local environment
 - Noise reduction benefits for staff, passengers & local community
 - This project will also address a range of sustainability and environmental priorities for Dublin Airport and users, while meeting commitments outlined in the DTTAS National Policy Framework, Alternative Fuels Infrastructure for Transport in Ireland 2017-2030 (required under Directive 2014/94/EU Alternative Fuels Infrastructure Directive).

The provision of FEGP on 15 stands on Pier 1, and 8 stands on Pier 3 will lead to a reduction in, and contribute to the phased removal of mobile GPU units from the ramp. In effect, this means that 23 of 71, or 32% of the existing non FEGP served stands East of RWY 16-34 will be FEGP enabled resulting in approximately 23 less GPU's on the ramp.

By removing the requirement for mobile GPU units, we are in effect:

- Reducing demand for GSE parking and releasing badly needed parking capacity, the supply of which currently does not meet demand. There are approximately 80 mobile GPU units in operation at Dublin Airport. Using the above assumption of a 32% reduction in the global number of GPU units required in Dublin Airport, one could assume the c.80 GPU's currently in operation will reduce by c.26 units to c.54, with further reductions as campus-wide roll-out of FEGP takes effect post 2020. Through roll-out of FEGP as proposed through PACE consultations, we could expect GSE parking spaces to see a capacity increase in the region of 26 parking spaces.

- Space at the head of stands is extremely constrained, and is also an area which requires a large amount of GSE for aircraft turnaround operations, and space for staff and vehicle movement during the turnaround process. Pushback tugs & Tow bars, GPU's, Airbridge/Passenger stairs, Catering trucks, Ambulifts, Belt Loader/High Loader (forward hold) are all required in the space at the head of stand (around the nose of the aircraft), while circulation space is also required for loading/offloading, and servicing of the aircraft. The removal of GPU's at the head of stand will ease space constraints, improving vehicular movement, which will aid turnaround operational efficiency. These issues are particularly exacerbated on Pier 3 due to the wedge shape of the stands, and more recently due to the fact that many widebody aircraft now require 2 GPU units (i.e. Etihad, Qatar, Ethiopian, Cathay Pacific, TUI, & Emirates). Mobile GPU units also often impede access of Catering Trucks & Ambulift vehicles to door R1 (forward catering & service door on aircraft) resulting in these operations taking longer than necessary, or requiring the moving of the GPU mid-turnaround. This can negatively impact the On-Time Performance of the aircraft, whilst also delaying services such as Catering & Ambulift in getting to their next aircraft. Any on-time performance issues such as these have a negative impact on available stand capacity at the airport for arriving traffic.

- The reduction in the global number of GPU's in circulation will result in a reduction in traffic on the apron road network, therefore reducing congestion and creating operational efficiencies for other traffic.

- A stable power supply is critical for next generation aircraft such as the Boeing 787 Dreamliner and Airbus A350. These aircraft have a higher power demand (180kva), which airlines have reported as problematic when provided by a mobile GPU unit. A GPU dropping offline during the turnaround process could result in onboard systems requiring to be reset and flight data re-entered, subsequently leading to a delayed departure. Again, any on-time performance issues such as this have a negative impact on available stand capacity at the airport for arriving traffic.

In line with government policy on climate change and sustainability, daa is anxious to ensure that future airport capacity development is advanced in accordance with the objectives of the National Mitigation Plan, which aims to enable transition to a low carbon, climate-resilient and environmentally sustainable economy by 2050. Dublin Airport has engaged with the development of the National Low Carbon Transition and Mitigation Plan and has participated in the Department of Transport, Tourism and Sport's sectoral stakeholder participatory initiatives which culminated in the recent publication of the sectoral plans for climate change adaptation. Energy efficiency is a national imperative driven by the multiple challenges of the need for security of energy supply, dealing with fluctuating energy costs and addressing global climate change. The Department of Communications, Climate Action and Environment (DCCA) has set a national target of 33% energy efficiency improvement to be achieved by all Irish public bodies by 2020. As part of achieving this objective, public bodies, including daa, are required to report annual energy efficiency data to the Sustainable Energy Authority of Ireland (SEAI). Maintaining this trajectory to 2020, and addressing the energy challenges for the subsequent period up to 2030 will be extremely challenging and will require investment in energy efficiency projects. The FEGP project will assist in the reduction of carbon usage by airlines, thus generating a positive effect on carbon and energy consumption and climate change mitigation at the airport.

daa, through its sustainability policy, outlines its commitment to:

- Provide a safe environment and facilities for employees and visitors.
- Make a positive contribution to the community in which we operate.
- Reduce energy consumption and carbon emissions.

Our local communities have called for greater action in areas of Environmental Sustainability. Specifically, at recent meetings with local community groups, Dublin Airport has been asked to expedite and encourage the use of alternative fuels and Low Emissions Vehicles (LEVs) on the Dublin Airport Campus. At the airport, daa is examining range of policies and measures to assist in addressing concerns of the local community, specifically in relation to Air Quality and

noise. Installation of FEGP is one project which will contribute in this regard in a manner which will benefit both staff of all operators at the airport, and the local community by delivering improved air quality on the airport ramp, and lower noise levels than the existing alternatives.

4.2.12. CCTV

Dublin Airport is seeking an allowance of €1.1m to proceed with this project. This project was requested by Users during the PACE consultation on the 25 and 26 of October 2017.

On review of the elevated support by users for inclusion of CCTV on the Apron, we are including a project for Apron Wide CCTV as part of our list of supplementary capex projects.

The proposed CCTV project allowance would cover the cost of one camera per stand for the following locations, this is a total of 110 cameras:

- Pier 1
- Pier 2
- Pier 3
- Pier 4
- Triangle
- South Apron

The benefits associated with the project are as follows:

- Greatly enhance safety and governance on the apron area, through the ability to monitor, review and manage all apron activity
- Enable operators on the ramp to review key operational issues during the aircraft turnaround process and assist with passenger/ground handling/other issues which will speed up turnaround times and improve efficiency.

4.3. Airfield/Taxiway

Dublin Airport is seeking a total allowance of €87.4m for the following taxiway projects:

- Link 3 Extension Taxiway
- Realignment of Taxiway A
- Dual Taxiway F
- Link 6 Extension
- Runway 10 Line Up Points (LUP)
- South Apron Taxiway Widening (Dual Code E)

Following the consultation, we now have the benefit of a more detailed feasibility study for the Link 3, Link 6, Realigned Taxiway A and Dual F Taxiway. The study was commissioned to develop the concept designs presented during the consultation to outline scheme design with a better cost estimate. Thus, some of the costs have been revised to align with this study. These are noted under each project heading.

The capacity assessment⁶ identified that taxi times have remained stable in 2017 due to collaboration with airlines, Air Navigation Service Providers (ANSP), ground handlers and continuous improvements, however, taxi times are at risk of increasing with further traffic growth, without the intervention or sustained continuous improvement efforts. Towing is expected to increase in line with growth, particularly with long haul based aircraft which have ground times over 5 hours, and subsequently cannot remain on contact stands (due to contact stand demand). As a result, more efficient towing, flexibility and resilience is required to maintain/improve taxi times through better taxiway infrastructure. Thus, after extensive consultation, we are seeking allowances to proceed with the following projects:

4.3.1. Link 3 Extension Taxiway (€5.0m)

Dublin Airport is seeking an allowance of €5.0m to design, manage and construct Link 3 Taxiway. The detailed feasibility study revised the cost estimate up from what was issued for consultation (€4.0m). The primary driver for the increase in cost was the need for an uplift in pavement area from 2,700m² to 4,800m² to facilitate the aircraft turns and to comply with EASA regulations.

The benefits associated with the project are as follows:

- Offloads traffic from more complex junctions (e.g. Link 4 / 2).
- Provides congestion relief on Apron Taxiway 4.
- Facilitates RWY 28 departure sequencing / queue balancing.
- Facilitates Dual RWY Operations and intersection take-offs for RWY 34 (reducing ROT) – (TORA 1,522m).
- Provides additional runway exit for RWY 16 arrivals.

4.3.2. Realignment of Taxiway A

Dublin Airport is seeking an allowance of €5.6m to design, manage and construct the Realignment of Taxiway A. The detailed feasibility has revised the estimate cost downward from what we issued for consultation (€5.7m).

The benefits associated with the project are as follows:

- Enables simultaneous use of Taxiway A and Taxiway B2 by removing existing wingtip conflict.
- Reduces complexity around Hotspot / Enhances safety.
- Provides additional Pier 3/4 towing route.
- Facilitates RWY28 departure sequencing.
- Provides TORA of 1759m on Runway 34.

4.3.3. Dual Taxiway F

Dublin Airport is seeking an allowance of €39.5m to proceed with this project. We initially proposed Code E- Code C arrangement for this project which had an associated project cost of €15.5m. However following consultation, there was feedback from users to proceed with a Code E-Code E taxiway arrangement on the basis it could be accommodated through proposed revised EASA provisions.

During consultation and following responses received on 13th November 2017, there was feedback from users that the Dual Taxiway F proposal put forward by Dublin Airport should be modified to remove the constraint whereby the existing Taxiway F-Inner was limited to Code C aircraft (with wingspan of 36 meters). The removal of this constraint would allow Code E aircraft (wingspan of 65 meters) on Taxiway F-Inner and also Code E aircraft on Taxiway F-Outer, thereby increasing capacity, flexibility and elevating safety.

This project is now being proposed on the basis that EASA have issued their Certification Specification No. 4 (CS ADR-

⁶ Please refer to Section 3.5 of PACE (October 2017) for more information on this

DSN - issue date 8th December 2017) which incorporates these revised changes⁷. The relevant change to facilitate this project is the reduction in runway to taxiway separation, currently 182.5 meters reduced to 172.5 meters (CS ADR-DSN.D.260) and the associated reduction in runway strip width, currently 150 meters reduced to 140 meters (CS ADR-DSN.J.480) for this runway type, Code 4. The impact of this proposal on aircraft parking stands, is subject to detail design, however it is anticipated to be no more than a loss of 2 x Code C and 2 x Code E, with the objective being to reduce this further through detail design.

The benefits associated with the project are as follows:

- Provides Code E – Code E taxiway separation from Link 6 to Link 2 thereby increasing taxiway capacity and flexibility as currently Taxiway F-Inner is limited to Code C aircraft.
- Minimal stand Impact.
- Significant additional taxiway capacity to assist towing and removal of through-traffic from apron to allow pushbacks without obstruction.
- Improved OTP anticipated through fewer ground interactions.
- Improved junction layout at Link 4.

4.3.4. Link 6 Extension

Dublin Airport is seeking an allowance of €5.8m design, manage and construct the Link 6 extension. The detailed feasibility study revised the cost estimate up from what was issued for consultation (€5.2m). The primary driver for this increase is the uplift in new pavement from 4,000sqm to 5,500sqm that is needed to integrate Link 6 Extension into the triple lane taxiway DN, C, DS on the North Apron. This requirement is as a result of a detailed analysis of this junction to reduce its complexity.

The benefits associated with the project are as follows:

- Offloads traffic from complex junctions – Link 4 and Link 5.
- Provides congestion relief on F-Inner/Outer and reduces taxi distance via TWY G.
- Provides additional Entrance/Exit for RWY 16/34 (reducing ROT and taxi-times) TORA of 1,370m on Runway 16.
- Alternative route options to RW 10/28 from Pier 1.
- Alternative access to north side of Pier 1 / Apron. 5G
- Benefits c.20 operators on Pier 1 / Apron 5G.

4.3.5. Runway 10 Line Up Points (LUP)

As part of the 2014 Determination, CAR set a trigger project for LUP's. The project was given a €30.0m allowance for LUP's on both ends of Runway 10/28. The project will trigger during the current determination "if declared peak capacity in the busy hour reaches 37 departures prior to the end of a pricing year". This project was to support an increase to 39 departures in the busy hour.

Following the finalising of the 2014 Determination, Dublin Airport carried out a feasibility study on the Runway 28 Line Up Point and during that study it became apparent that the original LUP would have a negative impact on runway capacity due to the additional taxi-time required to reach the runway threshold. In addition, the original design was not compliant with EASA. A re-design was required and following a consultant's review, it was advised not to proceed with Runway 28 LUP based on safety grounds as the LUP would significantly complicate the existing hotspot area and was rated 'very poor' (1/6) as part of critical taxiway review carried out under AAIU recommendation. However, there was merit with proceeding with a LUP on Runway 10 as there is currently little opportunity to sequence departures and bypass other aircraft. Also, it has become apparent we could possibly reach 39 departures in the busy hour without LUP's due to other Air Traffic Control efficiencies. Airlines were given an opportunity to increase busy hour departures to 37 for Summer 2016 and this was not supported. Thus, to date, this project has not triggered and we do not have the ability to proceed without project allowance certainty.

It is Dublin Airports preference, along with users, to only proceed with Runway 10 LUP's at this point in time as it has a number of benefits, however the current trigger restricts our ability to proceed. Therefore, we would ask CAR to review the current trigger condition in place and potentially remove or amend the trigger and revise the allowance to enable the development of this infrastructure which has support from users. Alternatively, a new specific allowance could be made

⁷ Subject to normal risk assessment for such changes.

for this project and Dublin Airport would not price in the LUP trigger if it were to meet the trigger condition. The cost of this infrastructure is estimated at €16.8m.

The benefits associated with the project are as follows:

- Increased operational efficiencies, increasing runway utilisation
- Aircraft with slot restrictions or technical issues can hold position in runway queue or divert to adjacent taxiway bypass without causing disruption to the whole departure sequence
- The ability to line up 2 departures simultaneously and maximise sequencing
- To provide additional queuing capacity and therefore remove congestion from closer in to the apron area
- This would have additional benefits in dual parallel runway operations if Runway 10R was the primary departure runway.

4.3.6. South Apron Taxiway Widening (Dual Code E)

Dublin Airport is seeking an allowance of €14.7m for this project. This project was not originally included in our proposed projects for consultation due to the design being non-compliant with EASA regulations and no immediate solution being available. However, due to strong user demand for this project, we are including it as part of our supplementary capex projects list. This project will involve the widening of Taxiway B1 to allow Code E – Code E simultaneous movements on Taxiway Z and Taxiway B1.

We propose a deliverable (or trigger) is set for this project as it is currently non-compliant with EASA requirements and an Equivalent Level of Safety (ELOS) or an Alternative Level of Safety (ALOS) must be established and agreed with IAA SRD, before the project can advance. Once there is sign-off on a compliant design by IAA-SRD, this project can commence construction. As discussed at consultation, we will set up a tripartite working group with daa, airlines and the Irish Aviation Authority (IAA) to advance the safety discussion and seek approval for the project through the IAA Safety Regulation Division (SRD).

This project is contingent on receiving approval from IAA Safety Regulation Division (SRD) due to non-compliance with EASA requirements in relation to protected surfaces.

The benefits associated with the project are as follows:

- Operational Efficiency/ Capacity benefits:
 - By providing unrestricted parallel Code E movements in and out of South Apron, existing constraints would be removed
 - Better utilisation of stand infrastructure on the South Apron and south side of Pier 4 contact stands
 - Reduction in aircraft holding due to aircraft type restrictions and thus Improving OTP
- Safety benefits:
 - Increase of Taxiway Z from Code C to Code E, thus removing the risk of Code E aircraft using a Code C taxiway in error (pilot error or human error via ATC instruction) without the required clearances, and the subsequent risk of aircraft to aircraft, vehicle, or building conflict
 - Reduces complexity of routings around the hotspot area, due to removal of existing constraint
- Satisfy Customer (airline) need:
 - Customers ongoing requests to address access in/out of South Apron would be resolved through the delivery of this project, improving traffic flows and OTP for aircraft operating on Pier 4 & South Apron stands

The above section concludes the rationale for the proposed 23 projects amounting to 283.9m, how they link in with the substantial grounds for this review and the key benefits associated with each project.

4.4. Deferred Projects

Where projects requested by respondents to the PACE consultation are not being put forward, we have provided an explanation as to why they are not considered appropriate for including in this submission.

4.4.1. Customs Boarder Protection (CBP)/US Preclearance

There has been numerous calls from one user to find solutions to expand the current US Preclearance facility to accommodate future growth. We have considered all available solutions that meet the objectives of the PACE programme and have found that the short-term solutions are an inefficient use of capital and we need to work towards a longer-term solution which will be identified as part of the master plan process.

4.4.2. Platinum Services Security

One user requested an improved security screening facility in Platinum Services including an arrival corridor to segregate arriving and departing passengers. While a detailed feasibility has not been carried out to understand the alteration and building work required to carry out the required changes, our preliminary cost estimate to deliver the improved security screening facility is in region of €500k.

Considering the scale and nature of the proposed improvement work, the project was not deemed to fit in with the purpose of PACE, which is to address substantial capacity issues and unlock passenger growth out to the end of the period.

This proposed project will be considered for inclusion in the current CIP and if it cannot be funded through capex flexibility within the revenue envelope, we will consider including this as part of the 2020 - 2024 CIP.

4.4.3. West Apron Business & General Aviation (B&GA) facility

Dublin Airport has assessed future plans for managing the B&GA business as part of PACE and continuation of operations on the east side of the campus is the most desired as it is cost efficient. The B&GA facility can continue to benefit from the existing passenger processing facilities and aircraft serving facilities on the east side of the campus. To this end, Dublin Airport is proposing to replace two thirds of the Light Aircraft Parking Bravo (LAPB) area with a new development as part of the Apron 5H project. Furthermore, Dublin Airport is proposing to provide 10 self-manoeuvring stands for GA on 5H and 5G. Given the profile of stand demand at Dublin Airport these stands will have stand availability during the B&GA busy periods between 0900hrs and 2100hrs. Notwithstanding our proposal to provide this replacement of LAPB parking, we envisage that we will continue to require a small number of B&GA overnight aircraft to use the West Apron stands.

In relation to a dedicated B&GA West Apron operation, this would require significant capital investment to provide the B&GA passenger processing facilities, along with the additional operational expenditure to provide the security and other services required to maintain and operate a B&GA facility and is not a necessary investment at this point in time.

4.4.4. Baggage Handling System

We are currently working on a significant project to implement Hold Baggage Screening Standard 3 across both terminals at Dublin Airport. This project will be consulted on with airport users in 2018 as there is currently no allowance for the Terminal 1 project. As part of this project, inter-terminal

connectivity options will be provided for consultation and user feedback will be considered.

05

REGULATORY TREATMENT



05. REGULATORY TREATMENT

5.1. Treatment of Capital Allowances with the RAB

Dublin Airport considers (and has demonstrated that) all of the proposed supplementary capex projects are capacity enabling and would therefore fall under the category 'Business Development' projects as per the 2014 Determination.

Projects approved under this process would be supplementary to the CIP allowance that was approved in the 2014 Determination. Therefore, the treatment of such should be consistent. Thus, there are two options: treatment and that:

- The business development envelope will increase for approved supplementary capex projects and there will be flexibility to accommodate changes in costs between individual projects, keeping to the total allowance; or
- There will be a new envelope called 'Supplementary Capex' envelope and there will be flexibility to accommodate changes in costs between individual projects.

A further breakdown or categories within the above envelope should not be imposed to keep consistent with the 2014 Determination and ensure maximum flexibility is maintained to manage potential risks such as, (1) the possibility that the priority associated with a proposed project is reduced due to the project being superseded by another development, and/or (2) a particular project cannot be progressed or completed for reasons currently unknown to Dublin Airport at this time. In addition, to support these potential risks, we would ask that not all projects are listed as deliverables. However, we do recognise that deliverables for some projects may be appropriate, for example, South Apron Taxiway Widening (Dual Code E) and projects already complete e.g. Pier 1 Extension etc. Classifying this project as a deliverable, could potentially negate the requirement for the project to have an associated 'trigger' element as the allowance would be removed if the project could not be delivered (due to EASA restrictions).

5.2. Remuneration of Approved Capital Allowances

As per CP7/2016, approved investments will not be remunerated until 2020 at the earliest. This results in Dublin Airport pre-funding significant investments as the price caps in the current regulatory period remain unchanged. As per the 2014 Determination, approved projects are allowed and immediately enter the RAB remunerating Dublin Airport for the annual depreciation cost and the associated return,

through pricing i.e. there is no pre-funding for CIP investments. In line with this, Dublin Airport would request that any approved supplementary capex projects commenced or complete at the time of the 2019 Determination would enter the RAB in 2020 without any further delay to remuneration. Additionally, different treatment versus that of the CIP increases uncertainty and can set precedent for future investments.

5.3. Price Cap Impact

Using CAR's financial model, an investment of c€283.9m with an average life of 21 years would result in €0.82/9% of an increase in the price cap assuming no incremental passengers. However, by the time any of this investment is remunerated, passenger numbers as a result of the projects will have increased. We have assumed a passenger number of 31.5m in 2019 which is the midpoint between our base and high scenario forecast. Revising the price cap analysis to take into account:

- Incremental commercial revenues.
- Increased operating costs (opex).
- Capital Remuneration.
- Higher passenger denominator into the 'required revenues'.

This results in a reduction to the 2019 base price cap of €0.60/7% assuming all other building block variables remain as per the 2014 Determination. These numbers are less favourable to that initially presented in our PACE submission as the number of projects has increased by 7 and some projects have been amended adding c€114m to the capital investment requirement with the same passenger numbers expected.

As there is uncertainty on our ability to complete South Apron Taxiway Widening (Dual Code E) project at this point in time, the price cap impact excluding this project would be as follows:

- €269.4m based on an average life of 21 years results in €0.78/9% of an increase in the price cap assuming no incremental passengers
- Taking into account the other price cap variables (listed above) results in a reduction to the 2019 base price cap of €0.63/7% assuming all other building block variables remain as per the 2014 Determination.

€269.4m Spend – capital impact only		
WACC		5.8%
Passengers		27.9m
Asset Life	Supplementary Capex	Price cap effect
5	6,100,000	€0.05
7	1,092,690	€0.01
10	5,100,000	€0.02
15	50,826,551	€0.18
20	59,668,137	€0.18
30	36,038,789	€0.09
40	110,473,555	€0.25
Isolated impact on the price cap		€0.78

€269.4m Spend – all building blocks	
Commercial Revenue Elasticity	0.64
Operating Costs Elasticity	0.16
2019 Base Price Cap	€8.68
Estimated increase in passengers resulting from capex:	3,600,000
Revised total passengers with supplementary capex	31,500,000
Commercial revenue increase	€14,583,508
Operating cost increase	€4,258,250
Price cap with supplementary capex	€8.05
Decrease in price cap due to supplementary capex	€0.63

06

MASTERPLAN COMPLIANCE



06. MASTERPLAN COMPLIANCE

6.1. Masterplan Integration

In late 2016, Dublin Airport commenced the periodic review of its Masterplan. An airport masterplan is a physical infrastructure blueprint for delivering potential future growth. The primary purpose of a masterplan is to consider and outline in advance the logical facilities and infrastructure required to support various long-range growth profiles. At the concept stage of this review, a theoretical planning capacity of 55 mppa was agreed for the project scope. This level of activity represents both an approximate doubling of current airport traffic and is also the 30-year forecast horizon for growth (when rounded to five mppa increments). The Dublin Airport Masterplan process is expected to be complete in October 2017. In June 2017, the project had progressed to an appropriate stage for consultation. An initial Masterplan briefing was conducted with airport users, customers and stakeholders on 7th June 2017. The purpose of this briefing was to:

- Outline the masterplan process.
- Explain how the Masterplan fits in the capital allocation process.
- Discuss key issues facing Dublin Airport that the Masterplan is seeing to address.
- Present the options considered to date.
- Understand user/stakeholder requirements from the Masterplan process.
- Request written feedback from airport users on a range of business development options and seek informed views on changes in market dynamics.

A key deliverable from the masterplanning process is to integrate, inform and steer future infrastructure development. The Masterplan Compliance Process (MCP) was developed in 2016 to ensure that all future capital infrastructure projects are assessed and subsequently deemed compatible with the emerging strands of the Dublin Airport Masterplan.

6.2. Masterplan Compliance Process (MCP)

- Mandatory process with formal oversight through the Masterplan Coordination Committee (MCC) and facilitated through the biweekly internal Capita Clearance Process (CCH).
- Underpinned by Compliance Register.
- Aims to ensure future-proof certainty, to minimise unnecessary spend.
- Mechanism to ensure the Masterplan is constantly refreshed.
- Promotes collaborative engagement and negates abortive development effort.
- Internal Service Level Agreement to ensure capital projects are compatible with the Airport Masterplan.
- Forms part of the quality management procedure (QM08).
- Approved audit process.

The key outputs from the Masterplan Compliance Process (MCP) are as follows:

- Masterplan compliance determination Compliant, Non-Compliant or N/A).
- Approval conditions (if any).
- Masterplan asset life determination.
- Mandatory additional internal consultation required.
- MCP final comments.

The supplementary capex projects discussed in Section 4 of this document with detailed project sheets in Appendix A, have all fully completed the Masterplan Compliance Process, based on the emerging Masterplan streams.

Project Title	Asset Life	Project Asset Life	Notes
Common User Passenger Processing (CUPPs) Check-in Terminal 1 and Terminal 2	5	5	This project does not constrain future masterplan development.
Pier 1 Extension	40	40	This project does not constrain future masterplan development.
South Apron PBZ	20	20	This project does not constrain future masterplan development.
T1 Immigration Hall extension	30	15	The immigration may have a reduced asset life pending longer term development of terminal facilities. The building structure may however be used for alternative uses if not required in the new masterplan.
T1 & T2 Immigration e-gates	10	10	This project does not constrain future masterplan development.
South Apron Stands Phase 1	40	40	This project does not constrain future masterplan development.
Additional Bus Gates	20	20	The Masterplan safeguards for a new terminal and connected bus lounge on the east side of Terminal 2. This will provide 8 bus gates for non-CBP flights. The proposed passenger route to the new bussing gates passes through the area proposed for the T2 level 15 bus gates. This would reduce the capacity of the Level 15 bus gates to 3 x RJ aircraft.
Apron 5H and Taxiway Rehabilitation	40	40	This project does not constrain future masterplan development.
Upgrade and Realignment of Stands 101 - 104	15	15	This project does not constrain future masterplan development.
Hangar 1 and Hangar 2 Stands	30	30	This project is consistent with any future clearance of this area for stand development; final stand layout may evolve with future masterplan layouts. Masterplan asset life based on stand pavement.
West Apron Stands	40	40	This project is consistent with future stand development in the area; final stand layout may evolve with future masterplan layouts.
Pier 2 Underpass	15	15	This project does not constrain future masterplan development.
Pier 3 Underpass	5	15	This project has a reduced asset life assigned (5 years) to allow for the possibility of a future extension of Terminal 1 which is safeguarded in the current masterplan. The overall spend on this project is modest in the amount of €0.2m and is capital efficient insofar as it offers a benefit over the period relative to the cost of the project.
West Apron Surface Access	10	30	This project has a reduced asset life assigned (10 years) to allow for the possibility of a future tunnel to the West Apron which is safeguarded in the current masterplan. The overall spend on this project is modest in the amount of €3m and is capital efficient insofar as it offers a benefit over the period relative to the cost of the project.
Advanced Visual Docking Guidance System (A-VDGS)	10	10	This project does not constrain future masterplan development.
Fixed Electrical Ground Power (FEGP)	15	15	This project does not constrain future masterplan development.
South Apron Stands Phase 2	30	30	The draft Masterplan safeguards for 5 x A321 and 2 x ATR extension to the South Apron subject to detailed design
Apron Wide CCTV	7	7	This project does not constrain future masterplan development.
Link 3 Extension Taxiway	30	30	This project does not constrain future masterplan development
Realignment of Taxiway A	30	30	This project does not constrain future masterplan development
Dual Taxiway F	30	30	This project does not constrain future masterplan development
Link 6 Extension Taxiway 6	30	30	This project does not constrain future masterplan development
South Apron Taxiway Widening (Dual Code E)	40	40	This project does not constrain future masterplan development.
Runway 10 Line-Up Points	30	30	This project does not constrain future masterplan development.

07 PROGRAMME MANAGEMENT



07. PROGRAMME MANAGEMENT

Programme Management is defined as the process of managing the multiple interdependent projects; ensuring a standardised approach to managing cost, time, quality, safety, and risk; and ensuring adequate control and monitoring is in place to safeguard the efficient delivery and overall regulatory compliance. In addition, Programme Management manages the collective impact of the project construction on day-to-day airport operations, and examines options to minimise any negative impact, ensuring minimum disruption to customers. The programme management principles for delivery of these projects, are:

- Expedite projects to alleviate the most significant capacity constraints.
- Expedite projects that can be delivered at an early stage.
- Group projects together, so that impact operations is minimised.
- Group projects together that deliver the greatest economies of scale and efficiency in construction delivery.
- Deliver individual projects in phases so that capacity can be released in stages aligned to the forecast demand.
- Group projects together to ensure ‘downtime’ of infrastructure is minimised.
- Expedite planning and regulatory/environmental processes to remove risks early in the project timeline.
- Assess the availability of construction resources (contractors) and the quantum of activity that can be managed in a live operational.

discussions, where a project has a direct impact on a single user or group of users. Any disruption will be quantified and communicated directly to users, along with the mitigation plan and managed solutions if applicable. General impacts, which affect the totality of airport operations, are best managed through the existing channels; i.e. The Dublin Airport Operations Committee (AOC), the Dublin Airport Operations Planning Group (DAOPG), and the Dublin Airport Coordination Committee.

7.2. Project Delivery

The below table highlights the project timelines for the 23-supplementary capex/PACE projects.

7.1. Stakeholder Engagement

In the delivery of any potential project, it will be essential that every avenue is explored to maintain operations with minimum disruption. It should however be recognised that it is impossible to construct large-scale projects in a live operational environment without some minor impact on operations or requiring some level of temporary relocations of services. We always aim to determine the optimum solution for each project. We will engage with affected stakeholders to solicit views to determine the potential impact of each project on their specific operation. This will be done through the normal operational channels, such as bilateral

Supplementary Capex Process - Capex Programme																														
ID	SCP Ref	Project Name	2016				2017				2018				2019				2020				2021				2022			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1	17.1.001	T1 & T2 Common User Self Service (CUSS)	██████████				██████████				██████████																			
2	17.1.002	Pier 1 Extension	██████████																											
3	17.1.003	South Apron PBZ	██████████																											
4	17.1.004	T1 & T2 Immigration Facilities					██████████				██████████																			
5	17.1.005	Additional Bus Gates									██████████				██████████															
6	17.2.001	South Apron Stands	██████████				██████████																							
7	17.2.002	Apron 5H & Taxiway Rehab	██████████				██████████				██████████				██████████															
8	17.2.003	101 - 104					██████████				██████████																			
9	17.2.004	H1 & H2					██████████				██████████				██████████															
10	17.2.005	West Apron Stands									██████████				██████████															
11	17.2.006	P2 Underpass					██████████				██████████				██████████															
12	17.2.007	P3 Underpass					██████████				██████████																			
13	17.3.008	West Apron Access					██████████				██████████				██████████															
14	17.2.009	Advanced Visual Docking Guidance System (A-VDGS)									██████████				██████████															
15	17.2.010	Fixed Electrical Ground Power (FEGP)									██████████				██████████															
16	17.2.011	South Apron Stands Phase 2									██████████				██████████				██████████				██████████							
17	17.2.012	Apron Wide CCTV									██████████				██████████															
18	17.3.001	Link 3 taxiway					██████████				██████████				██████████				██████████				██████████							
19	17.3.002	Realignment of Taxiway A					██████████				██████████				██████████				██████████				██████████							
20	17.3.003	Dual Taxiway F					██████████				██████████				██████████				██████████				██████████							
21	17.3.004	Link 6 taxiway					██████████				██████████																			
22	17.3.005	South Apron Aircraft Access, Dual Code E									██████████				██████████				██████████				██████████							
23	17.3.006	Runway 10 Line-up Points									██████████				██████████				██████████				██████████							

Please refer to Appendix B for detailed timelines.

7.3. Environmental Considerations

Our commitment to sustainability and specifically to carbon management is evident through a number of policy decisions in recent years, including:

- Dublin Airport was one of the first members of the Airports Carbon Accreditation programme, a voluntary carbon managed initiative launched by the airport industry. It is now implemented by 190 airports worldwide and recognised by the United Nations Framework Convention on Climate Change (UNFCCC).
- Dublin Airport was the first airport to obtain ISO 50001 accreditation for its energy management system.

Both Dublin and Cork Airports have entered an agreement with SEAI⁸ to actively manage energy consumption and have set a target of a reduction of 33% in energy consumption by 2020. The 33% reduction target was set for the public sector. We are on course to achieve this target. In the development of projects, we always consider the impact on the environment in relation to material selection, construction methods, asset life etc. In addition, there is a positive benefit from the airfield specific projects in relation to aircraft taxi time and associated fuel burn. Stimulation modelling demonstrates the PACE Taxiway projects (based on 39 peak departures) delivers the following efficiency improvements for operators:

- An average reduction in departure delay per movement of between 10%-14%.
- An average reduction in arrival delay per movement of 47%-56%.
- An overall reduction in departure delay of five hours per day.
- An overall reduction in arrival delay of two hours per day.

These delays would equate to an annual saving of circa 2,500 hours. At a fuel burn rate for taxiing aircraft at 700kg/hour, this would equate to a fuel burn saving of 1,750 tonnes or 5,512 tonnes of CO₂. New and more onerous energy standards will apply for CIP 2020-2024. For example, the enactment of the Near Zero Energy Buildings regulations will necessitate significant changes to traditional construction methods. After 31st December 2018, new buildings occupied and owned by public authorities must be Near Zero-Energy Buildings (NZEB). As part of this supplementary capex

process, we will consider these requirements in the design of the proposed facilities. We must comply with energy performance requirements in the design and construction of all new buildings. We must also comply if there is a material alteration or extension of an existing building, in terms of energy demand and CO₂ emissions. Progress towards energy efficiency targets, at a national level, has been slower than anticipated. After 2020 such national targets will become more onerous, as EU Member States seek to decouple economic growth from energy consumption. An EU energy consumption reduction target of 40% was announced during the Paris Climate Conference (COP 21).

⁸ Sustainable Energy Authority of Ireland

APPENDICES

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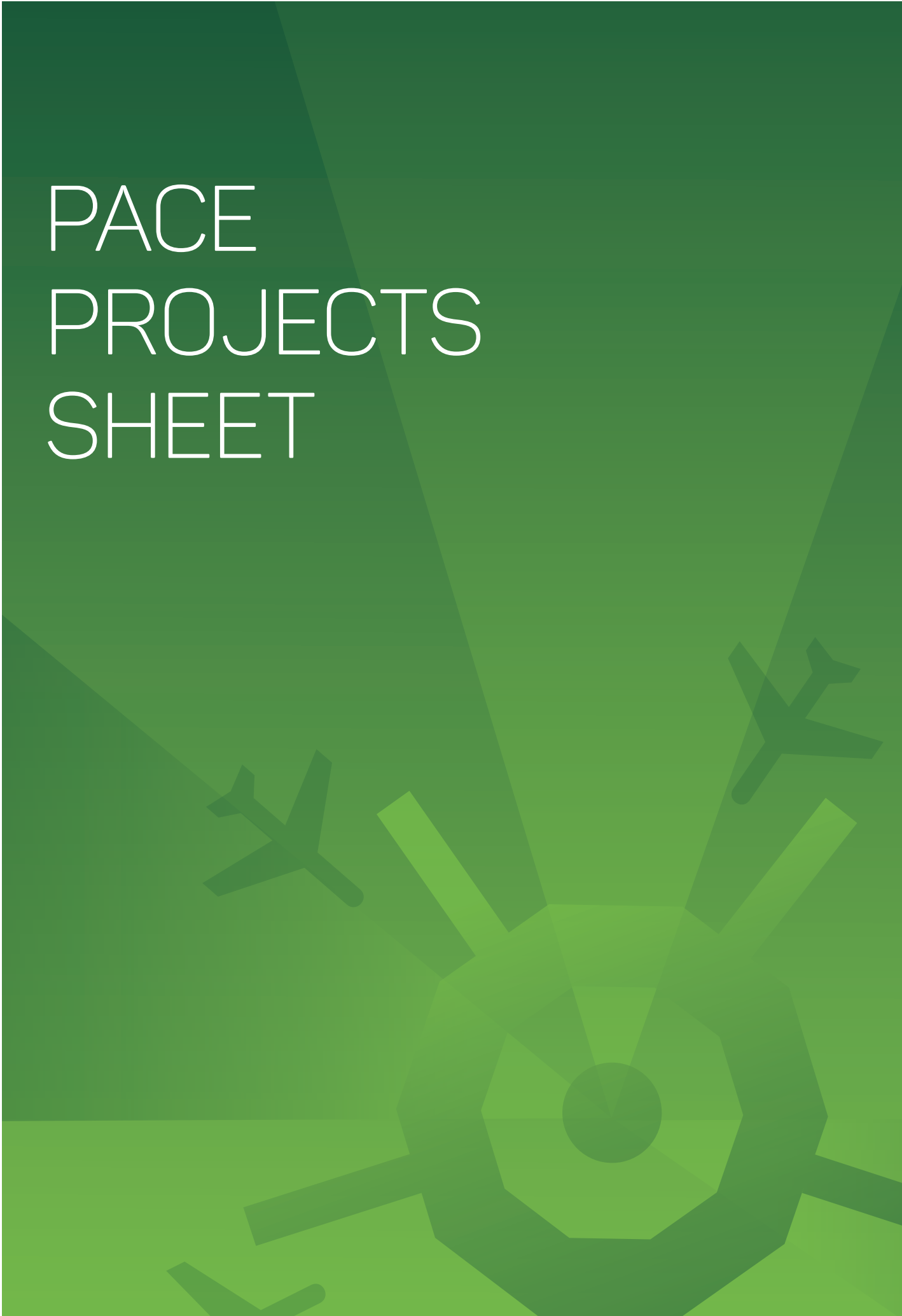
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PACE PROJECTS SHEET



PACE Projects Sheet

SCP Reference	Project Title	Estimated Cost €'m
Passenger Processing Projects		
SCP 171.001	Terminal 1 and Terminal 2 Common User Self Service (CUSS)	5.9
SCP 171.002	Pier 1 Extension	7.6
SCP 171.003	South Apron PBZ	22.0
SCP 171.004	Terminal 1 and Terminal 2 Immigration Facilities	11.3
SCP 171.005	Additional Bus Gates	8.7
Passenger Processing Projects Total		55.5
Stands and Associated Projects		
SCP 172.001	South Apron Stands	10.5
SCP 172.002	Apron 5H and Taxiway Rehabilitation	52.0
SCP 172.003	Upgrade and Realignment of Stands 101-104	5.0
SCP 172.004	Hangar 1 and Hangar 2 Stands	14.3
SCP 172.005	West Apron Stands	2.5
SCP 172.006	Pier 2 Underpass	5.0
SCP 172.007	Pier 3 Underpass	0.2
SCP 172.008	West Apron Surface Access	3.0
SCP 172.009	Advanced Visual Docking Guidance System (A-VDGS)	5.0
SCP 172.010	Fixed Electrical Ground Power	4.6
SCP 172.011	South Apron Stands Phase 2	37.8
SCP 172.012	Apron Wide CCTV	1.1
Stands and Associated Projects Total		141.0
Airfield/Taxiway Projects		
SCP 173.001	Link 3 Extension Taxiway	5.0
SCP 173.002	Realignment of Taxiway A	5.6
SCP 173.003	Dual Taxiway F	39.5
SCP 173.004	Link 6 Extension Taxiway	5.8
SCP 173.005	South Apron Taxiway Widening (Dual Code E)	14.7
SCP 173.006	Runway 10 Line Up Points	16.8
Airfield/Taxiway Projects Total		87.4
Cumulative Total		283.9

SCP 171.001 Terminal 1 and Terminal 2 Common User Self Service (CUSS) Check-in

Project Summary

This project provides for additional and more efficient check-in capacity in Terminal 1 and Terminal 2 through the implementation of Common Use Self Service (CUSS) technology. The technology can be installed to facilitate a one-step or a two-step process as described below:

- In a one-step configuration, the CUSS technology is fitted at the traditional check-in desk, where the passenger carries out their check-in process which can include printing of boarding and bag tags, weighing bags and bag drop.
- In the two-step configuration, the CUSS technology is provided in two units, one unit (away from the traditional check-in desk) is for printing boarding cards, bag tags and weighing bags. The second piece of technology is fitted at the traditional check-in desk and this automates the bag drop process and enables the passenger to drop their bag at the baggage belt.

CUSS technology reduces passenger processing time at the check-in area and provides an enhanced customer experience. Airports Council International (ACI) predicts that 80% of global passengers will be offered a complete self-service experience based on industry standards by 2020. This project is being carried out in 3 phases:

CUSS Phase 1 (incl. Proof of Concept) - €2.2m

- Terminal 1 users – one-step kiosk fit out.
- Terminal 2 users – two-step fit out.

As part of the CUPPS replacement project (Common User Passenger Processing System – previously known as CUTE (Common User Terminal Equipment)), and at the request of users, Dublin Airport implemented increased functionality for airline and handling agents through the introduction of CUSS passenger processing technologies.

CUSS extends to check-in, bag drop and boarding. It is expected that CUSS will significantly enhance the passenger experience at the airport and will drive efficiencies in the delivery of passenger services. CUSS for check-in and bag drop will only be in scope for this initiative. As part of the CUPPS/CUSS project, Dublin Airport undertook trials and a number of airlines have indicated their preference for CUSS products. CUSS Phase 1 was implemented through 2016. In this phase, Dublin Airport purchased 65 CUSS units for installation in Terminal 1 and Terminal 2.

CUSS Phase 2 - €1.7m

- Terminal 1 users - move to a 2-step CUSS layout.
- Sky Handling Partner and Swissport CUSS clusters in Terminal 1.
- Terminal 2 users - CUSS configuration changes.

Following the successful deployment of CUSS Kiosks and Bag Drops in Terminal 1 and Terminal 2 in 2016 (Phase 1), other airlines requested the installation of CUSS Technology in their area. Moreover, the rollout of CUSS supports Dublin Airports strategy of enabling growth by increasing the number of CUSS kiosks available to passengers the airport. The investment in CUSS Phase 1 and 2 has been transformative, in particular for Aer Lingus check-in, where CUSS has alleviated a critical poor service pinch point. CUSS Phase 2 was implemented through 2017. In this phase, Dublin Airport purchased 46 CUSS units for installation in Terminal 1 and Terminal 2.

The 2016 investment has seen the following benefits:

- Increased the check-in processing capacity of the existing check-in halls in both T1 and T2.
- A reduction in queue times by up to 75%, particularly in Terminal 2 where Aer Lingus have a 2-step check-in process. On average, 8,000 bags processed daily.
- There has also been very positive feedback from both airlines and passengers.
- It has negated the need to extend Terminal 2 check-in at an estimated cost in the region of c.€20m.
- There is now a standard seamless passenger experience across both terminals with equipment that can move between terminals.

SCP 17.1.001 Terminal 1 and Terminal 2 Common User Self Service (CUSS) Check-in

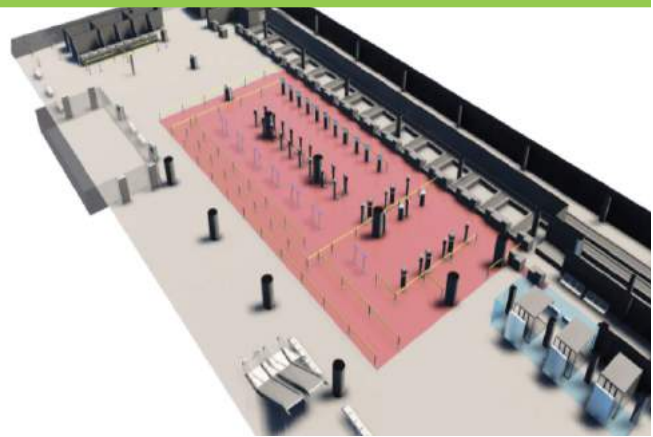
Project Summary

Phase 3 2018/19 - €3.0m

Phase 3 includes the installation of CUSS Technology on the east side of Terminal 2 check-in. The east side of the Terminal 2 check-in hall is mainly used for US based airlines and is at capacity during the transatlantic peak. To meet the 2018 and 2019 requirement for the US carriers, an eastern check-in hall extension was explored. This extension would cost in the region of €20m. By investing in CUSS on the east side of Terminal 2, we are innovating through technology to deliver efficient capital spend to increase capacity. An additional 65 units would be provided as part of this investment and will greatly improve the check-in experience at Dublin Airport and defer the need for large building extensions.

Full cost of 3 phases (2016-2019) - €6.9m

Phase 1 cost (2016)	€2.2m
Phase 2 cost (2017)	€1.7m
Phase 3 cost (2018/19)	€3.0m



CUSS implementation



CUSS implementation

SCP 171.001 Terminal 1 and Terminal 2 Common User Self Service (CUSS) Check-in

Project Details Summary

Category		
Passenger Processing	Terminal (Business Development)	
Primary Driver	Secondary Driver(s)	Total Capex Requirement
Business Volume Growth	Addressing User Request (Operational Efficiency)	€5.9m (6.9m less €1m allowance included in current CIP for CUSS)
Underpinning Assumptions and Cost Benchmarks	<ul style="list-style-type: none"> • Optimises use of critical infrastructure. • Supports airline growth and efficiency . • Meets user requirements. • Provides multiple user flexibility. • Cost based on tender returns for similar works in 2016 (CUSS Phase 1) and adjusted for inflation. 	
Opex Impacts	<ul style="list-style-type: none"> • IT support costs. • Energy costs. 	
Project Output	Terminal 1 and Terminal 2 CUSS implementation.	
Asset life	5 years.	

Project Delivery Key Milestones

Phase 1 Complete	Q3 2016
Phase 2 Complete	Q2 2017
Phase 3 Feasibility/Outline Design Complete	Q3 2017
Phase 3 Detail Design Complete	Q3 2017
Phase 3 Construction Commence	Q2 2018
Phase 3 Project Handover	Q2 2018

SCP 171.001 Terminal 1 and Terminal 2 Common User Self Service (CUSS) Check-in

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	7%	€506,827
Construction Costs	88%	€6,075,336
Design Development and Contingency	5%	€317,838
Total	100%	€6,900,000

*This is due to rounding.

Key Information

- Optimises use of critical infrastructure.
- Supports airline growth and efficiency.
- Meets user requirements.
- Provides multiple user flexibility.
- Cost based on tender returns for similar works in 2016 (CUSS Phase 1) and adjusted for inflation.
- Design Development and Contingency is not applicable for Phase 1 and 2.

LEVEL 2 - Cost Analysis				
Design and Management Costs	Value	% Fee	Total Fee	Total
Planning/Building Control/ Cost Consultants	€6,075,336	1.2	€72,404	€72,404
Civil/Airfield/Environmental Engineer	€6,075,336	3.4	€204,047	€204,047
Project Management/Other Costs	€6,075,336	3.8	€230,376	€230,376
Total - to summary				€506,827
Construction Costs	Quantity	Unit	Rate	Total
Preliminaries	1	Sum	€1,152,110	€1,152,110
Building works	170	m ²	€1,852	€314,784
Equipment; SSK Units Incl. Elec Works	98	Unit	€31,832	€3,119,560
Equipment; BDK Units Incl. Elec Works	41	Unit	€36,314	€1,488,881
Total - to summary				€6,075,336
Design Development and Contingency	Value	%	Total	Total
Design Development (Phase 3 Only)	€2,889,432	6.0	€173,366	€173,366
Contingency (Phase 3 Only)	€2,889,432	5.0	€144,472	€144,472
Total - to summary				€317,838

SCP 171.002 Pier 1 Extension

Project Summary

This project comprises a single storey extension to Pier 1 including:

- circa 860sqm ground floor extension to Pier 1 with the provision of 4 boarding gates.
- Associated civil works and ramp alterations.
- Relocation of existing battery chargers and fuel tank.
- Relocation of existing Ground Service Equipment (GSE) parking.
- Safeguarding structural works for future first floor extension.
- Toilet block on ground floor of Pier 1.

This project will enable more pier-served aircraft to be simultaneously boarded than currently possible (by having two additional boarding gates), through stands 118R, 119, 119R and 120L. In addition, the proposed gates will convert stands 119R and 120, from remote, to walk out contact stands. It will remove the current need to bus to these stands from Terminal 1 bus gates.

This project will increase the total number of walk-out contact stands at Pier 1 from 21 to 23, and it will relieve current congestion by providing a more favourable 'gate to stand' ratio.

This in turn, delivers better and more efficient usage of contact stands, and has the ability to facilitate an increase in departures from Pier 1.



SCP 171.002 Pier 1 Extension

Project Details Summary

Category

Passenger Processing

Primary Driver

Business Volume Growth

Secondary Driver(s)

Addressing User Requests

Total Capex Requirement

€7.6m

Underpinning Assumptions and Cost Benchmarks

- Cost based on tender return.

Opex Impacts

- Additional Opex includes heat and light.

Project Deliverable

- Ground Floor Extension to Pier 1.
- 2 contact (previously remote) Code C NBEs.
- Extra lounge/queuing space in Pier 1 (circa 860sqm).

Asset Life

40 years.

Project Delivery Key Milestones

Feasibility/Outline Design Complete	Q2 2016
Planning Complete	Q2 2016
Detail Design Complete	Q4 2016
Construction Commence	Q4 2016 (6 months)
Project Handover	Q2 2017

SCP 171.002 Pier 1 Extension

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	8%	€585,200
Construction Costs	92%	€7,014,800
Design Development and Contingency	NA	NA
Total	100%	€7,600,000

Key Assumptions

- Cost based on construction within existing apron.
- Works carried out airside.
- No demolitions of existing buildings.
- Standard steel structure cladded building.

LEVEL 2 - Cost Analysis				
Design and Management Costs	Value	% Fee	Total Fee	Total
Planning/Building Control/ Cost Consultants	€7,014,800	1.2	€83,600	€83,600
Civil/Airfield/Environmental Engineer	€7,014,800	3.4	€235,600	€235,600
Project Management/Other Costs	€7,014,800	3.8	€266,000	€266,000
Total - to summary				€585,200
Construction Costs	Quantity	Unit	Rate	Total
Enabling Works	860	m ²	€838	€720,605
Construction Cost	860	m ²	€5,562	€4,783,588
Mechanical Costs	860	m ²	€1,159	€997,000
Electrical Costs	860	m ²	€597	€513,606
Total - to summary				€7,014,800
Design Development and Contingency	Value	%	Total	Total
Design Development	-	-	-	NA
Contingency	-	-	-	NA
Others	-	-	-	NA
Total - to summary				€0

SCP 171.003 South Apron Pre-Boarding Zone (PBZ)

Project Summary

The South Apron Pre-Boarding Zone (PBZ), also known as the South Gates, is a satellite boarding gate facility comprising of five boarding gates to service nine Code C stands. The PBZ is a single storey building circa 6.95m in height and 117m long x 19.5m wide, and has a gross internal area of 2,205sqm. The South Apron Pre-Boarding Zone investment includes:

- PBZ modular building with associated enabling works.
- External covered walkways to stands 416–418.
- Food and beverage offering.
- Welfare facilities.
- Swing gate for mixed mode operation (separate arrivals and departures)
- Remodelled Pier C Bus lounge.
- Widening head of stand road to facilitate shuttle operation.

Passengers will access PBZ via the Pier C bus lounge (Gate 335) where a shuttle bus service will be operating to the PBZ.

This project is required to service 9 Code C stands on the South Apron to meet the current and forecast demand.

A pre-boarding zone on the South Apron will also have the following additional benefits:

- It will reduce the number of busses required to service 9 NBE remote stands on the South Apron for first wave departures and throughout the day.
- It will improve the On-Time Performance (OTP) of these aircraft stands, by achieving greater predictability of embarking and disembarking passengers from aircraft.
- It will provide a better passenger experience by having stands where passengers can walk directly from a gate facility to the aircraft.



SCP 171.003 South Apron Pre-Boarding Zone (PBZ)

Project Details Summary

Category

Passenger Processing

Primary Driver

Business Volume Growth

Secondary Driver(s)

Addressing User Requests

Total Capex Requirement

€22m

Underpinning Assumptions and Cost Benchmarks

- Costs based on contract award price.

Opex Impacts

- Heat and light, maintenance, cleaning etc.
- Shuttling bus operation.

Project Deliverable

- 5 Boarding Gates to serve nine walk out stands.
- Enabling works to facilitate boarding gate facility (realigned bus gate etc.).
- Relocation of Security Access Gate.
- Widening head of stand road.
- Remodelled Pier C Bus lounge to facilitate shuttle service.

Asset Life

20 years.

Project Delivery Key Milestones

Feasibility/Outline Design Complete	Q2 2016
Planning Complete	Q3 2016
Detail Design Complete	Q3 2016
Construction Commence	Q1 2017 (9 months)
Project Handover	Q4 2017

SCP 171.003 South Apron Pre-Boarding Zone (PBZ)

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	8%	€1,689,603
Construction Costs	92%	€20,151,298
Design Development and Contingency	-	NA
Total	100%	€21,832,392

*This is due to rounding.

Key Information

- Cost based on construction within existing aprons.
- Works carried out landside.
- Modular steel structure clad building.
- Construction costs are based on tender returns.

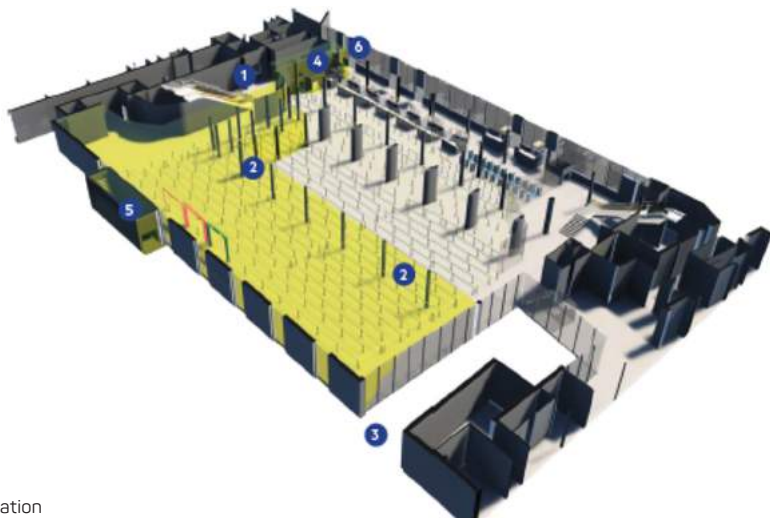
LEVEL 2 - Cost Analysis				
Design and Management Costs	Value	% Fee	Total Fee	Total
Planning/Building Control/ Cost Consultants	€20,253,298	1.2	€241,372	€241,372
Civil/Airfield/Environmental Engineer	€20,253,298	3.4	€680,230	€680,230
Project Management/Other Costs	€20,253,298	3.8	€768,002	€768,002
Total - to summary				€1,689,603
Construction Costs	Quantity	Unit	Rate	Total
Enabling Works	2,200	m ²	€3,104	€6,828,083
Terminal 2 Alterations	1	Item	€1,592,337	€1,592,337
Construction Cost	2,200	m ²	€4,657	€10,245,307
Mechanical Costs	2,200	m ²	€448	€985,265
Electrical Costs	2,200	m ²	€228	€502,307
Total - to summary				€20,151,298
Design Development and Contingency	Value	%	Total	Total
Design Development	-	-	-	NA
Contingency	-	-	-	NA
Others	-	-	-	NA
Total - to summary				€0

SCP 171.004 Terminal 1 and Terminal 2 Immigration Facilities

Project Summary	<p>The Terminal 1 and Terminal 2 Immigration Facilities projects include the installation of e-gates and an extension to the Immigration hall in Terminal 1 (Pier 1 and Pier 2).</p> <p>Terminal 1 e-gates and Extension to Immigration Hall (Pier 1 and Pier 2) - €9.6m</p> <p>This project comprises of - €1.3m:</p> <ul style="list-style-type: none"> The installation of 10 e-gates in the existing Immigration hall. The extension of the existing Immigration hall to facilitate additional processing and queuing to meet the forecast demand profile. <p>Passengers arriving in Pier 1 are regularly forced to queue on the Pier 1 Skybridge before entering the Immigration area. It is necessary at peak times to restrict usage of the traveller and the escalators, and to deploy customer service agents (CSAs) to manage queues in this area. This does not provide an acceptable level of customer service or safety for passengers. An extension to the Immigration hall is required to meet the increase in processing capacity provided by the e-gates and to eliminate queuing on the Skybridge</p> <p>Terminal 2 e-gates - €0.4m</p> <p>This project comprises the installation of 10 e-gates in the existing Immigration hall and modifications to the existing booths to facilitate additional processing and queuing to meet the forecast demand profile. The processing capacity will increase from 3,200 pax/hr to 3,400 pax/hr.</p>
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Terminal 1	Processing Capacity (pax/hr)	Queue Space	mppa	Comments
Current Layout Q2 2017	2,897	422m ²	25 mppa	<ol style="list-style-type: none"> Queue times exceed 40mins. Constant queuing on Skybridge .
12 Desks				
+10 e-gates	4,300*	422m ²	28 mppa	Queuing on Skybridge will still be an issue.
2019 Schedule	4,300	1,200m ²	32 mppa	Facility is sufficient for 32mppa.

*Capacity not achievable without Pier 1/Pier 2 extension as not possible to meet the presentation demand to e-gates or booths due to queuing on Skybridge, which extension will remove.



Immigration
Terminal 1 Pier 1/2

SCP 171.004 Terminal 1 and Terminal 2 Immigration Facilities



e-gates Terminal 1

Project Details Summary

Category

Passenger Processing

Primary Driver

Business Volume Growth

Secondary Driver(s)

Business Development

Total Capex Requirement

€11.3m

Underpinning Assumptions and Cost Benchmarks

- Cost based on rate of €5,500/sqm for Terminal building projects.
- Cost based on tender returns for similar works in 2016 (Terminal 2 Transfers, Pier 1 Extension) and adjusted for inflation.
- No allowance for refurbishment of existing area included.

Opex Impacts

- Additional energy costs.

Project Deliverables

- Increase processing capability from 2,897 pax/hr to 4,300 pax/hr.
- Extension of Pier 1/Pier 2 Immigration Hall.
- Installation of 10 e-gates in Terminal 1 (Pier 1 and 2) and 10 e-gates in Terminal 2 Immigration halls (supply of e-gates by others).
- Improved level of service.

Asset Life

- 10 years for installation of e-gates.
- 15 years for extension to hall.

SCP 171.004
Terminal 1 and Terminal 2 Immigration Facilities

Project Summary
(Cont.)

Project Delivery Key Milestones (e-gates Terminal 1 and Terminal 2)	
Feasibility/Outline Design Complete	Q1 2017
Planning Complete	Q1 2017
Detail Design Complete	Q2 2017
Construction Commence	Q3 2017 (3 months)
Project Handover	Q1 2018

Project Delivery Key Milestones (Extension to Pier 1 / Pier 2 Immigration Hall)	
Feasibility/Outline Design Complete	Q4 2017
Planning Complete	Q4 2017
Detail Design Complete	Q1 2018
Construction Commence	Q2 2018 (12 months)
Project Handover	Q2 2019

SCP 171.004 Terminal 1 and Terminal 2 Immigration Facilities

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	7%	€774,885
Construction Costs	82%	€9,288,561
Design Development and Contingency	11%	€1,243,797
Total	100%	€11,307,243

*This is due to rounding.

Key Information

- Cost based on tender returns for similar work in 2016 (T2 transfers and adjusted for inflation).
- Works carried out airside.
- Estimated for inflation.
- Refurbishment of existing Immigration area is excluded.

LEVEL 2 - Cost Analysis				
Design and Management Costs	Value	% Fee	Total Fee	Total
Planning/Building Control/ Cost Consultants	€9,288,561	1.2	€110,698	€110,698
Civil/Airfield/Environmental Engineer	€9,288,561	3.4	€311,967	€311,967
Project Management/Other Costs	€9,288,561	3.8	€352,221	€352,221
Total - to summary				€774,885
Construction Costs	Quantity	Unit	Rate	Total
New build extension with improved specification	870	m ²	€5,500	€4,785,000
Immigration E-Gates T1 and T2	1	sum	€1,067,911	€1,067,911
Mechanical Works	1	sum	€993,524	€993,524
Electrical Works	1	sum	€702,512	€702,512
Ext Bldg Works Caldding Etc Incl. Car Parking, Paving	700	m ²	€2,485	€1,739,614
Total - to summary				€9,288,561
Design Development and Contingency	Value	%	Total	Total
Design Development	€10,063,447	6.7	€678,435	€678,435
Contingency	€10,063,447	5.6	€565,362	€565,362
Total - to summary				€1,243,797

SCP 171.005 Additional Bus Gates

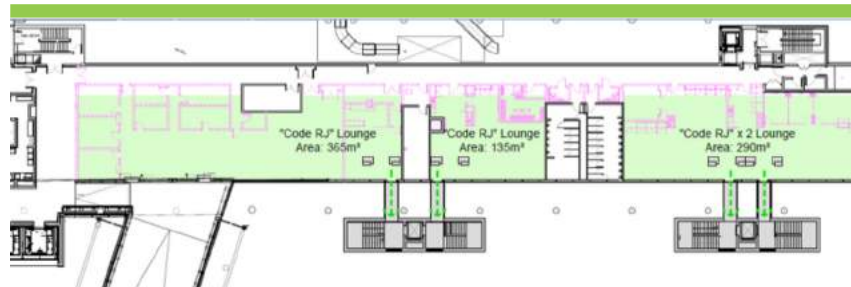
Project Summary

This Proposed Terminal 2, Level 15 Bus gate project entails the remodelling of existing office accommodation on the east side of T2 Level 15 to create new Bus gate facilities. The proposed bus gates will provide a dedicated facility for carriers that operate from Terminal 2. The proposed remodelled space will facilitate alternative operational scenarios as illustrated on the graphics below. Typical arrangements are:

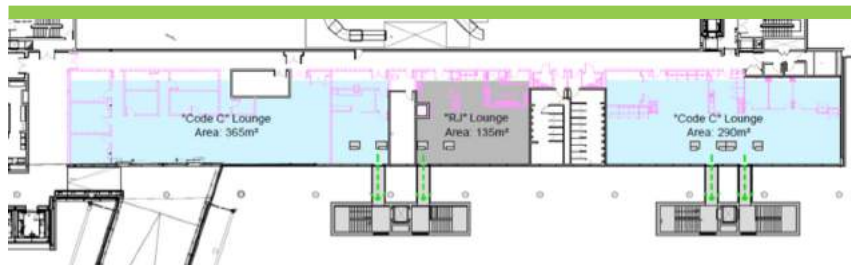
- 4 x Regional Jet type aircraft or
- 2 x full code C and 1 x Regional Jet.

The requires the construction of 2 vertical circulation cores (VCC) to route passengers from Level 15 to apron level.

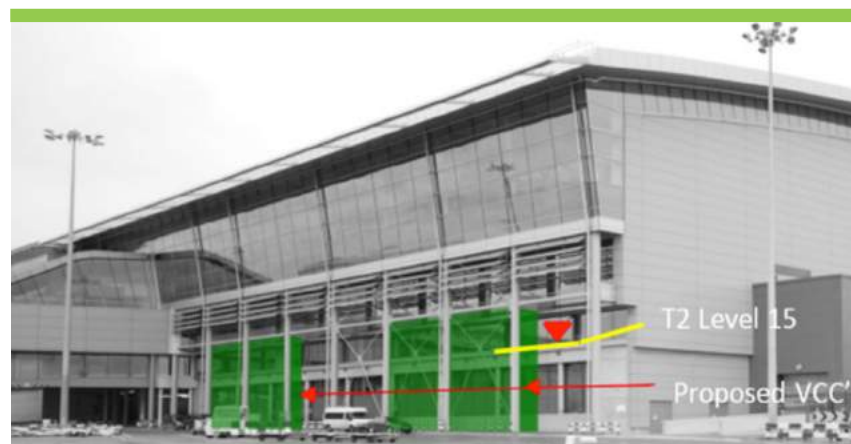
The scope also includes civil works to construct bus set down areas and bus manoeuvring areas.



4 x Regional Jet type aircraft



2 x full code C and 1 x Regional Jet



SCP 171.005 Additional Bus Gates

Project Details Summary		
Category Passenger Processing		
Primary Driver Business Volume Growth	Secondary Driver(s) Addressing User Requests	Total Capex Requirement €8.7m
Underpinning Assumptions and Cost Benchmarks	Cost based on recently constructed T2 Level 10 Bus gate project.	
Opex Impacts	<ul style="list-style-type: none"> • Facility opex cost. • Facility maintenance costs. 	
Project Deliverable	<ul style="list-style-type: none"> • Terminal 2 served Bus Gates for remote operations. <p>Capacity to accommodate:</p> <ul style="list-style-type: none"> • 4 x Regional Jet type aircraft, or • 2 x full code C and 1 x Regional Jet 	
Asset Life	30 years.	

Project Delivery Key Milestones	
Feasibility/Outline Design Complete	Q1 2018
Detail Design Complete	Q4 2018
Construction Commence	Q3 2019
Project Handover	Q2 2020

SCP 171.005 Additional Bus Gates

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	8%	€717,000
Construction Costs	77%	€6,693,962
Contingency and Escalation	15%	€1,333,973
Total		€8,744,936

Key Assumptions

- Optimises use of critical infrastructure.
- Supports airline growth and efficiency.
- Meets user requirements.
- Provides multiple user flexibility.
- Cost based on recent Bus Gates developments on Terminal 2 Level 10.

LEVEL 2 - Cost Analysis				
Design and Management Costs	Value	% Fee	Total Fee	Total
Planning/Building Control/ Cost Consultants	€6,693,962	2	€125,000	€125,000
Civil/Airfield/Environmental Engineer	€6,693,962	5	€367,000	€367,000
Project Management/Other Costs	€6,693,962	3	€225,000	€225,000
Total - to summary				€717,000
Construction Costs	Quantity	Unit	Rate	Total
Lounge Area Demo and Build	1,136	m ²	1772	€2,013,402
Mechanical and Electrical/LSS	1,136	m ²	1381	€1,569,520
Works to Existing Façade Works	1	Sum	-	€140,000
Link and Vcc Structure	1,672	m ²	€839	1,567,040
Rain Screen	1,012	m ²	€750	€759,000
Lifts Incl. Interlocks	2	Sum	€150,000	€300,000
Protection to Existing Services and Road Markings	1	Sum	-	€345,000
Total - to summary				€6,693,962
Design Development and Contingency	Value	%	Rate	Total
Contingency	€7,410,962	15	€1,111,644	€222,328
Others	€7,410,962	3	€222,328	€1,111,644
Total - to summary				€1,333,973

SCP 17.2.001 South Apron Stands

Project Summary

This project provides 4 Code C aircraft parking stands (NBEs–B737, A320, A321) including a self-maneuvring ATR-72 type and 8,000sqm of ground service equipment (GSE) parking on the South Apron.

This project is necessary to address the shortfall in stands of 11 NBEs as detailed in Section 3. It was necessary to commence this project in advance of the Supplementary Capex Process and expand the number of stands on the South Apron by 4 NBEs, in order to accommodate the 2017 demand.

There is currently a shortage of aircraft stands on the eastern side of RWY 16/34. The South Apron Stands were commenced to meet the demand and also to respond to customer requests.

The South Apron Stand development delivers 4 NBEs increasing the South Apron capacity to 9 NBEs.



SCP 17.2.001 South Apron Stands

Project Details Summary

Category

Aircraft Parking/Stands

Primary Driver

Business Volume Growth

Secondary Driver(s)

Addressing User Requests

Total Capex Requirement

€10.5m

Underpinning Assumptions and Cost Benchmarks

- Costs based on providing 4 Code C fully operational stands in compliance with EASA.
- Apron parking constructed in concrete.
- Apron parking providing AGL and floodlighting.
- Costs based on tender returns.
- Safeguarding of Fixed Electrical Ground Power (FEGP)

Opex Impacts

- This project was specifically requested by users.
- Additional opex costs include floodlighting, AGL and snow clearing.

Project Deliverable

- 4 NBE Code C stands.
- 8,000 sqm of GSE parking area.

Asset Life

40 years.

Project Delivery Key Milestones

Feasibility/Outline Design Complete	Q1 2015
Planning Complete	Q2 2015
Detail Design Complete	Q4 2015
Construction Commence	Q1 2016 (13 months)
Project Handover	Q4 2017

SCP 17.2.001 South Apron Stands

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	8%	€807,315
Construction Costs	92%	€9,677,289
Design Development and Contingency	-	NA
Total	100%	€10,484,604

Key Information

- Approx. 17,000m² of concrete apron and head of stand road pavement.
- Provision of new Airfield Ground Lighting systems (AGLs).
- Airfield signage including stand designators; electrical works including modifications to substation, provision of external distribution boards, MV and LV cabling and associated ducting; provision of new high mast lights and upgrades and modifications to existing high mast lighting.
- Construction of approx. 185m of earth retaining structures.
- Accommodation works for Swissport including realignment of Bond Road, including the relocation of weighbridge and provision of additional equipment parking area.
- Unit Rate costs vary for each area due to high level nature of estimate along with unique assumptions for each area.

LEVEL 2 - Cost Analysis				
Design and Management Costs	Value	% Fee	Total Fee	Total
Planning/Building Control/ Cost Consultants	€9,677,289	1.2	€115,331	€115,331
Civil/Airfield/Environmental Engineer	€9,677,289	3.4	€325,023	€325,023
Project Management/Other Costs	€9,677,289	3.8	€366,961	€366,961
Total - to summary				€807,315
Construction Costs	Quantity	Unit	Rate	Total
New Pavement	17,000	m ²	€290	€4,935,418
Electrical Work	17,000	m ²	€74	€1,258,048
Drainage	17,000	m ²	€154	€2,612,868
Temporary Works to Maintain Aircraft Operations	1	Sum	€870,956	€870,956
Total - to summary				€9,677,289
Design Development and Contingency	Value	%	Total	Total
Design Development	-	-	-	NA
Contingency	-	-	-	NA
Others	-	-	-	NA
Total - to summary				€0

SCP 17.2.002 Apron 5H and North Apron Taxiway Rehabilitation

Project Summary

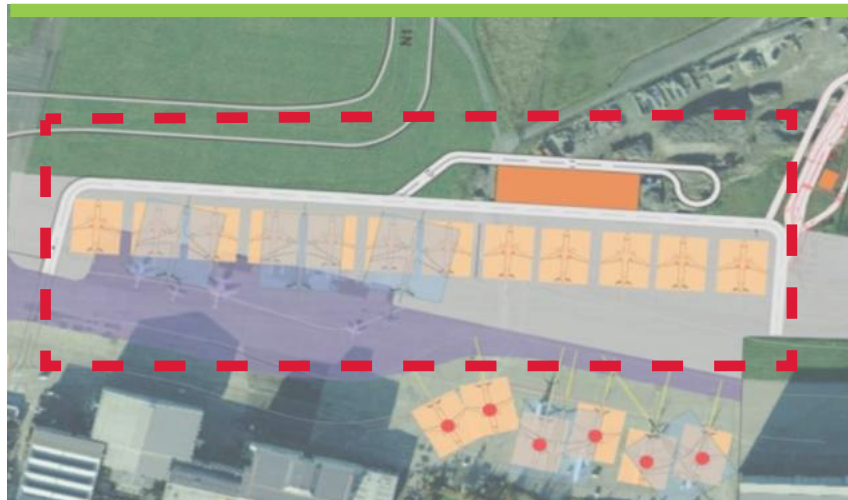
This project provides 12 Code C aircraft parking stands (NBEs – B737, A320 etc.) including 3 Wide Body stands (A330, B777 etc.) in MARS (Multi Apron Ramp System) configuration and an open hangar area for business aviation. It also includes the necessary rehabilitation of North Apron taxiway pavement which is over 60 years old, to facilitate this development.

Dublin Airport Summer 2019 forecast stand demand (based on current growth profiles) has identified a stand requirement of 116 NBEs (Narrow Body Equivalent) during the peak stand demand in the early morning, with a current (Q1 2017) stand supply of 105 NBEs. This results in a shortfall of 11 stands and with contingency provision, the shortfall increases to 21 stands, as detailed in Section 3.

Apron 5H and the associated North Apron Taxiway Rehabilitation project is one of the projects required to address this shortfall.

Apron 5H is an eastward extension of Apron 5G on the North Apron and encompasses the footprint of the General/Business Aviation parking on Light Aircraft Park 'B' (LAPB). Business aviation parking is being provided as part of this development to compensate for the loss of LAPB.

Apron 5H will be located directly adjacent to the future North Runway access taxiway and this will facilitate greater On Time Performance on completion of the North Runway. The apron also safeguards for a future satellite boarding facility.



SCP 17.2.002 Apron 5H and North Apron Taxiway Rehabilitation

Project Details Summary

Category

Aircraft Parking/Stands

Primary Driver	Secondary Driver(s)	Total Capex Requirement
Business Volume Growth	Addressing User Requests	€52m (incl. €15m Apron Reconstruction)
Underpinning Assumptions and Cost Benchmarks	<ul style="list-style-type: none"> Costs based on providing fully operational stands in compliance with EASA requirements. Apron parking to be constructed in concrete. Apron parking to be provided with AGL, high mast lighting and safeguarded for FEGP (not included). Adequate Ground Service Equipment (GSE) parking also to be provided – area 5,000sqm. Provision of surface water attenuation and pollution control facilities to required standard. Costs based on tender returns for similar works in 2014 (Apron 5G, South Apron and Apron Reconstruction), adjusted for inflation. 	
Opex Impacts	<ul style="list-style-type: none"> Additional opex costs include energy costs associated with floodlighting and AGL and de-icing as required. 	
Project Deliverable	<ul style="list-style-type: none"> 12 NBE Code C stands (including 3 WB stands). Business Aviation open hangar facility – area 7,000sqm. Rehabilitated North Apron Taxiway. GSE Parking Area – area 5,000sqm. 	
Asset Life	40 years.	

Project Delivery Key Milestones

Feasibility/Outline Design Complete	Q3 2016
Planning Complete	Q3 2017
Detail Design Complete	Q2 2018
Construction Commence	Q2 2018 (24 months)
Phase 1 (GNBEs available)	Q3 2019
Project Handover	Q2 2020

SCP 17.2.002 Apron 5H and North Apron Taxiway Rehabilitation

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	7%	€3,563,564
Construction Costs	82%	€42,716,487
Design Development and Contingency	11%	€5,720,006
Total	100%	€52,000,058

*This is due to rounding.

Key Assumptions

- Costs based on providing fully operational stands in compliance with EASA requirements.
- Apron parking to be constructed in concrete.
- Apron parking to be provided with AGL, high mast lighting and safeguarded for FEGP.
- Adequate Ground Service Equipment (GSE) parking also to be provided.
- Costs based on tender returns for similar works in 2014 (Apron 5G) adjusted for inflation.
- Costs based on similar ground conditions typical of works in adjacent areas. No allowance for unforeseen 'poor' ground conditions. No soil investigation completed.
- Unit Rate costs vary for each area due to high level nature of estimate along with unique assumptions for each area.

LEVEL 2 - Cost Analysis				
Design and Management Costs	Value	% Fee	Total Fee	Total
Planning/Building Control/ Cost Consultants	€42,716,487	1.2	€509,081	€509,081
Civil/Airfield/Environmental Engineer	€42,716,487	3.4	€1,434,682	€1,434,682
Project Management/Other Costs	€42,716,487	3.8	€1,619,802	€1,619,802
Total - to summary				€3,563,564
Construction Costs	Quantity	Unit	Rate	Total
New Apron Pavement Area	65,000	m ²	€344	€22,366,272
Rehabilitation of Existing Apron (Full)	25,000	m ²	€329	€8,236,990
Rehabilitation of Existing Apron (Partial)	15,000	m ²	€147	€2,199,610
New Apron Pavement (Business Aviation)	7,000	m ²	€246	€1,723,341
New Gse Parking Area (Incl. Potential Areas)	10,000	m ²	€222	€2,224,446
Drainage Attenuation	65,000	m ²	€20	€1,332,205
Electrical and Other Lighting	105,000	m ²	€31	€3,301,418
Preliminaries/Phasing/Operational Restrictions	1	Sum	€1,332,205	€1,332,205
Total - to summary				€42,716,487
Design Development and Contingency	Value	%	Total	Total
Design Development	€46,280,051	6.7	€3,120,003	€3,120,003
Contingency	€46,280,051	5.6	€2,600,003	€2,600,003
Others	€0	0	€0	€0
Total - to summary				€5,720,006

SCP 17.2.003 Upgrade and Realignment of Stands 101–104

Project Summary

The project comprises the upgrade and realignment of Stands 101–104 to enable full passenger operations. These stands add a net gain of 6 Narrow Body Equivalent (NBEs) passenger operational stands (incl. 2 additional Wide Body (WB) stands).

The project includes the realignment of the stand layout to maximise the flexibility of the existing stand arrangement, the provision of pollution control infrastructure, high mast lighting infrastructure, and GSE storage areas. The feasibility of this project depends on the Irish Aviation Authority-Safety Regulation Department acceptance of the Deviation Acceptance and Action Document (DAAD) for existing parking of maintenance aircraft on this pavement, as part of the EASA transition process.

Stands 103–104 are currently used to park aircraft being serviced by the hangar tenants. Stands 101-102 are currently used to park large business aviation aircraft. As part of this proposal these activities will be relocated when stands are required for passenger operations.

Dublin Airport Summer 2019 forecast stand demand (based on current growth profiles) has identified a stand requirement of 116 NBEs (Narrow Body Equivalent) during the peak stand demand in the early morning, with a current (Q1 2017) stand supply of 105 NBEs. This results in a shortfall of 11 stands and with contingency provision, the shortfall increases to 21 stands, as detailed in Section 3.

The Upgrade and Realignment of Stands 101-104 is one of the projects required to address this shortfall. These stands also benefit from the North Apron Taxiway Rehabilitation (carried out under SCP 17.2.002) by enabling aircraft access to the respective stands.



SCP 17.2.003 Upgrade and Realignment of Stands 101-104

Project Details Summary

Category

Aircraft Parking/Stands

Primary Driver	Secondary Driver(s)	Total Capex Requirement
Business Volume Growth	Addressing User Requests	€5.0m
Underpinning Assumptions and Cost Benchmarks	<ul style="list-style-type: none"> Costs based on providing fully operational stands with DAAD for gradient greater than 1% to be approved by IAA SRD. Apron parking to be provided with high mast lighting. Ground Service Equipment (GSE) parking to be provided. Surface water attenuation and pollution control facilities to be provided. Costs based on tender returns for similar works in 2014 (Apron 5G, South Apron and Apron Reconstruction) adjusted for inflation. 	
Opex Impacts	<ul style="list-style-type: none"> Additional opex costs include, energy costs associated with floodlighting, AGL and deicing disposal as required. 	
Project Deliverable	<ul style="list-style-type: none"> 6 passenger operational NBE Code C stands. 	
Asset Life	15 years (assumes stands will be rehabilitated after 15 years).	

Project Delivery Key Milestones

Feasibility/Outline Design Complete	Q3 2017
Planning Complete	Q4 2017
Detail Design Complete	Q4 2017
Construction Commence	Q1 2018 (5 months)
Project Handover	Q4 2018

SCP 17.2.003 Upgrade and Realignment of Stands 101-104

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	7%	€342,519
Construction Costs	82%	€4,105,781
Design Development and Contingency	11%	€549,790
Total	100%	€4,998,091

*This is due to rounding.

Key Assumptions

- Costs based on providing fully operational stands with DAAD for gradient greater than 1% approved by IAA SRD.
- Apron parking to be provided high mast lighting.
- Adequate Ground Service Equipment (GSE) parking also to be provided.
- Surface water attenuation and pollution control facilities to be provided.
- Costs based on tender returns for similar works in 2014 (Apron 5G) adjusted for inflation.
- Costs assume stand realignment only.
- Unit Rate costs vary for each area due to high level nature of estimate along with unique assumptions for each area.

LEVEL 2 - Cost Analysis				
Design and Management Costs	Value	% Fee	Total Fee	Total
Planning/Building Control/ Cost Consultants	€4,105,781	1.2	€48,931	€48,931
Civil/Airfield/Environmental Engineer	€4,105,781	3.4	€137,897	€137,897
Project Management/Other Costs	€4,105,781	3.8	€155,691	€155,691
Total - to summary				€342,519
Construction Costs	Quantity	Unit	Rate	Total
Rehab Apron Repair Work	3,000	m ²	€434	€1,256,963
High Mast Lighting And Electrical Infrastructure (Incl.Connection To Electrical Substation)	18,000	m ²	€62	€1,077,397
Pollution Control	3,000	m ²	€469	€1,539,139
New Surface Water and Drainage Infrastructure	910	m	€264	€232,281
Total - to summary				€4,105,781
Design Development and Contingency	Value	%	Total	Total
Design Development	€4,448,301	6.7	€299,885	€299,885
Contingency	€4,448,301	5.6	€249,905	€249,905
Others	€0	0	€0	€0
Total - to summary				€549,790

SCP 17.2.004 Hangar 1 and Hangar 2 Stands

Project Summary

This project provides for 3 Code C aircraft parking stands (NBE's – B737, A320 etc.) adjacent to Hangar 1 and Hangar 2. It includes the rehabilitation of the existing life expired apron pavement under the footprint of the proposed stands and the construction of a new apron pavement. This development will require partial demolition of the old fire station, and partial demolition of the single storey Hangar 1 annex, which will result in relocation of existing tenants.

Dublin Airport summer 2019 forecast stand demand (based on current growth profiles) has identified a stand requirement of 116 NBEs (Narrow Body Equivalent) during the peak stand demand in the early morning, with a current (Q1 2017) stand supply of 105 NBEs. This results in a shortfall of 11 stands and with contingency provision, the shortfall increases to 21 stands, as detailed in Section 3.

Hangar 1 and Hangar 2 Stands is one of the projects required to address this shortfall. These stands also benefit from the North Apron Taxiway Rehabilitation (carried out under SCP 17.2.002) by enabling aircraft access to the respective stands.

The proposed stands are located north of Hangar 1 and 2 and adjacent to the future North Runway Access Taxiway.

This development will provide remote NBE stand capacity on the eastern apron to facilitate growing airport demand for stands.



SCP 17.2.004 Hangar 1 and Hangar 2 Stands

Project Details Summary

Category

Aircraft Parking/Stands

Primary Driver

Business Volume Growth

Secondary Driver(s)

Addressing User Requests

Total Capex Requirement

€14.3m (Including €1.6m for apron taxiway rehabilitation)

Underpinning Assumptions and Cost Benchmarks

- Costs based on providing fully operational stands in compliance with EASA requirements.
- Apron parking to be constructed in concrete.
- Apron parking to be provided with AGL, high mast lighting and safeguarded for FEGP.
- Adequate Ground Service Equipment (GSE) parking also to be provided.
- Surface water attenuation and pollution control facilities to be provided.
- Costs based on tender returns for similar works in 2014 (Apron 5G, South Apron and Apron Rehabilitation) adjusted for inflation.

Opex Impacts

- Incremental opex costs include, energy costs associated with floodlighting and AGL, and snow clearing costs as required.

Project Deliverable

- 3 NBE Code C stands.

Asset Life

30 years.

Project Delivery Key Milestones

Feasibility/Outline Design Complete	Q3 2017
Planning Complete	Q3 2017
Detail Design Complete	Q4 2017
Construction Commence	Q2 2018 (13 months)
Project Handover	Q3 2019

SCP 17.2.004 Hangar 1 and Hangar 2 Stands

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	7%	€979,028
Construction Costs	82%	€11,735,621
Design Development and Contingency	11%	€1,571,474
Total	100%	€14,286,123

*This is due to rounding.

Key Assumptions

- Costs based on providing fully operational stands in compliance with EASA requirements.
- Apron parking to be constructed in concrete.
- Apron parking to be provided with AGL, high mast lighting and safeguarded for FEGP.
- Adequate Ground Service Equipment (GSE) parking also to be provided.
- Costs based on tender returns for similar works in 2014 (Apron 5G) adjusted for inflation.
- Apron area of 19,700m².
- Costs assume relocation of existing tenants to existing on site facilities.
- Unit Rate costs vary for each area due to high level nature of estimate along with unique assumptions for each area.

LEVEL 2 - Cost Analysis				
Design and Management Costs	Value	% Fee	Total Fee	Total
Planning/Building Control/ Cost Consultants	€11,735,621	1.2	€139,861	€139,861
Civil/Airfield/Environmental Engineer	€11,735,621	3.4	€394,154	€394,154
Project Management/Other Costs	€11,735,621	3.8	€445,013	€445,013
Total - to summary				€979,028
Construction Costs	Quantity	Unit	Rate	Total
Apron Area	19,700	m ²	€352	€6,933,376
Rehabilitation Main Taxiway Route To New North Apron Stands	4,000	m ²	€322	€1,288,000
Electrical Work	23,700	m ²	€37	€876,900
Demolitions Incl. Making Good To Building	1,300	m ²	€416	€540,301
Upgrade To Access Roads And Carpark	1	Sum	€736,799	€736,799
Refurbishment of Office Space to Accommodate Displaced Tenants Plus Temporary Storage and Relocation Costs	400	m ²	€3,401	€1,360,245
Total - to summary				€11,735,621
Design Development and Contingency	Value	%	Total	Total
Design Development	€12,714,649	6.7	€857,167	€857,167
Contingency	€12,714,649	5.6	€714,306	€714,306
Others	€0	0	€0	€0
Total - to summary				€1,571,474

SCP 17.2.005 West Apron Stands

Project Summary

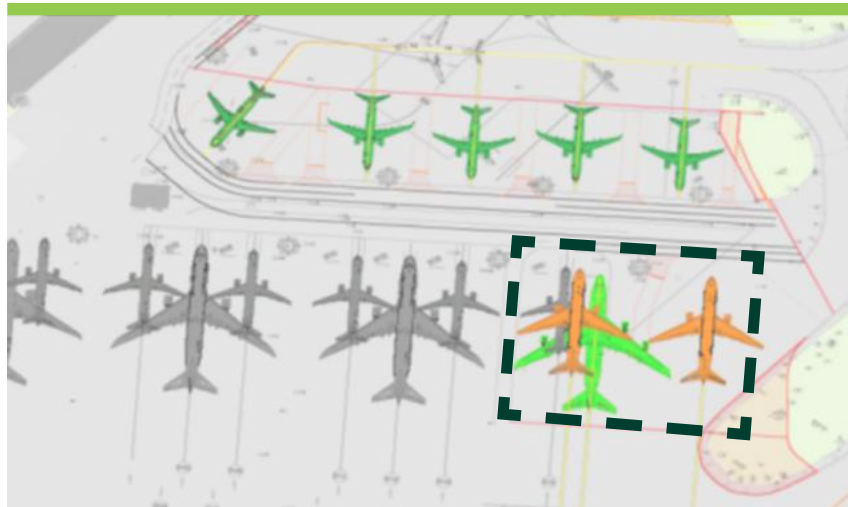
This project creates:

- 1 additional Code D aircraft parking stand (B757, B767, A300 etc.).
- An upgrade of an existing Code C stand to Code D.
- An upgrade of a restricted Code C to a full Code C.
- An upgrade of an existing Code C stand to a Code E MARS configuration.

The project entails part infill of grassed area with concrete pavement and conversion of existing West Apron towing route to deliver an additional stand.

Dublin Airport Summer 2019 forecast stand demand (based on current growth profiles) has identified a stand requirement of 116 NBEs (Narrow Body Equivalent) during the peak stand demand in the early morning. The current (Q1 2017) stand supply is of 105 NBEs. This results in a shortfall of 11 stands and with contingency provision, the shortfall increases to 21 stands, as detailed in Section 3.

A key element of the stand strategy to 2020 is maximising the use of the West Apron to facilitate cargo operations, business aviation, parking of standby aircraft and transit operations.



SCP 17.2.005 West Apron Stands

Project Details Summary

Category

Aircraft Parking/Stands

Primary Driver	Secondary Driver(s)	Total Capex Requirement
Business Volume Growth	Addressing User Requests	€2.5m
Underpinning Assumptions and Cost Benchmarks	<ul style="list-style-type: none"> Costs based on providing fully operational stands in compliance with EASA requirements. Apron parking to be constructed in concrete. Apron parking to be provided with AGL and high mast lighting. Costs based on tender returns for similar works in 2014 (Apron 5G, South Apron Stands and Apron Rehabilitation) adjusted for inflation. 	
Opex Impacts	<ul style="list-style-type: none"> Additional opex costs include floodlighting, AGL, and snow clearing/deicing. 	
Project Deliverable	<ul style="list-style-type: none"> 1 Code D stand. 1 upgrade from Code C to code D. 1 upgrade from Code C to Code E (MARS) configuration. 1 upgrade from restricted Code C to Full Code C. 	
Asset Life	40 years.	

Project Delivery Key Milestones

Feasibility/Outline Design complete	Q1 2018
Planning Complete	Q1 2018
Detail Design Complete	Q2 2018
Construction Commence	Q3 2018 (5 months)
Project Handover	Q1 2019

SCP 17.2.005 West Apron Stands

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	6%	€161,875
Construction Costs	79%	€1,974,090
Design Development and Contingency	14%	€359,459
Total	100%*	€2,495,424

*This is due to rounding.

Key Assumptions

- Costs based on providing fully operational stands in compliance with EASA requirements.
- Apron parking to be constructed in concrete.
- Apron parking to be provided with AGL and high mast lighting.
- Costs based on tender returns for similar works in 2014 (Apron 5G) adjusted for inflation.
- Apron area is 2,500m².
- Costs based on similar ground conditions typical of works in adjacent areas. No allowance for unforeseen 'poor' ground conditions. No soil investigation completed.
- Unit Rate costs vary for each area due to high level nature of estimate along with unique assumptions for each area.

LEVEL 2 - Cost Analysis				
Design and Management Costs	Value	% Fee	Total Fee	Total
Planning/Building Control/ Cost Consultants	€1,974,090	1.5	€29,611	€29,611
Civil/Airfield/Environmental Engineer	€1,974,090	3.2	€63,171	€63,171
Project Management/Other Costs	€1,974,090	3.5	€69,093	€69,093
Total - to summary				€161,875
Construction Costs	Quantity	Unit	Rate	Total
Apron Area	2,500	m ²	€541	€1,353,090
Electrical Work	25	Nr	€4,140	€103,500
Temporary Facilities	1	Sum	€517,500	€517,500
Total - to summary				€1,974,090
Design Development and Contingency	Value	%	Total	Total
Design Development	€2,135,965	8.0	€170,858	€170,858
Contingency	€2,135,965	8.8	€188,601	€188,601
Others	€0	0	€0	€0
Total - to summary				€359,459

SCP 17.2.006 Pier 2 Underpass Widening

Project Summary

This project comprises the widening of Pier 2 underpass to allow unrestricted access for busses carrying passengers to and from remote stands. Currently these vehicles cannot travel through the Pier 2 Underpass because it is too narrow and these vehicles are forced to route around the back of Pier 2 stand road, which requires them to travel behind 10 active aircraft stands. This regularly results in bus and fuel bowser journey times increasing. The journey time can range from 3 to 15 minutes.

As vehicle traffic travelling to/from the North Apron is expected to increase over the coming years, this project is critical in providing a good service for airport customers, predictable journey times and increased levels of safety on the airfield.

To provide a more predictable and efficient route for busses and fuel bowser traffic, it is necessary to widen the Pier 2 Underpass. This solution will also elevate the level of safety around Pier 2. In 2016, there were 7 occurrences of vehicles not giving way to active aircraft on Pier 3 stands.



SCP 17.2.006 Pier 2 Underpass Widening

Project Details Summary

Category Aircraft Parking/Stands	Overall Capex Type Apron Infrastructure	
Primary Driver Operational Efficiency	Secondary Driver(s) Safety	Total Capex Requirement €5m
Underpinning Assumptions and Cost Benchmarks	<ul style="list-style-type: none"> Steel transfer frame structure. Costs based on tender returns on similar works in 2014 (Terminal 2 Transfers, Bussing Lounge, Pier 1 Extension) and adjusted for inflation. Costs based on phased construction and night works and minimum disruption to operations. 	
Opex Impacts	<ul style="list-style-type: none"> None envisaged. 	
Project Deliverable	<ul style="list-style-type: none"> Widened Pier 2 Underpass, capable of facilitating fuel bowsers and bussing. More consistent bussing operation to North Apron and Apron 5G stands. Greater efficiency for fuel bowsers. Elevated safety – busses and fuel bowsers will no longer have to drive around Pier 2 (10 active stands) when accessing stands north of Pier 2. Improved On Time Performance. 	
Asset Life	15 years.	

Project Delivery Key Milestones

Feasibility/Outline Design Complete	Q4 2017
Planning Complete	Q4 2017
Detail Design Complete	Q1 2018
Construction Commence	Q3 2018 (15 months)
Project Handover	Q3 2019

SCP 17.2.006 Pier 2 Underpass Widening

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	6%	€298,193
Construction Costs	85%	€4,259,894
Design Development and Contingency	9%	€441,484
Total	100%	€4,999,571

*This is due to rounding.

Key Assumptions

- Widened Pier 2 Underpass, capable of facilitating fuel bowzers and bussing.
- Phased to minimise impact on operations.
- Works completed in sections to minimise time when Pier 2 Underpass would not be available.
- Cost based on structure above being suitable to accommodate revised structural arrangement.

LEVEL 2 - Cost Analysis				
Design and Management Costs	Value	% Fee	Total Fee	Total
Planning/Building Control/ Cost Consultants	€4,259,894	1.0	€42,599	€42,599
Civil/Airfield/Environmental Engineer	€4,259,894	3.0	€127,797	€127,797
Project Management/Other Costs	€4,259,894	3.0	€127,797	€127,797
Total - to summary				€298,193
Construction Costs	Quantity	Unit	Rate	Total
Alterations and Installation of New Steel Work	20	t	€24,433	€488,658
Demolition Work	840	m ²	€511	€429,180
Construction Work	840	m ²	€3,133	€2,632,074
Maintaining Passenger Operations	1	Sum	€709,982	€709,982
Total - to summary				€4,259,894
Design Development and Contingency	Value	%	Total	Total
Design Development	€4,558,087	4.0	€182,323	€182,323
Contingency	€4,558,087	5.7	€259,161	€259,161
Others	€0	0	€0	€0
Total - to summary				€441,484

SCP 17.2.007 Pier 3 Underpass Widening

Project Summary

This project comprises the widening of Pier 3 Underpass to allow unrestricted access for fuel bowzers and busses carrying passengers to and from remote aircraft stands. Currently these vehicles cannot travel through the Pier 3 Underpass because it is too narrow. Vehicles are forced to route around the back of Pier 3 stand road, which requires them to travel behind 11 active aircraft stands. The journey time can range from 3 to 15 minutes.

As vehicle traffic travelling to/from the North Apron is expected to increase over the coming years, this project is critical in providing an efficient service for airport customers, consistent journey times, and elevate levels of safety on the airfield.

To provide a more consistent and efficient route for buses and fuel bowser traffic, it is necessary to widen the Pier 3 Underpass. This solution will also elevate the level of safety around Pier 3. In 2016, there were 16 occurrences of vehicles not giving way to active aircraft on Pier 3 stands.



SCP 17.2.007 Pier 3 Underpass Widening

Project Details Summary

Category

Aircraft Parking/Stands

Primary Driver	Secondary Driver(s)	Total Capex Requirement
Operational Efficiency	Safety	€0.2m
Underpinning Assumptions and Cost Benchmarks	<ul style="list-style-type: none"> Costs based on no structural works required. Costs are based on tender returns for similar projects (South Apron Stands, Pier 1 Extension) and adjusted for inflation. 	
Opex Impacts	<ul style="list-style-type: none"> None envisaged. 	
Project Deliverable	<ul style="list-style-type: none"> Widened Pier 3 Underpass, capable of facilitating fuel bowsers and bussing. Required to provide consistent bussing operation to North Apron. Increased efficiency for fuel bowsers. Elevate safety – busses and fuel bowsers will no longer have to drive around Pier 3. Improved On Time Performance. 	
Asset Life	5 years.	

Project Delivery Key Milestones

Feasibility/Outline Design Complete	Q3 2017
Planning Complete	Q3 2017
Detail Design Complete	Q3 2017
Construction Commence	Q1 2018 (2 months)
Project Handover	Q1 2018

SCP 17.2.007 Pier 3 Underpass Widening

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	7%	€13,863
Construction Costs	85%	€166,174
Design Development and Contingency	10%	€19,339
Total	100%	€199,376

*This is due to rounding.

Key Assumptions

- Widened Pier 3 Underpass, capable of facilitating fuel bowsers and bussing.
- Works completed in sections to minimise time when Pier 3 Underpass would not be available.
- Phased to minimise impact on operations.
- Cost based on no structural works.

LEVEL 2 - Cost Analysis				
Design and Management Costs	Value	% Fee	Total Fee	Total
Planning/Building Control/ Cost Consultants	€166,174	1.2	€1,980	€1,980
Civil/Airfield/Environmental Engineer	€166,174	3.4	€5,581	€5,581
Project Management/ Other Costs	€166,174	3.8	€6,301	€6,301
Total - to summary				€13,863
Construction Costs	Quantity	Unit	Rate	Total
Alterations to Existing Underpass Configuration	840	m ²	€109	€91,396
Installation and Construction Works	840	m ²	€89	€74,778
Total - to summary				€166,174
Design Development and Contingency	Value	%	Total	Total
Design Development	€180,037	4.4	€7,975	€7,975
Contingency	€180,037	6.3	€11,364	€11,364
Others	€0	0	€0	€0
Total - to summary				€19,339

SCP 17.2.008 West Apron Surface Access

Project Details Summary

Category
Aircraft Parking/Stands

Primary Driver
Operational Efficiency

Secondary Driver(s)
Addressing User Requests

Total Capex Requirement
€3.0m

Underpinning Assumptions and Cost Benchmarks

- Cost based on providing fully compliant solution.
- Cost based on asphalt construction.
- Cost includes upgrade of perimeter road from IONA strip to West Apron.
- Airfield Ground Lighting (e.g. stop bars) to be included.
- Cost based on phased construction with minimum impact on operations. This will require work in RWY 16/34 flight strip and taxiway diversions on Taxiway F-Outer.
- Cost based on tender returns for similar works in 2016 (RWY 10/28 overlay, CPSRA) and adjusted for inflation.
- Access will not be available when RWY 16/34 is in use as a runway. Alternative access around the perimeter road will be necessary.
- IAA SRD approval will be required following detail design and operational solution.

Opex Impacts

- Opex costs include airfield escorts to manage runway crossing point.

Project Deliverable

- Surface access with appropriate controls in place to provide direct access to West Apron.
- c.2,000 sqm of road pavement.

Asset Life

10 years.

Project Delivery Key Milestones

Feasibility/Outline Design Complete	Q3 2017
Planning Complete	Q3 2017
Detail Design Complete	Q1 2018
Construction Commence	Q3 2018 (12 months)
Project Handover	Q3 2019

SCP 17.2.008 West Apron Surface Access

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	7%	€208,593
Construction Costs	83%	€2,500,407
Design Development and Contingency	10%	€291,000
Total	100%	€3,000,000

*This is due to rounding.

Key Assumptions

- Cost based on asphalt construction.
- Cost based on phased construction with minimum impact on operations. This will require work in RWY 16/34 flight strip and taxiway diversions on Taxiway F-Outer.
- Cost based on tender returns for similar works in 2016 (RWY 10/28 overlay) and adjusted for inflation.
- Scope includes widening existing IONA strip, installation of edge lighting and markings.
- Widening of existing perimeter road.
- Construction of new road 10m wide incl. automated barriers on either side, markings, lighting, signage and FOD detection.

LEVEL 2 - Cost Analysis				
Design and Management Costs	Value	% Fee	Total Fee	Total
Planning/Building Control/ Cost Consultants	€2,500,407	1.2	€29,799	€29,799
Civil/Airfield/Environmental Engineer	€2,500,407	3.4	€83,979	€83,979
Project Management/Other Costs	€2,500,407	3.8	€94,815	€94,815
Total - to summary				€208,593
Construction Costs	Quantity	Unit	Rate	Total
Construction Works	1	Sum	€2,050,334	€2,050,334
Temporary Works to Maintain Aircraft Operations	1	Sum	€450,073	€450,073
Total - to summary				€2,500,407
Design Development and Contingency	Value	%	Total	Total
Design Development	€2,709,000	4.4	€120,000	€120,000
Contingency	€2,709,000	6.3	€171,000	€171,000
Others	€0	0	€0	€0
Total - to summary				€291,000

SCP 17.2.009 Advanced Visual Docking Guidance System (A-VDGS)

Project Summary

This project entails the installation of Advanced Visual Docking Guidance System (A-VDGS) technology to aircraft parking stands on Pier 1, Pier 2, Pier 3, Pier 4, South Apron, Triangle and Apron 5G.

The A-VDGS technology guides the aircraft to within 10cm of its parking position using invisible infrared lasers to attain the aircraft's type and position. It will also display critical A-CDM operational data (TOBT, TSAT, etc.) and in turn automatically distribute accurate, real-time data over the IT network.

The implementation of A-VDGS, along with the introduction of A-CDM at Dublin Airport will result in a more efficient turnaround operation for users and more efficient use of stand infrastructure.

The primary drivers for investing in A-VDGS are:

More Efficient use of stand Infrastructure

- Faster and more efficient turnaround times for airlines.
- Better OTP through display of key turnaround information.
- Improved predictability through display of key arrival and departure information.

Enhanced safety at gates

- Greater visibility during reduced visibility conditions.
- Reduced jet blast issues due to fewer requirements for aircraft to stop before entering stand.
- Addressing existing DAAD's (Deviation acceptance and action document) on Pier 4 (5 Stands currently with reduced clearance).

Environmental

- Reduced ramp congestion, through less occurrences of aircraft holding on taxiways.
- Reduced fuel burn and emissions through less occurrences of aircraft holding on taxiways.



SCP 17.2.009

Advanced Visual Docking Guidance System (A-VDGS)

Project Details Summary

Category

Aircraft Parking Stands

Primary Driver Operational Efficiency/Safety	Secondary Driver(s) Addressing User Requests	Total Capex Requirement <ul style="list-style-type: none"> • €10.4m (gross) • €4.65m will be funded by eu under SESAR programme • Existing CIP allowance €0.75m • Capex cost €5.0m (net)
Underpinning Assumptions and Cost Benchmarks	<ul style="list-style-type: none"> • Cost based on tender returns for similar works on Pier 3 and framework contract with supplier. • A-VDGS – T1 type unit with apron scan function. • Units on Pier 1, Pier 2, Pier 3, Pier 4, South Apron, Triangle and Apron 5G. Total of 117 units. • Cost based on phased construction with minimum impact on operations. This project will require stand closures for a short period of time. • All units networked and connected to Dublin Airport - Airport Operations System (AOS). 	
Opex Impacts	<ul style="list-style-type: none"> • Additional opex costs include regular maintenance and servicing of the proposed units. • IT Support costs. • Energy costs. 	
Project Deliverable	<ul style="list-style-type: none"> • A-VDGS units on Pier 1, Pier 2, Pier 3, Pier 4, South Apron, Triangle and Apron 5G. • Provision of real time operational data to pilots on stand. • Close out existing non compliances (DAADs) on Pier 4. 	
Asset Life	10 years.	

Project Delivery Key Milestones		
Feasibility/Outline Design Complete		Q4 2017
Planning Complete		Q4 2017
Detail Design Complete		Q1 2018
Construction Commence		Q1 2018
Project Handover	<ul style="list-style-type: none"> • South Apron • Pier 4 • Pier 3 • Pier 1 • Pier 2 • Triangle • 5G 	<ul style="list-style-type: none"> Q2 2018 Q1 2019 Q2 2019 Q3 2019 Q4 2019 Q4 2019 Q4 2019

SCP 17.2.009 Advanced Visual Docking Guidance System (A-VDGS)

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	6%	€632,000
Construction Costs	85%	€8,791,980
Design Development and Contingency	9%	€939,467
Total		€10,363,447

Key Assumptions

- Meets user requirements.
- Cost based on tender returns for similar works in 2017 (Pier 3 AVDGS) and adjusted for inflation.
- Type T1 units.

LEVEL 2 - Cost Analysis				
Design and Management Costs	Value	% Fee	Total Fee	Total
Planning/Building Control/ Cost Consultants	€10,363,447	0.9	€95,000	€95,000
Civil/Airfield/Environmental Engineer	€10,363,447	2.1	€220,000	€220,000
Electrical/ICT/Project Management/Other Costs	€10,363,447	3	€317,000	€317,000
Total - to summary				€632,000

Construction Costs	Quantity	Unit	Rate	Total
Pier 1	1	Sum	NA	€2,478,078
Pier 2	1	Sum	NA	€1,102,374
Pier 3	1	Sum	NA	€968,260
Pier 4	1	Sum	NA	€1,768,830
South Apron	1	Sum	NA	€604,336
Triangle	1	Sum	NA	€676,278
Apron 5G	1	Sum	NA	€1,193,824
Total - to summary				€8,791,980

Design Development and Contingency	Value	%	Total	Total
Contingency		9	€ 942,398	€942,398
Total - to summary				€942,398

SCP 17.2.010 Fixed Electrical Ground Power (FEGP)

Project Summary

This project entails the installation of Fixed Electrical Ground Power (FEGP) infrastructure to 15 aircraft parking stands on Pier 1, and to 8 aircraft parking stands on Pier 3 as listed below.

Proposed aircraft parking stands to be fitted with FEGP:

Pier 1

- Stands 108 to 111 – 8 units (8 stands)
- Stands 121 to 127 – 7 units (7 stands)

Pier 3

- Stands 318C/R – 2 units (airbridge mounted)
- Stands 317 – 2 units (airbridge mounted)
- Stands 315C – 2 units (airbridge mounted)
- Stands 314 – 2 units (airbridge mounted)
- Stands 313C – 2 units (airbridge mounted)
- Stand 312 – 1 unit (airbridge mounted)
- Stand 311C/R – 1 unit (airbridge mounted)
- Stand 311L – 1 unit (pit and duct system)

FEGP infrastructure supplies electrical power to the aircraft to power various aircraft systems (flight deck systems, cabin lighting etc.) during the turnaround process whilst parked on stand. The proposed FEGP infrastructure will replace the current practice of providing electrical power to the aircraft on the ground by either:

- Running the aircraft's own Auxiliary Power Unit (APU), or
- Connecting to a mobile diesel-powered Ground Power Unit (GPU).

The primary drivers for the proposed FEGP investment are:

Efficiency, Capacity and Safety benefits:

- The provision of FEGP will reduce the level of airside traffic and ramp congestion through the removal of mobile ground power units and elevate safety in the aircraft turnaround process.
- The removal of the GPU will reduce the requirement for GSE parking in the vicinity of the piers.

Airline and ground handler performance benefits :

- Providing FEGP on stands will benefit airlines through providing a more reliable power source to the aircraft, less airline and reduced ground handling maintenance costs and operational expenditure (fuelling etc).
- It can better meet the requirements of next generation aircraft which have a higher power demand (e.g. B787 Dreamliner and A350 etc), and this high-power demand cannot be reliably supported by ground power units.

Health and Environmental benefits:

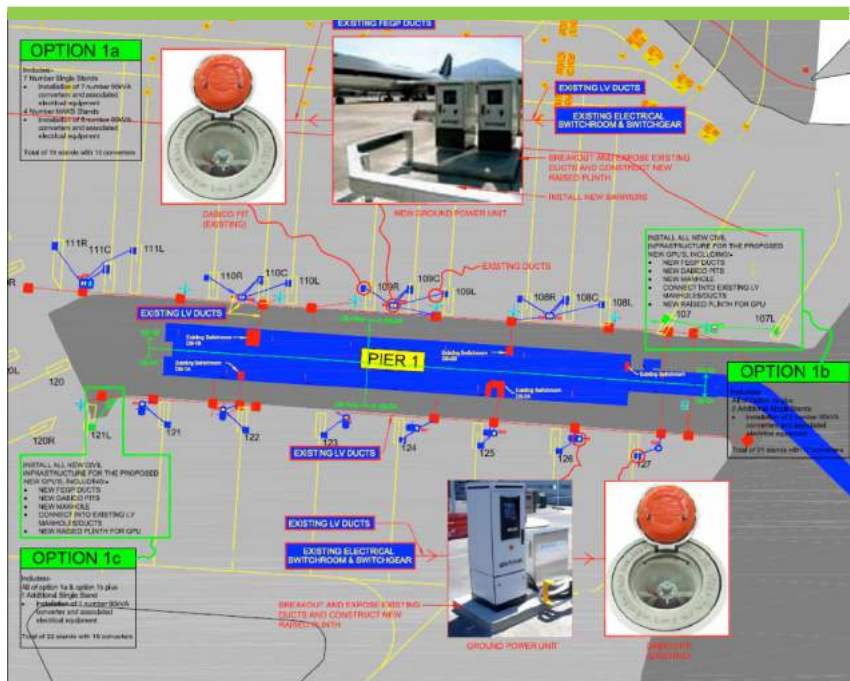
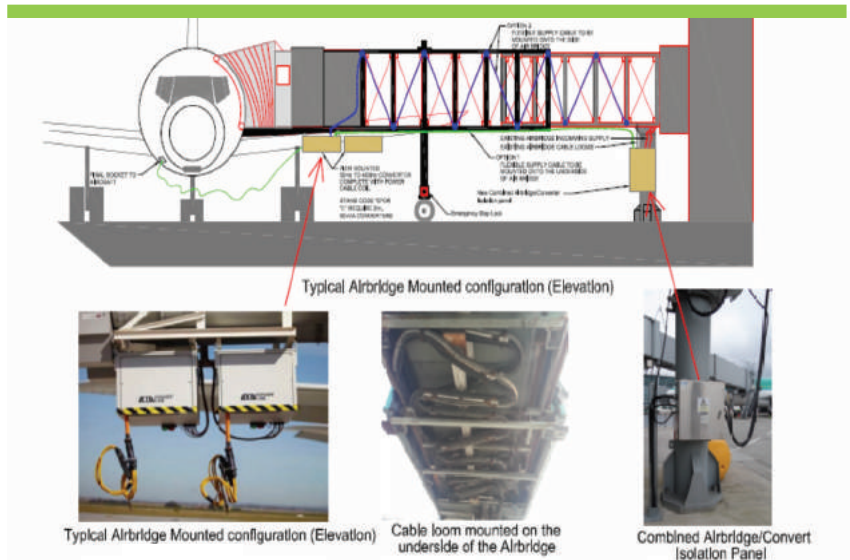
- Air quality improvement through less fuel burning, to benefit staff, passengers and local environment.
- Noise reduction benefits for staff, passengers and local community.
- Will assist Dublin Airport and airlines in reducing their carbon footprint (more efficient).
- Community / Reputational benefits – FEGP has been regularly requested by local community groups as a means of improving local air quality and comes up regularly at meetings as a demand for Dublin Airport.

SCP 17.2.010 Fixed Electrical Ground Power (FEGP)

Project Summary (Cont.)

- This project will also address a range of sustainability and environmental priorities for Dublin Airport and users, while meeting commitments outlined in the DTAS National Policy Framework, Alternative Fuels Infrastructure for Transport in Ireland 2017-2030 (required under Directive 2014/94/EU Alternative Fuels Infrastructure Directive).

Stands 313L and 313R are not included in the Pier 3 installation as they require significant apron disruption for installation of ducting system to service these walk out stands. These stands are generally only used for first wave departures and the installation of future ground power to these stands will be deferred to the next CIP (2020 to 2024). Stand 316 has 2 units which were installed in Q1 2017. The provision of Pier 2 FEGP will also be deferred to the next CIP period.



Fixed Electrical Ground Power (FEGP) – Pier 1 and Pier 3

SCP 17.2.010 Fixed Electrical Ground Power (FEGP)

Project Details Summary

Category

Aircraft Parking Stands

Primary Driver

Sustainability/Efficiency

Secondary Driver(s)

Addressing User Requests

Total Capex Requirement

€4.6m

Underpinning Assumptions and Cost Benchmarks

- Cost based on 2015 feasibility study and adjusted for inflation.
- Pier 3 - Cost based on airbridge mounted FEGP x 7 stands and pit and duct system for 1 x stand.
- Pier 1 - Cost based on using existing pit and duct infrastructure on 15 stands.
- Costs based on minimal operational disruption to users.

Opex Impacts

- Additional opex costs include regular maintenance and servicing of the proposed units.
- Energy costs.

Project Deliverable

- FEGP units on Pier 1 (15 stands) and Pier 3 (airbridges and 311L).
- Delivering up to 180kva supply in line with demand.

Asset Life

15 years.

Project Delivery Key Milestones

Feasibility/Outline Design Complete	Q4 2017
Detail Design Complete	Q1 2018
Construction Commence	Q2 2018
Project Handover	Q4 2018

SCP 17.2.010 Fixed Electrical Ground Power (FEGP)

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	9%	€432,100
Construction Costs	77%	€3,556,307
Design Development and Contingency	14%	€638,144
Total		€4,626,551

Key Assumptions

- Optimises use of critical infrastructure.
- Supports airline growth and efficiency.
- Meets user requirements.
- Provides multiple user flexibility.
- Cost based on 2015 FEGP feasibility study.

LEVEL 2 - Cost Analysis				
Design and Management Costs	Value	% Fee	Total Fee	Total
Planning/Building Control/Cost Consultants	€3,556,307	3	€100,000	€100,000
Civil/Electrical/Specialist	€3,556,307	4	€160,000	€160,000
Project Management/Security/Supervision	€3,556,307	5	€172,100	€172,100
Total - to summary				€432,100

Construction Costs	Quantity	Unit	Rate	Total
P1 FEGP Supply and Installation	1	Sum	NA	€978,750
P1 Civils and Prelims	1	Sum	NA	€253,727
P3 FEGP Supply and Installation	1	Sum	NA	€1,877,580
P3 Civils and Prelims	1	Sum	NA	€446,220
Total - to summary				€3,556,277

Design Development and Contingency	Value	%	Total	Total
Contingency		7	€239,304	€239,304
Others		11	€398,840	€398,840
Total - to summary				€638,144

SCP 17.2.011 South Apron Stands Phase 2

Project Summary

The proposed South Apron Stands Phase 2 project entails the development of 5 x NBE remote stands on the south side of the South Apron as illustrated in the graphic below. The proposed development will provide stand capacity within close proximity to Terminal 2 and will facilitate growth in the South Apron by providing parking stands for narrow body aircraft (Full Code C).



Proposed South Apron Phase 2 Key Challenges:

- The site area is currently occupied by a number of operational buildings and services (12 in total) that will need to be relocated in advance of construction commencing. These are identified on the graphic below. The relocation of these facilities requires new sites to be agreed with key stakeholders, planning applications to be prepared, planning permissions to be granted by Fingal County Council and An Bord Pleanala, new facilities to be constructed, tenants to be relocated, existing facilities to be demolished, new embankments to be constructed (with associated compaction) and new stands to be constructed. The timeline for this project indicates completion in 2022.
- The redevelopment of the area will require the diversion of the Cuckoo Stream and associated control gate infrastructure. Before construction works can commence there are significant amount of engagement and agreement required with several Government agencies including local authorities, Inland fisheries Ireland, and Irish water.
- The introduction of 5 new stands on the South Apron could give rise to increased levels of congestion. In the absence of a suitable solution for South Apron Taxiway Widening, Dual Code E (Ref: SCP:17.3.007, further simulation modelling would be required to understand the impact of the increased level of activity.



Required relocation of existing facilities on footprint of proposed South Apron Stands phase 2 site.

SCP 17.2.011 South Apron Stands Phase 2

Project Details Summary

Category

Aircraft Parking Stands

Primary Driver	Secondary Driver(s)	Total Capex Requirement
Business Volume Growth	Addressing User Requests	€37.8m
Underpinning Assumptions and Cost Benchmarks	<ul style="list-style-type: none"> • Costs based on replacing existing displaced facilities. • Costs based on providing 5 Code C (NBE) fully operational stands in compliance with EASA requirements. • Apron parking to be constructed in concrete. • Apron parking to be provided with high mast lighting, and safeguarded for FEGP and AVDGS (but not included). • Surface water attenuation and pollution control facilities to required standard to be provided. 	
Opex Impacts	<ul style="list-style-type: none"> • Additional opex costs include energy costs associated with floodlighting and de-icing as required. 	
Project Deliverable	<ul style="list-style-type: none"> • 5 x full code C stands. • Diversion of Cukoo stream. • Relocation of existing facilities (Dept. of Agriculture – Animal inspection unit, Aircraft lavatory disposal unit, Aircraft waste compactors, GSE washing facility, GSE parking/Aer Lingus cargo forwarding area, Cukoo stream watercourse, Bus parking, Gate Post 22A facility, ULD/GSE storage, Electrical Substation 19, Dublin Airport FOD Control Unit, DAP Site Team facility). • Significant infill. 	
Asset Life	40 years.	

Project Delivery Key Milestones

Feasibility/Outline Design Complete	Q2 2018
Detail Design Complete	Q4 2019
Construction Commence	Q1 2020
Project Handover	Q1 2022

SCP 17.2.011 South Apron Stands Phase 2

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	8%	€3,090,639
Construction Costs	71%	€26,967,740
Design Development and Contingency	21%	€7,815,178
Total		€37,873,557

Key Assumptions

- Costs based on providing fully operational stands in compliance with EASA requirements.
- Apron parking to be constructed in concrete.
- Apron parking to be provided with AGL, high mast lighting and safeguarded for FEGP (but not included).
- Adequate Ground Service Equipment (GSE) parking also to be provided.
- Surface water attenuation and pollution control facilities to required standard to be provided.
- Costs based on tender returns for similar works in 2014 (Apron 5G, South Apron and Apron Reconstruction) adjusted for inflation.

LEVEL 2 - Cost Analysis				
Design and Management Costs	Value	% Fee	Total Fee	Total
Planning/Cost Consultant	€26,967,740	1.7	-	€457,473
Civil/ Electrical/Environmental	€26,967,740	5.2	-	€1,423,166
Project Management/Site Super Vision/PSDP	€26,967,740	4.5	-	€1,210,000
Total - to summary				€3,090,639
Construction Costs	Quantity	Unit	Rate	Total
New Apron/Infill/SW Attenuation	24,500	m ²	488	€11,949,000
Pollution Control and Control Gate Relocation	24,500	m ²	488	€3,693,000
Site Clearance and Relocations	1	Sum	-	€5,020,740
New Substations/Electrical/High Mast Lighting	1	Sum	-	€4,650,000
Culvert diversion/Airside Road/ Temp Works	1	Sum	-	€1,655,000
Total - to summary				€26,967,740
Design Development and Contingency	Value	%	Total	Total
Design Development	€30,058,379	2	€500,000	€500,000
Contingency – Scope Definition Required	€30,058,379	20	€6,011,675	€6,011,675
Others	€30,058,379	6	€1,803,502	€1,803,502
Total - to summary				€7,815,177

SCP 17.2.012 Apron Wide CCTV

Project Summary

This project provides enhanced CCTV coverage to the following Aircraft Parking stands:

- Pier 1.
- Pier 2.
- Pier 3.
- Pier 4.
- Triangle.
- South Apron.

The project scope includes the provision of one Fixed IP camera per stand (listed from AIP Aircraft Parking/Docking Chart). On contact stands cameras will be mounted, where possible, on building façades and on remote stands cameras will be pole mounted.

Data cabling will be provided to all cameras and they will be networked onto the overall daa CCTV system. The cameras will be integrated into the Dublin Airport AOS system.

The key project drivers are:

- Greatly enhance safety and governance on the apron area, through the ability to monitor, review and manage all apron activity.
- Enable operator on the ramp to review key operational issues during the aircraft turnaround process and assist with passenger/ground handling/other issues.



SCP 17.2.012 Apron Wide CCTV

Project Details Summary

Category

Aircraft Parking Stands

Primary Driver
Safety/Security

Secondary Driver(s)
Addressing User Requests

Total Capex Requirement
€1.1m

Underpinning Assumptions and Cost Benchmarks

- Costs based on providing 1 camera per stand.
- Cost based on total number of cameras provided - 132.
- Cost based on network connection of all cameras

Cost based on the following IT specifications:

- Cat 6 cabling
- Network Switches

Opex Impacts

- Opex costs include maintenance costs and energy costs associated with running CCTV system.

Project Deliverable

- CCTV coverage on all stands on Piers, 1, 2, 3, 4, South Apron and Triangle.
- CCTV connected to wider Dublin Airport network and AOS system.

Asset Life

7 years.

Project Delivery Key Milestones

Feasibility/Outline Design Complete	Q1 2018
Detail Design Complete	Q2 2018
Construction Commence	Q3 2018
Project Handover	Q1 2019

SCP 17.2.012 Apron Wide CCTV

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	12%	130,000
Construction Costs	71%	773,050
Design Development and Contingency	17%	189,640
Total		1,092,690

*This is due to rounding.

Key Assumptions

- Supports airline growth and efficiency.
- Available to all users.
- Meets user requirements.

LEVEL 2 - Cost Analysis				Total
Design and Management Costs	Value	% Fee	Total Fee	Total
Civil/Airfield/Environmental Engineer/Cost Consultant	773,050	8	€60,000	€60,000
Project Management/Site Supervision/Security/Specialist	773,050	9	€70,000	€70,000
Total - to summary				€130,000

Construction Costs	Quantity	Unit	Rate	Total
IP Camera/ Cat 6/ Network Switches	110	nr	€1,782	€196,050
Licensing and Commissioning	110	nr	€1,000	€110,000
Installation and Electrical infrastructure	110	nr	€1,196	€131,650
Storage and Server Costs	1	Sum	-	€125,000
Cameras on Tug Release Points	22	nr	€6,744	€148,350
Total - to summary				€562,700

Design Development and Contingency	Value	Unit	Rate	Total
Contingency		18	€135,457	€135,457
Others		7	€55,183	€55,183
Total - to summary				€190,640

SCP 17.3.001 Link 3 Extension Taxiway

Project Summary

This project comprises an additional taxiway link from Link 3 to RWY 16/34 and it is aligned to the centreline of the existing Link 3 taxiway adjacent to Pier 3.

This project is part of a suite of airfield taxiway projects necessary to improve efficiency:

- To provide a more effective taxiway system for the airport.
- To elevate levels of safety.
- To address the forecast increases in traffic flows.

The suite of projects includes:

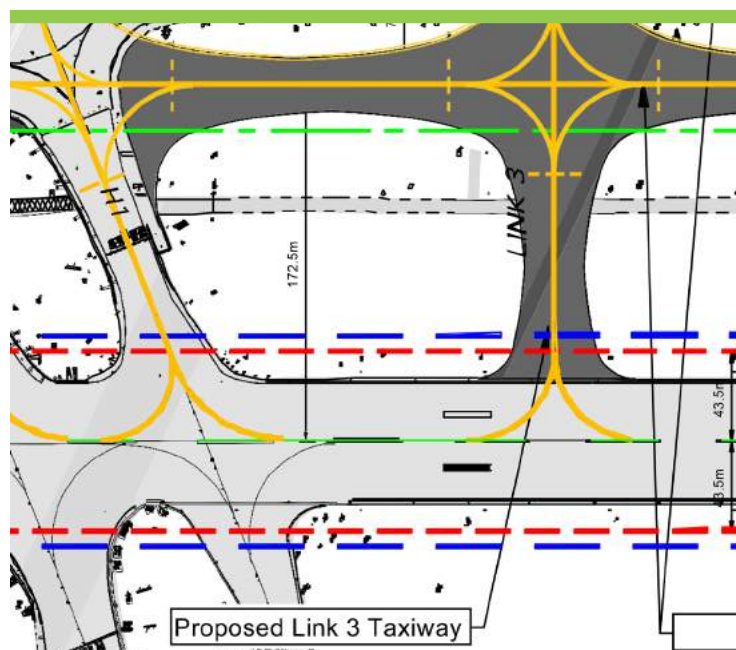
- Link 6 Taxiway .
- Link 3 Taxiway.
- Realigned Taxiway A.
- Dual Taxiway F.

This suite of projects provides the following collective benefits, based on busy day simulation modelling (based on 39 peak departures):

- An average reduction in departure delay per movement of between 10%-14%.
- An average reduction in Arrival delay per movement of 47%-56%.
- An overall reduction in departure delay of 5 hours per day.
- An overall reduction in arrival delay of 2 hours per day.

Link 3 has the following specific benefits:

- It reduces the number of movements on more complex junctions, Link 4 and Link 2. It was identified as an option to achieve this reduction under the 'Critical Taxiway Review' carried out by independent consultants.
- It provides congestion relief from F-Inner and F-Outer by enabling an alternative access to departure queue on RWY 16/34 during RWY 28 operations to facilitate queue balancing.
- It provides additional routing options (including towing to West Apron) from Pier 3 and Pier 4.
- It provides another runway exit, thus facilitating reduced Runway Occupancy Time (ROT) in RWY 16 operations.
- It provides an additional entrance point for short take off for RWY 34 departures and in Dual Runway Operations (DRO) again reducing ROT.



SCP 17.3.001 Link 3 Extension Taxiway

Project Details Summary

Category

Airfield/Taxiways

Primary Driver

Operational Efficiency

Secondary Driver(s)

Addressing User Requests

Total Capex Requirement

€5.0m

Underpinning Assumptions and Cost Benchmarks

- Cost based on providing fully compliant Code E taxiway.
- Cost based on asphalt construction.
- Airfield Ground Lighting (AGL) to be included with inset centreline lights and edge lights on curves.
- Cost based on phased construction with minimum impact on operations. This will require work in RWY 16/34 flight strip and taxiway diversions on Taxiway F-Outer.
- Cost based on tender returns for similar works in 2016 (RWY 10/28 overlay) and adjusted for inflation.
- Capital cost dependant on implementation of Dual F Taxiway. There is a capital cost of €800,000 if Dual F Taxiway does not proceed.

Opex Impacts

- Additional opex costs include AGL Energy costs and de-icing costs as necessary.

Project Deliverable

- New Code E taxiway connecting Link 3 to RWY 16/34.
- c.4,800 sqm of taxiway pavement (6,050m² if Dual F Taxiway does not proceed).
- Taxiway AGL.

Asset Life

30 years.

Project Delivery Key Milestones

Project Delivery Approach	This project will be delivered in conjunction with the following projects due to their interface: <ul style="list-style-type: none"> • Realigned Taxiway A. • Dual Taxiway F.
Feasibility/Outline Design Complete	Q3 2017
Planning Complete	Q3 2017
Detail Design Complete	Q2 2018
Construction Commence	Q4 2018 (28 months - in conjunction with other adjacent projects).
Project Handover	Q1 2021

SCP 17.3.001 Link 3 Extension Taxiway

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	10.7%	€ 530,028
Construction Costs	71.9%	€3,567,360
Design Development and Contingency	17.4%	€860,451
Total	100%	€4,957,839

*This is due to rounding.

Key Assumptions

- Cost based on providing fully compliant Code E taxiway.
- Cost based on asphalt construction.
- Airfield Ground Lighting (AGL) to be included with inset centreline lights and edge lights on curves.
- Cost based on phased construction with minimum impact on operations. This will require work in RWY 16/34 flight strip and taxiway diversions on Taxiway.
- Cost based on tender returns for similar works in 2016 (RWY 10/28 overlay) and adjusted for inflation.
- Costs based on constructing in conjunction with Dual F Taxiways and Realigned Taxiway A.

LEVEL 2 - Cost Analysis				
Design and Management Costs	Value	% Fee	Total Fee	Total
Planning/Building Control/ Cost Consultants	€3,567,360	1.5	€55,367	€55,367
Civil/Airfield/Environmental Engineer	€3,567,360	10.7	€384,661	€384,661
Project Management/Other Costs	€3,567,360	2.5	€90,000	€90,000
Total - to summary				€530,028
Construction Costs	Quantity	Unit	Rate	Total
Taxiway	4,800	m ²	311	€1,492,800
Electrical and AGL	4,800	m ²	25	€120,000
Drainage	1	Sum	480,000	€480,000
Other Elements	1	Sum	NA	€1,474,560
Total - to summary				€3,567,360
Contingency and Escalation	Value	%	Total	Total
Escalation	€4,097,388	6	€245,843	€245,843
Contingency	€4,097,388	15	€614,608	€614,608
Others	€0	0	€0	€0
Total - to summary				€860,451

SCP 17.3.002 Realignment of Taxiway A

Project Summary

This project realigns existing Taxiway A perpendicular to RWY 16/34 providing sufficient clearance from Taxiway B2 such that both taxiways can be operated independently, safeguarded for Code F clearance.

This project is part of a suite of airfield taxiway projects necessary to improve efficiency, to provide a more effective taxiway system for the airport, to elevate levels of safety and to address the forecast increased in traffic flows. The suite of projects includes:

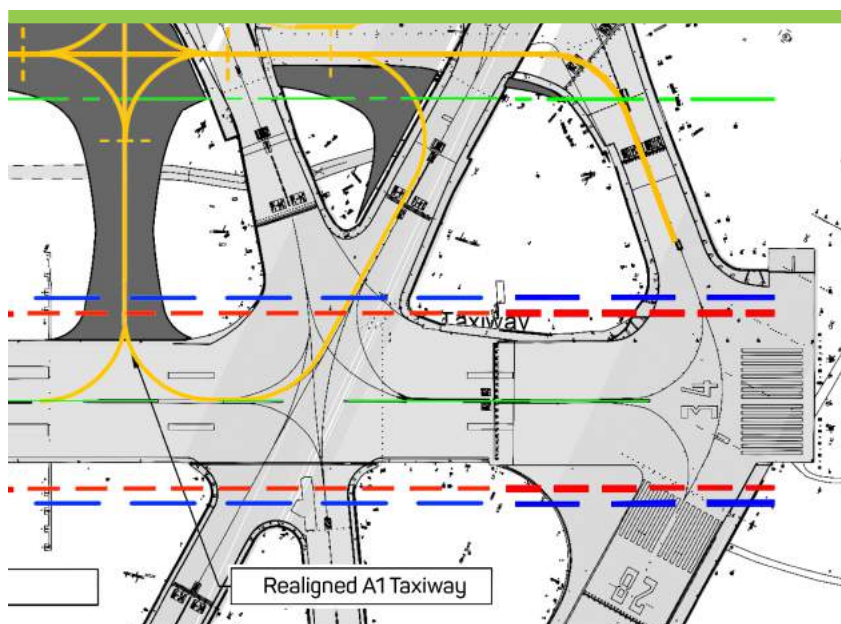
- Link 6 Taxiway .
- Link 3 Taxiway.
- Realigned Taxiway A.
- Dual Taxiway F.

This suite of projects provides the following collective benefits, based on busy day simulation modelling (based on 39 peak departures):

- An average reduction in departure delay per movement of between 10%-14%.
- An average reduction in arrival delay per movement of 47%-56%.
- An overall reduction in departure delay of 5 hours per day.
- An overall reduction in arrival delay of 2 hours per day.

The realignment of Taxiway A has the following specific benefits:

- It allows simultaneous movements on Taxiway B2 and realigned Taxiway A (currently not allowed), and reduces complexity at this Hotspot area.
- It removes a current conflict between two taxiways (A and B2) and can be used as an alternative access to departure queue on RWY 16/34 during RWY 28 operations to facilitate queue balancing.
- It provides a compliant (90 degree) entrance point for short take off on RWY 34 for departures in Dual Runway Operations (DRO) reducing Runway Occupancy Time (ROT).
- It allows Taxiway A be used as an exit facilitating reduced ROT in RWY 16 operations.



SCP 17.3.002 Realignment of Taxiway A

Project Details Summary

Category

Airfield/Taxiways

Primary Driver

Operational Efficiency

Secondary Driver(s)

Addressing User Requests

Total Capex Requirement

€5.6m

Underpinning Assumptions and Cost Benchmarks

- Cost based on providing fully compliant Code F taxiway.
- Cost based on asphalt construction.
- Airfield Ground Lighting (AGL) to be included with inset centreline lights and edge lights on curves.
- Cost based on phased construction with minimum impact on operations. This will require work in RWY 16/34 flight strip and taxiway diversions on Taxiway F-Outer.
- Cost based on tender returns for similar works in 2016 (RWY 10/28 overlay) and adjusted for inflation.

Opex Impacts

- Additional opex costs include AGL operational costs.

Project Deliverable

- Realigned Taxiway A providing Code F separation from Taxiway B2.
- Elevated safety and reduced Hotspot complexity.
- c.4,750 sqm of taxiway pavement.

Asset Life

30 years.

Project Delivery Key Milestones

Project Delivery Approach	This project will be delivered in conjunction with the following projects due to their interface: <ul style="list-style-type: none"> • Link 3 Taxiway Extension. • Dual Taxiway F.
Feasibility/Outline Design Complete	Q3 2017
Planning Complete	Q3 2017
Detail Design Complete	Q2 2018
Construction Commence	Q4 2018 (28 months - in conjunction with other adjacent projects)
Project Handover	Q1 2021

SCP 17.3.002 Realignment of Taxiway A

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	11.25%	€628,032
Construction Costs	71.39%	€3,985,200
Contingency and Escalation	17.36%	€968,778
Total	100%*	€5,582,010

*This is due to rounding.

Key Assumptions

- Cost based on providing fully compliant Code F taxiway.
- Cost based on asphalt construction.
- Airfield Ground Lighting (AGL) to be included with inset centreline lights and edge lights on curves.
- Cost based on phased construction with minimum impact on operations. This will require work in RWY 16/34 flight strip and taxiway diversions on Taxiway.
- Cost based on tender returns for similar works in 2016 (RWY 10/28 overlay) and adjusted for inflation.
- Costs based on constructing in conjunction with Dual F Taxiways and Taxiway Link 3.

LEVEL 2 - Cost Analysis				
Design and Management Costs	Value	% Fee	Total Fee	Total
Planning/Building Control/ Cost Consultants	€3,985,200	1.4	€57,465	€57,465
Civil/Airfield/Environmental Engineer	€3,985,200	12.4	€495,567	€495,567
Project Management/Other Costs	€3,985,200	1.8	€75,000	€75,000
Total - to summary				€628,032
Construction Costs	Quantity	Unit	Rate	Total
Taxiway	4,750	m ²	311	€1,477,250
Electrical and AGL	4,750	m ²	25	€118,750
Drainage	1	Sum	475,000	€475,000
Other Elements	1	Sum	NA	€1,914,200
Total - to summary				€3,985,200
Contingency and Escalation	Value	%	Total	Total
Escalation	€4,613,232	6	€276,793	€276,793
Contingency	€4,613,232	15	€691,984	€691,984
Others	€0	0	€0	€0
Total - to summary				€968,778

SCP 17.3.003 Dual Taxiway F

Project Summary

This project involves the continuation of the Taxiway F-Inner/Taxiway F-Outer axes (Code E-Code E) alignment between Link 4 and Link 1. It removes wide body and narrow body through traffic from Apron Taxiway 4, thereby reducing constraints on Pier 3 push back and manoeuvring.

This project is part of a suite of airfield taxiway projects necessary to improve efficiency, to provide a more effective taxiway system for the airport, to increase levels of safety and to address the forecast increased in traffic flows. The suite of projects includes:

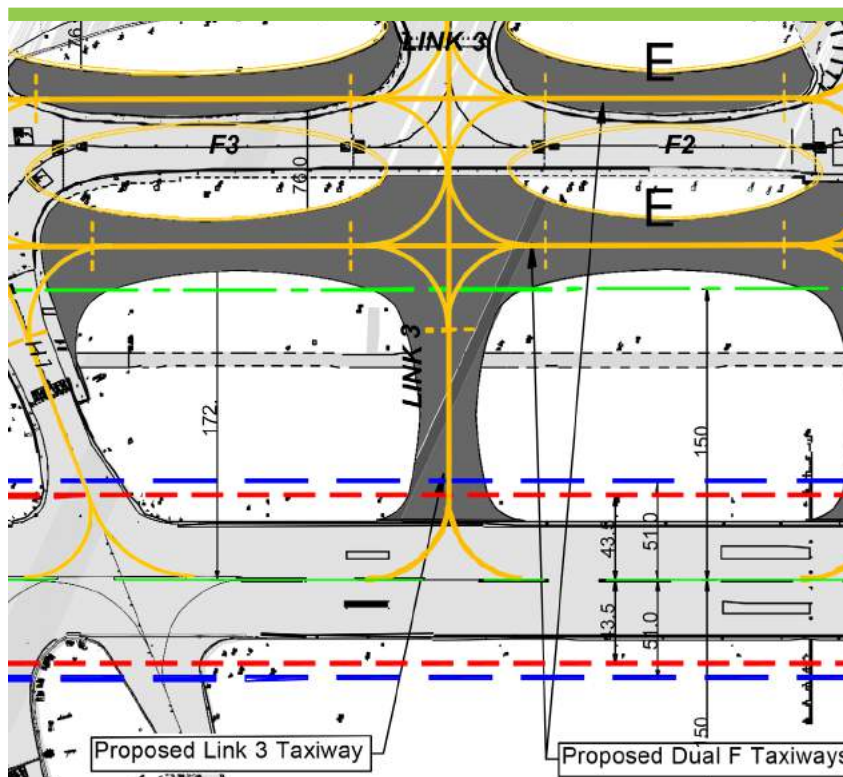
- Link 6 Taxiway.
- Link 3 Taxiway .
- Realigned Taxiway A.
- Dual Taxiway F.

This suite of projects provides the following collective benefits, based on busy day simulation modelling:

- An average reduction in departure delay per movement of between 10%-14%.
- An average reduction in arrival delay per movement of 47%-56%.
- An overall reduction in departure delay of 5 hours per day.
- An overall reduction in arrival delay of 2 hours per day.

Dual Taxiway F provides the following specific benefits:

- It provides additional queuing space of 500m.
- It reduces apron access/egress blockage adjacent to Pier 3.
- It provides more opportunity for departure sequencing as widebody and narrowbody aircraft form separate queues.
- It offers additional redundancy/resilience and provides an improved junction layout at Link 4.
- It facilitates future North Runway traffic flows.
- Provides new and improved towing options.



SCP 17.3.003 Dual Taxiway F

Project Details Summary

Category
Airfield/Taxiways

Primary Driver	Secondary Driver(s)	Total Capex Requirement
Operational Efficiency	Addressing User Requests	€39.5m
Underpinning Assumptions and Cost Benchmarks	<ul style="list-style-type: none"> • Cost based on providing fully compliant Code E-Code E taxiway. • Cost based on asphalt construction. • Airfield Ground Lighting (AGL) to be included with inset centreline lights and edge lights on curves. • Cost based on phased construction with minimum impact on operations. This will require taxiway diversions on Taxiway F-Outer and F-Inner. • Cost based on tender returns for similar works in 2016 (RWY 10/28 overlay) and adjusted for inflation. 	
Opex Impacts	<ul style="list-style-type: none"> • Additional opex costs include AGL Energy costs and de-icing costs as necessary. 	
Project Deliverable	<ul style="list-style-type: none"> • Code E Taxiway F-Outer, Code E Taxiway F-Inner providing Code E to Code E taxiway separation between Taxiway Link 6 and Realigned Taxiway A. • 32,000 sqm of taxiway pavement. 	
Asset Life	30 years.	

Project Delivery Key Milestones

Project Delivery Approach	This project will be delivered in conjunction with the following projects due to their interface: <ul style="list-style-type: none"> • Link 3 Taxiway Extension. • Realigned Taxiway A.
Feasibility/Outline Design Complete	Q3 2017
Planning Complete	Q3 2017
Detail Design Complete	Q2 2018
Construction Commence	Q4 2018 (28 months - in conjunction with other adjacent projects).
Project Handover	Q1 2021

SCP 17.3.003 Dual Taxiway F

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	6.18%	€2,442,348
Construction Costs	73.19%	€28,934,544
Design Development and Contingency	20.63%	€8,157,992
Total	100%	€39,534,885

*This is due to rounding.

Key Assumptions

- Cost based on providing fully compliant Code E - Code E taxiway separation.
- Cost based on asphalt construction.
- Airfield Ground Lighting (AGL) to be included with inset centreline lights and edge lights on curves.
- Cost based on phased construction with minimum impact on operations. This will require taxiway diversions on Taxiway F-Outer and F-Inner.
- Cost based on tender returns for similar works in 2016 (RWY 10/28 overlay) and adjusted for inflation.
- Costs based on constructing in conjunction with Taxiway A and Taxiway Link 3.

LEVEL 2 - Cost Analysis				
Design and Management Costs	Value	% Fee	Total Fee	Total
Planning/Building Control/ Cost Consultants	€28,934,544	0.07	€21,354	€21,354
Civil/Airfield/Environmental Engineer	€28,934,544	7.8	€2,260,994	€2,260,994
Project Management	€28,934,544	0.5	€160,000	€160,000
Total - to summary				€2,442,348
Construction Costs	Quantity	Unit	Rate	Total
New Taxiway	31,942	m ²	311	€9,934,183
Replace Existing Taxiway	20,263	m ²	311	€6,302,042
Electrical and AGL	52,205	m ²	25	€1,305,125
Other Elements	1	Sum	NA	€11,393,194
Total - to summary				€28,934,544
Design Development and Contingency	Value	%	Total	Total
Escalation	€31,376,892	6	€1,882,613	€1,882,613
Contingency	€31,376,892	20	€6,275,378	€6,275,378
Others	€0	0	€0	€0
Total - to summary				€8,157,992

SCP 17.3.004 Link 6 Extension Taxiway

Project Summary

This project comprises an additional taxiway from Link 6 to RWY 16/34, aligned to the centreline of the triple taxiway configuration north of Pier 1.

This project is part of a suite of airfield taxiway projects necessary to improve efficiency, to provide a more effective taxiway system for the airport, to increase levels of safety and to address the forecast increased in traffic flows. The suite of projects includes:

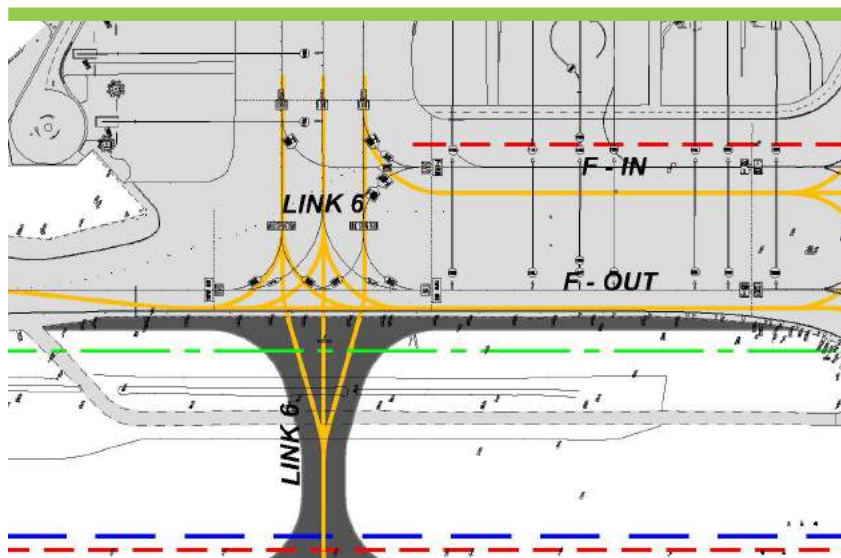
- Link 6 Taxiway.
- Link 3 Taxiway.
- Realigned Taxiway A.
- Dual Taxiway F.

This suite of projects provides the following collective benefits, based on busy day simulation modelling:

- An average reduction in Departure delay per movement of between 10%-14%.
- An average reduction in Arrival delay per movement of 47%-56%.
- An overall reduction in departure delay of 5 hours per day.
- An overall reduction in arrival delay of 2 hours per day.

The Link 5 Taxiway provides the following specific benefits:

- Reduces the number of movements on more complex junctions, link 4 and Link 5 and it was identified as an option to achieve this reduction under the 'Critical Taxiway Review' carried out by independent consultants.
- Provides congestion relief from F-Inner and F-Outer by having an alternative access to departure queue on RWY 16/34 during Runway 28 operations.
- Reduces the existing taxiway distance for inbound aircraft via Taxiway M, RW 16/34 and Taxiway G, by some 500m.
- Provides new and improved towing options.
- Provides another exit facilitating reduced runway occupancy time in Runway 34 operations.
- Provides an area between Taxiway G and Taxiway Link 6 to hold aircraft awaiting stands without significant disruption to other operations.
- Provides an additional entrance point for short take off on RWY 16/34 for RWY 16 operations.
- Facilitates future North Runway traffic flows.



SCP 17.3.004 Link 6 Extension Taxiway

Project Details Summary

Category

Airfield/Taxiways

Primary Driver	Secondary Driver(s)	Total Capex Requirement
Operational Efficiency	Addressing User Requests	€5.8m
Underpinning Assumptions and Cost Benchmarks	<ul style="list-style-type: none"> • Cost based on providing fully compliant Code E taxiway. • Cost based on asphalt construction. • Airfield Ground Lighting (AGL) to be included with inset centreline lights and edge lights on curves. • Cost based on phased construction with minimum impact on operations. This will require work in RWY 16/34 flight strip and taxiway diversions on Taxiway F-Outer. • Cost based on tender returns for similar works in 2016 (RWY 10/28 overlay) and adjusted for inflation. 	
Opex Impacts	<ul style="list-style-type: none"> • Additional opex costs include AGL operational costs and de-icing costs as required. 	
Project Deliverable	<ul style="list-style-type: none"> • New Code E taxiway from Link 6 to RWY 16/34. • c.5,500 sqm of taxiway pavement. • Taxiway AGL. 	
Asset Life	30 years.	

Project Delivery Key Milestones

Feasibility/Outline Design Complete	Q3 2017
Planning Complete	Q3 2017
Detail Design Complete	Q1 2018
Construction Commence	Q2 2018 (9 months)
Project Handover	Q1 2019

SCP 17.3.004 Link 6 Extension Taxiway

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	11.9%	€692,098
Construction Costs	72.8%	€4,228,500
Contingency and Escalation	15.3%	€885,707
Total	100%	€5,806,305

*This is due to rounding.

Key Assumptions

- Cost based on providing fully compliant Code E taxiway.
- Cost based on asphalt construction.
- Airfield Ground Lighting (AGL) to be included with inset centreline lights and edge lights on curves.
- Cost based on phased construction with minimum impact on operations. This will require work in RWY 16/34 flight strip and taxiway diversions on Taxiway F-Outer.
- Cost based on tender returns for similar works in 2016 (RWY 10/28 overlay) and adjusted for inflation.

LEVEL 2 - Cost Analysis				
Design and Management Costs	Value	% Fee	Total Fee	Total
Planning/Building Control/ Cost Consultants	€4,228,500	1.3	€56,932	€56,932
Civil/Airfield/Environmental Engineer	€4,228,500	12.65	€535,166	€535,166
Project Management	€4,228,500	2.5	€100,000	€100,000
Total - to summary				€692,098
Construction Costs	Quantity	Unit	Rate	Total
Taxiway	5,500	m ²	297.5	€1,636,250
Electrical and AGL	5,500	m ²	25	€137,500
Drainage	1	Sum	550,000	€550,000
Other Elements	1	Sum	€1,904,750	€1,904,750
Total - to summary				€4,228,500

Contingency and Escalation	Value	%	Total	Total
Escalation	€4,920,599	3	€147,617	€147,617
Contingency	€4,920,599	15	€738,089	€738,089
Others	€0	0	€0	€0
Total - to summary				€885,707

SCP 17.3.005 South Apron Taxiway Widening (Dual Code E)

Project Summary

This project entails the widening of Taxiway B1 and Taxiway Z to enable unconstrained concurrent Code E aircraft movements to and from the South Apron. Currently, traffic to and from the south apron is restricted to the following movements on Taxiway B1 and Taxiway Z:

- Taxiway Z – Code C aircraft only.
- Taxiway B1 – Code E aircraft, dependent on Taxiway Z being vacant
- Taxiway B1 – Code C aircraft, can use Taxiway Z simultaneously for Code C aircraft.

This proposed widening of Taxiway B1 and Z to a dual Code E taxiway would address the current restrictions at the end of Pier 4 where there are constraints to taxiing aircraft and aircraft queueing for Runway 28. This development proposes to remove the existing AIP restrictions and the current requirement for a 'follow me' escort for aircraft larger than Code C.

The key benefits are:

Operational Efficiency/Capacity benefits

- By providing unrestricted parallel Code E movements in and out of South Apron, existing constraints would be removed.
- Better utilisation of stand infrastructure on the South Apron and south side of Pier 4 contact stands.
- Reduction in aircraft holding due to aircraft type restrictions and thus Improving OTP.

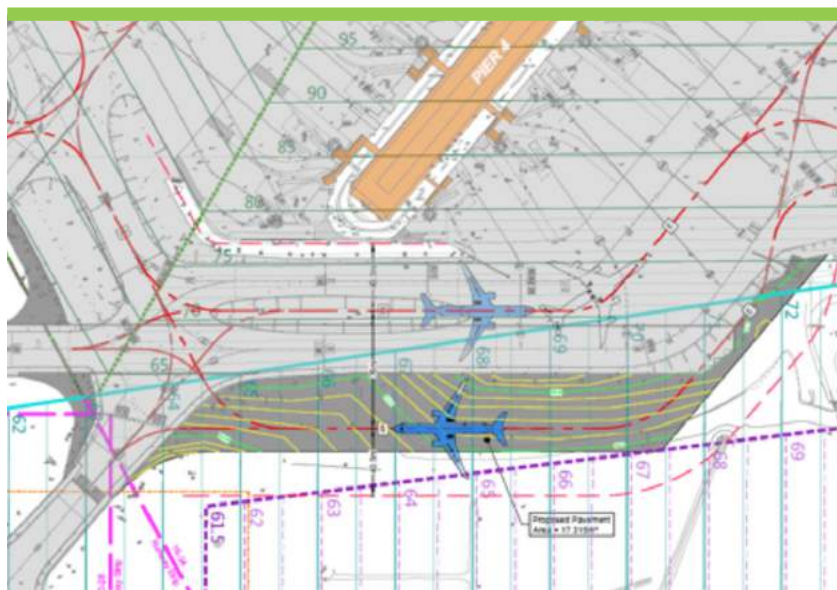
Safety benefits

- Increase of Taxiway Z from Code C to Code E, thus removing the risk of Code E aircraft using a Code C taxiway in error (pilot error or human error via ATC instruction) without the required clearances, and the subsequent risk of aircraft to aircraft, vehicle, or building conflict.
- Reduces complexity of routings around the hotspot area, due to removal of existing constraint.

Satisfy Customer (airline) need:

- Customers ongoing requests to address access in/out of South Apron would be resolved through the delivery of this project, improving traffic flows and OTP for aircraft operating on Pier 4 and South Apron Stands.

This project is contingent on receiving approval from IAA (Regulatory Division) due to non compliance with EASA requirements in relation to protected surfaces.



South Apron Taxiway Widening (Dual Code E)

SCP 17.3.005 South Apron Taxiway Widening (Dual Code E)

Project Details Summary

Category

Airfield/Taxiways

Primary Driver

Capacity

Secondary Driver(s)

Addressing User Requests

Total Capex Requirement

- €0.3m – Progress evaluation
- €14.4m – Remainder of project cost

Underpinning Assumptions and Cost Benchmarks

- Costs based on Code E – Code E separation.
- Costs based on night works, with minimal impact to operations.
- Cost based on asphalt construction.

Opex Impacts

- Reduction in opex cost through the removal of 'Follow Me' escorts for Code D and Code E traffic into the South Apron.
- Additional opex costs include AGL operational costs.

Project Deliverable

- Expansion of Taxiway Z to Code E.
- Realignment of Taxiway B1 to the South to facilitate concurrent operation of both Taxiway Z (Code E), and Taxiway B1 (Code E).
- Removal of existing AIP restrictions and 'Follow Me' escort requirement.
- Operational efficiencies with improved traffic flows in/out of South Apron – Improved OTP.

Asset Life

30 years.

Project Delivery Key Milestones

Feasibility/Outline Design Complete	Q1 2018
Detail Design Complete	Date cannot be confirmed - project design is subject to regulatory approval.
Construction Commence	Date cannot be confirmed - project design is subject to regulatory approval
Project Handover	Date cannot be confirmed - project design is subject to regulatory approval

SCP 17.3.005
South Apron Taxiway Widening (Dual Code E)

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	10%	€1,507,766
Construction Costs	69%	€10,069,51
Design Development and Contingency	21%	€ 3,075,104
Total		€ 14,652,384

*This is due to rounding.

Key Assumptions

- Cost based on providing fully compliant Code E taxiway.
- Cost based on asphalt construction.
- Airfield Ground Lighting (AGL) to be included with inset centreline lights and edge lights on curves.
- Cost based on phased construction with minimum impact on operations. This will require work in RWY 16/34 flight strip and taxiway diversions on Taxiway F-Outer.

LEVEL 2 - Cost Analysis				
Design and Management Costs	Value	% Fee	Total Fee	Total
Planning/Building Control/Cost Consultants	€10,069,512	1	€106,772	€106,772
Civil/Airfield/Environmental Engineer	€10,069,512	4	€390,994	€390,994
Project Management/Other Costs	€10,069,512	10	€1,010,000	€1,010,000
Total - to summary				€1,507,776

Construction Costs	Quantity	Unit	Rate	Total
New Taxiway Pavement	17,371	m ²	€318	€5,510,155
Electrical Infrastructure and AGL	17,371	m ²	€69	€1,184,275
Drainage/Attenuation and Specialist Grd Treatment	17,371	m ²	€65	€1,118,550
LVP and Temp Works	1	Sum	€2,256,532	€2,256,532
Total - to summary				€10,069,512

Design Development and Contingency	Value	%	Total	Total
Design Development		5	€500,000	€ 500,000
Contingency		8	€ 763,513	€ 763,513
Others		18	€1,811,591	€1,811,591
Total - to summary				€3,075,104

SCP 17.3.006 Runway 10 Line-Up Points

Project Summary

This project entails the construction of additional taxiway and line up infrastructure at Runway 10, to provide the following:

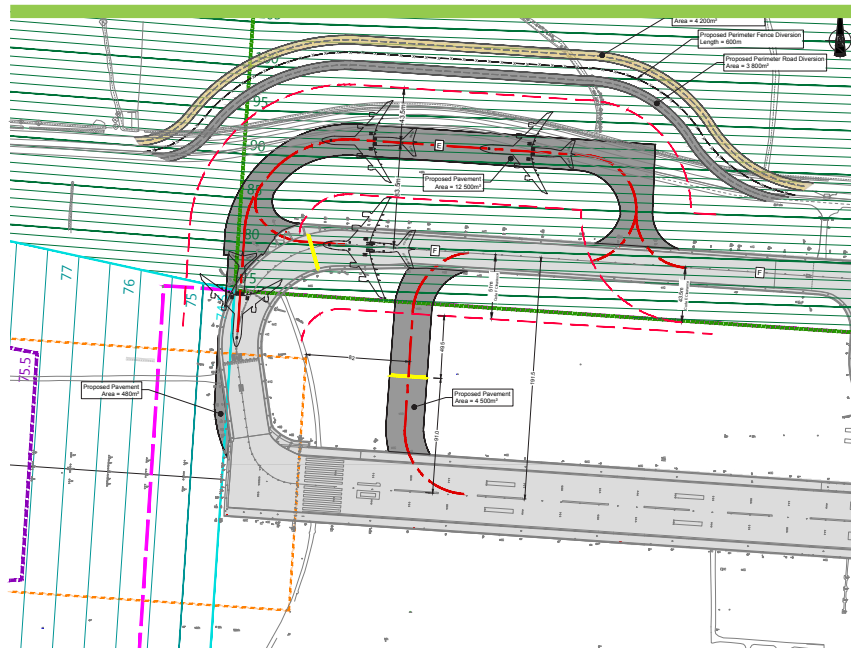
- The provision of an additional runway line-up point on Runway 10, and
- The provision of a Code F – Code E taxiway bypass to maximise the ability to sequence Runway 10 departures and bypass aircraft on easterly line-up point.

Primary drivers for providing Line ups/Benefits.

A new Code E line-up point (taxiway entry) will be provided adjacent (East) of existing Taxiway B7 with a Code F to Code F physical separation, which will result in a Take Off Run Available (TORA) of 2,400m. A bypass taxiway also with Code F – Code F physical separation will be provided to enable aircraft flexibility to use either runway access line-up point without constraint.

The addition of a second runway line-up point and bypass taxiway, will enable increased operational efficiencies, allowing IAA (ANSP) to optimise departure sequencing in terms of slot time, aircraft type (wake turbulence), and destination (left/right turn), therefore increasing runway utilisation. It also provides the ability for aircraft with slot restrictions or technical issues to hold without disruption the whole departure sequence.

With the addition of North Runway (Runway 10L/28R), and in parallel runway operations, Runway 10 (future 10R) may become the primary departure runway in easterly operations mode. This will further drive the requirement for this infrastructure.



Runway 10 Line-Up Points

SCP 17.3.006 Runway 10 Line-Up Points

Project Details Summary

Category
Airfield/Taxiways

Primary Driver	Secondary Driver(s)	Total Capex Requirement
Operational Efficiency	Addressing User Requests	€16.8m

Underpinning Assumptions and Cost Benchmarks	<p>Costs based on providing:</p> <ul style="list-style-type: none"> • A Code F separated runway line-up point, and bypass taxiway in compliance with EASA requirements. • Associated AGL infrastructure. • Realignment of R108 roadway.
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Opex Impacts	<ul style="list-style-type: none"> • Additional opex costs include energy costs associated with AGL infrastructure.
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Project Deliverable	<ul style="list-style-type: none"> • Code E Runway 10 Line-Up Point. • Code E bypass Taxiway. • Associated AGL. • Increased operational efficiency and ATC departure sequencing in Runway 10 operations.
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Asset Life	30 years.
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Project Delivery Key Milestones

Feasibility/Outline Design Complete	Q1 2018
Detail Design Complete	Q4 2019
Construction Commence	Q1 2020
Project Handover	Q4 2021

SCP 17.3.006 Runway 10 Line-Up Points

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	9%	€1,495,000
Construction Costs	71%	€11,912,906
Design Development and Contingency	20%	€3,420,660
Total		€16,828,568

*This is due to rounding.

Key Assumptions

- Optimises use of critical infrastructure.
- Supports airline growth and efficiency..
- Meets user requirements.
- Provides multiple user flexibility.

LEVEL 2 - Cost Analysis				Total
Design and Management Costs	Value	% Fee	Total Fee	Total
Planning/Building Control/ Cost Consultants	€11,912,907	1	€125,000	€125,000
Civil/Airfield/Environmental Engineer	€11,912,907	3	€370,000	€370,000
Project Management/Other Costs	€11,912,907	9	€1,100,000	€1,100,00
Total - to summary				€1,495,000
Construction Costs	Quantity	Unit	Rate	Total
Taxiway Pavement	17,480	m ²	€313.94	€5,487,689
Public Road Diversion incl. Fence	3800	m ²	€531.68	€2,020,400
Electrical – Incl. AGL, Ducting etc.	25,480	m ²	€40.70	€1,037,000
Drainage – Incl. Attenuation	17,480	m ²	€55.72	€974,000
LVP and Temp Works				€2,393,817
Total - to summary				€11,912,906
Design Development and Contingency Value	Value	%	Rate	Total
Design Development	€13,407,906	3.7	€500,000	€500,000
Contingency	€13,407,906	15.5	€2,086,186	€2,086,186
Others	€13,407,906	2.4	€834,477	€834,477
Total - to summary				€3,420,660

PACE PROJECT TIMELINES



PACE
Project Timelines

ID	SCP Ref	Project Name	Schedule Description	2016				2017					
				Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4		
1	171.001	T1 and T2 Common User Self Service (CUSS)	Indicative Programme										
			Actual/Forecast										
2	171.002	Pier 1 Extension	Indicative Programme		✗								
			Actual/Forecast		✗								
3	171.003	South Apron PBZ	Indicative Programme				✗						
			Actual/Forecast				✗						
4	171.004	T1 and T2 Immigration Facilities	Indicative Programme										
			Actual/Forecast										
5	172.001	South Apron Stands	Indicative Programme										
			Actual/Forecast										
6	172.002	Apron 5H and Taxiway Rehab	Indicative Programme										✗
			Actual/Forecast										
7	172.003	101-104	Indicative Programme										
			Actual/Forecast										
8	172.004	H1 and H2	Indicative Programme										
			Actual/Forecast										
9	172.005	West Apron Stands	Indicative Programme										
			Actual/Forecast										
10	172.006	P2 Underpass	Indicative Programme										
			Actual/Forecast										
11	172.007	P3 Underpass	Indicative Programme										
			Actual/Forecast										
12	172.008	West Apron Access	Indicative Programme										
			Actual/Forecast										
13	173.001	Link 3 Taxiway	Indicative Programme										
			Actual/Forecast										
14	173.002	Realignment of Taxiway A	Indicative Programme										
			Actual/Forecast										
15	173.003	Dual Taxiway F	Indicative Programme										
			Actual/Forecast										
16	173.004	Link 6 Taxiway	Indicative Programme										
			Actual/Forecast										

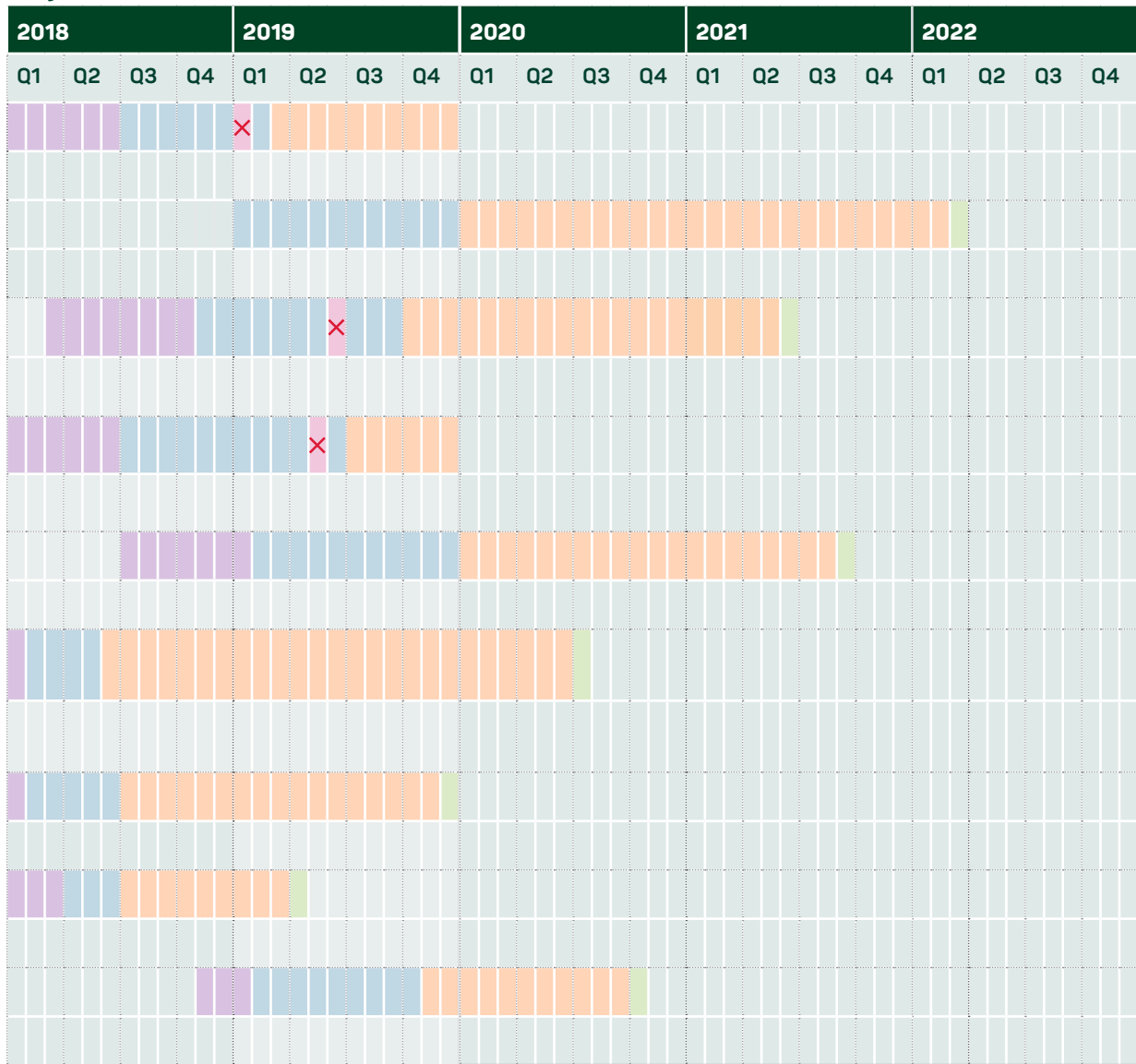
■ Feasibility/ Consultation
 ■ Design and Procurement
 ✗ Statutory Planning
 ■ Construction
 ■ Handover

PACE Project Timelines

ID	SCP Ref	Project Name	Schedule Description	2016				2017				
				Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
17	17.2.011	South Apron Stands Phase 2 (Relocations)	Indicative Programme									
			Actual / Forecast									
	17.2.011	South Apron Stands Phase 2	Indicative Programme									
			Actual / Forecast									
18	17.3.005	South Apron Taxiway Widening (Dual Code E)	Indicative Programme									
			Actual / Forecast									
19	17.3.006	Runway 10 Line-up Points (Road Re-alignment)	Indicative Programme									
			Actual / Forecast									
	17.3.006	Runway 10 Line-up Points	Indicative Programme									
			Actual / Forecast									
20	17.2.009	Advanced Visual Docking Guidance System (A-VDGS)	Indicative Programme									
			Actual / Forecast									
21	17.2.010	Fixed Electrical Ground Power (FEGP)	Indicative Programme									
			Actual / Forecast									
22	17.2.012	Apron Wide CCTV	Indicative Programme									
			Actual / Forecast									
23	17.1.005	Additional Bus Gates	Indicative Programme									
			Actual / Forecast									

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PACE Project Timelines



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