PROPOSAL TITLE:	Western Gateway (Cardiff Airport)	Group:	Dispersed
SUBMITTED BY:	University of South Wales	Reference No.:	43

PROPOSAL

Development of Cardiff Airport as the 'Western Gateway' airport, operating as a 'UK-West' international hub airport that is also able to attract passengers from London and the south east.

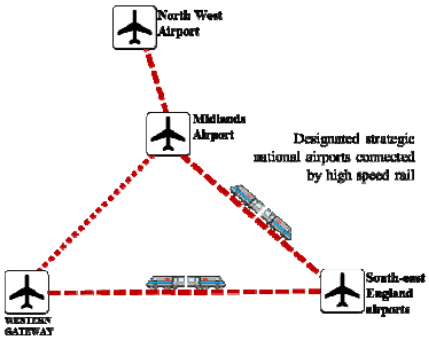
The Western Gateway will form the south-western point of a triangle of airport systems, with Birmingham in the north and the London airports (mainly Heathrow) to the east. Proposed High speed rail connections, HS2 and HS3, would provide the necessary link between these three airports and the regions they currently serve. A route for HS3 is proposed that would connect Swansea with London, serving a non-stop high speed service between Cardiff Airport and Heathrow Airport, carrying interlining passengers. Stopping services would provide access for passengers at intermediate stations and connecting to other parts of the rail network.

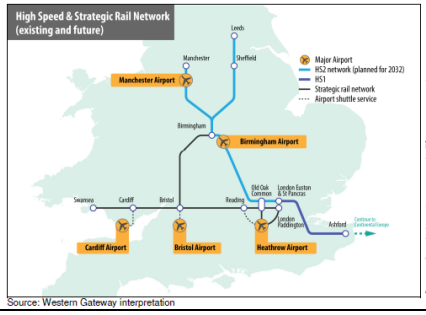
Two development options are proposed.

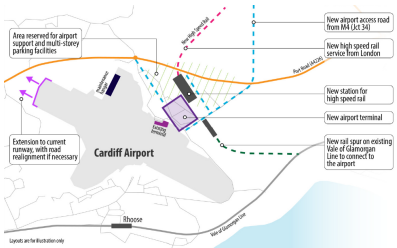
Option 1: HS3 goes ahead. A 20 year programme requiring possibly £18bn for HS3 rail infrastructure, £6.5bn for airport infrastructure, rolling stock and other connectivity improvements. Capacity of 20mppa would be achieved by 2040.

Option 2: HS3 is postponed. A Medium Term Solution of projects already planned (electrified Great Western Railway and South East Wales Metro) could be accelerated. Capital investment would include £1.7bn of road and rail improvements and £1.3bn of airport infrastructure. Capacity of 8mppa would be achieved by 2025.

Rail infrastructure is assumed to be funded by the government. Airport infrastructure may be funded by private investors and recouped through airport charges.







ASSESSMENT SUMMARY

The scheme is for a dispersed hub operation, expanding the existing Cardiff Airport to create additional capacity of up to 17m passengers, i.e. around half the additional capacity of the schemes at Gatwick, Stansted and Birmingham. While the airport development is of comparable cost to other expansion schemes, the necessary surface transport infrastructure costs could bring the total to c. £79bn, more than 5 times the cost of other second runway schemes.

Though the expanded Cardiff Airport would be capable of handling fully laden wide-body aircraft, the extent to which unfulfilled demand exists within the region is not clear. For the scheme to provide meaningful capacity, it is predicated upon the development of an 'HS3' link from Cardiff to London with branches from the respective airports. The Western Gateway airport, located 140 mile from London, would have to attract a certain proportion of current and future traffic away from Heathrow, including passengers originating in London. The model assumes that overseas passengers will be willing to transfer in Cardiff rather than London, and that network carriers will serve those routes with desirable schedules. Even with the proposed construction of an 'HS3' high speed railway to connect the airport with London or Heathrow, such a railway is likely to have a more significant impact on Cardiff-London connectivity than on air traffic demand at either Cardiff or Heathrow Airports. The wider benefits of an 'HS3' Cardiff-London scheme, unlikely to be delivered before 2035, have not warranted its conceptualisation to date.

The scheme would bring economic benefits to the local and regional population as well as improving connectivity. However a limited impact on the national economy would be expected. There appear to be few environmental constraints to the airport development and the noise affected population is comparatively low, although the environmental impact of the surface access requirements could be significant.

The airport is publically owned and private finance is suggested for its development. However, commercial viability appears to depend upon the wider surface transport upgrades, for which government funding would be required. Uncertainty in future demand levels may lead to a relative lack of interest from private finance.

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OVERVIEW

Approach

A majority government funded scheme with the majority of investment targeted at rail upgrades (construction of HS3 from London to Wales). High speed surface access will enable the expanded Cardiff airport 'Western Gateway' to become a hub airport serving international and domestic traffic.

Opening Year: 2035

Capacity

ATM capacity likely to be able to accommodate both options proposed. Passenger capacity increase required to cater for both.

	Option 1		Option 2	
	Airport	Net	Airport	Net
Runway	1	0	1	0
ATM	150,000	0	150,000	0
pax	20	17	8	5

Cost

The majority of this cost is made up of surface access requirements.

	Airport	Access	Other	Sub Total	Including Risk/OB
Option 1	2.0	35.1	0.7	37.8	79.3

Surface Transport

- Relies on a "HS3" line to Cardiff which is not at the pre-feasibility stage.
- Even with HS3, long Journey times (75 mins) to London.
- Unlikely proposal for interlining passengers would use service between Cardiff and Heathrow airports.
- New direct road link from airport to the M4 J34

1 hr isochrone	7
2 hr isochrone	22
London centre	140 miles

Economic

Borough	Cardiff	Vale of Glamorgan	Bridgend	Rhondda, Cynon, Taff
Unemployment (%)	10	7.9	8.3	11.1
Ave. Salary (£/yr)	25,256	26,733	25,896	22,438

Environment

Few constraints, although the runway will affect the setting of the historic park at Fonmon Castle and a number of listed buildings nearby.

	Airport	Net
57 LA_{eq}	2,000	2,000
55 L_{DEN}	7,000	7,000

SAC[1]	SPA[1]	Ramsar	CA[1]	AONB[1]	SSSI[1]	Listed Buildings	SAM[1]	Houses Lost
-	-	-	-	-	-	-	-	10

[1] SAC: Special Areas of Conservation; SPA: Special Protection Areas; CA: Conservation Area; SSSI: Site of Special Scientific Interest; SAM: Scheduled Ancient Monument.

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ECONOMY

Borough	Cardiff	Vale of Glamorgan	Bridgend	Rhondda, Cynon, Taff
Unemployment (%)	10	7.9	8.3	11.1
Ave. Salary (£/yr)	25,256	26,733	25,896	22,438

Impact on Industry

Expanding Cardiff Airport by lengthening its runway and building new terminal and associated facilities would create modest benefits by offering more opportunities for airlines to launch long haul services, as it would be capable of handling fully laden wide-body aircraft. However, it is unclear what unfulfilled demand there is to provide such flights that are constrained by the current facilities. The expanded airport would primarily service Wales, although substantial enhancement of rail access would enable it to also offer competitive access to Gloucestershire, and the proposal of a high speed railway to Heathrow and central London, would allow it to be more attractive to a wider catchment (although travel times, rail fares and the likely range of services to be offered from Cardiff would be unlikely to attract more than negligible demand from London). An expanded Cardiff Airport would primarily compete with Bristol Airport, and to a lesser degree with Birmingham, but would be unlikely to have an impact on demand at Heathrow or other London area airports. Even with the proposed construction of a high speed railway to connect the airport with London or Heathrow, such a railway is likely to have a more significant impact on Cardiff-London connectivity, than on air traffic demand at either Cardiff or Heathrow Airports.

Airports	An expanded Cardiff would compete directly with Bristol, and would meet its forecast demand through to 2050. However, it would be unlikely to have any noticeable impact on demand at Heathrow or any other London area airports. Even the provision of a proposed high speed railway to Heathrow and central London, would be unlikely to have more than a negligible impact. Airlines using Bristol Airport may see Cardiff as offering a competitive alternative, marginally reducing demand at Bristol Airport.
Airlines	Airlines using Cardiff and others seeking to use it would benefit from the increase in capacity and expanded facilities, which may allow some new routes and larger aircraft to be introduced according to market demand. However, while it is highly unlikely that any services currently operated at Heathrow would shift to Cardiff, it is possible that there could be some transfer of services from Bristol to Cardiff, as airlines using Bristol would have a possible competitive alternative.
Passengers	Passengers using Cardiff Airport will benefit from larger facilities and some users within the catchment of Cardiff Airport may benefit from new services.

Local & Regional Economic Impacts

An expanded Cardiff Airport to meet expected demand would facilitate growth of new and existing industries in aviation, airport and aviation support services and travel, tourism, logistics and other related sectors, to service any growth in passenger and freight demand at the airport. This would support marginal growth around Cardiff, but is highly dependent on demand levels and the commercial decisions of airlines to provide additional services. **Western Gateway claims a net 27,000 jobs would be generated by expansion of Cardiff Airport by 2040**. These estimates appear to be high relative to those for other airport expansion proposals.

National Economic Impacts

National Economic Impacts are expected to be negligible from expansion of Cardiff Airport

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SURFACE ACCESS

Time/Distance to Central London	1 hr isochrone population	Key required upgrade schemes
1hr 25min (HS3) 140 miles	7 million	▪ Branch from Vale of Glamorgan line to a new airport station ▪ An airport station at Hensol on the Great Western Mainline
Journey times to other population centre	**2 hr isochrone population**	▪ "HS3" from London to Cardiff ▪ Non-stop rail service between LHR and Cardiff Airport to carry interlining passengers ▪ New direct road link from airport to the M4 J34
Birmingham 1hr 55min	22 million	

Rail Infrastructure Capacity Analysis

The proposal is to establish a new airport station with a branch on the Vale of Glamorgan line to connect to services on the Great Western Mainline to London Paddington, and London Heathrow as a first phase. In addition, an 'Airport Station' on the Great Western Railway in the vicinity of J34 of the M4 at Hensol, served by an express shuttle bus to the airport is proposed. This would be superseded in the longer term by a new High Speed Rail line from London to Cardiff Western Gateway international airport via Cardiff. This would facilitate passenger services from Cardiff Airport – Cardiff – Bristol – Old Oak Common (West London) – London and a non-stopping high speed terminal connector service between Cardiff Airport and Heathrow Airport, carrying interlining passengers. It is assumed that the **50% of passengers using the High Speed Rail service between Cardiff and London would be air passengers arriving or departing from Cardiff Airport and 50% general rail travellers**. No modelling has been undertaken to determine this figure and it could equate to potential demand of around 500 passengers per train at peak times in one direction. It is doubtful that interlining passengers would travel 75 minutes between Cardiff and Heathrow airports, even assuming the provision of a high speed rail service.
This proposal relies on the provision on a high speed rail service to serve Cardiff airport, which is not at the pre-feasibility stage at the moment.

Highways Capacity Analysis

The sponsor states that a new direct road link to the M4 will be required. Welsh Government analysis has concluded that a dual carriageway access road from M4 Junction 34, running north-south directly to the airport is likely to be the most beneficial. No further information was given regarding the impact on the surrounding highway network, but if demand forecasts are met, there are likely to need to be other highway upgrades necessary to the local network.

Accessibility to Population & Business centres

Existing access to Cardiff is adequate by road. A proposed "HS3" service would reduce journey times from the current 3 hours to approximately **1 hour 15 minutes to Heathrow**. The **proposer states 3 million UK residents live within 1 hour travel time from Cardiff Airport and 5 million UK residents are within 2 hours travel time from Cardiff Airport.** With a range of transport improvements as described above excluding the HS3 option, **4 million UK residents would live within 1 hour travel time from Cardiff Airport and 7 million UK residents would live within 2 hour travel time of Cardiff Airport**. **With HS3 the proposer states, 7 million UK residents will live within 1 hour travel time of Cardiff Airport and 23 million UK residents will live within 2 hours travel time of Cardiff Airport.** This claim is for travel time by rail.

Accessibility to Transport Interchanges

Indicative travel times from Cardiff Airport by HS3 to transport interchanges are; **Bristol Parkway 25 minutes, Central London 1 hour 15 minutes, Heathrow Airport (non-direct) 1 hour 25 minutes, Heathrow Airport (direct) 1 hour 10 minutes, and Birmingham 1 hour 55 minutes**

Accessibility to Workforce

Investment in the supporting road and rail infrastructure within Wales would enlarge the labour market pool for the airport. In order to cater for shift patterns of airport workers, early morning and late night services are proposed on a proposed rail spur into the Airport campus from the Vale of Glamorgan rail line and regular bus and coach services from Cardiff (via Culverhouse Cross) and other locations in South Wales.

Modal Split Assumptions

No modal split has been calculated for public transport overall. Modal split assumptions have been made for passengers using HS3 based on where passengers will be travelling from; **Wales 50%, South West 50% and London, Slough and Reading 75%.** The sponsor recognises this is a high proportion.

Demand Management

The sponsor proposes bus priority measures, Park and Ride facilities at an 'Airport Station' in the vicinity of J34 of the M4 at Hensol, served by inner city and local rail services, with direct shuttle buses.

Potential Wider Use

Improvements to the Great Western Main Line and the proposed HS3 are likely to primarily benefit access between Wales and the west of England and London.

ENVIRONMENT

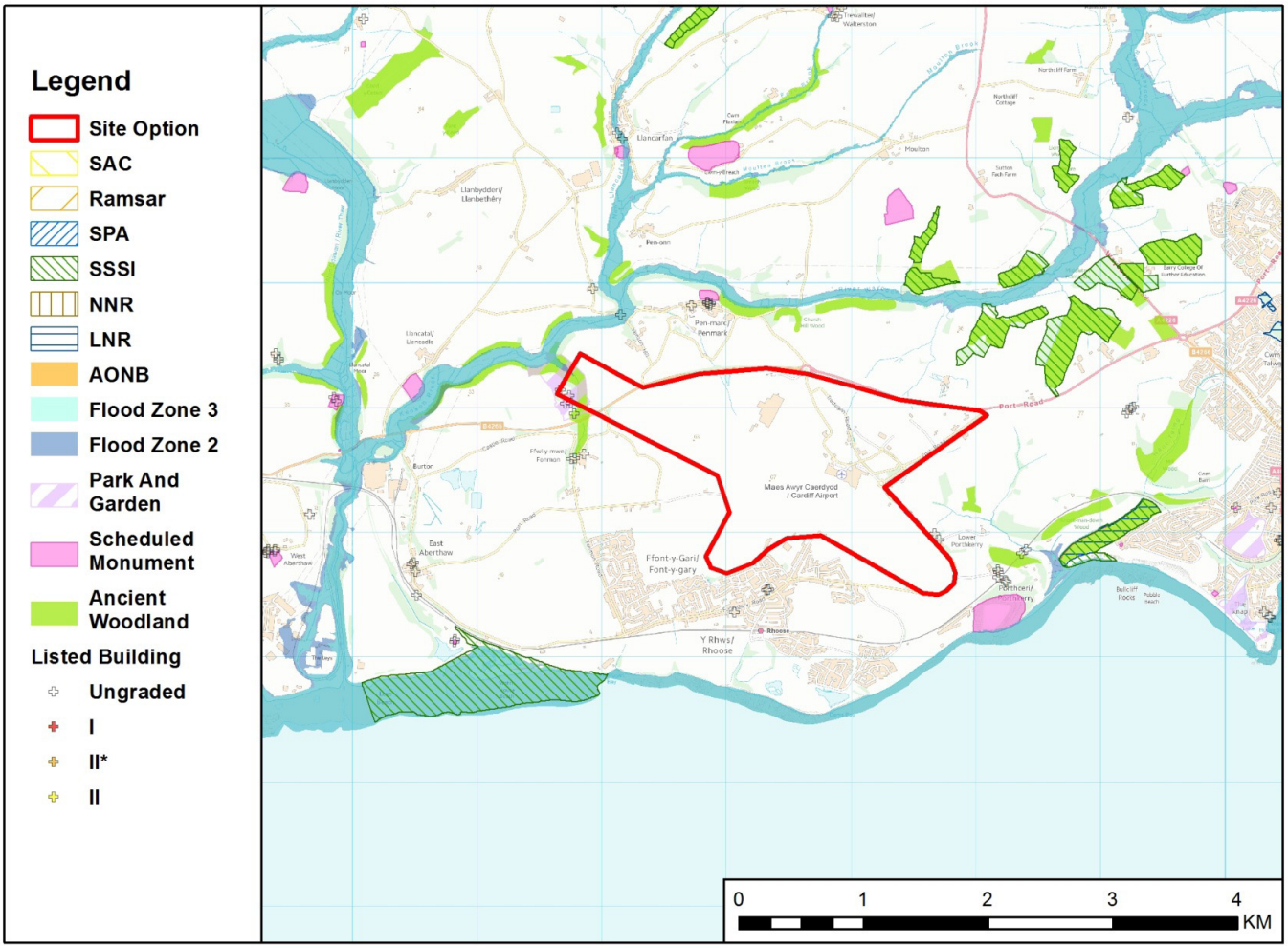
Overall noise impact	The currently affected population is very small, the impact may therefore be relatively significant, but would still affect very few people compared to other airports.		Option 1 Airport	Net
		57 LA_{eq}	2,000	2,000
		55 L_{DEN}	7,000	

SAC	SPA	Ramsar	AONB	SSSI	CA	Listed Buildings	SAM	Houses Lost
-	-	-	-	-	-	-	-	10

Air Quality **Glamorgan has no AQMAs currently. Diversion of airport traffic via link road is likely to benefit local residents.**	**Mitigation Plan** **Detailed assessment required**
Noise **The main approach is over water and the areas around the airport are relatively sparsely populated.** ▪ Independent noise modelling for comparison provided the following results: - 57LA_{eq}: 2,000 people affected, nett increase of c 2,000 with very few affected population currently. - 55L_{den}: 7,000 people affected.	**Mitigation Plan** **A range of noise mitigation suggested.**
Designations No designations are directly affected although the runway is close to an Historic Park and Garden at Fonmon Castles and a number of listed buildings. The setting of these sites will be severely affected.	**Mitigation Plan**
Climate Change **No change to CO2 emissions as would be transferring travel demand from elsewhere. Potential for passengers to transfer from road to rail with this option** which may improve the level. No significant effect on greenhouse gas emissions in terms of UK climate change targets.	**Mitigation Plan**
Other Issues ▪ **Wider setting is an historic landscape including industrial landscape and medieval agricultural designations to the north. Generally identified as an urban landscape of low scenic value.** ▪ Vulnerable ground water.	**Mitigation Plan** **Landscape and visual impact assessment required. Pollution prevention measures required.**

PEOPLE

Housing No material housing impact.	Demolished 10
Vulnerable Groups No specific information but main affect likely to be as a benefits related to economic opportunities	
Quality of Life Mainly related to the increase air traffic and associated noise and the road diversion. Loss of recreational amenity related to the adjacent historic gardens.	
Wider Social Impacts Regional growth opportunities and related improvements such as access to services and connectivity.	


Legend
Site Option
SAC
Ramsar
SPA
SSSI
NNR
LNR
AONB
Flood Zone 3
Flood Zone 2
Park And Garden
Scheduled Monument
Ancient Woodland
Listed Building
Ungraded
I
II*
II
Maes Awyr Caerdydd / Cardiff Airport
Port Road
0 1 2 3 4
KM

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COST

Capital Cost

Submitter estimates a cost of £1.35 bn for airport infrastructure, unadjusted for bias and does not state any allowance for risk. The submitter also estimates a cost of £22.7bn for rail investment including a high speed rail, and a further £0.45bn for road improvements.

Independent cost analysis assesses the scheme to be £79bn.

When compared to other dispersed airport schemes which share the same set of common assumptions, this option appears to be the most expensive. However the majority of this cost is made up of surface access requirements.

	£ bn
Airport	2.0
Access	35.1
Other	0.7
Sub-Total	37.8
Risk	15.1
Optimism Bias	26.4
Total	79.3

Key Risks

- Demand for and delivery of High Speed Rail 3.

Risk and Contingency Allowances

40% contingency adopted to all costs. 50% optimism bias applied to risk adjusted cost.

Surface Access Costs

£35.1bn estimate for road and rail links based on requirement for infrastructure identified by the independent analysis.

Other Off-Airport Costs

An allowance of £0.5bn has been included to cover typical environmental mitigations measures. A further allowance of £0.17bn has been made for the relocation of Fonmon Castle.

Summary Comments

The cost to develop the airport is significantly outweighed by the substantial cost of providing HS3.

OPERATIONAL VIABILITY

Capacity

ATM capacity likely to be able to accommodate both options proposed. Passenger capacity increase required to cater for both.

	Option 1		Option 2	
	Airport	Net	Airport	Net
Runways	1	0	1	0
ATM	150,000	0	150,000	0
pax	20	17	8	5

Resilience, Reliability and Efficiency

Option 2 could be reasonably accommodated within the current airfield, with increase passenger processing capacity to deliver a reasonably resilient operation. Option 1 however, may approach the achievable capacity for a single runway airport and may therefore suffer from resilience and reliability challenges during busy periods.

Safety

The proposal could be designed to comply with safety requirements.

Scalability

Although the proposal is defined within an identified boundary, additional capacity could be developed if required, although it may be more difficult to develop this site compared to other dispersed schemes.

Airspace

The proposal would not require significant airspace redesign.

DELIVERY

Timescale

The airport works could be provided at Cardiff Airport through conventional planning and development control, although it is in part based upon a rail link from the Great Western Mail Line. The greater capacity requirement is predicated upon the delivery of HS3, with uncertain timeframe.

Commercial Deliverability

The airport is publically owned. However commercial viability for public finance appears to depend upon the wider surface transport upgrades. Demand uncertainty may lead to a relative lack of interest from private finance.