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VULCAN ASSOCIATES LIMITED

Severnside

An Airport to replace Bristol and Cardiff

SEPTEMBER 2019



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Executive Summary

This paper proposes the construction of an international airport on a greenfield site on the Severn Estuary between Newport and Bristol.

The project would involve the closing of the existing Bristol and Cardiff airports and the transfer of their traffic to the new airport, Severnside.

Previous proposals for a less ambitious development of this site have foundered on the opposition of HMG to airport expansion. By the 1970s government policy had degenerated into a refusal to do more than to attempt compromises between the various interests that dominated the industry. In recent years it has been characterised by an evident desire to avoid hard decisions, a failure to take a strategic view and the development of industry analyses that are internally inconsistent and which have, by design persistently under-estimated the national demand for air services.

The result has been a set of national aviation assets that are congested, inefficient, economically and environmentally damaging and which are steadily being eroded by private interests for short-term gain and by foreign airlines, backed by their government, for increases in market share and the transfer of business to Europe and the Middle East.

The construction of Severnside could be the first step in a long-term strategy to rationalise the UK aviation network, to restore its international, competitive advantage, to reduce pollution, to release the suppressed economic potential of the regions and to ease congestion in the South East. For Wales, this is probably the last chance to arrest and reverse its economic decline.

The airport's position puts it at the centre of the proposed "Western Powerhouse" of Bristol Cardiff and Newport and of a catchment area of some 19 million inhabitants. Unsatisfied demand for air travel in the South West is itself enough to justify the establishment of an airport twice the size of Bristol.

The site and its proximity to road and rail connections to London, South Wales, the West Midlands and the South West make it one of the most promising in Europe. The opportunity to design and construct an airport to the highest standards of environmental protection and economic efficiency make the proposal an attractive investment opportunity on a stand- alone basis.

The public benefits of the project in terms of innovation, investment and employment more than justify the public infrastructural investment required to support its developmental potential.

This submission is not made by financial promoters, nor is it claimed that the feasibility of the project has been finally established. It is argued, however, that it is a proposal that should be very seriously and urgently considered in the public interest, by HMG, the Welsh Government and the municipal authorities of Bristol, Cardiff and Newport.

1. Civil Aviation in the United Kingdom 1945 - 2019

The development of civil aviation in the United Kingdom after 1945 was heavily conditioned by the configuration of aviation assets inherited from the war and the state domination of economic recovery. The network of airfields in the UK had been designed for the conduct of air warfare with Germany; the post-war network of airports was a net effect not something designed for commercial purpose. Abandoned RAF aerodromes and redundant aircraft manufacturing facilities were the basis of a network inappropriately located and with inadequate surface transport access. Initially these deficiencies were of little importance but the growth of traffic means that this has now become a major problem.

The airports, the airlines and the aircraft manufacturers were owned or controlled by the Government. Aviation was regulated by a government agency. Development was constrained by the government and such as there was, it was opportunistic while policy was reactive and conservative.

The pressures of demand led to some liberalisation in the 1950s. Private airlines were granted a limited range of licenses initially to operate only charter flights while International Air Service Agreements effectively protected the scheduled flight monopolies of BEA and BOAC.

In recognition of a need for the closer consideration of civil aviation issues the Air Ministry was established in 1959. With the further development of the industry the British Airports Authority was established in 1966 to own and manage the three major London airports, Heathrow, Gatwick and Stansted, together with Prestwick, Edinburgh, Aberdeen and Southampton. Prestwick, then an important staging airport to North America, was replaced by two successive Glasgow airports on different sites and then sold off. There was some further easing of restrictions in the hope of providing a competitive spur for the state-owned BEA and BOAC but growth continued to be controlled in the interests of the national flag carriers and airport investment and increases in capacity were in the South East, predominantly at Heathrow.

The Thatcher administrations of the 1980s attempted, as part of a wholesale programme of the privatisation of state-owned industry, to reinvigorate UK aviation by exposing it to comprehensive competition. Government policy was driven by a belief that market forces were or should be always and everywhere the key to efficiency and success subject only the need to constrain monopolies; monopolies were however defined in terms of national rather than international markets – for British Airways (BA) and British Airports Authority, a fateful distinction classifying them as whales in a small national pond rather than herrings in an international sea.

After the privatisation of BA, the Government continued to inhibit its growth by preventing the expansion of Heathrow and Gatwick and allowing expansion at Stansted. The exercise of the new entrepreneurial freedoms was limited by regulation and not least, by the complex requirements of planning inquiries for approval of airport expansion.

In Europe, by contrast, the privatisation of aviation was accompanied by massive support from governments. The main European competition, whether from airlines - Lufthansa, Air France and KLM – or airports – Frankfurt, Paris and Amsterdam – was encouraged by the authorities, central and municipal. Cross-investment between airlines and local authorities, forbidden in the UK, was encouraged; Lufthansa has a 10% share in and a seat on the board of Fraport, the German owner of Frankfurt Airport and owner/operator of a number of major airports overseas. European governments remained committed to the support of their national carriers while UK aviation was abandoned to international competition.

An unintended overall effect of UK policy was to weaken institutions which might have provided a focus for national, strategic thinking. The Air Ministry, set up to regulate the industry and to procure military aircraft, was disbanded in 1969. The aviation industry ceased to have any government agency wholly devoted to their interests and civil aviation became and remains just one of the Department for Transport's concerns. The British Airports Authority which, as the owner of the most important airports in London, provided a co-

ordination force, was privatised in 1987 but ironically, its success both at home and overseas led to increasing concern about its monopolistic position. Weakened by financial setbacks - principally cost overruns at Heathrow Terminal Five - in 2006 BAA was taken over by the Spanish construction firm Ferrovial. In 2008 the Monopoly and Mergers Commission ruled that its ownership of the 3 major SE Airports should be broken up.

Civil aviation in the UK, now fragmented and directionless, continues to be at a disadvantage from foreign airlines and airports strongly backed by their governments. It is further handicapped by the financial objectives of some of the concerns that have moved into the sector. Airports and airlines are capital intensive operations which, like other utilities, require frequent and major financial injections to develop and to maintain their efficiency and competitiveness. Airports, like any other infrastructural asset, need to be managed with low discount rates and by reference to long-term objectives. Important newcomers to the sector have been private equity firms, concerns with relatively short-term planning horizons.

The remoteness of the management of these financial interests from UK national and local strategic needs is exacerbated by the fact that their ownership is, again, largely foreign. Investors discovered that the liberal UK environment enabled them, for a relatively small equity exposure, to leverage aviation assets on a large scale, to remunerate their financial costs from their control of airport charges and to extract profits via dividends and exit within inappropriately short periods of time. There is of course nothing improper about this behaviour; it is a perfectly rational response to the incentives made available by the regulatory environment. The fault lies with a long-standing government failure to understand the strategic needs of the aviation sector.

In the short-haul market the formation and rapid growth of low-cost airlines has changed the face of the business. The glut of aircraft after the 9/11 New York City attack enabled them to order hundreds of aircraft for delivery at short notice at heavily discounted prices and to transfer a considerable part of their capital financial risks to the manufacturers. They became supply-led operators and were able to generate huge volumes of new traffic at discount prices. They moved into many UK regional airports, took up spare capacity in major airports and set up new bases at airports in the EU and Switzerland. Their short-haul fleets became the largest in Europe. They have been able to exploit small, regional airports at marginal costs; they fail to remunerate historic capital costs of the facilities they use and *a fortiori*, make no contribution to investment in airport improvements; they encourage the inefficient use of smaller aircraft and fragment the networks; their need to maintain lower costs leads to lower levels of maintenance and increased levels of pollution. They have considerably increased the pressure on the UK established full-service scheduled airlines, on airport facilities and on increasingly crowded airspace. Ryanair and easyJet now carry more short-haul passengers than BA.

In the long-haul markets the difference between the UK and European regulatory and commercial environments has meant the establishment of large and rapidly growing international networks with their hubs outside the UK, in Europe and the Middle East. European airlines have siphoned off UK traffic to reinforce their own long-haul networks. Most of the KLM long-haul network could not continue in its present form in the absence of demand from UK passengers. Similarly, the Middle East carriers – principally Emirates, Etihad and Qatar Airways – have supplemented their own modest passenger and cargo traffic by carrying very large numbers of UK passengers to Asia, Africa, Australasia and some even to the Americas. The UK is their largest European market.

The UK authorities have been slow to see the effects of this weakening of UK aviation and the various Green and White Papers exhibit little or no understanding of what is at stake. The UK's largest airline - BA - and the two largest airports - Heathrow and Gatwick - are effectively owned by foreign interests. With the exception of Manchester Airports Group there are now no major UK-majority owned airports. Easyjet, the last major UK based airline not owned by foreign interests, is considering the transfer of its headquarters to Paris and its delisting from the London Stock Exchange. As a result of all these factors the two major London Airports are operating at 99% (LHR) and over 90% (LGW) of capacity, far higher rates than the major European airports, Amsterdam (Schiphol,) Paris (Charles de Gaulle) and Frankfurt, which operate with a much larger

reserve of unused capacity as well as a much higher absolute level of permitted aircraft movements. These levels of operation allow these airports to grow while the two biggest UK airports are inhibited in adding additional runway capacity by complex planning regulations and political difficulties in the way of granting approvals.

The situation with respect to international freight facilities for air cargo night operations is even less satisfactory. No major UK airport can operate on a twenty-four hour basis. The plan to expand Heathrow with the third runway includes some additional cargo development, but this is suited only for the expansion of belly-hold capacity on passenger aircraft while room for further increases in capacity is constrained by a commitment to reduce the operating day by half an hour. There is and never has been any effective strategy for the air cargo market.

These weaknesses have further debilitating effects on the sector. The UK aviation consulting and engineering business is disadvantaged in world markets. There is no world class UK-owned airport which can offer itself as a demonstration model and no world-class UK airport management company with which UK enterprises they collaborate to increase their penetration of export airport markets. The Government plans for a major increase in foreign aviation business consulting will be difficult to achieve without UK-owned world-class major airports. The French, Dutch and German consulting companies have a huge advantage in being able to work with their own national world-class airports and world-class airport operating companies.

In consequence of this haphazard development and the steady degradation of the UK's aviation assets, many parts of the country are inadequately served to the extent that economic development is impeded. At the same time the south-east region is so congested that air traffic is often at the limit of safety requirements. Emissions from aircraft stacked up awaiting landing at the major SE Airports generate a significant increase in air pollution. The dispersion of multiple services in a large number of inadequate regional airports is a major factor in the inhibition of growth of long-haul flights other than at Heathrow and Gatwick. It prevents airports playing their proper part in the economic development of many regions in the UK and especially in the west of England and south Wales. It leads to a significant increase in exhaust emissions from surface transport as well as the use of smaller, less fuel-efficient aircraft adding to additional unnecessary flight movements soaking up scarce capacity at key airports.

2. The Department for Transport Forecasts

The Department for Transport aviation forecasts are seriously flawed.

The Department for Transport's computer-based forecasting model for the UK predicts air travel demand by region on the basis of expected economic growth and the propensity to fly. The model then allocates demand to existing airports in accordance with the maximum capacity assessed for each airport by year of the forecast, typically in five-year increments. The model outcomes are then compared with past demand at each airport. Provided that the differences between demand predictions and historic outturns are small it is assumed that the forecasts generated by the model are accurate.

It is assumed that the individual passenger will travel from the nearest airport with a suitable flight, and then, if capacity is not available, they will go to the next most convenient airport with capacity. If direct flights are not available they will then fly to a European or continental hub. If they are deterred by longer travelling time and inconvenience, their demand will simply be extinguished. This calculation would not exclude the possibility that demand will be frustrated even in the South East. The effect is to disguise unsatisfied demand while excess demand in so far as it is satisfied is steadily squeezed into the South East until finally frustrated. Extinguished demand will not, of course, appear in the actual outturns and there is no way of knowing the exact extent to which air travel is suppressed.

The forecasts themselves present a number of difficulties.

Immediately striking is the fact that the actual demand outturns are consistently higher than predicted. Nowhere have the errors been greater than for Bristol Airport;

	2000	2015	2018	2030
DfT RRC Case (2002)	2.1	4.5 – 5.3.		7.7 – 9.5
Actual		6.8	8.7	
DfT 2017 Forecast	2.1	6.8		10.00*

*restrained by airport capacity

In 2007 Air Passenger Duty was doubled and, as expected, adversely affected demand. In 2002 the forecast was for a **maximum** of 5.3 million passengers in 2015. Given the unpredictable imposition of the duty this forecast could have been expected to be too high. In fact the outturn for 2015 was 6.8 million passengers and the forecast proved, taking its upper limit, to be more than **20% too low**.

In 2018 actual passenger demand at Bristol was 8.7 million. The DfT now forecasts that in the 12 years to 2030 it will grow at a rate of less than 1% a year; this for an airport that has increased its traffic by over 9% a year in the previous three years and by 23% a year in the previous 18.

There appear to be two problematic sets of assumptions in the DfT forecasting model.

First, it underestimates actual demand in the regions and assumes that the excess unsatisfied demand at the local airports is met by travelling to and flying from South East Airports, primarily Heathrow and Gatwick, or is suppressed. Demand estimates may be further distorted by a failure to account for the pricing behaviour of low cost budget airlines. They are driven by a financial policy that requires the maximisation of the use of capacity. Prices are adjusted to produce load factors of over 95%. This will produce a propensity to fly greater than that assumed and so again help to produce underestimates of demand.

Second, the model assumes that no additional airport capacity can, or perhaps should, be built in the UK except in the South East, principally at Heathrow. The DfT baseline airport capacity figures for Air Transport Movements (ATMs) and Passenger Terminal Capacities in Appendix I illustrate this point perfectly. This shows no growth in airport passenger capacity at a number of airports for periods up to 30 years between 2020 and 2050.

This is entirely improbable. Even if the number of flights does not increase, the number of passengers handled over such a long period would grow due to use of larger aircraft and improvements to passenger handling. The failure to take account of this well-established trend amounts to a policy presumption; it is not a prediction of market behaviour. It suggests that the assumptions are simply a reflection of a policy to force passengers to travel through Heathrow or to frustrate their demand rather than to provide capacity in the regions. This policy itself may be an unstated acknowledgement that these passengers are needed to remunerate the very high cost of Heathrow expansion.

There appears to be no understanding that the apparent purpose of this policy – the maintenance of Heathrow as the ‘airport of last resort’ for the regions – is frustrated by the fact that it is not only the regional passenger that can transfer to Heathrow. Many passengers from Gatwick and Stansted would prefer to travel from Heathrow and are prepared to pay more in order to do so. This means that any increase in capacity at Heathrow is immediately taken up by flights transferred from Gatwick and Stansted. Heathrow continues to be congested and no relief is provided for the increasing volume of otherwise suppressed demand from the regions.

It is as if the model were designed to prevent regional development, especially in South Wales and the South West. The model prediction obscures the demand that would justify such expansion. But Bristol will be much more heavily in demand than predicted in the DfT forecasts. The distortion in the numbers become even greater when regional demand is aggregated.

The DfT forecasts are based on three scenarios – high, medium and low demand derived as functions of forecast economic growth – and on two different assumptions about capacity - “unconstrained” and “constrained”. The “unconstrained” model assumes, with a number of minor restrictive provisions, that capacity is added wherever and whenever required. The “constrained” model has two variants, one that assumes that there is only one extra runway provided in the south-east and none elsewhere in the forecast period and another variant which assumes no new construction at all. The most interesting feature of this analysis is that alterations in the supply of capacity are not driven by changes in demand. Whether or not airport facilities are constructed is entirely exogenous to the model. Supply appears to rest entirely on political assumptions. There is, of course, nothing illogical about this, even if it results in an under-estimation, but it obscures the analysis when it is not made explicit. It would have been more accurate and helpful, even if presentationally awkward, to state it clearly.

The approach taken appears to be one designed to meet a predetermined set of undeclared objectives rather than to provide a reasoned account of supply and demand. It is hard to find any other explanation of the Department’s poor track record in forecasting. It is, however, even more difficult to identify any analytical reason for the way in which the initial data of the respective periods are inconsistent with each other; it further undermines confidence in the analytical coherence of all the forecasts. When the analysis on which policy development is based are so deeply flawed it is not surprising that governmental policies for aviation have been sub-optimal when not actually self-defeating.

When the consultations on the Future of UK Aviation 2050 were launched the DfT issued a new set of forecasts (2017 Forecast) based on end year 2016 data. The basic assumptions are similar to those of the 2013 Forecasts, but with a more extensive analysis of technical changes and the environmental impact.

The DfT 2017 Forecasts provide for 3 Scenarios covering both unconstrained and constrained demand as defined above.

In Table 1 below the DfT 2017 Forecasts are compared with the DfT 2013 forecasts together with the actual outturns for 2010, 2016 and 2018.

Table 1: UNCONSTRAINED UK DEMAND

Year	DfT 2013 Forecast			DfT 2017 Forecast			Difference: 2017 vs 2013		
	Low	Central	High	Low	Central	High	Low	Central	High
	MPPA			MPPA			MPPA		
2010	211	211	211	211	211	211			
2016				267	267	267			
2018				292	292	292			
2020	238	259	281	285	300	315	47	41	34
2030	281	320	359	335	355	380	54	35	21
2040	314	391	483	395	420	455	81	29	-28
2050	350	482	661	470	495	535	120	13	-126

2016 and 2018 are CAA recorded actuals for modelled airports

Confidence in the numbers is immediately undermined by the observation that the 2017 low forecast for 2020 is actually *below* the outturn for 2018.

Further doubts are raised by the internal consistency of the forecasts and their relationship with each other. In the 2013 forecasts the spread between the Low and High Forecasts is, by 2050, one of 311 million passengers. In the 2017 forecasts the spread is much smaller and has reduced dramatically by 2050 to one of 65 million passengers. The relationship between economic growth and the propensity to fly appears to have changed with no explanation.

Again, the differences between the three scenarios in each of the 2013 and 2017 forecasts vary with the scenario. In the 2017 forecast for example, the low scenario forecasts 120 million passengers more in 2050 than does the 2013 Forecast. But the forecast for the high scenario is 126 million passengers lower.

At no point in any of the DfT scenarios for unconstrained demand is the capacity of the airports sufficient to meet demand. This is, to state the obvious, an admission that UK airport capacity is inadequate for demand and that there are no plans to do anything about it.

Table 2 below shows the forecasts for “constrained” demand. It is not apparently meant that *demand* is itself constrained but that constraints on *supply* mean that demand cannot be met.

The constrained forecasts assume five different SE Airport configurations: no new runways, 3 different runway assumptions at Heathrow and a wide spaced additional runway at Gatwick. (The differences between the three Heathrow assumptions are small and are not considered in detail here).

Table 2: CONSTRAINED UK DEMAND

Year	DfT 2013 Forecast			DfT 2017 Forecast		
	Low	Central	High	Low	Central	High
	MPPA	MPPA	MPPA	MPPA	MPPA	MPPA
2010	211	211	211			
2016				267	267	267
2018				292	292	292
2020	236	255	277	265	275	290
2030	276	313	347	295	315	330
2040	306	372	451	345	360	380
2050	339	447	cannot meet demand	395	410	435
2016 and 2018 are CAA recorded actuals for modelled airports						

Again, forecast passenger numbers in all scenarios in 2020 are *below* those recorded in 2018, while in 2030 they are, in the low scenario, only 3 million higher than 12 years before. The numbers in the 2017 forecast, judging by comparison with the 2013 forecast, appear again to have been reduced without explanation.

The DfT figures appear to predict that an increasingly large proportion of demand will be unsatisfied. By 2050 the figure for unsatisfied demand is 75 million in the low scenario, and 100 million in the high scenario - 16% and 19% of demand respectively. From the internal inconsistencies of DfT forecasting it might be suspected that this difference is smaller than the basic analysis would suggest. This level of unsatisfied demand means that it is the regions outside the South East that will lose most from what appears to be a settled policy of inadequate provision.

Table 3 compares the expected outcomes of the Unconstrained and Constrained Forecasts and shows how much demand is expected to be frustrated.



Table 3: DfT 2017 – Unconstrained versus Constrained Demand

Year	Unconstrained			Constrained			Difference		
	Low	Central	High	Low	Central	High	Low	Central	High
	MPPA	MPPA	MPPA	MPPA	MPPA	MPPA	MPPA	MPPA	MPPA
2010	211	211	211						
2016	267	267	267	267	267	267			
2018	292	292	292	292	292	292			
2020	285	300	315	265	275	290	20	25	25
2030	335	355	380	295	315	330	40	40	50
2040	395	420	455	345	360	380	50	60	75
2050	470	495	535	395	410	435	75	85	100

Even in 2020 and in the low scenario the shortfall in supply is expected to amount to 20 million passengers – requiring an airport twice the size of Bristol to meet it. By 2050 the numbers would suggest the need for another Heathrow.

DfT forecasts underpin a policy in which is not driven by demand and which is throttling economic development, nowhere more greatly than in South Wales and the South West.

3. Air Cargo

Air freight is carried in the belly-holds of passenger aircraft and the value of passenger traffic is greater, per unit of weight, than cargo. It follows that freight is a function of passenger traffic and not the other way around. A policy for air freight related primarily to the needs of economic development requires a consideration of the possibilities beyond the technical constraints of aircraft designed for passenger traffic. The efficient air transport of air cargo requires, in addition, the use of dedicated freight aircraft, night operations and longer runways for the larger, more heavily loaded aircraft.

Freight aircraft utilisation is often less than that for passenger aircraft and account needs to be taken of the longer time spent by freight aircraft on the ground and their requirement for more parking time and space. There is no evidence that the authorities have ever undertaken any such analysis. Cargo is of secondary importance and its treatment is perfunctory. DfT forecasts acknowledge that they do not fully provide for air cargo demand. There is no world-class cargo airport in the UK and, apart from the proposal for Severnside, no plan for one.

Major cargo operations with the largest aircraft require runways of 3700 metres in length and 60 metres in width. The runways at Bristol and Cardiff are each over 1000 metres too short and at least 5 metres too narrow. The necessary improvements to these runways would be neither practical nor economic. B747-400F or B747-8F aircraft cannot be operated at these airports even with reduced payloads.

Table 4 shows the development of the UK air cargo market of the period 2008 to 2018:

Table 4 Air Cargo Statistics 2007-2018 in tonnes'000

Airport	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Heathrow	1311.0	1397.1	1277.7	1473.0	1484.4	1464.4	1422.9	1498.9	1496.5	1541.0	1698.5	1685.1
East Midlands	274.8	261.5	255.1	273.7	264.6	264.3	267.0	277.4	291.7	300.1	324.2	334.5
Stansted	203.7	197.7	182.8	202.2	202.6	214.2	212.0	204.7	208.0	223.2	236.9	226.1
Manchester	165.4	141.8	102.5	115.9	107.4	96.8	96.4	93.5	100.0	109.6	120.2	114.1
Gatwick	171.1	107.7	74.7	104.0	88.1	97.6	96.7	88.5	73.4	79.6	97.0	112.6
Birmingham	13.6	12.2	13.1	21.6	16.6	19.1	21.1	5.1	7.2	30.0	41.8	33.7
Subtotal '000	2139.5	2118.0	1905.9	2190.5	2163.7	2156.3	2116.0	2168.1	2176.8	2283.6	2518.5	2506.2
Airport'000	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Bristol	0.02	0.003	0	0	0	0	0	0	0	0	0.01	0.007
Cardiff	2.391	1.334	0.178	0.028	0.377	0.066	0.048	0.036	0.026	0.005	0.004	1.459
Total '000	2.411	1.337	0.178	0.028	0.377	0.066	0.048	0.036	0.026	0.005	0.014	1.466
Total UK Million	2.325	2.282	2.048	2.325	2.298	2.302	2.262	2.304	2.299	2.385	2.622	2.631

Source: CAA statistics

Heathrow is the principal UK freight airport handling around 65% of UK freight by volume. Virtually all the cargo at Heathrow is handled by bellyhold capacity on widebody aircraft. There are very few freighters. The UK cargo market as a whole has grown by little more than 1% annually for 11 years. The bulk of this growth has been at Heathrow, officially designated by the government as the country's principal airfreight airport, where it has increased by something more than 2.5% a year over the same period.

East Midlands Airport is ranked by the UK Government as the second most important freight airport. The volume of cargo there grew by less than 2% annually in this period. Like Bristol and Cardiff, East Midlands has a runway which is at least 500 metres too short for the largest freighters at maximum take-off weight in summer conditions. Elsewhere cargo volume has declined.

Official policies have resulted in internationally uncompetitive freight operations and facilities:

1. There is no UK owned air cargo operation operating internationally competitive freighters.
2. There is no UK world-class cargo airport with suitable runways capable of 24-hour operation.

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3. The UK manufacturing base for high-value products and components requiring air transport distribution is weak and internationally uncompetitive.
 4. South East airports are congested with passenger aircraft and the number of slots available for freighters is inadequate.
 5. The major European airports of Frankfurt, Amsterdam and Paris (CDG) have better freight facilities than are available in the UK and are the home to major freight operations by their national airlines - Lufthansa and Air France/KLM.
 6. European airlines move more freight in and out of the UK than does BA in and out of Europe.
 7. Over the last ten years Paris, Frankfurt and Amsterdam have consistently and individually handled more cargo volume than has Heathrow.

The UK urgently needs a dedicated cargo airport capable of handling the largest freighter aircraft at maximum take-off weight for 24-hour operation. Severnside would fulfill these needs immediately on opening.

Severnside Airport would also constitute the best intermodal cargo hub in Europe, offering rail-to-air as well as road-to-air interchange. The proximity of local seaports offers further opportunities for development

The level of service offered by the UK air cargo operators is such that any industry wishing to set up a high added value, air-transportable production operation given a choice would never choose the UK when Frankfurt, Paris and Amsterdam offer much better services.

5. The Strategic Context – Rationalisation

An underlying argument of this submission is that the UK aviation network needs to be rationalised in order to increase efficiency and to restore UK aviation to a position that reflects its comparative, international competitive advantages. The reduction of emissions and pollution is not a separate, optional extra. The achievement of the objective function of this policy, the optimisation of the value of UK civil aviation, necessarily entails policy, design and technological improvements that bring with them not only increased productivity and profitability but also a maximisation of external benefits in terms of employment, economic growth and environmental protection and improvement.

Such a policy requires careful thought and long-term commitment. It is not suggested that the project under consideration is anything more than a contribution to the solution. It is, nonetheless, an important first step in the revitalisation of the whole UK aviation network.

Nor are the advantages of what is proposed confined to some public advantage. The closure of two obsolescent airports, Bristol and Cardiff, in one case congested and in the other uneconomic, and the transfer of their activities to a new, technologically advanced, larger airport on a much better site will, given that their contribution in terms of established traffic is of particular importance, provide their existing owners with improved investment prospects and profitability.

The analysis in this submission includes a re-examination of recent DfT Forecasts and this section provides a new and detailed forecast of air traffic for the new airport, Severnside.

Given improvements to road and rail infrastructure Severnside would be able to accommodate a much higher proportion of passengers and staff travelling by rail than would be possible at the existing Bristol and Cardiff Airports.

[REDACTED]

The analysis and projection of passenger demand, both nationally and regionally, is based on an extensive working familiarity with the UK and international networks over a long period of time. The analysis of infrastructural requirements and costs is necessarily more speculative. However, it is believed that these estimates are conservative and that they are based on the best information available to Vulcan at the time of writing.

The paper includes a description of the changes to the road and rail infrastructure required for the optimisation of the success of the airport.

The submission also describes the nature and scope of capital costs required for the construction of the airport and its associated facilities. In terms of road and rail connectivity the budget estimate does not cover the full costs of the rail and road infrastructure. The assumption has been made that the capital costs for this would form part of the construction and maintenance programme for roads and railways.

A further assumption is that the geological structures in the extension of the shoreline and on the land-side where the airport would be built are stable and appropriate for the proposed buildings and facilities that would be required by the airport. The preliminary information on which this assumption has been made supports this hypothesis, but no detailed surveys were made by Vulcan when undertaking earlier studies of Severnside and none have been undertaken for this report.

The construction of Severnside raises important environmental issues. The closing of Bristol and Cardiff Airports would represent, even on the narrowest consideration, a net gain environmentally. The city of Bristol and surrounding areas would be freed from a source of nuisance that has caused so much local resentment that it is unlikely, on that ground alone, that the airport will be allowed to increase its capacity. The transfer of Cardiff Airport's traffic to Severnside would increase the amenity of a large area of countryside. Severnside itself would have much lower noise and emission nuisance per passenger than Bristol and Cardiff and the management of passenger and aircraft movement would provide further improvements. Land in both areas would be freed for urban development. The runway orientation would be designed to maximise landing and take-off over water, transport would make use of sunken roads and railway tracks and maximise the use of electric vehicles. Airport buildings would minimise energy consumption and the transport of passengers and staff would be mainly by rail with electric 25KV overhead wires catenary.

At the same time Severnside is on or close to a number of Sites of Special Scientific interest created by the Welsh Government in the last decade. It is not suggested that these areas will be destroyed by this project. It is unlikely that the effects on wild life will be more than marginal. But while the design and operation of Severnside will minimise the extent to which its activities will affect these areas, it is improbable that they will be not be affected to some extent. This is an issue that the authorities will need to take head on in the context of national environmental improvement and as a matter of priority in the studies that will be required as part of the planning approval process.

Severnside, to repeat, is the important first move in the rationalisation of the whole British airport network. As such it is part of a programme of very great importance in the development of the British economy, its productivity, growth of employment and the diversity of its economic activities. Again, in terms of both design and modern technology, these policies bring with them, as an inherent part of the very idea of modernisation and improvement, positive improvements in the environmental impact of aviation and in pollution and the use of space.

The environmental costs and benefits of Severnside cannot be considered in isolation. They involve HMG as well as the Welsh government and directly affect the welfare of very large numbers of people. The environmental benefits clearly and heavily outweigh the environmental costs. Nor is the environmental calculus one that can be carried out in isolation from the consideration of the economic health of the country and its ability to finance further improvements.

[REDACTED]

For the Welsh government, the effects on a small part of the foreshore of the Bristol Channel have to be set against the opportunity for the economic transformation of South Wales. It is an opportunity that will not recur. Welsh incomes are 25% less than those for the country as a whole. This is the last chance for this and the next generation to curb the economic degeneration of Wales and to provide a lead for the United Kingdom as a whole.

6. Severnside Airport Basic Description

This section briefly describes three areas – initial onsite facilities, initial offsite facilities and the construction of facilities phased so as to match the growth in passengers. The location of the site will be an extension of the foreshore in the Goldcliffe area south of the former Llanwern iron and steelworks orientated so that the airport landing and take-off flight paths are over water avoiding urban and significantly populated areas. The airport would be able to handle flights on a 24-hour basis.

Onsite facilities

The initial plan is to build a single runway 3700 metre long and 60 metres wide capable of handling the heaviest widebody aircraft at maximum take-off weight. There would be a parallel taxiway which would provide for the continuous use of the runway in mixed-mode operation (both landings and take-offs in mixed sequence) with a maximum capacity of some 50 movements per hour. Standard operational practice would constrain the use of this runway to an average of 75% of its maximum capacity and there would be a possible need for a second runway after 2040. The exact location of the second runway and whether it should be close-, widely spaced-, or staggered-parallel would be determined in the light of operational experience.

There would be a main terminal for passenger and baggage processing with satellites arranged in a toast rack layout similar to that at Terminal 5 at Heathrow. Taxiways would be built on both sides of the terminal so that aircraft can enter and exit from either side of the terminal access paths. When and if twin parallel runways were to be constructed aircraft could still enter and exit the terminal areas from either side so reducing congestion, taxiing and waiting times.

The toast rack satellites and the main building would have pier-served stands to avoid bussing and exposing passengers to the weather. As at LHR Terminal 5 the satellites and main terminal building would be linked by an underground shuttle rail link.

The terminal and satellites would be designed so that they could be readily expanded as passenger volumes increase. The design would provide for incremental and gradual growth in capacity rather than large discontinuous additions of construction. The buildings would be designed to minimize energy consumption and exhaust emissions.

There would be full provision for passenger catering and retail activities including duty-free sales. There would also be airline lounges accessible by subscription, membership of airline frequent flyer schemes and as well as premium class travel.

Security, customs and border-guard entry and exit arrangements would be an important part of the design and layout of the terminal. The airport would meet any eventual government requirements as, for example border-guard exit supervision.

Full screening systems would provide for the examination of the baggage of all departing passengers. Facilities for the screening of arrival baggage in hold would be provided if required by government regulation.

[REDACTED]

A full range of emergency facilities, including a fire-station, first-aid facilities and ambulances would be provided.

Offsite and land side facilities

The airport would be designed to maximise the transportation of passengers by rail. The main Cardiff-London line would be diverted so as to pass under the airport in a station immediately under or adjacent to the main airport building. Ideally it would have more than two platforms so that trains could stop in the station allowing other trains to still use the station. Offsite facilities would include provision for facilities for:

- Fuel tanks for storage of jet fuel and automotive road fuels.
- Kitchens, food preparation and washing facilities for in-flight and ground catering
- Waste disposal including incineration
- Rainwater treatment and recovery of toxic de-icing fluids
- Potable water storage and treatment
- Sewage treatment and disposal
- Repair and maintenance facilities for aircraft handling equipment and road vehicles
- Electrical Power Recharging facilities for electric vehicles and handling equipment

Offsites would include all the facilities and equipment required to meet the needs of a state of the art major airport.

There would be space for further facilities including warehousing and a helicopter station.

Landside Surface Access

For surface access the objective is to maximise movement of people and goods by rail wherever this is possible. Use of 25KV overhead wires would minimise the use of diesel powered trains and where this could not be avoided such trains would run on battery power when on site. Local emissions from rail travel will be confined to brake dust and steel filings.

For passengers travelling by car, incentive parking rates will be offered for parking adjacent to the east and west rail connections. This will reduce vehicle exhaust emissions in the airport area and around the SSSIs.

Airport Heating and Ventilation Emissions

The most advanced and cost-effective heating and ventilation systems would minimise energy consumption and emissions. The exact configuration of plant and equipment would depend on the ultimate detailed design of the terminal and other facilities.

Airside Vehicle Emissions

For airside vehicles the proposal is to maximise the use of electric vehicles.

Aircraft Emissions

For aircraft the emission reduction measures anticipated would include the management of stand operations and taxiing so as to minimise waiting time for take-off and movement around the airport. The taxiways on both sides of the terminal and satellites will allow the most efficient movement of aircraft on and off stands and will lower emissions. A further major factor is due to the size of the airport and bigger movement of passengers it should be possible to operate bigger more efficient aircraft including modern efficient wide-bodies such as the A330 Neo, A350 and the B787.

Together all these measures will deliver a significant lower emission profile than continued operations at the Bristol and Cardiff. The prevailing winds from the west will disperse the airport and road emissions out over the Severn Estuary preventing concentrations of exhaust gases in the SSSI areas.

[REDACTED]

The statements in this section of the report are based on extensive experience of airline and airport operations. They are, however, necessarily initial estimates and a detailed environmental impact and energy study will be needed.

7. Severnside – Road and Rail Access

Road Access

The objective is to maximise use of rail access to the airport for both passengers and employees. Car parking provision at the airport will not need to be large. From the west, access would be via existing roads to Goldcliffe. To the east access would be via Redwick. The existing roads are narrow and winding. They need improvement to eliminate congestion and to ensure traffic safety. For the traffic that cannot go by rail a two lane road of sufficient size for the safe operation of commercial traffic is required. Most of the necessary construction would be for the widening of the existing carriage way.

By maximising rail traffic and using large long and medium term car parking at rail terminals to the west of Newport and at Severn Tunnel Junction the road traffic passing through the SSSI areas would be minimised.

Rail Access

It is proposed to divert the main Great Western railway from the west bank of the Usk via a tunnel under the river into the airport site under the terminal area. The line then would connect with the existing line at the Severn Tunnel Junction to the east of Newport. This would require about 17km of track of which around 40% would be tunnelled or in cuttings. The track would be electrified with 25KV overhead wires to avoid the use of diesel trains and reduce noise and toxic/harmful emissions. This gives main line trains direct access to the airport. Car parks at the two junctions with the existing main line with shuttle services to Severnside would mean that the proportion of passengers using public transport to access the airport could exceed 80%. This would be the highest in Europe.

Cargo Access to and From the Airport

Airside space would be provided for air freight with the aim of establishing Severnside as the second largest cargo airport after Heathrow. In order to reduce road traffic to the airport warehouses would be constructed at the car parking areas and freight moved in and out of the airport by rail.

Sea Access

It is not planned initially to construct links to the deep sea ports in the region – Avonmouth, Newport, Cardiff and Swansea. But the existing capacity and expansion plans of these ports suggest that there could be a substantial demand for intermodal services. If a market were to develop it would be possible to establish road and rail connection to these ports.

8. Severnside Passenger Forecast – Demand

Regional Demand

Table 7.2 shows the unconstrained DfT and Vulcan passenger traffic forecasts for Wales and the South West for 2016 and the equivalent forecasts for 2030 and 2050. To say that they are “unconstrained” means that they are forecasts of passenger demand in the region independent of the location of airport capacity.

Table 7.2

DfT 2016 Central Forecast Unconstrained Case mppa				Growth rate on Base		Growth rate on Base	
Year	2016	2030	2050	2016-30	CAGR	2016-2050	CAGR
South West	14.3	17.3	25.1	21%	1.40%	76%	1.68%
Wales	6	6.8	9.3	13%	0.90%	55%	1.30%
Total Passenger Demand	20.3	24.1	34.4	18.70%	1.25%	69.5%	1.56%
Vulcan 2018 Central Forecast Unconstrained Case mppa				Growth rate on Base		Growth rate on Base	
Year	2016	2030	2050	2016-30	CAGR	2016-2050	CAGR
South West	14.3	20.2	31	41%	2.50%	117%	2.30%
Wales	6	7.7	10	27%	1.75%	66%	1.50%
Total Passenger Demand	20.3	27.9	41	37%	2.30%	101.6%	2.21%

Vulcan's forecast is higher than that of the DfT because it is based on assumptions derived from the historic outturns whereas, as has already been noted, the DfT forecasts are based on inconsistent and inconsistently applied assumptions that in the past have consistently delivered underestimates of demand.

Vulcan's forecast of 41 million passengers for 2050 is just under 20% higher than the DfT forecast for the same date. The DfT sees passenger demand as growing by 1.56% a year while Vulcan estimates it at 2.21% a year. Nonetheless even the lower DfT forecast of 34.4 million passengers by 2050 would justify the construction of another airport. The lowest of their estimates exceeds the capacity of Bristol and Cardiff together. The DfT's forecast implies that a considerable amount of demand in South Wales, South West England and the Thames Valley west of Reading would be suppressed in the absence of any major airport construction.

Severnside – initial demand

Turning to the forecast for Severnside itself the first requirement is to establish a baseline with a forecast for 2028 when the airport opens. Vulcan has conservatively assumed that traffic will be limited to what is transferred from Bristol and Cardiff airports and has ignored the extra demand predicted even in the DfT forecasts. The calculation therefore assumes that initially traffic will be exclusively that transferred from Bristol and Cardiff in 2028.

Table 7.1

Cardiff and Bristol Airports DfT 2017 Baseline Central Forecast										
	2016	2017	2018	2020	2025	2030	2035	2040	2045	2050
ATMS										
Bristol	58	61	61	61	65	67	71	69	74	78
Cardiff	17	18	17	15	14	14	15	19	30	38
Total	76	80	78	76	79	81	86	87	104	116
Pax MPPA										
Bristol	7.6	8	8	8.2	8.7	9.5	10.1	10	10.1	10.2
Cardiff	1.4	1.3	1.2	0.9	0.8	0.8	0.9	1.1	2.4	3
Total	9	9.3	9.1	9.1	9.6	10.3	11	11.1	12.5	13.2
Pax/ATM										
Bristol	131	130	131	134	135	142	143	145	136	131
Cardiff	51	51	54	60	67	73	73	60	42	35
Average	119	117	118	119	121	127	129	127	120	114

Further details of the DfT forecast for Bristol and Cardiff airports are set out in Appendix 1

In Table 7.1 the DfT's forecast for Cardiff of something less than one million passengers, although almost certainly much too low, is not inconsistent with what is to be expected from its poor location and limited catchment area. Vulcan's prediction is for 1.5 million passengers.

The DfT forecast for Bristol is even less satisfactory. Demand is capped at its present, declared capacity of 10 million passengers right through to 2050. This is possibly again the Department's desired outcome rather than a forecast and is inconsistent with the historic data.

By de-bottlenecking areas of congestion both within and outside the airport at Bristol and making more efficient uses of stands and remote parking areas capacity could be increased to provide capacity for more than 12 million passengers without a serious decline in service standards. If further congestion, longer waiting times and inadequate parking can be tolerated it might be possible to take 14 million passengers in all.

On this conservative basis Vulcan forecasts 15.5 million passengers for Severnside in 2028 without considering the certainty that there will be other traffic generated regionally.

Severnside forecast.

Table 7.3

2018 Forecast	2028	2029	2030	2035	2040	2045	2050
	Passengers (millions)						
Short-haul	Growth Rate	5%	5%	5%	4%	4%	4%
ex Bristol	14	14.7	15.4	19.7	24	29.2	30.3
ex Cardiff	1.5	1.6	1.7	2.1	2.6	3.1	4
Subtotal	15.5	16.3	17.1	21.8	26.5	32.3	34.3
Long haul	Growth Rate		150%	20%	15%	5%	5%
		0.2	0.5	1.7	3.6	4.6	5.9
Total	15.5	16.5	17.6	23.5	30.1	36.9	40.2

In addition Vulcan's work relies on data from the CAA passenger surveys carried out every year at selected airports.

Vulcan has also drawn on the historic data for passenger growth at Stansted and Munich especially in their early years. Severnside is assumed to follow a similar growth path albeit at a slower rate. These two major airports are important examples of what can be done to develop significant networks at airports of comparable population catchments. However, Vulcan has applied a slower rate of traffic growth than that at Munich and Stansted. In 1992 Munich handled 12.0 million passengers. By 2018 (26 years later) the airport handled 46.1 million. This represents an average annual compound growth rate of 5.3%. The growth assumed by Vulcan at 4.4% a year over 22 years for Severnside is higher than that implied in the 2017 DfT forecasts, but it is considerably less than the growth at Munich. Again, Munich was growing strongly before the advent and rapid growth of the new entry low-cost carriers easyJet and Ryanair- who even now do not provide an important part of Munich's traffic but are expected to figure more importantly at Severnside. Munich now serves 266 destinations (more than Heathrow or Gatwick).

With the growth of the long-haul network, the possible presence of a major airline hub, and its greater ease of access by road and rail, Severnside will attract passengers from inside and outside the region who would not have used Bristol and Cardiff. It is also conservatively assumed that not all passengers to and from the

[REDACTED]

South West, leaving from and arriving at airports outside the region, would necessarily switch to Severnside even though, given a better choice of destinations, greater frequency, a greater number of long-haul flights and superior service, Severnside could expect to attract much more traffic than Bristol and Cardiff combined.

It is submitted that, given these assumptions, Vulcan's forecast is almost certainly an underestimate of demand at Severnside.

For further detail see Appendices 2, 3 and 4.

8 Supply Analysis – Competing Airports

The principal airports competing with Severnside are the major South East Airports, Heathrow and Gatwick, and the large regional airports, Birmingham and Manchester. The smaller airports, Oxford, Exeter, Bournemouth and Southampton, do not provide long-haul flights and their short-haul services often operate with smaller aircraft with low frequency to a comparatively limited number of destinations. Stansted is relatively difficult to reach for passengers from Wales and the West of England as is Luton which essentially provides short-haul low-cost flights. Neither Luton nor Stansted would compete with Severnside.

Heathrow and Gatwick offer a very large number of destinations (around 200 each) generally with good frequency especially Heathrow. They both have extensive short-haul networks and Heathrow has a huge long-haul network. Heathrow has two parallel runways: The Northern is 3,902 metres x 50 metres and the Southern is 3,658 metres x 50 metres. In 2018 it handled 80.1 million passengers and remains the largest airport in Europe in terms of passengers handled. Public transport to Heathrow has the disadvantage of requiring passengers travelling by train from the West to go to Paddington and then take the Heathrow Express, a 15/20 minute service every 15 minutes at a premium additional fare.

There is a rail-air-coach service at Reading but the frequency is less than the Heathrow Express and the route to Heathrow includes the congested M4 motorway. There is a proposal to extend a rail link west of Heathrow into Reading, but no plans to divert the Great Western main line under the airport. Without this radical change (which would not be easy to achieve) Heathrow will continue to have a sub-standard connection into the main Great Western mainline.

Gatwick Airport has the second busiest single runway airport in the world and handled 46.1 million passengers in 2018. (Mumbai is now the busiest with 49 million passengers). Runway length is 3316 metres. There is also an emergency close parallel runway of 2568 metres normally used as a taxiway. Gatwick is accessible by direct train from London Victoria every 15 minutes. It is also accessible directly from Reading with two trains per hour via Redhill for a journey time of around 1h20.

Additional runway and terminal capacity at Heathrow would be filled with flights from other SE airports and would have little impact on Severnside. Similar expansion at Gatwick would also have a small effect on demand at Severnside.

Birmingham is potentially a serious competitor for Severnside as it has a main line railway station that also serves the exhibition centre and is on the M42 motorway that connects into the M5 and M40. It has recently commissioned a 400 metre extension to its single runway extending it to 3003 metres. This was designed to encourage Emirates to operate the A380 into Birmingham. However, the runway length is too short for Boeing 747-400F and 747-8F aircraft at maximum take-off weight in summer. Birmingham has a relatively weak presence in the air cargo market and this is not expected to change in the foreseeable future,

Birmingham has a large short-haul network and regular scheduled long-haul flights to the Middle East (Dubai and Doha) and the Indian Sub-Continent. Long-haul flights elsewhere are mainly charters for holiday services to the Caribbean. Birmingham for years has tried to build up scheduled flights to the USA. For a while BA

operated flights from Birmingham to New York but gave up as operating costs were too high; it is inefficient to operate a single route with two aircraft positioned for another airport with no standby cover. Because passenger demand elasticity rapidly increases with flight from Birmingham offer low yields to long-haul airlines; it has difficulty in attracting flights from outside the Middle East and the Indian subcontinent. Birmingham is not a major competitor for Severnside. This view is supported by the CAA passenger survey data.

Manchester Airport has twin close-staggered parallel runways (3050 and 3048 metres) with movements capped at 61 per hour. If the cap was lifted it could handle up to 50 million passengers per annum. It currently handles around 27 million passengers per annum.

Manchester is competitive with Severnside for passengers from North Wales and Mid Wales. For South Wales and the South West, it is too distant to compete effectively. Access from South Wales is provided by an hourly rail service via Hereford changing at Crewe. This is relatively slow and from West Wales the journey takes about three hours. By road the route would be via the M4, M5 and M6 with heavy congestion around Birmingham. Most of the long-haul flights are limited to economy class seats offered by a diverse range of airlines. It is not an attractive option for premium passengers. As at Birmingham there is a considerable price resistance. Manchester, like Birmingham, is not a major competitor for Severnside.

9. Internal Economics - Severnside as a Stand-Alone Project

This section provides a brief account of the economic value of Severnside as it might appear to a private investor. It does not include any account of wider infrastructural costs or employment and environmental benefits.

It is also important to note that these calculations are based on forecasts generated by Vulcan in 2013 in its Severnside submission to the Davies Commission. These have not yet been revised to consider any changes that have occurred since that date. In particular, the traffic forecast is even lower than the cautious forecast given in Section 7 (Table 7.3) above.

The returns shown here are, therefore less than what, on the latest data, may reasonably be expected.

The table below shows the projections for Bristol and Cardiff made in 2013:

Table 9.1 Vulcan 2013 Passenger Forecast - Bristol and Cardiff

Year	2028	2019	2030	2035	2040	2045	2050
Short-haul							
Ex-Bristol mppa	12	12.6	13.2	16.5	20.1	24.4	29.7
Ex-Cardiff mppa	1.2	1.3	1.3	1.6	2.0	2.4	3.0
Subtotal mppa	13.2	13.9	14.5	18.1	22.1	26.8	32.7
<i>Growth rate</i>		5%	5%	4.5%	4%	4%	4%
Long-haul mppa	0	0.2	0.5	1.7	3.4	4.2	5.3
<i>Growth rate</i>			150%	20%	15%	5%	5%
TOTAL mppa	13.2	14.1	15.0	19.8	25.5	31.0	38.0

All the numbers given are lower than in the latest Vulcan forecast. There are differences for all years starting with 14.1 million compared to the latest forecast of 15.5 million for 2029. In 2040 volume is 26 million as compared to 30.1 million, and in 2050 38 million compared to 40.2 million in the latest forecast. In short, if Severnside were operating to-day it would, on conservative assumptions, be performing better than

predicted by Vulcan in 2013. The rest of the Vulcan forecast can confidently be taken to be an underestimate of Severnside's prospects.

Costs of the Project

The construction costs are calculated on the basis of a broad estimate of UK airport project costs and the costs that Amsterdam Schiphol Airport incurred in building its last southern long runway (18R/36L 3800 metres). Allowance is made for the land values and compensation costs which are lower than those applying at Heathrow or Gatwick. The costs of major road and railway costs external to the site are excluded.

Construction Capital Costs and Investment:

The phasing of the outturn value of £5 billion is set out in table 9.2:

Table 9.2 Capital Costs by Year (money of the day)

£ million	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Total
Capital Cost	400	600	900	1000	1200	900	5000

Funding structure

At this stage neither Bristol or Cardiff airports or any other governmental, municipal or financial body has committed to making any investment in Severnside.

It is assumed that the owners of both Bristol and Cardiff Airports would wish to be equity participants. This follows from the argument that Severnside represents the further development of their investment in aviation assets and the transfer of their traffic to Severnside is accordingly the natural development of those interests. It is assumed that a consortium would be established in the form of a public-private partnership to ensure that the strategic development of the airport is properly managed and is not diverted from its long-term goals by investors with short-term financial objectives. This arrangement would provide for a minority, but substantial and controlling, interest for HMG and the Welsh government with the remaining equity interest held by pension funds, sovereign wealth funds and other interested investors.

In Vulcan's submission to the Davies Commission the project was assumed to be funded 50% debt/equity as shown in Tables 9.3 and 9.4 indicating the expected sources, volumes and phasing of equity funding.

Table 9.3 Capital Structure and Value

Investors Equity	Passengers million	Land Acres	Land Value £/acre	Total Value £ million	2028 Value £ million
Cardiff Airport	1.3	1500	300,000	450	
Bristol Airport	10	1500	450,000	675	
Subtotal	13.3	3000		1125	1250
Other Investors					1250
Total Equity					2500
Debt					2500
Total Funding					5000

It is assumed that Bristol and Cardiff will not make any equity contributions before 2030, i.e., before they have closed, transferred their traffic to Severnside and have started to realise the value of their airport assets.



Table 9.4: Phasing of Equity Contributions

£ million	2024	2029	2030	2031	2032	2033	2034	2035
Bristol/Cardiff	-	-	250	250	250	250	250	-
Other Investors	1,250	-	-	-	-	-	-	-
Total	1,250	-	250	250	250	250	250	-
Cumulative	1,250	-	1,500	1,750	2,000	2,250	2,500	2,500

It is assumed that investors other than the two airports would contribute to funding at the start of construction. Bristol and Cardiff will take time to realise the value of their existing sites. An even rate of disposal over five years is assumed.

Debt interest rate: This is assumed at a rate of 6% per annum. This is higher than the rate that Heathrow Airport currently pays. Debt at higher and lower rates are examined as sensitivities.

Airport Income:

This is based on Gatwick Airport data. These have been adjusted to take account of a number of factors. Gatwick Airport's asset base is largely written down and its rates are likely to escalate under the new CAA regulatory regime. Further, because Severnside has much higher capital costs, airport charges will be higher than the current Gatwick charges. Gatwick will also have escalated its charges significantly by 2028. The data used in 2013 was the data available from Gatwick for 2011.

The 2018/19 Gatwick Airport holding company report has been used to calculate the income streams by key activities and this data is shown in Table 2.8 for comparison with the 2011 data used to estimate the Severnside income in 2028 onwards. The data has also been inflated at two rates, 2.5% pa and 3.7% pa. The 3.7% pa is the figure that is required to equate the Gatwick data in 2018/19 to reach the figure assumed for Severnside in 2028. The 2.5% pa case is also shown to illustrate what would happen at a lower inflation rate. It would be reasonable for the Severnside charges to be higher than those of Gatwick as it is a new state of the art airport. Gatwick in 2028 will be an old and increasingly obsolescent airport.

If Gatwick builds a second runway and replaces with new construction its by then obsolete facilities, it will incur substantial capital costs. These costs will have to be recovered by a large increase in airline user charges and non-aeronautical income (additional levies on shops, catering and parking charges). These developments would bring Gatwick charges to the level estimated by Vulcan for Severnside on its opening in 2028.

Table 9.5 Income Assumptions

INCOME	2011		2018		2028		
Airport	GATWICK	GATWICK	GATWICK	GATWICK	GATWICK £/PAX	GATWICK £/PAX	SEVERNSIDE
	£m	£/PAX	£m	£/PAX	2.5% pa	3.7% pa	£/PAX
Aeronautical Income	244.3	7.73	427.8	9.22	12.1	13.75	15
Retail	115.6	3.66	191.3	4.12	5.41	6.15	5
Car Parking	51.7	1.64	88.3	1.9	2.5	2.84	3
Operations and Utilities	22.2	0.7	31.9	0.7	0.92	1.04	1
Property Income	26.9	0.85	32.5	0.69	0.9	1.03	1
Other	15.6	0.49	39	0.84	1.1	1.25	1
TOTAL	476.3	15.07	810.8	17.47	22.93	26.06	26

Airport Running Costs:

These are also based on the Gatwick Airport costs but have been scaled back to allow for a smaller operation at the new airport and improved efficiency. Vulcan has assumed direct staff numbers of 1000 compared to 2400 currently employed at Gatwick.

Gatwick is a multi-terminal site with buildings and facilities originally constructed thirty years ago. In spite of modernisation the airport terminals there still have very long corridors and connecting buildings. Heating and ventilation costs and building maintenance expenses are higher than those expected for Severnside. Vulcan has also assumed lower employment costs with less highly paid management positions and significantly lower wage rates for junior staff. Table 9.6 also includes data for 2018/9.

Table 9.6 Cost Estimates

COSTS	GATWICK 2011	GATWICK 2018	GATWICK 2011	GATWICK 2018	SEVERNSIDE	
	£m	£m	Cost/£/PAX	Cost/£/PAX	£m	Cost/£/PAX
Staff	126.5	203.6	4.00	4.39	48	3.40
Retail	1.1	3.4	0.03	0.07	0	0.00
Car parking	16.2	19.1	0.51	0.41	4	0.28
Maintenance	25.6	45.2	0.81	0.97	10	0.71
Utilities	28.2	23.1	0.89	0.50	10	0.71
Rent and Rates	22.5	32.8	0.71	0.71	7	0.50
General expenses	64.8	42.2	2.05	0.91	15	1.06
TOTAL	284.9	369.4	9.02	7.96	94	6.67

Recurrent Capital Expenditure for Expansion:

The initial airport capacity is for 20 million passengers per annum. The airport would be designed to be expanded to 30 and to 40 million in two phases. This is represented by a spend of £50 million per annum growing to £70 million annum after 5 years, £90 million per annum after 10 years and £120 million per annum after 20 years. This gives a figure of £1.05 billion over 15 years. If a second runway is required it will be necessary to increase capital contributions after 2050.

Economics - The Payback Period

Using the 2013 median forecast assumptions it is estimated that the payback of the capital costs could be achieved after something less than 12 operating years. If 50% of the equity capital were to be made available at the beginning of the construction period it would improve the economics and shorten the payback period by around 2 years to 10 operating years. Using the revised (higher) 2018 forecast of 15.5 million passengers would probably improve the payback period by a further 2 years.

Sensitivities

The results have been tested against a number of sensitivities that are shown in detail in Appendix 5. The major variations are set out in Table 9.7.

Table 9.7 Economic Sensitivities

Case	Construction Cost	Forecast	Equity	Availability	Debt interest rate	Payback period operating years
Case 1	£5 billion	median	£2.5 billion	£1.25 billion at start of construction	6%	11.5
Case 4	£5 billion	High	£2.5 billion	£1.25 billion at start of construction	6%	9.5
Case 5	£5 billion	Low	£2.5 billion	£1.25 billion at start of construction	6%	14.1
Case 6	£5.5 billion	median	£2.5 billion	£1.25 billion at start of construction	6%	12.6
Case 9	£6 billion	median	£2.5 billion	£1.25 billion at start of construction	6%	14.3

10. Public Infrastructure

It is expected that surface access to the airport will be rapid, convenient and environmentally friendly. The maximisation of the use of public rail transport for surface access to and from the airport would minimise emissions. The airport would be linked to the west with a double track spur link from the main line running from Cardiff close to the coast before it turns North towards Newport. The line would run through a tunnel under the Usk estuary and then into the airport location before running up to re-join the main line just west of Severn Tunnel Junction. Newport City station and the new Severnside station would be on separate sections of the GWR mainline which would connect south west of Newport and at the Severn Tunnel Junction. The line would be electrified with a 25KV overhead wire catenary system. This would justify electrification of the main line further west to Swansea and possibly Carmarthen and beyond.

Trains from Milford Haven and London would run directly to the new airport. Newport City station could be linked by a shuttle service to Severnside station running along an extension of the line running south east from Newport City Station that used to serve the coastal coal-fired power station at Nash.

This map shows diagrammatically how a spur could be routed to the airport from both the GWR mainline west of Newport and from Severn Tunnel Junction east of Newport. This would require a tunnel under the Usk estuary. There would also be a tunnel under the airport site to provide passenger access to the terminal. The length of track required would be about 17km.

Locations of stations and car parking area



The planning and building period for the new airport is likely to be 8 years a period which would allow sufficient time for the construction of all the rail links before the airport opens. The rail link would mean that at least 65% of all movements of both staff and passengers would be by rail.

Most car parking would be at remote sites served by shuttle rail services. A site adjacent to Severn Tunnel Junction would provide car parking for car passengers from England and a similar site would be established on the west side of Newport for passengers from Cardiff and beyond and from the north.

Cardiff is currently served by a fast service to London every half hour that takes around 2 hours including some intermediate stops operated by Great Western Railway. A new company Grand Union Trains has filed an application to operate a 1.5-hour service from Cardiff to London Paddington eliminating all stops west of Bristol Parkway. The trains would stop at a new Cardiff Parkway station, Newport, Severn Tunnel Junction and Bristol Parkway. This service if started could stop at the airport station instead of Newport station. It is not known whether this service will actually operate and what its impact on Great Western Railway services would be, but it seems highly unlikely that there would be no changes to the existing operating timetable.

Reducing the time to travel to South Wales by 30 minutes would probably only have a marginal effect on transferring demand from London based passengers from Heathrow to the new airport. However, reducing the time from Reading, Didcot, Swindon and other Thames Valley towns would make Severnside a very attractive alternative to Heathrow.

[REDACTED]

In the absence of the M4 relief road, new access schemes from both east and west will be needed. A link into the existing steelworks road link from the M4 junction east of Newport would handle road traffic from the east. Improvement of road access from the west could probably be achieved by improving the existing road network rather than by building major new roads.

11. Environmental Implications

This discussion of the environmental implications is not based on any extensive study but is supported by Vulcan's long and extensive experience of civil aviation both in the United Kingdom and abroad. Severnside commends itself as a site for a major airport precisely because its environmental impact is lower than that of any other airport in the UK and Europe.

Exhaust emissions

Airports generally give rise to 4 types of exhaust emissions. First, there are the emissions related to surface transport accessing the airport. This consists of private and commercial vehicles and rail transport. Second, there are emissions arising from heating and ventilation of the airport buildings and facilities. Third, there are emissions airside from vehicles used to service the aircraft. Fourth, there are emissions airside and in the air for aircraft using the airport. The airport is designed so as to minimise emissions from all four sources.

Noise Nuisance

At Severnside by building the runways away from the existing foreshore it is possible to orientate landing and take-off over the waters of the Severn estuary and to avoid heavily populated areas. No other airport in the UK is able to offer this advantage. Most noise is over water and the strong prevailing winds will help to reduce noise in the SSSI area.

There has recently been increased publicly voiced opposition to the use of all kinds of fossil fuels whether for transportation or any other purpose from a newly reinvigorated environmental movement. Technological advance and projects like Severnside already offer important opportunities for the mitigation of the effects of emissions. There will be continuous and discontinuous improvements in the design of aircraft and engines. Fuel technology will continue to advance; work on the generation of jet fuels from waste has already produced a medium-sized process plant and can be expected to lead to production on a larger scale.

The low costs of aviation, its increasing success in controlling emissions and its importance to economic development and to the leisure industry make it difficult to suppose that the industry will not demonstrate its ability to satisfy environmental concerns and that, therefore, demand will be seriously constrained. These environmental concerns make it all the more important that the changes represented by Severnside should be implemented as soon as possible.

A reconstructed UK network with fewer, more efficient airports and aggregated flights would be a major step in the reduction of pollution. Larger, more fuel-efficient aircraft and a reduction in the overall number of flights would make it possible to travel to more destinations, and to reduce or possibly eliminate some hubs and their often wasteful, circuitous routes to and through the Middle East and South and East Asia.

Many regional UK airports are entirely uneconomic and there are far too many airports in SE England clustered around London with Heathrow, Gatwick, Stansted, Luton, London City, Southampton, Southend, and Oxford. Scotland does not need both Edinburgh and Glasgow Airports. Rationalisation would require the closure of many aging and dilapidated airports and their replacement by modern, larger and more attractive facilities. The effect on the environment will be positive. Severnside offers an early opportunity to demonstrate the value of the renovation of the aviation network.

12. Regional and National Economic Benefits

The construction of Severnside would have an important effect on the economy of Wales and South West England, the Thames Valley and the South Midlands. It is the missing link in the current Western Powerhouse Project and would constitute a major collaborative project between the authorities in England with Wales.

In Wales skilled employment has been hard hit by the continuous decline of iron and steel making, oil refining, petrochemicals and plastics production, the failed interim solution of electronics production and assembly and the virtual elimination of the coal mining industry. To this must now be added the planned closure of the Ford Bridgend car engine plant while with the failure of the Thyssen-Krupp/Tata Steel merger a major question mark hangs over the UK's largest integrated iron and steel making site at Port Talbot.

The Western Powerhouse project is a recognition of the need for new investment and the major changes in infrastructure needed to attract it. The most obvious deficiency of the region is the unsatisfactory nature of air services.

Severnside will affect employment in a number of ways.

The construction of the airport together with the changes and improvements in transport infrastructure will provide local stimulus as soon as it starts. Something like £10 billion is to be spent in the first five years.

The airport itself will initially create direct employment for about 1,000 staff. The airlines, sub-contractors and service companies together with off-site functions essential to the operation of the airport will provide employment for another 4,000.

The secondary effect of this would be the eventual creation of anything between 10,000 and 20,000 other jobs.

The most important employment effect is the greatest and necessarily the most difficult to estimate. Severnside makes it possible to extend the Thames Corridor beyond Swindon and area which, with Severnside, offers a serious alternative to the crowded South East. Cardiff and Bristol have, by national standards, a high concentration of research facilities and technical training. The local income figures suggest that there has been a suppression of opportunity in the region and a failure to realise the economic opportunity which the development of these skills represent.

The Western Powerhouse proposal is an acknowledgement that there is a need and opportunity to ease some of the congestion in the South East, in transport, in housing and in education. Mere road and rail improvement will not be enough to overcome the decline of industry and agriculture and to produce the indigenous sources of commercial growth on which regeneration depends. It is hard to be precise about the location and timing of such growth which is, in the nature of things, essentially unpredictable but it is hard to believe that this will not increase employment in the region by another 50,000 jobs.

13. Strategic Control

In the context of expenditure on national infrastructure the construction of an international airport at Severnside does not present a forbidding outlay of resources. The financial case for the airport can be justified in terms of its internal returns. The public, infrastructural changes required can be justified in terms of the external benefits in terms of employment and economic growth both in England and in Wales. In total the proposed costs represent a fraction of the proposed expenditure on HS2.

[REDACTED]

Nonetheless, it is submitted that its importance for national strategies of environmental protection, economic renewal and industrial development has a greater significance than is suggested by the size of the resources that would be directly required. It could be, as has been argued in this submission, the first step in the rationalisation and re-design of the United Kingdom airport system – the policies for which require long-term and consistent, application. In terms of the national interest the construction of an airport of the kind planned should be conceived within a planning time-horizon of at least a generation. Severnside is not merely a proposal to meet local and regional concerns; its strategic value is national.

It is important therefore that the long-term management of the airport should be in the hands of investors with appropriately long-term horizons and an understanding of and commitment to the interests of those who benefit from it. Interest from any quarter would, of course, be welcome, but it is desirable that there should be close links with the airport's long-term beneficiaries. To this end a controlling interest should be assigned to one of the public authorities whose agreement will be needed – HMG, the Welsh Government, the Bristol, Cardiff and Newport municipal authorities (the "Western Powerhouse"). The participation of the owners of Bristol and Cardiff airports as key investors in and beneficiaries from the project – in the latter case, happily, the Welsh Government itself – is also of fundamental importance to the success of the proposal.


To this end the next formal step would, it is suggested, for one of these entities – ideally, but not necessarily the Welsh Government, to take the lead, either alone or as the prime mover in a consortium, to test the feasibility of the proposal and gather the necessary political support. This would guarantee that the discussion of the airport's financial viability and its developmental importance for the region and for the UK's aviation industry as a whole, takes place in the context of a proper understanding of relevant and wider considerations. Such discussion would provide the best guarantee of the creation of a strategically-determined ownership structure.

14. Conclusion

This paper makes no more than a *prima facie* case for the construction of an airport in the South West. Demand and supply in the UK are the fundamental elements in the analysis. At this stage in the consideration of the proposal discussion of the elements in the argument become progressively more speculative as discussion moves from passenger numbers, to the detail of airport design and construction, to the questions of infrastructure of the effect on the UK aviation network as a whole and to its short-, medium- and long-term environmental and economic effects. Nonetheless, the force of the argument is that this is a proposition that no public authority can afford to reject without further serious study.

Further study is needed to establish the feasibility of what is proposed but it may help to keep the discussion at a practical and purposeful level if some of the most pressing issues for inquiry are listed here:

- Confirmation of the traffic forecasts.
- Evaluation of air transport movements and required runway capacity.
- Terminal capacity and aircraft stand requirement.
- Aircraft parking space for Passenger and Cargo Aircraft.
- Geological report on the nature of the soil and geological structure onshore and offshore around the Gwent Levels.
- Detail identification of possible sites with a recommendation.
- Preliminary Civil engineering study of the possible sites and costs.
- Outline design of the airport runways taxiways and terminals and costs.
- Shuttle train below terminal building and pier served stands satellites.
- Surface access study for road and rail infrastructure options and costs.
- Underground station, tunnelling and cutting considerations.
- Shuttle train movements on main line from remote car parking areas.

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- Impact of airport on GWR line mainline trains from London to major South Wales towns and cities.
 - Car parking requirements and locations
 - Movements of passengers and cargo by rail.
 - Environmental Impact Studies for road infrastructure, rail infrastructure and their effect on the Gwent Level SSSIs.
 - Fire ambulance and safety assessment.
 - Environmental Impact Study for the airport emissions in the area of airport and expected dispersal.
 - Environmental Impact Study for noise nuisance at the airport and on the flight paths in and out of the airport.
 - An overall analysis of the environmental effects to establish the extent of the net benefit of rationalisation and airport closure.
 - Air Traffic Control Aspects Study with NATS Involvement.

This proposal or various and less ambitious versions of it has been submitted at different times over the last thirty years. None of the versions have received serious consideration because of misunderstandings, the power of vested interests and the restrictive nature of government policy. The present proposal has not been formally presented to any of the various parties, public and private, that are directly involved. However, informal discussion has confirmed that there is now considerable support on both commercial and public interest grounds. The proposal is also aligned with government priorities with respect to the environment and more specifically the need to rebalance national economy so as to distribute resources and activity more productively between the congested South East and the regions. The constellations of political and economic forces appear, at least on first soundings, to be aligned. The time has come to examine the feasibility of the proposal in detail.

Vulcan Associates
September 2019

APPENDICES

Appendix 1 DfT 2017 Forecast Airport Capacity – Air Transport Movements (ATMs) and Passenger Numbers (PAX) 2016 to 2050

Baseline Runway and Terminal Capacities by Individual Airport										
DfT 2017 Forecast	Runway ATMs (000s)					Terminal Passengers (mppa)				
Airport	2016	2020	2030	2040	2050	2016	2020	2030	2040	2050
Gatwick	290	290	290	290	290	45	45	45	50	50
Heathrow	480	480	480	480	480	90	90	90	90	90
London City	111	111	111	111	111	5	5	7	7	7
Luton	130	160	160	160	160	18	18	18	18	18
Stansted	259	259	259	259	259	35	35	35	35	35
London	1270	1300	1300	1300	1300	193	193	195	200	200
Birmingham	206	206	206	206	206	27	27	37	37	37
Bristol	150	150	226	226	226	10	10	10	10	10
East Midlands	264	264	264	264	264	6	6	10	10	10
Edinburgh	150	150	225	225	225	13	15	20	20	35
Glasgow	226	226	226	226	226	10	10	20	20	20
Liverpool	213	213	213	213	213	7	7	15	15	15
Manchester	324	324	400	500	500	30	30	38	55	55
Newcastle	213	213	226	226	226	9	9	9	9	9
Larger regional	1746	1746	1985	2085	2085	112	114	159	176	191
Aberdeen	175	175	225	225	225	6	6	6	6	6
Blackpool	0	0	0	0	0	0	0	0	0	0
Bournemouth	150	150	150	150	150	3	3	5	5	5
Cardiff	105	105	150	150	150	3	3	8	8	8
Coventry	0	0	0	0	0	0	0	0	0	0
Doncaster Sheffield	57	57	57	57	57	2	2	2	2	2
Exeter	150	150	150	150	150	2	2	4	4	4
Humberside	150	150	150	150	150	1	1	3	3	3
Inverness	150	150	150	150	150	1	1	3	3	3
Leeds-Bradford	150	150	150	150	150	5	5	8	8	8
Newquay	75	75	75	75	75	0	0	1	1	1
Norwich	175	175	175	175	175	2	2	3	3	3
Prestwick	150	150	225	225	225	3	3	3	3	3
Southampton	150	150	150	150	150	3	3	3	7	7
Southend	30	45	53	53	53	5	5	5	5	5
Durham Tees Valley	150	150	150	150	150	1	1	1	1	1
Sub-total	1817	1833	2011	2011	2011	36	36	53	57	57
All regional	3563	3579	3995	4095	4095	148	150	212	233	248
Total	4833	4879	5295	5395	5395	341	343	406	432	447



The numbers in Appendix 1 understate actual capacity. Operational practice is subject to change. Airports constantly seek for ways of increasing the numbers of aircraft and passengers that they can manage. Terminals are extended, traffic access is improved, aircraft increase in size, runway use is expanded. Even if, from today, no new runway capacity is added at Heathrow, it is extremely improbable that the number of passengers passing through it will not increase for 34 years.

Appendix 2: Vulcan Analysis of South West England, Wales and West Midlands Traffic

This appendix is an account of the way in which the Vulcan forecast of demand for Severnside will develop in the immediately adjacent regions. The analysis is based on two separate years for which CAA data is available – 2012 and 2018. From this some idea of the direction of change can be derived.

The tables show what numbers of South West are “lost” to South West airports and to whom. The key numbers in the tables below are the number of passengers handled by Bristol and Cardiff in the right hand column and the total of regional passengers at the bottom of the left hand column.

South West England Passengers 2012					
Airport	Passengers		Airport	Passengers	
	'000	%		'000	%
Heathrow	3,239	27.80%	Manchester	26	0.20%
Gatwick	1,107	9.50%	Liverpool	6	0.10%
Stansted	311	2.70%	Birmingham	309	2.60%
Luton	207	1.80%	East Midlands	20	0.20%
London City	13	0.10%	Bristol	5,033	43.10%
Total SE Airports	4,877	41.80%	Cardiff	115	1.00%
			Exeter	688	5.90%
Total Regional Airports	6,792	58.20%	Bournemouth	429	3.70%
			Newquay	166	1.40%
TOTAL South West	11,669	100.00%	Total Regional Airports	6,792	58.20%

In 2012 the total South West demand was 11.7 million of which 44% was met by Bristol and Cardiff and 6 million were “lost”.

South West England Passengers 2018					
Airport	Passengers		Airport	Passengers	
	'000	%		'000	%
Heathrow	3,685	22.30%	Manchester	113	0.68%
Gatwick	2,212	13.40%	Liverpool	3	0.02%
Stansted	616	3.70%	Birmingham	473	2.87%
Luton	428	2.60%	East Midlands	31	0.19%
London City	42	0.30%	Bristol	6,784	41.10%
Total SE Airports	6,982	42.30%	Cardiff	55.3	0.33%
			Exeter	931	5.64%
Total Regional Airports	9,522	57.70%	Bournemouth	675	4.09%
			Newquay	457	2.77%
TOTAL South West	16,504	100.00%	Total Regional Airports	9,522	57.70%

In 2018 total air travel demand for South West England was 16.5 million of which 41% was met by Bristol and Cardiff and 10 million were “lost”.



Wales Passengers 2012					
Airport	Passengers		Airport	Passengers	
	'000	%		'000	%
Heathrow	810	19.30%	Manchester	760	18.10%
Gatwick	302	7.20%	Liverpool	245	5.80%
Stansted	90	2.10%	Birmingham	150	3.60%
Luton	55	1.30%	East Midlands	20	0.50%
London City	3	0.10%	Bristol	800	19.10%
Total SE Airports	1,260	30.10%	Cardiff	950	22.70%
			Exeter	5	0.10%
Total Regional Airports	2,930	69.90%	Bournemouth	0	0.00%
			Newquay	0	0.00%
TOTAL Wales	4,190	100.00%	Total Regional Airports	2,930	69.90%

In 2012 Welsh demand was 4.2 million of which 41% was met by Bristol and Cardiff and 3.1 million were “lost”.

Wales Passengers 2018					
Airport	Passengers		Airport	Passengers	
	'000	%		'000	%
Heathrow	961	15.10%	Manchester	1045	16.40%
Gatwick	461	7.20%	Liverpool	222	3.50%
Stansted	112	1.80%	Birmingham	187	2.90%
Luton	92	1.40%	East Midlands	15	0.20%
London City	3	0.10%	Bristol	1739	27.30%
Total SE Airports	1,630	25.60%	Cardiff	1524	24.00%
			Exeter	0	0.00%
Total Regional Airports	4,732	74.40%	Bournemouth	0	0.00%
			Newquay	0	0.00%
TOTAL Wales	6,362	100.00%	Total Regional Airports	4,732	74.40%

In 2018 Welsh demand was 6.36 million passengers of which 49% were met by Bristol and Cardiff and 3.1 million were “lost”.



West Midlands Passengers 2012					
Airport	Passengers		Airport	Passengers	
	'000	%		'000	%
Heathrow	1,078	13.50%	Manchester	678	8.50%
Gatwick	414	5.20%	Liverpool	147	1.80%
Stansted	223	2.80%	Birmingham	4,494	56.30%
Luton	358	4.50%	East Midlands	476	6.00%
London City	12	0.20%	Leeds	0	0.00%
Total SE Airports	2,085	26.10%	Bristol	87	1.10%
			Cardiff	11	0.10%
Total Regional Airports	5,894	73.90%	Exeter	1	0.00%
			Bournemouth	0	0.00%
			Newquay	0	0.00%
TOTAL West Midlands	7,979	100%	Total Regional Airports	5,894	73.90%

West Midlands demand in 2012 was 8.0 million passengers of which 1.2% was met by Bristol and Cardiff and 7.9 million were “lost”.

West Midlands Passengers 2018					
Airport	Passengers		Airport	Passengers	
	'000	%		'000	%
Heathrow	1,309	9.26%	Manchester	1432	10.14%
Gatwick	625	4.42%	Liverpool	152	1.08%
Stansted	349	2.47%	Birmingham	8,663	61.30%
Luton	454	3.21%	East Midlands	730	5.17%
London City	12	0.08%	Leeds	6	0.04%
Total SE Airports	2,749	19.45%	Bristol	148	1.05%
			Cardiff	8	0.06%
Total Regional Airports	11,144	80.21%	Exeter	1	0.01%
			Bournemouth	0	0.00%
			Newcastle	3	0.02%
TOTAL West Midlands	13,893	100%	Total Regional Airports	11,144	80.21%

West Midlands demand in 2018 was 13.9 million passengers of which 1.1% was met by Bristol and Cardiff and 13.7 million were “lost”.

In 2018 32 million passengers in the regions immediately adjacent to Severnside travelled to and from airports other than Bristol and Cardiff. A large proportion of these “lost” passengers would be attracted to a local airport with the facilities planned for Severnside. If only a fifth of these passengers were to shift to Severnside in its opening years then it would very rapidly have a passenger throughput of 20 million. This is about one third greater than the passenger forecast on which Vulcan’s financial predictions are based.

Appendix 3 DfT Traffic Analysis - Cardiff and Bristol

In the DfT numbers the maximum capacity of Cardiff and Bristol Airports in terms of Air Transport Movements (landings and take-offs) does not change. Curiously, passenger flows in terms of ATMs in the 2017 DfT Forecast are reduced at Bristol Airport where capacity has been capped at 10 million passengers per annum.

DfT Data: Evolution of Airport Capacity at Bristol and Cardiff Airports							
2013 Forecast				2017 Forecast			
Runway Capacity ATMs/a	2008	2030	2050	Runway Capacity ATMs/a	2016	2030	2050
Bristol	150	226	226	Bristol	150	150	150
Cardiff	105	150	150	Cardiff	105	150	150
Passenger Capacity mppa	2008	2030	2050	Passenger Capacity mppa	2016	2030	2050
Bristol	10	12	12	Bristol	10	10	10
Cardiff	3	8	8	Cardiff	3	8	8
Total	13	20	20	Total	13	18	18

Since Bristol has applied to expand its airport capacity to 12 million passengers per annum for 2020, this the current DfT 2017 Forecast hard to understand. We have also looked in more detail at what the DfT 2017 forecasts show for Cardiff and Bristol Airports in terms of utilisation.

Cardiff and Bristol Airports DfT 2017 Baseline Central Forecast										
	2016	2017	2018	2020	2025	2030	2035	2040	2045	2050
ATMS										
Bristol	58	61	61	61	65	67	71	69	74	78
Cardiff	17	18	17	15	14	14	15	19	30	38
Total	76	80	78	76	79	81	86	87	104	116
Pax MPPA										
Bristol	7.6	8	8	8.2	8.7	9.5	10.1	10	10.1	10.2
Cardiff	1.4	1.3	1.2	0.9	0.8	0.8	0.9	1.1	2.4	3
Total	9	9.3	9.1	9.1	9.6	10.3	11	11.1	12.5	13.2
Pax/ATM										
Bristol	131	130	131	134	135	142	143	145	136	131
Cardiff	51	51	54	60	67	73	73	60	42	35
Average	119	117	118	119	121	127	129	127	120	114

Bristol utilisation is capped at 10 million while Cardiff, on account of its poor location and catchment area never exceeds 3 million passengers per annum. The growth in demand for these airports that cannot be met there goes mainly to Heathrow and Gatwick and is otherwise frustrated.

Airport	DfT 2017 Forecast			Actual Outturn		
Pax MPPA	2016	2017	2018	2016	2017	2018
Bristol	7.6	8	8	7.6	8.2	8.7
Cardiff	1.4	1.3	1.2	1.4	1.5	1.6
Total	9	9.3	9.1	9	9.7	10.3



Demand for Bristol and Cardiff airports in 2018 was already 8.7 and 1.6 million passengers respectively. This is the equivalent of the aggregate shown for 2030 in the DfT 2017 forecast. This implies that there will be no growth in passenger demand for 12 years! It is simply not credible to assert that passenger demand will not grow for a period of 12 years. It is possible that the management of Bristol Airport is deluded in its belief that traffic there will double in the next ten years. If not, it is hard to see any practical use for the DfT 2017 forecasts for Bristol and Cardiff

Appendix 4: Vulcan Forecasts for Severnside and their Derivation

The forecasts in this submission are derived from the analysis of the South West England, Wales and West Midlands Markets described in Appendix 3. The DfT Central Forecast has been adjusted in the light of these numbers and the expected attraction of Severnside as a modern state-of-art airport. The DfT forecast and the Vulcan adjusted version are set out in the table below:

DfT 2016 Central Forecast Unconstrained mppa				Growth rate on Base		Growth rate on Base	
Year	2016	2030	2050	2016-30	CAGR	2016-2050	CAGR
South West	14.3	17.3	25.1	21%	1.40%	76%	1.68%
Wales	6	6.8	9.3	13%	0.90%	55%	1.30%
Total Passenger Demand	20.3	24.1	34.4	18.70%	1.25%	69.50%	1.56%
Vulcan 2018 Central Forecast Unconstrained mppa				Growth rate on Base		Growth rate on Base	
Year	2016	2030	2050	2016-30	CAGR	2016-2050	CAGR
South West	14.3	20.2	31	41%	2.50%	117%	2.30%
Wales	6	7.7	10	27%	1.75%	66%	1.50%
Total Passenger Demand	20.3	27.9	41	37%	2.30%	101.60%	2.21%

From this forecast of “unconstrained” demand a detailed traffic forecast for Severnside has been developed, based on transferring traffic from Bristol and Cardiff Airports starting in 2028. As the longhaul network increases in size over the last 10 years of the planning period, 2040 to 2050, the new airport will attract higher volumes of traffic originating in regions from which the old Bristol and Cardiff Airports drew few or no passengers.

Vulcan 2018 Passenger Forecast - Bristol and Cardiff

Year	2028	2019	2030	2035	2040	2045	2050
Short-haul							
Ex-Bristol mppa	14	14.7	15.4	19.7	24	29.2	30.3
Ex-Cardiff mppa	1.5	1.6	1.7	2.1	2.6	3.1	4.0
Subtotal mppa	15.5	16.3	17.1	21.8	26.6	32.3	34.3
Growth rate		5%	5%	5%	4%	4%	4%
Long-haul mppa	0	0.2	0.5	1.7	3.6	4.6	5.9
Growth rate			150%	20.00%	15%	5%	5%
TOTAL mppa	15.5	16.5	17.6	23.5	30.2	36.9	40.2

Appendix 5: Economic Sensitivities

The full set of variants included in the submission to the Davies Commission is shown in this table.

Case	Construction Cost	Forecast	Equity	Availability	Debt interest rate	Payback period operating years
Case 1	£5 billion	median	£2.5 billion	£1.25 billion at start of construction	6%	11.5
Case 2	£5 billion	median	£2.5 billion	£1.25 billion at start of construction	7%	11.6
Case 3	£5 billion	median	£2.5 billion	£1.25 billion at start of construction	5%	10.2
Case 4	£5 billion	High	£2.5 billion	£1.25 billion at start of construction	6%	9.5
Case 5	£5 billion	Low	£2.5 billion	£1.25 billion at start of construction	6%	14.1
Case 6	£5.5 billion	median	£2.5 billion	£1.25 billion at start of construction	6%	12.6
Case 7	£5.5 billion	median	£2.5 billion	£1.25 billion at start of construction	7%	13.6
Case 8	£5.5 billion	median	£2.5 billion	£1.25 billion at start of construction	5%	11.7
Case 9	£6 billion	median	£2.5 billion	£1.25 billion at start of construction	6%	14.3
Case 10	£6 billion	High	£2.5 billion	£1.25 billion at start of construction	6%	12.4

Commentary on the Cardiff Airport Masterplan 2040

Vulcan has prepared some individual comments on the outline Cardiff Airport 2040 Masterplan. It fully understands that the airport is required to produce such a document and that quite reasonably the airport would wish the plan to represent an ambitious redevelopment and expansion of the existing asset base. Cardiff Airport's problem is that its location, catchment and facilities are such that any future significant growth at the airport is most unlikely to occur under realistic conditions of commercial or business justification. To build the facilities as envisaged under the Masterplan 2040 the Welsh Government would have to underwrite all the costs as the airport would not be able to support the costs from its existing and future earnings.

For many years the traffic at Cardiff Airport fell year-by-year and although this position has reversed in recent years, the growth that has occurred has been modest and apparently achieved at significantly reduced (discounted) airport charges. The airport has made a big announcement of securing scheduled Qatar Airways' flights to Doha. This is the first long haul scheduled service achieved by the airport for many years (if ever).

While this development is laudable, Vulcan is concerned that this achievement may have been secured at considerable cost and that the airline will only continue to serve Cardiff Airport while such advantageous terms remain in force. Gaining new routes and new airlines at Cardiff Airport will not be easy and is likely to succeed only with significant discounting of published airport charges. Even then, in many cases the economics will not work out as there is insufficient traffic willing to pay the necessary fares to cover full operational costs. The consequence of this position is that the airport will struggle to earn any economic return in the near future and certainly will not be in a position to support or justify the expansion and renewal programme outlined in the Masterplan 2040.

This commentary is not to show that Vulcan does not support the future of Cardiff Airport. As an interested observer Vulcan would be keen to see Cardiff succeed (as the more traffic it secures in the medium-term the better would be the case for the new Severnside Airport Project advocated by Vulcan), but it is merely a reflection of reality. Cardiff Airport is too small and obsolete in terms of facilities and its catchment is far too limited. It also has the disadvantage that Bristol and Birmingham are much larger airports successfully competing to take away a significant traffic volume that might otherwise use the airport.

If the Welsh Government were to decide to underwrite implementation of the Cardiff Airport 2040 Masterplan, it seems likely that it would be subject to scrutiny by the Competition and Markets Authority. Were Birmingham and Bristol Airport to object to such a level of subsidies to Cardiff Airport, it is difficult to see how the Competition and Markets Authority could uphold such action by the Welsh Government. Of course if Wales were to leave the UK as well as the EU it could do what it wishes with any subsidies. However, this in itself would not be a reason to recommend such action.

If the standard rules for any business are applied, the future for Cardiff Airport is either medium-term closure or operating for a few more years and then transferring its traffic to a new and much larger Severnside Airport to replace both the existing Bristol and Cardiff Airports. Vulcan has prepared a very detailed report on the Severnside Project which is attached with this submission. This Severnside report examines in detail the future prospects for both Bristol and Cardiff Airports, so there is no point in going into further detail in this commentary beyond what is written below.

CARDIFF AIRPORT - MASTERPLAN 2040 *(Vulcan comments are in red italics)*

The development strategy for the Masterplan has been designed to be flexible enough to accommodate changes in passenger demand and carrier needs.

(The drawings and commentary prepared for Cardiff Airport do not seem to reflect such developments especially if the growth continues to be modest.)

The following principles set out a guide for expansion and improvement of the Airport that the Masterplan seeks to promote:

1. A new 'best in class' terminal, focused on optimising the user experience and providing a distinctive welcome to be designed and orientated to allow interface with the Enterprise Zone and potential business and commercial developments;

Due to its poor location, relatively modest catchment and severe competition with the existing Bristol Airport, future demand for air travel at the existing Cardiff Airport is likely to be at best only a modest improvement on existing utilisation. Even if the traffic were to grow by 50% (which would be a highly ambitious target bearing in mind the competitive effectiveness of the current site) this would be a long way short of being sufficient to justify on economic grounds the building of a new passenger terminal.

It should also be borne in mind that the airport will almost certainly have to offer subsidies to airlines starting new services, including reduced airport charges. This will mean less income per passenger on the incremental volumes of future traffic. This factor, coupled with the existing real loss-making position of the airport, makes it impossible to seriously consider major expansion and replacement of facilities with an ambitious new passenger terminal without state subsidies. Such action could be subject to investigation of the Competition and Markets Authority on the basis of unfair competition to other commercial airports.

2. Replacement stands to be provided for a mix of aircraft, including contact and remote stands;

Remote stands offer a very poor passenger handling product especially in the poor weather conditions that are fairly common at Cardiff Airport. What is needed are pier served stands with jetways docked on to aircraft parked in front of the terminal building. Jetways are expensive equipment items and it is hard to see how they could be justified at Cardiff Airport on cost/economic return grounds.

3. A new cargo terminal;

Cardiff Airport's track record on air cargo operations is lamentable over the last 20 years although traffic did pick up from a practically zero base in 2018. Unless a commitment can be obtained from a significant air cargo operator it would not seem to be economic to build a substantial new cargo terminal.

4. New dedicated road access to be provided for the terminal from the A4226, separating Airport traffic from other uses including the Enterprise Zone;
5. Improvements to pedestrian and cycle access to and through the Airport site, including links to Rhose and Barry;
6. Future integration with the Metro with a safeguarded bus link as well as an improved, dedicated connection between the terminal and Rhose Cardiff International Airport railway station, improving the transfer experience;

Commentary on Items 4, 5, and 6:

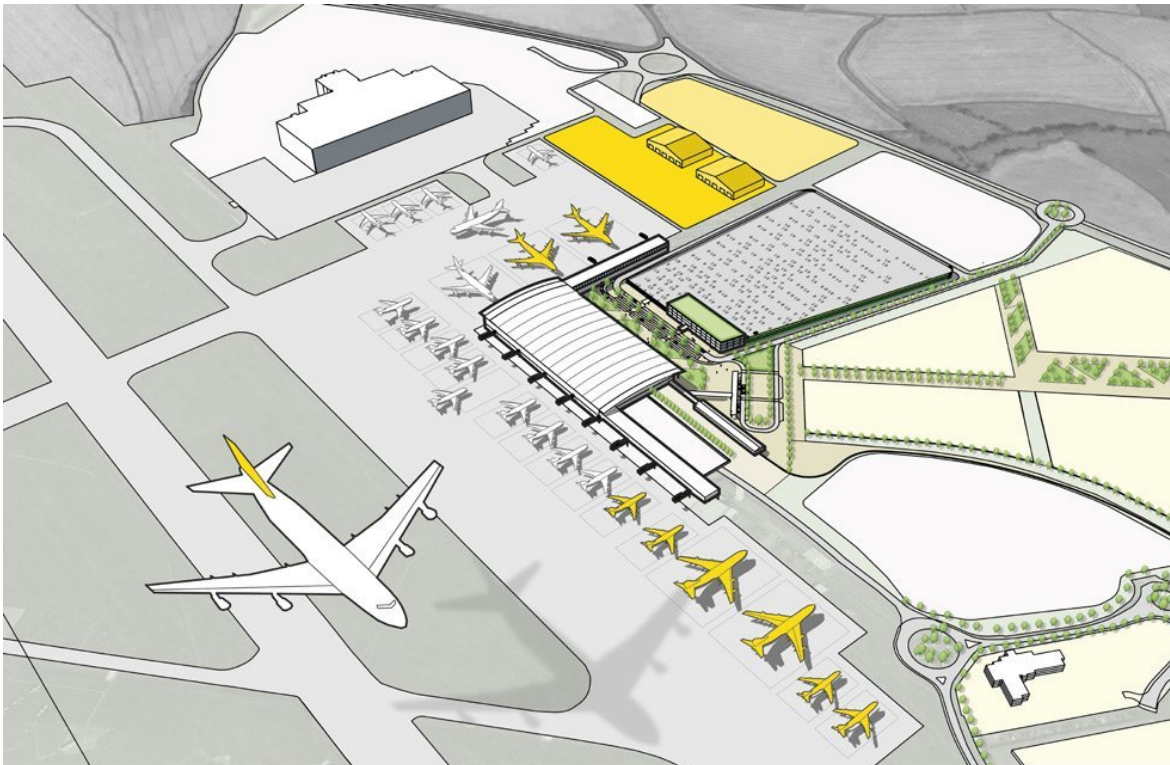
We are aware that significant expenditure (£26 million we understand) has been made to the A4226 between the A48 and Barry's Weycock Cross roundabout, and that the new route opened in October 2019. It may be worthwhile proceeding with the items described under 4, 5 and 6, but it should be borne in mind that the future prospects for significant growth at Cardiff Airport do not look encouraging. So modest expenditure on road surface access to the airport that brings about other benefits to the area may be worth pursuing, but lavish expenditure on long payback items would be best avoided unless there are other proven benefits apart from access to the airport that justify the costs.

- 7. Open space, public realm and landscaping improvements; and
- 8. Safeguarded land for expansion.

As stated earlier it is difficult and will continue to be difficult to justify future major expansion of the airport, so safeguarding land for future expansion may not be a high priority. It might still be justified on the basis that the long term future use of the site as an airport could be questionable, but safeguarding areas of land adjacent to the airport could enhance its value for alternative use.

Key features and design considerations include:

International Gateway:



9. Deliver greater capacity to grow to three million passengers per annum and beyond

Capacity is probably not the top immediate priority. Improving the passenger experience might be more important. Bearing in mind the future economic worth of the airport site as an ongoing operation, 3 million passengers per annum will be an ambitious target for the next 10 years, and is unlikely to be exceeded without significant subsidies to the airlines. This is not a sustainable long term path. The diagram immediately above looks very ambitious and is most unlikely to ever be economic to build.

10. Attract new airlines, secure new routes and more choice for customers travelling to and from the region.

Cardiff Airport has done remarkably well in maintaining the traffic at around 2 million passengers per annum in recent years. It is believed that this gain to replace airlines leaving Cardiff has been achieved by in effect offering subsidies reducing airport charges. The danger of this position is that it is difficult to raise the charges as at that point airlines choose to leave and operate elsewhere. Cardiff's problem is that airlines would prefer to operate at Bristol Airport and, so as long as it has available capacity, airlines will choose to go there unless they get subsidies to go to Cardiff Airport.

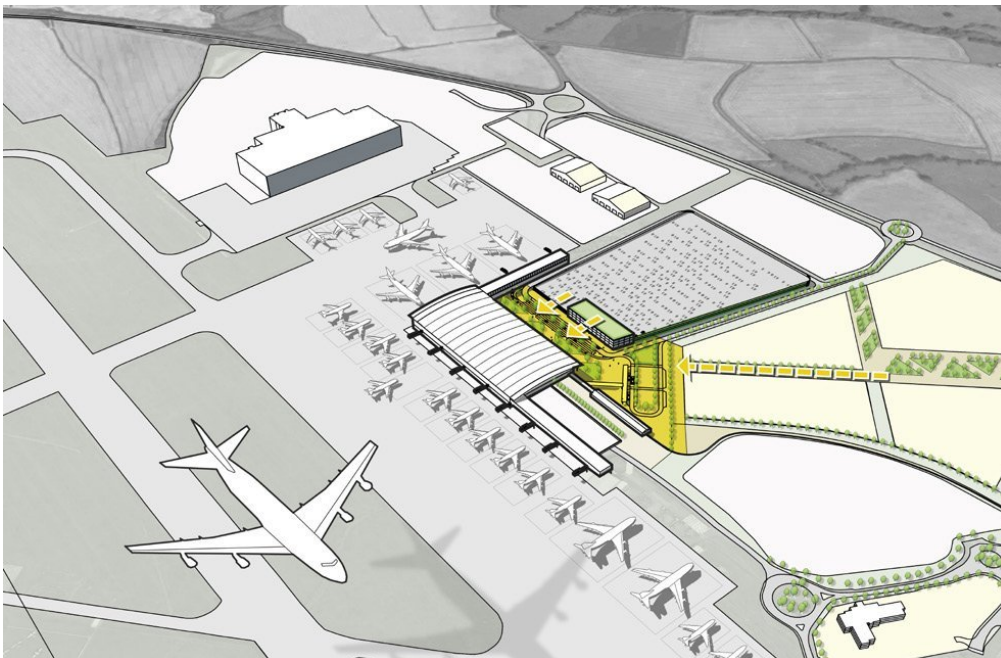
11. Diversify the Airport business to create and develop opportunities for aviation, cargo, education, technology and innovation

This is a laudable set of objectives and it is hard to dismiss these aspirations. The problem is actually getting these activities to the site.

12. Build upon our efficient, safe and secure 24/7 operation.

Any well-run airport would aspire to meet the first two objectives. 24/7 operation may be difficult to achieve and could create serious noise nuisance for the airport's neighbours. It would not seem to be an important priority.

A Unique Place:



- Create a public realm for the community to enjoy

It appears hard to object to this objective until one realises airports are largely about the passenger experience. So to the extent that the community are passengers, this is probably correct.

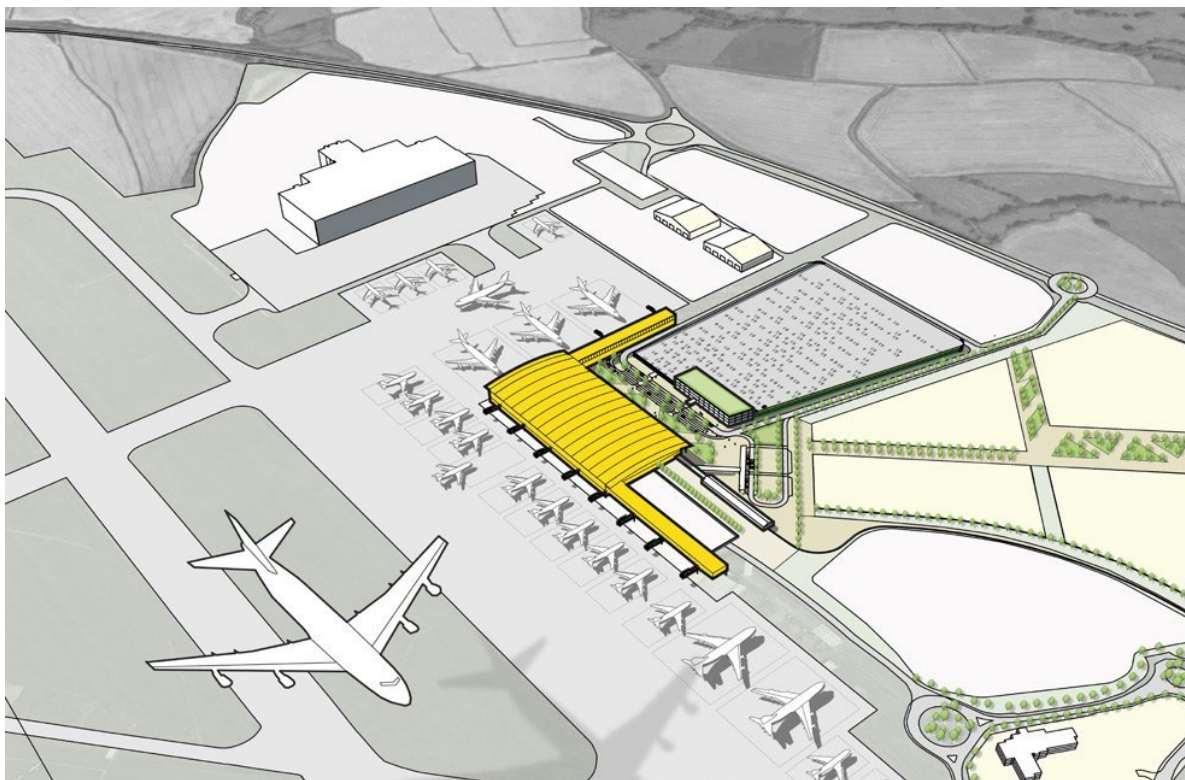
- Excite customers before they fly and those arriving to Wales, creating a sense of place and awareness of the Welsh culture.

Airports are fairly international and similar places. Passenger customer service excellence is perhaps a more important factor rather than major cultural impressions.

- Link businesses across the Airport campus, supporting the region and Enterprise Zone
- Support education with a place to learn and innovate.

These are laudable aims and should be implemented providing they are practical and economic.

New Terminal:



- Enhance our unique identity as the gateway to Wales, creating a memorable first and last impression
- Ensure ease of access for all
- Enhance our customer experience with best in class facilities
- Develop our 'green' credentials to meet our environmental and social commitments.

These are all laudable aspirations, but bearing in mind that available capex will be limited, improvement in current conditions may be much more difficult to achieve than with completely new facilities.

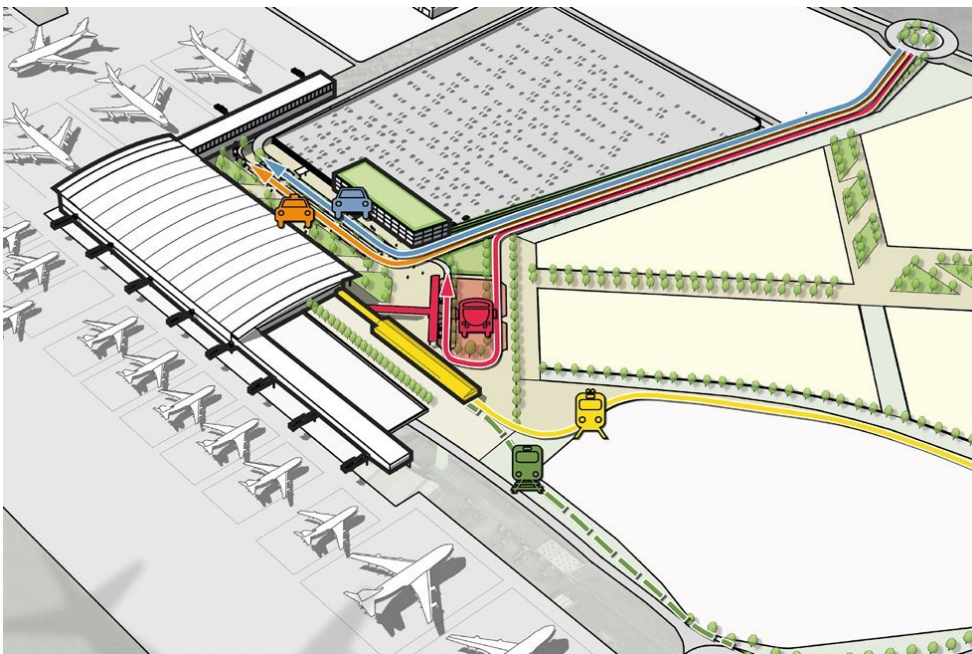
New 4* Hotel:



- Develop the first on site hotel
- Offer more choice in local accommodation for customers
- Offer business meeting and conference facilities
- Provide a convenient base for visitors to explore the region.

A hotel would be a valuable additional asset to the airport. This needs to be investigated and implemented even without a new passenger terminal.

New Transport Hub & Car Park:



- Offer greater travel choice for customers, the community and the Airport team; car, bus, rail, taxi, car hire and active travel
- Offer an improved integrated transport facility
- Develop a new multi storey car park close to the terminal building
- Offer new services to enhance the customer experience.

The airport's location beyond Barry is not helpful for road or rail links. Also, the current modest traffic volume averaging 5,500 passengers per day is very low to develop a major intermodal hub. Some improvements can be made, but if this was easy, it would probably already have been done.

Surface Access: Status:

M4 Severn Crossing toll removal: *Achieved.*

M4 Newport relief road: Proposed, *but now cancelled by the Welsh Government.*

M4 Pendoylan link road: Proposed

Five Mile Lane improvements: In progress: *opened in October 2019.*

Great Western mainline improvement: In progress

South Wales Metro development: In progress

Rail frequency enhancements: Proposed

Express bus connectivity: In progress: *There is an express bus in operation: T9 to Cardiff.*