

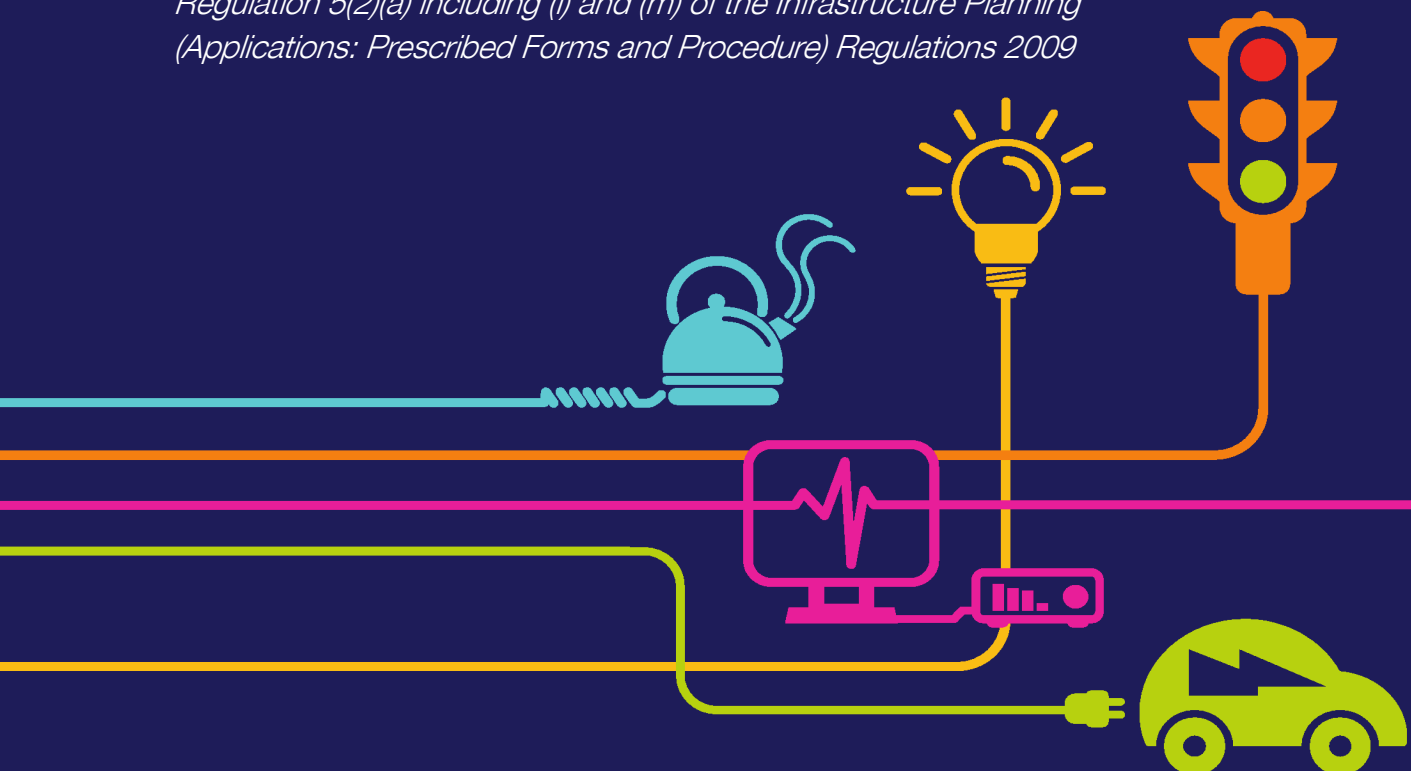
DOCUMENT 5.17.2.2

Workforce Analysis Assumptions Log

Chapter 17 – Appendix 2

National Grid (North Wales Connection Project)

*Regulation 5(2)(a) including (l) and (m) of the Infrastructure Planning
(Applications: Prescribed Forms and Procedure) Regulations 2009*



nationalgrid

North Wales Connection Project

Volume 5

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1 Introduction

1.1 INTRODUCTION

- 1.1.1 This document summarises the key assumptions relating to the construction workforce required for the Proposed Development. These assumptions are used to inform the assessment of Wider Effects in Chapter 17, Socio Economics (**Document 5.17**).
- 1.1.2 The information presented in this document is derived from the knowledge and experience of National Grid and is intended to represent the most likely outcome during construction.
- 1.1.3 It is envisaged that National Grid would appoint three 'Principal Contractors' to construct the Proposed Development; one for the overhead line (OHL), one for the tunnel, and one for the substations. Once appointed, the Principal Contractors would choose exactly how the project would be staffed, and would sub-contract work out to other construction companies. The information presented here is not intended as a mandate for the Principal Contractors or sub-contractors, but is compiled as a series of reasonable assumptions to inform the analysis.
- 1.1.4 Information is presented for two main areas of assessment:
- Worker accommodation profile, including likely uptake of tourist accommodation as well as likely uptake of accommodation in the Private Rented Sector (PRS); and
 - Worker skills profile, including the nature and duration of specialist work activities and the number, nature and duration of non-specialist roles.
- 1.1.5 In addition to these two areas of assessment, a sensitivity test is applied to the key worker assumption regarding the percentage uptake of local workers (both a higher and lower percentage).
- 1.1.6 As presented in Chapter 17, three possible scenarios remain for tunnelling between Anglesey and Gwynedd. There are two tunnel boring machine (TBM) scenarios for tunnel construction, Scenario 1, tunnelling from Braint (drive shaft) to Tŷ Fodol (reception shaft) and Scenario 2, tunnelling from

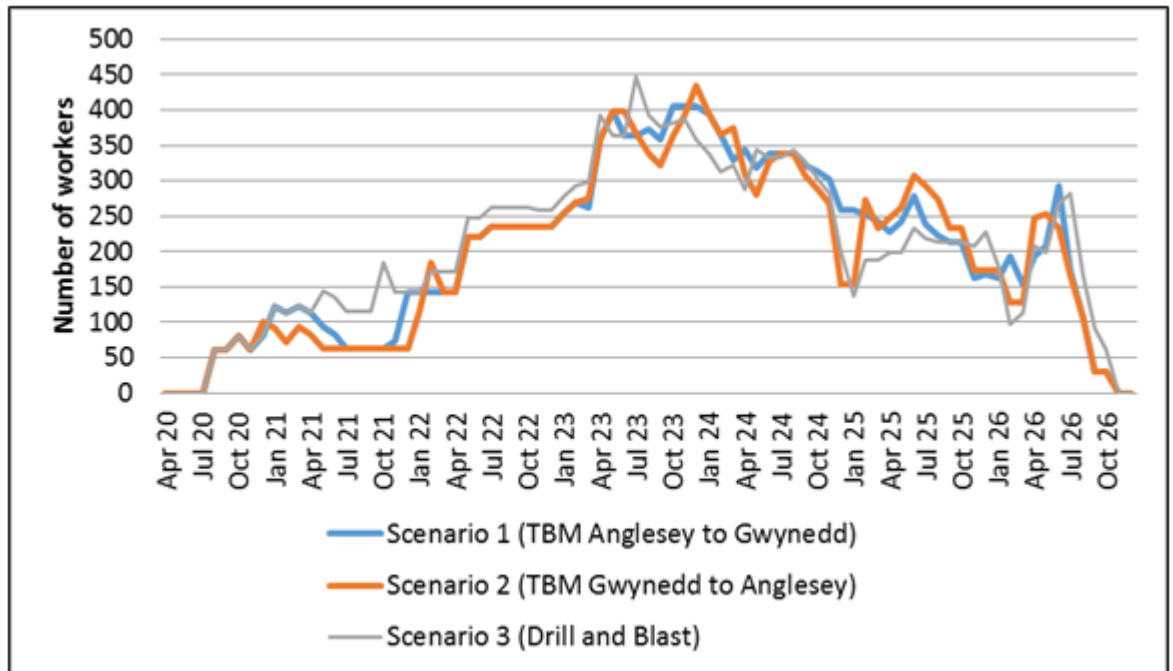
Tŷ Fodol (drive shaft) to Braint (reception shaft). A third 'drill and blast' scenario is also assessed (tunnelling from both Braint and Tŷ Fodol).

- 1.1.7 The assumptions presented here relate only to the construction phase of the Proposed Development. As stated in Chapter 17, employment effects during the operational phase have not been considered. General operation activities are expected to be undertaken by existing National Grid employees and the numbers would be expected to be low. Any employment generation that could be directly attributed to the operation of the Proposed Development would be minimal and represent a 'no change' or 'no impact' scenario. Effects during maintenance and decommissioning would be expected to be similar to those for construction.
- 1.1.8 No extension is proposed to the Wylfa Substation and the number of workers required there is expected to be low. Works would be limited to upgrades of the existing substation, requiring specialist workers only; therefore, no detailed descriptions of roles and skills is provided for Wylfa Substation.

1.2 PROGRAMME OVERVIEW

- 1.2.1 As illustrated in Image 17.2.2.1, the estimated peak workforce for the Proposed Development is in the region of 450 workers, based on a peak workforce of 447 for Scenario 3. For TBM, due to the way in which different construction activities are envisaged to overlap, a TBM drive from Anglesey to Gwynedd generates a peak workforce of 405 compared to a Gwynedd to Anglesey TBM drive which generates a peak of 435.
- 1.2.2 The following assumptions are made:
- The construction programmes for each tunnelling scenario are indicative only. For all three programmes the duration is expected to be 75 months. On this basis, the average number of construction workers per month is calculated as follow for the three scenarios:
 - For Scenario 1, 218 workers per month.
 - For Scenario 2, 212 workers per month.
 - For Scenario 3, 224 workers per month.
 - The overall average number of construction workers per month is 218 over the 75-month programme.
 - The programme for the substation construction and commissioning is the same for all three options.

Image 17.2.2.1 Workforce profile for Scenario 1, Scenario 2 & Scenario 3



1.2.3 A key feature of the construction programme for the Proposed Development is that different construction activities require different types of specialist teams at different points in the programme. As such, not all workers would be required at all times. The linesmen and crane operatives constructing the OHL would be on-site for the longest duration, a total two and a half years, and would be mobile as they move along the route. The more static components of the Proposed Development, the Tunnel Head Houses (THH), Cable Sealing End Compounds (CSECs), and the extension to Pentir Substation, would be constructed on a rolling programme of different specialist activities, such as civil, mechanical and electrical engineering, with each separate task typically lasting less than a year. Further information on the nature and duration of construction roles is provided in section 3.

2 Worker accommodation profile

2.1 WORKER ACCOMMODATION PROFILE ASSUMPTIONS

2.1.1 The accommodation profile presented in this section is based on a series of assumptions that have been made in relation to the expected behaviour of workers.

Likely behaviours in terms of cost of accommodation

2.1.2 Nightly subsistence rates for workers on the Proposed Development are likely to be broadly in line with the National Agreement for the Engineering Construction Industry (NAECI) (Ref 17.2.1) and the Construction Industry Joint Council (CIJC) Working Rule Agreement (Ref 17.2.2). According to the NAECI, in 2017, the daily allowance was £38 per night. Under the CIJC agreement, the subsistence (lodging) allowance for construction workers was set at £36 per night as of 25 July 2016.

2.1.3 It is assumed that Project Managers on site intermittently are likely to have hotel expense paid by the Principal Contractor or National Grid, rather than receiving the standard subsistence allowance. Nightly subsistence would vary depending on level of seniority but the basic standard rate would apply to the majority of construction workers.

2.1.4 Serviced accommodation such as Bed and Breakfasts would be less affordable than self-catering and latent accommodation¹. As reported in section 7.4 of Chapter 17, recent occupancy survey data for the UK (Ref 17.2.6) include occupancy rates and tariffs for Bed and Breakfasts. The data suggest that accommodation in the £20.00 - £29.99 bracket is much less popular in Wales than across the UK in general, with a low occupancy rate of 26%. Occupancy rates are comparable for the UK and Wales in the

¹ For the purposes of the assessment, the term 'latent accommodation' relates to new capacity coming to the market, for example through the letting of spare bedrooms or the renting of second homes which would otherwise not be occupied.

£30.00-£39.99 and £40.00-£49.99 brackets and then higher again across the UK than in Wales for the £50.00-£59.99 and >£60.00 brackets.

- 2.1.5 The relatively low occupancy rates for Bed and Breakfast accommodation in the £20.00 - £29.99 bracket implies that this accommodation is relatively unpopular compared to other more expensive accommodation. The occupancy survey data also indicate that there is a good level of spare occupancy in the £30.00-£39.99 bracket, which would potentially be affordable for construction workers receiving a subsistence allowance. The data indicate, however, that the majority of Bed and Breakfast tariffs are in excess of £40, which is unlikely to be economically viable for construction workers, particularly for those working for extended periods of time.
- 2.1.6 In 2016, the median rent for private sector accommodation was £536 per property per month in Anglesey and £524 per property per month in Gwynedd (Ref 17.2.3). Based on the subsistence allowance of £36 per night, it is likely that workers would be able to afford properties in the mid-range of the market. It is expected that workers would typically share accommodation rather than taking up single occupancy, as this allows for the maximisation of earnings.
- 2.1.7 It is assumed that hotel accommodation would only be economically viable in the short term. It is assumed that those requiring accommodation for three months or less would not go into the PRS due to high set-up costs (i.e. deposits).

Likely behaviour in terms of location

- 2.1.8 The boundary for assuming reasonable daily commuting behaviour of construction workers is described in the assessment as the 'travel to work area' (TTWA), as presented in Figure 17.3 (**Document 5.17.1.3**). For the Proposed Development, the TTWA includes 'Bangor, Caernarfon & Llangefni' and 'Holyhead' (Ref 17.2.7).
- 2.1.9 For OHL construction, there would be two main construction compounds; one at Penmynydd Road on Anglesey and the other at Pentir in Gwynedd. There would also be working areas at each pylon site. It is assumed that workers would typically travel to Penmynydd Road or Pentir before moving to the area that they are working on that day. The components of the Proposed Development where work is more static i.e. the THHs, CSECs, and the extension to Pentir Substation, are located in the south of Anglesey and in Gwynedd.
- 2.1.10 It is recognised that for the construction activities taking place on the mainland (i.e. tunnel construction at Gwynedd, and the extension to Pentir

Substation), workers are likely to be willing to travel from destinations outside of the TTWA. Communities within a sixty-minute commute of the mainland construction compounds include Abersoch to the south-west, Porthmadog to the south, Betws-y-Coed to the south-east, and Rhyl to the north-east. It is likely that workers would be more widely dispersed than the TTWA, and therefore any potential effects on tourism accommodation are likely to be diluted across a wider area. For the purpose of the assessment, as a reasonable worst case, it is assumed that all construction workers would reside within the TTWA.

- 2.1.11 The main construction activities are presented in Table 17.2.1, along with an indication of where non-home-based workers are likely to take up residence during construction.
- 2.1.12 Only those community areas located within the TTWA are included in Table 17.2.1. Towns in Anglesey close to the proposed infrastructure and predicted to attract workers for construction of the Proposed Development include Llangefni and Menai Bridge. In Gwynedd, workers are likely to locate themselves in the towns of Y Felinheli, Bangor and Caernarfon.

Table 17.2.1: Communities within the TTWA in which workers are likely to reside during construction

	OHL construction	Tunnel construction (Anglesey)	Tunnel construction (Gwynedd)	Wylfa substation	Pentir substation	Commissioning (at substations and THHs)
Llangefni	✓					
Menai Bridge	✓	✓				✓
Benllech	✓					
Llanfairpwll	✓	✓				✓
Bangor	✓	✓	✓	✓	✓	✓
Y Felinheli			✓		✓	✓
Llandygai			✓		✓	✓
Caernarfon	✓	✓	✓		✓	✓
Amlwch				✓		✓
Cemaes				✓		✓
Tregele				✓		✓
Holyhead	✓	✓		✓		✓

Likely behaviour of workers in terms of preferred accommodation

- 2.1.13 It is assumed that ten percent of workers would be local, and therefore home-based, as defined in section 3 of this document.
- 2.1.14 Due to the linear nature of OHL work, workers would need to move around, as and when particular work activities are finished at a particular pylon/stringing location. As such, many OHL workers (linesmen) are likely to own their own touring caravans, and are anticipated to stay in their own vans. In the winter months, when fewer caravan sites remain open, it is assumed that OHL workers would take up Bed and Breakfast accommodation.
- 2.1.15 It is assumed that a small proportion of OHL workers (those who do not own their own touring caravan) would rent property in the PRS.
- 2.1.16 It is assumed that Bed and Breakfast accommodation would not be sufficiently flexible for those working shifts. Accommodation in the PRS is likely to be the preferred choice for shift workers, particularly if they are due to be in the area six months or more.
- 2.1.17 It is assumed that workers taking up Bed and Breakfast accommodation in the short term would move to PRS and latent accommodation once they become familiar with the area.
- 2.1.18 It is assumed that some senior management staff would be paid a higher subsistence rate than the typical construction worker's subsistence allowance. It is assumed that management staff may rent a property in the PRS if they are likely to be on site for longer periods but, in the short term, would be more likely to stay in a hotel.

Likely behaviours of workers with families/dependants

- 2.1.19 It is considered very unlikely that workers would relocate their families to be close to the Proposed Development. The specialist construction workers required for OHL and tunnel construction are accustomed to working away from home, rather than moving to the location of each project. The nature of the work is such that projects are located all over the UK and also overseas. Workers do not typically move with each project, as this would be very disruptive to family life, particularly if they have children in school or a spouse/partner in work.
- 2.1.20 It is also assumed that non-Welsh-speaking workers would be unlikely to relocate their families to be close to the Proposed Development because the first language of many schools in the area is Welsh.

2.1.21 There may be rare occurrences where workers may choose to take up temporary accommodation in the PRS for example if there is a spouse or partner who is retired or not working. In this event, the numbers would be expected to be very low and have not therefore been considered in the analysis.

2.2 ACCOMMODATION PROFILES

2.2.1 Based on the assumptions above, further analysis was completed to estimate the distribution of workers across the different types of accommodation, as set out in Table 17.2.2. Two different profiles were derived, one for OHL workers and one for all 'other' types of workers (i.e. tunnel and substation construction workers and commissioning workers).

Table 17.2.2: Accommodation profile for OHL and 'other' workers						
	Home-based	Self-catering	Hotels, guest houses, B&Bs	Caravan and camping	Private	Latent
OHL	10%	1%	6%	71%	8%	4%
Other	10%	9%	15%	5%	35%	26%
Overall	10%	5%	11%	36%	22%	16%

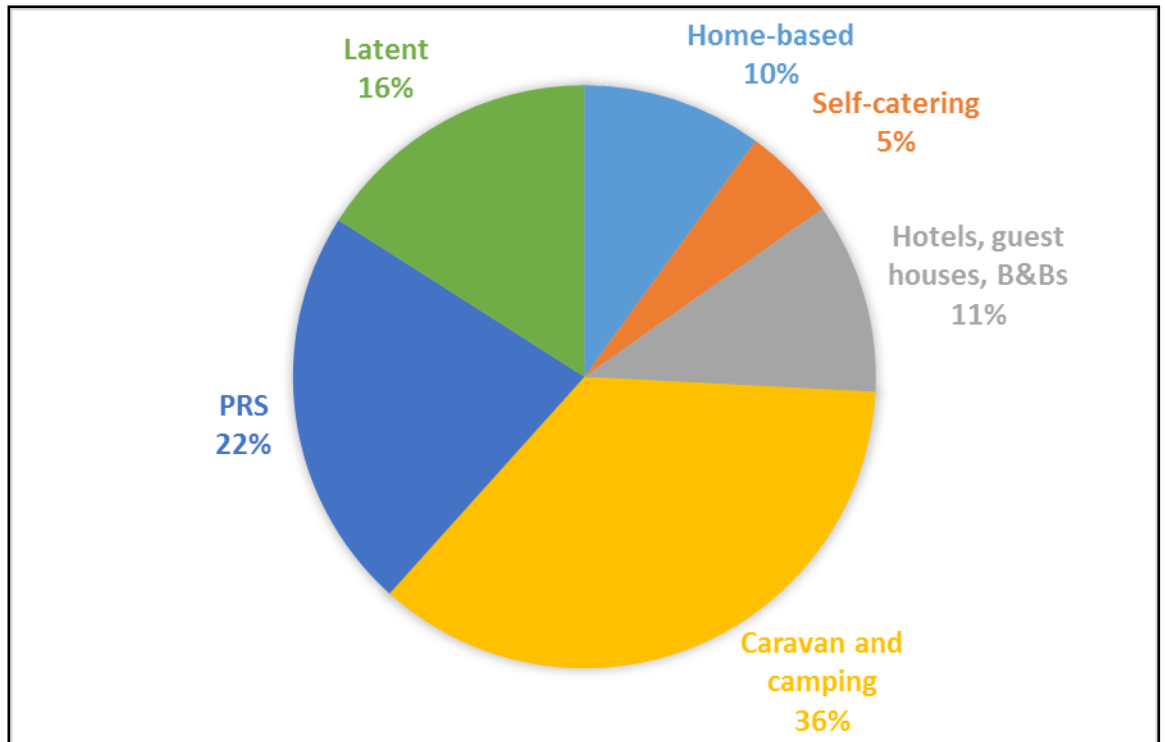
2.2.2 These profiles were then applied to the peak workforce for each of the three scenarios, as illustrated in **Error! Reference source not found.**

2.2.3 Uptake of accommodation is highest for all categories under Scenario 3. The overall peak figures, shown here in bold, were taken forward to analysis of the available capacity or headroom (as presented in Section 9 of Chapter 17).

Table 17.2.3: Peak uptake of accommodation (number of workers) for Scenario 1, Scenario 2 and Scenario 3							
	Home-based	Self-catering,	Hotels, guest houses, B&Bs	Caravan	Private	Latent	Total
Scenario 1 (TBM Anglesey to Gwynedd)	41	20	41	158	85	60	405
Scenario 2 (TBM Gwynedd to Anglesey)	44	22	46	160	96	68	435
Scenario 3 (drill and blast)	45	23	47	160	100	71	447
Overall peak (Scenario 3)	45	23	47	160	100	71	447

2.2.4 Image 17.2.2.2 illustrates the breakdown of accommodation type expected to be taken up by construction workers on the Proposed Development (Scenario 3, overall peak demand).

Image 17.2.2.2 Accommodation breakdown



3 Worker skills profile

3.1 SKILLS PROFILE FOR SPECIALIST ROLES

3.1.1 The following tables detail the specialist skills that are likely to be required to construct and commission the Proposed Development, and the likely duration of each role.

3.1.2 For each of the three scenarios, the construction workforce programmes for OHL construction, substation construction and commissioning are almost identical. However, the workforce required for each of the three tunnelling scenarios is variable, as presented in Table 17.2.4 below.

3.1.3 Job descriptions and durations for specialist roles are provided for the following construction activities:

- OHL construction;
- Substation construction;
- Tunnel shaft construction;
- Main tunnel construction;
- Tunnel head house construction;
- Cable sealing end compound (CSEC) construction; and
- Project management and site administration.

3.1.4 Certain activities are carried out continuously from start to finish, such as erecting pylons and stringing conductors. Other activities are carried out in phases as dictated by the construction programme. For example, crane operatives working on Pentir substation steelwork would be required in two phases, with each phase lasting two weeks. This phasing would be denoted in the table as “2 weeks + 2 weeks”.

3.1.5 Table 17.2.4 shows the likely job description and duration of the specialist skills required for OHL construction.

Table 17.2.4: Specialist: Construction job descriptions and duration – OHL		
Job	Job description	Duration
Linesmen	Erecting pylons and assembly	Two-and-a-half-year period – one week per pylon
	Conductor stringing	13 months + 11 months + 1 month + 1 month
Civils	Foundations, construction working area set-up and removal	One year
Machine Operatives	Excavations, loading and unloading	One year
Crane Operatives	Erecting pylons	Two-and-a-half-year period – one week per pylon
Scaffolders	Erecting scaffolding	Up to two weeks at a time to install at each scaffold location and same to dismantle

3.1.6 Table 17.2.5 shows the likely job description and duration of the specialist skills required for the extension to Pentir substation.

Table 17.2.5: Specialist: Construction job descriptions and duration – Pentir substation and Wylfa substation		
Job	Job description	Duration
Linesmen	Erecting pylons and terminating conductors	<u>Pentir</u> 2 weeks + 3 months + 2 months
Civils	Excavations, foundations, drainage, fencing	<u>Pentir</u> 7 months + 3 months + 4 months
		<u>Wylfa</u> 3 months + 1 month
Machine operatives	Excavations, loading and unloading	Duration of Civils and Mechanical and Electrical works
Crane operatives	Steelwork and equipment	<u>Pentir</u> 2 weeks + 2 weeks
		<u>Wylfa</u> 3 weeks + 3 weeks
Mechanical	Wiring, equipment	<u>Pentir</u> – 2 months + 7 months +

Table 17.2.5: Specialist: Construction job descriptions and duration – Pentir substation and Wylfa substation

Job	Job description	Duration
and Electrical (including steelworkers, fitters and electricians)	installation, testing	3 months + 4 months <u>Wylfa</u> 3 months + 3 months + 2 month
Cable layers and jointers	Cable laying, jointing and termination	<u>Pentir</u> 2 months
Commissioning engineers	Commissioning and testing	<u>Pentir</u> 1 month + 4 months + 1 week + 1 month <u>Wylfa</u> 2 months

3.1.7 The tables below summarise the likely job description and duration of the specialist skills required for the following tunnel-related activities:

- Tunnel shaft construction (Table 17.2.6);
- Main tunnel construction (Table 17.2.7);
- Tunnel head house construction (Table 17.2.8); and
- Construction of CSECs (Table 17.2.9).

3.1.8 In addition to the specialist roles identified in the tables below, specialist commissioning engineers would be required throughout commissioning and testing, in four phases (6 months + 10 months + 2 months + 8 months).

Table 17.2.6: Specialist: Construction job descriptions and duration – Tunnel shaft		
Job	Job description	Duration
Mining	Excavating shaft, lining of shaft	22 months
Civils	Temporary culverts and bridges, earthworks, site set-up including erection of crane gantry, removal and reinstatement. Excavations, ground control and dewatering, shaft lining and excavation, foundations, internal walls.	10 months + 5 months + 4 months + 6 months
Machine operatives	Excavations, loading and unloading	Duration of Civils and Mechanical and Electrical works
Scaffolders	To work in shaft prior to stair and lift availability	2 months' installation then removal
Mechanical and Electrical (including steelworkers, fitters and electricians)	Electrical wiring of specialist equipment, equipment installation and testing	3 months + 14 months + 5 months + 5 months

Table 17.2.7: Specialist: Construction job descriptions and duration – Main tunnel		
Job	Job description	Duration
Mining	Building up TBM and trailing system. Excavating tunnel, lining of tunnel.	22 months
Machine operatives	Excavations, loading and unloading	Duration of Civils and Mechanical and Electrical works
Mechanical and Electrical (including steelworkers, fitters and electricians)	Electrical wiring of specialist equipment, equipment installation and testing	4 months
Cable layers and jointers	Cable laying, jointing	15 months

Table 17.2.8: Specialist: Construction job descriptions and duration – Tunnel Head House		
Job	Job description	Duration
Civils	Excavations, foundations, drainage, fencing, building the head house structure, finishing off top slab and assisting cable installation requirements	14 months
Machine operatives	Excavations, loading and unloading	Duration of Civils and Mechanical and Electrical works
Crane operatives	Steelwork and equipment	14 months
Scaffolders	Erection of scaffolding to assist building of structure	2 weeks
Mechanical and Electrical (including steelworkers, fitters and electricians)	Wiring, equipment installation, testing	5 months + 5 months (in conjunction with shaft work)

Table 17.2.9: Specialist: Construction job descriptions and duration – Cable Sealing End Compound		
Job	Job description	Duration
Civils	Excavations, foundations, drainage, fencing	5 months + 4 months
Machine operatives	Excavations, loading and unloading	Duration of Civils and Mechanical and Electrical works
Crane operatives	Steelwork and equipment	Use same operative as for tunnel head house construction
Scaffolders	Erection of scaffolding for the cable sealing ends	4 weeks
Mechanical and Electrical (including steelworkers, fitters and electricians)	Wiring, equipment installation, testing	2 months + 2 months
Cable layers and jointers	Cable laying, jointing and termination	2 months

3.1.9 Table 17.2.10 shows the likely range of specialist skills relating to project management and administration (all scenarios).

Table 17.2.10: Specialist: Job descriptions and duration – Project Management and site administration		
Job	Job description	Duration
Senior Authorised Person	National Grid personnel to provide Safety from the electricity system	During outage period plus preparation of paperwork
Project Management	Manage the project works (National Grid and Primary Contractors)	Duration of project
Site Management	Ensure work is safely carried out on site (National Grid and Primary Contractors)	Duration of site works
Site administration	Quantity Surveyor, Temporary works, etc. (Primary Contractors only)	Duration of site establishment
Health Safety and Environment (HS&E) Advisor	Advise on safety issues (National Grid and Primary Contractors)	Duration of site works

3.2 SKILLS PROFILE FOR NON-SPECIALIST ROLES

3.2.1 The following tables detail the non-specialist roles that are likely to be required over the duration of the construction of the Proposed Development. Job roles are likely to include ground workers, drivers, electricians, fitters and plumbers. The number of non-specialist roles likely to be created by the Proposed Development is also presented.

3.2.2 The following key points are noted:

- Drivers would be likely to be required for the transportation of stone, ready-mixed concrete, waste and recycling materials.

- Electricians, fitters and plumbers would be likely to be required during compound set-up and removal, primarily in relation to the connecting and disconnecting of welfare cabins.
- Non-specialist roles in security and site administration are likely to be required at the Penmynydd Road compound and the Pentir substation compound, as well as at the two THHs/CSECs at Braint and Tŷ Fodol. Additional security will also be required at the pylon working areas.
- Groundworks for the Pentir substation compound would be delivered by a single contractor.
- It is assumed that sources within the region as set out in the Outline Materials Management Plan (Document 7.12) would provide stone for haul road installation, and that an engineering subcontractor, appointed by the Primary Contractor, would supervise the works.

3.2.3 Table 17.2.11 shows the likely number of non-specialist workers required for OHL construction, and the likely duration of the role.

3.2.4 Table 17.2.12 shows the likely number of non-specialist staff required for substation construction. This table relates to Pentir substation only. At Wylfa substation all workers would require specialist training to work within the substation enclosure, whereas at Pentir most construction works happen outside of the existing substation.

3.2.5 Table 17.2.13, Table 17.2.14, and Table 17.2.15 show the likely number of non-specialist staff required for tunnelling activities, for Scenario 1, Scenario 2 and Scenario 3 respectively. Note that the tunnel construction compounds include the THHs and CSECs.

Table 17.2.11: Non-specialist: Number of construction workers – OHL					
Activity	Ground workers	Drivers	Electricians	Fitters	Plumbers
Haul road	6 workers for 9 months; 12 workers for 3 months then 6 workers for 9 months (consecutively).	20 workers for 21 months	-	-	-
Mobilisation and main compound set-up (Penmynydd Road)	5 workers for 9 months	4 workers for 9 months	1 worker for 9 months	1 worker for 9 months	1 worker for 9 months
Main compound deliveries and waste removal (Penmynydd Road)	-	1 worker for 49 months	-	-	-
Pylon construction working area set-up and removal	2 workers for 12 months	4 workers for 12 months	-	-	-
Main compound removal (Penmynydd Road)	5 workers for 3 months	-	1 worker for 3 months	1 worker for 3 months	1 worker for 3 months

Table 17.2.12: Non-specialist: Number of construction workers – Pentir substation					
Activity	Ground workers	Drivers	Electricians	Fitters	Plumbers
Haul road installation: Mobilisation and main substation compound set-up plus set-up of additional smaller compounds for OHL and substation works	8 workers for 3 months	20 workers for 3 months	1 worker for 3 months	1 worker for 3 months	1 worker for 3 months
Haul road removal: Removal of main substation compound plus removal of additional smaller compounds for OHL and substation works	8 workers for 3 months	5 workers for 3 months	1 worker for 3 months	1 worker for 3 months	1 worker for 3 months

Table 17.2.13: Non-specialist: Number of construction workers – Tunnelling (Scenario 1)					
Activity	Ground workers	Drivers	Electricians	Fitters	Plumbers
Tunnel construction compound access road installation/removal (Braint)	10 workers for 3 months; then 10 workers for 4 months	15 workers for 3 months; then 15 workers for 4 months	-	-	-
Tunnel construction compound set-up and removal (Braint)	5 workers for 4 months; then 5 workers for 3 months	8 workers for 4 months; then 8 workers for 3 months	1 worker for 4 months; then 1 worker for 3 months	1 worker for 4 months; then 1 worker for 3 months	1 worker for 4 months; then 1 worker for 3 months
Tunnel construction compound admin (Braint)	-	1 worker for 65 months	-	-	-
Construction of shaft (Braint)	-	3 workers for 4 months; then 3 workers for 6 months	-	-	-

Table 17.2.13: Non-specialist: Number of construction workers – Tunnelling (Scenario 1)					
Activity	Ground workers	Drivers	Electricians	Fitters	Plumbers
Tunnel construction compound access road installation and removal (Tŷ Fodol)	10 workers for 8 months; then 10 workers for 5 months	15 workers for 8 months; then 15 workers for 5 months	-	-	-
Tunnel construction compound set-up and removal (Tŷ Fodol)	5 workers for 5 months; then 5 workers for 3 months	8 workers for 5 months; then 8 workers for 3 months	1 worker for 5 months; then 1 worker for 3 months	1 worker for 5 months; then 1 worker for 3 months	1 worker for 5 months; then 1 worker for 3 months
Tunnel construction compound admin (Tŷ Fodol)	-	1 worker for 54 months	-	-	-
Construction of shaft (Tŷ Fodol)	-	3 workers for 15 months	-	-	-
Tunnel boring (surface team)	-	12 workers for 23 months	-	-	-

Table 17.2.13: Non-specialist: Number of construction workers – Tunnelling (Scenario 1)					
Activity	Ground workers	Drivers	Electricians	Fitters	Plumbers
Tunnel construction compound completion (Braint)	-	2 workers for 6 months	-	-	-
Tunnel construction compound completion (Tŷ Fodol)	-	2 workers for 7 months	-	-	-

Table 17.2.14: Non-specialist: Number of construction workers – Tunnelling (Scenario 2)					
Activity	Ground workers	Drivers	Electricians	Fitters	Plumbers
Tunnel construction compound access roads installation/removal (Tŷ Fodol)	10 workers for 6 months; then 10 workers for 4 months	15 workers for 6 months; then 15 workers for 4 months	-	-	-
Tunnel construction compound set up and removal (Tŷ Fodol)	5 workers for 5 months; then 5 workers for 3 months	8 workers for 5 months; then 8 workers for 3 months	1 worker for 5 months; then 1 worker for 3 months	1 worker for 5 months; then 1 worker for 3 months	1 worker for 5 months; then 1 worker for 3 months
Tunnel construction compound admin (Tŷ Fodol)	-	1 worker for 62 months	-	-	-
Construction of shaft (Tŷ Fodol)	-	3 workers for 4 months; then 3 workers for 6 months	-	-	-

Table 17.2.14: Non-specialist: Number of construction workers – Tunnelling (Scenario 2)					
Activity	Ground workers	Drivers	Electricians	Fitters	Plumbers
Tunnel construction compound access road installation and removal (Braint)	10 workers for 3 months; then 10 workers for 3 months	15 workers for 3 months; then 15 workers for 3 months	-	-	-
Tunnel construction compound set-up and removal (Braint)	5 workers for 4 months; then 5 workers for 3 months	8 workers for 4 months; then 8 workers for 3 months	1 worker for 4 months; then 1 worker for 3 months	1 worker for 4 months; then 1 worker for 3 months	1 worker for 4 months; then 1 worker for 3 months
Tunnel construction compound admin (Braint)	-	1 worker for 52 months	-	-	-
Construction of shaft (Braint)	-	3 workers for 15 months	-	-	-
Tunnel boring (surface team)	-	12 workers for 23 months	-	-	-

Table 17.2.14: Non-specialist: Number of construction workers – Tunnelling (Scenario 2)					
Activity	Ground workers	Drivers	Electricians	Fitters	Plumbers
Tunnel construction compound completion (Tŷ Fodol)	-	2 workers for 6 months	-	-	-
Tunnel construction compound completion (Braint)	-	2 workers for 6 months	-	-	-

Table 17.2.15: Non-specialist: Number of construction workers – Tunnelling (Scenario 3)					
Activity	Ground workers	Drivers	Electricians	Fitters	Plumbers
Tunnel construction compound access road installation/removal (Braint)	10 workers for 3 months; then 10 workers for 4 months	15 workers for 3 months; then 15 workers for 4 months	-	-	-
Tunnel construction compound set up and removal (Braint)	5 workers for 4 months; then 5 workers for 3 months	8 workers for 4 months; then 8 workers for 3 months	1 worker for 4 months; then 1 worker for 3 months	1 worker for 4 months; then 1 worker for 3 months	1 worker for 4 months; then 1 worker for 3 months
Tunnel construction compound admin (Braint)	-	1 worker for 67 months	-	-	-
Construction of shaft (Braint)	-	3 workers for 4 months; then 3 workers for 6 months	-	-	-

Table 17.2.15: Non-specialist: Number of construction workers – Tunnelling (Scenario 3)					
Activity	Ground workers	Drivers	Electricians	Fitters	Plumbers
Tunnel construction compound access road installation and removal (Tŷ Fodol)	10 workers for 8 months; then 10 workers for 4 months	15 workers for 8 months; then 15 workers for 4 months	-	-	-
Tunnel construction compound set up and removal (Tŷ Fodol)	5 workers for 5 months; then 5 workers for 3 months	8 workers for 5 months; then 8 workers for 3 months	1 worker for 5 months; then 1 worker for 3 months	1 worker for 5 months; then 1 worker for 3 months	1 worker for 4 months; then 1 worker for 3 months
Tunnel construction compound admin (Tŷ Fodol)	-	1 worker for 60 months	-	-	-
Construction of shaft (Tŷ Fodol)	-	3 workers for 9 months; then 3 workers for 4 months	-	-	-

Table 17.2.15: Non-specialist: Number of construction workers – Tunnelling (Scenario 3)					
Activity	Ground workers	Drivers	Electricians	Fitters	Plumbers
Tunnel boring (surface team)	-	12 workers for 4 months; then 18 workers for 15 months; then 12 workers for 3 months; then 2 workers for 2 months (consecutively).	-	-	-
Tunnel construction compound completion (Braint)	-	2 workers for 7 months	-	-	-
Tunnel construction compound completion (Tŷ Fodol)	-	2 workers for 6 months	-	-	-

3.2.6 Table 17.2.16 shows the likely number of non-specialist security and site administrative staff required for each different activity (all scenarios).

Table 17.2.16: Non-specialist: number of security and administrative staff			
Activity	OHL	Substation	Tunnel
Mobilisation and construction compound set-up (Penmynydd Road)	2 workers for 9 months	-	-
Construction compound admin (Penmynydd Road)	4 workers for 49 months	-	-
Pylon working area set-up and removal	2 workers for 12 months	-	-
Tunnel construction compound (including THHs and CSECs) set-up and removal (drive shaft end)	-	-	2 workers for 4 months; then 2 workers for 3 months
Tunnel construction compound (including THHs and CSECs) admin (drive shaft end)	-	-	6 workers for 61 months
Tunnel construction compound (including THHs and CSECs) set up/removal (reception shaft end)	-	-	2 workers for 5 months; then 2 workers for 3 months
Tunnel construction compound (including THHs and CSECs) admin (reception shaft end)	-	-	4 workers for 54 months
Pentir substation main construction compound, plus	2 workers for 49 months	4 workers for 25 months; then 4 workers	-

Table 17.2.16: Non-specialist: number of security and administrative staff			
Activity	OHL	Substation	Tunnel
additional smaller compounds for OHL and substation works		for 6 months	

3.3 FURTHER ANALYSIS OF NON-SPECIALIST ROLES

3.3.1 The availability of non-specialist roles throughout the course of the construction programme is presented for each of the three scenarios in Image 17.2.2.3, Image 17.2.2.4 and Image 17.2.2.5. Drivers are likely to be in particularly high demand at certain points during construction. Relatively high numbers of ground workers are likely to be required, in four main phases. Security and administrative staff would also be likely to be required throughout most of the programme. Requirements for electricians, fitters and plumbers are likely to be relatively low-level in comparison to drivers and ground workers.

3.3.2 Taking the average values from the three scenarios, as presented in Table 17.2.17, the minimum monthly number of specialist workers is likely to be around 6%, and the maximum is likely to be around 84%.

Table 17.2.17: Non-specialist: average, minimum and maximum non-specialist workers, as a percentage of the total workforce

	Scenario 1	Scenario 2	Scenario 3	Average
Average monthly non-specialist workers	25.1%	24.8%	24.5%	24.8%
Minimum monthly non-specialist workers	6.8%	6.8%	7.3%	7.0%
Maximum monthly non-specialist workers	84.0%	84.0%	84.0%	84.0%

3.3.3 As illustrated in Image 17.2.2.6, the greatest percent of workers is required at the beginning and towards the end of the construction programme. This is due in the main to the need for ground workers and drivers during compound and access road set-up and removal.

Image 17.2.3 Non-specialist roles – Scenario 1

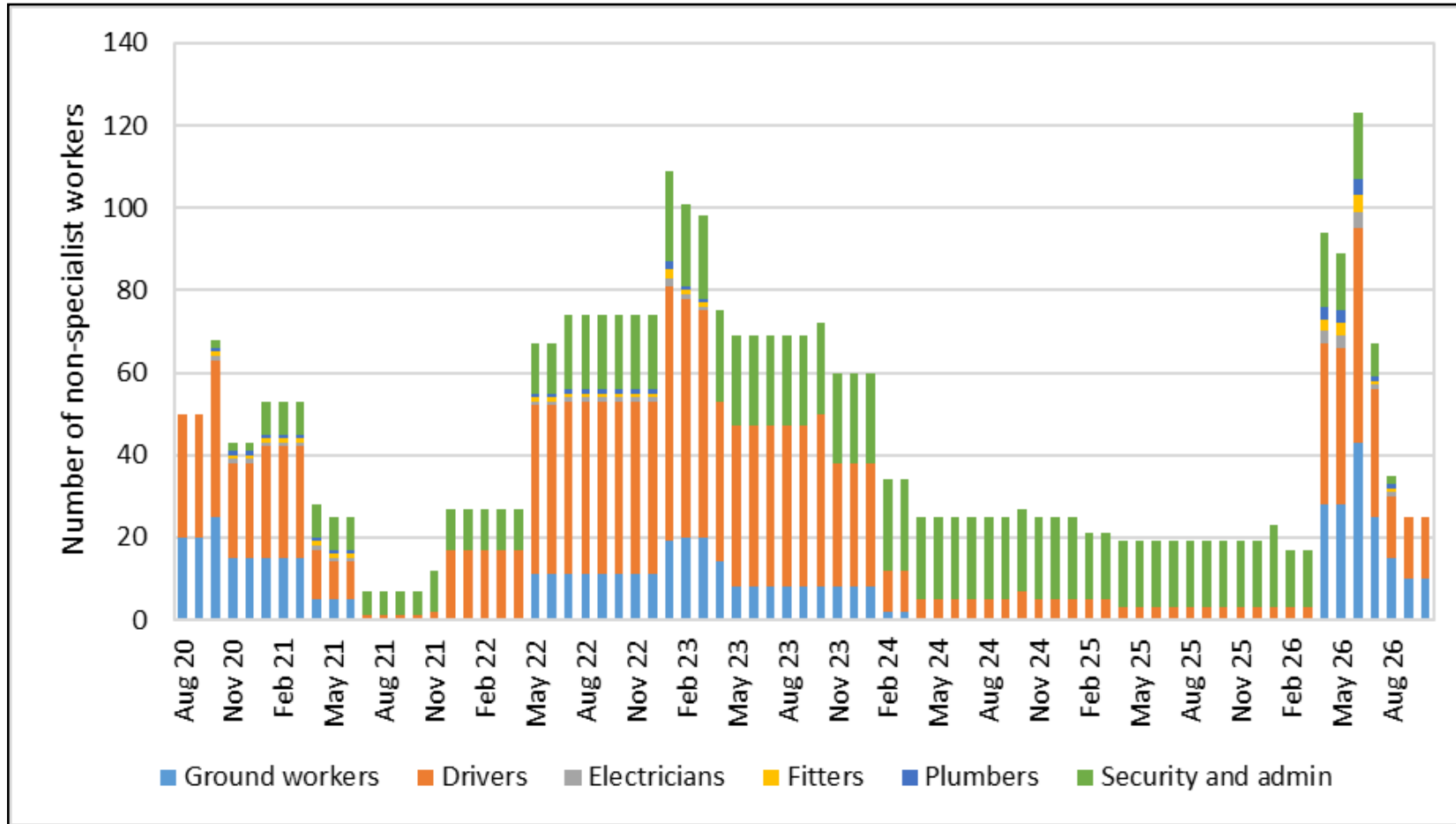


Image 17.2.4 Non-specialist roles – Scenario 2

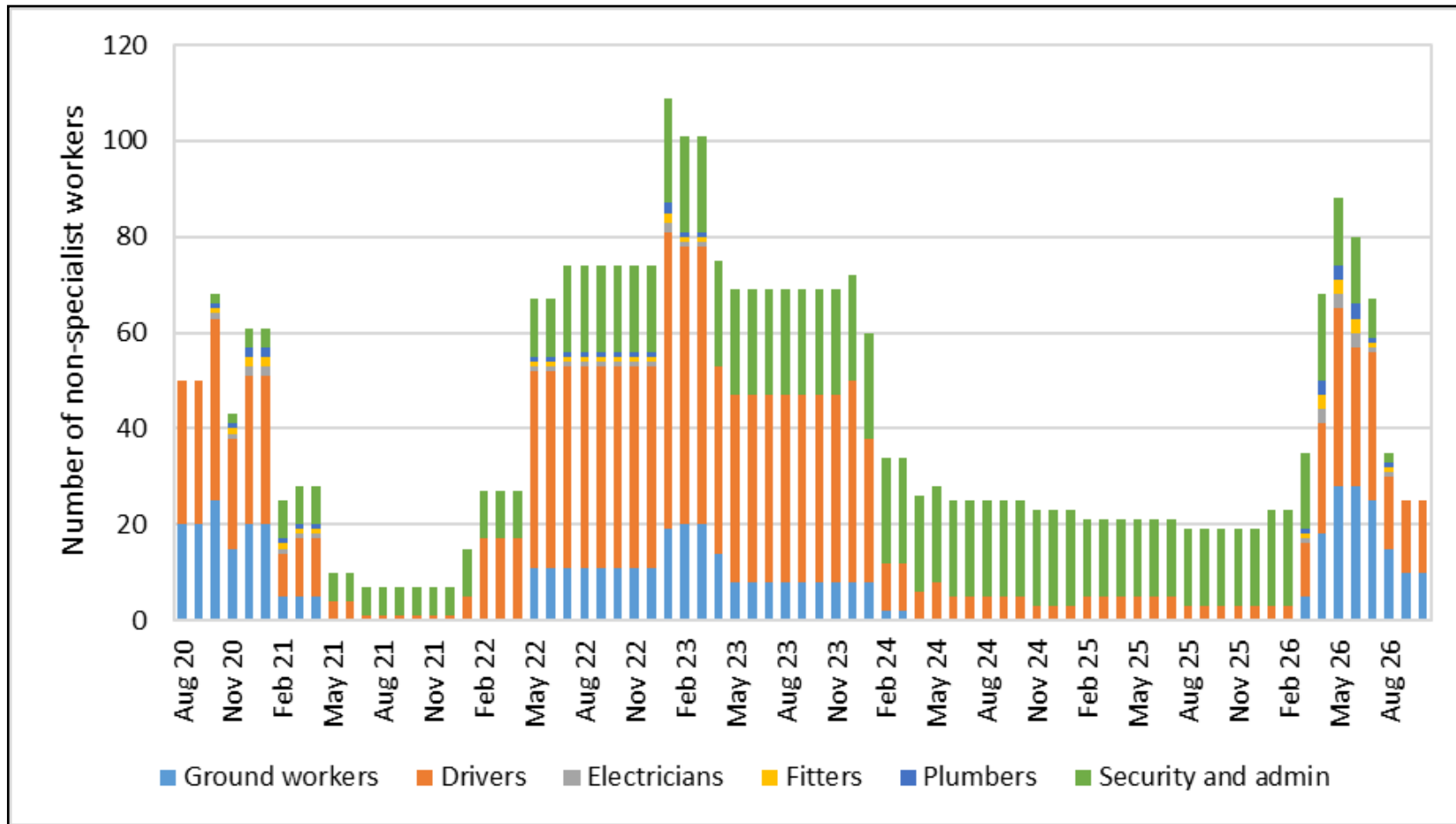


Image 17.2.5 Non-specialist roles – Scenario 3

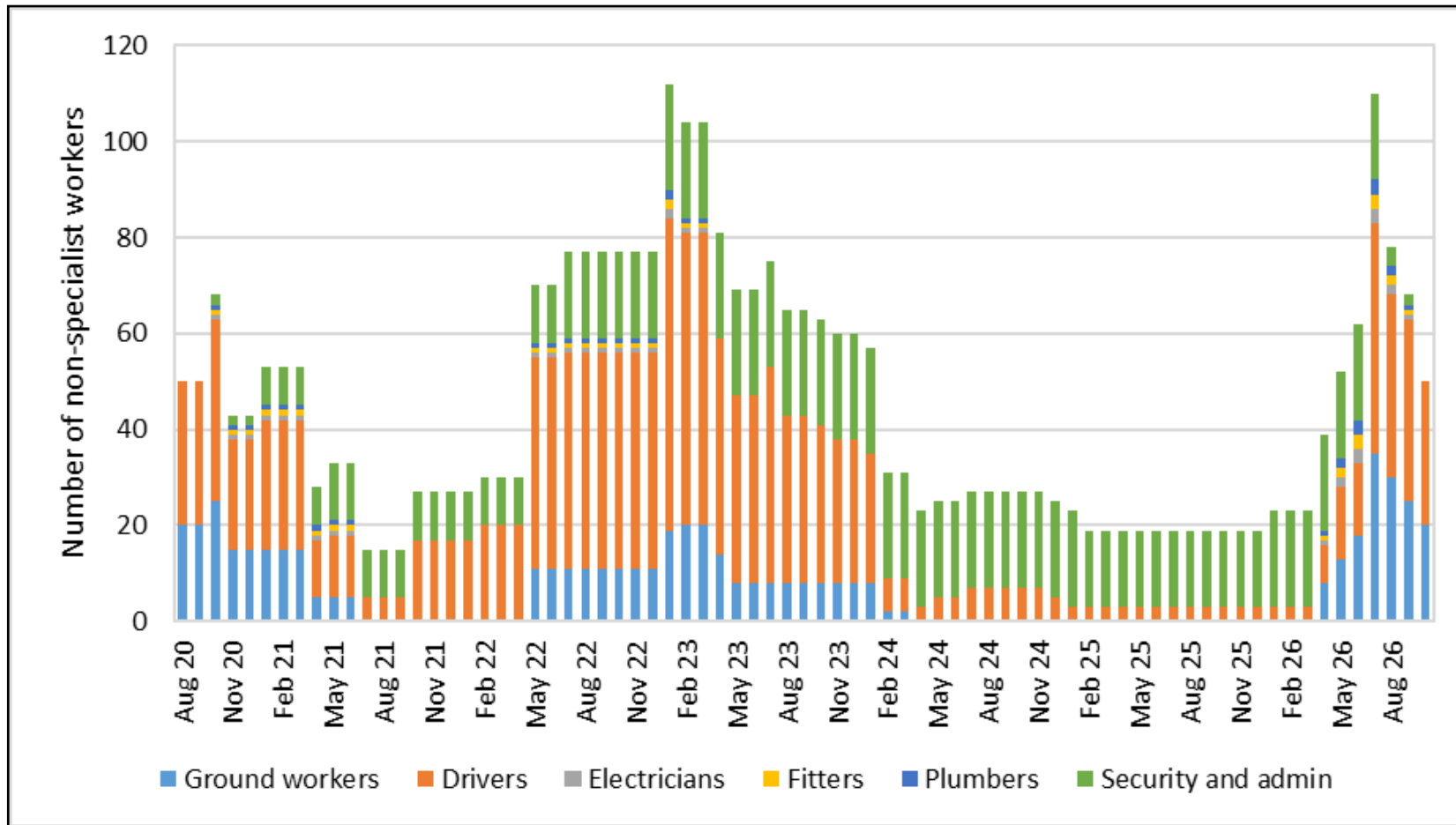
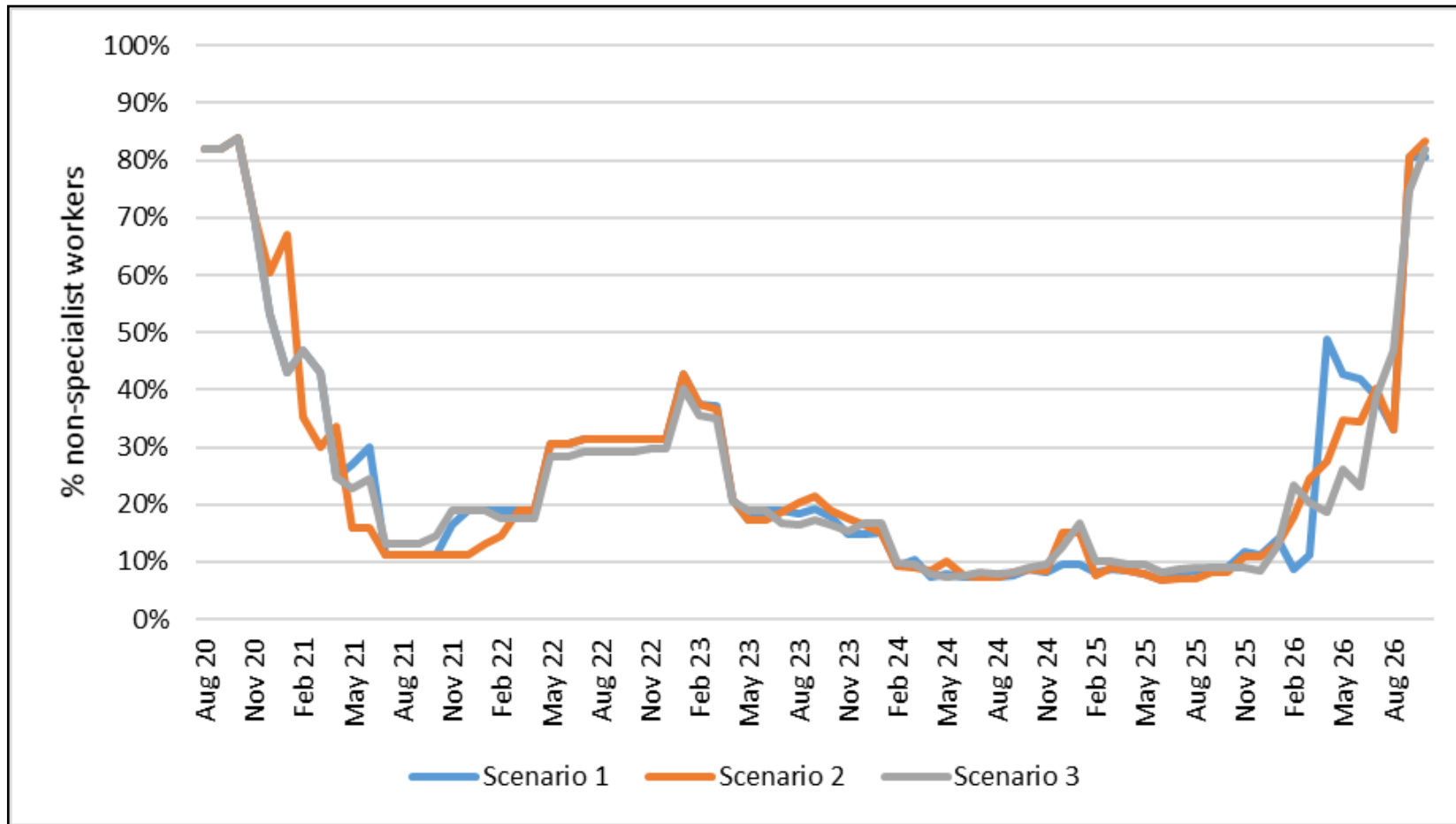


Image 17.2.2.6 Percent non-specialist workers during construction – Scenario 1, Scenario 2 and Scenario 3



3.4 CONSTRAINTS ON PROCUREMENT OF LOCAL CONSTRUCTION SERVICES

- 3.4.1 It is estimated that, on an average monthly basis, 24% of the total workforce would be non-specialist. It is assumed that the majority of specialist workers would come from outside of the local area. A proportion of non-specialist roles would also be filled by workers from outside the local area, but there would be potential for local construction companies to fulfil a high proportion of these roles.
- 3.4.2 Benchmarking of similar projects shows that the findings for the Proposed Development are broadly comparable. For both the Hinkley Point C Project (Ref 17.2.4) and Richborough Connection Project (Ref 17.2.5), an average of 17% of the workforce was estimated to be from the local labour force.
- 3.4.3 The following constraints have been identified, which would have a bearing on the procurement of local services during construction:
- In general, the Principal Contractor (or any other specialist subcontractor) must be on the National Grid framework agreement to be awarded a contract. Furthermore, the Principal Contractor would have a list of approved subcontractors. The local provider would need to be listed as approved by the subcontractor for a contract to be awarded.
 - Anyone working on the electricity network must have the appropriate authorisation from National Grid, and be registered on the Energy Utility Skills Register (EUSR). This may be a limiting factor for any non-specialist construction companies.
 - The likelihood of constraints relating to the availability of local construction workers is also recognised, given that workers would also be attracted to work on the Wylfa Nuclear Power Station project.

3.5 CONCLUSION

- 3.5.1 Taking into account the constraints highlighted in section 3.4, as a 'realistic worst case', an assumption of 10% uptake of local workers is applied in Chapter 17 of the ES.
- 3.5.2 Given the uncertainty in relation to the uptake of local workers, a sensitivity test of this assumption is provided in section 4 of this report.

4 Sensitivity test

4.1 SENSITIVITY TEST

Introduction

- 4.1.1 Although an assumption has been made that 10% of construction workers on the Proposed Development would be local, National Grid cannot commit to this figure. Given the constraints set out above, there is no certainty that this number of local workers would actually be available.
- 4.1.2 In addition, some aspects of the Proposed Development present potentially contradictory parameters in terms of defining a 'realistic worst case'. A high proportion of local workers taking up jobs on the Proposed Development is considered a 'best case' in terms of economic effects and effects on Welsh language and culture (**Document 5.26**), but potentially a worst case in terms of displacement of workers from tourism sector jobs, or displacement from other sectors such as social care. Further discussion on this point is presented in the assessment of employment effects in section 9.10 of Chapter 17.
- 4.1.3 Considering these contradictions, and to tackle the uncertainty of the assumptions, the sensitivity of the socio-economic assessment to the 10% local worker assumption has therefore been tested by applying plus or minus 10% (i.e. 0% and 20% uptake of local workers).
- 4.1.4 Applying this assumption, the distribution of workers across different types of accommodation has been recalculated, as shown in Table 17.2.18. The results of the sensitivity test are presented in Table 17.2.19 (Proposed Development only) and Table 17.2.20 (Cumulative assessment).
- 4.1.5 The cumulative assessment has been completed within the context of the Key Socio-economic Study Area (KSA), used as the study area for the assessment of socio-economic effects associated with the Wylfa Newydd Power Station project.
- 4.1.6 Note that the 'Tourism accommodation' category in Table 17.2.20 includes 'Hotels, guest houses and Bed and Breakfasts' and 'Self-catering'.

Zero uptake of local workers

- 4.1.7 **Tourism accommodation:** The change in demand as a percentage of headroom is less than 1% for all three groups of tourism accommodation ('Hotels, guest houses and B&Bs', 'Self-catering' and 'Caravans & camping'). It is therefore concluded that the assessment is not sensitive to this assumption.
- 4.1.8 **PRS accommodation:** Demand as a percentage of headroom increases from 29% to 34% (five-point increase). This is on the basis of Anglesey PRS supply only, and one worker per accommodation unit. Assuming workers are spread across Anglesey and Gwynedd, and assuming two workers sharing, demand as a percentage of headroom increases from 5% to 6% (one-point increase). Given that the latter scenario is more likely, it is concluded that the assessment is not sensitive to this assumption.
- 4.1.9 **Latent accommodation:** Demand as a percentage of headroom increases from 10% to 11% (one-point increase). It is therefore concluded that the assessment is not sensitive to this assumption.

Cumulative assessment sensitivity test, zero uptake of local workers

- 4.1.10 The results of the cumulative accommodation assessment, assuming zero uptake of local workers, are as follows:
- Cumulative demand as a percentage of headroom for tourism accommodation increases by 0.2%;
 - Cumulative demand as a percentage of headroom for caravan accommodation increases by 0.3%;
 - Cumulative demand as a percentage of headroom for PRS accommodation increases by 1.0% (assuming one worker per accommodation unit); and
 - Cumulative demand as a percentage of headroom for latent accommodation increases by 1.5%.
- 4.1.11 These differences are considered to be very low and it is concluded that the cumulative assessment is not sensitive to this assumption.
- 4.1.12 **Employment:** When an assumption of 10% local workers is applied, a total of 28 jobs (direct and indirect) would be filled from the local resident workforce. These jobs would not be filled under the conditions of the sensitivity test. Considering that total employment in Anglesey and Gwynedd is in the region of 85,000, it is concluded that the assessment is not

sensitive to the difference between 28 temporary jobs and zero temporary jobs.

4.1.13 On this basis, it is also concluded that the zero-local-workers assumption has no implications for the WLIA (e.g. in-migration, economic diversity).

Twenty percent uptake of local workers

4.1.14 **Tourism accommodation:** The change in demand as a percentage of headroom is less than 2% for all three groups of tourism accommodation ('Hotels, guest houses and B&Bs', 'Self-catering' and 'Caravans & camping'). It is therefore concluded that the assessment is not sensitive to this assumption.

4.1.15 **PRS accommodation:** Demand as a percentage of headroom decreases from 29% to 24% (five-point decrease). This is on the basis of Anglesey PRS supply only, and one worker per accommodation unit. Assuming workers are spread across Anglesey and Gwynedd, and assuming two workers sharing, demand as a percentage of headroom decreases from 5% to 4% (one-point decrease). Given that the latter scenario is more likely, it is concluded that the assessment is not sensitive to this assumption.

4.1.16 **Latent accommodation:** Demand as a percentage of headroom decreases from 10% to 9% (one-point decrease). It is therefore concluded that the assessment is not sensitive to this assumption.

Cumulative assessment sensitivity test, twenty percent uptake of local workers

4.1.17 The results of the cumulative accommodation assessment, assuming 20% uptake of local workers, are as follows:

- Cumulative demand as a percentage of headroom for tourism accommodation decreases by 0.5%;
- Cumulative demand as a percentage of headroom for caravan accommodation decreases by 0.2%;
- Cumulative demand as a percentage of headroom for PRS accommodation decreases by 1.0% (assuming one worker per accommodation unit); and
- Cumulative demand as a percentage of headroom for latent accommodation decreases by 0.8%.

- 4.1.18 These differences are considered to be very low and it is concluded that the cumulative assessment is not sensitive to this assumption.
- 4.1.19 **Employment:** When an assumption of 20% local workers is applied, a total of 57 jobs (direct and indirect) would be filled from the local resident workforce, representing an increase of 28. Considering that total employment in Anglesey and Gwynedd is in the region of 85,000, it is concluded that the assessment is not sensitive to this assumption.
- 4.1.20 On this basis, it is also concluded that an assumption of 20% local workers has no implications for the WLIA (e.g. in-migration, economic diversity).

Table 17.2.18: Distribution of workers under conditions of the sensitivity test

	Activity	Home-based	Self-catering, including hostels	Hotels, guest houses, B&Bs	Caravan and camping	Private	Latent
Sensitivity 0%	OHL	0%	2%	6%	76%	10%	6%
	Other	0%	10%	16%	5%	40%	29%
Sensitivity 20%	OHL	20%	1%	3%	68%	6%	2%
	Other	20%	8%	12%	5%	30%	26%

Table 17.2.19: Results of the sensitivity test (Proposed Development only)

Accommodation type	Study area	Headroom	Demand – sensitivity test (0%)	Demand – primary assumption (10%)	Demand – sensitivity test (20%)	Demand as a % of headroom - sensitivity test (0%)	Demand as a % of headroom - primary assumption (10%)	Demand as a % of headroom - sensitivity test (20%)
Hotels, guest houses and B&Bs	TTWA	884	51	47	35	5.7%	5.4%	3.9%
Self-catering	TTWA	638	27	23	20	4.3%	3.7%	3.1%
Caravans & camping	TTWA	4,774	170	160	154	3.6%	3.4%	3.2%
PRS	Anglesey only, single occupancy	345	116	100	83	34%	29%	24%

Table 17.2.19: Results of the sensitivity test (Proposed Development only)								
Accommodation type	Study area	Headroom	Demand – sensitivity test (0%)	Demand – primary assumption (10%)	Demand – sensitivity test (20%)	Demand as a % of headroom - sensitivity test (0%)	Demand as a % of headroom - primary assumption (10%)	Demand as a % of headroom - sensitivity test (20%)
	Anglesey only, two sharing	345	58	50	41	17%	14%	12%
	Gwynedd only, single occupancy	646	116	100	83	18%	15%	13%
	Gwynedd only, two sharing	646	58	50	41	9%	7.7%	6%
	Anglesey and Gwynedd, single occupancy	992	116	100	83	12%	10%	8%
	Anglesey and Gwynedd, two sharing	992	58	50	41	5.8%	5%	4.2%
Latent	Anglesey only	743	83	71	65	11.1%	9.6%	8.8%

Table 17.2.20: Results of the sensitivity test (Cumulative assessment)									
Accommodation type	Study area	Headroom	HNP demand	Cumulative demand – sensitivity test (0%)	Cumulative demand – primary assumption (10%)	Cumulative demand – sensitivity test (20%)	Cumulative demand as a % of headroom - sensitivity test (0%)	Cumulative demand as a % of headroom - primary assumption (10%)	Cumulative demand as a % of headroom - sensitivity test (20%)
Tourism	KSA	3,101	450	528	521	505	17%	16.8%	16.3%
Caravans & camping	KSA	3,275	650	820	810	804	25%	24.6%	24.6%
PRS	KSA, one sharing	1,649	900	1016	1000	983	61.6%	59.6%	59.6%
Latent	KSA (Anglesey only)	743	400	483	471	465	65%	62.6%	62.6%

5. References

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