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Cost and Commercial Viability:

Reduced Scope Scenarios Costs

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1 Introduction

This report sets out the capital cost estimates to develop the reduced scope schemes as described in Section 4 (Reduced Provision of Facilities) of the *Operational Efficiency: Phasing and Facilities Review* report. In addition to assessing the cost revisions arising from scope reductions, opportunities to reduce the cost rates are considered as part of this analysis. All costs are stated in 2014 prices.

The reduced cost scenarios presented are illustrative of some of the main design options and it is expected that airport operators will wish to consider such opportunities for cost efficiency and others they identify. The base case scenarios and the reduced scope scenarios represent points on the possible spectrum of designs with different implications for passenger service levels. It is expected that the preferred option would be determined with the active involvement of a range of stakeholders including the airport operator, its airlines and the regulator. It is, therefore, important to note that the reductions in the capital costs set out in this report demonstrate how a range of potential costs might be realised during the development of each of the schemes.

Sections 2 to 4 present the capital costs for the three schemes respectively, with supporting data presented in Appendix C. The impact on passenger service levels for each scheme is briefly highlighted in this report but for more detail reference should be made to the *Operational Efficiency: Phasing and Facilities Review* report.

To enable comparison with the consultation and Cost and Revenue Identification Update reports, the same appendix references have been retained, and present:

- *In Appendix F, the operational expenditure relating to the existing and developed asset; and*
- *In Appendix G, the non-aeronautical revenues generated from the existing and developed asset*

Appendices B, D and E are not used in this report as the data they would present are unchanged from the relevant *Cost and Commercial Viability: Cost and Revenue Identification Update* report to which reference should be made.

Consistent terms have been adopted throughout this report:

- *“Core” refers to the investment in the airport irrespective of the investment in the additional runway works*
- *“Scheme” refers to the investment in the additional runway and its associated works*
- *“scheme” refers to the any of the three options being considered by the Airports Commission: Gatwick Airport 2R, Heathrow Airport ENR or Heathrow Airport NWR*
- *“base case” refers to the scheme as considered in the Cost and Commercial Viability: Cost and Revenue Identification Update reports, i.e. the scheme before the application of the identified reductions in scope, the application of which leads to the “reduced scope scheme*

A consistent colour scheme has been adopted throughout this report to present the estimates for each demand scenario, as stated in Table 1-1:

Scenario	
	Assessment of Need Carbon Capped
	Assessment of Need Carbon Traded
	Low Cost is King Carbon Traded (2R)
	Global Growth Carbon Traded (ENR and NWR)
	Global Fragmentation Carbon Capped

Table 1-1 Demand Scenario Reference Colours

1.1 Approach

The analysis was undertaken following the methodology described in the *Cost and Commercial Viability: Cost and Revenue Identification Update* reports for each of the three schemes: Gatwick Second Runway (2R), Heathrow Extended Northern Runway (ENR) and Heathrow Northwest Runway (NWR).

With reference to these consultation Cost and Revenue Identification reports, in order to enable the Cost and Commercial Viability study to consider the viability of the investment in the schemes, it is necessary to understand the wider cost and revenue contexts of the investment. Therefore, it is also necessary to forecast the investment in Core works, asset replacement cost, operational expenditure and non-aeronautical revenue. The Core works were not reduced and therefore their capital cost estimates remain as presented in the above Cost and Revenue Identification reports. Similarly, the reduced scope schemes were assessed against the same demand scenarios; therefore asset replacement costs, driven by the passenger demand forecast, remain unchanged from the costs presented in the corresponding Cost and Revenue Identification report. In practice, airport operators may be able to identify cost savings by having more detailed assessments. The forecasts of operational expenditure and non-aeronautical revenue were updated to reflect the revised infrastructure constructed and operated in the reduced scope schemes.

Risk and optimism bias allocations were made to all costs and revenues following the methodology and rates presented in the Cost and Revenue Identification reports.

1.2 Treatment of On-Costs

Throughout this report “*cost elements*” refers to the individual elements of the cost estimate as presented in Appendix C. As the promoters did not present their information in a consistent format, the presentation of cost elements varies for each scheme.

To enable comparison between the Airports Commission’s capital cost forecasts and for financial modelling purposes, a consistent grouping of “*cost headings*” was adopted, as follows:

- *Terminal buildings: passenger terminal buildings including piers and satellites*
- *Plant: building plant (e.g. air conditioning, etc) including utilities and power generation*
- *Transit systems: passenger transit systems above or below ground*
- *Runways: runway and associated instrument landing systems*
- *Taxiways and aprons: taxiways, aprons and their associated systems*
- *Equipment: mobile equipment and baggage handling installations*

- *Land: acquisition of land including commercial businesses and residential properties*
- *Airfield ancillary: other infrastructure elements, for example control tower, rescue and firefighting facilities, fencing, airside roads, etc*
- *Car parks: all car parks whether multi-storey or surface*
- *Third party land users: provision of serviced plots for third party development*
- *Environment: river diversions and environmental compensation and mitigation*
- *Community: community impact compensation*

Cost elements were allocated to cost headings as appropriate. On-costs (enabling works, project management on-cost, operational readiness, etc), were distributed across the above cost headings in proportion to the underlying cost of each cost heading to the total cost. Therefore, the reduced scope Scheme cost results in a minor reallocation of fixed on-costs resulting in minor variations to those cost headings.

This report, therefore, sets out two tables for each scheme. The first presents the reduced scope cost estimate by *cost element* (excluding on-costs) and the second by *cost heading* (aggregated by heading and including on-costs). The first table, by cost element, also shows the reduced scope total adjusted for on-costs to indicate consistency of the total cost reduction with the second table, by cost heading.

2

Gatwick Airport 2R

2.1 Approach and Scheme Cost Reduction

The analysis followed the approach set out in the *Cost and Commercial Viability: Gatwick Airport Second Runway Cost and Revenue Identification Update* report, based upon the reduced scope scheme discussed in the *Operational Efficiency: Phasing and Facilities Review* report. As discussed in the Operational Efficiency report, scope and cost rate reductions were considered and generate the cost reductions presented in Table 2-1 on the following page. The resulting total reduction in the Scheme cost estimate is presented in Table 2-2 on page 8.

The 2R scheme is considered to be efficient in its design with only limited potential for reduction in scope. The major infrastructure elements are considered to operate at an efficient size for the type and nature of the anticipated operation i.e. oriented towards lower cost air transport and the only potential reduction in infrastructure is to adopt an alternative to the provision of a control tower.

As discussed in the *Appraisal Framework Module 14. Operational Efficiency: Ground Infrastructure Gatwick Airport Second Runway* report, the Airports Commission adopted a risk based approach to assess a phasing that broadly maintains the same space available per passenger throughout the lifetime of the scheme. This ensures that the passenger experience is less reliant on the realisation of the proposed process improvements and would in fact enhance, relative to today, should these benefits come to pass in future years. We also note that the size and phasing of the terminal and passenger processing infrastructure would ultimately be a commercial decision for the airport operator following constructive engagement with its airlines and the regulator.

Figure 2-1 shows the terminal space planning factor in terms of square metres (sqm) of space per Design Hour Passenger (DHP) for a sample of international airports as discussed in detail in the *Appraisal Framework Module 14. Operational Efficiency: Ground Infrastructure Gatwick Airport Second Runway* report. It illustrates how the space planning factor for the Commission's phasing of the Gatwick scheme compares. It is generally below the level for the European international hub airports illustrated but within the central range internationally, albeit at the lower end. This review has identified no material scope for reduction in design capacity given passenger service level and operational constraints.

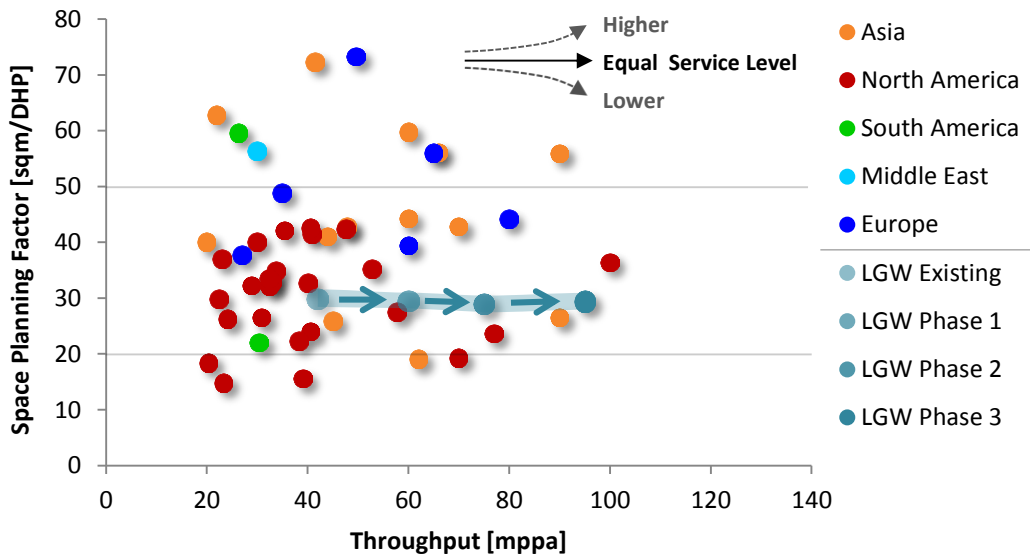


Figure 2-1 Space Planning Factor for Airports with more than 20 mppa, Showing All Phases of the Commission’s Gatwick Airport 2R Scheme

The only identified potential reduction in infrastructure scope therefore is to replace the proposed air traffic control (ATC) tower with a remote facility fulfilling the same role. Through careful design and collaboration with the stakeholders, it should be possible to provide effective air traffic control without a decrease in efficiency or safety.

While there are no identified opportunities to reduce the scope of the scheme except for the change to the proposed ATC tower, there are opportunities to reduce the cost rates of the following categories:

- Terminal and satellite
- Fixed links, nodes and boarding bridges
- Airside and landside Automated People Mover (APM)
- Baggage handling system

These cost reductions are likely to result in some compromise to the passenger experience delivered as a result of the lower specification of terminal fit-out and equipment.

Table 2-1 sets out the reduction in the cost for each work element unadjusted for on-costs (project fees, enabling works, and operational readiness). Table 2-2 includes on-costs against the summary cost headings presented in Section 1.2. Note that on-costs are distributed across all summary cost headings in proportion to their contribution to the total cost. Therefore, the reduced scope Scheme cost results in a different distribution of on-costs resulting in minor variations to all cost headings, although the total reduction is consistent between the two tables. The tables are presented in £ millions, with minor rounding differences. For presentational purposes, minor adjustments due solely to redistribution of project-wide costs have not been presented in this table.

Cost Element £'million	Reduction in Project Scope	Cost Reduction	Reduction in Unit Rate	Cost Reduction	Total Cost Reduction
Enabling works and demolitions	No material opportunity for reduction as required for the scheme.	-	Rates considered reasonable with no material opportunity for reduction.	-	-
Runway, taxiway and aprons	No material opportunity for reduction as scope provided is necessary for the functionality of the scheme and airfield.	-	Rates considered reasonable with no material opportunity for reduction.	-	-
Stands	No material opportunity for reduction as scope provided is necessary for the functionality of the scheme and airfield.	-	Rates considered reasonable with no material opportunity for reduction.	-	-
Airfield instrumentation	No material opportunity for reduction as scope provided is necessary for the functionality of the scheme and airfield.	-	Rates considered reasonable with no material opportunity for reduction.	-	-
Air traffic control tower	Could be removed and replaced by a remote control room.	19	Rates considered reasonable with no material opportunity for reduction.	-	19
Other airfield ancillary works	No material opportunity for reduction as scope provided is necessary for the functionality of the scheme and airfield.	-	Rates considered reasonable with no material opportunity for reduction.	-	-
Terminal and satellite	No material opportunity for reduction beyond existing size without significant detrimental impact on passenger service standards and operations.	-	Could be provided to a lower specification. Fixed elements may limit potential for reduction; however, a cost saving of 5% has been assumed.	95	95
Fixed links, nodes and boarding bridges	Even in the absence of boarding bridges, fixed links and nodes are required to enable passengers to access the apron level from the terminal. Although the number of contact stands served by boarding bridges could be reduced – in extremis to zero – such a reduction is considered to have a significant detrimental impact on passenger service. No reduction has therefore been considered.	-	Passenger boarding bridges could be provided to a lower specification, with an assumed cost saving of 10%.	6	6
Airside and landside APM	The removal of the APM would require replacement with a significant bussing operation which does not appear to be operationally practical and may have a negative air quality impact. No reduction has therefore been considered.	-	Could be provided to a lower specification, with an assumed cost saving of 10%.	31	31

Cost Element £'million	Reduction in Project Scope	Cost Reduction	Reduction in Unit Rate	Cost Reduction	Total Cost Reduction
Car parks	No material opportunity for reduction as required for the surface access strategy.	-	Rates considered reasonable with no material opportunity for reduction.	-	-
Power and utilities	No material opportunity for reduction as scope provided is necessary for the functionality of the scheme.	-	Rates considered reasonable with no material opportunity for reduction.	-	-
Baggage handling system	No material opportunity for reduction as scope provided is necessary for the functionality of the scheme.	-	Could be provided to a lower specification, with an assumed cost saving of 10%.	23	23
Land	No material opportunity for reduction without affecting the surface car parks. As these would have to be provided as multi-storey car parks, which are significantly more expensive, there is no business case for a reduction in land acquisition.	-	Rates considered reasonable with no material opportunity for reduction.	-	-
Environment and community	No material opportunity for reduction as essential to the scheme.	-	Rates considered reasonable with no material opportunity for reduction.	-	-
Cost reduction		19		155	174
Cost reduction including on-costs					200

Table 2-1 Scope and Unit Rate Reductions Excluding On-Costs, Risk and Optimism Bias (2014 prices, £'million)

Cost Heading £'million	Base Case	Reduction	Reduced Scope Scheme
Terminal buildings	2,127	104	2,023
Plant	397	11	386
Tunnels and bridges	-	-	-
Transit systems	638	36	602
Runways	127	-	127
Taxiways and aprons	846	-	847
Equipment	281	27	254
Land	1,126	-	1,127
Rail	-	-	-
Airfield ancillary	252	25	227
Car parks	168	-	168
Third party land users	22	-	22
Environment	378	-	378
Community	140	-	140
Sub-Total	6,501	200	6,301
Risk	1,300	40	1,260
Optimism bias	1,170	36	1,134
Total	8,971	277	8,695

Table 2-2 Impact of Scope and Rate Reductions Including On-Costs, Risk and Mitigated Optimism Bias (2014 prices, £'million)

Section 2.2 summarises the forecast reduced scope Scheme capital expenditure, by year, against each of the Airports Commission’s demand scenarios. As certain demand scenarios do not require the full build-out of all phases, the difference between the scenarios is both the profile of expenditure required to deliver capacity in line with the differing demand requirements and the total expenditure, which is dependent upon whether Phase 3 is required before 2050 or not.

In summary, for each scenario, the reduced scope Scheme capital expenditure is as shown in Table 2-3, presented in comparison with the base case cost estimate.

Scenario	£'million	
	Base Case	Reduced Scope
Assessment of Need Carbon Capped	7,060	6,868
Assessment of Need Carbon Traded	8,971	8,695
Low Cost is King Carbon Traded	8,971	8,695
Global Fragmentation Carbon Capped	7,060	6,868

Table 2-3 Total Reduced Scope Scheme Capital Expenditure by Demand Scenario Including On-Costs, Risk and Mitigated Optimism Bias (2014 prices, £'million)

2.2 Airports Commission Demand Scenarios

2.2.1 Assessment of Need Carbon Capped



Figure 2-2 Assessment of Need Carbon Capped

2.2.2 Assessment of Need Carbon Traded

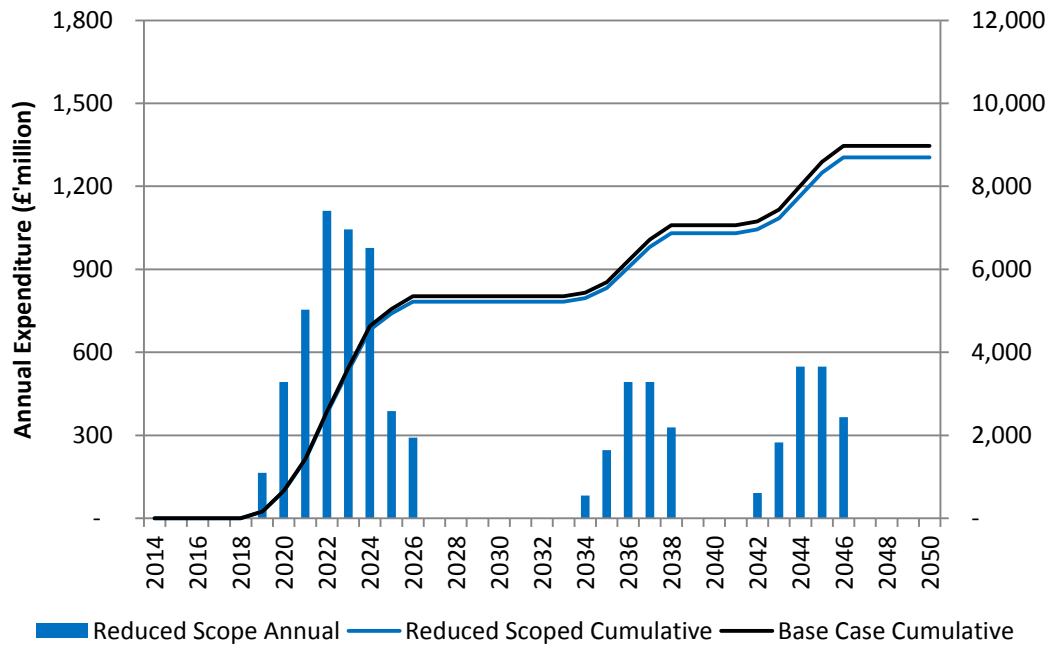


Figure 2-3 Assessment of Need Carbon Traded

2.2.3 Low Cost is King Carbon Traded

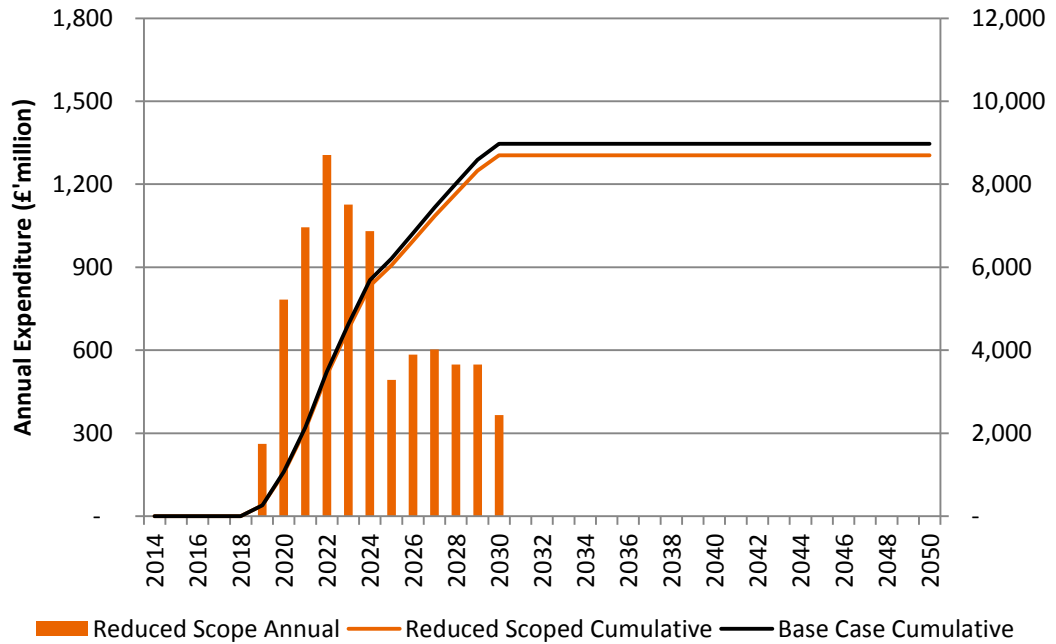


Figure 2-4 Low Cost is King Carbon Traded

2.2.4 Global Fragmentation Carbon Capped

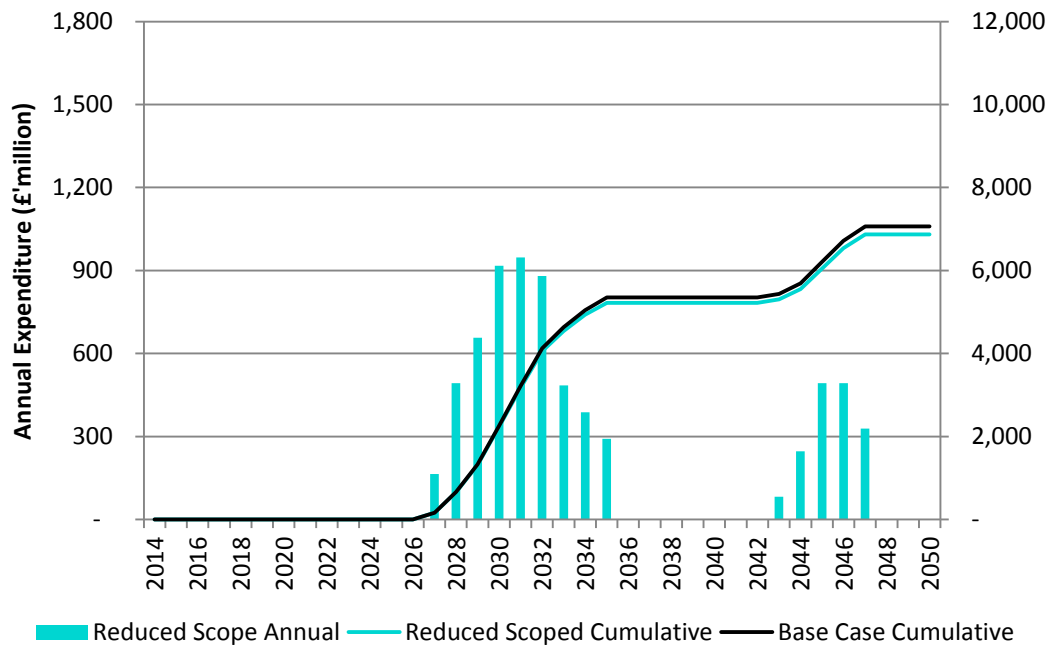


Figure 2-5 Global Fragmentation Carbon Capped

2.3 Annual Reduced Scope Scheme Capital Expenditure Summaries

The tables on the following pages present the data underlying the previous figures with mitigated optimism bias. These tables are based upon the detailed breakdown presented in Appendix C, but, for the purpose of enabling the assessment of depreciation, summarise the total expenditure into the headings as set out in Section 1.2.

2014 real prices in £million - including mitigated optimism bias

Reduced Scope	Total	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Terminal buildings	1,170	-	-	-	-	-	-	-	-	-	-	40	121	161	202	161	121	-	-	-	-	-	-	-	-	-	-	18	54	109	109	73	-	-	-	-	-	
Plant	291	-	-	-	-	-	8	24	32	40	32	29	13	18	22	18	13	-	-	-	-	-	-	-	-	-	-	2	6	12	12	8	-	-	-	-	-	
Tunnels and bridges	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Transit systems	602	-	-	-	-	-	-	-	-	-	-	9	28	38	47	38	28	-	-	-	-	-	-	-	-	-	-	21	62	124	124	82	-	-	-	-	-	
Runways	127	-	-	-	-	-	6	19	25	32	25	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Taxiways and aprons	644	-	-	-	-	-	15	45	60	75	60	50	15	20	25	20	15	-	-	-	-	-	-	-	-	-	-	12	37	74	74	49	-	-	-	-	-	
Equipment	143	-	-	-	-	-	0	1	1	1	1	5	13	17	21	17	13	-	-	-	-	-	-	-	-	-	3	8	16	16	10	-	-	-	-	-		
Land	1,127	-	-	-	-	-	56	169	225	282	225	169	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Airfield Ancillary	227	-	-	-	-	-	7	20	27	33	27	24	12	16	20	16	12	-	-	-	-	-	-	-	-	-	1	2	4	4	3	-	-	-	-	-		
Car Parks	109	-	-	-	-	-	-	-	-	-	-	3	8	10	13	10	8	-	-	-	-	-	-	-	-	-	3	9	18	18	12	-	-	-	-	-		
Third Party Land Users	16	-	-	-	-	-	0	1	1	1	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	0	1	2	2	1	-	-	-	-	-		
Environment	378	-	-	-	-	-	19	57	76	95	76	57	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Community	140	-	-	-	-	-	7	21	28	35	28	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Optimism Bias	896	-	-	-	-	-	21	64	86	107	86	77	38	51	63	51	38	-	-	-	-	-	-	-	-	-	11	32	64	64	43	-	-	-	-	-		
Risk	995	-	-	-	-	-	24	71	95	119	95	85	42	56	70	56	42	-	-	-	-	-	-	-	-	-	12	36	71	71	48	-	-	-	-	-		
Total	6,868	-	-	-	-	-	164	492	657	821	657	589	291	388	485	388	291	-	-	-	-	-	-	-	-	-	82	247	493	493	329	-	-	-	-	-		

Table 2-4 Assessment of Need Carbon Capped

2014 real prices in £million - including mitigated optimism bias

Reduced Scope	Total	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Terminal buildings	2,023	-	-	-	-	-	-	-	40	121	161	202	161	121	-	-	-	-	-	-	-	18	54	109	109	73	-	-	43	128	256	256	170	-	-	-	-	
Plant	386	-	-	-	-	-	8	24	37	54	50	47	18	13	-	-	-	-	-	-	-	2	6	12	12	8	-	-	5	14	28	28	19	-	-	-	-	
Tunnels and bridges	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Transit systems	602	-	-	-	-	-	-	-	9	28	38	47	38	28	-	-	-	-	-	-	-	21	62	124	124	82	-	-	-	-	-	-	-	-	-	-		
Runways	127	-	-	-	-	-	6	19	25	32	25	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Taxiways and aprons	847	-	-	-	-	-	15	45	65	90	80	70	20	15	-	-	-	-	-	-	-	12	37	74	74	49	-	-	10	30	61	61	40	-	-	-	-	
Equipment	254	-	-	-	-	-	0	1	5	14	18	22	17	13	-	-	-	-	-	-	-	3	8	16	16	10	-	-	6	17	33	33	22	-	-	-	-	
Land	1,127	-	-	-	-	-	56	169	225	282	225	169	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Airfield Ancillary	227	-	-	-	-	-	7	20	31	45	43	40	16	12	-	-	-	-	-	-	-	1	2	4	4	3	-	-	-	-	-	-	-	-	-	-		
Car Parks	168	-	-	-	-	-	-	-	3	8	10	13	10	8	-	-	-	-	-	-	-	3	9	18	18	12	-	-	3	9	18	18	12	-	-	-	-	
Third Party Land Users	22	-	-	-	-	-	0	1	1	2	2	2	1	1	-	-	-	-	-	-	-	0	1	2	2	1	-	-	0	1	2	2	1	-	-	-	-	
Environment	378	-	-	-	-	-	19	57	76	95	76	57	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Community	140	-	-	-	-	-	7	21	28	35	28	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Optimism Bias	1,134	-	-	-	-	-	21	64	98	145	136	128	51	38	-	-	-	-	-	-	-	11	32	64	64	43	-	-	12	36	71	71	48	-	-	-	-	
Risk	1,260	-	-	-	-	-	24	71	109	161	151	142	56	42	-	-	-	-	-	-	-	12	36	71	71	48	-	-	13	40	79	79	53	-	-	-	-	
Total	8,695	-	-	-	-	-	164	492	754	1,112	1,045	978	388	291	-	-	-	-	-	-	82	247	493	493	329	-	-	91	274	548	548	365	-	-	-	-		

Table 2-5 Assessment of Need Carbon Traded

2014 real prices in £million - including mitigated optimism bias

Reduced Scope	Total	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Terminal buildings	2,023	-	-	-	-	-	40	121	161	202	180	176	109	151	200	256	256	170	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Plant	386	-	-	-	-	-	13	38	50	63	52	44	12	17	22	28	28	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Tunnels and bridges	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Transit systems	602	-	-	-	-	-	9	28	38	47	58	90	124	124	82	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Runways	127	-	-	-	-	-	6	19	25	32	25	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Taxiways and aprons	847	-	-	-	-	-	20	60	80	100	92	97	74	84	79	61	61	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Equipment	254	-	-	-	-	-	5	14	18	23	21	21	16	21	27	33	33	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Land	1,127	-	-	-	-	-	56	169	225	282	225	169	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Airfield Ancillary	227	-	-	-	-	-	11	32	43	53	43	34	4	4	3	-	-																					

2014 real prices in £million - including mitigated optimism bias

Reduced Scope	Total	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Terminal buildings	1,170	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40	121	161	202	161	121	-	-	-	-	-	-	-	-	18	54	109	109	73	-	-	-
Plant	291	-	-	-	-	-	-	-	-	-	-	-	-	-	8	24	32	45	46	42	22	18	13	-	-	-	-	-	-	2	6	12	12	8	-	-	-	
Tunnels and bridges	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Transit systems	602	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9	28	38	47	38	28	-	-	-	-	-	-	-	21	62	124	124	82	-	-	-	
Runways	127	-	-	-	-	-	-	-	-	-	-	-	-	-	6	19	25	32	25	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Taxiways and aprons	644	-	-	-	-	-	-	-	-	-	-	-	-	-	15	45	60	80	75	65	25	20	15	-	-	-	-	-	-	12	37	74	74	49	-	-	-	
Equipment	143	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1	1	6	14	18	21	17	13	-	-	-	-	-	3	8	16	16	10	-	-	-		
Land	1,127	-	-	-	-	-	-	-	-	-	-	-	-	-	56	169	225	282	225	169	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Airfield Ancillary	227	-	-	-	-	-	-	-	-	-	-	-	-	-	7	20	27	37	39	36	20	16	12	-	-	-	-	-	1	2	4	4	3	-	-	-		
Car Parks	109	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	8	10	13	10	8	-	-	-	-	-	3	9	18	18	12	-	-	-			
Third Party Land Users	16	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1	1	2	2	2	1	1	1	-	-	-	-	-	0	1	2	2	1	-	-	-		
Environment	378	-	-	-	-	-	-	-	-	-	-	-	-	-	19	57	76	95	76	57	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Community	140	-	-	-	-	-	-	-	-	-	-	-	-	-	7	21	28	35	28	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Optimism Bias	896	-	-	-	-	-	-	-	-	-	-	-	-	-	21	64	86	120	124	115	63	51	38	-	-	-	-	-	11	32	64	64	43	-	-	-		
Risk	995	-	-	-	-	-	-	-	-	-	-	-	-	-	24	71	95	133	137	128	70	56	42	-	-	-	-	12	36	71	71	48	-	-	-			
Total	6,868	-	-	-	-	-	-	-	-	-	-	-	-	-	164	492	657	918	948	881	485	388	291	-	-	-	-	82	247	493	493	329	-	-	-			

Table 2-7 Global Fragmentation Carbon Capped

3

Heathrow Airport ENR

3.1 Approach and Scheme Cost Reduction

The analysis followed the approach set out in the *Cost and Commercial Viability: Cost and Revenue Identification Update Heathrow Airport Extended Northern Runway* report, based upon the reduced scope scheme discussed in the *Operational Efficiency: Phasing and Facilities Review* report. As discussed in the Operational Efficiency report, scope and cost rate reductions were considered and generate the cost reductions presented in Table 3-1 on the following page. The resulting total reduction in the Scheme cost estimate is presented in Table 3-2 on page 18.

The ENR scheme is considered to be efficient in its design with only limited potential for reduction in scope. The only identified potential reduction in infrastructure is to reduce the size of T6.

The proposed T6 and its two satellites are currently designed at a space planning factor of 45 sqm/DHP, comparable to today's T5, delivering a good standard of passenger experience appropriate for a long-haul, hub operation. With reference to Figure 3-1 and the consultation *Appraisal Framework Module 14. Operational Efficiency: Ground Infrastructure Heathrow Airport Extended Northern Runway* report, T6 could be defined with a lower space planning factor.

Although this would reduce passenger experience for those passengers using T6, reduce its flexibility, reliability and resilience, and may not so readily facilitate forecast traffic in demand scenarios, it is possible to consider such a reduction. The main processing building could be redesigned with careful consideration of the number of floors, the footprint of the building and the requirements for key passenger processing areas and back-office.

We would consider a terminal designed to operate at a space planning factor of 30 m²/DHP, comparable to today's terminals at Gatwick Airport, as the lower end of space provision for a major international airport terminal, but appropriate for and potentially more aligned with the business case requirements of a low cost carrier, short-haul, point-to-point operation.

Figure 3-1 shows the terminal space planning factor (square metres (sqm) of space per Design Hour Passenger (DHP)) for a sample of international airports including Heathrow with the ENR scheme built. It shows two phases of the ENR scheme with the construction of T6 (combined with the closure of T3) followed by the full expansion of T2 and its satellites.

The space planning factor illustrates how Heathrow compares to these international airports as it develops the ENR scheme under the base case (the grey trend line) or alternatively the reduced scope scenario (the purple trend line). It is currently broadly comparable to a number of European international hub airports illustrated and remains so under the reduced scope scenario, albeit with a reduced average space planning factor due to T6 being built at 30 sqm per DHP.

In practice, it is expected that the eventual specification, which is a key determinant of cost, will be determined with the active involvement of a range of stakeholders including the airport operator, airlines, and the regulator.

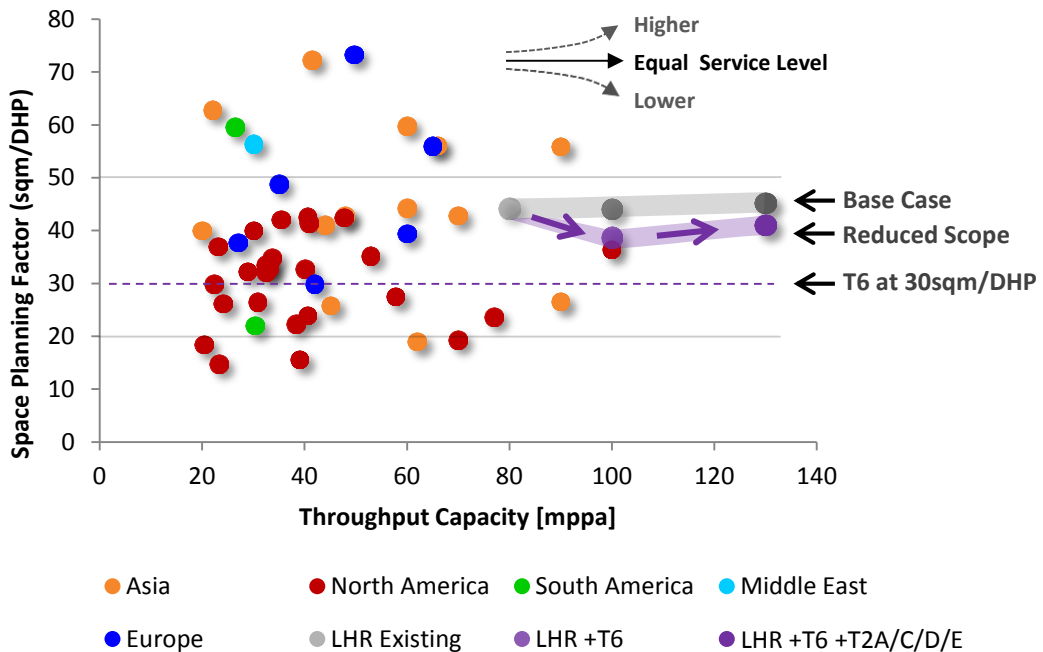


Figure 3-1 Space Planning Factor for Airports with more than 20 mppa, Showing All Phases of the Commission’s Heathrow Airport ENR Scheme

In addition to the identified opportunity to reduce the scope of the scheme, there are opportunities to reduce the cost of the following categories:

- *Stands*
- *Terminal and satellite*
- *Fixed links, nodes and boarding bridges*
- *Airside and landside Automated People Mover (APM)*
- *Baggage handling system*

The cost reductions set out below will result in some compromise to the passenger service levels delivered as a result of the lower specification of terminal fit-out and equipment. They may also result in compromise to the flexibility of aircraft stand usage and to air quality.

Table 3-1 sets out the reduction in the cost for each work element unadjusted for on-costs (project fees, enabling works, and operational readiness). Table 3-2 includes on-costs against the summary cost headings presented in Section 1.2. Note that on-costs are distributed across all summary cost headings in proportion to their contribution to the total cost. Therefore, the reduced scope Scheme cost results in a different distribution of on-costs resulting in minor variations to all cost headings, although the total reduction is consistent between the two tables. The tables are presented in £’million, with minor rounding differences. For presentational purposes, minor adjustments due solely to redistribution of project-wide costs have not been presented in this table.

Cost Element £'million	Reduction in Project Scope	Cost Reduction	Reduction in Unit Rate	Cost Reduction	Total Cost Reduction
Enabling works and demolitions	No material opportunity for reduction as required for the scheme.	-	Rates considered reasonable with no material opportunity for reduction.	-	-
Runway, taxiway and aprons	No material opportunity for reduction as scope provided is necessary for the functionality of the scheme and airfield.	-	Rates considered reasonable with no material opportunity for reduction.	-	-
Stands	No material opportunity for reduction as scope provided is necessary for the functionality of the scheme and airfield.	-	A lower specification may be possible. This may affect flexibility of stand usage and might impact air quality in terms of APU usage. However, 10% reduction assumed possible.	22	22
Airfield instrumentation	No material opportunity for reduction as scope provided is necessary for the functionality of the scheme and airfield.	-	Rates considered reasonable with no material opportunity for reduction.	-	-
Air traffic control tower	Not included within the scheme.	-	Not included within the scheme.	-	-
Other airfield ancillary works	No material opportunity for reduction as scope provided is necessary for the functionality of the scheme and airfield.	-	Rates considered reasonable with no material opportunity for reduction.	-	-
Terminal and satellite	Scope for reduction in size to provide a level of passenger service, as measured by the space planning factor, equivalent to the Gatwick Airport Second Runway scheme. Although the satellites are defined to a higher service standard than the 2R scheme, the greater width and functionality is considered to be required within this Heathrow scheme, therefore no scope for reduction in size of the satellites.	714	T6 and its satellites could be provided to a lower specification. Fixed elements may limit potential for reduction; however, a cost saving of 5% has been assumed. It is assumed that T2E would be provided to the same standard as other T2 satellites in line with assumed agreements with tenant airlines.	86	800
Fixed links, nodes and boarding bridges	Even in the absence of boarding bridges, fixed links and nodes are required to enable passengers to access the apron level from the terminal. Although the number of contact stands served by boarding bridges could be reduced such a reduction is considered to have a significant detrimental impact on passenger service. No reduction has therefore been considered.	-	Could be provided to a lower specification, with an assumed cost saving of 10%.	19	19

Cost Element £'million	Reduction in Project Scope	Cost Reduction	Reduction in Unit Rate	Cost Reduction	Total Cost Reduction
Airside and landside APM	The removal of the APM would require replacement with a significant bussing operation which does not appear to be operationally practical and may have a negative air quality impact. No reduction has therefore been considered.	-	Could be provided to a lower specification, with an assumed cost saving of 10%.	20	20
Car parks	No material opportunity for reduction as required for the surface access strategy.	-	Rates considered reasonable with no material opportunity for reduction.	-	-
Power and utilities	No material opportunity for reduction as scope provided is necessary for the functionality of the scheme.	-	Rates considered reasonable with no material opportunity for reduction.	-	-
Baggage handling system	A substantial reduction in provision of the proposed baggage handling system is not considered to be feasible given the distance between T6 and its satellites and that its reduction would necessitate a vehicle solution with potentially significant negative air quality impact. No reduction has therefore been considered.	-	Could be provided to a lower specification, with an assumed cost saving of 10%.	73	73
Land	No scope for reduction as land take is already minimised.	-	Rates considered reasonable with no material opportunity for reduction.	-	-
Environment and community	No material opportunity for reduction as essential to the scheme.	-	Rates considered reasonable with no material opportunity for reduction.	-	-
Cost reduction		714		220	934
Cost reduction including project management and on-costs					1,074

Table 3-1 Scope and Unit Rate Reductions Excluding On-Costs, Risk and Optimism Bias (2014 prices, £'million)

Cost Heading £'million	Base Case	Reduction	Reduced Scope Scheme
Terminal buildings	3,509	850	2,659
Plant	590	94	496
Tunnels and bridges	-	-	-
Transit systems	1,033	21	1,012
Runways	269	-	269
Taxiways and aprons	781	31	749
Equipment	999	84	915
Land	1,233	-	1,237
Airfield ancillary	599	-	601
Car parks	580	-	580
Third party land users	74	-	75
Environment	442	-	442
Community	352	-	352
Sub-Total	10,460	1,074	9,386
Risk	2,092	215	1,877
Optimism bias	1,883	193	1,690
Total	14,435	1,482	12,953

Table 3-2 Impact of Scope and Rate Reductions Including On-Costs, Risk and Mitigated Optimism Bias (2014 prices, £'million)

Section 3.2 summarises the forecast reduced scope Scheme capital expenditure, by year, against each of the Airports Commission’s demand scenarios. The difference between the scenarios is the profile of expenditure required to deliver capacity in line with the differing demand requirements.

In summary, for each scenario, the reduced scope Scheme capital expenditure is as shown in Table 3-3 with mitigated optimism bias, presented in comparison with the base case cost estimate.

Scenario	£'million	
	Base Case	Reduced Scope
Assessment of Need Carbon Capped	14,435	12,953
Assessment of Need Carbon Traded	14,435	12,953
Low Cost is King Carbon Traded	14,435	12,953
Global Fragmentation Carbon Capped	14,435	12,953

Table 3-3 Total Reduced Scope Scheme Capital Expenditure by Demand Scenario Including On-Costs, Risk and Mitigated Optimism Bias (2014 prices, £'million)

3.2 Airports Commission Demand Scenarios

3.2.1 Assessment of Need Carbon Capped

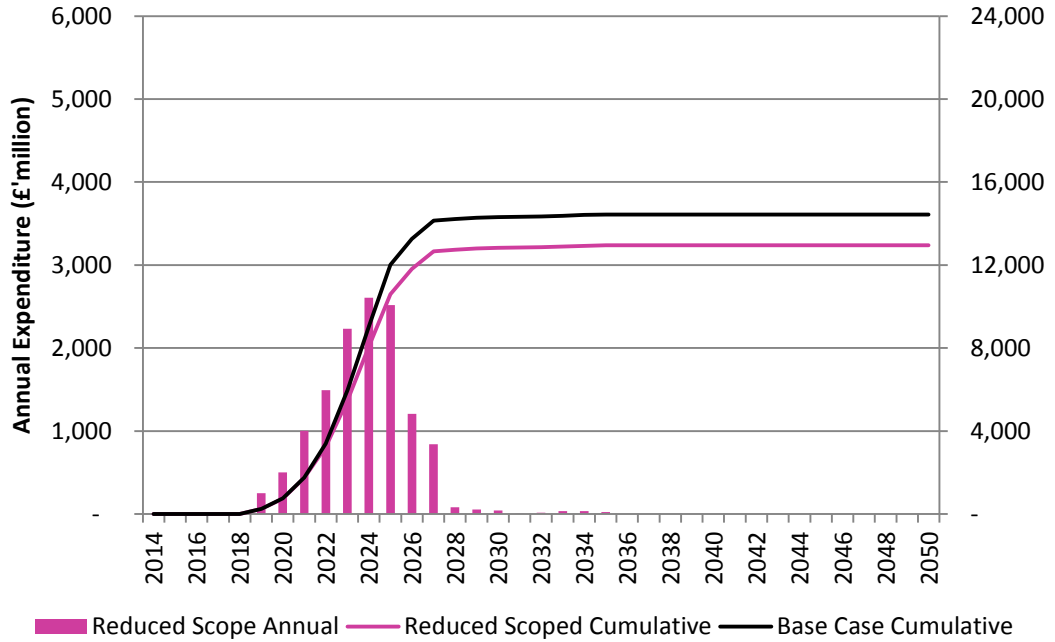


Figure 3-2 Assessment of Need Carbon Capped

3.2.2 Assessment of Need Carbon Traded

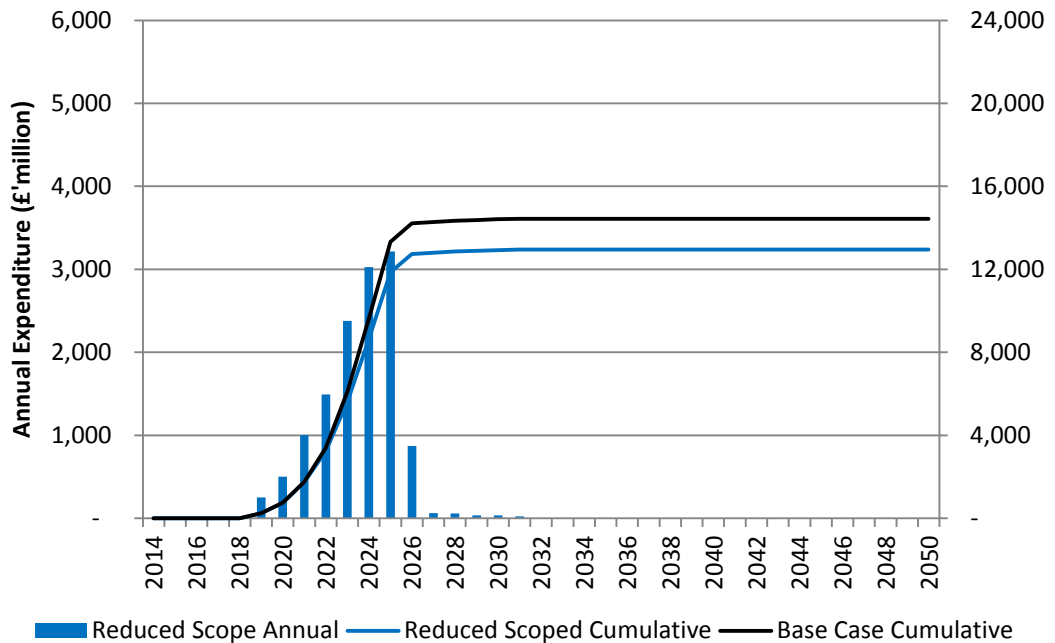


Figure 3-3 Assessment of Need Carbon Traded

3.2.3 Global Growth Carbon Traded

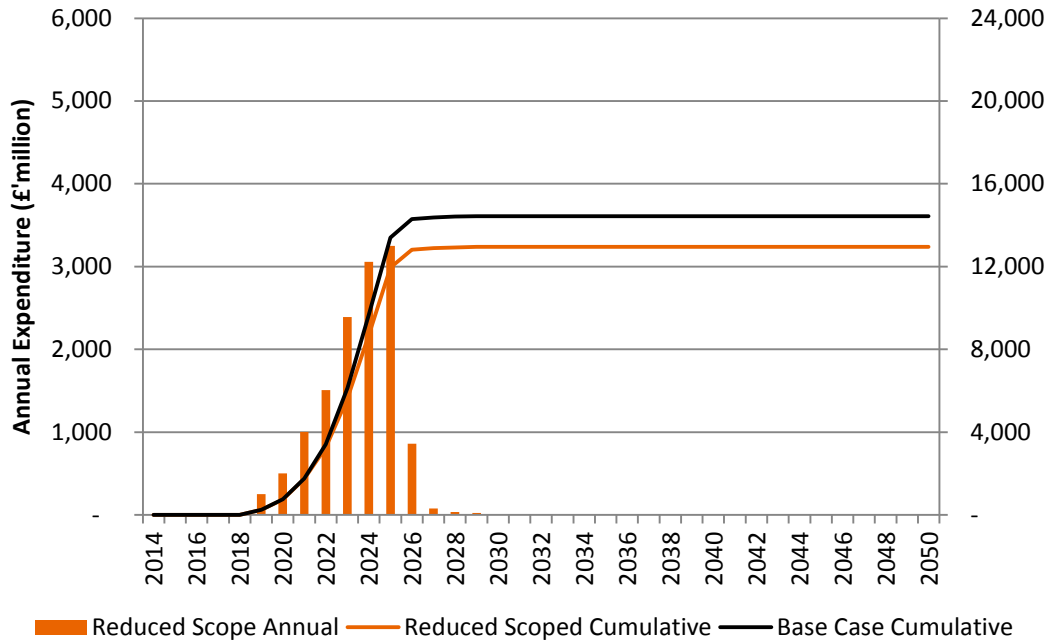


Figure 3-4 Global Growth Carbon Traded

3.2.4 Global Fragmentation Carbon Capped

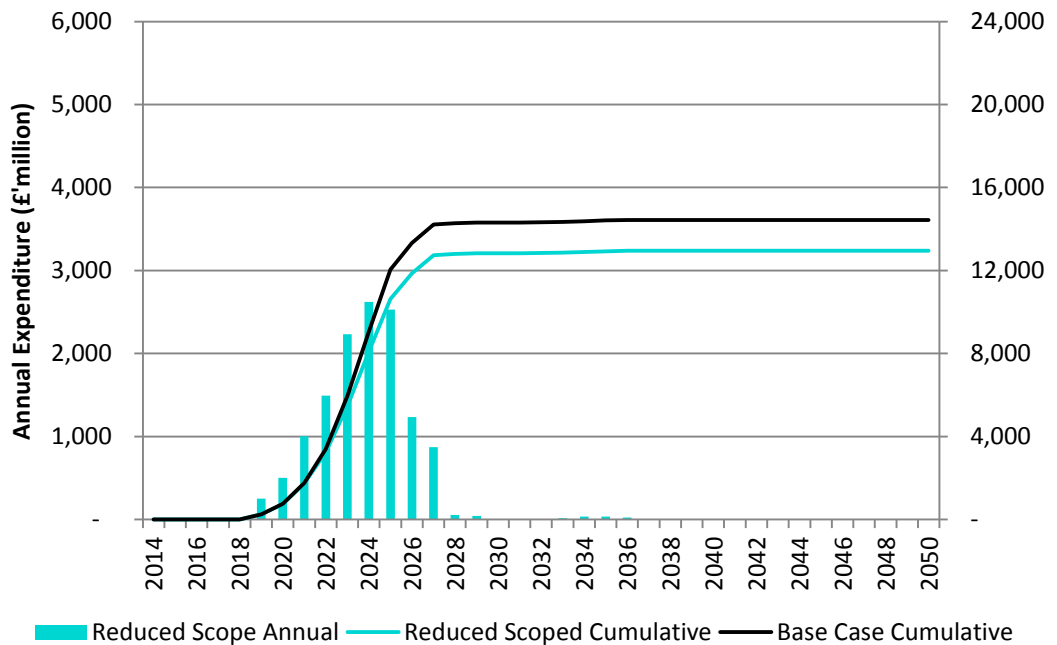


Figure 3-5 Global Fragmentation Carbon Capped

3.3 Annual Reduced Scope Scheme Capital Expenditure Summaries

The tables on the following pages present the data underlying the previous figures with mitigated optimism bias. These tables are based upon the detailed breakdown presented in Appendix C, but, for the purpose of enabling the assessment of depreciation, summarise the total expenditure into the headings as set out in Section 1.2.

2014 real prices in £million - including mitigated optimism bias

Reduced Scope	Total	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	
Terminal buildings	2,659	-	-	-	-	-	-	-	-	184	461	686	716	367	245	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Plant	496	-	-	-	-	-	-	-	-	41	101	146	140	41	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Tunnels and bridges	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Transit systems	1,012	-	-	-	-	-	3	5	11	77	176	255	263	133	89	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Runways	269	-	-	-	-	-	13	27	54	54	54	40	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Taxiways and aprons	749	-	-	-	-	-	30	60	120	128	140	122	98	32	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Equipment	915	-	-	-	-	-	-	-	-	43	108	176	226	217	144	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Land	1,237	-	-	-	-	-	62	124	247	247	247	185	124	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Airfield Ancillary	601	-	-	-	-	-	30	60	120	120	120	90	60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Car Parks	580	-	-	-	-	-	-	-	-	15	36	58	83	86	84	60	40	30	4	13	26	26	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Third Party Land Users	75	-	-	-	-	-	4	7	15	15	15	11	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Environment	442	-	-	-	-	-	22	44	88	88	88	66	44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Community	352	-	-	-	-	-	18	35	70	70	70	53	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Optimism Bias	1,690	-	-	-	-	-	33	65	131	195	291	340	328	158	110	11	7	5	1	2	5	5	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Risk	1,877	-	-	-	-	-	36	73	145	217	324	378	365	175	122	12	8	6	1	3	5	5	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Total	12,953	-	-	-	-	-	250	501	1,001	1,494	2,233	2,607	2,517	1,208	843	83	56	42	6	18	36	36	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Table 3-4 Assessment of Need Carbon Capped

2014 real prices in £million - including mitigated optimism bias

Reduced Scope	Total	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	
Terminal buildings	2,659	-	-	-	-	-	-	-	-	184	502	808	920	245	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Plant	496	-	-	-	-	-	-	-	-	41	106	160	162	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Tunnels and bridges	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Transit systems	1,012	-	-	-	-	-	3	5	11	77	191	299	337	89	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Runways	269	-	-	-	-	-	13	27	54	54	54	40	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Taxiways and aprons	749	-	-	-	-	-	30	60	120	128	143	132	116	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Equipment	915	-	-	-	-	-	-	-	-	43	132	248	347	144	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Land	1,237	-	-	-	-	-	62	124	247	247	247	185	124	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Airfield Ancillary	601	-	-	-	-	-	30	60	120	120	120	90	60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Car Parks	580	-	-	-	-	-	-	-	-	15	54	100	150	104	45	43	26	26	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Third Party Land Users	75	-	-	-	-	-	4	7	15	15	15	11	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Environment	442	-	-	-	-	-	22	44	88	88	88	66	44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Community	352	-	-	-	-	-	18	35	70	70	70	53	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Optimism Bias	1,690	-	-	-	-	-	33	65	131	195	310	395	419	114	8	8	5	5	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Risk	1,877	-	-	-	-	-	36	73	145	217	345	439	466	126	9	9	5	5	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Total	12,953	-	-	-	-	-	250	501	1,001	1,494	2,378	3,028	3,215	870	62	60	36	36	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Table 3-5 Assessment of Need Carbon Traded

2014 real prices in £million - including mitigated optimism bias

Reduced Scope	Total	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Terminal buildings	2,659	-	-	-	-	-	-	-	-	184	502	808	920	245	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Plant	496	-	-	-	-	-	-	-	-	41	106	160	162	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tunnels and bridges	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transit systems	1,012	-	-	-	-	-	3	5	11	77	191	299	337	89	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Runways	269	-	-	-	-	-	13	27	54	54	54	40	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Taxiways and aprons	749	-	-	-	-	-	30	60	120	128	143	132	116	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Equipment	915	-	-	-	-	-	-	-	-	43	132	248	347	144	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Land	1,237	-	-	-	-	-	62	124	247	247	247	185	124	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Airfield Ancillary	601	-	-	-	-	-	30	60	120	120	120	90	60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Car Parks	580	-	-	-	-	-	-	-	-	25	64	121	174	97	56	26	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Third Party Land Users	75	-	-	-	-	-	4	7	15	15	15	11	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Environment	442	-	-	-	-	-	22	44	88	88	88	66	44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Community	352	-	-	-	-	-	18	35	70	70	70	53	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Optimism Bias	1,690	-	-	-	-	-	33	65	131	197	312	399	424	112	10	5	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Risk	1,877	-	-	-	-	-	36	73	145	219	347	443	471	125																								

2014 real prices in £million - including mitigated optimism bias

Reduced Scope	Total	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Terminal buildings	2,659	-	-	-	-	-	-	-	-	184	461	686	716	367	245	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Plant	496	-	-	-	-	-	-	-	-	41	101	146	140	41	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tunnels and bridges	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transit systems	1,012	-	-	-	-	-	3	5	11	77	176	255	263	133	89	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Runways	269	-	-	-	-	-	13	27	54	54	54	40	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Taxiways and aprons	749	-	-	-	-	-	30	60	120	128	140	122	98	32	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Equipment	915	-	-	-	-	-	-	-	-	43	108	176	226	217	144	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Land	1,237	-	-	-	-	-	62	124	247	247	247	185	124	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Airfield Ancillary	601	-	-	-	-	-	30	60	120	120	120	90	60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Car Parks	580	-	-	-	-	-	-	-	-	15	36	68	93	106	104	40	30	-	-	4	13	26	26	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Third Party Land Users	75	-	-	-	-	-	4	7	15	15	15	11	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Environment	442	-	-	-	-	-	22	44	88	88	88	66	44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Community	352	-	-	-	-	-	18	35	70	70	70	53	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Optimism Bias	1,690	-	-	-	-	-	33	65	131	195	291	342	330	161	114	7	5	-	-	1	2	5	5	3	-	-	-	-	-	-	-	-	-	-	-	-	-	
Risk	1,877	-	-	-	-	-	36	73	145	217	324	380	367	179	126	8	6	-	-	1	3	5	5	3	-	-	-	-	-	-	-	-	-	-	-	-	-	
Total	12,953	-	-	-	-	-	250	501	1,001	1,494	2,233	2,620	2,531	1,236	870	56	42	-	-	6	18	36	36	24	-	-	-	-	-	-	-	-	-	-	-	-	-	

Table 3-7 Global Fragmentation Carbon Capped

4

Heathrow Airport NWR

4.1 Approach and Scheme Cost Reduction

The analysis followed the approach set out in the *Cost and Commercial Viability: Cost and Revenue Identification Update Heathrow Airport North West Runway* report, based upon the reduced scope scheme discussed in the *Operational Efficiency: Phasing and Facilities Review* report. As discussed in the Operational Efficiency report, scope and cost rate reductions were considered and generate the cost reductions presented in Table 4-1 on the following page. The resulting total reduction in the Scheme cost estimate is presented in Table 4-2 on page 29.

The NWR scheme offers some potential sources of scope reduction. These relate to the size of T6, as for the ENR scheme, the removal of the ATC tower, as for the 2R scheme, and opportunities with respect to land acquisition.

Firstly, as for the ENR scheme above, the proposed T6 could be considered at a space planning factor of 30 sqm/DHP.

Although this would reduce passenger experience for those passengers using T6, reduce its flexibility, reliability and resilience, and may not so readily facilitate forecast traffic in demand scenarios, it is possible to consider such a reduction. The main processing building could be redesigned with careful consideration of the number of floors, the footprint of the building and the requirements for key passenger processing areas and back-office.

We would consider a terminal designed to operate at a space planning factor of 30 sqm/DHP, comparable to today's terminals at Gatwick Airport, as the lower end of space provision for a major international airport terminal, but appropriate for and potentially more aligned with the business case requirements of a low cost carrier, short-haul, point-to-point operation.

Secondly, as for the 2R scheme above, the proposed ATC tower could be replaced with a remote facility fulfilling the same role.

Finally, the last cost reduction identified would consider acquiring only the minimum land necessary for the operation of the scheme – the layout and land acquisition requirement of the NWR scheme would in certain aspects be more comparable with the layout and acquisition requirement of the ENR scheme. Following a similar approach to the ENR scheme, this scope reduction would implicitly assume that other parties would develop ancillary operations (for example, maintenance hangars, cargo facilities), but that the acquisition of the land necessary for these developments would not be an element of the NWR scheme.

Figure 4-1 shows the terminal space planning factor (square metres (sqm) of space per Design Hour Passenger (DHP)) for a sample of international airports including Heathrow with the NWR scheme built. It shows two phases of the NWR scheme with the construction of T6 (combined with the closure of T3) followed by the full expansion of T2 and its satellites.

This illustrates how Heathrow compares to these airports as it develops the NWR scheme under the base case (the grey trend line) or alternatively the reduced scope scenario (the purple trend line). It is currently broadly comparable to a number of

European international hub airports illustrated and remains so under the reduced scope scenario, albeit with a reduced average space planning factor.

In practice, it is expected that the eventual specification, which is a key determinant of cost, will be determined with the active involvement of a range of stakeholders including the airport operator, airlines, and the regulator. A key matter for discussion would be how terminals with significantly different space planning factors might best meet airline and passenger requirements.

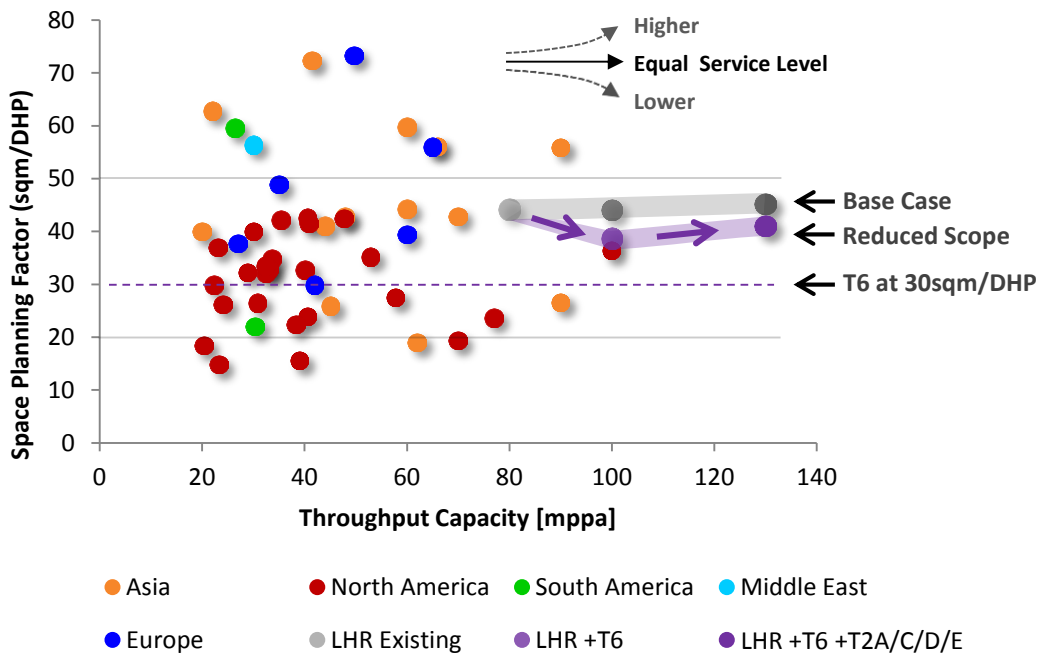


Figure 4-1 Space Planning Factor for Airports with more than 20 mppa, Showing All Phases of the Commission’s Heathrow Airport NWR Scheme

In addition to the identified opportunities to reduce the scope of the scheme, there are opportunities to reduce the cost of the following categories:

- *Stands*
- *Terminal and satellite*
- *Fixed links, nodes and boarding bridges*
- *Airside and landside Automated People Mover (APM)*
- *Baggage handling system*

The cost reductions set out below will result in some compromise to the passenger experience delivered as a result of the lower specification of terminal fit-out and equipment. They may also result in compromise to the flexibility of aircraft stand usage and to air quality.

Table 4-1 sets out the reduction in the cost for each work element unadjusted for on-costs (project fees, enabling works, and operational readiness). Table 4-2 includes on-costs against the summary cost headings presented in Section 1.2. Note that on-costs are distributed across all summary cost headings in proportion to their contribution to the total cost. Therefore, the reduced scope Scheme cost results in a different distribution of on-costs resulting in minor variations to all cost headings, although the total reduction is consistent between the two tables. The tables are presented in £ millions, with minor rounding differences. For presentational purposes, minor adjustments due solely to redistribution of project-wide costs have not been presented in this table.

Cost Element £'million	Reduction in Project Scope	Cost Reduction	Reduction in Unit Rate	Cost Reduction	Total Cost Reduction
Enabling works and demolitions	No material opportunity for reduction as required for the scheme.	-	Rates considered reasonable with no material opportunity for reduction.	-	-
Runway, taxiway and aprons	No material opportunity for reduction as scope provided is necessary for the functionality of the scheme and airfield.	-	Rates considered reasonable with no material opportunity for reduction.	-	-
Stands	No material opportunity for reduction as scope provided is necessary for the functionality of the scheme and airfield.	-	A lower specification may be possible. This may affect flexibility of stand usage and might impact air quality in terms of APU usage. However, 10% reduction assumed possible.	20	20
Airfield instrumentation	No material opportunity for reduction as scope provided is necessary for the functionality of the scheme and airfield.	-	Rates considered reasonable with no material opportunity for reduction.	-	-
Air traffic control tower	Could be removed and replaced by a remote control room.	60	Not included within the scheme.	-	60
Other airfield ancillary works	With respect to a reduced potential land acquisition, the extent of land prepared for third-party users would be reduced. No other material opportunities for reduction considered appropriate as scope provided is necessary for the functionality of the scheme and airfield.	7	Rates considered reasonable with no material opportunity for reduction.	-	7
Terminal and satellite	Scope for reduction in size to provide a level of passenger service, as measured by the space planning factor, equivalent to the Gatwick Airport Second Runway scheme. Although the satellite is defined to a higher service standard than the 2R scheme, the greater width and functionality is considered to be required within this Heathrow scheme, therefore no scope for reduction in size of the satellite.	692	T6 and its satellite could be provided to a lower specification. Fixed elements may limit potential for reduction; however, a cost saving of 5% has been assumed. It is assumed that T2E would be provided to the same standard as other T2 satellites in line with agreements with tenant airlines.	85	777

Cost Element £'million	Reduction in Project Scope	Cost Reduction	Reduction in Unit Rate	Cost Reduction	Total Cost Reduction
Fixed links, nodes and boarding bridges	Even in the absence of boarding bridges, fixed links and nodes are required to enable passengers to access the apron level from the terminal. Although the number of contact stands served by boarding bridges could be reduced such a reduction is considered to have a significant detrimental impact on passenger service. No reduction has therefore been considered.	-	Could be provided to a lower specification, with an assumed cost saving of 10%.	21	21
Airside and landside APM	The removal of the APM would require replacement with a significant bussing operation which does not appear to be operationally practical and may have a negative air quality impact. No reduction has therefore been considered.	-	Could be provided to a lower specification, with an assumed cost saving of 10%.	23	23
Car parks	No material opportunity for reduction as required for the surface access strategy.	-	Rates considered reasonable with no material opportunity for reduction.	-	-
Power and utilities	No material opportunity for reduction as scope provided is necessary for the functionality of the scheme.	-	Rates considered reasonable with no material opportunity for reduction.	-	-
Baggage handling system	A substantial reduction in provision of the proposed baggage handling system is not considered to be feasible given the distance between T6 and its satellite and that its reduction would necessitate a vehicle solution with potentially significant negative air quality impact. No reduction has therefore been considered.	-	Could be provided to a lower specification, with an assumed cost saving of 10%.	73	73
Land	Land take could be reduced to a potential minimum. The reduction could represent between 15 and 20% of the total land acquisition required. Depending upon the valuation of the individual parcels, this reduction may be between £250 and £500 million. A reduction of £500 million, indicating the maximum likely extent, has been assumed.	500	Rates considered reasonable with no material opportunity for reduction.	-	500

Cost Element £'million	Reduction in Project Scope	Cost Reduction	Reduction in Unit Rate	Cost Reduction	Total Cost Reduction
Environment and community	No material opportunity for reduction as essential to the scheme.	-	Rates considered reasonable with no material opportunity for reduction.	-	-
Cost reduction		1,259		222	1,481
Cost reduction including project management and on-costs					1,703

Table 4-1 Scope and Unit Rate Reductions Excluding On-Costs, Risk and Optimism Bias (2014 prices, £'million)

Cost Heading £'million	Base Case	Reduction	Reduced Scope Scheme
Terminal buildings	3,481	828	2,654
Plant	730	85	645
Tunnels and bridges	-	-	-
Transit systems	1,232	22	1,210
Runways	182	-	185
Taxiways and aprons	642	15	627
Equipment	1,142	84	1,058
Land	2,882	601	2,281
Airfield ancillary	757	65	692
Car parks	579	-	579
Third party land users	91	7	84
Environment	668	-	668
Community	399	-	399
Sub-Total	12,785	1,703	11,083
Risk	2,557	341	2,217
Optimism bias	2,301	306	1,995
Total	17,644	2,350	15,294

Table 4-2 Impact of Scope and Rate Reductions Including On-Costs, Risk and Mitigated Optimism Bias (2014 prices, £'million)

Section 4.2 summarises the forecast reduced scope Scheme capital expenditure, by year, against each of the Airports Commission’s demand scenarios. The difference between the scenarios is the profile of expenditure required to deliver capacity in line with the differing demand requirements.

In summary, for each scenario, the reduced scope Scheme capital expenditure is as shown in Table 4-3 with mitigated optimism bias, presented in comparison with the base case cost estimate.

Scenario	£'million	
	Base Case	Reduced Scope
Assessment of Need Carbon Capped	17,644	15,294
Assessment of Need Carbon Traded	17,644	15,294
Low Cost is King Carbon Traded	17,644	15,294
Global Fragmentation Carbon Capped	17,644	15,294

Table 4-3 Total Reduced Scope Scheme Capital Expenditure by Demand Scenario Including On-Costs, Risk and Mitigated Optimism Bias (2014 prices, £'million)

4.2 Airports Commission Demand Scenarios

4.2.1 Assessment of Need Carbon Capped

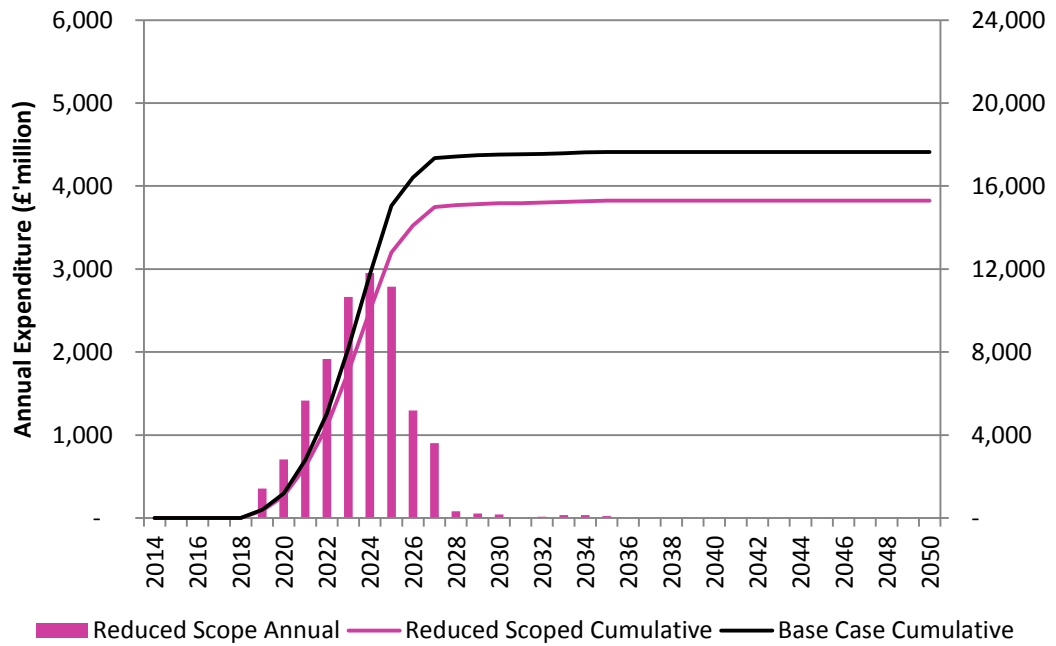


Figure 4-2 Assessment of Need Carbon Capped

4.2.2 Assessment of Need Carbon Traded

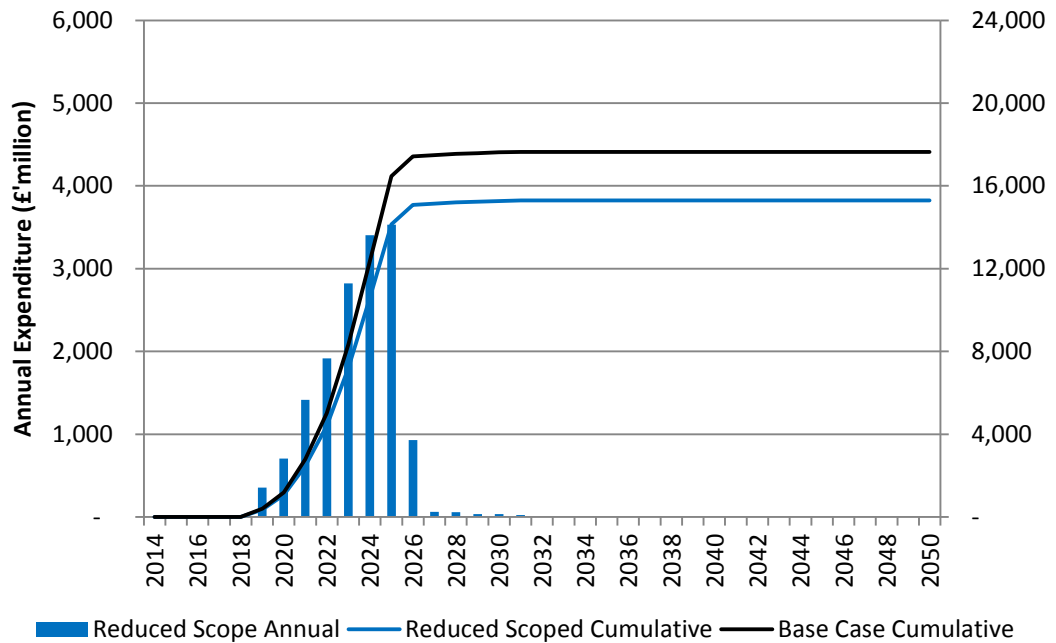


Figure 4-3 Assessment of Need Carbon Traded

4.2.3 Global Growth Carbon Traded

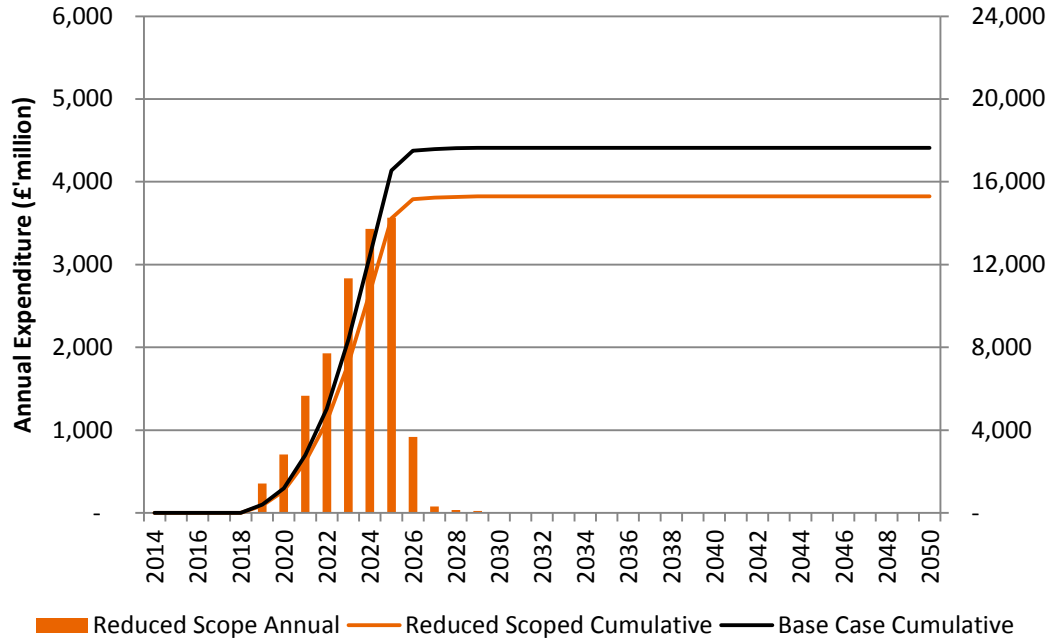


Figure 4-4 Global Growth Carbon Traded

4.2.4 Global Fragmentation Carbon Capped

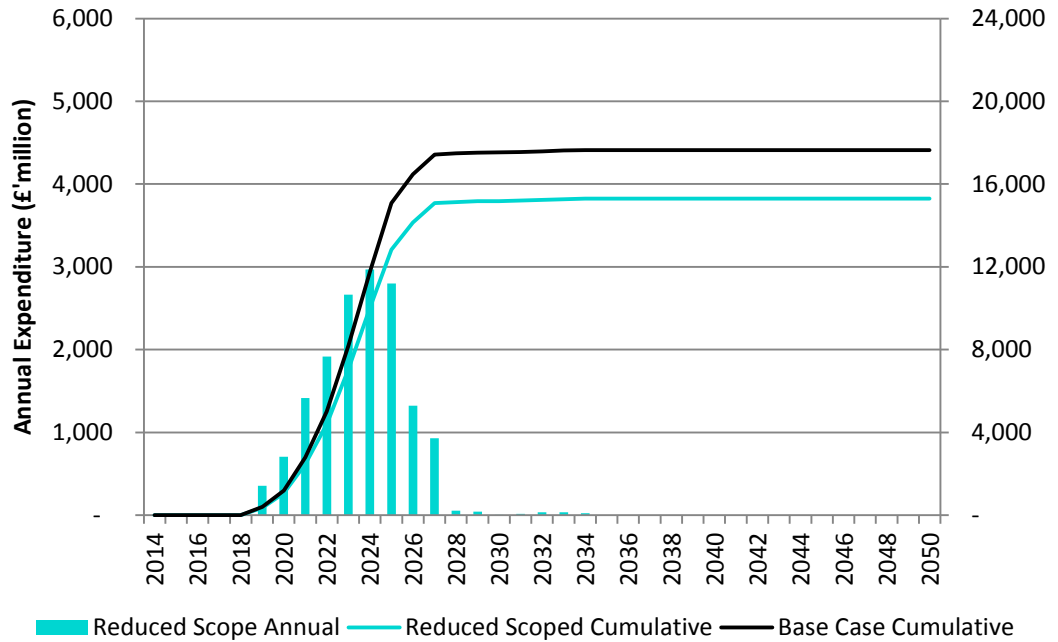


Figure 4-5 Global Fragmentation Carbon Capped

4.3 Annual Reduced Scope Scheme Capital Expenditure Summaries

The tables on the following pages present the data underlying the previous figures with mitigated optimism bias. These tables are based upon the detailed breakdown presented in Appendix C, but, for the purpose of enabling the assessment of depreciation, summarises the total expenditure into the headings as set out in Section 1.2.

2014 real prices in £million - including mitigated optimism bias

Reduced Scope	Total	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Terminal buildings	2,654	-	-	-	-	-	-	-	-	184	459	684	714	368	245	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Plant	645	-	-	-	-	-	18	35	70	91	121	129	114	41	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Tunnels and bridges	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Transit systems	1,210	-	-	-	-	-	6	13	26	110	237	327	314	106	70	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Runways	185	-	-	-	-	-	9	19	37	37	37	28	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Taxiways and aprons	627	-	-	-	-	-	21	42	83	83	83	73	84	94	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Equipment	1,058	-	-	-	-	-	-	-	-	55	138	219	267	227	152	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Land	2,281	-	-	-	-	-	114	228	456	456	456	342	228	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Airfield Ancillary	692	-	-	-	-	-	31	61	123	127	133	108	81	18	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Car Parks	579	-	-	-	-	-	-	-	-	15	36	58	83	86	84	60	40	30	4	13	26	26	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Third Party Land Users	84	-	-	-	-	-	4	8	17	17	17	13	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Environment	668	-	-	-	-	-	33	67	134	134	134	100	67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Community	399	-	-	-	-	-	20	40	80	80	80	60	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Optimism Bias	1,995	-	-	-	-	-	46	92	185	250	348	385	363	169	118	11	7	5	1	2	5	5	3	-	-	-	-	-	-	-	-	-	-	-	-	-		
Risk	2,217	-	-	-	-	-	51	103	205	278	386	428	404	188	131	12	8	6	1	3	5	5	3	-	-	-	-	-	-	-	-	-	-	-	-	-		
Total	15,294	-	-	-	-	-	354	708	1,415	1,915	2,666	2,953	2,786	1,296	901	83	56	42	6	18	36	36	24	-	-	-	-	-	-	-	-	-	-	-	-	-		

Table 4-4 Assessment of Need Carbon Capped

2014 real prices in £million - including mitigated optimism bias

Reduced Scope	Total	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Terminal buildings	2,654	-	-	-	-	-	-	-	-	184	500	806	919	245	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Plant	645	-	-	-	-	-	18	35	70	91	126	142	137	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Tunnels and bridges	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Transit systems	1,210	-	-	-	-	-	6	13	26	110	249	363	372	70	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Runways	185	-	-	-	-	-	9	19	37	37	37	28	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Taxiways and aprons	627	-	-	-	-	-	21	42	83	83	94	105	136	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Equipment	1,058	-	-	-	-	-	-	-	-	55	164	295	393	152	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Land	2,281	-	-	-	-	-	114	228	456	456	456	342	228	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Airfield Ancillary	692	-	-	-	-	-	31	61	123	127	134	113	91	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Car Parks	579	-	-	-	-	-	-	-	-	15	54	100	150	104	45	43	26	26	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Third Party Land Users	84	-	-	-	-	-	4	8	17	17	17	13	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Environment	668	-	-	-	-	-	33	67	134	134	134	100	67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Community	399	-	-	-	-	-	20	40	80	80	80	60	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Optimism Bias	1,995	-	-	-	-	-	46	92	185	250	368	444	461	121	8	8	5	5	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Risk	2,217	-	-	-	-	-	51	103	205	278	409	493	512	135	9	9	5	5	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Total	15,294	-	-	-	-	-	354	708	1,415	1,915	2,821	3,404	3,532	929	62	60	36	36	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		

Table 4-5 Assessment of Need Carbon Traded

2014 real prices in £million - including mitigated optimism bias

Reduced Scope	Total	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Terminal buildings	2,654	-	-	-	-	-	-	-	-	184	500	806	919	245	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Plant	645	-	-	-	-	-	18	35	70	91	126	142	137	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Tunnels and bridges	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Transit systems	1,210	-	-	-	-	-	6	13	26	110	249	363	372	70	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Runways	185	-	-	-	-	-	9	19	37	37	37	28	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Taxiways and aprons	627	-	-	-	-	-	21	42	83	83	94	105	136	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Equipment	1,058	-	-	-	-	-	-	-	-	55	164	295	393	152	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Land	2,281	-	-	-	-	-	114	228	456	456	456	342	228	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Airfield Ancillary	692	-	-	-	-	-	31	61	123	127	134	113	91	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Car Parks	579	-	-	-	-	-																																

2014 real prices in £million - including mitigated optimism bias

Reduced Scope	Total	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Terminal buildings	2,654	-	-	-	-	-	-	-	-	184	459	684	714	368	245	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Plant	645	-	-	-	-	-	18	35	70	91	121	129	114	41	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tunnels and bridges	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transit systems	1,210	-	-	-	-	-	6	13	26	110	237	327	314	106	70	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Runways	185	-	-	-	-	-	9	19	37	37	37	28	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Taxiways and aprons	627	-	-	-	-	-	21	42	83	83	83	73	84	94	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Equipment	1,058	-	-	-	-	-	-	-	-	55	138	219	267	227	152	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Land	2,281	-	-	-	-	-	114	228	456	456	456	342	228	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Airfield Ancillary	692	-	-	-	-	-	31	61	123	127	133	108	81	18	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Car Parks	579	-	-	-	-	-	-	-	-	15	36	68	93	106	104	40	30	4	13	26	26	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Third Party Land Users	84	-	-	-	-	-	4	8	17	17	13	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Environment	668	-	-	-	-	-	33	67	134	134	134	100	67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Community	399	-	-	-	-	-	20	40	80	80	80	60	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Optimism Bias	1,995	-	-	-	-	-	46	92	185	250	348	387	365	173	121	7	5	1	2	5	5	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Risk	2,217	-	-	-	-	-	51	103	205	278	386	430	406	192	135	8	6	1	3	5	5	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Total	15,294	-	-	-	-	-	354	708	1,415	1,915	2,666	2,967	2,800	1,324	929	56	42	6	18	36	36	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Table 4-7 Global Fragmentation Carbon Capped

Appendix A Glossary

2R	Second Runway
APM	Automatic People Mover
APU	Auxiliary power unit
Base case	Scheme before applying scope reductions
Core	Investment in the airport irrespective of investment in the additional runway works
ENR	Extended Northern Runway
GDP	Gross domestic product
NWR	Northwest Runway
Scheme	Investment in the additional runway works

Appendix B Optimism Bias

See relevant appendix in the *Cost and Commercial Viability: Cost and Revenue Identification Update* report.

Appendix C Reduced Scope Scheme Capital Cost Estimates Breakdown

The tables on the following pages set out the breakdown of the reduced scope Scheme costs for each scheme.

C.1 Gatwick Airport 2R

Ref No	Description	Quantity	Unit	Unit Rate	Total (£)
GAL	Gatwick Airport (Jacobs Estimate)				8,694,751,438
01.	Investment Costs				6,300,544,520
01.01.	Airport Infrastructure Construction				4,205,113,675
01.01.01.	Enabling Works				149,302,409
01.01.01.0001.	Site preparation comprising topsoil strip and breaking out existing landside roads and parking areas				45,248,193
01.01.01.0001.0010	Site strip of soft ground and remove to spoil for reuse	6,398,000	m2	3	17,146,640
01.01.01.0001.0020	Break up and disposal Staff car parks X, V, Z overflow, R G W J	40,611	m2	21	832,932
01.01.01.0001.0030	Break up and disposal Public car parks; Long stay zones A-G & U-Z, Holiday, Courtlands & Summer special, Coach park, Valet south, including access roads	577,000	m2	21	11,834,270
01.01.01.0001.0040	Break up and disposal of paved areas in City Place Area	155,170	m2	21	3,182,537
01.01.01.0001.0050	Break up and disposal of paved areas in Lowfield Heath Place Area	102,102	m2	21	2,094,112
01.01.01.0001.0060	Break up and disposal of paved areas in Gatwick Manor Place Area	8,580	m2	21	175,976
01.01.01.0001.0070	Break up and disposal of paved areas in BCP Airparks Area at west end - approx. 350mx125m	43,750	m2	21	897,313
01.01.01.0001.0080	Break up and disposal of paved areas in Gatwick Road North Area	26,100	m2	21	535,311
01.01.01.0001.0090	Break-out and dispose of existing A23 including all associated infrastructure, 3.6km	108,000	m2	21	2,215,080
01.01.01.0001.0100	Break-out and dispose of existing Charlwood Road, 950m	5,700	m2	21	116,907
01.01.01.0001.0110	Strip Balcombe Road from Radford Road to M23 spur road – Assumption – Allowance; 1800m	10,800	m2	21	221,508
01.01.01.0001.0120	Strip Steers Lane – 600m	3,720	m2	21	76,297
01.01.01.0001.0130	Strip Antlands Lane – 550m	4,400	m2	21	90,244
01.01.01.0001.0140	Strip Peeks Brook Lane – 1200m	7,200	m2	21	147,672
01.01.01.0001.0150	Strip Church Lane – 250m	1,500	m2	21	30,765
01.01.01.0001.0160	Strip Fernihill Road – 700m	4,200	m2	21	86,142
01.01.01.0001.0170	Strip Donkey Lane – 200m	206	m2	21	4,225
01.01.01.0001.0180	Strip Bonnets Lane – 1200m	12,000	m2	21	246,120
01.01.01.0001.0190	Strip out existing utilities beneath redundant road surfaces	15,736	m	53	827,714
01.01.01.0001.0200	Allowance for disposal of contaminated material off site comprising asphalt surfaces at 33% of the road thickness	100,796	m3	45	4,486,430
01.01.01.0001.0210	Site clearance		m2	21	
01.01.01.0002.	Demolitions - within GAL boundary				10,911,081
01.01.01.0002.0010	22018 NT LSCP Admin Building	1	sum	28,404	28,404
01.01.01.0002.0020	20603 NT LSCP Block Park Admin Building	1	sum	14,202	14,202
01.01.01.0002.0030	22085 Summer Special Admin Building	1	sum	18,936	18,936
01.01.01.0002.0040	41209 Viking House	1	sum	260,370	260,370
01.01.01.0002.0050	20020 Building 583A	1	sum	18,936	18,936
01.01.01.0002.0060	20021 Building 583B	1	sum	28,404	28,404
01.01.01.0002.0070	20023 Building 583C	1	sum	14,202	14,202
01.01.01.0002.0080	20025 Building 583D	1	sum	23,670	23,670
01.01.01.0002.0090	20534 Bomb Defusing Building	1	sum	2,367	2,367
01.01.01.0002.0100	41208 Tinsley House	1	sum	175,158	175,158
01.01.01.0002.0110	20063 New Engineering Stores	1	sum	94,680	94,680
01.01.01.0002.0120	20238 & 20062 Marco Workshop & Admin Building	1	sum	23,670	23,670
01.01.01.0002.0130	20706 Coached Departures Building	1	sum	246,168	246,168
01.01.01.0002.0140	20222 ST Sanitation Block	1	sum	4,734	4,734
01.01.01.0002.0150	20515 Sub-station J	1	sum	52,600	52,600
01.01.01.0002.0160	20266 Sub-station L	1	sum	52,600	52,600
01.01.01.0002.0170	20331 Sub-station H	1	sum	52,600	52,600
01.01.01.0002.0180	20591 Sub-station AS	1	sum	52,600	52,600
01.01.01.0002.0190	20230 Sub-station G	1	sum	52,600	52,600
01.01.01.0002.0200	20228 Sub-station E	1	sum	52,600	52,600
01.01.01.0002.0210	22020 Sub-station BTF (BE)	1	sum	52,600	52,600

Ref No	Description	Quantity	Unit	Unit Rate	Total (£)
01.01.01.0002.0220	22128 Pumping Station 07	1	sum	31,560	31,560
01.01.01.0002.0230	22127 Pumping Station 06	1	sum	31,560	31,560
01.01.01.0002.0240	22204 Pumping Station 45	1	sum	31,560	31,560
01.01.01.0002.0250	22199 Pumping Station 41	1	sum	31,560	31,560
01.01.01.0002.0260	2142 Pumping Station 25	1	sum	31,560	31,560
01.01.01.0002.0270	22201 Pumping Station 42	1	sum	31,560	31,560
01.01.01.0002.0280	20229 Pumping Station 24	1	sum	31,560	31,560
01.01.01.0002.0290	22143 Pumping Station 26	1	sum	31,560	31,560
01.01.01.0002.0300	22147 Pumping Station 33	1	sum	31,560	31,560
01.01.01.0002.0310	Allowance for power diversions during demolition, alterations and relocation of sub station	1	sum	9,205,000	9,205,000
01.01.01.0002.0320	Demolition of river gates	1	sum	78,900	78,900
01.01.01.0002.0330	Demolition of steel structure over inverted syphon	1	sum	21,040	21,040
01.01.01.0003.	Demolitions - outside of GAL boundary				26,774,452
01.01.01.0003.0010	Domestic properties on Radford Road	44	Nr	21,040	925,760
01.01.01.0003.0020	Domestic properties on Balcombe Road	43	Nr	21,040	904,720
01.01.01.0003.0030	Industrial properties on Antlands Road	1	sum	157,800	157,800
01.01.01.0003.0040	Domestic properties on Peeks Brook Lane	28	Nr	21,040	589,120
01.01.01.0003.0050	Industrial properties on Peeks Brook Lane	1	sum	315,600	315,600
01.01.01.0003.0060	Industrial properties on Balcombe Road	1	sum	52,600	52,600
01.01.01.0003.0070	Demolish existing APM structure from South Terminal to approximately 250m North	2,000	m2	526	1,052,000
01.01.01.0003.0080	Demolish existing South Terminal APM transit station	3,000	m2	158	473,400
01.01.01.0003.0090	Demolish existing South Terminal APM transit station walkway	600	m2	158	94,680
01.01.01.0003.0100	Office Buildings at City Place (Assume 4 levels)	1	sum	3,787,200	3,787,200
01.01.01.0003.0110	Industrial Buildings at City Place	1	sum	568,080	568,080
01.01.01.0003.0120	MSCP at City Place	1	sum	284,040	284,040
01.01.01.0003.0130	Industrial Buildings at Lowfield Heath	1	sum	2,840,400	2,840,400
01.01.01.0003.0140	Travel Lodge Hotel at Lowfield Heath	1	sum	473,400	473,400
01.01.01.0003.0150	BCP Airparks Buildings	1	sum	37,872	37,872
01.01.01.0003.0160	BCP Airparks MSCP	1	sum	1,893,600	1,893,600
01.01.01.0003.0170	Gatwick Manor Buildings and Premier Inn	1	sum	378,720	378,720
01.01.01.0003.0180	TUI building adjacent to Astral Towers	1	sum	710,100	710,100
01.01.01.0003.0190	Industrial Buildings Gatwick Road North	1	sum	4,734,000	4,734,000
01.01.01.0003.0200	Residential / Farm Properties	1	sum	1,052,000	1,052,000
01.01.01.0003.0210	Premier Inn in Balcombe Road	1	sum	189,360	189,360
01.01.01.0003.0220	Allowance for disconnections or temporary diversions in relation to demolished buildings	1	sum	5,260,000	5,260,000
01.01.01.0005.	Airfield other				66,368,683
01.01.01.0005.0010	Cut or excavation from stockpile and fill to make levels on new airfield	5,800,235	m3	4	24,883,008
01.01.01.0005.0020	Extra over for ground stabilisation; top 300mm mixed with Lime and Cement	2,191,281	m2	12	26,470,674
01.01.01.0005.0030	Landscaping	3,500,000	m2	4	15,015,000
01.01.02.	Airfield				802,147,013
01.01.02.0001.	Runway				51,281,155
01.01.02.0001.0010	Runway	204,000	m2	218	44,423,040
01.01.02.0001.0020	Runway shoulders	43,326	m2	114	4,922,700
01.01.02.0001.0030	Runway extension / modification	6,847	m2	261	1,789,258
01.01.02.0001.0040	Runway shoulders	1,072	m2	136	146,156
01.01.02.0002.	Taxiways & Aprons				521,601,880
01.01.02.0002.0010	Taxiways	769,000	m2	292	224,755,630
01.01.02.0002.0020	End Around Taxiway (EAT's) Western end	67,000	m2	276	18,502,050
01.01.02.0002.0030	Head of Stand roads and footway	109,000	m2	167	18,174,660
01.01.02.0002.0040	Rapid exit taxiway	130,000	m2	321	41,776,800
01.01.02.0002.0050	Rapid access taxiway	77,000	m2	330	25,382,280
01.01.02.0002.0060	Runway crossing	26,000	m2	420	10,927,800
01.01.02.0002.0070	Apron to new aircraft maintenance units	36,000	m2	263	9,468,000
01.01.02.0002.0080	Code C Taxi lanes	91,000	m2	343	31,227,560
01.01.02.0002.0090	Code E Taxi lanes	282,000	m2	316	88,999,200
01.01.02.0002.0100	GSE Parking Areas	167,000	m2	314	52,387,900

Ref No	Description	Quantity	Unit	Unit Rate	Total (£)
01.01.02.0003.	Stands				181,482,080
01.01.02.0003.0010	Code C - Midfield	156,000	m2	365	56,890,080
01.01.02.0003.0020	Code E and F (MARS), Midfield	325,000	m2	383	124,592,000
01.01.02.0004.	Airfield instrumentation				47,781,898
01.01.02.0004.0010	Instrument Landing System (ILS) comprising 1nr localiser and 1nr glide path	4	Nr	2,445,900	9,783,600
01.01.02.0004.0020	Fibre link from MLS to new control tower	1	sum	526,000	526,000
01.01.02.0004.0030	Distance Measuring Equipment (DME)	1	Nr	3,534,720	3,534,720
01.01.02.0004.0040	Surface Movement Radar	1	Nr	4,439,440	4,439,440
01.01.02.0004.0050	Instrumented Runway Visual Range (IRVR)	4	Nr	326,120	1,304,480
01.01.02.0004.0060	VHF Receiver Aerial	1	Nr	631,200	631,200
01.01.02.0004.0070	Digitally Resolved Direction Finder	1	Nr	3,156,000	3,156,000
01.01.02.0004.0080	Landing lighting set, end of runway	3	Nr	3,261,200	9,783,600
	Runway and taxiway lighting	2,437,143	m2	6	14,622,858
01.01.03.	Airfield Ancillary Facilities				130,254,042
01.01.03.0001.	Air Traffic Control				11,140,680
01.01.03.0001.0010	Control Tower and ATC Facilities; height 46m		sum	Descoping sensitivity	0
01.01.03.0001.0050	Apron Control Centre	5,000	m2	1,262	6,312,000
01.01.03.0001.0090	Airfield Operations building	1,500	m2	3,219	4,828,680
01.01.03.0002.	Security				15,234,897
01.01.03.0002.0010	Remove existing perimeter RZ fencing	5,190	m	26	136,497
01.01.03.0002.0020	New perimeter RZ fencing	10,164	m	600	6,098,400
01.01.03.0002.0030	External Security gate / control point	3	Nr	3,000,000	9,000,000
01.01.03.0003.	Rescue & Fire Fighting				4,734,000
01.01.03.0003.0040	Fire Crash & Rescue (FCR) station	2,500	m2	1,894	4,734,000
01.01.03.0004.	Fuel Systems				0
01.01.03.0005.	De-icing & Snow Clearance				29,317,850
01.01.03.0005.0030	De-icing facility	1	sum	24,000,000	24,000,000
01.01.03.0005.0040	New Mid-Field Snow Base	2,500	m2	2,127	5,317,850
01.01.03.0006.	Serviced areas for ancillary facilities e.g. Hotels, Offices, Cargo Buildings, Hangars, etc				18,263,300
01.01.03.0006.0080	Serviced areas for ancillary facilities e.g. Hotels, Offices, Cargo Buildings, Hangars, etc	182,633	m2	100	18,263,300
01.01.03.0007.	Surface Water Drainage				33,845,218
01.01.03.0007.0010	Drainage	2,191,281	m2	5	10,583,887
01.01.03.0007.0020	Replacement of pumping stations	9	Nr	526,000	4,734,000
01.01.03.0007.0030	NW Zone balancing ponds for clean and contaminated; 564,500m3 capacity	1	sum	10,520,000	10,520,000
01.01.03.0007.0040	Gravity main connection connecting to network for Pond D and TWSTP	800	m	126	100,992
01.01.03.0007.0050	Underground attenuation at east side, 144,000m3 capacity	1	sum	6,854,339	6,854,339
01.01.03.0007.0060	Water quality monitoring station	1	sum	1,052,000	1,052,000
01.01.03.0008.	Noise control				17,718,097
01.01.03.0008.0010	Concrete Noise Wall	308	m	6,312	1,944,096
01.01.03.0008.0020	Earth bund	2,849	m	5,537	15,774,001
01.01.04.	Terminal Buildings				1,931,298,781
01.01.04.0001.	Terminals				1,010,433,364
01.01.04.0001.0010	New Terminal		m2	Descoping sensitivity	994,456,006
01.01.04.0001.0020	New Terminal - fitout ONLY		m2	Descoping sensitivity	15,977,358
01.01.04.0001.0030	Remote Pier (temporary facility)		m2	2,893	0
01.01.04.0002.	Piers & Satellites				797,445,405
01.01.04.0002.0010	Contact Pier		m2	Descoping sensitivity	245,499,331
01.01.04.0002.0020	Remote Pier		m2	Descoping sensitivity	551,946,074
01.01.04.0003.	Fixed Links, VCC, Rotunda/Nodes, PCA and Airbridges				123,420,013
01.01.04.0003.0030	Fixed links	67	Nr	368,200	24,669,400
01.01.04.0003.0040	Nodes (Rotunda)	67	Nr	731,994	49,043,613
01.01.04.0003.0050	Passenger Boarding Bridge (PBB)		Nr	Descoping sensitivity	49,707,000
01.01.05.	Airside Infrastructure				384,215,481
01.01.05.0001.	Access Roads				30,490,546
01.01.05.0001.0010	Airside Roads	5,000	m	4,000	20,000,000

Ref No	Description	Quantity	Unit	Unit Rate	Total (£)
01.01.05.0001.0020	Airside Roads - Perimeter Security Road	10,450	m	1,004	10,490,546
01.01.05.0010.	Airside APM				353,724,935
	Sub-surface APM New Terminal and Remote Pier				
01.01.05.0010.0010	Cut and cover tunnel, excluding fit out	1,855	m	30,929	57,372,924
01.01.05.0010.0020	Guideway system and fit out			Descoping sensitivity	71,657,611
	Station construction	2	Nr	50,000,000	100,000,000
01.01.05.0010.0030	Station fit out		Nr	Descoping sensitivity	54,000,000
01.01.05.0010.0040	Sub-surface maintenance facility remote pier	1	sum	25,248,000	25,248,000
01.01.05.0010.0050	Rolling stock; 4 cars each per set		each	Descoping sensitivity	45,446,400
01.01.06.	Landside Infrastructure				529,326,349
01.01.06.0001.	Landside APM - Continuous system from NT to MFT				162,751,571
	North Terminal to South Terminal				
01.01.06.0001.0010	Extend existing NT Transit station to accommodate new train length	270	m2	4,208	1,136,160
01.01.06.0001.0020	Upgrade existing retained station systems	1	Nr	1,683,200	1,683,200
01.01.06.0001.0030	Upgrade existing retained guidance system	1,070	m	11,572	12,382,040
01.01.06.0001.0040	New sub-structure supports	5	Nr	105,200	526,000
01.01.06.0001.0050	Realign existing bridge deck units to new continuous APM alignment	1	sum	526,000	526,000
	South Terminal to Mid-field Terminal				
01.01.06.0001.0060	New elevated APM guideway connecting new Terminal to South Terminal	500	m	29,231	14,615,285
01.01.06.0001.0070	New at grade APM guideway connecting existing system North of ST to new Terminal	1,400	m	6,733	9,425,920
01.01.06.0001.0080	Guideway system and fit out		m	Descoping sensitivity	56,665,980
01.01.06.0001.0090	VCC ST Railway Station to APM ST Station: Lifts	6	Nr	263,000	1,578,000
01.01.06.0001.0100	VCC ST Railway Station to APM ST Station: Escalators	6	Nr	105,200	631,200
01.01.06.0001.0110	New APM Station, 75m x 18m = 1,350m2 each	2	Nr	5,680,800	11,361,600
01.01.06.0001.0120	Station fit out		Nr	Descoping sensitivity	12,454,586
01.01.06.0001.0130	Rolling stock; 4 cars each per set		Nr	Descoping sensitivity	39,765,600
01.01.06.0002.	Car Parks				144,055,620
01.01.06.0002.0010	Car Park - Surface Parking	49,350	Spaces	1,578	77,874,300
01.01.06.0002.0020	Car Park - Surface Parking - EO for Decking	5,520	Spaces	526	2,903,520
01.01.06.0002.0030	Multi Storey Car Park	3,500	Spaces	12,624	44,184,000
01.01.06.0002.0040	Staff car parking - replacement of X, V, Z OVERFLOW, R, G, W, & J	12,100	Spaces	1,578	19,093,800
01.01.06.0003.	Power Generation				84,160,000
01.01.06.0003.0010	New Energy Centre, 37MW	1	sum	52,600,000	52,600,000
01.01.06.0003.0020	Anaerobic Digestion Plant	1	sum	21,040,000	21,040,000
01.01.06.0003.0030	District Heating Pipework from Energy Centre to New Midfield Terminal and Satellite, including service tunnel below railway line	1	sum	10,520,000	10,520,000
01.01.06.0004.	Utilities				41,238,400
01.01.06.0004.0010	Upgrade sub station AF	1	sum	10,520,000	10,520,000
01.01.06.0004.0020	Upgrade sub station BF	1	sum	12,624,000	12,624,000
01.01.06.0004.0030	Water provision to new terminal	1	sum	1,052,000	1,052,000
01.01.06.0004.0040	Reinstatement of electrical capacity previously handed back to UKPN	1	sum	12,624,000	12,624,000
01.01.06.0004.0050	Gas connection to site and on site distribution to new terminal	1	sum	1,052,000	1,052,000
01.01.06.0004.0060	Telecoms to new terminal	1	sum	1,052,000	1,052,000
01.01.06.0004.0070	Alterations to existing sub-stations	1	sum	210,400	210,400
01.01.06.0004.0080	Foul drainage network from New Terminal and Piers to Thames Water WwTW East of Railway	1	sum	2,104,000	2,104,000
01.01.06.0006.	Airport Roads (GAL)				10,772,480
01.01.06.0006.0010	Landside Road Tunnels - car park connections beneath A23	2	Nr	3,682,000	7,364,000
01.01.06.0006.0020	Services road to New Terminal	1,800	m2	1,894	3,408,480
01.01.06.0007.	Facilities				31,328,560
01.01.06.0007.0010	Public transport interchange (PTI)	1	sum	13,150,000	13,150,000
01.01.06.0007.0020	Landside / Airside vehicle control point	3	Nr	1,052,000	3,156,000
01.01.06.0007.0030	Transport Maintenance Base	1,500	m2	1,473	2,209,200
01.01.06.0007.0040	Taxi Feeder	1,500	m2	126	189,360

Ref No	Description	Quantity	Unit	Unit Rate	Total (£)
01.01.06.0007.0050	ST Consolidated Car Rental Facility	1,000	Spaces	12,624	12,624,000
01.01.06.0008.	Principle Water Course Permanent Diversions				55,019,718
01.01.06.0008.0010	Water Courses - Crawters Brook	2,551	m	4,301	10,970,780
01.01.06.0008.0020	Water Courses - River Mole	3,700	m	7,408	27,410,266
01.01.06.0008.0030	Allowance for structural shoulders	1	sum	526,000	526,000
01.01.06.0008.0040	Re-use of excavated material to infill disused river beds	47,700	m3	2.1	100,170
01.01.06.0008.0050	Allowance for habitat reprovisions	1	sum	2,104,000	2,104,000
01.01.06.0008.0060	Allowance for contribution to lfield Lake project	1	sum	5,260,000	5,260,000
01.01.06.0008.0070	Disposal of excavated material off site surplus to requirement; assume inert	818,061	m3	11	8,606,002
01.01.06.0008.0080	Stop-off ends of existing River Mole Culvert	12	m2	473	5,681
01.01.06.0008.0090	Filling shaft to inverted syphon	500	m3	74	36,820
01.01.07.	Equipment				217,553,600
01.01.07.0001.	De-icing & Snow Clearance Equipment				6,312,000
01.01.07.0001.0010	Snow clearing and de-icing plant	15	Nr	420,800	6,312,000
01.01.07.0002.	Rescue & Fire Fighting				2,945,600
01.01.07.0002.0020	Fire Engines	8	Nr	368,200	2,945,600
01.01.07.0003.	Baggage Handling Systems				208,296,000
01.01.07.0003.0010	Centralised baggage handling system - Mid Field	1	sum	Descoping sensitivity	208,296,000
01.01.08.	Operational Commissioning				39,976,000
01.01.08.0001.	M&E services				18,410,000
01.01.08.0001.0010	Comprising: Electrical, Mechanical, Comms & Operations	1	sum	18,410,000	18,410,000
01.01.08.0002.	Airfield				4,208,000
01.01.08.0002.0010	Comprising: Runway, Taxi ways & Stands	1	sum	4,208,000	4,208,000
01.01.08.0003.	Baggage				2,104,000
01.01.08.0003.0010	Comprising: Automated BHS & Operations	1	sum	2,104,000	2,104,000
01.01.08.0004.	APM				1,052,000
01.01.08.0004.0010	Comprising: APM airside & APM landside	1	sum	1,052,000	1,052,000
01.01.08.0005.	Passenger flow and security				3,682,000
01.01.08.0005.0010	Comprising: Terminal & Piers	1	sum	3,682,000	3,682,000
01.01.08.0006.	Flight systems				10,520,000
01.01.08.0006.0010	Comprising: Network testing by GAL & Third party ICS testing	1	sum	10,520,000	10,520,000
01.01.09.	Operational Handover				21,040,000
01.01.09.0001.	Proving trials by area				21,040,000
01.01.09.0001.0010	BHS, Terminals, Piers, Aprons & Runway	1	sum	21,040,000	21,040,000
01.02.	Purchase of Land & Existing Infrastructure				877,740,930
01.02.01.	Purchase of Land & Existing Infrastructure				877,740,930
01.02.01.0001.	Land Purchase				846,023,130
01.02.01.0001.0010	PCE, as advised by Deloitte	1	sum	846,023,130	846,023,130
01.02.01.0009.	Reprovision of removed facilities				31,717,800
01.02.01.0009.0010	22018 NT LSCP Admin Building	1	sum	1,136,160	1,136,160
01.02.01.0009.0020	20603 NT LSCP Block Park Admin Building	1	sum	568,080	568,080
01.02.01.0009.0030	22085 Summer Special Admin Building	1	sum	757,440	757,440
01.02.01.0009.0040	20020 Building 583A	1	sum	757,440	757,440
01.02.01.0009.0050	20021 Building 583B	1	sum	1,136,160	1,136,160
01.02.01.0009.0060	20023 Building 583C	1	sum	568,080	568,080
01.02.01.0009.0070	20025 Building 583D	1	sum	946,800	946,800
01.02.01.0009.0080	41208 Tinsley House	1	sum	7,006,320	7,006,320
01.02.01.0009.0090	20063 New Engineering Stores	1	sum	3,787,200	3,787,200
01.02.01.0009.0100	20238 & 20062 Marco Workshop & Admin Building	1	sum	946,800	946,800
01.02.01.0009.0110	20706 Coached Departures Building	1	sum	9,846,720	9,846,720
01.02.01.0009.0120	20222 ST Sanitation Block	1	sum	1,052,000	1,052,000
01.02.01.0009.0130	20515 Sub-station J	1	sum	157,800	157,800
01.02.01.0009.0140	20266 Sub-station L	1	sum	1,209,800	1,209,800
01.02.01.0009.0150	20331 Sub-station H	1	sum	157,800	157,800
01.02.01.0009.0160	20591 Sub-station AS	1	sum	157,800	157,800
01.02.01.0009.0170	20230 Sub-station G	1	sum	1,209,800	1,209,800
01.02.01.0009.0180	20228 Sub-station E	1	sum	157,800	157,800
01.02.01.0009.0190	22020 Sub-station BTF (BE)	1	sum	157,800	157,800

Ref No	Description	Quantity	Unit	Unit Rate	Total (£)
01.04.	Environmental Compensation & Mitigation				274,086,855
01.04.01.	Environmental Compensation & Mitigation				274,086,855
01.04.01.0001.	Environmental Compensation & Mitigation				250,000,000
01.04.01.0001.0010	Environmental Compensation & Mitigation	1	sum	250,000,000	250,000,000
01.04.01.0007.	Archaeology/ Ecology / Heritage				5,786,000
01.04.01.0007.0010	Archaeology	1	sum	2,104,000	2,104,000
01.04.01.0007.0020	Ecology	1	sum	2,630,000	2,630,000
01.04.01.0007.0030	Architectural Heritage	1	sum	1,052,000	1,052,000
01.04.01.0008.	Obstacle clearances				18,300,855
01.04.01.0008.0010	High trees for new flight path outside of land take	1	sum	526,000	526,000
01.04.01.0008.0020	Removal of Feeder Park wood	23,400	m2	5	123,084
01.04.01.0008.0030	Removal The Grove wood	9,350	m2	5	49,181
01.04.01.0008.0040	Removal Horleyland wood	90,000	m2	5	473,400
01.04.01.0008.0050	Removal Allens wood	85,100	m2	5	447,626
01.04.01.0008.0060	Removal Furze Fields wood	68,000	m2	5	357,680
01.04.01.0008.0070	Allowance for re provision of woodland at 2 times the area removed	1,051,700	m2	11	11,063,884
01.04.01.0008.0080	Allowance for other heritage and nature conservation	1	sum	5,260,000	5,260,000
01.05.	Community Impacts				121,792,905
01.05.01.	Community Impacts				121,792,905
01.05.01.0001.	Compensation/Blight				25,460,168
01.05.01.0001.0010	HoSS, as per Deloitte report	1	sum	2,076,200	2,076,200
01.05.01.0001.0020	Allowance for Blight, Property Market Bond Scheme, etc.	1	sum	23,383,968	23,383,968
01.05.01.0002.	Levies & 106 Agreements				61,332,737
01.05.01.0002.0010	Section 106 & 278	1	sum	44,053,398	44,053,398
01.05.01.0002.0020	Section 60	1	sum	11,013,349	11,013,349
01.05.01.0002.0030	Building regulations and planning control	1	sum	6,265,990	6,265,990
01.05.01.0003.	Other Community				35,000,000
01.05.01.0003.0010	Other Community	1	sum	35,000,000	35,000,000
01.06.	Project / Design Team Fees				821,810,155
01.06.01.	Project / Design Team Fees				821,810,155
01.06.01.0001.	Project Team Fees	15%			821,810,155
01.06.01.0001.0010	Project / Design Team Fees on 01.01				630,767,051
01.06.01.0001.0020	Project / Design Team Fees on 01.02				131,661,140
01.06.01.0001.0030	Project / Design Team Fees on 01.03				0
01.06.01.0001.0040	Project / Design Team Fees on 01.04				41,113,028
01.06.01.0001.0050	Project / Design Team Fees on 01.05				18,268,936
03.	Risks & Optimism Bias				2,394,206,918
03.01.	Risks (Design, Construction & Employer Risk)				1,260,108,904
03.01.01.	Risks (Design, Construction & Employer Risk)				1,260,108,904
03.01.01.0001.	Risks (Design, Construction & Employer Risk)	20%			1,260,108,904
03.01.01.0001.0010	Risk Contingency on 01.01				967,176,145
03.01.01.0001.0020	Risk Contingency on 01.02				201,880,414
03.01.01.0001.0030	Risk Contingency on 01.03				0
03.01.01.0001.0040	Risk Contingency on 01.04				63,039,977
03.01.01.0001.0050	Risk Contingency on 01.05				28,012,368
03.02.	Optimism Bias				1,134,098,014
03.02.01.	Optimism Bias				1,134,098,014
03.02.01.0001.	Optimism Bias	15%			1,134,098,014
03.02.01.0001.0010	Optimism Bias on 01.01				870,458,531
03.02.01.0001.0020	Optimism Bias on 01.02				181,692,373
03.02.01.0001.0030	Optimism Bias on 01.03				0
03.02.01.0001.0040	Optimism Bias on 01.04				56,735,979
03.02.01.0001.0050	Optimism Bias on 01.05				25,211,131

C.2 Heathrow Airport ENR

Ref No	Description	Quantity	Unit	Unit Rate	Total (£)
HHL	Heathrow Hub (Jacobs Estimate)				12,953,116,735
01.	Investment Costs				12,953,116,735
01.01.	Airport Infrastructure Construction				6,996,987,338
01.01.01.	Enabling Works				1,064,784,817
01.01.01.0001.	Advanced Enabling Works, Clearing Site and Preparation				1,064,784,817
01.01.01.0001.0010	Site clearance	358.16	ha	156,326.82	55,990,201
01.01.01.0001.0020	Demolition / Enabling works	0.91		170,612,244.90	154,456,920
01.01.01.0001.0030	Remediation works	192.79	ha	454,974.30	87,714,495
01.01.01.0001.0040	Ground stabilisation works				
01.01.01.0001.0050	Earthworks, cut, fill, grading of imported fill	21,903,520.00	m3	35.00	766,623,200
01.01.01.0002.	Landscaping				0
01.01.01.0002.0120	Grassed Areas & carriage drainage		m2		
01.01.01.0002.0130	Landscaping		m2		
01.01.02.	Airfield				535,570,161
01.01.02.0001.	Runway				81,630,792
01.01.02.0001.0010	Runway including shoulders	221,600.00	m2	368.37	81,630,792
01.01.02.0002.	Taxiways & Aprons				210,766,948
01.01.02.0002.0030	Parallel Taxiway Links, Rapid Exit Taxiway (RETs), Taxiway Hold incl. fillets to support new runways.	185,576.00	m2	368.37	68,360,631
01.01.02.0002.0040	Taxiway shoulders	386,585.00	m2	368.37	142,406,316
01.01.02.0003.	Stands				198,651,701
01.01.02.0003.0050	Stands		m2	Descoping sensitivity	198,651,701
01.01.02.0004.	Airfield Instrumentation				44,520,720
01.01.02.0004.0120	Navigational Equipment / Lighting	1,463,053.58	m2	30.43	44,520,720
01.01.03.	Airfield Ancillary Facilities				203,787,733
01.01.03.0001.	Air Traffic Control				
01.01.03.0002.	Security				18,579,184
01.01.03.0002.0090	Fencing and CCTV to Terminal Area	7,700.00	m	600.00	4,620,000
01.01.03.0002.0100	Police Facilities	0.00	item	15,300,000.00	0
01.01.03.0002.0110	Control posts	1.00	item	13,959,183.67	13,959,184
01.01.03.0003.	Rescue and Fire Fighting				3,060,000
01.01.03.0003.0030	Fire Station	1.00	Nr	3,060,000.00	3,060,000
01.01.03.0004.	Fuel Systems				49,219,049
01.01.03.0004.0060	Fuel Farm	7.00	Nr	7,031,292.78	49,219,049
01.01.03.0004.0070	Diversion of existing fuel line	0.00	m	2,040.00	0
01.01.03.0005.	De-icing & Snow Clearance				20,000,000
01.01.03.0005.0050	De-icing pads	1.00	item	20,000,000.00	20,000,000
01.01.03.0006.	Serviced areas for ancillary facilities e.g. Hotels, Offices, Cargo Buildings, Hangars, etc				34,969,500
01.01.03.0006.0010	Serviced areas for ancillary facilities e.g. Hotels, Offices, Cargo Buildings, Hangars, etc	349,695.00	m2	100.00	34,969,500
01.01.03.0007.	Surface Water Drainage				29,160,000
01.01.03.0007.0030	Balancing Ponds incl. equipment, pumping, controls * instrumentation, oil interceptors, pipework, etc	97.20	ha	300,000.00	29,160,000
01.01.03.0008.	Noise Control Measures				48,800,000
01.01.03.0008.0080	Noise walls	4,800.00	m	6,000.00	28,800,000
01.01.03.0008.0090	Boundary Treatment - Environmental bund	4,000.00	m	5,000.00	20,000,000
01.01.04.	Terminal Buildings				2,531,350,792
01.01.04.0001.	Terminals				803,043,339
01.01.04.0001.0010	T6 Terminal building, Substructure		m2	Descoping sensitivity	124,382,596
01.01.04.0001.0020	T6 Terminal building, Superstructure		m2	Descoping sensitivity	234,383,024
01.01.04.0001.0030	T6 Terminal building, Fit Out		m2	Descoping sensitivity	444,277,719
01.01.04.0002.	Piers & Satellites				1,556,489,272
01.01.04.0002.0010	Satellite Substructure		m2	Descoping sensitivity	135,354,002
01.01.04.0002.0020	Satellite Superstructure		m2	Descoping sensitivity	409,915,634
01.01.04.0002.0030	Satellite Fit Out		m2	Descoping sensitivity	283,014,701
01.01.04.0002.0040	T2E Satellite	21,780.00	m2	33,434.57	728,204,935
01.01.04.0002.0050	T2D Satellite	0.00	m2	33,434.57	0
01.01.04.0002.0060	T2C Satellite	0.00	m2	33,434.57	0
01.01.04.0002.0070	T2A Phase 2	0.00	m2	33,434.57	0
01.01.04.0002.0080	T2A Phase 3	0.00	m2	33,434.57	0

Ref No	Description	Quantity	Unit	Unit Rate	Total (£)
01.01.04.0003.	Fixed Links, VCC, Rotunda/Nodes, PCA and Airbridges				171,818,182
01.01.04.0003.0030	VCC, Airbridge, PCA, nodes and fixed links to new stands		Nr	Descoping sensitivity	171,818,182
01.01.05.	Airside Infrastructure				1,059,644,148
01.01.05.0001.	Access Roads				112,697,250
01.01.05.0001.0010	Service / Circulatory roads within airport	5,000.00	m	4,080.00	20,400,000
01.01.05.0001.0070	Airside roads, perimeter track (actually access road)	103,250.00	m2	153.00	15,797,250
01.01.05.0001.0080	Airside Road - C&C Tunnel	1,000.00	m	76,500.00	76,500,000
01.01.05.0002.	Baggage Tunnels				125,409,972
01.01.05.0002.0040	Baggage Tunnels Civils	1,200.00	m	30,864.14	37,036,968
01.01.05.0002.0050	Baggage Tunnels Fit Out	1,200.00	m	73,644.17	88,373,004
01.01.05.0003.	TTS Tunnels				213,288,762
01.01.05.0003.0010	TTS - Tunnel Civils	2,600.00	m	57,855.52	150,424,352
01.01.05.0003.0020	TTS - System and Fit-out		m	Descoping sensitivity	51,848,410
01.01.05.0003.0070	Additional TTS Cars		Nr	Descoping sensitivity	11,016,000
01.01.05.0004.	TTS Station / Depot				608,248,165
01.01.05.0004.0030	TTS Station	1.20	Nr	296,761,906.00	356,114,287
01.01.05.0004.0060	TTS Station Fit Out		sum	Descoping sensitivity	116,419,592
01.01.05.0004.0070	TTS Maintenance Base Substructure	1.00	sum	103,142,857.14	103,142,857
01.01.05.0004.0080	TTS Maintenance Base Fit Out	1.00	sum	32,571,428.57	32,571,429
01.01.05.0005.	Facilities				0
01.01.05.0005.0070	Coaching Facility - Terminal		item	3,876,000.00	0
01.01.06.	Landside Infrastructure				802,376,217
01.01.06.0001.	Connectivity				25,000,000
01.01.06.0001.0040	Landside connectivity systems	1.00	sum	25,000,000.00	25,000,000
01.01.06.0002.	Car Parks				500,204,082
01.01.06.0002.0020	Car Park - Surface & Multi Storey Parking	1.00	sum	500,204,081.63	500,204,082
01.01.06.0003.	Power Generation				0
01.01.06.0003.0020	Energy and Infrastructure	1.00	sum	0.00	0
01.01.06.0004.	Utilities				172,163,265
01.01.06.0004.0030	Utilities	1.00	sum	172,163,265.31	172,163,265
01.01.06.0005.	River Diversion / Culverts				105,008,870
01.01.06.0005.0020	Culverts	1.00	sum	28,460,347.83	28,460,348
01.01.06.0005.0030	Waterways	1.00	sum	76,548,521.74	76,548,522
01.01.07.	Equipment				656,779,592
01.01.07.0001.	De-icing & Snow Clearance Equipment				
01.01.07.0002.	Rescue & Fire Fighting				
01.01.07.0003.	Baggage Handling Systems				656,779,592
01.01.07.0003.0010	Baggage Equipment Terminal		sum	Descoping sensitivity	269,412,245
01.01.07.0003.0050	Baggage Equipment Satellite		sum	Descoping sensitivity	387,367,347
01.01.08.	Operational Commissioning				139,591,837
01.01.08.0001.	Operational Commissioning				139,591,837
01.01.08.0001.0010	Operational Commissioning	0.80	sum	155,102,041.00	124,081,633
01.01.08.0001.0020	Operational Readiness	0.80	sum	19,387,755.10	15,510,204
01.01.09.	Operational Handover				3,102,041
01.01.09.0001.	Operational Handover				3,102,041
01.01.09.0001.0010	Operational Handover	0.80	sum	3,877,551.00	3,102,041
01.02.	Purchase of Land & Existing Infrastructure				579,326,988
01.02.01.	Purchase of Land & Existing Infrastructure				579,326,988
01.02.01.0001.	Purchase of Land & Existing Infrastructure				579,326,988
01.02.01.0001.0010			sum		0
01.02.01.0001.0020			sum		0
01.02.01.0001.0030	Land Purchase		sum	579,326,988.00	579,326,988
01.04.	Environmental Compensation & Mitigation				279,700,000
01.04.01.	Airport Infrastructure Construction				218,500,000
01.04.01.0001.	Airport - Ecology / Environmental / Archaeological				193,000,000
01.04.01.0001.0010	Ecology - allowance for mitigation and monitoring of ecological impact	1.00	sum	51,000,000.00	51,000,000
01.04.01.0001.0020	Air quality - allowance for monitoring and mitigation	1.00	sum	0.00	0
01.04.01.0001.0030	Noise - allowance for noise monitoring	1.00	sum	0.00	0
01.04.01.0001.0040	Allowance for costs associated with Archaeological	1.00	sum	0.00	0
01.04.01.0001.0050	Noise mitigation measures to nearby houses	4,000.00	Nr	8,000.00	32,000,000
01.04.01.0001.0060	Flood water mitigation	1.00	sum	110,000,000.00	110,000,000

Ref No	Description	Quantity	Unit	Unit Rate	Total (£)
01.04.01.0002.	M25 Diversion / Other Road Works - Ecology / Environmental / Archaeological				25,500,000
01.04.01.0002.0010	Ecology - Allowance for mitigation and monitoring of ecological impact	1.00	item	25,500,000.00	25,500,000
01.04.01.0002.0020	Air quality - Allowance for monitoring	0.00		0.00	0
01.04.01.0002.0030	Noise - Allowance for noise monitoring and control measures	0.00		0.00	0
01.04.01.0002.0040	Allowance for costs associated with Archaeological	0.00		0.00	0
01.04.02.	Associated Road Works				25,500,000
01.04.02.0001.	Airport - Ecology / Environmental / Archaeological				25,500,000
01.04.02.0001.0010	Ecology - allowance for mitigation and monitoring of ecological impact	1.00	sum	25,500,000.00	25,500,000
01.04.02.0001.0020	Air quality - allowance for monitoring and mitigation	1.00	sum	0.00	0
01.04.02.0001.0030	Noise - allowance for noise monitoring	1.00	sum	0.00	0
01.04.02.0001.0040	Allowance for costs associated with Archaeological	1.00	sum	0.00	0
01.04.03.	Southern Rail Access - T5 to Staines				14,280,000
01.04.03.0001.	Airport - Ecology / Environmental / Archaeological				14,280,000
01.04.03.0001.0010	Ecology - allowance for mitigation and monitoring of ecological impact	1.00	sum	14,280,000.00	14,280,000
01.04.03.0001.0020	Air quality - allowance for monitoring and mitigation	1.00	sum	0.00	0
01.04.03.0001.0030	Noise - allowance for noise monitoring	1.00	sum	0.00	0
01.04.03.0001.0040	Allowance for costs associated with Archaeological	1.00	sum	0.00	0
01.04.04.	Southern Rail Access - M25 Junction 13 to Ruxbury Road Junction				21,420,000
01.04.04.0001.	Airport - Ecology / Environmental / Archaeological				21,420,000
01.04.04.0001.0010	Ecology - allowance for mitigation and monitoring of ecological impact	1.00	sum	21,420,000.00	21,420,000
01.04.04.0001.0020	Air quality - allowance for monitoring and mitigation	1.00	sum	0.00	0
01.04.04.0001.0030	Noise - allowance for noise monitoring	1.00	sum	0.00	0
01.04.04.0001.0040	Allowance for costs associated with Archaeological	1.00	sum	0.00	0
01.05.	Community Impacts				306,000,000
01.05.01.	Community Impacts				306,000,000
01.05.01.0001.	Community Impacts				306,000,000
01.05.01.0001.0010	Residential - noise	1.00	sum	255,000,000.00	255,000,000
01.05.01.0001.0020	Community Infrastructure Levy	1.00	sum	51,000,000.00	51,000,000
01.06.	Project / Design Team Fees				1,224,302,149
01.06.01.	Project / Design Team Fees				1,224,302,149
01.06.01.0001.	Project / Design Team Fees		15%		1,224,302,149
01.06.01.0001.0010	Project / Design Team Fees on 01.01				1,049,548,101
01.06.01.0001.0020	Project / Design Team Fees on 01.02				86,899,048
01.06.01.0001.0030	Project / Design Team Fees on 01.03				0
01.06.01.0001.0040	Project / Design Team Fees on 01.04				41,955,000
01.06.01.0001.0050	Project / Design Team Fees on 01.05				45,900,000
03.	Risks & Optimism Bias				3,566,800,260
03.01.	Risks (Design, Construction & Employer Risk)				1,877,263,295
03.01.01.	Risks (Design, Construction & Employer Risk)				1,877,263,295
03.01.01.0001.	Risks (Design, Construction & Employer Risk)		20%		1,877,263,295
03.01.01.0001.0010	Risk Contingency on 01.01				1,609,307,088
03.01.01.0001.0020	Risk Contingency on 01.02				133,245,207
03.01.01.0001.0030	Risk Contingency on 01.03				0
03.01.01.0001.0040	Risk Contingency on 01.04				64,331,000
03.01.01.0001.0050	Risk Contingency on 01.05				70,380,000
03.02.	Optimism Bias				1,689,536,965
03.02.01.	Optimism Bias				1,689,536,965
03.02.01.0001.	Optimism Bias		15%		1,689,536,965
03.02.01.0001.0010	Optimism Bias on 01.01				1,448,376,379
03.02.01.0001.0020	Optimism Bias on 01.02				119,920,687
03.02.01.0001.0030	Optimism Bias on 01.03				0
03.02.01.0001.0040	Optimism Bias on 01.04				57,897,900
03.02.01.0001.0050	Optimism Bias on 01.05				63,342,000

C.3 Heathrow Airport NWR

Ref No	Description	Quantity	Unit	Unit Rate	Total (£)
HAL	Heathrow Airport (Jacobs Estimate)				15,293,926,220
01.	Investment Costs				11,082,555,232
01.01.	Airport Infrastructure Construction				7,088,173,593
01.01.01.	Enabling Works				394,478,438
01.01.01.0001.	Decants / Demolitions				239,408,228
01.01.01.0001.0010	Site Clearance	543	ha	156,326.82	84,951,308
01.01.01.0001.0020	Decants / Demolitions	0.91	sum	170,612,244.90	154,456,920
01.01.01.0002.	Enabling Works				155,070,210
01.01.01.0002.0010	Earthworks	3,932,524	m3	8.21	32,286,023
01.01.01.0002.0020	Site Levelling and Soil Remediation / Stabilisation	270	ha	454,974.30	122,784,187
01.01.02.	Airfield				635,232,194
01.01.02.0001.	Runway				96,697,125
01.01.02.0001.0010	Runways including shoulders	262,500	m2	368.37	96,697,125
01.01.02.0002.	Taxiways & Aprons				315,604,681
01.01.02.0002.0015	Taxiways and Taxi Lanes	856,760	m2	368.37	315,604,681
01.01.02.0003.	Stands				179,323,389
01.01.02.0003.0020	Code C/D Stands		m2	Descoping sensitivity	289,249
01.01.02.0003.0030	Contact Stands to satellites		m2	Descoping sensitivity	143,441,363
01.01.02.0003.0040	Remote Stands		m2	Descoping sensitivity	35,592,777
01.01.02.0004.	Airfield Instrumentation				43,606,999
01.01.02.0004.0100	Navigational Equipment / Lighting	1,433,027	m2	30.43	43,606,999
01.01.03.	Airfield Ancillary Facilities				262,249,403
01.01.03.0001.	Air Traffic Control				0
01.01.03.0001.0090	Control Tower		sum	Descoping sensitivity	0
01.01.03.0002.	Security				19,387,755
01.01.03.0002.0120	Site Security Fence	1	sum	5,428,571.43	5,428,571
01.01.03.0002.0130	Control Posts	1	sum	13,959,183.67	13,959,184
01.01.03.0003.	Rescue and Fire Fighting				3,060,000
01.01.03.0003.0010	Fire Station	1	Nr	3,060,000.00	3,060,000
01.01.03.0004.	Fuel Systems				49,219,049
01.01.03.0004.0080	Fuel Farms	7	Nr	7,031,292.78	49,219,049
01.01.03.0005.	De-icing & Snow Clearance				29,352,522
01.01.03.0005.0010	De Icing Pads	1	sum	29,352,521.74	29,352,522
01.01.03.0006.	Serviced areas for ancillary facilities e.g. Hotels, Offices, Cargo Buildings, Hangars, etc				63,585,270
01.01.03.0006.0010	Serviced areas for ancillary facilities e.g. Hotels, Offices, Cargo Buildings, Hangars, etc		m2	Descoping sensitivity	63,585,270
01.01.03.0007.	Surface Water Drainage				24,960,000
01.01.03.0007.0060	Balancing Ponds incl. equipment, pumping, controls * instrumentation, oil interceptors, pipework, etc	83	ha	300,000	24,960,000
01.01.03.0008.	Noise Control Measures				72,684,807
01.01.03.0008.0130	Noise Bund	1	sum	72,684,807	72,684,807
01.01.04.	Terminal Buildings				2,531,865,656
01.01.04.0001.	Terminals				824,403,718
01.01.04.0001.0010	T6 Terminal building, Substructure		m2	Descoping sensitivity	127,691,084
01.01.04.0001.0020	T6 Terminal building, Superstructure		m2	Descoping sensitivity	240,617,445
01.01.04.0001.0030	T6 Terminal building, Fit Out		m2	Descoping sensitivity	456,095,189
01.01.04.0002.	Piers & Satellites				1,518,461,938
01.01.04.0002.0040	Satellite Substructure		m2	Descoping sensitivity	129,139,769
01.01.04.0002.0050	Satellite Superstructure		m2	Descoping sensitivity	391,096,011
01.01.04.0002.0060	Satellite Fit Out		m2	Descoping sensitivity	270,021,223
01.01.04.0002.0090	T2E Satellite	21,780	m2	33,434.57	728,204,935
01.01.04.0003.	Fixed Links, VCC, Rotunda/Nodes, PCA and Airbridges				189,000,000
01.01.04.0003.0070	VCC, Airbridge, PCA, nodes and fixed links to new stands		Nr	Descoping sensitivity	189,000,000
01.01.05.	Airside Infrastructure				1,513,008,420
01.01.05.0001.	Access Roads				332,693,878
01.01.05.0001.0050	Airside Roads & Tunnels	1	sum	332,693,877.55	332,693,878
01.01.05.0002.	Baggage Tunnels				250,819,944
01.01.05.0002.0010	Baggage Tunnels Civils	2,400	m	30,864.14	74,073,936
01.01.05.0002.0040	Baggage Tunnels Fit Out	2,400	m	73,644.17	176,746,008
01.01.05.0003.	TTS Tunnels				400,002,080
01.01.05.0003.0050	TTS Tunnels Civils	5,000	m	57,855.52	289,277,600
01.01.05.0003.0070	TTS Tunnels Fit Out		m	Descoping sensitivity	99,708,480
01.01.05.0003.0080	Additional TTS Cars		Nr	Descoping sensitivity	11,016,000
01.01.05.0004.	TTS Station / Depot				529,492,518
01.01.05.0004.0050	TTS Stations	1.00	Nr	296,761,905.80	296,761,906
01.01.05.0004.0060	TTS Station Fit Out		sum	Descoping sensitivity	97,016,327
01.01.05.0004.0080	TTS Maintenance Base Substructure	1.00	sum	103,142,857.14	103,142,857
01.01.05.0004.0090	TTS Maintenance Base Fit Out	1.00	sum	32,571,428.57	32,571,429
01.01.06.	Landside Infrastructure				967,376,217
01.01.06.0001.	Connectivity				96,938,776
01.01.06.0001.0040	Landside connectivity systems	1.00	sum	96,938,775.51	96,938,776
01.01.06.0002.	Car Parks				500,204,082
01.01.06.0002.0020	Car Park - Surface & Multi Storey Parking	1.00	sum	500,204,081.63	500,204,082

Ref No	Description	Quantity	Unit	Unit Rate	Total (£)
01.01.06.0003.	Power Generation				93,061,224
01.01.06.0003.0020	Energy and Infrastructure	1.00	sum	93,061,224.49	93,061,224
01.01.06.0004.	Utilities				172,163,265
01.01.06.0004.0030	Utilities	1.00	sum	172,163,265.31	172,163,265
01.01.06.0005.	River Diversion / Culverts				105,008,870
01.01.06.0005.0020	Culverts	1.00	sum	28,460,347.83	28,460,348
01.01.06.0005.0030	Waterways	1.00	sum	76,548,521.74	76,548,522
01.01.07.	Equipment				656,779,592
01.01.07.0003.	Baggage Handling Systems				656,779,592
01.01.07.0003.0001	Baggage Equipment Terminal		sum	Descoping sensitivity	269,412,245
01.01.07.0003.0002	Baggage Equipment Satellite		sum	Descoping sensitivity	387,367,347
01.01.08.	Operational Commissioning				124,081,633
01.01.08.0007.	Development Process Costs				124,081,633
01.01.08.0007.0010	Consents	0.80	sum	135,714,285.71	108,571,429
01.01.08.0007.0020	Operational Readiness	0.80	sum	19,387,755.10	15,510,204
01.01.09.	Operational Handover				3,102,041
01.01.09.0001.	Operational Handover				3,102,041
01.01.09.0001.0030	Aerodrome Manual	0.80	sum	3,877,551.02	3,102,041
01.02.	Purchase of Land & Existing Infrastructure				1,725,973,913
01.02.01.	Purchase of Land & Existing Infrastructure				1,725,973,913
01.02.01.0001.	Purchase of Land & Existing Infrastructure			Descoping sensitivity	1,725,973,913
01.02.01.0001.0010	Residential property compulsory purchase		sum	Descoping sensitivity	
01.02.01.0001.0020	Commercial property compulsory purchase		sum	Descoping sensitivity	
01.02.01.0001.0030	Land Purchase		sum	Descoping sensitivity	
01.04.	Environmental Compensation & Mitigation				476,069,043
01.04.01.	Environmental Compensation & Mitigation				476,069,043
01.04.01.0001.	Ecology				12,222,783
01.04.01.0001.0010	Ecology	1.00	sum	12,222,782.61	12,222,783
01.04.01.0002.	Landscape				138,019,304
01.04.01.0002.0010	Habitat Reprovision	1.00	sum	26,497,565.22	26,497,565
01.04.01.0002.0020	Landscape	1.00	sum	111,521,739.13	111,521,739
01.04.01.0003.	Surface water flood mitigation				137,840,870
01.04.01.0003.0010	Surface Water Flood Mitigation	1.00	sum	120,175,826.09	120,175,826
01.04.01.0003.0050	Sundries	1.00	sum	17,665,043.48	17,665,043
01.04.01.0004.	Listed Building Decants				45,500,870
01.04.01.0004.0010	Listed Building Decants / Relocations	1.00	sum	21,412,173.91	21,412,174
01.04.01.0004.0020	Archaeology	1.00	sum	24,088,695.65	24,088,696
01.04.01.0005.	Energy / Water / Waste (Sustainability)				43,900,000
01.04.01.0005.0010	Energy / Water / Waste (Sustainability)	1.00	sum	43,900,000.00	43,900,000
01.04.01.0006.	Noise Mitigation				98,585,217
01.04.01.0006.0010	Noise Bunds	1.00	sum	77,262,260.87	77,262,261
01.04.01.0006.0020	Local Road Resurfacing	1.00	sum	14,453,217.39	14,453,217
01.04.01.0006.0030	Acoustic fence	1.00	sum	6,869,739.13	6,869,739
01.05.	Community Impacts				346,788,000
01.05.01.	Community Impacts				346,788,000
01.05.01.0001.	Community Impacts				346,788,000
01.05.01.0001.0010	Noise Insulation and Compensation	1.00	sum	223,043,478.26	223,043,478
01.05.01.0001.0020	Community Infrastructure Levy	1.00	sum	53,262,782.61	53,262,783
01.05.01.0001.0030	Other Community	1.00	sum	70,481,739.13	70,481,739
01.06.	Project / Design Team Fees				1,445,550,682
01.06.01.	Project / Design Team Fees				1,445,550,682
01.06.01.0001.	Project / Design Team Fees	15%			1,445,550,682
01.06.01.0001.0010	Project / Design Team Fees on 01.01				1,063,226,039
01.06.01.0001.0020	Project / Design Team Fees on 01.02				258,896,087
01.06.01.0001.0030	Project / Design Team Fees on 01.03				0
01.06.01.0001.0040	Project / Design Team Fees on 01.04				71,410,357
01.06.01.0001.0050	Project / Design Team Fees on 01.05				52,018,200
03.	Risks & Optimism Bias				4,211,370,988
03.01.	Risks (Design, Construction & Employer Risk)				2,216,511,046
03.01.01.	Risks (Design, Construction & Employer Risk)				2,216,511,046
03.01.01.0001.	Risks (Design, Construction & Employer Risk)	20%			2,216,511,046
03.01.01.0001.0010	Risk Contingency on 01.01				1,630,279,926
03.01.01.0001.0020	Risk Contingency on 01.02				396,974,000
03.01.01.0001.0030	Risk Contingency on 01.03				0
03.01.01.0001.0040	Risk Contingency on 01.04				109,495,880
03.01.01.0001.0050	Risk Contingency on 01.05				79,761,240
03.02.	Optimism Bias				1,994,859,942
03.02.01.	Optimism Bias				1,994,859,942
03.02.01.0001.	Optimism Bias	15%			1,994,859,942
03.02.01.0001.0010	Optimism Bias on 01.01				1,467,251,934
03.02.01.0001.0020	Optimism Bias on 01.02				357,276,600
03.02.01.0001.0030	Optimism Bias on 01.03				0
03.02.01.0001.0040	Optimism Bias on 01.04				98,546,292
03.02.01.0001.0050	Optimism Bias on 01.05				71,785,116

Appendix D Approach to Core and Asset Replacement Capital Expenditure

See relevant appendix in the *Cost and Commercial Viability: Cost and Revenue Identification Update* report.

Appendix E Core and Asset Replacement Capital Expenditure Summary

See relevant appendix in the *Cost and Commercial Viability: Cost and Revenue Identification Update* report.

Appendix F Operational Expenditure

F.1 Approach

With reference to the *Operational Efficiency: Phasing and Facilities Review* report, the facilities in the Gatwick 2R scheme were not reduced in scale, but only in terms of capital cost. Therefore, with the same extent of infrastructure to be operated, the operational expenditure forecast for this scheme remained as previously forecast and as reported in the *Cost and Commercial Viability: Cost and Revenue Identification Update Gatwick Second Runway* report. The following, therefore, discusses only the approach taken with respect to the Heathrow ENR and NWR schemes.

The modelling approach adopted a combination of elasticities to passenger growth, terminal floor space, and airfield area, in addition to any real increases or savings through efficiencies as described in Appendix F of the *Cost and Revenue Identification Update* reports. Terminal floor space was used as a driver to model the stepped increases in fixed cost associated with opening a new terminal. Such fixed costs include a provision of a certain level of staffing, utilities for heating, lighting and water, cleaning, maintenance, and business rates, among others. Modelling the costs associated with a smaller terminal facility requires a more sophisticated approach. Whereas we anticipate that a smaller terminal will consume less energy for heating and lighting, it is reasonable to assume that there would be no significant reduction in the number of staff required to handle passengers. Indeed, a smaller terminal handling the same number of forecast passengers may require more staff to handle queues and ensure service standards are maintained to the extent possible. A reduction in aircraft contact stands would mean a greater requirement for passengers to be bussed, leading to an increase in staffing, vehicle leasing and fuel costs.

Business rates will be lower for a smaller terminal; however, the cost of routine maintenance is expected to be similar as the greater concentration of passengers will result in greater wear and tear on the facility.

To model the expected impacts of the reduced terminal scope, we modified the elasticities to terminal floor space growth that apply to each category of costs in the year in which Terminal 6 is forecast to open. This approach ensures that costs in areas where the scope reduction would have little impact (e.g. staffing, routine maintenance, and other costs) see a stepped increase similar to that of the base case Terminal 6, whereas costs in which savings would be made (e.g. utilities and rent & rates) see a smaller stepped increase.

F.2 Outputs

Tables F-1 and F-2 on the following pages present the forecasts for the Heathrow ENR and NWR schemes.

2014 real prices in £million

Assessment of Need Carbon Capped	Total	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Staff	16,821	449	425	410	400	395	390	389	385	381	376	375	375	427	438	478	479	480	485	484	481	480	481	502	498	498	498	496	496	493	489	488	486	486	483	482	480	479
Routine maintenance	6,318	168	161	155	152	150	148	147	146	145	143	143	142	148	152	168	168	183	182	182	183	183	184	182	190	190	189	189	188	186	186	185	185	184	184	183	182	
Utilities	3,678	94	94	93	92	91	90	89	88	87	87	86	85	93	92	106	105	104	106	105	104	103	102	109	109	108	108	107	107	106	105	104	104	103	103	103	102	
Rent and rates	5,966	129	128	127	125	124	124	124	124	124	124	124	124	144	144	168	168	168	173	173	173	173	173	187	187	187	187	187	187	187	187	187	187	187	187	187	187	
Rail	2,078	69	58	57	57	56	55	55	55	54	54	53	53	55	57	57	57	57	57	57	57	57	57	57	56	56	56	56	55	55	55	55	55	55	54	54		
Other	9,276	228	223	220	217	214	212	211	209	207	207	205	205	230	237	255	257	259	262	262	262	263	265	275	274	275	277	277	278	278	278	278	280	279	281	280	281	
Opex	44,137	1,137	1,089	1,061	1,042	1,030	1,020	1,015	1,007	998	998	987	984	1,096	1,119	1,231	1,234	1,251	1,265	1,263	1,259	1,258	1,260	1,313	1,307	1,314	1,316	1,311	1,312	1,308	1,301	1,300	1,296	1,297	1,291	1,292	1,287	1,286
Opex (incl. Risk & OB)	48,765	1,137	1,089	1,061	1,042	1,030	1,025	1,025	1,022	1,018	1,023	1,017	1,019	1,170	1,204	1,332	1,343	1,369	1,392	1,397	1,400	1,406	1,417	1,482	1,483	1,498	1,508	1,510	1,519	1,522	1,521	1,526	1,529	1,537	1,538	1,547	1,549	1,556
Opex/pax (£)		15.81	14.69	14.18	13.73	13.30	13.28	13.12	13.05	13.00	12.73	12.76	12.60	12.84	12.12	12.89	12.61	12.47	12.48	12.29	12.22	12.03	11.90	12.23	12.28	12.29	12.20	12.23	12.15	12.16	12.23	12.19	12.21	12.14	12.18	12.11	12.15	12.10

Assessment of Need Carbon traded	Total	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Staff	17,046	449	425	409	399	391	387	387	385	383	381	376	374	428	479	484	494	496	495	515	509	507	506	505	502	499	500	499	497	494	493	491	489	487	486	484	482	480
Routine maintenance	6,436	168	162	156	152	149	147	147	147	146	145	143	142	149	154	171	187	187	190	189	187	194	194	193	192	191	191	191	190	189	189	188	187	186	186	185	185	184
Utilities	3,731	94	94	93	92	91	90	89	88	88	87	86	85	93	107	106	108	107	106	112	111	110	110	109	109	108	108	107	107	106	105	105	104	104	103	103	102	
Rent and rates	6,057	129	128	127	125	124	124	124	124	124	124	124	124	144	168	168	173	173	173	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187
Rail	2,113	69	58	57	57	56	55	55	55	55	54	54	54	56	58	59	59	59	59	59	58	58	58	58	58	57	57	57	57	56	56	56	56	56	56	55	55	
Other	9,419	228	224	221	217	213	211	210	209	208	207	206	205	232	255	259	265	267	268	277	276	276	277	278	278	277	279	280	280	280	281	281	281	283	282	283	283	
Opex	44,802	1,137	1,090	1,062	1,042	1,023	1,015	1,013	1,009	1,004	998	989	984	1,102	1,222	1,247	1,285	1,289	1,291	1,340	1,330	1,334	1,331	1,330	1,326	1,320	1,322	1,321	1,318	1,314	1,311	1,308	1,306	1,302	1,302	1,297	1,296	1,291
Opex (incl. Risk & OB)	49,543	1,137	1,090	1,062	1,042	1,023	1,020	1,023	1,024	1,024	1,024	1,019	1,019	1,178	1,313	1,353	1,401	1,414	1,424	1,485	1,480	1,493	1,497	1,503	1,506	1,506	1,516	1,523	1,526	1,530	1,533	1,538	1,542	1,544	1,553	1,556	1,561	1,563
Opex/pax (£)		15.81	14.59	14.10	13.70	13.46	13.38	13.15	12.97	12.82	12.67	12.68	12.58	12.67	12.75	12.50	12.46	12.16	11.98	12.24	12.21	12.13	12.11	12.06	12.09	12.12	12.03	11.99	11.98	12.00	11.99	11.99	11.97	11.99	11.92	11.95	11.93	11.95

Global Growth Carbon Traded	Total	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Staff	17,810	449	434	421	409	403	402	400	395	396	392	390	387	446	500	514	519	542	542	536	532	529	525	525	523	522	522	519	519	517	516	514	514	513	512	512	509	509
Routine maintenance	6,530	168	161	155	151	149	149	148	146	146	145	144	143	151	156	174	190	194	193	199	198	197	195	195	194	194	194	193	193	192	192	191	191	191	190	190	189	189
Utilities	3,755	94	94	93	92	91	90	89	88	88	87	86	85	93	107	109	108	115	114	113	112	110	110	109	109	108	108	107	107	106	105	105	104	104	103	103	102	
Rent and rates	6,090	129	128	127	125	124	124	124	124	124	124	124	124	144	168	173	173	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	
Rail	2,136	69	58	57	57	56	56	55	55	55	55	54	54	57	59	60	60	60	60	59	59	58	58	58	58	58	58	58	58	57	57	57	57	57	57	57	57	
Other	9,550	228	222	220	216	213	212	211	209	209	207	207	206	234	259	266	270	281	282	280	280	278	280	280	280	281	283	283	284	284	285	285	287	288	288	290	290	291
Opex	45,872	1,137	1,096	1,072	1,049	1,036	1,034	1,029	1,018	1,017	1,010	1,005	1,000	1,125	1,249	1,296	1,321	1,379	1,378	1,374	1,367	1,362	1,354	1,355	1,352	1,351	1,353	1,347	1,347	1,345	1,343	1,340	1,342	1,341	1,338	1,340	1,334	1,337
Opex (incl. Risk & OB)	50,796	1,137	1,096	1,072	1,049	1,036	1,039	1,039	1,033	1,038	1,035	1,036	1,035	1,204	1,344	1,408	1,443	1,514	1,521	1,523	1,523	1,526	1,521	1,531	1,535	1,542	1,552	1,552	1,559	1,565	1,570	1,574	1,591	1,598	1,603	1,613	1,615	1,626
Opex/pax (£)		15.68	14.84	14.22	13.88	13.48	13.24	13.08	13.08	12.81	12.72	12.60	12.50	12.50	12.56	12.40	12.11	12.30	12.09	12.14	12.06	11.92	12.00	11.92	11.													

2014 real prices in £million

Assessment of Need Carbon Capped	Total	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Staff	16,937	449	425	410	400	395	390	389	385	381	381	378	376	429	439	478	479	480	485	483	480	479	480	500	500	502	502	503	502	501	501	500	496	496	493	492	489	489
Routine maintenance	6,361	168	161	155	152	150	148	147	146	144	145	144	143	148	152	168	168	183	182	181	183	183	183	183	183	191	191	191	191	191	190	189	189	188	187	186	186	
Utilities	3,714	94	94	93	92	91	90	89	88	87	87	86	85	94	107	106	105	107	106	105	104	104	110	110	109	109	109	108	108	107	107	106	106	105	105	104	104	
Rent and rates	6,018	129	128	127	125	124	124	124	124	124	124	124	124	146	146	170	170	170	175	175	175	175	175	189	189	189	189	189	189	189	189	189	189	189	189	189	189	189
Rail	2,110	69	58	57	57	56	56	56	55	55	55	54	54	56	57	58	58	58	58	58	57	57	57	57	57	57	57	57	57	57	57	57	57	56	56	56	56	
Other	9,342	228	223	220	217	214	212	211	209	206	206	206	206	231	238	255	257	258	261	262	261	263	264	274	275	277	279	281	282	283	284	285	284	286	285	286	286	287
Opex	44,483	1,137	1,089	1,061	1,042	1,030	1,020	1,016	1,007	998	997	993	988	1,104	1,126	1,237	1,238	1,255	1,267	1,265	1,261	1,261	1,263	1,314	1,315	1,326	1,328	1,331	1,329	1,328	1,329	1,328	1,321	1,322	1,316	1,316	1,311	1,311
Opex (incl. Risk & OB)	49,213	1,137	1,089	1,061	1,042	1,030	1,026	1,022	1,018	1,022	1,023	1,024	1,024	1,180	1,212	1,339	1,349	1,374	1,395	1,401	1,403	1,410	1,420	1,484	1,493	1,513	1,524	1,535	1,541	1,548	1,557	1,562	1,562	1,572	1,571	1,579	1,581	1,590
Opex/pax (£)		15.81	14.70	14.19	13.74	13.31	13.30	13.13	13.08	13.04	12.77	12.65	12.53	12.86	12.17	12.97	12.70	12.57	12.59	12.41	12.34	12.13	12.02	12.35	12.28	12.22	12.11	12.01	11.99	11.93	11.85	11.82	11.87	11.80	11.85	11.81	11.84	11.78

Assessment of Need Carbon Traded	Total	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Staff	17,227	449	425	409	399	391	387	387	385	383	381	376	374	429	480	485	494	496	496	515	513	513	515	513	512	514	512	510	507	505	502	502	500	498	496	495	492	490
Routine maintenance	6,505	168	162	156	152	149	147	147	147	146	145	143	142	149	154	171	187	187	190	190	189	197	197	196	196	197	196	195	194	193	192	192	191	191	190	190	188	188
Utilities	3,770	94	94	93	92	91	90	89	88	88	87	86	85	95	108	107	109	108	107	114	113	112	111	111	110	109	109	108	108	107	107	106	106	105	105	104	104	
Rent and rates	6,109	129	128	127	125	124	124	124	124	124	124	124	124	146	170	170	175	175	175	189	189	189	189	189	189	189	189	189	189	189	189	189	189	189	189	189	189	189
Rail	2,148	69	58	57	57	56	56	56	55	55	55	54	54	57	59	59	60	60	60	60	59	59	60	59	59	59	59	59	58	58	58	58	58	57	57	57	57	
Other	9,521	228	224	221	217	213	211	210	209	208	207	206	205	232	256	260	265	267	269	278	278	279	282	282	283	285	286	286	286	286	287	288	288	288	288	289	289	289
Opex	45,280	1,137	1,090	1,062	1,042	1,023	1,016	1,013	1,009	1,004	999	990	984	1,108	1,227	1,253	1,290	1,294	1,296	1,345	1,342	1,350	1,354	1,350	1,349	1,354	1,352	1,348	1,343	1,339	1,334	1,335	1,333	1,329	1,325	1,325	1,320	1,317
Opex (incl. Risk & OB)	50,159	1,137	1,090	1,062	1,042	1,023	1,021	1,023	1,024	1,024	1,024	1,020	1,019	1,184	1,319	1,359	1,407	1,420	1,430	1,490	1,495	1,513	1,525	1,529	1,535	1,550	1,554	1,557	1,558	1,563	1,563	1,573	1,577	1,580	1,584	1,592	1,593	1,598
Opex/pax (£)		15.81	14.59	14.10	13.70	13.46	13.39	13.15	12.97	12.83	12.68	12.69	12.59	12.74	12.81	12.57	12.52	12.22	12.03	12.29	12.12	11.97	11.83	11.83	11.79	11.64	11.63	11.63	11.67	11.67	11.70	11.62	11.61	11.62	11.62	11.58	11.61	11.60

Global Growth Carbon Traded	Total	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Staff	18,024	449	434	421	409	403	402	400	395	396	392	390	387	447	501	515	520	546	548	546	544	541	537	537	534	534	530	531	529	527	525	527	524	522	521	520	521	518
Routine maintenance	6,609	168	161	155	151	149	149	148	146	146	145	144	143	151	156	174	190	195	196	203	202	201	199	200	198	198	197	197	196	195	196	195	194	194	193	194	193	
Utilities	3,794	94	94	93	92	91	90	89	88	88	87	86	85	95	108	110	109	116	115	114	113	112	111	110	110	109	109	108	108	107	107	106	106	105	105	105	104	
Rent and rates	6,143	129	128	127	125	124	124	124	124	124	124	124	124	146	170	175	175	189	189	189	189	189	189	189	189	189	189	189	189	189	189	189	189	189	189	189	189	
Rail	2,162	69	58	57	57	56	56	56	55	55	55	54	54	57	59	60	61	61	61	61	60	60	60	60	60	59	59	59	59	59	59	58	58	58	58	58	58	
Other	9,667	228	222	220	216	213	212	211	209	209	207	207	206	235	259	267	270	283	285	286	286	286	285	287	286	288	287	289	290	290	292	292	293	294	294	295	297	296
Opex	46,397	1,137	1,096	1,072	1,049	1,036	1,034	1,029	1,018	1,017	1,010	1,005	1,000	1,130	1,253	1,300	1,325	1,391	1,395	1,400	1,395	1,390	1,381	1,384	1,378	1,379	1,373	1,374	1,372	1,368	1,366	1,370	1,365	1,363	1,361	1,360	1,363	1,358
Opex (incl. Risk & OB)	51,470	1,137	1,096	1,072	1,049	1,036	1,039	1,039	1,033	1,038	1,035	1,036	1,035	1,210	1,349	1,413	1,448	1,528	1,541	1,554	1,557	1,561	1,556	1,568	1,568	1,577	1,578	1,587	1,591	1,595	1,600	1,614	1,621	1,627	1,634	1,641	1,653	1,655
Opex/pax (£)		15.68	14.84	14.22	13.88	13.48	13.24	13.08	13.09	12.81	12.72	12.60	12.50	12.57	12.62	12.46	12.18	12.21	11.92	11.82	11.69	11.55																

Appendix G Non-Aeronautical Revenue

G.1 Approach

With reference to the *Operational Efficiency: Phasing and Facilities Review* report, the facilities in the Gatwick 2R scheme were not reduced in scale, but only in terms of capital cost. Therefore, with the same extent of infrastructure from which to generate non-aeronautical revenue, the non-aeronautical revenue forecast for this scheme remained as previously forecast and as reported in the *Cost and Commercial Viability: Cost and Revenue Identification Update Gatwick Second Runway* report. The following, therefore, discusses only the approach taken with respect to the Heathrow ENR and NWR schemes.

The modelling approach adopted was primarily based on elasticities to gross domestic product (GDP) for the various geographical markets forming the passenger mix. The approach assumed that the new retail offering provided within new terminal buildings would be broadly similar to the offering elsewhere in the airport at the same time, i.e. the new Terminal 6 would not have a significantly different operation or retail offering to that of Terminal 5 or Terminal 2.

In the reduced scope scenarios, the size of Terminal 6 is reduced by approximately one-third. This will lead to revenue-generating retail space being reduced to preserve passenger processing capacity, as well as increasing the general feeling of congestion within the terminal. The airside retail offering in the base case schemes can be expected to include a mixture of duty free, specialist retail, and catering. Under the reduced scope scenarios, it is likely that the luxury end retail would be decreased by a proportionally greater degree in order to retain the staple retailers and catering offerings that customers would expect as a minimum. Airside luxury retailers typically perform best when located in clusters; therefore, to remove some luxury stores or constrain their size could have a disproportionately large impact on the performance of the segment. The performance of the other non-aeronautical revenue segments (car parking, property rental, rail, utilities, and other) is assumed to be unaffected by the reduced scope scenarios.

To model the performance of non-aeronautical retail revenues, we have taken the approach of reducing the retail revenue (duty free, airside specialist shops, and catering) generated by Terminal 6 by 25%.

G.4 Outputs

Tables G-1 and G-2, on the following pages present the forecasts for the Heathrow ENR and NWR schemes.

2014 real prices in £million

Assessment of Need Carbon Capped	Total	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	
Car parking	3,597	65	66	68	70	72	73	74	76	77	79	81	82	88	95	99	101	102	103	104	105	106	107	109	109	110	112	113	113	114	115	116	116	116	116	116	116	116	116
Total retail	20,944	404	409	417	423	430	435	438	442	443	449	457	462	456	496	528	544	559	572	583	591	601	613	628	638	649	661	671	677	682	688	694	695	697	700	702	704	707	
<i>Duty and tax-free</i>	7,500	129	131	135	137	141	143	144	146	147	150	153	156	156	172	186	193	200	206	210	214	219	224	231	235	240	246	250	253	255	258	260	261	262	263	264	265	266	
<i>Other retail</i>	11,371	236	238	242	244	247	249	251	253	253	256	259	262	255	273	289	296	303	309	314	318	322	328	335	339	344	350	354	357	359	362	365	365	366	368	368	369	371	
<i>Food and beverage</i>	2,073	40	40	41	41	42	42	43	43	43	44	44	45	45	50	53	55	56	57	58	59	60	61	62	63	64	65	66	67	68	68	69	69	69	69	70	70	70	
Property rental	4,205	108	111	111	111	111	111	111	111	111	111	111	111	112	112	114	114	114	115	115	115	115	115	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	
Rail	7,603	124	126	130	134	138	140	143	145	146	151	154	158	173	187	194	199	204	208	212	216	220	225	230	234	239	243	248	252	256	261	265	267	271	273	276	278	282	
Other revenue	9,757	253	253	253	253	253	253	253	252	252	252	252	252	257	258	267	267	267	268	268	268	268	268	272	272	272	272	272	272	271	271	271	271	271	271	270	270	270	
Non-aero	46,106	955	966	979	990	1,004	1,011	1,019	1,026	1,029	1,042	1,055	1,065	1,085	1,148	1,202	1,225	1,246	1,266	1,282	1,294	1,310	1,329	1,354	1,369	1,386	1,404	1,419	1,430	1,439	1,452	1,462	1,464	1,471	1,475	1,479	1,484	1,491	
Non-aero (incl. Risk & OB)	42,656	955	966	979	990	1,004	1,006	1,009	1,010	1,009	1,016	1,023	1,028	1,043	1,097	1,144	1,159	1,173	1,186	1,195	1,201	1,209	1,220	1,238	1,245	1,254	1,264	1,271	1,274	1,276	1,281	1,284	1,279	1,278	1,276	1,273	1,270	1,270	
Non-aero/pax (£)		13.28	13.04	13.08	13.05	12.98	13.04	12.92	12.93	12.92	12.69	12.66	12.58	11.37	11.01	11.08	10.92	10.74	10.71	10.59	10.56	10.40	10.33	10.30	10.24	10.13	10.05	9.94	9.91	9.83	9.75	9.71	9.72	9.60	9.62	9.52	9.51	9.41	

Assessment of Need Carbon Traded	Total	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Car parking	3,729	65	66	68	70	71	72	74	76	78	80	81	82	88	97	103	106	108	110	112	113	115	117	118	117	118	119	119	118	118	118	118	119	119	119	119	119	119
Total retail	22,490	404	411	420	424	427	430	435	443	449	455	457	459	491	543	579	602	623	640	655	668	682	698	708	714	726	737	739	739	739	743	749	751	752	752	755	754	
<i>Duty and tax-free</i>	8,109	129	132	136	138	140	141	143	147	149	152	153	154	167	189	205	216	225	232	239	245	251	258	263	266	271	277	277	278	278	279	282	283	283	283	285	285	
<i>Other retail</i>	12,144	236	239	243	245	246	247	250	253	256	258	260	260	274	298	315	326	335	343	350	356	362	369	374	376	382	387	388	388	388	390	392	393	394	393	395	394	
<i>Food and beverage</i>	2,238	40	41	41	42	42	42	42	43	44	44	44	44	49	55	59	61	63	65	66	67	69	70	71	71	73	73	73	73	74	75	75	75	75	75	75	75	75
Property rental	4,213	108	111	111	111	111	111	111	111	111	111	111	111	112	114	114	115	115	115	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116
Rail	7,887	124	127	131	134	136	138	142	146	150	153	154	156	174	193	203	210	216	222	228	233	239	246	248	251	256	260	261	262	265	267	271	275	277	280	284	286	289
Other revenue	9,800	253	253	253	253	253	253	253	253	252	252	252	252	257	267	267	269	269	269	273	273	273	273	273	273	273	273	272	272	272	272	272	271	271	271	271	270	270
Non-aero	48,119	955	969	983	992	998	1,003	1,015	1,029	1,040	1,050	1,055	1,060	1,122	1,214	1,266	1,302	1,331	1,356	1,384	1,403	1,426	1,450	1,462	1,471	1,490	1,504	1,507	1,507	1,510	1,511	1,520	1,530	1,534	1,537	1,541	1,546	1,547
Non-aero (incl. Risk & OB)	44,484	955	969	983	992	998	998	1,005	1,013	1,019	1,024	1,023	1,024	1,078	1,160	1,204	1,232	1,254	1,271	1,290	1,302	1,316	1,331	1,336	1,337	1,348	1,354	1,349	1,343	1,339	1,333	1,334	1,336	1,333	1,330	1,326	1,324	1,318
Non-aero/pax (£)		13.28	12.97	13.04	13.05	13.14	13.09	12.92	12.83	12.76	12.68	12.73	12.64	11.60	11.27	11.13	10.96	10.79	10.69	10.64	10.55	10.41	10.33	10.34	10.27	10.12	10.13	10.08	10.06	10.00	9.99	9.86	9.84	9.80	9.75	9.65	9.65	9.57

Global Growth Carbon Traded	Total	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	
Car parking	3,890	66	66	68	70	71	73	76	77	79	80	82	83	91	101	108	112	116	119	122	123	124	123	123	123	123	122	122	123	123	123	124	125	125	125	126	127	127	
Total retail	23,006	405	410	418	424	429	437	444	446	452	458	463	468	503	559	600	630	659	686	703	715	726	730	735	742	746	753	748	751	753	752	748	754	752	752	752	749	755	
<i>Duty and tax-free</i>	8,343	129	132	135	138	140	144	147	148	150	154	156	158	172	197	214	227	240	251	259	265	270	272	275	278	280	284	282	283	284	284	283	286	285	285	286	285	288	
<i>Other retail</i>	12,359	236	238	242	244	247	250	254	255	257	260	262	264	280	306	325	338	352	364	372	377	382	384	386	390	391	394	391	393	393	393	390	393	392	392	391	389	392	
<i>Food and beverage</i>	2,303	40	40	41	41	42	43	43	43	44	45	45	45	51	57	61	64	68	70	72	73	74	74	74	75	75	75	75	75	75	75	75	75	75	75	75	75	76	
Property rental	4,216	108	111	111	111	111	111	111	111	111	111	111	111	112	114	115	115	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	
Rail	8,237	125	126	131	133	137	142	145	147	152	154	157	160	180	200	212	221	232	241	247	252	257	257	260	262	265	266	269	273	276	279	286	289	292	296	300	307	310	
Other revenue	9,825	253	253	253	253	253	253	253	253	253	252	252	252	258	267	269	269	274	274	274	274	274	274	274	274	273	273	273	273	272	272	272	272	272	271	271	271	271	271
Non-aero	49,174	958	966	981	990	1,001	1,016	1,029	1,033	1,045	1,056	1,065	1,074	1,143	1,242	1,303	1,347	1,397	1,436	1,462	1,479	1,496	1,500	1,508	1,516	1,522 </													

Appendix H Surface Access Capital Expenditure, Operational Expenditure and Maintenance Costs

See relevant appendix in the *Cost and Commercial Viability: Cost and Revenue Identification Update* report.