HORIZON NUCLEAR POWER

WYLFA NEWYDD

ENERGY WORKING FOR BRITAIN

Wylfa Newydd Project

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Contents

1 General introduction 1
2 Skills and labour 2
2.1 Introduction 2
2.2 Overview of the UK construction industry 2
Trends in the nuclear industry 3
2.3 Local labour participation benchmarks 5
Wylfa B power station (not implemented) 6
South Texas Electric Generating Stations 7
Sizewell B 8
Flamanville-3 8
Liquid Natural Gas Energy Cluster, Pembrokeshire 9
Channel Tunnel Rail Link 9
Heathrow Terminal 5 (T5) 9
London 2012 Olympics 11
Nuclear Power Development Establishment at Dounreay in Caithness and Torness Nuclear Power Station in Lothian Region 12
2.4 Construction phase local labour participation 12
Labour demand 12
Evaluating the sustainability of the local labour participation 14
Re-scoping local labour participation 15
Labour market resilience 20
Sensitivity issues – occupational impacts 22
Sensitivity issues – viability of a DCCZ 23
Sensitivity issues – duration of work 24
2.5 Operational phase local labour participation 25
Local labour area 25
Transfers from decommissioned reactors 26
Expectations of local content 26
Wylfa Newydd Project requirements 27
Outages 28
3 Accommodation and spatial distribution of the workforce 29
3.1 Introduction 29
3.2 Gravity model 29
Gravity modelling approach 30
Gravity model input data 32
Gravity model calibration 34
Gravity model outputs 35
3.3 Accommodation supply 40
Available capacity 40
KSA sub area bed space supply 47
KSA key settlements bed space supply 48
3.4 Supply and demand interaction 49
KSA sub area supply and demand 49
KSA key settlement supply and demand 51

3.5 Summary of construction phase accommodation assessment 53
3.6 Operational phase 54
Full operation *54*
Outage *56*
3.7 Accommodation benchmarks 56
Socio-Economic Impact Study – Proposed Wylfa B Power Station August 1988 ..... *57*
Sizewell B *59*
Liquefied Natural Gas (LNG) Energy Cluster *60*
Motunui Synthetic Petrol Plant, New Plymouth and Marsden Point Oil Refinery, Whangarei, New Zealand *63*
Conclusions *64*
4 Tourism 66
4.1 Introduction 66
4.2 Economic development and tourism strategy 66
4.3 Visitor behaviour survey 69
Aims and objectives *69*
Approach *69*
Visitor behaviour survey results *72*
4.4 Tourism accommodation survey 77
4.5 Business survey – tourism related 78
Business survey results *79*
5 Business and supply chain 82
5.1 Introduction 82
5.2 Business survey 82
Aims and objectives *82*
Methodology *83*
Results *83*
5.3 Business and supply chain benchmarks 93
Nuclear capability study (2015) *94*
Actual impacts from Sizewell B *97*
Predicted impacts from Hinkley Point C *99*
Anglesey Enterprise Zone *100*
6 Bibliography 103
7 Appendices 109

List of Appendices

7-1.1 EDF occupation mapping 109
7-1.2 Geographic definitions of Hinkley Point C and Sizewell B Daily Construction Commuting Zone 111
7-1.3 Assumptions for non-contractor controlled supply 112

List of Tables

Table 2-1 NNB civils construction workforce demand as a % of overall employment in each occupation in the UK 5
Table 2-2 Occupational assumptions 6
Table 2-3 Comparison of key characteristics of NNB development site catchment areas (90 minutes) 15
Table 2-4 Categorisation of the occupations of resident persons in the DCCZ 2011 and JSA claimants 2016 16
Table 2-5 Transformation of CSN occupational categories to broad categories 18
Table 2-6 Summary of the occupational skills profile of the workforce across the DCCZ for construction 19
Table 2-7 Summary of the occupational skills profile of the workforce across the DCCZ for construction 20
Table 2-8 Effect of different local labour scenarios 23
Table 2-9 Distance travelled by region/geographical area (%) 23
Table 2-10 Cogent analysis of skills 25
Table 2-11 Local recruitment assumptions used in the Hinkley Point C assessment 27
Table 2-12 Analysis of local content in operational reactors 28
Table 3-1 Occupation groups workforce breakdown 33
Table 3-2 Accommodation type workforce breakdown 33
Table 3-3 Split of workers within each travel-time catchment (home-based) 35
Table 3-4 Sub-regions trip distribution (home-based) 36
Table 3-5 Split of workers within each travel-time catchment (non-home-based) 38
Table 3-6 Sub-regions trip distribution (non-home-based) 38
Table 3-7 Selected towns trip distribution (non-home-based) 39
Table 3-8 Occupancy rate assumptions and reasoning 42
Table 3-9 Estimated headroom in August peak across the KSA 42
Table 3-10 Rate of churn by tenure, 2011 44
Table 3-11 Median monthly rents recorded by property type and local authority area, January to December 2015 46
Table 3-12 Analysis of bed spaces by sub area 48
Table 3-13 Analysis of accommodation headroom (bed spaces) by settlement 48
Table 3-14 KSA sub area bed space supply (accommodation headroom) and demand 50
Table 3-15 KSA key settlements bed space supply (accommodation headroom) and demand 52
Table 3-16 Summary of workforce distribution results 53
Table 3-17 Summary of bed space supply (accommodation headroom) and demand 54
Table 3-18 Skills Profile 54
Table 3-19 Accommodation assumptions for Wylfa B PWR 57
Table 3-20 Distribution of construction workers by area 58
Table 3-21 Predicted distribution of relocated operational workforce 59
Table 3-22 Energy cluster – labour requirement 61
Table 4-1 Common development requirements 68

Table 4-2 Visitor behaviour survey summary results 71
Table 4-3 Sector breakdown of IACC tourism bed space survey 77
Table 4-4 Number of bed spaces by types of establishment 78
Table 4-5 Business location for tourism-related businesses within North Wales 79
Table 4-6 Size of tourism businesses (full-time equivalent) 80
Table 4-7 Awareness of the Wylfa Newydd Project – tourism businesses by location 80
Table 4-8 Business impacts – tourism businesses 81
Table 5-1 Survey respondents (2016) and Experian database businesses by location (2015) 84
Table 5-2 Survey respondents (2016) and Experian data by business sector (2015) 84
Table 5-3 Survey responses – business turnover(2016) 86
Table 5-4 Survey responses – employee turnover (2016) 87
Table 5-5 Survey responses – problems recruiting employees (2016) 88
Table 5-6 Survey responses – awareness of the Wylfa Newydd Project and creation of opportunities (2016) 89
Table 5-7 Survey responses – business impacts 90
Table 5-8 Respondents expecting staff retention impacts by location 91
Table 5-9 Respondents expecting staff retention impacts by business sector 91
Table 5-10 Respondents expecting staff retention impacts by size of business 93
Table 5-11 The capability of Welsh businesses for nuclear new build activity assessed by Miller Research UK Ltd [RD52] 95
Table 5-12 Employment capability and demand: nuclear new build in Wales assessed by Miller Research UK Ltd [RD52] 96
Table 5-13 Types of goods and services supplied (£) by local companies gaining at least £50,000 in orders or contracts (1991) 98
Table 5-14 Energy Island Programme – Potential outcomes and performance measures (2011) 101
Table 6-1 Bibliography 103
Table 7-2 Hinkley Point C assumptions 112

List of Figures

Figure 3-1 Occupancy rates (%) Wales, 2015 41
Figure 3-2 Occupancy rates (%) North Wales, 2015 41
Figure 4-1 Visitor behaviour survey locations 70
Figure 4-2 Comparison of types of visitors responding to the visitor behaviour survey with STEAM data (%) 74

1 General introduction

1.1.1 This technical appendix presents background information and socio-economic research on the topics covered in the main socio-economic assessment chapter C1 (Project-wide effects – Socio-economics) (Application Reference Number: 6.3.1).

1.1.2 Additional information is provided on:

- skills and labour;
- accommodation and spatial distribution of workforce, including gravity modelling;
- tourism; and
- business and supply chain.

1.1.3 During the preparation of socio-economic assessment to support the application for development consent, a substantial amount of research was carried out that now underpins the analysis contained within chapter C1 (Application Reference Number: 6.3.1) and is used as supporting information in B2 (Introduction to the topics – Socio-economics)(Application Reference Number: 6.2.2), D3 (WNDA Development – Socio-economics)(Application Reference Number: 6.4.3), E3 (Off-Site Power Station Facilities – Socio-economics)(Application Reference Number: 6.5.3), F3 (Park and Ride – Socio-economics)(Application Reference Number: 6.6.3), G3 (A5025 Off-line Highway Improvements)(Application Reference Number: 6.7.3), H3 (Logistics Centre – Socio-economics)(Application Reference Number: 6.8.3) and I3 (Cumulative effects – Methodology)(Application Reference Number: 6.9.3) and associated appendices within the Development Consent Order (DCO) documentation. This research has been updated in cases where it is material to the assessment of effects presented in chapter C1 (Application Reference Number: 6.3.1). Where information is relevant to the socio-economic baseline, it has been updated within appendix C1-1 (Socio-economic technical appendix) (Application Reference Number: 6.3.9).

2 Skills and labour

2.1 Introduction

2.1.1 This section documents the background research that has served to underpin the assessment of effects on skills and local labour presented in chapter C1 (Application Reference Number: 6.3.1). It presents a number of reviews which have supported the assessment of local labour participation, skills development and considerations with regards to where non-home-based workers may come from, e.g. the rest of the UK or overseas. This research also served to support the development of the home-based workforce scenario used for the gravity modelling and accommodation assessment.

2.2 Overview of the UK construction industry

2.2.1 According to the Chartered Institute of Building, there is a general shortage of construction skills in the UK which is set to worsen over the next five years due to an ageing workforce and a lack of investment in training [RD1].

2.2.2 In terms of general industry trends, the level of construction activity is highly sensitive to changes in gross domestic product. The UK population is predicted to reach 71.4 million by 2030, equating to an increase of 6.6 million people in 15 years (0.65% growth per annum) [RD2]. The population growth coupled with the low cost of borrowing will drive gross domestic product and further growth in construction, generating a demand for new entrants to work in the industry. This demand must be met while also recovering from the large number of job losses which occurred during the recession in 2008 and responding to further losses due to increasing numbers of construction workers reaching retirement age.

2.2.3 In recent years, the construction industry has relied heavily on migration to fill gaps. In 2009, Organisation for Economic Co-operation and Development (OECD) data show that approximately 228,000 people working in construction in the UK (10% of the total) were foreign-born [RD3]. Similarly, the 2011 Census data show that approximately 10.6% of the construction workforce was born outside of the British Isles. There is a distinction to be made here between foreign-born workers permanently based in the UK and non-UK workers, however. The flux of non-UK workers is difficult to measure as it is often reliant on surveys which are prone to underestimating new arrivals and those set to leave, who are less likely to respond to survey sampling.

2.2.4 A 2008 study on migrant workforce in the construction sector found that non-UK workers in the construction sector accounted for a relatively low 4% of the total construction workforce and that a large number of construction workers originated from the Republic of Ireland. However, another report from the same year shows that the nationality of non-UK workers is shifting, with the proportion from Ireland decreasing and an increasing representation from Eastern Europe [RD4] [RD5].

2.2.5 Whilst these studies suggest that the estimated proportion of foreign-born and migrant workers ranges from 4–10% across the UK construction sector as a whole, there is likely to be a greater proportion of migrant workers for major infrastructure projects due to the combination of high peak demand and specialised skills required as well as the use of foreign contracting firms.

2.2.6 There is also a high level of mobility in construction employment, particularly in the contracting element which is different from office or factory-based work. The CIOB notes that "*the workforce needed for major or highly-specialised projects is seldom met by the local labour market*" and that, as a result, the industry has adapted to form a highly flexible workforce which moves from site to site, often large distances apart [RD1].

2.2.7 The CIOB maintains that migration benefits the UK construction industry as it helps to smooth the volatility in the sector as well as improving the efficiency and competitiveness of UK firms [RD1]. However, the report notes that there is a risk that a ready source of high-quality migrant labour provides a disincentive to invest in trainee schemes which can be lengthy and expensive. Rather than try and limit migrant workers which would be difficult given current legislation and international agreements in place, as well as potentially disadvantage UK firms, the CIOB recommends increasing the provision of training [RD1]. Policies to develop the local workforce and improve the route of young people into construction firms are favoured. These would in turn reduce the need for firms to recruit workers from outside the UK. This highlights the potential importance of Horizon Nuclear Power's (Horizon) intention to implement a Job and Skills Strategy which could provide targets for the number of local apprenticeships and trainee positions created.

Trends in the nuclear industry

2.2.8 Given the increasing demand for energy in the UK coupled with challenging CO_2 reduction targets, the nuclear industry is growing, and plans are in place for several large nuclear infrastructure projects. At the same time, several existing Nuclear Power Stations have reached the end of their design life and are entering the decommissioning phase.

2.2.9 A recent report from the Nuclear Energy Skills Alliance outlines the best Labour Market Intelligence currently available for the nuclear industry, with information on civil (power generation) and defence projects, as well as decommissioning [RD6]. According to the report, the total nuclear workforce demand is expected to grow from 77,880 in 2015 to 111,280 in 2021. In order to meet this demand, the forecasted average required recruitment (including replacement and expansion) is 9,000 full-time equivalents per annum. It is predicted that the civil new build workforce will comprise 30% (33,380) of the total nuclear workforce in 2021 covering "*a range of skill levels and degrees of nuclearisation*".

2.2.10 The NESA report identifies that there are eight new nuclear build (NNB) projects either in progress or with construction programmed to start before 2023: Hinkley Point C (South West), Sizewell B (East), Wylfa Newydd (Wales), Oldbury (South West), Sellafield (North West), Bradwell (East), Hartlepool (North East) and Heysham (North West). However, at the time of writing only four of the eight stations are likely to be in the construction phase in 2023 based on current progress. Nonetheless, the findings of the NESA report are used to inform this assessment, as this is considered to be a 'worst case' scenario in terms of peak construction workforce demand.

2.2.11 The workforce demand for civil new build projects is assessed in the NESA report in terms of engineering construction (involving design, planning and construction management), civil construction and operations. As operations

staff are excluded from the assessment of peak construction workforce demand for the Wylfa Newydd Project, the following paragraphs summarise the findings related to the first two workforce categories.

2.2.12 The Engineering Construction Industry (ECI) comprises primarily professional-grade staff involved in design, planning and construction management as opposed to labourers/skilled trades. The total ECI workforce is estimated to comprise of around 180,000, 50% of which have membership of the ECITB [RD6]. Across the whole ECI in the UK, it is estimated that 18,000 are currently employed in the nuclear sector, split between decommissioning sites (50%), operational staff at reactor sites (43%) and NNB sites (7%). Demand is set to increase the total number of engineers in the nuclear sector to 26,000 by 2020. However, with regard to NNB sites, it is stated that "*new build technologies are all sourced outside the UK so will in any case all require significant overseas design, planning and engineering support which will reduce the demand on the UK workforce*" [RD6]. In terms of the other occupations within the ECI category, the shortfall is expected to be met by new entrants including apprentices and transfer of skilled staff from other sectors including the wider EU. Across the ECI as a whole (not just nuclear), the report notes that there is an increasing trend in employment of non-UK workers.

2.2.13 With regard to the civils construction workforce, the assessment found that the NNB programme as a whole would account for less than 0.5% of the total construction workforce in the UK at peak in year 2021. This is due to the fact that NNB construction is typically more capital intensive and less labour intensive than other construction activities. This, coupled with the sheer size of the overall construction industry in the UK, means that even in a peak year the NNB programme will only contribute around 1% of total construction output. At a regional level there is a more noticeable impact, where labour demand is estimated to account for 1.3% to 1.7% of the construction workforce in each English region with dedicated NNB sites, rising to 3.5% of the construction workforce in Wales. The report points out that the estimated demand for construction employment on Wylfa Newydd Project is proportionally much higher than any of the English regions and that "*most of the skilled construction workforce is in the conurbations of South Wales, which are not realistic commuting locations for Anglesey. Therefore, the construction workforce will almost certainly be a relocated one, whether from South Wales, the rest of the UK or indeed elsewhere*" [RD6].

2.2.14 The key civils construction trades identified as being in demand across the NNB programme are:

- wood trades and interior fit-out, in particular form-workers;
- building envelope specialists, in particular steel fixers (rebar) and concrete workers;
- scaffolders;
- civil engineering operatives not elsewhere classified (nec); and
- labourers nec.

2.2.15 Table 2-1 below shows the collective demand for the NNB programme for each of the main occupations as a percentage of the available workforce in the UK. The report notes that a figure of 1% to 2% can be attributed to 'normal' flows

in the labour market; therefore, anything above this range indicates a potential pinch point.

Table 2-1 NNB civils construction workforce demand as a % of overall employment in each occupation in the UK

Occupation	2019	2020	2021	2022	2023	2024	2025	2026
Construction managers	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2
Wood trades and interior fit-out	0.3	0.5	0.7	0.7	0.8	0.8	0.7	0.5
Building envelope specialists	0.6	1.1	1.4	1.5	1.6	1.6	1.4	1.1
Scaffolders	2.0	3.6	4.6	4.9	5.4	5.4	4.6	3.6
Plant operatives	0.3	0.6	0.8	0.9	1.0	0.9	0.8	0.6
Labourers	0.2	0.3	0.4	0.5	0.5	0.5	0.4	0.3
Civil engineering operatives	1.3	2.4	3.1	3.3	3.6	3.6	3.1	2.4
All occupations	0.1	0.2	0.3	0.3	0.4	0.4	0.3	0.3
Key		2-2.9%						
		3-4.9%						
		>5%						

Source: Adapted from [RD6]

2.2.16 As a general point, the report found that quantifying the available labour supply is difficult because of the variable sources of skilled workers both in the UK and from abroad, the recruitment policies of operators and developers, and the time required to achieve competence in certain skills.

2.3 Local labour participation benchmarks

2.3.1 The identification of a local labour participation rate can be further informed by reviewing information on other major infrastructure projects, accepting that the term ‘local’ will have a different meaning on each project, based on the local context. Given the absence of any UK/European examples of an Advanced Boiling Water Reactor (ABWR) installation, the review has been widened to include examples outside Europe and to examine generic major infrastructure projects. The risk from using non-UK/European projects is that the labour market context is often very different from the UK, which reduces the transferability of lessons learned. There is also a practical limitation in accessing material which has not been translated into English. The risks from widening the project review to include non-Nuclear Power Station projects is that, once again, limited lessons might be drawn on transferability to the current project. Major infrastructure projects do however often share a need to draw upon large numbers of people over a short period of time which involves absorbing migrant labour. A further issue concerns the lack of evidence on what actually happens during and after the implementation of a project as opposed to a predicted position produced to support a consenting process. With one exception (Sizewell B), there are no *ex-post* evaluations

available. This review has been produced within the boundaries of these constraints.

Wylfa B power station (not implemented)

2.3.2 This socio-economic impact assessment was commissioned by the Central Electricity Generating Board to support a planned Pressurised Water Reactor (PWR) called Wylfa B [RD7]. The plans for the PWR were not implemented; however, the study had to come to decisions concerning the same issues under consideration for this assessment[1].

2.3.3 The target programme for the construction of buildings and the installation and commissioning of the plant was 66 months, giving a commissioning date of spring 1998. The workforce profile was estimated to be as set out in Table 2-2.

Table 2-2 Occupational assumptions

Occupational group	Number	%
Site services and security	150	4%
Staff	700	20%
Civil operatives	600	17%
Mechanical and electrical operatives	2,050	59%
Total	**3,500**	**100%**

2.3.4 The Daily Construction Commuting Zone (DCCZ) for construction workers was based on the local authority areas of Anglesey and Arfon, and extended to a maximum of approximately 40 kilometres from the site (representing an estimated 45-minute journey to work). This definition was said to take account of current travel-to-work patterns in the area (at least 85% of employees included in TM Economics' business survey lived within 16 kilometres of their workplace), the low level of public transport provision in the locality and the consequent high dependence upon private transport (82% of employees in the survey used their own car or shared a car in order to travel to work), and the remote rural location of the site. The area definition also took into account discussions held with contractors working on the A55 North Wales coastal road, which revealed that, in general, the construction workers travelled (on a daily basis) less than 35 kilometres from their place of residence to the construction site. In terms of the operational workforce, it was noted that 97% of the Existing Power Station (current Wylfa Power Station) workforce was said to live on Anglesey. Consequently, it was assumed that, for the operational stage, all but a small minority of the employees would travel daily to the power station from within the Anglesey local authority area.

2.3.5 It was noted that the local construction sector was more geared towards smaller-scale domestic work rather than larger-scale civil engineering. It was also noted that the workforce was small in relation to peak requirements for

[1] It should be noted that the original analysis was carried out in 1998, therefore the assumptions underpinning the analysis is likely to have moved on.

2,300 civil, mechanical and electrical operatives required to construct the PWR.

2.3.6 A prevailing assumption was that construction and power station employment would be attractive to the local workforce as a result of the traditionally higher level of wages in these industries compared with local industry.

2.3.7 Despite the small size of the civil engineering workforce, it was noted that previous major projects had been able to find workers from the locality. Anglesey and Gwynedd have a long history of large-scale construction projects, such as: Ffestiniog Power Station, Trawsfynydd Power Station, the Existing Power Station, the aluminium smelter and Dinorwig Power Station. The study included a review of contractors working on the construction of the A55 coastal road (January 1988), which considered that the majority of the 400 site operatives working on the project had been recruited from the locality, in particular from locations along the North Wales coastal belt and from Anglesey. Generally, little difficulty had been experienced in hiring the predominantly civil operatives from the local area. However, two of the contractors mentioned that the recruitment of joiners had presented some difficulties because there was not a large supply of people with such skills available locally. The study concluded that it was not possible to determine the size of the construction workforce.

2.3.8 The study concluded by estimating that about 1,655 of the 3,500 workers required at the overall construction peak would be recruited from the local area (i.e. resident on Anglesey or Arfon). In particular, the vast majority of the site services and security and clerical staff were predicted to be local, resulting in the creation of about 340 local jobs (year 4 of construction). Conversely, a minority of local labour (approximately 75 local jobs) was forecast for the professional staff category due to the specialist nature of the work required and the shortage of suitably qualified persons in the area. It was estimated that approximately 600 local jobs would be created within the civil operatives' category at the peak requirement for such operatives. At the peak requirement for mechanical and electrical operatives, it was predicted that about 800 jobs would be created locally.

2.3.9 The number of local people recruited to the Existing Power Station at the operational stage was forecast to be between 335 and 375, representing about three-quarters of the total labour requirement. An important factor influencing the forecast for local labour was the likely closure of the Existing Power Station and the consequent scope for transfers from it to the PWR station. The remote rural location of the site and the study area's cultural characteristics are also important determinants of local labour contribution.

2.3.10 With regard to the temporary workers required at the site over a period of about four months periodically (every 12-18 months) for repairs, refuelling and maintenance, it was forecast that between 290 and 300 (of the 300 required at peak for about two-months duration) would originate outside the local area. An important factor in determining this forecast was the expectation that the people used would largely be travelling maintenance crew for PWR power stations.

South Texas Electric Generating Stations

2.3.11 This assessment concerns the construction of two additional units on an existing Nuclear Power Station site using ABWRs. Subsequently, financial backing for the development appears to have been withdrawn [RD8].

2.3.12 The assessment for this development observed that the "*planned building activities would differ significantly from those required to build the original South Texas Project (STP) Units 1 and 2*". Although some activities would be similar, STP Units 1 and 2 were constructed almost entirely on-site. For proposed Units 3 and 4, many of the components of the U.S. ABWR nuclear units would be delivered pre-fabricated, thus reducing on-site building labour requirements.

2.3.13 The assessment was based on a peak worker requirement of 5,950 (excluding operational workers). The in-migration of approximately 2,975 workers was assumed (50% of the peak construction workforce). The project would have been able to draw upon a resident construction workforce of 141,650 in 2005. The assessment assumed an average commuting distance for construction workers to be 20 miles one way.

Sizewell B

2.3.14 Construction activity began in 1987 and was completed in 1995. The construction of Sizewell B created 20,000 individual jobs on-site. Peak employment was over 5,000 (in 1992), with over 3,000 for four years. Annual recruitment of new employees exceeded 3,500 for about four years. Of the 5,000 employed in 1992, well over 2,000 were recruited locally (i.e. within daily commuting distance from the site). Peak construction accounted for over 10% total employment in the immediate Suffolk Coastal district.

2.3.15 Conditions attached to the planning consent included labour recruitment and traffic matters; in particular, that a proportion of employees should be recruited locally and that local firms should benefit from the construction project. These conditions were seen to be a key means of minimising adverse impacts and maximising local benefits. Construction workers were considered to be 'local' if their permanent address was within commuting distance of Sizewell B (35-40 miles) immediately before being recruited to the project.

Flamanville-3

2.3.16 Flamanville-3 is the first Nuclear Power Station employing the European PWR design to be built in France. The development is part of the existing Flamanville Nuclear Power Station located at Flamanville, Manche, on the Cotentin Peninsula in Normandy. Construction on a new reactor, Flamanville 3, began on 4 December 2007. The new unit is an Areva European Pressurized Reactor type and is planned to have a capacity of 1,650 megawatt electric per reactor.

2.3.17 Glasson reported that peak construction employment was "*likely to rise to around 3,000, to deliver the project on time*" [RD9]. About 45% to 50% home-based workers were expected at peak and a similar percentage of non-home-based workers (including, as at August 2009, approximately 400 workers from other EU countries – especially from Romania, but also Portugal and Poland). The home-based recruitment percentage was considered to be helped by the

presence of local skills in Cherbourg, the Cap Le Hague nuclear reprocessing plant, and the La Manche department (population of approximately 500,000).

Liquid Natural Gas Energy Cluster, Pembrokeshire

2.3.18 Analysis of existing and potential local[2] labour percentages at various energy sites within the cluster (Pembrokeshire County Council, 2005) revealed the following:

- Dragon 70% local;
- S Hook 65% local;
- RWE Power 50% local;
- Milford Power 50% local;
- TRANSCO 30% local; and
- Chevron 30% to 40% local.

2.3.19 The local labour percentages are based on discussion undertaken by Pembroke County Council with main contractors and project sponsors, the figures should be treated with caution and are expected to change over time, particularly as they will be effected by external factors [RD10].

2.3.20 In terms of future energy projects, it was predicted that liquid natural gas plants would have a peak labour requirement in excess of 1,500 between spring 2006 and 2007, of which 500 to 600 were likely to be in-migrant workers.

Channel Tunnel Rail Link

2.3.21 The initial predictions were that peak construction employment on the Channel Tunnel would be 4,000 in 1990, with improvements to supporting infrastructure generating further employment throughout the county of Kent over a longer time span [RD11]. The construction workforce was predicted to be focused in Dover and Shepway, but construction workers, especially those with specific skills, were recognised as being traditionally very mobile and were not necessarily expected to be local. An analysis of the outcomes from the project showed that construction employment peaked in 1990, though with a much larger workforce than originally anticipated (8,300 plus 1,827 employed by sub-contractors). Only 35% were from within Kent in 1990. In France, the Government set up Projet de Grand Chantier to coordinate all economic activities associated with the construction of the Channel Tunnel [RD11]. State-funded training was provided to ensure that 90% of all new jobs arising from the Channel Tunnel project were filled by recruits from the local area.

Heathrow Terminal 5 (T5)

2.3.22 The Heathrow Local Labour Strategy defined a “local labour area” as follows [RD12]:

- priority area (London Boroughs of Ealing, Hillingdon and Hounslow, and Borough Councils Slough and Spelthorne);

[2] Note that the source does not define ‘local’ in this context. This also applies in the case of the Channel Tunnel Rail Link.

- wider local labour area (Berkshire, West London and part of Surrey within M25); and
- total workforce employment was expected to peak in 2005 at around 5,000.

2.3.23 The Local Labour Strategy made the following estimations about the quarterly workforce demands of the T5 programme, which was predicted to peak in 2004 at 3,812. Construction commenced in September 2002; phase one of the project was completed in March 2008. At any point in time the project employed up to 8,000 workers, and as many as 60,000 people were involved in the project over its lifetime [RD13]. During 2002/03, approximately 51% of the construction workforce at T5 resided locally during the week, returning home at the weekends [RD5].

2.3.24 A detailed study was undertaken of local labour strategies applied to T5 [RD5]. Concerted efforts were made to implement a diversity policy and to integrate local labour. The client, British Airport Authority, made a commitment as early as 2002 to a Local Labour Strategy to ensure that local people had the opportunity to benefit from the employment generated by the new terminal.

2.3.25 With severe recruitment difficulties and skill gaps anticipated at all levels, the benefits claimed for this strategy included improved travel to work patterns; the opportunity to tackle social exclusion in some of the areas of relative deprivation close to the airport; involvement and up skilling of ethnic minorities, women and other groups traditionally under-represented in the construction industry; and cost savings for contractors from accommodation allowances to workers residing outside the area.

2.3.26 Many of these benefits were never fully realised. The actual local labour strategy implemented was managed on-site by a workplace coordinator employed by only one contractor, in contact with relevant external organisations, including local training organisations and colleges. However, over the course of the project's development, these diversity-related measures increasingly lost their impetus and had minimal impact in breaking down the exclusivity of the building trades.

2.3.27 Despite the efforts made, only 150 people were employed on T5 over the course of three years as a result of the strategy (employment being defined as a minimum of 13 weeks), of whom 3% were women and 30% from Black Asian Minority Ethnic groups. The lack of success is attributable to several factors, including insufficient resources, the skill sets of groups targeted, difficulties in recruiting skilled workers among the local labour force, the fact that the workplace coordinator was only employed by one contractor and the narrow definition of 'local'—confined to just the surrounding local authorities rather than West London.

2.3.28 Over time, priorities underwent significant change and the very notion of 'local labour' became rather blurred and acquired different meanings. Skill shortages and lack of work experience placements were serious problems, and the usual practice became to choose instead from the pool of existing and known labour that moves from site to site and comes from all over the country and from other parts of Europe.

2.3.29 On T5, as with other development sites, a distinction is drawn in collective agreements between travelling and 'local' people. Those classed as

'travellers' generally lived over 75km (50 miles) away and receive payment for travel time over seven days, including regular weekend returns home. The travel allowance offered a considerable inducement to workers from all over the UK to work the long site hours. Indeed, a number of interviewees claimed that local skilled tradesmen did not necessarily want to work on the site given the very long hours required to earn 'good' money, which meant that local domestic construction was often more attractive for those with family commitments. Trade union representatives also reported that, if workers came from outside the UK, including from Eastern Europe, they were recruited 'locally' and did not therefore qualify as 'travellers' in terms of pay but as 'local' labour.

2.3.30 Over the course of the project, many suppliers to T5 came to rely heavily on an itinerant workforce, both from outside London and, increasingly, from different nationalities and geographic regions outside the UK. For the employer, the advantages in employing migrant workers include that such workers are willing to go where work is and to work long hours while away from home. On T5, there were German, Polish, Punjabi, Portuguese, Czech and Croatian crews working alongside migrant workforces from Wales, Scotland, the North and the Midlands. Many lived in the surrounding, specially set up, caravan parks, in particular those employed on ground works, shuttering, civil engineering and infrastructure.

London 2012 Olympics

2.3.31 The Olympic Delivery Authority Employment and Skills Strategy's predictions for the Olympic Park included the following [RD14]:

- employ 5% to 10% of the labour force from five London Boroughs;
- in 2006, Experian estimated that, in 2010, demand would be for over 9,300 construction workers;
- Experian also estimated that the number of jobs provided at the Olympic Park would be equivalent to 35,000 person work years during the games and 15,000 person work years thereafter;
- there was a likelihood that locals would not take the majority of the work, although they might take lower-income, lower-skilled work; and
- recruitment for specialist labour is trans-national in scope, meaning that skills would be met by a global labour pool rather than a local one.

2.3.32 The Olympic Delivery Authority published a final set of employment and skills figures for the Olympic Park and Olympic Village (snapshot at June 2011) [RD15]. The figures showed that the combined Olympic Park and Olympic Village 'big build' workforce was 10,989. A quarter was classed as resident in the five Host Boroughs – Greenwich, Hackney, Newham, Tower Hamlets and Waltham Forest – this was above the target of Host Borough residents making up at least 15% of the construction workforce. More than six out of 10 workers lived in the London area. The Olympic Delivery Authority also published cumulative employment figures for the Olympic Park (April 2008 to June 2011) and Olympic Village workforce (April 2010 to June 2011), showing that, overall, 40,341 people worked on the Olympic Park and Village.

Nuclear Power Development Establishment at Dounreay in Caithness and Torness Nuclear Power Station in Lothian Region

2.3.33 These two projects were reviewed in the context of an examination into the economic multipliers pertaining to the two new build projects. However, the review touches upon the local labour input into the projects. McGuire observes that "*the explicit consideration of the effects of immigration on a sub-regional economy are particularly important when the labour input associated with a project under study is of a skilled nature and presumed to be in short supply locally*" [RD16]. In such instances, local recruitment will be relatively small. The level of immigration at both sites was estimated to be approximately 64%.

2.4 Construction phase local labour participation

Labour demand

2.4.2 This section considers the context within which the scope of local participation on the construction phase is determined – the nature of work opportunities that would be created as a result of the Wylfa Newydd Project. Researching labour demand for any aspect of a nuclear project was hampered by the lack of recent projects, particularly in a UK context.

2.4.3 In 2010, Cogent (the Sector Skills Body for Engineering) published a report entitled "Next Generation - Skills for New Build Nuclear" [RD17]. The report used a 'reactor model' to generate workforce requirements based on known workforce profiles taken from the Generic Design Assessment process for two reactor types – AP1000 and the EPR (European Pressurised Reactor) (the research did not use data on Boiling Water Reactors of the type now proposed for the Wylfa Newydd Project). Of the two types of reactors, more data tended to be available on the EPR given the advanced work on *ex-ante* assessment of the Hinkley Point C project to support an application for development consent. At the time, insufficient evidence was available to differentiate between the implications for labour demand of a modular design-based system like an AP1000 compared to a design like the EPR, which required more construction *in situ*.

2.4.4 Overall, construction taken together with electrical, mechanical and site preparation was found to be the largest workforce grouping and would account for 60% of the employment during a new build programme. This workforce would consist initially of site infrastructure preparation, followed by civil construction and engineering construction. A small proportion of a given project is likely be involved in site infrastructure development. These skills will be predominantly from levels 1 and 2. The balance, and overwhelming majority of the construction workforce, would be involved in the Main Construction phase. In this phase, the skills equilibrium was considered to shift to Level 3.

2.4.5 Based on the reactor model, a station with twin Reactor Units was considered to need 13,000 person-years[3] in site preparation, construction, electrical and

[3] The number of person years is defined as the total of the full-time equivalent jobs per year for each year of the programme. By way of illustration, a five-year programme employing 1,000 people in the

mechanical work over a typical six-year period to deliver, assuming a staggered but overlapping build of Reactor Units. Taking these numbers over a six-year build period for a twin-unit station, the average employment is 2,200 full-time equivalent[4] personnel per year. However, with construction many occupations were recognised as being transient and exist for a period shorter than the build programme. A headcount for construction employment would consequently be significantly higher.

2.4.6 The report also considered the impact of overlapping NNB programmes on the demand for skills. In particular, consideration was given to an indicative 16 gigawatt electric scenario, with a requirement for many thousands of workers. A key issue was the long lead times involved in developing some of these skills (over a decade) and the fact that many of the people with these skills are expected to retire.

2.4.7 Attrition due to retirement was expected to limit the mobility of experienced people to where the demand is located. In this way, a large proportion of the predicted skills peak demand would be passed on to the skills pipeline of those currently in education and training as either direct infill of skills gaps or for back-fill for the movement of experienced people across sectors.

2.4.8 The report's findings highlighted the sensitivity of skills demand to the phasing of the programme, which is exemplified by the Hinkley Point C project having slipped. The report highlighted particular skills shortages in "project and programme management", "engineering (various)" and "safety and regulatory compliance".

2.4.9 In 2012, the skills and training board for the construction industry, ConstructionSkills, commissioned a more detailed study on the construction skills implications of an NNB programme [RD18]. The study was based on combining the Construction Skills Network (CSN) Employment Model with data made available from Électricité de France (EDF) Energy (in relation to the Hinkley Point C project), and setting this against forecasts for the overall NNB programme. Estimates were made of the impact that the NNB programme could have, both in terms of construction output and construction employment at both a UK and regional/national level. It is recognised that a major part of construction work on the NNB programme will require similar skills sets to those of the workforce involved in the construction of major infrastructure projects, particularly civil engineering skills.

2.4.10 The study assumed that the nuclear programme represents not much more than 1% of the UK's total construction output in any year, which in turn means only a small impact on UK construction employment levels. Whilst the national picture was considered manageable, the report recognised that a nuclear build project would have a larger impact on individual regional construction markets within which they were to take place. It was nevertheless found that the net

first year and 2,000 each year thereafter amounts to 9,000 person years. Other construction research projects use similar workforce accounting schemes. For example, it was reported that the 2012 Olympics would require 60,000 person years of construction employment.

[4] The full-time equivalent corresponds to a full year of employment on normal working hours and leave. For the construction sector in particular, each full-time equivalent can correspond to more than one individual, reflecting transient employment on a project.

impact was no greater than the pre-recession construction peak. The analysis did however identify pinch-points such as building envelope specialist workers, and those involved in building the very large reinforced concrete structures, such as steel fixers and concreters. This modelling approach does have merits in so far as the Wylfa Newydd Project relevant data can be fitted to some of the framework.

2.4.11 The Wylfa Newydd Project requires the use of specialist labour with skills specific to the nuclear sector (alongside typical civils type work) involving the application of proprietary knowledge (e.g. Hitachi ABWR design). The involvement of overseas contractors with their own workforce seems highly likely; however, details on this are not available at this time. This is a consistent assumption for other global examples of ABWR deployment which are mainly Japanese and American in origin.

2.4.12 This type of labour demand is unlikely to be met easily within any local labour market at an appreciable scale, especially in remote rural locations such as those encountered in North Wales [RD16].

2.4.13 Specialist (higher skilled) labour would, therefore, need to be imported to a certain level. In this context, the term “specialist” typically relates to “mechanical and electrical” and “professional” (supervisory/managerial) components of labour demand during the construction phase.

2.4.14 Correspondingly, there are other types of work found in some aspects of civil engineering, building and support activities that are more likely to be filled locally based on considerations such as ease of transfer from current activities in the existing skills supply.

2.4.15 The evidence base on local participation comes from a limited range of studies of power station developments considering the comparatively recent resurgence of Nuclear Power Station proposals. The most recent project that has been tested through a consenting process (the *Planning Act 2008* and *Town and Country Planning Act 1990* for some aspects of development) is Hinkley Point C, which sets out participation rates for local people drawn from across the DCCZ.

2.4.16 The socio-economic assessment completed for that project set out local participation rates by occupational/skills categories. For Hinkley Point C, they were as follows:

- civil engineering operatives 23%;
- mechanical and electrical engineering operatives 14%;
- off-site services, security and clerical staff 90%;
- operational staff 50%;
- site services, security and B clerical staff 90%; and
- supervisory/managerial 7%.

Evaluating the sustainability of the local labour participation

2.4.17 A key issue is the degree to which local labour participation is sustainable given the relative condition (as demonstrated by the scale and skills availability) of the local labour market covered by the DCCZ.

2.4.18 A key concern is the differences between the baseline conditions found in North Wales compared to both the South West (Hinkley Point C) and East Anglia (Sizewell B), as summarised in Table 2-3 below.

Table 2-3 Comparison of key characteristics of NNB development site catchment areas (90 minutes)

Worker Variants	Wylfa Newydd Project	Hinkley Point C[5]	Sizewell B[6]
Peak construction workforce	9,000	5,600	5,100[7]
Local labour at peak assumption	-	34%	43%
Peak local labour	-	1,900	2,200
Resident workers (2011) for the DCCZ[8]	165,881	1,163,205	784,723
Resident construction workforce for the DCCZ[9]	14,507	91,358	65,987

2.4.19 A comparison of the resident worker population shown in Table 2-3 demonstrates the overall size of the labour pool is much smaller for the DCCZ defined for the Wylfa Newydd Project compared to both Hinkley Point C and Sizewell B. The comparison is even more marked when resident construction workers are considered. This comparison probably reflects the level of urbanisation in the respective catchments. Hinkley Point C, for example, includes the City of Bristol and medium-sized towns like Taunton and Bridgwater and, as such, there is a greater density of population and workers to draw upon. The location of Wylfa Newydd Power Station does not have a comparable urban structure of the same scale within the DCCZ.

2.4.20 Overall, it seems highly unlikely that local economy could sustain local labour rates assumed at Hinkley Point C or Sizewell B based on relative magnitude of the working age population, population density and construction workforce. The comparative data review would tend to suggest a local labour rate considerably below 34%.

Re-scoping local labour participation

[5] Based on a 90-minute drive-time best fit used in the Hinkley Point C assessment – See Appendix 77-1.2 Comparator Areas

[6] Based on a 90-minute drive-time best fit – See Appendix 77-1.2 Comparator Areas

[7] [RD19]

[8] [RD20]

[9] [RD20]

2.4.21 New evidence has become available since the Hinkley Point C evidence base was compiled that provides insight into a relationship between local participation rates and size of population/workforce

2.4.22 The CSN has published work on the employment implications of the NNB programme [RD18]. This study used an analysis of EDF workforce profile for Hinkley Point C reclassified into CSN occupational aggregate categories. Each aggregate category consists of a grouping of individual occupations defined under the 2010 Standard Occupational Category (SOC) definition of occupations as revised in 2010. The original EDF requirements and matching CSN category are repeated in detail in appendix 77-1.1. The results of applying this classification system to occupational groupings data for the DCCZ are shown in Table 2-4 below.

Table 2-4 Categorisation of the occupations of resident persons in the DCCZ 2011 and JSA claimants 2016

CSN skills category	No. of currently employed people	JSA claimants seeking employment (July 2016)[10]
Other professional and technical staff	3,182	10
Plumbing and HVAC	1,442	10
Civil engineering operatives (nec)	287	0
Electrical trades and installation	2,002	5
Bricklayers	575	5
Building envelope specialists	967	3
Scaffolders	235	0
Glaziers	405	0
Roofers	366	5
Floorers	300	0
Non-construction operatives	9,104	390
Painters and decorators	1,093	10
Wood trades and interior fitters	2,639	11
Labourers not elsewhere classified	1,153	135
Non-construction professional, technical,	30,029	1,835

[10] SOC2000 Unit Groups best-fit match with SOC 2010 'Minor group' refers to the level of categories within the hierarchy of occupations.

CSN skills category	No. of currently employed people	JSA claimants seeking employment (July 2016)[10]
IT and other office-based staff (excl. managers)		
Logistics	4,469	140
Plant operatives	1,067	5
Specialist building operatives (nec)	1,362	15
Steel erectors/structural	724	5
Plasterers and dry liners	383	5
Total	**61,784**	**2,590**

2.4.23 Some of these occupational aggregate categories include occupations like "glaziers" or "bricklayers" that are clearly identified within the construction sector. Several important categories, however, do not relate directly to the construction as a distinct sector, such as "non-construction professional, technical, IT and other office based staff" and "non-construction operatives". Both of these categories broaden the base of the workforce that the Wylfa Newydd Project could potentially draw upon to achieve its peak workforce requirements.

2.4.24 Based on modelling, the overall pool of "nuclear relevant" workers within the DCCZ expands to 61,784 (this contrasts with the 14,500 jobs attributed to the construction sector alone[11] within the same area) [RD20].

2.4.25 Whilst the "nuclear relevant" workforce is potentially much larger than the construction workforce alone, the potential supply is unevenly distributed across the occupational requirements of the Wylfa Newydd Project. It is therefore necessary to look at skills supply in relation to specific occupations or groups of occupations demanded by the Wylfa Newydd Project.

2.4.26 For the purposes of simplifying the analysis, categories have been transformed from CSN skills category to definitions used in C1 (Application Reference Number: 6.3.1) and other parts of the evidence base concerning local labour (see Table 2-5 below). This concerns a process of identifying similarities between CSN skills categories and the broader categories defined for the Wylfa Newydd Project; for example, "Electrical trades and installation" CSN skills category would fall under the broader "Mechanical and electrical operatives" category.

[11] Based on a count of jobs.

Table 2-5 Transformation of CSN occupational categories to broad categories

CSN skills category	Site services, security and clerical	Supervisory and managerial	Civil operatives	Mechanical and electrical operatives	Operations
Other professional and technical staff	-	-	-	-	*
Plumbing and HVAC	-	-	Y	-	-
Civil engineering operatives nec	-	-	Y	-	-
Electrical trades and installation	-	-	-	Y	*
Bricklayers	-	-	Y	-	-
Building envelope specialists	-	-	Y	-	-
Scaffolders	-	-	Y	-	-
Glaziers	-	-	Y	-	-
Roofers	-	-	Y	-	-
Floorers	-	-	Y	-	-
Non-construction operatives	Y	-	-	-	Y
Painters and decorators	-	-	Y	-	-
Wood trades and interior fitters	-	-	Y	-	-
Labourers not elsewhere classified	-	-	Y	-	-
Non-construction professional, technical, IT and other office-based staff (excl. managers)	Y	-	-	-	-
(Part-time)	Y	-	-	-	-
(Part-time)	-	-	Y	-	-
Logistics	-	-	Y	-	*

CSN skills category	Site services, security and clerical	Supervisory and managerial	Civil operatives	Mechanical and electrical operatives	Operations
Plant operatives	-	-	Y	-	*
Specialist building operatives (nec)	-	-	Y	-	-
Steel erectors/structural	-	-	-	Y	-
Plasterers and dry liners	-	-	Y	-	-

*Note: * indicates some potential for transferability.*

2.4.27 As a result of applying the transformation analysis shown above, the potential for supplying workers to the project is shown in Table 2-6.

Table 2-6 Summary of the occupational skills profile of the workforce across the DCCZ for construction

Classification[12] of the occupational characteristics of all residents working in the Census 2011 in "nuclear relevant" occupations[13]	No. of employed people (2011) (Column B)	No. of claimants seeking jobs of type (Column C)	Nuclear relevant (currently employed plus claimants seeking) (Column D) Col B + Col C
Site services, security and clerical staff	31,520	2,210	33,730
Supervisory/managerial	10,795	25	10,820
Civil engineering	16,744	345	17,089
Mechanical and electrical operatives	2,725	10	2,735
Total	**61,784**	**2,590**	**64,374**

2.4.28 Having regrouped the data into broad categories, Table 2-7 draws a comparison between supply and demand by calculating the theoretical number of people within "nuclear relevant" occupations for each broad category of labour demand.

[12] Operations staff are not included in the CSN scope and therefore are excluded from this analysis

[13] "Nuclear relevant" includes any occupational grouping falling within the occupational categories matching table 1 in Appendix 77-1.1 [RD18].

Table 2-7 Summary of the occupational skills profile of the workforce across the DCCZ for construction

Classification of the occupational characteristics of all residents working in the Census 2011 in "nuclear relevant" occupations[14]	Nuclear relevant (currently employed plus claimants seeking)	Expected demand at peak	Ratio of employed persons to jobs created at peak
Site services, security and clerical staff	33,730	902	37.4:1
Supervisory/managerial	10,820	1,998	5.4:1
Civil engineering	17,089	3,069	5.6:1
Mechanical and electrical operatives	2,735	2,580	1.1:1
Operatives	Outside CSN scope	451	Outside CSN scope
Total	**64,374**	**9,000**	**7.2:1**

2.4.29 Table 2-7 shows that based on persons employed across CSN categories there are 7 persons working within nuclear relevant occupations (or seeking work in nuclear relevant occupations) for each construction job created by the Wylfa Newydd Project at peak. The average does however disguise a range with 37 persons for each site services, security and clerical job on offer compared to only 1.1 persons for each mechanical and electrical operative job. This analysis shows that finding sufficient people to meet peak labour demand is less of a problem for site services, security and clerical staff but a severe challenge for mechanical and electrical operative jobs. As the ratio tightens, there is a lower probability of finding a suitably skilled person.

Labour market resilience

2.4.30 A key issue is the resilience of the local labour market contained in the DCCZ to accommodate the additional demand for labour created by the Wylfa Newydd Project.

2.4.31 New job opportunities will create a number of different effects. The most obvious effect will be to encourage existing workers to move from an existing job unrelated to the Wylfa Newydd Project to work directly on the Wylfa Newydd Project.

2.4.32 This action does however create a chain reaction by:

- creating a vacancy that can be filled by either another existing worker from within the 90-minute drive-time area;
- attracting a new worker from outside the 90-minute-drive area;

[14] "Nuclear relevant" includes any occupational grouping falling within the occupational categories matching table 1 in Appendix 77-1.1 [RD18].

- allowing an unemployed person from within the 90-minute area to gain employment; or
- attracting an unemployed person from outside the 90-minute area.

2.4.33 The relative productivity of the new worker and the speed at which a vacancy can be filled may determine whether there is a job to be filled. The effect is repeated every time a vacancy is created.

2.4.34 A significant share of labour market activity is taken up by workers reacting to jobs being lost by failing companies and gained by growing companies in the same sector[15] which necessitates movement. The level of general turnover is typically greater than the net change in jobs observed over any time period. Between 2012 and 2013, employment across the 90-minute drive-time area grew by around 7,800 jobs overall; however, this was a result of just over 12,500 job movements (the sum of jobs lost and gained over the same period). This general turnover of jobs represented around 9% of the average total employment for the area[16]. Over the same period, general turnover of jobs for the Isle of Anglesey was 16% in a period where net employment actually fell. The level of turnover for Wales represented around 6% of employment, while employment growth here was just less than 0.5% in the same period.

2.4.35 The general turnover in employment only represents part of labour market activity, as workers are not only moving out of jobs that have ceased and into new jobs, they are also moving between jobs that continue from one period to the next. Overall, the movement of workers between jobs that continue to exist as well as jobs that have been newly created or destroyed are greater than the jobs that get reallocated. The OECD has calculated that total job turnover is 22%, averaged across 11 countries[17], whilst total worker turnover is of the order of 33% [RD3]. However, local data are unavailable at this time.

2.4.36 A conservative approach would be to assume that the movement of workers triggered by jobs being reallocated within an economy represents the minimum movement bearable by a local economy. Within the DCCZ there is a general turnover of 9% in the stock of employment (jobs). This implies that the local economy could sustain a maximum of 5,560 workers with relevant nuclear skills moving from existing jobs into new jobs created by the Wylfa Newydd Project. It is not expected this level of workforce would cause an effect which the capacity of the local economy could not absorb.

2.4.37 Ultimately, the level of movement depends upon the nature of the job opportunity on offer, in terms of how long the opportunity will last and the level of pay on offer compared to the prevailing rate of pay in the area. Movement levels will also depend upon the relevance of detailed capabilities of the local workforce in so far as certain types of apparent skills matches may be less than first appear. Construction skills based on small-scale

[15] This is termed “Total worker reallocations” being the sum of job creation and job destruction between t-1 and t as set out in [RD3] Chapter 2: How do Industry, Firm and Worker Characteristics Shape Job and Worker Flows?

[16] This rate is calculated using the OECD method of taking the average of total employment in t-1 and t as detailed in [RD3] Chapter 1: The Jobs Crisis.

[17] 11 countries were chosen on the basis of comparable data being available.

renewal/refurbishment projects in domestic and smaller commercial work may not transfer particularly well to larger projects like the Wylfa Newydd Project.

Sensitivity issues – occupational impacts

2.4.38 In a free labour market, it is not possible to predict with any degree of certainty who is most likely to move from their current job to the Wylfa Newydd Project. Individuals will make a risk/reward calculation based on the advertised pay rate and duration of the job opportunity. Individuals will also be encouraged to consider non-economic factors such as maintaining family contacts and so forth. Individuals will also be minded to consider whether they will have a job to return to after a job opportunity on the Wylfa Newydd Project has come to an end. Despite these issues, the assessment process requires a prediction of the likely occupation destination of local resident workers.

2.4.39 Hinkley Point C offers the only recent source of data on these likely destinations. The implication of these local participation rates was demonstrated earlier (see 2.4.29) with a conclusion that the overall level of local labour participation may be distorted by the large site services component in labour demand.

2.4.40 Given the absence of a clear causal relationship between the conditions found in a local economy and local labour content on a NNB, the issue has been explored using a scenario based on a raised local labour content. Table 2-8 shows the implications of assuming that proportionally more local people work in the “site services, security and clerical” category under each local labour force scenario. Each scenario assumes that the recruitment potential for site services, security and clerical workers (alongside operatives) remains constant. This assumption is based upon a professional assessment of the information contained in Table 2-7, which shows a relatively large pool of labour suitable for this type of work across the DCCZ (33,730). As pay levels for this type of work are less likely to attract long-distance movers (non-home-based workers), it would seem reasonable to assume a much higher local content is achievable. However, it is recognised that local participation within other types of skill categories is desirable from a policy perspective aimed at enhancing the development and retention of higher skills in the local economy.

2.4.41 Table 2-8 shows the effect of holding the number of home-based “site services, security and clerical” workers constant across each of the three overall local labour scenarios based on 25%, 20% and 15% home-based workers at peak construction respectively. Based on the available pool of labour for site services, security and clerical, the raised local content scenario seems to offer an entirely feasible strategy for Horizon.

Table 2-8 Effect of different local labour scenarios

Overall local labour (Col A)	Overall peak demand (Col B)	25% local labour content	20% local labour content	15% local labour content	22% local labour content (latest estimate)
Site services, security and clerical staff	902	812	812	812	689
Supervisory/managerial	1,998	140	83	26	237
Civil engineering	3,069	717	426	134	675
Mechanical and electrical operatives	2,580	362	214	68	208
Operatives	451	226	226	226	191
Total	9,000	2,250	1,800	1,350	2,000

Sensitivity issues – viability of a DCCZ

2.4.42 The analysis contained within this paper has been based on the DCCZ for local labour – as shown in figure C1-1. This has been used for practical reasons in so far as the most recent nuclear impact assessments have been based on defining a DCCZ. More generally, there is evidence that the propensity to engage in journeys to work that exceed a travel time of about 90 minutes declines significantly for most groups of workers.

2.4.43 The counter argument is that construction represents an atypical group of workers in so far as the available evidence indicates a greater willingness to travel further on a daily basis than the average commuting worker. Table 2-9 shows that 19% of surveyed construction workers in Wales were willing to travel more than 50 miles to work on a daily basis.

Table 2-9 Distance travelled by region/geographical area (%)[18]

Region/geographic area of establishment	<5 miles	<10 miles	>25 miles	>50 miles	>100 miles
South West	35	46	66	11	1
London	33	55	78	9	1
East Midlands	30	46	70	15	1
Northern Ireland	29	39	63	13	*
Scotland	28	43	73	6	*
North West	27	45	69	11	1
Yorkshire and Humberside	25	40	66	13	*
West Midlands	25	50	74	10	*
Wales	25	41	62	15	4

[18] [RD24]

Region/geographic area of establishment	<5 miles	<10 miles	>25 miles	>50 miles	>100 miles
South East	24	38	64	18	1
North East	22	41	78	8	*
East	17	25.6	49	24	2
Average	27	42	68	13	1

2.4.44 An expansion of the DCCZ eastwards would eventually bring in much more urbanised areas within England around Cheshire and Deeside. A further extension eastward would bring in Liverpool City and large sections of the Liverpool conurbation[19]. An extension of the daily commuting area towards these parts of the country would mean accepting longer travel times of around 140 minutes (around 55% more travel time than has been allowed for). Subject to shift systems, this extension of travel would mean that the "working day" would become even longer, which may be incompatible with issues raised in the Travel Plan concerning health and safety. An extension would also place a greater reliance upon the A55 transport corridor which might carry a risk if the corridor becomes congested or blocked, an issue for testing in the transport assessment. This is likely also to influence the arrangements made for the payment of travel allowances.

2.4.45 A further issue of concern is the degree to which a single catchment area is capable of describing the characteristics of all workers likely to work on the Wylfa Newydd Project. As demonstrated earlier (section 2.2), not all workers will be from a construction background. Non-construction workers are more likely to conform to the average distance travelled to work (which is 12 miles or 19.6 kilometres)[20].

Sensitivity issues – duration of work

2.4.46 Some of the issues concerning the propensity to commute on a daily basis are tied to assumptions concerning the duration of jobs created by the Wylfa Newydd Project. Matters related to duration of jobs are problematic in so far as determination lies in the hands of main contractors and their supply chains as to how work would be organised and resourced on-site.

2.4.47 The principal source of data on duration of work is the Babcock study published in 2012[21] (a sample study of the workforce) which found that 13% did not expect to work on-site for more than a month, including 4% who expected to change site after no more than a week [RD21]. Site durations of between one month and one year were predicted by 29% of those on-site in Wales, and 26% expected to work continuously on the same construction site for a year or longer. A sizable minority (32%) felt that they could not predict how much longer they would be working on the same site, that their agency or

[19] Based on using Google Maps, December 2014

[20] These issues are explored in greater detail within modelling work undertaken on the spatial distribution of the workforce.

[21] This study supersedes the earlier Warwick University Study on the UK Construction Workforce in 2005.

employer could send them elsewhere (or end their contract) at any time, regardless of whether the current site still required workers with their own skill set.

2.4.48 The same report found that the occupation groups that were the least likely to have a clear expectation of working at the same site for more than another month were those trades that would be expected to have relatively short durations undertaking specific tasks within certain phases of builds. The occupations identified were floorers (66.1%), roofers (49.5%) and painter/decorators (48.3%), also general operatives/labourers (49.1%) who might be part of a short-phase specialist team, but who also tend to be given the least security by larger companies, which move general operatives around between sites as demand for labour peaks and declines. Numerous general operatives/labourers reported that they might find themselves circulating between a handful of sites operated by their employer for varying lengths of time, from a day or two, to several months.

2.4.49 Short-duration working is therefore more likely to relate to “civils” type workers who might only be engaged on the site for a few months at a time (dependent upon task and phasing of the units).

2.5 Operational phase local labour participation

2.5.1 Labour demand for the operational phase for the Wylfa Newydd Project are distinct from the construction phase in terms of the specific skills required, duration of employment opportunities and the magnitude of impact.

2.5.2 Evidence on the operational phase is also sparse in relation to the next generation of nuclear reactors. Cogent research provides a breakdown of existing employment in the UK nuclear electricity generating sector into five broad skill levels, as shown in Table 2-10 [RD17]. It shows that the skills levels of the existing workforce in the nuclear generating sector are high, with around 80% of the workforce in the Level 3 and 4 (technical and professional) skill categories, whilst only 16% are in Level 1 and 2 occupations. The future trend is likely to be towards increasing numbers qualified to Level 4 and above.

Table 2-10 Cogent analysis of skills

Skill levels	% of Employees
Semi-skilled (NVQ level 1 equivalent)	4%
Skilled (NVQ 2)	12%
Technician (NVQ 3)	38%
Professional (NVQ 4)	42%
Managerial (NVQ 5)	4%

Local labour area

2.5.3 The definition of “local” in relation to the operational phase is much more constrained when compared with the construction phase. The evidence on this comes from some of the existing reactor sites in the UK.

2.5.4 Information from Hinkley Point B showed that 94% of the operational workforce lived within the three immediate districts, with 70% living in Sedgemoor alone.

EDF's existing nuclear (ex. British Energy) policy states that all operational permanent staff should live within 25 miles of the station, and it is envisaged that all but a very small minority would live in these three districts.

2.5.5 The socio-economic study of decommissioning the existing Wylfa Power Station used data on the home addresses of workers during the operational period of the existing Wylfa Power Station to establish the potential geographical distribution of workers for the proposed operation station. In April 2007, data on employee postcode sectors were supplied (e.g. LL65, LL67, PR7). Analysis of the postcode data reveals the following residential locations of staff:

- Isle of Anglesey (87.2%);
- rest of North Wales (7.9%);
- rest of Wales (2.3%); and
- England (2.5%).

2.5.6 Some concentrations of staff were noted within the immediate vicinity of the Existing Power Station, including the nearby settlements of Amlwch and Cemaes, broadly matching Anglesey North (defined in chapter C1 (Application Reference Number: 6.3.1) section 1.2), accounting for 44% of the total. A further 24% came from the settlements around Holyhead (broadly matching Anglesey West). The balance for the Isle of Anglesey came from Anglesey South (19.2%).

Transfers from decommissioned reactors

2.5.7 The NNB programme is paralleled by the extensive decommissioning programme running alongside it. Decommissioning effectively releases workers from the older reactor fleet whose skills can still be used within the next generation fleet. It is nevertheless the case that many of the released workers are coming to the end of their working lives with attrition due to retirement.

2.5.8 The Hinkley Point C assessment did nevertheless make allowances for the anticipated decommissioning of both the Hinkley A and B stations. The predictions used in the assessment suggested relatively high local recruitment figures, partly because of the assumed transfers from Hinkley Point B (and possibly from the decommissioning activities at Hinkley Point A), and also because of the stances of both developer and local authorities to strongly encourage local recruitment, and the attraction of such jobs in more constrained economic times.

2.5.9 Based on the differences between evidence from other studies on local recruitment and the final figure used for Hinkley Point C, transfers appear to form the basis of assuming 15% as opposed to 5% local participation for managerial and professional workers [RD9]. This is an important assumption given the numbers of higher skilled staff involved.

Expectations of local content

2.5.10 A key issue for the assessment is to determine how many local people might work on a fully operational development.

2.5.11 On average, Glasson assumed that around 50% of the new workforce for Hinkley Point C would come from within 10 miles of the new development with distinct variations by skill groups [RD9]. Information from previous studies suggested a low local recruitment ratio, usually from 5-15% for the managerial and technical category, but much higher ratios for administrative and clerical (55-85%) and industrial staff (50-70%). For example, the combined pattern of recruitment at the Hinkley Point A and B stations showed only 5% local recruitment of managerial and technical staff, but around 60% for both administrative and clerical staff, and industrial staff (rising to 80% for the unskilled industrial staff). The local recruitment assumptions used for the Hinkley Point C project are shown in Table 2-11 below.

Table 2-11 Local recruitment assumptions used in the Hinkley Point C assessment[22]

Occupational groupings	% Local
Managerial and technical	15%
Administrative and clerical	70%
Industrial	65%
Overall	52%

Wylfa Newydd Project requirements

2.5.12 It is estimated that 850 staff would be employed during operation. This estimate includes directly employed staff and contract staff. The breakdown is shown in Table 2-12, with Hitachi-GE Nuclear Energy worker categories mapped on to socio-economic categories, which facilitate benchmarking against other available assessments or evidence bases. Table 2-12 shows a local labour rate of 45% which compares with 52% quoted for the Hinkley Point C reactor. This result suggests the assignment (and related local labour assumption) seems reasonable.

2.5.13 It should be noted that this assumption reflects a “policy off” scenario. Therefore, the assessment of effects discussed in chapter C1 (Application Reference Number: 6.3.1) concludes that, with the proposed interventions to maximise the local contribution to the workforce, an 85% local contribution is achievable.

[22] [RD9]

Table 2-12 Analysis of local content in operational reactors

Occupation categories	No.	Socio-economic categories of worker		
		Management and professional	Administrative and clerical	Industrial
Management	10	10	-	-
Operations	145	145	-	-
Engineering	84	-	-	84
Maintenance	165	-	-	165
Business support	52	52	-	-
Technical support	125	125	-	-
Training	31	31	-	-
Permanent contractors and others	238	-	238	-
Total	850	363	238	249
Local content %	45%	15%	70%	65%
Local content (Numbers)	383	54	167	162

Outages

2.5.14 Additional contract personnel would be employed at the site during refuelling and maintenance outages. It is estimated that outages would require up to 1,000 additional staff per day, excluding utilities contractors.

2.5.15 By way of comparison, Sizewell B typically involved an additional 800 to 1,000 contracting staff for a short duration of one to two months. A detailed study, by the Impact Assessment Unit, of the first outage at Sizewell B (1996) found that around 37% of the outage employees were recruited from within daily commuting distance of the Sizewell B site (90-minute drive-time), with the remaining 63% recruited from elsewhere in the UK and abroad [RD22].

3 Accommodation and spatial distribution of the workforce

3.1 Introduction

3.1.1 The estimated local workforce serves to identify the potential number of workers who may travel to the area and seek accommodation locally. In order to understand the potential locations, they may seek accommodation in, a gravity model was used. This predicts the distribution of workers within a defined area. The area considered for the distribution of non-home-based workers is the Key Socio-economic Area (KSA). For the home-based gravity model, the distribution is over a wider area, the DCCZ. The gravity model does not inform the distribution of workers during the operations phase of the Project.

3.1.2 Gravity models are used in various social sciences to predict and describe certain behaviours that mimic gravitational interaction. The methodology, inputs and outputs of the model are described below. The detail provided formed part of a Technical Note shared with the Welsh Government and Isle of Anglesey County Council (IACC) in April 2017. The model outputs were utilised to support the assessment of effects on housing and accommodation discussed in chapter C1 (Application Reference Number: 6.3.1).

3.1.3 In addition to information on the gravity model, the assessment of accommodation capacity is also provided below. This serves to support the assessment of supply demand balance within the accommodation sector in the KSA.

3.2 Gravity model

3.2.1 The gravity model provides an evidence base for understanding where local labour might come from and which communities are likely to host non-home-based workers, i.e. imported labour to facilitate construction of the Wylfa Newydd Project.

3.2.2 The gravity models provide worker distribution inputs to the transport strategy and Strategic Traffic Model for the Wylfa Newydd Project; however, it is not intended that the gravity model will address detailed issues arising from the transport assessment. Matters such as modal split, bus service scheduling and the impacts of shift patterns will be addressed through other means and is not in this report. The implications of such matters will be addressed as appropriate within other aspects of the socio-economic scope of works.

3.2.3 The approach to, and results from, the bespoke gravity models for estimating the geographical distribution of workers who either travel to work from their homes (home-based workers) or who are based in temporary accommodation (non-home-based workers) is set out below. Two separate gravity models have been produced as follows:

- **Home-based travel:** The gravity model provides an estimated geographical distribution of the main residence of workers who travel each day to and from the Wylfa Newydd Development Area.

- **Non-home-based travel:** The gravity model provides an estimated geographical distribution of bed spaces. These are likely to attract migrant workers who would reside in temporary accommodation (i.e. not their permanent residence) close to the Wylfa Newydd Development Area for the duration of their employment on the Wylfa Newydd Project.

3.2.4 For purposes of clarity, the gravity model role and limitations are summarised as follows.

- The Gravity Models produced for this project are tools to provide an indicative distribution of workers to home locations and non-home-based accommodation.
- The Gravity Models are an input to the transport strategy for the Project, and it is not intended that the model will address detailed issues arising from the transport assessment. Matters such as road traffic capacity, modal split (e.g. car, group travel, bus train, Park & Ride), bus service arrangements, and the impact of shift patterns, are addressed through other means and are out-with the Gravity Model Assessment.
- The inputs to estimate distribution of worker trips are travel time and distribution to geographical areas of either workers with relevant skills (from Census data), or the estimated number of bed spaces in potential worker accommodation (for home-based and non-home-based workers respectively).
- The actual distribution of workers at the time of construction will be subject to a wide range of influences, such as competing employment sites, salary on offer, car ownership, terms and conditions of employees (e.g. an ability to arrive say 5 minutes late without penalty), availability of public transport or some other form of group transport, government initiatives on skills in certain areas.
- The models do not take into account that the actual travel time will vary between different times of day, week or month e.g. slower in summer time at peak tourism periods as this is a matter for consideration by the Transport Assessment.

3.2.5 Hence the Gravity Model should be considered as providing guidance on likely worker travel origins. It provides a basis for determining the estimated spatial distribution of the place of residence or accommodation of the workforce; It does not provide estimations in respect of the actual availability of workers.

3.2.6 The Gravity Model outputs are based on a series of input characteristics in respect of worker numbers, proportion of job types/skills, proportion of home-based and non-home-based workers, and proportional distribution of accommodation types across the local area. The Gravity Model has been subject to a number of updates during the on-going development of the Wylfa Newydd Project, as the Project details were refined and as further information became available. Examples of changes made which required updates are: the number of total workers, and changes to worker accommodation bed space geographical distribution.

Gravity modelling approach

Deterrence function

3.2.7 Both gravity models have been built as bespoke spreadsheet-based models. Gravity models are based on a 'travel deterrence' function, such that each individual's choice to work at the WDNA (or not) has a relationship with the ease of travelling to work, and that the cumulative numbers of travellers from each area has a direct relationship with a measure of the population of each area (e.g. working age population, accommodation stock).

3.2.8 The 'travel deterrence' has a negative exponential relationship with the 'generalised cost' of travel; that is, as the travel cost, distance and time increases, the 'attraction' of travel reduces. For this model, **travel time** has been used as a proxy for 'generalised cost'. The generalised cost travel deterrence is expressed as in the formula below:

$$f(c) = c^{-\beta} * e^{-\gamma c}$$

3.2.9 Where **β** and **γ** are constants and c is cost (which in this case is journey time in minutes). For the gravity models produced for this Wylfa Newydd Project, the travel time is based on car travel by the quickest route (see 3.2.26).

Category of travel

3.2.10 The worker distribution is based on peak workforce as this represents maximum carrying capacity needed in the network and is, therefore, most likely to represent the worst case environmental impact.

3.2.11 The distribution of worker travel can be split into two core 'types' as follows:

- Employees living at home within approx. 90-minute[23] travel-time radius by road [home-based trips].
- Employees based at local guest houses, hotels, B&Bs, and caravan sites etc. at specified locations, travelling by road [non-home-based trips].

3.2.12 A third category also exists in the form of non-home-based workers residing in purpose built accommodation. This category will not be subject to gravity model analysis, as it is fixed by the location of contractor controlled accommodation.

Treatment of travel by other modes

3.2.13 The travel-time values used in the gravity model are based on travel by private car to the Wylfa Newydd Development Area (i.e. the centroid), and which effectively serves as a proxy for travel by any other mode or combination of modes (e.g. bus, rail, Park and Ride).

3.2.14 It is recognised, however, that for the two categories (home-based trips and non-home-based trips) defined above, a proportion of employees may travel via existing or bespoke bus services, depending on bus routes and travel schedules. Therefore, an inherent assumption is that the travel time is based

[23] For 'site services, security and clerical' occupation group travel time radius is assumed to be 60 minutes.

on car use, irrespective of the ultimate journey mode, e.g. car, car/Park and Ride or bus.

Wider transport appraisals

3.2.15 The gravity model outputs in respect of the distribution of travel is a key input to wider transport appraisals (beyond the scope of the gravity model work), which consider the transport strategies, operations and impacts associated with worker transport flows on road links, and/or worker bus services (including Park and Ride).

Gravity model input data

3.2.16 The gravity model requires inputs in respect of worker numbers. Based on a peak construction workforce of 9,000, the modelled scenario has 2,000 home-based workers (those persons commuting to the Wylfa Newydd Development Area from their own permanent homes), 3,000 non-home-based workers (those who are expected to search for their own accommodation) and 4,000 non-home-based workers residing in purpose-built accommodation. This scenario was developed based on the outputs of analysis of presented in section 2 and later in section 3 of this document, alongside discussion with stakeholders and consideration of project needs.

3.2.17 The focus of the model is to estimate the distribution of peak workforce, which happens to occur during the construction phase of the Wylfa Newydd Project. The operation phase will begin soon after with a much reduced peak operation workforce of 850.

3.2.18 The gravity model includes input data in respect of the following.

- Travel times: Travel time by private car between centres of population, or accommodation stock, to the Wylfa Newydd Development Area, for the home-based and non-home-based gravity model respectively.
- Population: The measure of population will either be workers with relevant skills or working in the relevant/occupations (from Census data) or the availability of accommodation, for the home-based and non-home-based gravity model respectively.

Home-based gravity model workforce and population data

3.2.19 The ‘workforce’ data for the home-based gravity model is based on the approach set out in the section 2.4. The categories of job types suitable for employment at the Wylfa Newydd Development Area are:

- site services, security and clerical staff;
- professional/supervisory/managerial;
- civil engineering operatives;
- mechanical and electrical engineering operatives; and
- operations.

3.2.20 Table 3-1 presents the profile of home-based workers if certain assumptions are made concerning the proportion of each occupational grouping likely to be taken by local people. These figures are derived from taking a professional

view on what the home-based percentage might reasonably be, given the size and nature of the local labour pool and experience from comparator projects where available (based on an overall number of 2,000). For further information on this, consult evidence presented in section 2.4 and sensitivity analysis in 2.4.38.

Table 3-1 Occupation groups workforce breakdown

Occupation group	Percentage of workers	Number of workers
Site services, security and clerical	34%	689
Civils labour	34%	675
Mechanical & electrical labour	10%	208
Professional	12%	237
Operations	10%	191
Total	100%	2,000

3.2.21 The 'population' numbers utilised in the model are based on the existing resident population (from Census 2011) in each of the 2011 electoral wards [RD20]. For each ward, the population for each of the above 'occupation' types has been identified separately. Thus, five separate home-based gravity models have been produced to represent each of the occupational groupings associated with the construction workforce.

Non-home-based gravity model accommodation data

3.2.22 Data for the 'population' in respect of the accommodation stock at a ward level has been provided via parallel research – the outcomes of which are presented in chapter C1 (Application Reference Number: 6.3.1). For each ward, data has been provided for the five different types of accommodation as presented in Table 3-2 below.

Table 3-2 Accommodation type workforce breakdown

Accommodation type	Percentage of stock (and worker allocation)	Accommodation Demand
Tourism - Hotels/B&B	15%	450
Caravans and camping	22%	650
Owned	20%	600
Private Rented Sector (PRS)	30%	900
Latent Accommodation[24]	13%	400
Total	100%	3,000

[24] Latent Accommodation - bed spaces accessible by workers that are brought into use by owners encouraged by the economic opportunities presented by Wylfa Newydd. They are not currently on any other register of accommodation.

3.2.23 The “mass” of each accommodation type corresponding to destination accommodation sectors was then modelled using electoral ward based statistics taken from the Census of Population or accommodation sector specific data.

3.2.24 For tourism bed spaces, it was possible to use disaggregated data on caravanning and camping released by IACC taken from a tourism bed space survey [RD23]. Caravanning and camping bed spaces in Gwynedd were modelled using data on site locations to distribute bed spaces. For Conwy, estimates were produced using the distribution of employment corresponding to the different tourist accommodation sector types.

3.2.25 It should be noted that the model uses stock data rather than making any specific assumptions concerning availability of that stock. The use of stock data may reflect the actual search behaviours of workers who are unlikely to have comprehensive knowledge of actual availability but may be guided by their knowledge of where different types of accommodation are available in the first instance. Consideration of availability supply /demand balance is presented in section 3.4.

Travel time data

3.2.26 As set out in "Gravity modelling approach”, travel time has been used as a proxy for the ‘generalised cost’ of travel, as means to calculate the Gravity Model’s ‘travel deterrence’; that is the likelihood of travel between two locations. The travel journey time by car from the centroid of each ward to the Wylfa Newydd Development Area (i.e. the centroid or destination point) has been calculated in TRACC software using ‘Fastest Path’ analysis that identifies the quickest route between locations; that is, there is no restriction to any particular route. For purposes of the Gravity Model, which covers every road in North Wales and Cheshire/Merseyside, a standardised approach to calculation of travel time has been adopted, utilising standard speed values in OS Open Roads network database, with the following typical speeds assumed for each road type:

- Motorway – 70mph;
- A Roads – 50mph;
- B Roads – 30mph; and
- Unclassified Roads – 20mph.

3.2.27 This approach provides an appropriate representation of the generalised cost of travel from all Wards in North Wales and Cheshire/Merseyside to the Wylfa Newydd Development Area, irrespective of mode, and time of day or month, which in turn provides a sound basis for producing an estimated distribution of home-based workers’ origins.

Gravity model calibration

Calibration of home-based gravity model

3.2.28 It is assumed that the majority of journeys are within a 90-minute drive time. Conclusions from the ‘Workforce Mobility and Skills in the UK Construction Sector’ indicates that 85% of construction workers living within a 90-minute drive time is a reasonable assumption; hence, the gravity model will be

calibrated such that 15% of workers fall outside the 90-minute drive time catchment [RD24]. The exception to the above is workers who are employed in the 'site services, security and clerical staff' sector, for whom a reduced catchment is used assuming 85% of this type of worker live within a 60-minute drive time and the remaining 15% fall outside this catchment. This exception is based on high level of potential local employees available for these types of roles.

3.2.29 **Comparison with Census Journey to Work data:** Inspection of the Census of Population Journey to Work data for 2011 has been undertaken to inform the calibration of the home-based gravity model. An example of current local Journey-to-Work patterns (by car) for Holyhead indicates that 90% of 'travel to work' journeys originate from Anglesey itself (as would be expected), with journey times of less than 40 minutes. This can be compared to the assumption that 85% of home-based workforce would travel from within a 90-minute commuter travel time to the Wylfa Newydd Development Area. It is concluded that the difference between the typical local workforce distribution and the assumed Wylfa Newydd Project distribution follows a logical pattern; that is, the specialist workforce skills for the Wylfa Newydd Project would tend to produce a wider, atypical, travel-to-work distribution.

Calibration of non-home-based gravity model

3.2.30 It is assumed that all accommodation stock would be located within the KSA, which approximates to the travel to work areas of 'Holyhead and Bangor', 'Caernarfon' and 'Llangefni'. The accommodation stock numbers for wards outside the KSA have thus been set (in the model) to zero. The KSA is set out in the Accommodation Assumptions Report.

Gravity model outputs

Definition of areas

3.2.31 Chapter B2 (Application Reference Number: 6.2.2) defines study areas in detail and chapter C1 (Application Reference Number: 6.3.1) presents maps of the areas designated as the KSA and sub-regions (of Anglesey North, Anglesey South, Anglesey West and Menai Mainland).

Home-based gravity model outputs

3.2.32 Analysis of the output is presented in Table 3-3 and Table 3-4. The proportionate number of travellers in each travel time band is shown in Table 3-4.

Table 3-3 Split of workers within each travel-time catchment (home-based)

Time (min)	Site services, security and clerical staff		Professional (Managerial)		Civil engineering operatives		Mechanical and electrical operatives		Operations		Total
	%	Trips	%	Trips	%	Trips	%	Trips	%	Trips	Trips
0-10	3.7	25	3.9	9	4.5	30	4.8	10	4.5	9	83

Time (min)	Site services, security and clerical staff		Professional (Managerial)		Civil engineering operatives		Mechanical and electrical operatives		Operations		Total
	%	Trips	%	Trips	%	Trips	%	Trips	%	Trips	Trips
10-20	22.7	156	14.8	35	21.2	143	19.3	40	21.2	41	415
20-30	24.5	169	21.0	50	23.6	159	19.7	41	23.6	45	464
30-40	21.8	150	19.7	47	15.0	101	17.8	37	15.0	29	363
40-50	7.8	54	6.6	16	7.2	48	6.7	14	7.2	14	145
50-60	4.7	32	6.0	14	4.6	31	5.1	11	4.6	9	97
60-70	4.2	29	6.8	16	3.8	26	5.0	10	3.8	7	89
70-80	3.0	21	4.9	12	3.8	26	4.9	10	3.8	7	76
80-90	0.7	5	1.4	3	1.4	9	1.8	4	1.4	3	24
90+	7.0	48	15.0	36	15.0	101	15.0	31	15.0	29	245
Total	100	689	100	237	100	675	100	208	100	191	2,000

Table 3-4 Sub-regions trip distribution (home-based)

Sub-region	Site services, security and clerical staff		Professi-onal (Manager-ial)		Civil engine-ering operatives		Mechanical and electrical operatives		Operations		Total
	%	Trips	%	Trips	%	Trips	%	Trips	%	Trips	Trips
Anglesey North	27	189	19	46	27	181	26	54	27	51	521
Anglesey South	17	115	15	36	12	78	14	28	12	22	279
Anglesey West	24	163	21	49	23	158	19	41	23	45	456
Menai Mainland	15	104	13	31	12	82	12	25	12	23	265
Wider Area	17	119	31	74	26	176	29	60	26	50	479
Total	**100**	**689**	**100**	**237**	**100**	**675**	**100**	**208**	**100**	**191**	**2,000**

3.2.33 From Table 3-4, it can be seen that the predicted number of home-based workers crossing the Menai between Anglesey and the mainland equates to 744.

Non-home-based gravity model outputs

3.2.34 Analysis of the output is presented in Table 3-5 and Table 3-6. The proportionate number of travellers in each travel time band is shown in Table 3-5, with the numbers allocated to each sub-region zone shown in Table 3-6.

3.2.35 From Table 3-6, it can be seen that the number of non-home-based workers crossing the Menai between Anglesey and the mainland equates to 451.

3.2.36 For purposes of aiding interpretation, the approximate number of non-home-based workers accommodated within a selected number of 'towns' has been estimated, as shown in Table 3-7. This is based on an assumed designation of wards to each town or community, although in practice the ward boundaries do not (in many cases) correspond with town areas. The non-home-based workforce accommodated in town areas (as tabulated in Table 3-7) represents around 41% of the overall non-home-based workforce, i.e. around 59% are accommodated in rural/out-of-town areas.

Table 3-5 Split of workers within each travel-time catchment (non-home-based)

Time (min)	Hotel Accommodation		Caravan Accommodation		Owned Accommodation		PRS		Latent Accommodation		Total
	%	Trips	%	Trips	%	Trips	%	Trips	%	Trips	Trips
0-10	8.5	38	1.5	10	8.6	51	5.7	52	10.5	42	193
10-20	11.6	52	41.2	268	29.3	176	19.7	178	33.6	134	808
20-30	45.2	203	39.0	254	29.7	178	31.0	279	35.9	144	1,058
30-40	26.1	117	9.5	61	22.6	136	32.0	288	18.3	73	676
40-50	5.3	24	5.8	37	7.3	44	8.4	75	1.7	7	188
50-60	2.7	12	1.9	13	2.0	12	2.2	20	0	0	56
60-70	0.5	2	1.0	7	0.5	3	0.8	7	0	0	19
70-80	0.1	1	0.1	0	0.1	0	0.2	2	0	0	3
Total	**100**	**450**	**100**	**650**	**100**	**600**	**100**	**900**	**100**	**400**	**3,000**

Table 3-6 Sub-regions trip distribution (non-home-based)

Sub-region	Hotel Accommodation		Caravan Accommodation		Owned Accommodation		PRS		Latent Accommodation		Totals
	%	Trips	%	Trips	%	Trips	%	Trips	%	Trips	Trips
Anglesey North	20	90	43	278	39	235	27	239	46	182	1,024
Anglesey South	16	72	31	201	19	116	18	161	21	83	633
Anglesey West	45	201	18	115	28	166	30	274	34	135	892
Menai Mainland	19	87	9	55	14	83	25	226	0	0	451
Total	100	450	100	650	100	600	100	900	100	743	3,000

Table 3-7 Selected towns trip distribution (non-home-based)

Town	Hotel Accommodation		Caravan Accommodation		Owned Accommodation		PRS		Latent Accommodation		Total
	%	Trips	%	Trips	%	Trips	%	Trips	%	Trips	Trips
Amlwch	0	0	3.5	23	6.7	40	7.1	64	8.3	33	160
Bangor	7.7	35	1.1	7	3.5	21	12.4	112	0	0	174
Beaumaris	2.0	9	0	0	0.9	5	1.7	15	1.2	5	34
Benllech & Llanbedr-goch	3.7	17	25.1	163	4.6	28	3.5	32	5.4	21	261
Bethel & Llanrug	0.8	4	0.3	2	1.0	6	0.6	6	0	0	18
Bethesda	0.1	1	0	0	1.3	8	1.9	17	0	0	26
Caernarfon & Bontnewydd	3.3	15	2.0	13	2.4	15	2.8	25	0	0	67
Deiniolen	0.4	2	0	0	0.3	2	0.4	4	0	0	8
Holyhead	4.6	21	1.5	10	12.0	72	16.1	145	16.6	66	314
Llandygai	0.1	1	0.1	0	0.1	0	0.2	2	0	0	3
Llangefni	4.4	20	0	0	2.4	15	1.8	16	2.5	10	60
Menai Bridge & Llanfair Pwllgwyngyll	2.6	11	0	0	4.3	26	4.6	41	4.4	18	96
Total	**29.7**	**134**	**34**	**219**	**39.6**	**238**	**53.0**	**477**	**38.4**	**153**	**1,221**

3.3 Accommodation supply

3.3.1 This section concerns the supply of bed spaces for accommodating non-home-based workers within the known accommodation stock.

Available capacity

3.3.2 The baseline assessment has reviewed the overall position concerning the stock of accommodation classified as relevant for the purposes of providing worker accommodation. The overall position concerning the stock of accommodation does not however represent how much stock potentially might be available to meet worker requirements. This section examines the stock from the perspective of available capacity.

3.3.3 The notion of available capacity is open to interpretation and is also subject to data availability issues. Available capacity is typically equated to 'not being currently occupied'. However, the lack of a current occupier does not necessarily indicate availability for workers.

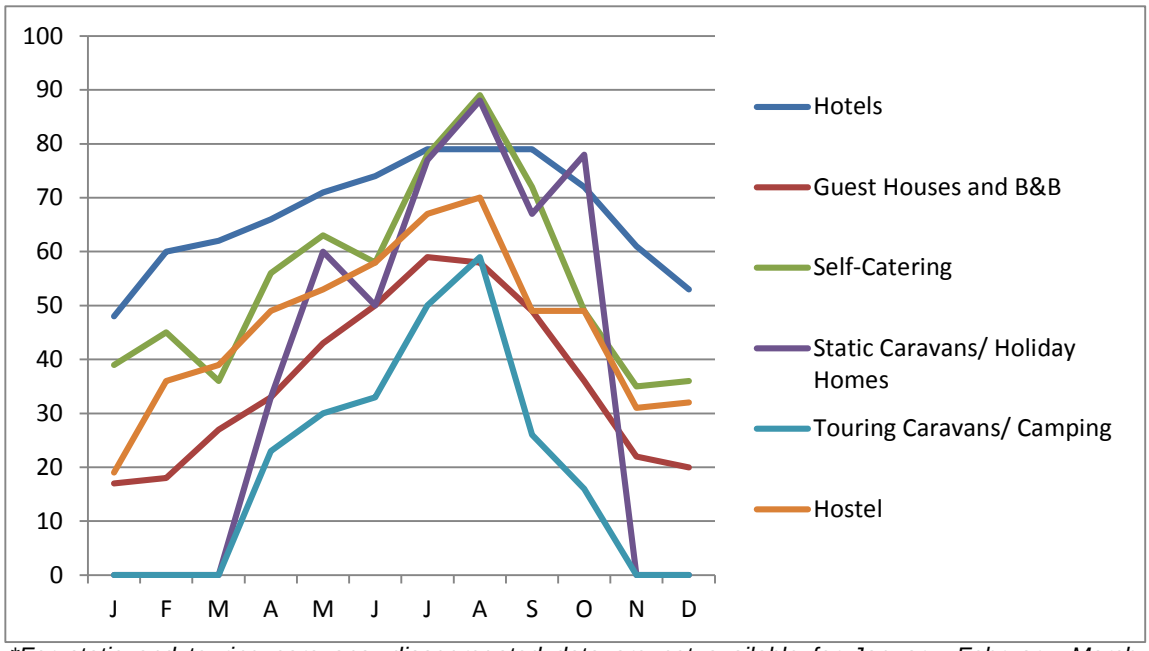
3.3.4 Market-allocated accommodation typically means that, at any given point in time, there will be unoccupied property because it is in a state of transition between a former occupier leaving and a new occupier taking up the space. The absorption of this capacity would constrain the normal operation of the market in allocating space efficiently.

3.3.5 Availability must therefore account for both occupation by existing users and the efficient functioning of the market for each accommodation sector. No specific guidance exists concerning the calculation of availability; however, this topic was extensively researched for the Hinkley Point C socio-economic assessment. Where appropriate, these metrics have been applied to the non-contractor-controlled accommodation sectors.

Tourism accommodation availability

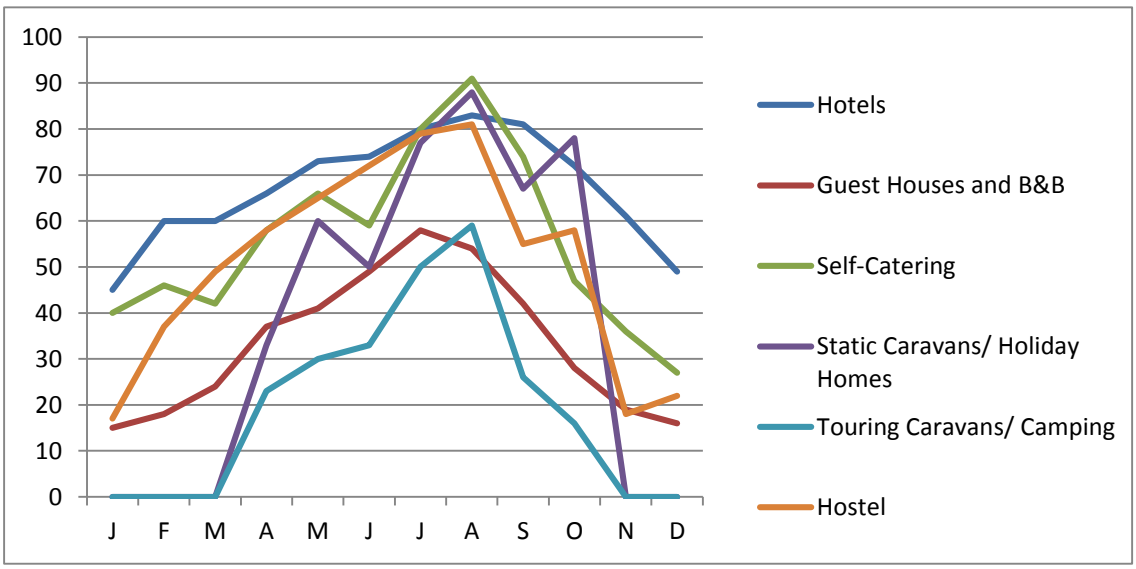
3.3.6 For any given supply of tourism accommodation, all areas will typically experience a level of occupancy below maximum capacity. Occupancy rates can be measured as an average over the year which will 'smooth' out low occupancy experienced out of season with the very high occupancy levels experienced at a typical peak summer period. However, such an average does not capture the economic dislocation that might occur if leisure visitors in the peak seasonal months were unable to find accommodation. The peak season therefore offers a worst case assessment of the market. Figure 3-1 provides a summary of occupancy rates over a typical year, 2015 for Wales as a whole, whilst Figure 3-2 provides a North Wales summary.

Figure 3-1 Occupancy rates[25] (%) Wales, 2015



**For static and touring caravans, disaggregated data are not available for January, February, March, November and December.*

Figure 3-2 Occupancy rates (%) North Wales[26], 2015



**For static and touring caravans, disaggregated data are not available for January, February, March, November and December.*

3.3.7 For the purposes of the assessment, the assumptions concerning occupancy in Table 3-8 have been used. The selection of rates is designed to reflect a worst case position that tends to reduce the headroom assumed to be available for workers.

[25] [RD25]

[26] [RD25]

Table 3-8 Occupancy rate assumptions and reasoning

Accommodation type	Occupancy rate	Justification
Hotels, guest houses and B&B	83%	Based on hotel occupancy rate for North Wales in August
Self-catering	59%	Based on North Wales occupancy rate (in July representative of the peak)
Fixed caravans	88%	Based on an August peak
Mobile caravans and camping	59%	Based on 59% of bed spaces attributed to caravanning and camping
Other	0%	The 'Other' category includes types of accommodation which may not be suited to the needs of workers

3.3.8 Availability can be defined as the difference between peak occupancy in July/August and known bed space capacity in the sector.

3.3.9 Price also acts as a moderator on availability in so far as a proportion of the serviced accommodation base will be priced at levels beyond the financial capacity of workers. Due to the absence of detailed data on the accommodation sector and Horizon's policy concerning accommodation allowances, estimates based upon Hinkley Point C have been applied until such time as better information becomes available. A key assumption is that only 40% of serviced accommodation (considered to be hotels and guest houses and B&B) are suitable and affordable. It is also assumed that only 25% of camping and caravan site capacity can be used to reflect likely problems in availability or year-round occupancy.

3.3.10 Table 3-9 shows the results of applying the assumptions listed in Table 3-8 to known facts about the stock.

Table 3-9 Estimated headroom in August peak across the KSA

Type of Accomm.	Estimated number of bed spaces (Column A)	Price or access moderator (Column B)	Adjusted estimate of bed spaces (Column C = Column A x Column B)	Peak capacity utilisation (Column D)	August peak bed space requirement (Column E = Column D x Column C)	Estimated headroom in August (Column F = Column C - Column E
Hotels, guest houses and B&B	6,947	40%	2,779	83%	2,306	472
Self-catering	6,411	100%	6,411	59%	3,783	2,629

Type of Accomm.	Estimated number of bed spaces (Column A)	Price or access moderator (Column B)	Adjusted estimate of bed spaces (Column C = Column A x Column B)	Peak capacity utilisation (Column D)	August peak bed space requirement (Column E = Column D x Column C)	Estimated headroom in August (Column F = Column C - Column E
Caravans	45,428	25%	11,357	71%[27]	8,084	3,273
Other	2,650	0%	0	n/a	0	0
Total	**61,436**		**20,547**		**14,173**	**6,374**

Private Rented Sector (PRS) availability

3.3.11 The baseline assessment suggests that there are 21,700 bed spaces within the PRS. A majority of these bed spaces will be needed by people already reliant upon this sector to meet their housing need – a segment of demand that has historically grown. There is nevertheless a vacancy level. The Communities and Local Government 2014-2015 English Housing Survey [RD26][28] calculated the level of vacancy by tenure based on properties' previous occupancy. This research established the existence of significant variations across tenures as detailed below:

- owner-occupied: 3.3% of properties vacant;
- social rented: 3.7% of properties vacant (Council and Housing Association); and
- private rented: 11.1% of properties vacant.

3.3.12 These vacancy levels exist even when there is a significant housing need and when local authorities have housing waiting lists. The existence of need in one part of the market does not demonstrate that there is a shortage of housing overall or that there is no additional capacity that could be used in some sectors.

3.3.13 It is also important to note the degree of annual turnover (or churn) in the property market. The Census of Population 2011 records the number of households that lived at the same address one year ago [RD2]. The smaller the number of households recorded as living at the same address implies a greater level of churn in the accommodation market. Table 3-10 shows the proportion of households by tenure which were not at their current address a year ago (i.e. the inverse). The greater the rate or percentage, the more dynamic the market is considered to be. The table shows that, overall, around 13% of households had moved from elsewhere in 2011 across North West Wales. Analysis of the individual counties within North Wales shows very little variation. At a tenure level, there are however significant variations. Owner occupation shows the lowest level of churn based on this measure, with social

[27] Assumes that 42% of Caravan and Camping stock is vacant.

[28] No recent Welsh Housing Statistics are available

rented accommodation showing levels of movement broadly similar to area average. The PRS does however show a much higher level of churn. The rate of churn also varies across the counties with Gwynedd having a particularly high rate (42%) which may reflect a higher transient population associated with student populations.

Table 3-10 Rate of churn by tenure[29], 2011

Types	Anglesey	Conwy	Gwynedd	North West Wales	Wales
All households	12%	13%	14%	13%	12%
Owner-occupied	7%	7%	8%	7%	6%
Social rented	12%	13%	13%	13%	12%
Private landlord or letting agency	35%	35%	42%	38%	40%

3.3.14 Comparisons for the PRS based on the same measure, using data from the Census of Population in 2001[30], suggest that the rate of churn has increased markedly over a 10-year period, which may reflect government policies aimed at addressing more housing needs through this form of tenure [RD28]. The results for the PRS within counties (wholly or partly) within the KSA in 2001 were as follows:

- Isle of Anglesey: 30% of households had moved within the last 12 months;
- Gwynedd: 36% of households had moved within the last 12 months; and
- Conwy: 31% of households had moved within the last 12 months.

3.3.15 Using Gwynedd as a worst case benchmark of 42% (Table 3-10), this means that an average of 3.5% (i.e. 42% divided by 12, representing the months of the year) of all private-rented properties are turning over in each month. This would be the absolute minimum vacancy level required for the market to function effectively. Assuming compatibility of the datasets involved, this would suggest headroom equivalent to 7.6% of capacity, using the private-rented figure in paragraph 3.3.11.

3.3.16 This would suggest the existence of an overall headroom of 1,649 bed spaces. This implies that worker uptake of fewer than 1,649 bed spaces could take place without prejudicing the functioning of the market based on 2011 data concerning stock.

[29] Based on UKMIG011 - Household migration by tenure combined with KS402EW – Tenure. [RD27]

[30] Household migration statistics have yet to be released for 2011 in a similar format to table 34 of the 2001 Census of Population

3.3.17 It should be noted that no attempt has been made to apply an affordability test on the accommodation or determine the impact of non-market factors, e.g. landlord preference concerning tenant status. Insufficient information exists to determine how landlord preference might work at present, and an affordability test is unworkable if a unit is supported by multiple workers sharing the costs of one unit. It should also be noted that no such test was applied at Hinkley Point C.

Latent accommodation availability

3.3.18 Latent accommodation is not included in any current accommodation registers, but offered in response to the opportunities associated with a major development, such as Wylfa Newydd. It can, for example, include landlords with houses to rent and those with spare bed space or self-catering facilities within their own personal property. For Hinkley Point C, a survey of latent accommodation potential identified 45% of offers for serviced accommodation (i.e. bed and breakfast) and 55% for rooms to rent. The nature of latent accommodation makes its estimation difficult to substantiate. Hidden capacity may come forward for all manner of reasons. Ironically, those with surplus accommodation may not be the primary source if there is no financial motivation to offer accommodation in the first place. Financial motivation may mean larger households economising on their own use of space to free up capacity to generate much needed income even where they are space-constrained.

3.3.19 The capacities for latent accommodation within the KSA have been tested through a survey, and 400 bed spaces have been identified. The responses to the survey have been reviewed, and bed spaces identified within the self-catering or PRS have been removed from the results. The IACC's 2011 bed space survey also gathered data on the potential latent accommodation bed spaces; this identified 743 bed spaces and was used in the most recent gravity model.

Owner-occupied property availability

3.3.20 Owner-occupied property availability comes from two principal sources: churn within the existing stock and new construction. The Census of Population 2011 results in Table 3-10 above showed a relatively low level of churn compared to the PRS of around 7% for the three counties located in the KSA. Based on a worst case analysis (the lowest level of churn), this means that an average of 0.8% of all owner-occupied properties are turning over in any month. This would equate to headroom of 2.5% of stock, using the owner-occupied figure in paragraph 3.3.11.

3.3.21 This would suggest the existence of an overall headroom of 949 units, where one unit is equivalent to accommodation for one worker, and where it is assumed that an owner-occupied unit is likely to be occupied by a single worker plus dependants (who themselves would not directly work on the Wylfa Newydd Project). Online housing sales databases suggest that between about 900 and 1,000 houses are available across the KSA.

Cost as a moderator of availability

3.3.22 The cost at which accommodation is offered on the market acts as a limiter for workers seeking access to bed spaces. The union-agreed accommodation allowances for construction projects provide an insight into the likely effect of cost on access, although Horizon has yet to determine a policy on this matter.

3.3.23 Under a prospective union agreement, the daily allowance of £38.41 per night (2017 rates) [RD29] per worker may be payable. The daily allowance is designed to cover a range of out-of-pocket expenses incurred by non-home-based workers including accommodation, food and incidentals. For the purposes of this assessment, worker affordability has been based on the assumption that £25.00 of this allowance is attributable to accommodation costs. Thus, four nights stay would be equivalent to £100.00 payable to an accommodation provider[31].

3.3.24 Renting of a three-bed house on Anglesey shared by three persons equates to £183.33 per person per month (see Table 3-11 for monthly rents). This suggests that the current level of rents within the KSA is affordable to construction workers based on £100 per week (£300 per month) assuming a shared dwelling.

Table 3-11 Median monthly rents recorded by property type and local authority area[32], January to December 2015

Area	A single room	1 bedroom	2 bedrooms	3 bedrooms	4 or more bedrooms
Isle of Anglesey	£285.00	£397.50	£500.00	£550.00	£675.00
Gwynedd	£368.33	£370.00	£450.00	£525.00	£599.99
Conwy	*	£395.00	£525.00	£595.00	£750.00
Wales	£303.33	£410.00	£495.00	£550.00	£750.00

3.3.25 Similar issues apply to tourist accommodation since the amount payable per night will range from caravans to hotels, some of which will be affordable whilst others will not be. The prevailing assumption is that only 40% of serviced accommodation (considered to be hotels, guest houses and B&B) will be suitable and affordable for construction workers.

3.3.26 Affordability also applies to the owner-occupied sector. The median sale price on Anglesey in the three months to September 2015 was £153,000, which is higher than in Gwynedd (£145,000) and Conwy (£145,000), and above the Welsh average (£142,000). Property values are highest for detached houses, where the average price differential is largest in Gwynedd, where average house prices are £145,000 and the average price for a detached house is £215,000.

3.3.27 In 2014, median house prices on Anglesey were 7.2 times greater than the median income, compared to ideal ratios of 2.9 for an individual income and 3.5 for a dual income [RD30]. However, the ratio was higher in Gwynedd at

[31] The allowance system deals with the payment of retainers for periods of non-occupancy

[32] [RD30]

7.8 and in Conwy at 7.7. This compares to an average of 8.8 across England and Wales.

3.3.28 The most expensive area on Anglesey was Rhosgoch (£328,000 on average for a property) and the least expensive was Llanbedrgoch (£133,667 on average for a property) [RD31]. Dulas is approximately 10km south-east of the Wylfa Newydd Development Area, while Llanbedrgoch is about 29km to the south-east.

3.3.29 In recent years, the 2007-2010 recession have affected the average house price on Anglesey, as is the case across Wales and the UK. Data from ONS show that the average house price on Anglesey declined by almost 8% between the three months to September 2007 and the three months to September 2011, a stronger decline than the 6.1% seen across Wales as a whole [RD30]. The rates of house price declines over the same period in Conwy was much weaker at -3.3%.

3.3.30 Consideration will need to be given to affordability when more is known about the average wages and salaries which are likely to apply for various segments of the workforce.

3.3.31 The analysis presented is based on a core assumption that the Site Campus would provide bed spaces and that these would be sufficiently attractive at peak to be fully utilised. This paper acknowledges the potential for the underlying assumption on bed spaces to be subject to change. Sensitivity analysis is therefore used to consider variations.

3.3.32 Assuming that the Site Campus provided does attract 4,000 workers at peak, there would still be a substantial residual population of non-home-based workers seeking alternative accommodation elsewhere within the KSA. As a result, alternative sources of accommodation ranging from owner occupied, PRS, tourist and latent accommodation need to be identified.

Summary

3.3.33 All accommodation stocks have specific spatial characteristics in so far as the stock is concentrated within certain communities as opposed to others.

3.3.34 Overall, the headroom assumptions suggest that 9,715 bed spaces might be available to accommodate workers across the KSA. 34% of these bed spaces are within the “caravans and camping” accommodation sector. This quantity of bed spaces would be 3.2 times the number of non-home-based workers seeking accommodation.

3.3.35 Dependent on question on hand, size of budget, importance of question, size of community, market research firms will carry this out.

3.3.36 A key issue is whether the aggregate stock of bed spaces is in the right place when compared to the demand from workers as predicted from the gravity model. A second issue is whether the right quantity of bed spaces exists in the accommodation sectors of choice. A third issue concerns the likely risks associated with assumptions concerning availability. Fundamental to answering these questions is an understanding of the distribution of the stock across the KSA.

KSA sub area bed space supply

3.3.37 This section reviews the supply of bed spaces for each of the four sub areas comprising the KSA.

Table 3-12 Analysis of bed spaces by sub area[33]

Sub areas	Tourism	Caravans and camping	Owner	PRS	Latent	Total
Anglesey North	200	502	106	145	153	1,106
Anglesey South	559	991	250	354	332	2,486
Anglesey West	936	457	171	312	258	2,134
Menai Mainland	1,407	1,323	422	837	0	3,989
Total	3,101	3,273	949	1,649	743	9,715

3.3.38 Table 3-12 shows the stock availability is skewed towards the south of the KSA, with 63% of available bed spaces recorded in Menai Mainland and Anglesey South. The remaining 37% is skewed towards Anglesey West, with Anglesey North accounting for around 11% of the available bed spaces.

KSA key settlements bed space supply

3.3.39 This section considers the supply of accommodation at the key settlement level.

Table 3-13 Analysis of accommodation headroom (bed spaces) by settlement[34]

Towns	Tourism	Caravans and camping	Latent	Owner	PRS	Total
Holyhead	72	29	67	156	114	437
Amlwch	0	29	15	34	23	101
Llangefni	161	0	33	37	43	275
Beaumaris	96	0	15	38	24	174
Benllech & Llanbedr-goch	81	665	32	42	46	865
Bangor	384	69	58	293	0	804
Llandygai	8	0	16	31	0	55
Caernarfon & Bontnewydd	258	200	67	96	0	621

[33] All figures subject to rounding corrections

[34] All figures subject to rounding corrections

Towns	Tourism	Caravans and camping	Latent	Owner	PRS	Total
Bethel & Llanrug	57	34	26	21	0	138
Deiniolen	41	0	12	19	0	72
Bethesda	9	0	32	59	0	100
Menai Bridge & Llanfairp Pwllgwyngyll	90	0	51	81	64	286
Total in towns	1,257	1,025	424	907	314	3,927

3.3.40 Table 3-13 considers stock availability in terms of the major settlements within the KSA. Overall, these settlements account for around 41% of all available bed spaces. Holyhead, Benllech and Bangor account for the highest count of available bed spaces.

3.4 Supply and demand interaction

3.4.1 This section considers how the available supply of bed spaces interacts with the assumed demand for bed spaces from workers, as estimated in the gravity model outputs discussed above and given the prevailing assumptions used in that process.

KSA sub area supply and demand

3.4.2 This section reviews the supply and demand balance across the four sub areas comprising the KSA.

3.4.3 Table 3-14 brings together demand and supply for each sub area within the KSA with sub-analysis covering all accommodation sectors. The underlying assumption is that workers will search for accommodation in those areas predicted by the gravity model. In reality, their area of search is likely to be significantly wider if available accommodation cannot be identified. This is felt particularly by the owner-occupied sector where workers would want to achieve the best match with their requirements given the longer-term nature of such a commitment.

3.4.4 Table 3-14 demonstrates that, whilst there is sufficient supply in the KSA to meet demand from 3,000 non-home-based workers, it is unevenly distributed across the KSA. The supply of bed spaces from latent, owner-occupied and PRS sources in Anglesey North would be expected to be less than the level of demand predicted. It should be noted that, for latent accommodation, only those bed spaces that actually become available can be taken up. The predicted constrained outcome noted above is a function of where the survey suggested beds would be made available.

Table 3-14 KSA sub area bed space supply (accommodation headroom) and demand[35]

Sub-region	Hotels/ B&B		Caravans and camping		Owned		PRS		Latent		Totals	
	Supply	Demand	Supply	Demand	Supply	Demand	Supply	Demand	Supply	Demand	Supply	Demand
Anglesey North	200	90	502	278	106	235	145	239	153	182	1,106	1024
Anglesey South	559	72	991	201	250	116	354	161	332	83	2,486	633
Anglesey West	936	201	457	115	171	166	312	274	258	135	2,134	891
Menai Mainland	1,407	87	1,323	55	422	83	837	226	0	0	3,989	451
Total	3,101	450	3,273	650	949	600	1,649	900	743	400	9,715	3000

[35] All figures subject to rounding corrections

KSA key settlement supply and demand

3.4.5 This section considers the impact of worker demand on the key settlements identified across the KSA.

3.4.6 Table 3-15 considers supply and demand at a settlement level covering just over 40% of bed spaces to be found within settlements. Overall, the analysis shows that non-home-based worker demand targeted at settlements can be met by the collective of settlements (following the conclusions from the sub area analysis in Table 3-14). Overall, Amlwch would be expected to experience a generalised shortfall in the aggregate supply of bed spaces relative to predicted levels of demand. The shortfall is noticeable in PRS, owned and latent accommodation sectors (reflecting the sub-regional position of Anglesey North within which it is based)

Table 3-15 KSA key settlements bed space supply (accommodation headroom) and demand[36]

Town	Hotels/B&B		Caravans and camping		Owner Occupier		PRS		Latent		Total	
	Supply	Demand	Supply	Demand	Supply	Demand	Supply	Demand	Supply	Demand	Supply	Demand
Holyhead	72	21	29	10	67	72	156	145	114	66	437	314
Amlwch	0	0	29	23	15	40	34	64	23	33	101	160
Llangefni	161	20	0	0	33	15	37	16	43	10	275	61
Beaumaris	96	9	0	0	15	5	38	15	24	5	174	34
Benllech & Llanb'goch	81	17	665	163	32	28	42	32	46	21	865	261
Bangor	384	35	69	7	58	21	293	112	0	0	804	175
Llandygai	8	1	0	0	16	0	31	2	0	0	55	3
Caernarfon & Bontn'ydd	258	15	200	13	67	15	96	25	0	0	621	68
Bethel & Llanrug	57	4	34	2	26	6	21	6	0	0	138	18
Deiniolen	41	2	0	0	12	2	19	4	0	0	72	8
Bethesda	9	1	0	0	32	8	59	17	0	0	100	26
Menai Bridge & Llanfair Pwllgwyngyll	90	11	0	0	51	26	81	41	64	18	286	96
Total in Towns	1,257	136	1,025	218	424	238	907	479	314	153	3,927	1,224

[36] All figures subject to rounding corrections

3.5 Summary of construction phase accommodation assessment

3.5.1 From the gravity model output results for home-based workers (summarised in Table 3-16), it can be seen that:

- an estimated 744 workers might cross from the mainland to Anglesey (see paragraph 3.2.23);
- 1,256 workers could be expected to be resident on Anglesey;
- the workers on Anglesey could be distributed as follows: 521 Anglesey North; 279 Anglesey South; 456 Anglesey West (see Table 3-16);
- outside Anglesey, 265 workers are expected to reside in Menai Mainland, and 479 elsewhere (outside the KSA) (see Table 3-16); and
- a reminder that 4,000 workers will be housed in Site Campus during the construction phase.

3.5.2 From the gravity model output results for non-home-based workers, it can be seen that:

- an estimated 451 non-home-based workers could be expected to stay on the mainland and cross from the mainland to Anglesey each day (see Table 3-17);
- 2,549 non-home-based workers would be accommodated on Anglesey; and
- the non-home-based workers on Anglesey could be distributed as follows: 1,024 Anglesey North, 633 Anglesey South and 892 Anglesey West (see Table 3-17).

3.5.3 From the analysis of supply, Table 3-14 summarises the degree to which demand from non-home-based workers can be met from accommodation supplies based on a series of assumptions, including no interventions being made to steer worker accommodation choices. From this analysis, it can be seen that:

- Anglesey North has a shortfall in supply over predicted demand in relation to PRS, latent and owned accommodation; and
- there is an excess of supply relative to demand in Anglesey South and on Menai Mainland.

Table 3-16 Summary of workforce distribution results

Area	Home-based Workforce	Non-home-based migrant workforce	Site Campus
Anglesey North	521	1,024	4,000
Anglesey South	279	633	-
Anglesey West	456	892	-
Menai Mainland	265	451	-

Area	Home-based Workforce	Non-home-based migrant workforce	Site Campus
Wider Area	479	-	-
Workforce totals	**2,000**	**3,000**	**4,000**

Table 3-17 Summary of bed space supply (accommodation headroom) and demand[37]

Area	Available bed spaces	Demand from non-home-based workforce
Anglesey North	1,106	1,024
Anglesey South	2,486	633
Anglesey West	2,134	892
Menai Mainland	3,989	451
Workforce totals	9,715	3,000

3.5.4 It should be noted that the main model outputs essentially represent a "policy off" position, i.e. a representation of the distribution of workers which takes no account of possible mitigations that might be employed (refer to chapter C1 (Application Reference Number: 6.3.1) for information on embedded, good-practice, and additional mitigation).

3.6 Operational phase

Full operation

3.6.2 It is estimated that 850 staff would be employed during the operational phase. This estimate includes directly employed staff and contract staff. The breakdown is shown in Table 3-18 with Hitachi-GE Nuclear Energy worker categories mapped on to socio-economic categories which facilitate benchmarking against other available assessments or evidence bases.

Table 3-18 Skills Profile

Occupation categories	No.	Socio-economic categories of worker		
		Management and professional	Administrative and clerical	Industrial
Management	10	10	-	-
Operations	145	145	-	-
Engineering	84	-	-	84
Maintenance	165	-	-	165

[37] All figures subject to rounding corrections

Occupation categories	No.	Socio-economic categories of worker		
		Management and professional	Administrative and clerical	Industrial
Business support	52	52	-	-
Technical support	125	125	-	-
Training	31	31	-	-
Permanent contractors and others	238	-	238	-
Total	850	363	238	249
Local content %	45%	15%	70%	65%
Local content (Numbers)	383	54	167	162

3.6.3 Based on Table 3-18, around 470 workers would migrate into the area represented by the KSA during the operation of the Wylfa Newydd Power Station. These people could come from within the DCCZ or further afield. While it is assumed that, ultimately, all operation staff would reside within the KSA, it may be the case that a very small number of workers would remain in their current location if already within the DCCZ.

3.6.4 As discussed in 2.5.13, this scenario reflects a “policy off” scenario and with interventions, a local proportion of 85% for workforce during the operation of the Wylfa Newydd Power Station is achievable; therefore, only 128 workers assumed to be non-home-based.

3.6.5 The approximate tenure mix at full operation is estimated at 80% owner occupation and 20% private rented (based on the assumptions used in the Hinkley Point C assessment). This would equate to an additional demand of around 102 owner-occupied and around 26 private rented accommodation units.

3.6.6 The anticipated demand in total for owner-occupied and private rented accommodation is relatively low in comparison with the construction stage. As the demand is likely to be spread over a number of years, coinciding with the rundown of construction (and the release of some accommodation previously used by construction stage workers), it is not expected that there would be any notable problems in meeting the accommodation demands associated with operation.

3.6.7 Existing Power Station personnel are distributed as follows: Isle of Anglesey, 87.2%; rest of North Wales, 7.9%; rest of Wales, 2.3%; and England, 2.5% (refer to 2.5.5 for further detail). Looking at Anglesey in greater detail some concentrations of staff were noted within the immediate vicinity of the station in Anglesey North, accounting for 44% of the total. A further 24% come from the settlements in Anglesey West and the balance for the Isle of Anglesey comes from Anglesey South (19.2%).

3.6.8 Based on findings from the Magnox decommissioning assessment for the Existing Power Station and Hinkley Point B, it is likely that the majority of this additional demand for accommodation from the operational workforce would take place on the Isle of Anglesey itself, although some demand may take place on the mainland (subject to Horizon policies concerning staff location).

Outage

3.6.9 As mentioned in 2.5.14 and 2.5.15, additional contract personnel of approximately 1,000 additional workers would be employed at the site during refuelling and maintenance outages. By way of comparison, Sizewell B typically involved an additional 800 to 1,000 contracting staff for a short duration of one to two months with around 37% of the outage employees recruited from within the daily commuting distance of the site and the remaining 63% recruited from elsewhere in the UK and abroad.

3.6.10 At Sizewell B:

- 28% of the non-local workforce used the site hostel accommodation during the outage (this was still available at the end of Sizewell B construction);
- 41% used serviced accommodation (e.g. B&Bs, guest houses and hotels);
- 20% used rented flats or houses;
- 7% used caravan accommodation; and
- sharing of accommodation with other outage employees was widespread, especially for rented property, which helped to limit the uptake of local accommodation.

3.6.11 At Hinkley Point B, outages involved an additional 800 contracting staff for a short duration of one to two months. The outage workforce uses an array of primarily serviced (e.g. B&B; guest houses) and rented accommodation. Here, outage workers tended to be more widely dispersed than their Sizewell equivalents with only 13.1% originating from within the south-west region.

3.6.12 The Existing Power Station at Wylfa Head required an annual statutory maintenance outage, during which an additional 400 contract personnel were located at the site. Outages generally lasted approximately four months. During this period, outage contract personnel required accommodation, and data suggest that most (95%) used B&B or hotel accommodation whilst 5% used rented housing, rooms and caravans. The majority of the accommodation used by contract personnel was located in the immediate area (in an approximate 16km radius from the Existing Power Station). Overall, outage staff seem to have been routinely absorbed by their host areas without adverse effects. Should outage staff overlap with the presence of construction staff on Unit 2 of Wylfa Newydd, then this conclusion would need to be revisited.

3.7 Accommodation benchmarks

3.7.1 This section reviews case study evidence from large capital projects from the UK and abroad that cite accommodation impacts. The selection of case

studies has been informed by a search for large projects from the energy sector where there are problems of remoteness and non-contractor-controlled accommodation impacts. A preference has been to draw upon evaluations/studies involving power generation, specifically nuclear, drawing upon surveys undertaken for Sizewell B and a previous extant study completed for the implementation of a reactor type at Wylfa Head which did not proceed. In addition, a petrochemical cluster project in Pembrokeshire and a synthetic petrol plant in New Zealand have been reviewed.

3.7.2 Conclusions are drawn at the end of the section based on the benchmarking review.

Socio-Economic Impact Study – Proposed Wylfa B Power Station August 1988[38]

3.7.3 This study was commissioned by the Central Electricity Generating Board to support a planned PWR called Wylfa B [RD7]. The plans for the PWR were not implemented; however, the study had to come to decisions concerning the same issues under consideration for this assessment.

3.7.4 The target programme for the construction of buildings and the installation and commissioning of plant was 66 months, giving a commissioning date of spring 1998. At the time of the report (August 1988), the 'best estimate' for the peak employment of the construction labour force was 3,500.

3.7.5 The assessment estimated that between 1,520 and 1,790 of the peak construction workforce could be recruited locally (i.e. from within Anglesey or Arfon[39]). The remaining 1,845 workers would be recruited from outside this area. The study assumed that the A55 coastal road would reduce travelling times between Colwyn Bay and Bangor and that approximately 1% of the 1,845 non-local workers would travel on this basis. Consequently, the assessment assumed 1,645 would relocate into Anglesey and Arfon resulting in a demand for additional accommodation units. The study assumed that 50% of professional staff and 10% of operatives working on the construction stage would bring their families. During peak construction, it was assumed that 310 workers would relocate with their families with 1,335 relocating without families.

3.7.6 Table 3-19 below shows the assessment assumptions by accommodation sector.

Table 3-19 Accommodation assumptions for Wylfa B PWR

Type	Staff		Operatives		Total	
	%	No.	%	No.	%	No.
Owner-occupation	50	193	5	63	16	256
Private rented	10	38	3	38	5	76
Site hostel	25	96	50	630	44	726

[38] [RD7]

[39] Arfon is a parliamentary constituency in Gwynedd and includes the towns of Bangor and Caernarfon

Type	Staff		Operatives		Total	
	%	No.	%	No.	%	No.
Hotels/lodgings	13	50	38	479	32	529
Caravans	2	8	4	50	3	58
Total	**100**	**385**	**100**	**1,260**	**100**	**1,645**

3.7.7 The study identified the presence of significant holiday accommodation in the construction impact area. The study identified potential impacts from workers falling when holiday accommodation was in greatest demand. Interestingly, the study made the assumption that workers would not be looking for accommodation in caravans/camping sites.

3.7.8 The analysis identified 2,402 bedrooms within serviced accommodation like hotels, guest houses and farm houses in the area of interest. A further 498 self-catering units were identified (e.g. cottages, houses, chalets). The bedroom occupancy rate was identified as 74% in the peak month of August which was applied to the 2,402 rooms identified as serviced accommodation. In this respect, it was assumed that Anglesey in general and the areas near to the Britannia and Menai Bridges would be most attractive to workers for daily commuting to the site. It was assumed that areas to the south of Bangor and Caernarfon would be less attractive due to increased journey to work times. The spare capacity recognised above, has been identified after allowing for a 70% capacity benchmark.

3.7.9 The assessment did however comment upon the appeal to permanent residents of a year-round source of income from workers as opposed to temporary income from leisure visitors. Based on this analysis, a maximum of 500 workers were assumed to be accommodated in the serviced sector. The assessment assumed that only 2% of staff and 4% of operatives would take up camping and caravanning options.

3.7.10 Contractor-controlled hostel accommodation was assumed to play a major role, accounting for 25% of staff and 50% of operatives. The total demand for such accommodation would therefore be about 730 places.

3.7.11 Geographically, the assessment estimated the distribution of workers between Anglesey and Arfon. This is shown below in Table 3-20.

Table 3-20 Distribution of construction workers by area[40]

Area	Owner-occupied and private rented		Other (hostel, hotels, etc.)		Total	
	No.	%	No.	%	No.	%
Isle of Anglesey	299	90	1,182	90	1,481	90
Arfon	33	10	131	10	164	10
Total	**332**	**100**	**1,313**	**100**	**1,645**	**100**

3.7.12 Owner-occupied housing was expected to be needed for 50% of the staff (193 people) and 5% of operatives (63 people) at peak construction, representing

[40] [RD7]

256 properties in all. The ratio of properties currently for sale on Anglesey to the predicted demand for these properties emanating from Power Station construction was 4:1. This level of demand was seen as sustainable.

3.7.13 The requirement for 76 construction workers to go into the PRS was deemed to be sustainable as the number of units taken up would constitute 1.5% of the private rented households across Anglesey and Arfon.

3.7.14 For the operational stage, it was assumed that 70% of the relocated operational workforce would be likely to move into owner-occupied accommodation with the remainder moving into rented property. It was estimated that 115 of the 470 permanent staff needed would originate from outside the local area. The assessment assumed that a small proportion (about 10%) would prefer to travel on a daily basis, which resulted in an estimated demand for 105 accommodation units.

3.7.15 The needs of outage workers were assumed to be taken care of through temporary accommodation near to the site. The assessment assumed that this was feasible because the headroom identified in the serviced accommodation sector could be deployed to meet their needs.

3.7.16 The operational assumptions are shown below in Table 3-21.

Table 3-21 Predicted distribution of relocated operational workforce[41]

Area	Owner-occupied and private rented		Other (hostel, hotels, etc.)		Total	
	No.	%	No.	%	No.	%
Isle of Anglesey	70	95	31	100	101	96
Arfon	4	5	0	0	4	4
Total permanent	74	100	31	100	105	100
Outage (Anglesey)	290 - 300					

3.7.17 Some families living in the local area would be able to generate additional income by renting out rooms to construction workers. There may also be some temporary plant-induced inflation of property prices, which meant that some families may sell their single properties to developers who convert them into multi rental units. Following completion of the construction phase, these properties would be occupied by tenants with a lower economic status than most local residents.

Sizewell B

3.7.18 Impacts of the construction of Sizewell B on the local housing market were monitored via two annual workforce surveys, and surveys of local stakeholders in housing, including B&Bs, real estate firms and camp and caravan sites [RD19].

[41] [RD7]

3.7.19 The purpose-built on-site hostel, occupancy of which averaged 85%, was identified as a major mitigating factor in reducing housing impacts.

3.7.20 Project-related demand for owner-occupied housing was not high, and was quite widespread geographically. It has been difficult to identify specific effects on local house prices, although demand may have helped to stabilise prices during a time when they were generally falling. Chadwick and Glasson identified pressure on accommodation and other local services, and nuisance created by large numbers of construction workers as a negative impact of the scheme [RD19].

3.7.21 Positive effects on the B&B and guest house sector have been identified – particularly in filling up weekday capacity and ensuring high occupancy levels over the long term and across seasons. Incoming workers often went home at the weekend, thereby allowing for the tourism market at the weekend. Sizewell B workers constituted 50% weekday lettings and 80% winter season business.

3.7.22 In terms of predicted vs. actual effects and behaviours of construction workers at Sizewell B, significant errors were made in predicting the type of accommodation used by non-home-based construction personnel as follows:

- higher construction worker numbers than predicted meant that only 30% could be accommodated in the site hostel;
- the resulting shortfall led to higher-than-expected demand for rented and B&B accommodation;
- take-up of owner-occupied accommodation was under estimated; and
- workers tended to commute on a daily or weekly basis from much greater distances than previously anticipated.

3.7.23 Reasons for inaccuracies in prediction included:

- project modifications (design and implementation);
- length of project authorisation process and associated changes in baseline conditions;
- inadequacies in prediction techniques; and
- lack of availability of relevant comparative information from previous projects.

Liquefied Natural Gas (LNG) Energy Cluster

3.7.24 The Pembrokeshire Energy Cluster involved a construction programme at the LNG plants from October 2004 to December 2009 during which RWE npower anticipated that the construction of a 2000MW power station would fall within the three years Jan 2007 – Nov 2009 [RD10].

- South Hook LNG terminal Phase 1 + 2;
- Dragon LNG terminal;
- RWE npower, Power Station;
- Milford Power, Power Station;
- Transco Pipeline;

- Energy Technium[42]; and
- Combined Heat and Power refurbishment at Dragon site.

3.7.25 In addition, the planned maintenance programmes at the refineries would have been a source of additional construction pressures (programmed to take place during 2006, 2008 and 2009).

3.7.26 Impact assessment work was based on discussion with contractors and project sponsors. With 'local' referring to workers with a permanent address within a radius stretching from Milford Haven to Swansea and travelling workers being those in temporary accommodation. The division between local and travelling workers is shown in Table 3-22 below.

Table 3-22 Energy cluster – labour requirement[43]

Energy project	% local workers	Local workers*		Non-local travelling workers	
		Year	No. workers	Year	No. workers
Dragon (construction period Oct 04 to Dec 07)	70%	2005 2006 2007 2008	310 320-420 140-280 60	2005 2006 2007 2008	130 150-180 60-120 0
South Hook	65%	2005 2006 2007 2008 2009-2010	350 600-850 450-850 80-250 80	2005 2006 2007 2008 2009-20010	150 250-450 240-450 100-150 0
RWE Npower	50%	2007 2008 2009 2010 2011	 20-400 550-600 75-400 75	2007 2008 2009 2010 2011	30-50 250-600 250-600 0 0
Milford Power	50%	2008 2009 2010 2011	20 200-600 250-600 75	2008 2009 2010 2011	30-350 500-600 250-400 0
Transco	30%	2006 2007	5-300 15-150	2006 2007	20-700 35-350
Chevron	30-40%	2006 2008	400 400	2006 2008	800 1000
Total/FINA	70%	2009	300	2009	700

[42] This was a Research & Development/higher level skills initiative involving the Welsh Development Authority

[43] [RD10]

*Local workers refers to workers with a permanent address within a radius stretching from Milford Haven to Swansea, whereas travelling workers are those in temporary accommodation. Figures were based on discussions with main contractors and project sponsors.

3.7.27 Pembrokeshire and adjoining coastal rural communities generally have a relatively small housing stock, higher levels of second-home ownership, incoming retirees and low wages, which in normal circumstances create enormous pressures in the local housing market for rental and purchase. Affordability of housing for local residents is a problem. The Chartered Institute of housing policy briefing 'Young Working & Homeless' identified Pembrokeshire as having the second highest house price to income ratio in Wales in 2004. The declining housing stock resulting from Right to Buy will continue to exacerbate the position in future years.

3.7.28 Given the lack of quantifiable evidence on housing impacts in the private sector, a series of telephone interviews were undertaken, initially in Milford Haven and subsequently further afield. It was clear from the interviews with estate agents that the construction projects were having a significant impact on the local housing market by:

- stimulating the buy-to-let market for construction workers (placing pressures on the bottom end of the market);
- increasing house prices by up to 20% for properties below £150k; and
- increasing rental levels with a knock-on effect on homelessness.

3.7.29 There is also a suggestion that much of the rental revenue was not returned to the local market suggesting external speculative investment in the market.

3.7.30 The latest Land Registry data had shown that semi-detached and terraced property prices in the Milford Haven area had risen at about twice the rate seen across Wales.

3.7.31 Homelessness applications in Pembrokeshire also rose steadily year on year. Analysis of reasons for homelessness showed an increase in numbers due to loss of PRS accommodation. Anecdotal evidence also suggested that several landlords terminated tenancies to let to LNG workers at higher rents. One of the results of increasing homelessness was the increase in households placed in temporary accommodation due to a lack of affordable PRS accommodation and an insufficient and diminishing turnover of social rented stock.

3.7.32 The report estimated that there would be an ongoing requirement for approximately 500-600 bed spaces during the LNG phase, and doubling if both power stations proceeded. Additional sources of demand were also identified from the statements below:

- Pembrokeshire returners also requiring accommodation;
- short-term specialist sub-contractors' requirements;
- it was estimated that approximately 10% might bring families; and
- maintenance shut-downs at the refineries require additional bed spaces for one to two months.

3.7.33 The study was unable to reconcile this assessment of demand against a quantifiable supply of accommodation.

3.7.34 In Carmarthenshire, Transco were in discussion with the County Council about the possibility of establishing a work camp to house travelling workers on the Transco contract.

3.7.35 The report highlighted the following:

"Despite the difficulties in obtaining precise information on the wider housing situation it is clear that there is a rapidly deteriorating position for the homeless which must be addressed as a matter of priority. Pembrokeshire County Council was reported to be working with [the Welsh Assembly Government] to review options to provide short term solutions to the homelessness problem as well as considering the wider issues of affordable housing in a low wage economy."

3.7.36 In the longer term, the report concluded on the importance to consider a work camp option for the power station projects.

Motunui Synthetic Petrol Plant, New Plymouth and Marsden Point Oil Refinery, Whangarei, New Zealand

3.7.37 This case study concerns the construction of the Motunui Synthetic Petrol Plant (with construction worker employment of 2,340 at the peak of construction in 1984) and the Marsden Point Oil Refinery (with a peak construction workforce of 3,600 in 1985, of which 62% were non-home-based) [RD32].

3.7.38 Prior to the period of construction in both New Plymouth and Whangarei, house prices were increasing at a steady rate, and in line with national trends. When construction began, prices in both New Plymouth and Whangarei were reported to have risen dramatically. The high prices stabilised for the duration of the construction phase, and then showed some decline on project completion. Although the falls were significantly less than the rises, they were very much against the prevailing national trend and indicate an oversupply in the housing market.

3.7.39 Effects on the local rental market during construction of the Motunui petrol plant were also significant. In New Plymouth prior to construction (1981), rents ranged from $60/week for a three-bedroom home to $35 for a single-bedroom flat. At the peak of construction (1983-1984), the average rent for a three-bedroom house was $145, and $65 for a flat. When the project was completed the price for a three-bedroom home fell to between $100 and $110 per week, whilst flat prices fell only slightly.

3.7.40 Rising rents resulted in the displacement of some low income tenants who were unable to pay the upwardly adjusted rents. The New Plymouth City Council was forced to create areas for emergency housing in local parks, all of which were quickly filled, particularly by low income families and beneficiaries. In Whangarei, the housing shortage was regarded as the most pressing issue facing local authorities. For the entire period of construction, emergency housing was full. Waiting lists for government-sponsored housing also rose from pre-construction levels of 250 to almost 400 during the workforce peak. The time taken to provide housing also meant that overcrowding was common and occupancy rates in motor camps were high.

3.7.41 Figures prior to construction showed a surplus of two dwellings available for every one demanded in both New Plymouth and Whangarei. During construction, the trend was dramatically reversed in both centres; for every dwelling available, between eight and 11 were demanded. When construction was completed, there was a fall-off in demand to the extent that three to four houses were available for every one demanded. Although the situation eased slightly when the projects were completed, many problems persisted up to a year after the construction finished. These included numerous ex-construction workers still living in motor camps, high rents and waiting lists for emergency housing persisting at double the level before construction.

Conclusions

3.7.42 To date, the only recent impact assessment that has taken the contribution of the full range of accommodation sectors into account has been the one completed for Hinkley Point C (for which a DCO has been approved) (see appendix 77-1.3). Whilst Hinkley Point C assumptions come from a different contextual setting, they represent contemporary assumptions concerning the use of different categories of accommodation stock. These assumptions have been tested through examination under the *Planning Act 2008* and take into account the acknowledged uncertainties concerning how individual workers will behave. Given the expected review of the original evidence supporting GP10, 'Construction Worker Accommodation and Anglesey's Housing Market' [RD33], within *New Nuclear Build at Wylfa: Supplementary Planning Guidance* (Wylfa SPG) [RD34]. The Hinkley Point C assumptions offer a reasonable basis for assessing the likely requirements in this case including mitigations and enhancements. That said, the assessment presented within this report does however go on to test these assumptions by also applying those assumptions in the Wylfa SPG [RD34]. The Wylfa SPG sets out assumptions concerning the distribution of workers across different types of accommodation. Policy GP10 of the Wylfa SPG states that a third of the workforce is expected to be accommodated in purpose-built accommodation, with a further third in the PRS and a remaining third in tourist accommodation [RD34]. It is now understood that the report upon which this was based is to be updated and amended. It is also evident that the indicative allocations exclude consideration of the purchase of owner-occupied properties and latent accommodation capacity which could provide additional capacity to meet needs.

3.7.43 The inclusion of owner-occupied property within the assessment of where workers will be distributed meets the needs that may come forward mainly from professional and project management staff moving to the area for a significant length of time, possibly several years or permanently in cases where roles change to include some element of operational delivery. These individuals are likely to seek permanent housing in the local area and in some cases to bring their families with them. Evidence from Sizewell B and Hinkley Point C suggests that the owner-occupied sector and PRS are most likely to offer suitable accommodation for these households. The owner-occupied sector within the KSA may be well placed to meet these needs during construction. However, it is likely that the Isle of Anglesey would become the focus for workers during the operation of the Wylfa Newydd Power Station, given the current distribution of the operational workforce for the Existing

Power Station shows just over 87% of the workforce living on the Isle of Anglesey itself in 2007 [RD35].

3.7.44 Latent accommodation takes account of properties which have hitherto not been offered for rent. The basic premise is that the scale of opportunity will be sufficient to encourage householders to bring forward accommodation. This source of accommodation may consist, for example, of spare bedrooms brought forward to take advantage of the opportunity to earn income. The majority of the workforce would, however, be civil or mechanical and electrical operatives who are more likely to work on the Wylfa Newydd Project for periods of months, or possibly a year. These workers would be likely to move to the local area without their partners/families and would typically seek more temporary forms of accommodation in the area. A key issue for the future, especially for potential latent accommodation, may be the effect of the *Housing (Wales) Act 2014* on the willingness of providers who may be reluctant to bring forward accommodation due to additional costs and administrative burdens associated with legislative changes. That said, initial indications from the Latent Accommodation Survey are that this accommodation stock may provide a significant number of bed spaces for the construction workers.

4 Tourism

4.1 Introduction

4.1.1 This section covers:

- tourism strategy overview;
  - These documents are the most pertinent as their aims may be affected by the Wylfa Newydd Project. Documents vary from general strategies for Wales to specific sector based plans.
- visitor behaviour survey;
  - Gauged opinions on the Project and specifically identified potential effects from a tourism perspective, carrying out 530 face-to-face interviews with visitors in August 2015.
- tourism accommodation survey; and
  - Provided indication of bed space for analysis and the opinion of accommodation providers that potentially may interact with the Wylfa Newydd Project.
- tourism related business survey.
  - General business survey with results on the tourism industry's awareness and expectations from the Wylfa Newydd Project.

4.2 Economic development and tourism strategy

4.2.1 The following tourism policy documents have been identified as important as their aims and objectives may be affected by the Wylfa Newydd Project. It is necessary to look at these strategies and frameworks in order to understand how tourism in Wales intends to grow. The following reports and strategies are shown in a common development requirements matrix in Table 4-1. This overview shows the recurring themes across the various strategies.

4.2.2 It can be inferred that the number of documents which reference a particular requirement is an indication of its importance. On this basis:

- 'sustaining and regenerating communities and ensuring local prosperity' is identified in seven of the nine strategies, the highest of any of the common requirements.
- 'ensuring economic viability by investing in product excellence' is identified in six of the nine strategies.
- A further three development requirements are identified in five of the nine strategies.

4.2.3 The strategies and plans identified can be divided into two types: general strategies and specific plans. The former, such as *The Welsh Government Strategy for Tourism 2013-2020 Partnership for Growth* [RD25], apply a wider scope and therefore are more likely to be pertinent to a larger audience. Whilst specific plans, such as the *Food Tourism Action Plan 2015-2020* [RD36], present more precise aims for that area of tourism and therefore could be considered vital.

4.2.4 *The Coastal Tourism Strategy* was published in 2008 by the Welsh Government [RD37] and sets out to identify a clear way forward for developing coastal tourism in Wales. The strategy is one of the key national actions put forward in the Wales Spatial Plan [RD38].

4.2.5 *Tourism Strategy North Wales 2010-2015* was produced in 2010 by the Tourism Partnership North Wales [RD39]. The strategy sets out a number of priorities for tourism and provides a detailed action plan for each area.

4.2.6 *Sustainable Tourism: A Framework for Wales* was produced in 2007 by the Welsh Government [RD40]. This includes 12 aims which were identified in the World Tourism Organisation and the United Nations Environment Programme for sustainable tourism. The framework is supported by the four Welsh regional strategies for tourism.

4.2.7 The *Welsh Government Strategy for Tourism 2013-2020* was produced in 2013 by the Welsh Government [RD41]. The strategy is accompanied by an annual action plan that sets out priority projects and programmes of work.

4.2.8 *Wales Tourism Policy Towards 2020*, produced by the Wales Tourism Alliance in 2012, provides detail about how the Welsh Tourism Alliance can invest in products, people, communities and marketing [RD42].

4.2.9 *The Food Tourism Action Plan for Wales 2015-2020* (Welsh Government, 2015c), produced by the Welsh Government in 2015, recognises the importance of food and drink to the Welsh Tourism sector. Its aim is to raise Wales' profile as a high quality food destination [RD43].

4.2.10 *The Faith Tourism Action Plan for Wales* was produced in 2013 by the Welsh Government [RD44]. It aims to identify ways in which places of faith and sacred sites, which are a large part of the Welsh heritage, can be enhanced.

4.2.11 A *Hospitality, sport and tourism sector skills assessment 2012* was produced by the UK Commission for Employment and Skills in 2012 [RD45]. The ambition is to transform the UK's approach to investing in the skills of people as an intrinsic part of securing jobs and growth.

4.2.12 *One Wales: Connecting the Nation* is a transport strategy which was produced by the Welsh Government in 2008 [RD46]. The strategy identifies its role in contributing to the growth and sustainability of the tourism sector, by improving sustainable access to key visitor attractions.

4.2.13 The *Destination Management Plan 2012-2016*, produced by the IACC in 2012, is a shared statement of intent to manage a destination over a stated period of time, articulating the roles of the different stakeholders and identifying clear actions to be taken [RD47].

Table 4-1 Common development requirements

Strategy/policy document	Developing the tourism industry as a critical sector of the Isle of Anglesey economy	Providing an outstanding experience to ensure visitor fulfilment	Sustaining and regenerating communities and ensuring local prosperity	Working together in partnerships across other sectors and businesses	Promoting the brand and the distinctive strengths of the area	Improving the skills of staff and managers in the tourism sector	Ensuring economic viability by investing in product excellence	Minimising tourism's environmental effect	Equality	Sustainable development objectives	Resource efficiency
Coastal Tourism Strategy 2008			x			x		x	x	x	
Tourism Strategy North Wales 2010-2015	x	x		x	x		x				
Sustainable Tourism: a Framework for Wales		x	x			x	x	x			x
The Welsh Government Strategy for Tourism 2013-2020 Partnership for Growth	x	x	x	x		x	x	x			
Wales Tourism Policy Towards 2020			x		x	x	x				
Food Tourism Action Plan 2015-2020			x	x			x				
The Faith Tourism Action Plan for Wales	x	x		x							
One Wales: Connecting the Nation –The Wales Transport Strategy			x						x	x	
Isle of Anglesey Destination Management Plan 2012-2016: The Strategy		x	x	x	x	x	x			x	

4.3 Visitor behaviour survey

Aims and objectives

4.3.1 To gauge public opinion of the Wylfa Newydd Project and identify any potential effect on tourism as a result of the construction and presence of the Wylfa Newydd Power Station, a survey was undertaken in 2015 amongst visitors to the island at key tourism destinations throughout Anglesey. While some of the information gathered provides a view of the baseline activities, the survey results are all presented here, as collectively they contribute to the understanding of the potential effects.

4.3.2 Specific objectives were to:

- determine frequency and reasons for visiting the island and whether the visit was a day trip or part of a longer holiday;
- explore activities that visitors were taking part in;
- gauge the likelihood of visitors returning to the island in future;
- ascertain awareness of the Existing Power Station and any effect of this structure on visitors' enjoyment of their visit;
- gauge levels of awareness of the proposals to construct the Wylfa Newydd Power Station and sources of information;
- gauge likelihood of visiting the proposed Wylfa Newydd Power Station during construction, and once the development had been completed;
- gauge perceptions of how the construction and presence of the Wylfa Newydd Power Station would affect the local environment; and
- gauge the effect of the construction and presence of the Wylfa Newydd Power Station on visitors' intentions to visit the island again and whether this would have any effect on the activities undertaken.

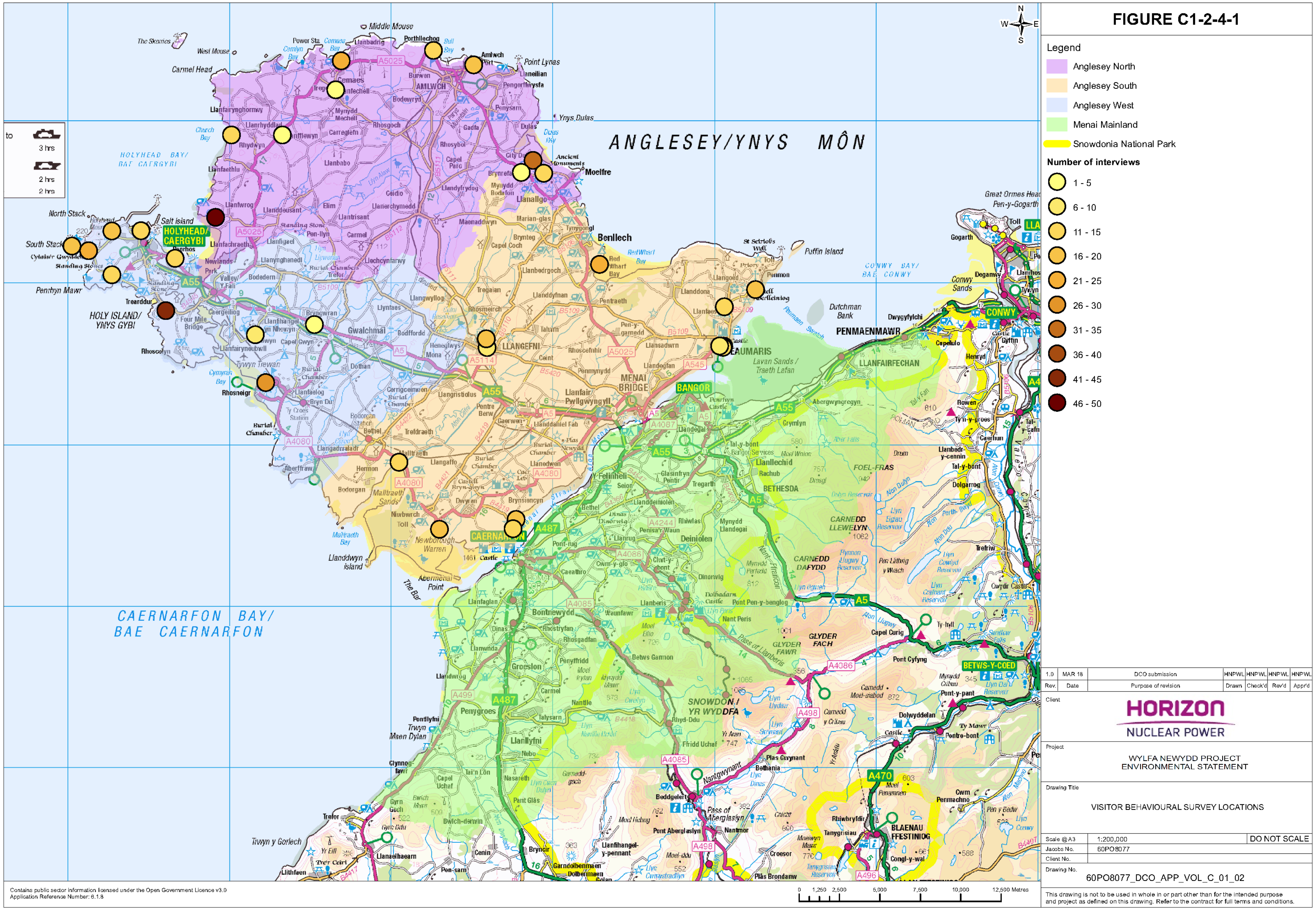
Approach

4.3.3 A total of 530 face-to-face interviews were conducted with visitors at 32 locations on the Isle of Anglesey; visitors were approached as they were coming to the end of their visit. Interviews took place between Friday 7 August and Monday 31 August 2015. Locations were classified as being:

- attractions (12 locations);
- campsites/caravan parks (nine locations);
- coast paths/beaches (six locations); and
- roadside locations (five locations).

4.3.4 Figure 4-1 provides a map of the interview locations across Anglesey.

Figure 4-1 Visitor behaviour survey locations



4.3.5 All visitors taking part in the survey were aged 16 years or over, and classified as a day visitor or staying visitor on the Isle of Anglesey. Permanent residents were excluded from the survey. There were no quotas applied to the sample; rather the profile of visitors was allowed to fall out naturally. To deliver a truly representative sample of visitors and avoid any bias, the 'next person' rule was employed. This means the interviewer selected respondents on the basis of the next person to pass them, on completion of the previous interview.

4.3.6 Also, no more than one person per group was interviewed and, in the event of large groups, the 'next birthday' rule was applied; that is, the person with the next birthday to come in the group was interviewed. This overcame potential bias in the sample and helped ensure it was as representative as possible.

4.3.7 Visitors were offered the choice of conducting the interview in either Welsh or English. Amongst the 42 Welsh speakers who were interviewed, a total of six opted to undertake the interview in Welsh.

4.3.8 Table 4-2 details the number and relative proportion of interviews undertaken within each of the key sub-groups used in the analysis of the data. Tables do not include 'don't know' or 'refused' responses.

Table 4-2 Visitor behaviour survey summary results

Metric	Number of interviews	% of sample
Location type		
Attractions	182	34
Campsites/caravan parks	216	41
Coast paths/beaches	103	19
Roadside locations	29	5
Visitor type		
Day visitor	91	17
Transient	8	2
Staying visitor	430	81
Visitor frequency		
First visit	173	33
Weekly	48	9
One to two times a month	85	16
Two to four times a year	91	17
Less often	131	25
Aware of development		
Yes	191	36
No	339	64

Metric	Number of interviews	% of sample
Welsh speaker		
Yes	42	8
No	488	92
Influence of construction on returning to area		
More likely to return	4	1
No influence on returning	468	88
Less likely to return	46	9
Influence of operation on returning to area		
More likely to return	4	1
No influence on returning	477	90
Less likely to return	43	8

** Please note percentages do not sum as some respondents answered 'don't know' to some questions.*

Visitor behaviour survey results

4.3.9 The results of the visitor behaviour survey are presented below.

Profile of respondents

4.3.10 The gender split for the sample was even (50% male and 50% female).

4.3.11 Only a small proportion of visitors interviewed were younger than 35 years of age (13%), while almost half of the sample were aged between 35 and 54 years (49%). The remaining 38% were 55 or older.

4.3.12 Reflecting the fairly young age profile of visitors, just under three-quarters were employed (74%), while 21% were retired. Around 6% were not working due to unemployment, studies or looking after the home.

4.3.13 The average group size was four people, with just over half of groups containing fewer than four people (54%) and roughly two in five containing four or more people (45%).

4.3.14 Just under half of visitor groups consisted of adults only (49%), while half contained children (51%); the average number of children accompanying adults was two per group.

4.3.15 The vast majority of visitors to Anglesey lived in England (82%), with most of these (56%) travelling a fairly short distance (from north-west England) to visit the island. Only 13% of visitors lived in Wales, and mainly came from neighbouring areas such as Gwynedd (4%), Flintshire (3%) and Conwy (2%).

4.3.16 Only around one in 10 (8%) of the visitors interviewed spoke Welsh, reflecting the high proportion of English visitors coming to the island.

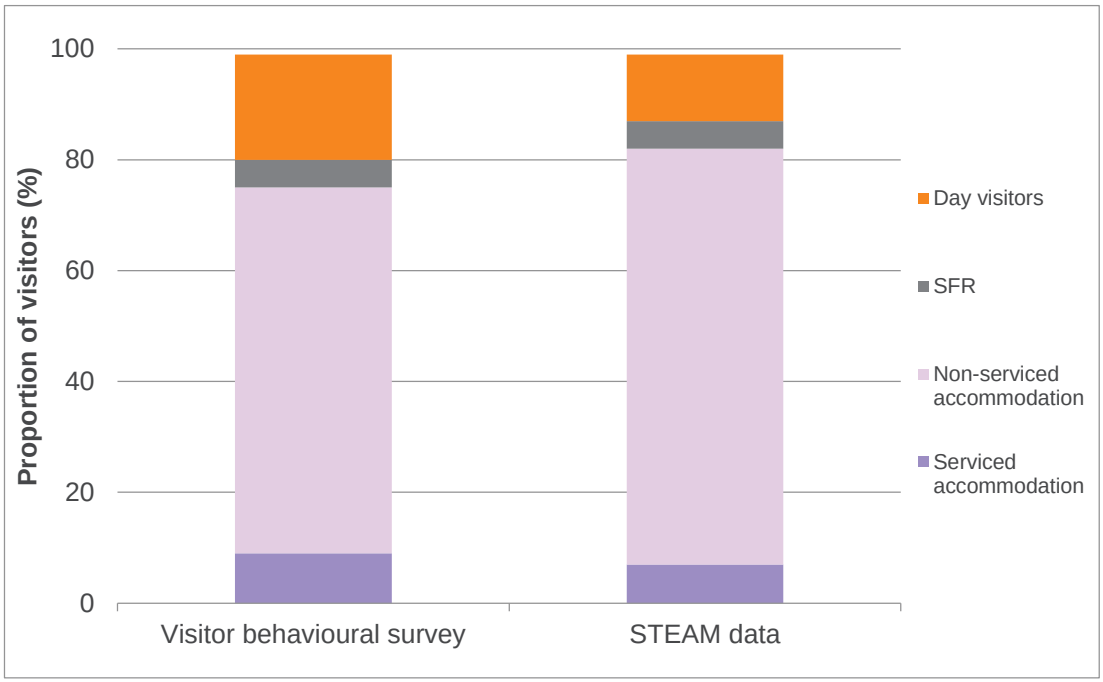
Visitor profile

4.3.17 The majority of participants were staying visitors (81%), less than a fifth of visitors interviewed were day trippers (17%), with the remaining 2% 'just passing through'.

4.3.18 This sample of visitors is only indicative and is not an exact comparison of the average type of visitor on Anglesey in 2014. Figures provided by Global Tourism Solutions provides a baseline (Global Tourism Solutions, 2014) showing that 645,000 of 1,579,000 (40%) were day visitors, compared with 17% in the survey, and 60% staying overnight compared to 82% in the survey. However, looking at the number of tourist days rather than visitor numbers, 88% of tourist days were from staying visitors and the remaining 12% were day trippers [RD48]. Therefore, it can be seen that the results of the survey are a fairly accurate representation of the types of visitors on the island on any given day.

4.3.19 Given that 41% of all interviews were conducted at campsites, it is not surprising that most staying visitors were staying at a campsite/caravan park during their time on Anglesey (67%). However, this does not mean that the results are disproportionately in favour of visitors staying in campsite/caravan accommodation as the remaining 59% of interviews would have picked up visitors staying in a range of accommodation, including hotels, guest houses etc. Visitors staying in non-serviced accommodation, which includes campsites/caravan parks, made up 40% of total visitors to Anglesey in 2014 according to the STEAM data, which was lower than the proportion of survey respondents staying in this type of accommodation (approximately 66%). Much smaller proportions of survey respondents were staying in other paid accommodation, such as guest houses (7%) and hotels (4%). Around one in 10 were staying with friends and family (7%).

Figure 4-2 Comparison of types of visitors responding to the visitor behaviour survey with STEAM data (%)



4.3.20 In terms of the frequency of visiting Anglesey, one-third of participants reported that it was their first visit to the place where they were interviewed (i.e. attraction, campsite, coast path, roadside location).

4.3.21 For repeat visitors (67% of respondents), their frequency of coming to that place was fairly evenly distributed, 37% visited at least once a month and 26% visited fairly frequently (once or twice every six months). Other less frequent visitors, who only visited once a year or less, made up the remaining 37%.

4.3.22 The main reasons stated for visiting were to enjoy the scenery (38%) and the relaxing atmosphere (28%). Just under a quarter said they had been before and wanted to come again (24%), while 22% said that they considered visiting the island (and its attractions, paths, beaches etc.) as 'a good day out'.

4.3.23 Reflecting this, the activity taken part in by the majority of visitors was 'admiring the scenery', mentioned by 79% of participants. Outdoor activities were also very popular, with 76% taking part in walking, cycling, horse riding, fishing etc. A similar proportion (71%) had visited a café, restaurant or pub during their time on the island, while 64% had visited towns and villages. Several specific attractions were mentioned, including Beaumaris Castle (13%), Anglesey Sea Zoo (3%) and Plas Newydd (2%).

4.3.24 Just under nine in 10 intended to spend money on Anglesey during the day they were interviewed (89%), with the average spend per visitor group being £72. Approximately one in 10 (9%) did not intend to spend any money on that day and the remaining 2% did not know. As the average group size was four people, this is equivalent to £18 per person per day, which is significantly lower than indicated by the STEAM data, which showed expenditure of £165 per visitor on Anglesey in 2014. However, it is likely that the majority of survey respondents did not include expenditure on accommodation in their response, whilst the STEAM data does.

4.3.25 Over half said that they would spend the majority of their money on food and drink (55%) – this was by far the most mentioned area of spend. Another 16% said that most money would be spent on shopping, while 13% said they would spend most on accommodation during the day they were interviewed.

4.3.26 Over nine in 10 visitors said that they would be likely to return to Anglesey in future (96%), with the majority of these claiming that a return visit was very likely (88%). Only 4% said it was unlikely they would visit the island again.

Awareness and perceptions of the nuclear facilities on the island

4.3.27 There was a roughly even split between visitors that had seen the Existing Power Station (52%) and those who had not (48%).

4.3.28 A quarter of those aware of the Existing Power Station said they had seen it or visited areas nearby (26%), while 15% mentioned it was located at Wylfa Head. Another 7% had visited the site (including those who had been on a guided tour), while 2% knew of someone with links to the site.

4.3.29 The vast majority of visitors said that the presence of the Existing Power Station had not interfered with the enjoyment of their visit (90%), although 7% reported that it had. The remaining 3% answered ‘don’t know’.

4.3.30 However, slightly higher than average proportions of visitors to coast paths (13%), first-time visitors (12%), day trippers (12%) and those accompanied by children (10%) reported that the presence of the Existing Power Station had somewhat interfered with the enjoyment of their visit.

4.3.31 Levels of awareness of the proposals for the Wylfa Newydd Power Station were slightly lower than awareness of the Existing Power Station (36% aware), highlighting that 64% of respondents did not know of the proposals for the Wylfa Newydd Power Station.

4.3.32 Amongst those aware of the plans, the main sources of awareness were TV coverage and word of mouth (29% for each). Another 20% had read about the plans in a newspaper, while 8% knew someone with links to the Existing Power Station, or links to the nuclear industry.

4.3.33 When asked if they would be likely to visit the Visitor and Media Centre during the construction of the new Wylfa Newydd Power Station, a third (35%) said that they would. However, most reported they were unlikely to visit during construction (62%). A higher proportion reported that they would be likely to visit once the Wylfa Newydd Power Station was completed and operational (49%); an approximately equal proportion (48%) would be unlikely to visit such a facility. The remaining respondents stated ‘don’t know’ or ‘depends what is there’

Perceived effect of the Wylfa Newydd Power Station – construction

4.3.34 When asked what effect the new Wylfa Newydd Power Station would have on the island, over half of visitors made positive comments (53%). Over four in 10 felt the Wylfa Newydd Power Station would bring more jobs to the area (47%), while 17% said it would bring more businesses to the area. Another 6% said it would make the UK more self-sufficient in terms of energy supply, while 3% felt it would bring improvements to the roads.

4.3.35 However, 23% of visitors felt the Wylfa Newydd Power Station would have a negative effect on the area, with most of the comments received focusing on the potential damage that could be caused to the landscape (23%). Nearly 1 in 10 were concerned about noise pollution and the potential effect on people's health during construction (9% for each). A further 6% felt that the Wylfa Newydd Power Station would have a detrimental effect on tourism and would discourage people from coming to the area. However, nearly 9 in 10 reported that the construction of the new Wylfa Newydd Power Station would have no effect on their own intention to return to Anglesey (88%). A further 1% said that it would make them more likely to return, although 9% said it would deter them from returning to the island.

4.3.36 For those who would be less likely to return to the island during construction, the main reason was that they felt it would create too much traffic and disruption to the roads (39%); another 20% were anti-nuclear and considered this a potentially dangerous form of energy. One in 10 (11%) of these people said that they would simply visit other areas of the island.

4.3.37 Of those survey respondents indicating that they would be less likely to visit during construction, more than half (24 responses) stated that it was their first visit to Anglesey and 12 respondents stated that they visited less frequently than two to four times a year. Of those visiting Anglesey weekly, two respondents stated that they would be less likely to visit during construction, whilst 45 said that it would have no effect.

Perceived effect of the Wylfa Newydd Power Station – operation

4.3.38 90% of visitors reported that the presence of the Wylfa Newydd Power Station would have no effect on their intention to return to Anglesey, although 8% said it would make them less likely to return (1% more likely to return).

4.3.39 Amongst those who would be less likely to visit when Wylfa Newydd Power Station was operational, most said that this was because they were anti-nuclear power and thought it was dangerous (40%), while another 12% said that the Wylfa Newydd Power Station would 'spoil the environment and ruin the landscape'.

4.3.40 Nearly nine in 10 said that the presence of the Wylfa Newydd Power Station would not have any effect on the activities they took part in on the island (88%), although 9% reported that it would have some effect.

4.3.41 For the majority reporting that the Wylfa Newydd Power Station would not influence the activities they undertook, the most frequent comment/reason given was that it did not bother them and they would come to visit anyway (19%), while a similar proportion would visit other areas of Anglesey instead (17%).

4.3.42 For the small proportion who said that the Wylfa Newydd Power Station would influence the activities they undertook (9%), most said that they would not visit Anglesey (20%), while 12% would visit other areas of the island.

4.3.43 For those respondents indicating that they would be less likely to visit Anglesey during the operation of the Wylfa Newydd Power Station, around 58% (25 responses) stated that it was their first visit, while only a few regular visitors (eight responses) indicated that they would be less likely to visit Anglesey

during the operation of the Wylfa Newydd Power Station. Regular visitors included those visiting weekly, those visiting once or twice a month, and those visiting between two and four times per year.

4.4 Tourism accommodation survey

4.4.1 A revised bed space survey provided specific insights for tourism accommodation on Anglesey and therefore is included here. It was completed in late 2015 by the IACC, providing more up-to-date information following the previous survey which was undertaken in 2011. There were 172 responses to the survey.

4.4.2 It should be noted that these results are different from those shown in Table 3-9 because they explore different study areas and used different data sources. The number of bed spaces indicated from the survey based approach relies heavily on the number of responses compared to the data shown in Table 3-9.

4.4.3 The sector breakdown of responses is shown in Table 4-3, and shows the high proportion of responses from self-catering accommodation in particular.

Table 4-3 Sector breakdown of IACC tourism bed space survey

Type of establishment	Proportion of responses (%)
Self-catering accommodation	62
Serviced accommodation	24
Caravan and camping	5
No response	8
Total	**100**

** Note: column does not sum due to rounding*

4.4.4 The survey also asked for the number of bed spaces in each type of accommodation. The responses are shown in Table 4-4. Of the 2,210 total bed spaces reported by survey respondents, the highest number are in self-catering houses or cottages (1,313), followed by hotels (382).

Table 4-4 Number of bed spaces by types of establishment

Type of establishment	Number of bed spaces
Self-catering house/cottage	1,313
Hotel	382
B&B	220
Static caravan park	82
Other	73
Guest house	47
Hostels/group accommodation	44
Farmhouse	32
Townhouse	10
Restaurant with rooms	7
Inn	0
Budget hotel	0
Touring parks	0
Camping parks	0
Activity accommodation	0
Total	**2,210**

4.4.5 Approximately 64% of respondents were interested in housing workers, primarily to improve their year-round income stream, and they could supply 1,302 bed spaces. The primary reason given for not wishing to provide accommodation to workers was linked to concerns of an effect on the tourism business. The main reason for not wanting to accommodate workers was due to a reduction in returning customers as a result of housing workers, and a loss of new tourism business due to housing workers.

4.4.6 Establishments appeared more willing to house workers during the traditional 'off-peak' period (the winter months), and respondents noted that increased traffic on Anglesey roads as a result of the development was a key concern.

4.5 Business survey – tourism related

4.5.1 Between 18 January 2016 and 22 February 2016, an online survey of businesses in North Wales was undertaken by the Isle of Anglesey Energy Island Programme and the North Wales Economic Ambition Board, and supported by Horizon. The survey was publicised on the websites of the IACC and the North Wales Economic Ambition Board and also via their social media streams.

4.5.2 The results were largely used to inform the Business and Supply Chain impact assessment (see chapter C1 - (Application Reference Number: 6.3.1)); however, data for tourism businesses were also gathered and are relevant to this tourism impact assessment in gathering a stronger picture of the tourism businesses across Anglesey and North Wales. The full aims and objective, the methodology and the results of the survey are discussed in full in section

5.2 of this report. For the purposes of this section, only tourism-related business responses have been analysed.

Business survey results

4.5.3 The business survey received a total of 376 responses. The responses from tourism-related businesses are discussed below.

4.5.4 Tourism is a broad term and therefore does not have its own category. For the purpose of this assessment, the categories that were chosen to be included under 'tourism business' were accommodation and food services, arts, entertainment and recreation, and other services. 'Other services' is a very large category which includes many businesses that are not seen as tourism related; therefore, the analysis largely focuses on accommodation and food services which make up 34% of the total tourism-related businesses surveyed. Table 4-5 shows the location of the tourism businesses and how many of them lie within the accommodation and food services sector; however, it should be noted that not all survey respondents answered all the questions.

4.5.5 As described in chapter B2's description of study areas (Application Reference Number: 6.2.2), the Menai Mainland includes most of Gwynedd and a small area of Conwy and therefore survey respondents were asked to identify if their business was based in the Menai Mainland, or 'elsewhere in Gwynedd' or 'elsewhere in Conwy'.

Table 4-5 Business location for tourism-related businesses within North Wales[44]

Location	Number	Proportion within accommodation and food service (%)
Anglesey North	19	47
Anglesey South	18	39
Anglesey West	11	45
Menai Mainland	10	10
Elsewhere in Gwynedd	13	62
Elsewhere in Conwy	11	55
Denbighshire	6	0
Flintshire	13	8
Wrexham	3	0
No response	5	0
Total areas (excluding 'No responses')	**109**	**34**

[44] [RD49]

4.5.6 Table 4-6 shows that 54% of businesses in the study area are classed as 'micro', with less than 10 employees, with a further 11% of tourism businesses classed as 'small', which is between 10 and 49 employees [RD50].

Table 4-6 Size of tourism businesses (full-time equivalent)[45]

Employees	Number of tourism businesses	Proportion of total tourism businesses (%)
0-9	59	54
10-49	12	11
50-249	4	4
250+	3	3
No response	31	28
Total (excluding no responses)	**78**	**100**

4.5.7 In addition to the questions relating to the type and size of businesses, the survey also asked specific questions about the Wylfa Newydd Project.

How aware of the Wylfa Newydd Project are you?

4.5.8 Table 4-7 below shows that, of the tourism businesses that responded when asked about their awareness of the Wylfa Newydd Project, 86% were either generally aware or understood that the Wylfa Newydd Project was underway.

Table 4-7 Awareness of the Wylfa Newydd Project – tourism businesses by location

Location	Never heard of it	Generally aware	Understand in detail	No response
Anglesey North	0	6	5	8
Anglesey South	0	8	4	6
Anglesey West	0	1	3	7
Menai Mainland	0	6	0	4
Elsewhere in Gwynedd	0	6	1	6
Elsewhere in Conwy	1	4	0	6
Denbighshire	3	2	0	1
Flintshire	4	6	1	2
Wrexham	0	3	0	0
No response	1	1	0	3
Total	**9**	**43**	**14**	**43**

[45] [RD49]

Do you think the Wylfa Newydd Project will create opportunities that your business will benefit from?

4.5.9 Within the accommodation and food service category, the main effects mentioned were increased demand in accommodation from which they might benefit, and the decrease in tourist numbers due to people not being interested in nuclear power plants.

In what way do you think the project will impact your business? Please select all that apply

4.5.10 Respondents were asked in what way they thought the Wylfa Newydd Project would affect their business (they could select multiple answers), including in terms of the following:

- supply chain impacts;
- customer impacts;
- turnover impacts;
- staff retention; and
- other (please specify).

4.5.11 Table 4-8 shows the proportion of tourism businesses that reported specific business impacts. Almost one-quarter (24%) of tourism businesses expect customer impacts, with 21% expecting turnover impacts; the majority of these were beneficial impacts, although a small proportion of respondents expected adverse impacts. Of those reporting 'other', the responses were largely positive, with businesses indicating that they thought that the Wylfa Newydd Project would lead to increased local spending, and increased occupancy of accommodation. However, some respondents also reported concerns over potential traffic management problems and potential adverse supply chain issues.

Table 4-8 Business impacts – tourism businesses

In what way do you think the Wylfa Newydd Project will impact your business?	Proportion of total tourism businesses (%)
Supply chain impacts	14
Customer impacts	24
Turnover impacts	21
Staff retention	12
Other (please specify)	13

5 Business and supply chain

5.1 Introduction

5.1.1 This section covers:

- business survey (section 5.2);
  - Provides an indication of business performance and awareness of the Wylfa Newydd Project in relevant areas of north Wales.
- nuclear capability study;
  - Research commissioned by the Welsh Government into the capabilities of the economy to take advantage of the opportunities presented by nuclear sector.
- case studies on other Nuclear Power Stations; and
  - Sizewell B and Hinkley Point C
- Anglesey Enterprise Zone.
  - explores the effects of various potential investments in Anglesey, including the Wylfa Newydd Project.

5.2 Business survey

5.2.1 Between 18 January 2016 and 22 February 2016, an online survey of businesses in North Wales was undertaken by the Isle of Anglesey Energy Island Programme and the North Wales Economic Ambition Board, and supported by Horizon. The survey was publicised on the websites of the IACC and the North Wales Economic Ambition Board and also via their social media streams.

Aims and objectives

5.2.2 The purpose of undertaking the survey was to gauge the sentiment among North Wales businesses about general business conditions and the Wylfa Newydd Project.

5.2.3 Specific questions covered the following topics:

- location and sector of business;
- size of business (employment/turnover);
- recent and expected change in turnover;
- recent and expected change in employment;
- recent and expected recruitment issues;
- location and type of customers (new/returning);
- awareness of the Wylfa Newydd Project;
- potential impacts/opportunities of the Wylfa Newydd Project for businesses; and
- limitations/support required by businesses to benefit from opportunities.

Methodology

5.2.4 The business survey was an online survey undertaken using Survey Monkey; there were both Welsh and English language versions of the survey.

5.2.5 The North Wales Economic Ambition Board, the IACC and Horizon provided details of the survey on their website and via social media. In addition, businesses from the Experian database of companies were notified of the survey directly, via email.

Results

5.2.6 The business survey received a total of 376 responses. It was split into two sections: one asking questions about the business and recent trends, the second focusing on views about the Wylfa Newydd Project. These are discussed in separate sections below.

Business profiles

5.2.7 Table 5-1 shows that more than two fifths of respondents (43%) were located on Anglesey, with 53% from elsewhere in North Wales and the remainder not providing a response to that question. The largest number of responses were from businesses located in Anglesey South (22%), followed by Menai Mainland (15%) and Anglesey North (14%). This is a higher response rate from businesses in Anglesey North, Anglesey South and Anglesey West than would be expected based on the proportion of businesses in North Wales located in these areas using the Experian database of companies (Table 5-1). However, given the Wylfa Newydd Project is located on Anglesey, a strong response from businesses on Anglesey is to be expected.

Table 5-1 Survey respondents (2016) and Experian database businesses by location[46] (2015)

Location	Survey responses (%)	Businesses[47] (%)
Anglesey North	14	2
Anglesey South	22	6
Anglesey West	7	4
Menai Mainland	15	12
Elsewhere in Gwynedd	10	22
Elsewhere in Conwy	8	11
Denbighshire	6	10
Flintshire	10	33
Wrexham	4	-
No response	5	-

5.2.8 In terms of business type, the highest proportion of respondents was classified within other service activities (16%), followed by professional, scientific and technical activities (13%), the construction industry (11%), manufacturing (10%) and accommodation and food services (10%) (Table 5-2). Again, this differed from the composition of businesses types within the Experian data.

Table 5-2 Survey respondents (2016) and Experian data by business sector[48] (2015)

Business sector	Survey responses (%)	Businesses (%)
Accommodation and food service	10	13
Administrative and support services	1	6
Agriculture, forestry and fishing	3	7
Arts, entertainment and recreation	3	4
Construction	11	11
Education	2	3
Electricity, gas, steam and air conditioning supply	3	0.2
Financial and insurance activities	3	1

[46] Please note, columns may not sum due to rounding

[47] The data from Experian do not include businesses in Wrexham

[48] Please note, columns may not sum due to rounding

Business sector	Survey responses (%)	Businesses (%)
Human health and social work	2	5
Information and communication	6	4
Manufacturing	10	8
Mining and quarrying	1	0.2
Other service activities	16	8
Professional, scientific and technical activities	13	8
Public administration and defence	1	0.3
Real estate activities	2	2
Transport and storage	3	3
Water supply, sewerage, waste management and remediation	1	0.5
No response	2	-

5.2.9 More than half of responses (54%) were from 'micro' businesses; those with a turnover up to £1.7m[49] [RD51]. Around 11% of responses were from 'small' businesses (i.e. those with a turnover between £1.7m and £8.8m), and 4% from 'medium' businesses (i.e. those with a turnover between £8.8m and £44m).

5.2.10 In terms of employment, 44% of respondents had up to nine employees, 20% had between 10 and 49 employees and 6% had between 50 and 249 employees. A further 3% of respondents employed more than 250 staff.

Recent trends and expectation

5.2.11 This section summarises some key trends from the business survey.

5.2.12 Just over one-third of respondents (35%) indicated that their turnover had increased during the past 12 months, while a further 26% indicated that turnover had remained unchanged over the same period (Table 5-3). This demonstrates a positive business outlook from respondents.

5.2.13 The responses by business sector showed that 55% of firms in the construction sector and 45% firms in the professional, scientific and technical activities sector reported that turnover had increased over the past 12 months; these proportions are higher than the average for all businesses. In contrast, just 15% of respondents in the agriculture, forestry and fishing sector and 22% of those in the wholesale and retail trade indicated that turnover had increased over the same period.

[49] Turnovers are based on the exchange rate as of July 2017

5.2.14 The responses by business size showed that whilst 45% of micro businesses reported that turnover had increased over the past 12 months, the proportion was slightly higher for small and medium businesses (51% and 56% respectively).

5.2.15 Expectations were largely positive for the coming 12 months, with 44% anticipating increased turnover and 21% expecting turnover to remain the same. Just 5% of respondents thought that their turnover would decrease over the coming year (Table 5-3).

5.2.16 In terms of business sector, a higher proportion of businesses in the construction sector (57%) and the manufacturing sector (50%) expected an increase in turnover over the coming year than the average for all businesses.

5.2.17 Small businesses were particularly optimistic about expected turnover, with 72% of respondents expecting turnover to increase, compared with 63% for medium businesses and 58% for micro businesses.

Table 5-3 Survey responses – business turnover[50](2016)

Question	Answers	Responses (%)
How has your turnover broadly changed over the past 12 months?	Increased	35
	Decreased	13
	Remained the same	26
	Don't know	2
	No response	25
How do you expect your turnover to change over the next 12 months?	Increase	44
	Decrease	5
	Remain the same	21
	Don't know	5
	No response	24

5.2.18 One-third of respondents (34%) stated that they had seen no turnover in employees over the past 12 months (Table 5-4). Around 9% of respondents indicated that their employee turnover had been between 1% and 5% over the past year, and 3% indicated an employee turnover of more than 40%.

5.2.19 Firms in the construction sector reported relatively high levels of staff turnover over the past 12 months, with 12% of respondents in the sector reporting staff turnover between 11% and 30%, 7% of respondents reporting staff turnover of between 6% and 10%, and just 17% of respondents in the sector indicating no change in staffing levels over the past 12 months. Firms in the manufacturing sector and other service activities sector also had relatively high rates of staff turnover, with 18% of respondents and 10% of respondents, respectively, reporting staff turnover of between 11% and 30%.

5.2.20 More than half (53%) of micro businesses reported no change in staffing levels over the past 12 months, although 10% reported a change of between 11%

[50] Please note, columns may not sum due to rounding

and 30%. Small businesses generally reported higher levels of staff turnover, with just 23% reporting no change in staffing numbers, 12% reporting staff turnover of between 6% and 10%, and 9% indicating that employee turnover had been between 11% and 30%.

5.2.21 Over the next five years, 36% of respondents expect the number of people employed at their site to increase, with a further 29% expecting employment to remain the same over this period.

5.2.22 Almost half (49%) of businesses in the professional, scientific and technical activities sector expect the number of people employed at their site to increase over the next five years, along with 45% of firms in the construction sector. Although the sector had a much lower number of responses, it is worth noting that 55% of companies in the electricity, gas, steam and air conditioning supply sector expect their employment to increase over the next five years.

5.2.23 Around 45% of micro businesses expect the number of people employed at their site to increase, while the proportion is 63% for small businesses.

Table 5-4 Survey responses – employee turnover[51] (2016)

Question	Answers	Responses (%)
Over the past 12 months, what has the rate of employee turnover been? (% turnover)	No change	34
	<1%	1
	1% to 5% change	9
	6% to 10% change	6
	11% to 30%	7
	31% to 40%	1
	>40%	3
	No response	40
Over the next five years, do you expect the number of people employed (at this site) to increase, decrease or stay the same?	Increase	36
	Decrease	4
	Stay the same	29
	Don't know	6
	No response	26

5.2.24 One-quarter of respondents indicated that they had experienced problems recruiting employees over the last five years, whilst 43% indicated that they had not (Table 5-5). Respondents reported difficulties including lack of workers with the necessary skills, recruitment of Welsh speakers, lack of experienced workers and poor work ethics from candidates.

5.2.25 Approximately 32% of manufacturing companies, 31% of construction companies and 30% of businesses in the professional, scientific and technical activities sector responding to the survey indicated that they had experienced problems recruiting employees over the last five years.

[51] Please note, columns may not sum due to rounding

5.2.26 Just 30% of micro companies responding to the survey reported that they had experienced problems recruiting staff over the last five years, compared to 47% for small companies and just 19% for medium-sized companies.

5.2.27 Around 24% of respondents expect to have difficulties recruiting employees with the necessary skills over the next five years, whilst one-third do not expect to have issues with recruitment. Respondents reported a number of reasons for potential difficulties, including an ageing workforce, a lack of qualified and experienced personnel, a lack of apprentices and the loss of qualified and experienced personnel to the Wylfa Newydd Project.

5.2.28 Around 36% of firms in the professional, scientific and technical activities sector expect to have difficulties recruiting employees with the necessary skills over the next five years, along with 31% of construction companies and 29% of manufacturing companies.

5.2.29 Approximately 28% of micro companies expect to have difficulties recruiting employees with the necessary skills over the next five years, compared to 44% of small companies and just 6% of medium-sized companies.

5.2.30 Skills shortages were expected for mechanical, civil and electrical engineers across the manufacturing sector, and those working in IT and finance. A number of firms in the professional, scientific and technical activities sector highlighted the lack of potential employees with nuclear skills and experience.

5.2.31 Construction firms indicated that they expected to have problems recruiting employees with the necessary skills, including carpenters, ground workers, skilled construction operatives and steel erectors.

Table 5-5 Survey responses – problems recruiting employees[52] (2016)

Question	Answers	Responses (%)
Have you experienced problems recruiting employees over the last five years?	Yes	25
	No	43
	Don't know	5
	No response	27
Over the next five years, do you expect to have problems recruiting employees with the necessary skills?	Yes	24
	No	33
	Don't know	16
	No response	26

General awareness of the Wylfa Newydd Project

5.2.32 Around 58% of respondents were either generally aware of the Wylfa Newydd Project or understood the Wylfa Newydd Project in detail (Table 5-6). Just 5% of respondents had never heard of the Wylfa Newydd Project. Those who had not heard of it were in Flintshire (eight businesses), Denbighshire (four

[52] Please note, columns may not sum due to rounding

businesses), elsewhere in Conwy (two businesses) and Menai Mainland (one business).

5.2.33 Just over one-third of respondents (34%) think that the Wylfa Newydd Project would create opportunities that their business would benefit from, compared to 14% who think that it would not (Table 5-6).

5.2.34 Of those expecting that the Wylfa Newydd Project would create opportunities that their business would benefit from, responses came from businesses across North Wales. The largest number of responses came from businesses in Anglesey South, followed by Menai Mainland, Anglesey North and Flintshire.

5.2.35 In terms of business sector, the largest number of positive responses came from firms in the other service activities, professional, scientific and technical activities, and construction sectors, although there were positive responses from businesses in all business categories.

5.2.36 Looking at the responses by size of business, the largest number of positive responses came from micro businesses, followed by small businesses.

Table 5-6 Survey responses – awareness of the Wylfa Newydd Project and creation of opportunities[53] (2016)

Question	Answers	Responses (%)
How aware of the Wylfa Newydd Project are you?	Never heard of it	5
	Generally aware	41
	Understand in detail	17
	No response	37
Do you think the Wylfa Newydd Project will create opportunities that your business will benefit from?	Yes	34
	No	14
	Don't know	15
	No response	38

Anticipated business impacts of the Wylfa Newydd Project

5.2.37 Respondents were asked in what way they thought the Wylfa Newydd Project would affect their business, including in terms of the following:

- supply chain impacts;
- customer impacts;
- turnover impacts;
- staff retention; and
- other (please specify).

5.2.38 Respondents could select multiple answers.

[53] Please note, columns may not sum due to rounding

5.2.39 Just over one-quarter of respondents (26%) expect that the Wylfa Newydd Project would have turnover impacts on their business, with 21% expecting customer impacts and 20% expecting supply chain impacts (Table 5-7). A lower proportion of respondents (18%) expect that the Wylfa Newydd Project will have an impact on staff retention.

5.2.40 The vast majority of respondents anticipating turnover impacts expected these to be positive, assuming that they were able to obtain work on the Wylfa Newydd Project. Responses came from across North Wales.

5.2.41 A small number of respondents thought that the Wylfa Newydd Project could have negative impacts on their supply chain in the long run if their supply chain focused on working on the Wylfa Newydd Project, rather than servicing existing customers.

5.2.42 For customer impacts, a few respondents were concerned that the construction of the Wylfa Newydd Power Station could put off tourists, partly by the construction work causing congestion on the roads, but also the presence of the Wylfa Newydd Power Station itself.

Table 5-7 Survey responses – business impacts[54]

In what way do you think the Wylfa Newydd Project will impact your business?	Number	Percentage (%)
Supply chain impacts	75	20
Customer impacts	79	21
Turnover impacts	99	26
Staff retention	69	18
Other (please specify)	46	12

Specific staff retention issues of the Wylfa Newydd Project

5.2.43 One of the key potential issues linked to the Wylfa Newydd Project is that of labour churn where workers move from existing businesses to the Wylfa Newydd Project. One of the questions in the business survey sought to gauge the views of businesses in North Wales on this issue.

5.2.44 Of the 376 respondents to the survey, 69 (18.4%) thought that they would experience staff retention impacts as a result of the Wylfa Newydd Project; 40 respondents provided some free text detail relating to their response. The free text answers were analysed and the responses grouped into positive or negative, although 11 were neutral and therefore not included in the analysis. Further analysis was then undertaken on these responses to understand the nature of specific concerns, in terms of geographic location (5.2.45), business sector (Table 5-9) and size of business (Table 5-10).

5.2.45 The most responses about staff retention came from businesses in Anglesey South (11), Menai Mainland (9), elsewhere in Gwynedd (8) and Flintshire (8).

[54] Please note, columns may not sum due to rounding

Of those respondents expecting positive effects, these came from Anglesey South (5), Wrexham (3), Anglesey North (2) and elsewhere in Gwynedd (2)[55].

Table 5-8 Respondents expecting staff retention impacts by location

Location	Total responses	Positive	Negative	Neutral/no free text
Anglesey North	6	2	-	4
Anglesey South	11	5	3	3
Anglesey West	6	1	2	3
Menai Mainland	9	1	3	5
Elsewhere in Gwynedd	8	2	-	6
Elsewhere in Conwy	4	-	1	3
Denbighshire	4	-	-	4
Flintshire	8	1	2	5
Wrexham	4	3	-	1
No location specified	9	-	1	8
Total	**69**	**15**	**12**	**42**

5.2.46 Companies within the construction, manufacturing and other service activities sectors were more likely to report staff retention impacts (Table 5-9). The responses from companies within the construction sector were largely positive or neutral, whilst those from the manufacturing sector tended to be more negative.

Table 5-9 Respondents expecting staff retention impacts by business sector

Business sector	Total responses	Positive	Negative	Neutral/no free text
Agriculture, forestry and fishing	2	-	1	1
Mining and quarrying	1	-	-	1
Manufacturing	10	2	6	2
Electricity, gas, steam and air conditioning supply	4	2	-	2
Water supply, sewerage, waste	2	-	-	2

[55] 'Elsewhere in Gwynedd' refers to areas in Gwynedd which are not within Menai Mainland.

Business sector	Total responses	Positive	Negative	Neutral/no free text
management and remediation				
Construction	13	3	1	9
Wholesale and retail trade (incl. car repair)	1	1	-	-
Transport and storage	6	3	1	2
Accommodation and food service	1	-	-	1
Information and communication	2	-	-	2
Financial and insurance activities	-	-	-	-
Real estate activities	-	-	-	-
Professional, scientific and technical activities	7	1	1	5
Administrative and support services	-	-	-	-
Public administration and defence	-	-	-	-
Education	2	-	-	2
Human health and social work	-	-	-	-
Arts, entertainment and recreation	-	-	-	-
Other service activities	10	3	1	6
No business sector selected	8	-	1	7
Total	**69**	**15**	**12**	**42**

5.2.47 In line with the general responses to the survey, those companies reporting staff retention impacts were largely micro and small companies (Table 5-10). Responses were more likely to be positive than negative for both micro and small companies. Micro and small companies were positive about being involved in the Wylfa Newydd Project, either directly or in terms of being involved in the wider supply chain (through working with companies in the supply chain for the Wylfa Newydd Project).

Table 5-10 Respondents expecting staff retention impacts by size of business

Size of business (turnover)	Total responses	Positive	Negative	Neutral/no free text
Micro (turnover up to £1.5m)	29	8	4	17
Small (turnover £1.5m – £7.5m)	20	6	4	10
Medium (turnover £7.5m – £37m)	6	-	4	2
Turnover more than £37m	5	-	-	5
Don't know/no turnover selected	9	1	-	8
Total	**69**	**15**	**12**	**42**

5.2.48 Specific reported retention concerns included the following:

- higher pay rates on the Wylfa Newydd Project would encourage staff to leave existing jobs;
- the Wylfa Newydd Project could potentially use some of the lower-skilled labour pool, from which the company recruits their lower level factory operatives and office personnel;
- local companies may lose staff to the Wylfa Newydd Project;
- the Wylfa Newydd Project would employ the skilled and experienced staff available, which would make it more difficult to recruit and retain staff; and
- staff retention of those with engineering and electrical skills and non-destructive testing technicians were highlighted as a particular issue.

5.2.49 Positive comments about staff retention included the following:

- working on the Wylfa Newydd Project would help to support staffing levels and staff retention;
- working on the Wylfa Newydd Project would enable companies to offer longer and more secure contracts to staff;
- working on the Wylfa Newydd Project would allow staff to work closer to home, and therefore they would have a better quality of life (could help with staff retention); and
- higher turnover from working on the Wylfa Newydd Project would help to safeguard employment.

5.3 Business and supply chain benchmarks

5.3.1 This section discussed studies or assessments relevant to the assessment of business and supply chain effects presented in chapter C1 (Application Reference Number: 6.3.1).

Nuclear capability study (2015)

5.3.2 In November 2013, the Welsh Government commissioned Miller Research, in partnership with Beaufort Research; Cogent; and Oxford Economics, to scope out the capabilities (both current and latent) of Welsh businesses to respond to opportunities in the nuclear supply chain over the next 20 years. At the time this research was undertaken, the consortium did not have full knowledge or detail of the Wylfa Newydd Project. Therefore, the analysis relating to the Wylfa Newydd Project is not based on the most recent and accurate information.

5.3.3 The report, *Nuclear Capability Study*, produced an assessment of the capabilities of Welsh businesses to be involved in NNB work, operation and maintenance, and decommissioning, and also surveyed businesses to identify their interest in working for the nuclear sector [RD52]. They used SIC code mapping to estimate the number of firms in Wales that would be capable of delivering work in the NNB programme. The firms were mapped to the stages of activity using four-digit SIC codes. It was assumed that as businesses were matched to stages of activity using the most detailed SIC codes available, which give the most information about the activities that they undertake, the businesses would be capable of supplying the nuclear industry.

5.3.4 Miller Research estimated that around 21,260 businesses in Wales could be defined as capable of delivering the work packages required for the NNB programme, using this SIC code mapping. The breakdown by SIC code for these 21,260 businesses is not available in the report, but Table 5-11 shows the number of businesses broken down by stage of activity. The business survey undertaken by Miller Research indicated that around 54% of those businesses defined as capable are interested in working for the nuclear sector. However, just 7% of those capable businesses have previously engaged with the nuclear industry. The number and proportion of capable businesses that are interested and engaged are shown in Table 5-11.

5.3.5 This is a unique study commissioned by the Welsh Government; there are no current plans to update this report. Therefore, there are limitations to the assumptions taken from this report which are used to analyse the nuclear sector in Wales.

Table 5-11 The capability of Welsh businesses for nuclear new build activity assessed by Miller Research UK Ltd [RD52]

Stage of activity	Capable		Interested		Engaged	
	Businesses	Employment	Businesses	Employment	Businesses	Employment
Civil and building supplies	230	544	96 (42%)	226 (42%)	16 (7%)	38 (7%)
Civil engineering and construction						
• Design	3,200	8,148	1,710 (53%)	4,358 (53%)	547 (17%)	1,305 (16%)
• Enabling works	630	6,325	294 (47%)	2,548 (40%)	40 (6%)	419 (7%)
• Superstructure	4,730	25,579	2,336 (49%)	12,045 (47%)	606 (13%)	2,589 (10%)
Internal building works	5,655	23,372	3,025 (53%)	12,306 (53%)	394 (7%)	1,611 (7%)
Plant and equipment						
• Installation	7,160	37,368	3,997 (56%)	21,589 (58%)	341 (5%)	2,351 (6%)
• Manufacturing	2,380	16,418	1,601 (67%)	11,754 (72%)	211 (9%)	1,619 (10%)
Professional services	7,190	22,576	4,008 (56%)	12,522 (55%)	828 (12%)	3,035 (13%)
Programme management and technical services	12,105	45,061	6,457 (53%)	22,753 (50%)	981 (8%)	4,051 (9%)

5.3.6 Miller Research highlights the challenge of converting businesses' interest in the supply chain to ensuring that they can compete for contracts. They flag up issues around barriers to entry and competitive advantage, but one key factor to mention is the need for businesses to be able to meet the rigorous safety standards required by the nuclear industry.

5.3.7 Miller Research compares the size of the capable workforce and the scale of demand for each stage of activity in the NNB programme. Table 5-12 shows these capability/demand ratios by stage of activity and work package. Some sectors have greater capability than the expected demand; for example, Table 5-12 shows that Wales has nearly 14 times the number of professional services personnel than is required for the NNB programme. At the other end of the scale, only 1.16 times as many people work in industries relating to civil and building supplies as the estimated demand for the NNB programme. This suggests that, during peak construction, the demand could outweigh supply in some areas of the Welsh labour market, given that employees would also be working on other projects elsewhere.

Table 5-12 Employment capability and demand: nuclear new build in Wales assessed by Miller Research UK Ltd [RD52]

Stage of activity	Work package	Capability/demand ratio
Civil and building supplies	Civil and building supplies	1.16
Civil engineering and construction	Design	1.49
	Enabling works	1.53
	Superstructure	4.51
Internal building works	Internal building works	4.16
Plant and equipment	Installation	7.49
	Manufacturing	2.94
Professional services	Professional services	13.98
Programme management and technical services	Programme management and technical services	7.72

5.3.8 Estimates from the report suggests that, on aggregate, 44% of the spend on a new nuclear plant would occur in the UK. Further estimates are that 34% of the forecast spend on the Wylfa Newydd Project could occur in Wales if the allocation of turnover (Wales' share of UK turnover) in the relevant industry categories remains the same. However, as noted above, the analysis relating to the Wylfa Newydd Project was undertaken at a time when full details of the Wylfa Newydd Project were not available. Therefore, this assessment needs to be interpreted with caution and does not feed directly into the assessment of effects in section 5 of this report, but it is included for information.

5.3.9 The report by Miller Research suggests that the planning, build, operation and maintenance of the Wylfa Newydd Project would generate an estimated 36,500 years of employment in Wales between 2013 and 2033, with 80% of

this classed as temporary, while the remaining 20% would be associated with the operation of the Wylfa Newydd Power Station. Between 2013 and 2033, the planning, construction, operation and maintenance of the plant are forecast within the report to make a £2.4 billion gross value added (GVA) contribution to Welsh gross domestic product. Of this, two-thirds would occur in the planning and construction phase and one-third when the plant becomes operational. After the plant begins to generate electricity, it is forecast to contribute nearly £87 million in GVA each year of operation (as mentioned in 5.3.5, this analysis was published in 2015 and therefore does not consider the most up to date proposals for the Wylfa Newydd Project).

Actual impacts from Sizewell B

5.3.10 The realised wider local expenditure impacts from Sizewell B are drawn from the monitoring studies carried out for Nuclear Electric by the Impacts Assessment Unit at Oxford Brookes University over the period from 1987 to 1995. This is still the most recent monitoring of the realised or actual impacts of the construction of a UK Nuclear Power Station.

5.3.11 Sizewell B is a major project and involved an expenditure of over £2 billion over the eight-year construction period. Although most of this expenditure was external to the locality, the construction of the station did result in substantial injections of spending into the local economy of Suffolk and Norfolk. This expenditure, and its supply chain implications, was of two main types:

- firstly, the spending undertaken by construction employees in the local economy. This included spending in shops and other local businesses (such as pubs, restaurants and garages) as well as on accommodation; and
- secondly, contracts and orders placed by Nuclear Electric, contractors and sub-contractors, with local companies for the supply of various goods and services.

Spending by construction employees in the local economy

5.3.12 From workforce surveys, it was estimated that construction employees and their families spent a total of about £27 million in the Suffolk and Norfolk local economy during the peak construction year of 1992. An estimated £8.4 million was spent in the very local area of Leiston.

5.3.13 The main categories of expenditure were the following:

- food and groceries – approximately £9 million;
- drink and tobacco – approximately £6 million;
- fuel and transport – approximately £4 million; and
- accommodation – approximately £3 million.

5.3.14 Not all the expenditure could be regarded as a net addition to local spending attributable to the Sizewell B project construction; this is because some of the spending undertaken by home-based recruited employees would have occurred anyway. Overall however, it was estimated that of the £27 million, up to around £19 million would not have been spent if the construction project

had not gone ahead. This was the local additional expenditure impact for the peak year; the impact was estimated at up to £80 million over the full construction period.

Contracts and orders placed by contractors and sub-contractors with local firms

5.3.15 Over the eight-year construction period, contracts and orders with local companies (within a 50-mile radius of the Sizewell B site) amounted to at least £72 million. However, this figure should be regarded very much as a minimum estimate, given the difficulty in getting full information.

5.3.16 The peak years for local contracts were early in the construction period, reflecting greater opportunities for local companies during the civil engineering phase rather than the more technically complex mechanical and engineering phase.

5.3.17 In terms of the significance for local firms, a 1992 survey of 122 local firms having Sizewell B contracts found that, for over 50% of firms, Sizewell B construction work amounted to no more than 2% of turnover. However, for 25% of firms, the Sizewell B contracts amounted to 10% of turnover, and for 15% the contracts amounted to at least 25% of turnover. Interestingly, 22% of companies stated that the work gained at Sizewell B had helped them gain work with other clients, as a result of improved credibility, references and the establishment of new contacts.

Table 5-13 Types of goods and services supplied (£) by local companies gaining at least £50,000 in orders or contracts (1991)[56]

Type of goods or services supplied	Number of companies	Total value of work (£)
Foodstuffs, drink, tobacco and catering disposables	8	1,115,690
Plant and crane hire; testing, maintenance and repair of cranes	7	664,000
Building materials; specialist construction materials, aggregates	3	460,000
Structural steelwork and pipework fabrication; steel piping materials	2	350,000
Ground works, drainage and fencing	2	280,000
Cleaning services; cleaning equipment	2	182,000
Garage services; petrol; vehicle servicing and repair; etc.	2	162,500
Employment agency	1	Confidential

[56] [RD53]

Type of goods or services supplied	Number of companies	Total value of work (£)
Supply of drilling machines and fixing systems	1	Confidential
Painting, cladding and roofing	1	Confidential
Training services	1	Confidential
Electrical contractor	1	Confidential
Industrial fasteners and bolts	1	Confidential
Electrical wholesaler	1	Confidential
Waste disposal services	1	Confidential
Other goods and services	2	147,881
Total	**36**	**5,439,065**

Perceived adverse impact

5.3.18 One issue often perceived by local companies is the potential impact of a high wage project on the local companies' retention and recruitment of staff. To check this, a survey was undertaken of 159 local companies at the peak Sizewell B construction.

5.3.19 Only one in 10 (16) companies stated that the construction project had made it more difficult to retain or recruit staff, and five of these companies stated that these difficulties had not been significant.

5.3.20 At least eight companies had lost staff directly to the construction and cited high wages as significant. Some noted that higher-than-normal wages had been needed to retain workers.

Conclusions

5.3.21 The information from the monitoring of the construction of Sizewell B has been used to inform the assessment of the potential impacts of the Wylfa Newydd Project for local businesses and the supply chain, including the potential proportion of local investment.

Predicted impacts from Hinkley Point C

5.3.22 The predicted supply chain and wider economic effects of the construction and operation of the proposed new nuclear development at Hinkley Point C, Somerset, were provided during the planning process. EDF Energy's application for twin PWRs (3.2GW) was approved by the Secretary of State for the Department of Energy and Climate Change in 2013 [RD54].

5.3.23 The socio-economic impacts of the proposal were key considerations in the examination of the project, which considered impacts for the various stages in the life-cycle of the project (especially construction and operation).

Construction impacts

5.3.24 In addition to the direct local employment effects (predicted to be employment of around 1,900 within the 90-minute local commuting zone), there would also be a range of indirect economic impacts.

5.3.25 These indirect impacts include expenditure on local supplies and services by the project contractors and on services by the project workforce (allowing for the fact that some of the expenditure by local recruits would take place anyway).

5.3.26 Estimates drew on previous studies (including the detailed monitoring of the socio-economic impacts of building Sizewell B, current construction projects such as Flamanville in France) and detailed multiplier calculations. For Hinkley Point C, it was estimated that for a £10 billion project, the wider/indirect local expenditure injection (i.e. within the 90-minute local commuting zone) would be about £100 million to £110 million per annum over the construction life of the project [RD54]. This included 50% from additional workforce expenditure in the 90-minute local commuting zone, and 50% from supply chain contracts/sub-contracts within the local commuting zone.

Operational impacts

5.3.27 Estimates of operational station expenditure and the expenditure of around 700 operational staff for Hinkley Point C draw on data from current operational stations. The wider/indirect local expenditure injection was estimated to be of the order of £40 million per annum over the 60-year life of the project. This is likely to consist of between 75% and 80% additional worker expenditure and between 20% and 25% contracts/sub-contract expenditure.

5.3.28 The average local economic impact of an outage was estimated at around £25 million per outage (all at 2010 prices).

Conclusions

5.3.29 The assessment undertaken for the DCO for Hinkley Point C has been used to inform this assessment of the potential impacts of the Wylfa Newydd Project.

Anglesey Enterprise Zone

5.3.30 In 2011, the Welsh Government announced the creation of five Enterprise Zones across Wales, including one on Anglesey. The purpose of the Enterprise Zone status on Anglesey is to stimulate investment, attract new businesses and increase employment within the low-carbon energy sector and its supply chain. The IACC's Energy Island Programme is part of the Enterprise Zone framework.

5.3.31 URS and ESYS Consulting produced a report for the IACC which considered the outcomes, impacts and targets associated with the Energy Island Programme and Enterprise Zone status. This report was published in 2012 [RD55]. At the time of the report, the following potential investments were included as part of the Energy Island Programme:

- the Wylfa Newydd Project;
- Round 3 offshore wind zone;

- marine current technology; and
- large-scale biomass at the Anglesey Aluminium site.

5.3.32 These are included within the modelling undertaken as part of the report, although some of the proposed investments, including the Celtic Array Wind farm (Round 3 offshore wind) have been cancelled.

5.3.33 The report included a list of potential outcomes and performance measures, which would allow the progress of the programme to be assessed. These are shown in Table 5-14 and relate to changes over the period to 2025.

Table 5-14 Energy Island Programme – Potential outcomes and performance measures (2011)[57]

Indicator	Outcome/target
1.0 Vibrant Anglesey and north-west Wales economy	
1.1 GVA	Increase of 10% to 13% over and above the base case to 2025
1.2 GVA per head	Gap in GVA per head relative to the UK measure is closed from the current position (in 2010)
1.3 Employment per head of population	Increase the number of jobs per head of population over the period to 2025
1.4 Retention of younger people	16–24 year olds as a percentage of overall population to stabilise at 10%
1.5 Working age population	Proportion of 16–64 year olds increases to 61% to 62% of the population by 2025
2.0 Increased prosperity	
2.1 Earnings	Gap between Anglesey and Wales as a whole narrows over the period to 2025
2.2 Skills	At minimum, a 3% increase in the proportion of the workforce (over 2008 levels) for the Standard Occupational Classifications 1-3[58]
2.3 Unemployment	The proportion of Job Seeker's Allowance claimants reduces to that of Wales
2.4 Activity rates	Rise to at least 1% above that for Wales
2.5 Long-term unemployment	Reduce to the average for Wales overall
3.0 Flourishing local culture	
3.1 Welsh language speakers	The proportion of Welsh language speakers is maintained at the current level, with

[57] [RD55]

[58] Standard Occupational Classification (SOC), 1: Managers, Directors and Senior Officials, 2: Professional Occupations, 3: Associate

Indicator	Outcome/target
	between 60% and 65% of the population (aged 3+) able to speak Welsh
3.2 Housing need	Level of housing need, as evidenced by the Index of Multiple Deprivation housing domain shows marked improvement relative to Wales
3.3 Vibrant housing market	Land Registry house price data show sustained improvement relative to Wales

5.3.34 These potential outcomes and performance measures are for the Energy Island Programme, of which the Wylfa Newydd Project is a key part. Engagement of local businesses and the supply chain as part of the Wylfa Newydd Project could contribute to achieving a number of these potential outcomes, such as increasing activity rates, reducing unemployment and the retention of younger people.

6 Bibliography

Table 6-1 Bibliography

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7 Appendices

7-1.1 EDF occupation mapping

Trade	Group	CSN Occupational Aggregate[59]
Lifts	Building Services/ Mechanical	Other construction professionals and technical staff
Mechanical	Building Services/ Mechanical	Other construction professionals and technical staff
Plumbing inc. Sanitary Ware	Building Services/ Mechanical	Plumbing and HVAC trades
Rail Workers	Civil Engineering Operatives	Civil engineering operatives (nec)
Utilities – Comms	Civil Engineering Operatives	Electrical trades and installation
Utilities – Electrics	Civil Engineering Operatives	Electrical trades and installation
Utilities – Gas	Civil Engineering Operatives	Plumbing and HVAC trades
Utilities – Water & Drainage	Civil Engineering Operatives	Plumbing and HVAC trades
Groundworkers (Civils) inc. Piling	Civil Engineering Operatives	Civil engineering operatives (nec)
Tunnellers	Civil Engineering Operatives	Civil engineering operatives (nec)
Asphalters/Road Layers	Civil Engineering Operatives	Civil engineering operatives (nec)
Landscapers/Pitch/Track Contractors	Civil Engineering Operatives	Civil engineering operatives (nec)
Electricians (including FAs & Comms)	Electrical Trades	Electrical trades and installation
Brick/Block Layers	External Envelope	Bricklayers
External walls	External Envelope	Building envelope specialists
Scaffolders	External Envelope	Scaffolders
Glaziers	External Envelope	Glaziers
Roofers	External Envelope	Roofers
Screeders	Finishing Trades	Floorers

[59] Table 1 [RD18]

Trade	Group	CSN Occupational Aggregate[59]
Carpet Layers	Finishing Trades	Non-construction operatives
Decorators	Finishing Trades	Painters and decorators
Fittings, Seats Signage	Finishing Trades	Wood trades and interior Fit-outs
Tilers (Floor and Wall)	Finishing Trades	Floorers
General Operatives	Labourers	Labourers (nec)
Prelims – Site Admin	Non-construction Operatives	Non-construction professional, technical, IT and other office-based staff (excl. managers)
Prelims – Caterers	Non-construction Operatives	Non-construction operatives
Prelims – Cleaners	Non-construction Operatives	Non-construction operatives
Prelims – Security	Non-construction Operatives	Non-construction operatives
Prelims – Transport	Non-construction Operatives	Logistics
Logistics – Waste Operatives	Non-construction Operatives	Non-construction operatives
Logistics – Technicians	Non-construction Operatives	Non-construction operatives
Logistics – Facilities Management	Non-construction Operatives	Non-construction operatives
Security Specialist	Non-construction Operatives	Non-construction operatives
Plant Operatives	Plant Operatives	Plant operatives
Demolition	Specialist Building Operatives	Specialist building operatives
Metal Workers (Arch & General)	Specialist Building Operatives	Specialist building operatives
Ceiling Fixers	Specialist Building Operatives	Specialist building operatives
Maintenance Operatives	Specialist Building Operatives	Specialist building operatives
Concreters (Frame)	Structural Trades	Building envelope specialists – classed

Trade	Group	CSN Occupational Aggregate[59]
		against SOC 5319 (part)
Rebar Fixers (Frame)	Structural Trades	Building envelope specialists – classed against SOC 5319 (part)
Precast Erectors	Structural Trades	Building envelope specialists – classed against SOC 5319 (part)
Steel Erectors (inc. Decking)	Structural Trades	Steel erectors/structural
Carpenters (Frame)	Wood Trades & Interior Fit-out	Wood trades and interior fit-out
Joiners	Wood Trades & Interior Fit-out	Wood trades and interior fit-out
Dry Liners	Wood Trades & Interior Fit-out	Plasterers and dry liners
Plasterers	Wood Trades & Interior Fit-out	Plasterers and dry liners
Raised Floor Fixers	Wood Trades & Interior Fit-out	Floorers

7-1.2 Geographic definitions of Hinkley Point C and Sizewell B Daily Construction Commuting Zone

Hinkley Point C Daily Construction Commuting Zone

- Bath and north-east Somerset
- Bristol, City of
- East Devon
- Exeter
- Mendip
- Mid Devon
- North Devon
- North Somerset
- Sedgemoor
- South Gloucestershire
- South Somerset
- Taunton Deane
- Teignbridge

- West Dorset
- West Somerset
- Newport

Sizewell B Daily Construction Commuting Zone

- Babergh
- Breckland
- Broadland
- Colchester
- Forest Heath
- Great Yarmouth
- Ipswich
- Mid Suffolk
- Norwich
- South Norfolk
- St Edmundsbury
- Suffolk Coastal
- Tendring
- Waveney

7-1.3 Assumptions for non-contractor controlled supply

Hinkley Point C gravity model assumptions[60]

7-1.3.1 The table below shows the assumptions used in the Development Consent Order for Hinkley Point C.

Table 7-2 Hinkley Point C assumptions

Type of accommodation	Number of workers	% share
Tourist accommodation	600	27%
PRS	750	33%
Owner-occupied	500	22%
Latent	400	18%
Total	**2,250**	**100%**

[60] [RD54] Table 9.11

Tourism accommodation (Sizewell B)

7-2.3.2 Given the diversity of the tourist accommodation sector and the environmental consequences of worker take-up, evidence from the Sizewell impact study has also been used to account for where workers might actually live across two distinct components of the stock – permanent bed space stock and temporary bed space in caravans/camping. The Sizewell B monitoring report (1993) found that 11.5% of all non-home-based workers (including those taking accommodation in a site hostel) took accommodation in caravans. When the overall pattern of usage is examined, the split used is as follows:

Type of tourism accommodation	% share
Hotels, B&B, guest houses, Self-catering	20%
Caravans and camping	7%