Falkland Islands Government – Policy and Economic Development Directorate

Socio-economic impacts of oil & gas development in the Falkland Islands

Employment and population growth

A wider perspective

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Glossary

Direct jobs	Jobs working for oil licensees are referred to as direct jobs.
Indirect jobs	Jobs working for companies that supply the oil licensees with goods and services are referred to as indirect jobs.
Induced jobs	Direct and indirect employees will spend a portion of their wages buying goods and services in the Falkland Islands. Using economic multipliers estimated based on information on the structure of the Falkland Islands economy, it is possible to estimate how many additional jobs will be required to provide these goods and services. These are called induced jobs.
Development phase	This refers to the period running from the beginning of the project until the last wells are drilled. This may extend beyond first oil.
Production phase	This is the period from the end of drilling until the end of production.
Steady state	This refers to the period in which employment estimates remain constant for the remainder of the project. It does not imply that the estimates will remain correct once the project has ended.

Abbreviations

ADR	Age dependency ratio
FI	Falkland Islands
FIG	Falkland Islands Government
FKP	Falkland Islands Pound
FTE	Full time equivalent
GBP	Pound sterling
IOT	Input-output table
IT	Information technology
KEMH	King Edward Memorial Hospital
MOD	Ministry of Defence
MPA	Mount Pleasant Airport
MPC	Mount Pleasant Complex
PMO	Premier Oil plc
PRP	Permanent resident permit
RFIP	Royal Falkland Islands Police
SUT	Supply and Use Table
USD	United States dollar
UK	United Kingdom of Great Britain and Northern Ireland
VPU	Vulnerable persons unit
WP	Work permit

Executive Summary

The Falkland Islands has been steadily growing in both population and capacity since 2012. Increases in population are observed both in Stanley and Camp, and in both the contractor (temporary) and permanent populations. Economic activity has increased, primarily in response to activity in resource sectors including fisheries and oil and gas exploration (with the latest round completed in 2016).

Both as a response to growth and to support future economic activity, the Falkland Islands Government has analysed the potential socio-economic impacts that could occur. Due to the current size of the population, and the geographic isolation of the Falkland Islands, it has always been anticipated that these impacts would primarily be due to pressures from an increasing population. Therefore, this paper focuses primarily on providing a realistic analysis of potential population growth and its consequences particularly for infrastructure and accommodation, as well as strain on government and private sector services.

With the exception of a short-term construction phase that can be largely managed through a controlled, temporary and transient workforce, we find that overall population growth over the next 15 years will likely be modest, at an annualised growth rate of 1.9% per year to meet expected labour force requirements. Long term social cohesion will largely depend on how successful the Falkland Islands are at converting temporary workers to permanent residents, as a high percentage of transient workers (churn) has been demonstrated to have negative effects on small communities, particularly in remote locations[1]. A brief illustration of the demographic impact of permanent versus temporary population is provided in Section 6.3.

Section 1 provides a brief assessment of macro and micro economic effects that may accompany the development of oil in the Falkland Islands and concludes that the unique characteristics of the Falkland Islands economy, along with government actions planned or already in place, will help to insulate the Falkland Islands from impacts that were seen in other jurisdictions. Section 2 provides population growth projections in the absence of any new economic activity.

Sections 3 – 5 provide a detailed analysis of labour force and population projections due to planned oil development, planned infrastructure investments by government, and further economic activity. As this report is meant to support government planning, we have utilised aggressive labour force projections and time horizons, to guard against underestimating impacts. However it is understood that actual requirements, particularly in support sectors, including government, will depend on actual circumstances as well as opportunities for productivity gain.

For that reason, we assume that a certain workforce flexibility will always be desirable, and that this will continue to be met through foreign, temporary labour. However, the goal of the Falkland Islands should be to continuously improve education and training to ensure that the higher skilled jobs can be filled by the permanent population and that spin-off economic opportunities can be developed.

Projections of growth in total population

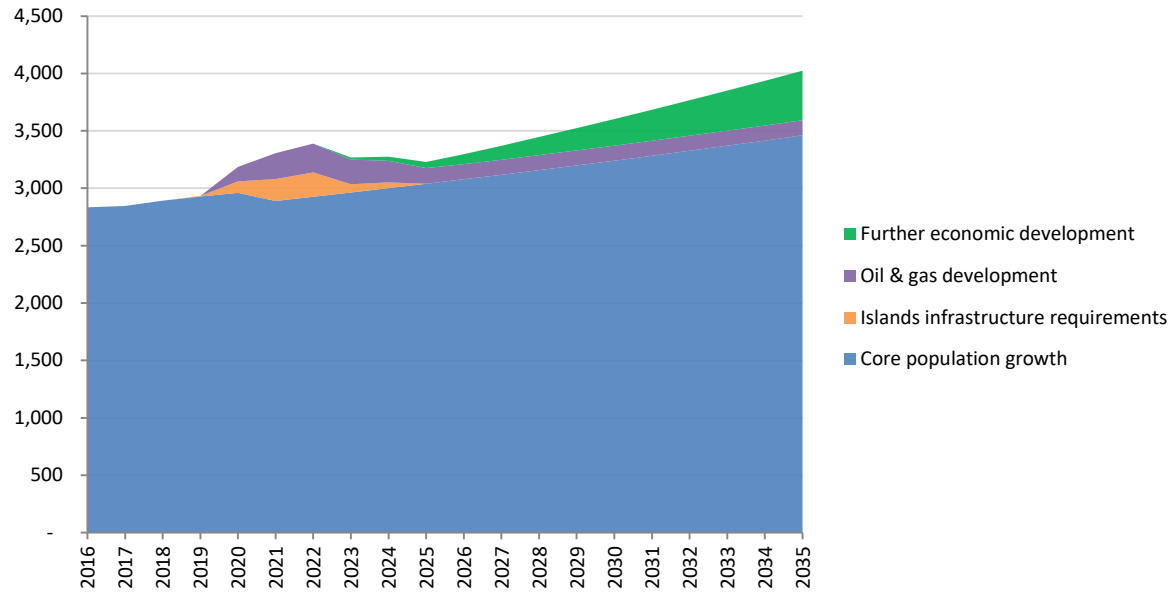
A total population growth forecast has been developed by considering a number of drivers of population change and layering their effect:

1. core population growth (based on existing demographic trends);
2. population growth driven by oil & gas development;
3. population growth driven by the planned Islands infrastructure requirements; and

[1] Keith Storey (2010), Fly-In/Fly-Out: Implications for Community Sustainability. Sustainability v2: 1161-1181; Morris, Robyn (2012), *Impact of Fly-in Fly-out/Drive-in Drive out work practices on local government.* Australian Centre of Excellence for Local Government, University of Technology, Sydney.

4. population growth driven by further economic development enabled by oil & gas development and infrastructure construction.

Figure 1: Population growth projections



Share of population in employment

After a short-term employment peak, described below, population growth in both Stanley and Camp is expected to stabilise, growing at a moderate pace to accommodate employment requirements associated with oil production, operation of new FI infrastructure and supply and services sector growth associated with increased economic activity. Figures on the share of population in employment over total population (including children and pensioners) do not reflect the labour force participation rate – which is remarkably high in the Falkland Islands (89% in 2016; for comparison, the UK rate was 78% in the same year).

Table 1: Population in employment and other residents, by population category

		Census End 2016	Current End 2019	Immediate End 2022	Short term End 2025	Long term End 2035
Population in employment	Core population growth	1,732	1,819	1,811	1,892	2,155
	Oil & gas development	-	-	229	115	109
	Islands infrastructure requirements	-	5	194	-	-
	Further economic development	-	-	-	40	325
	Total	**1,732**	**1,824**	**2,234**	**2,047**	**2,589**
Other residents[2]	Core population growth	1,102	1,109	1,115	1,148	1,308
	Oil & gas development	-	-	22	22	22
	Islands infrastructure requirements	-	-	19	-	-
	Further economic development	-	-	-	13	106
	Total	**1,102**	**1,109**	**1,156**	**1,183**	**1,436**
Share of population in employment over total population	Core population growth	61%	62%	62%	62%	62%
	Oil & gas development	n.a.	n.a.	91%	84%	83%
	Islands infrastructure requirements	n.a.	n.a.	91%	n.a.	n.a.
	Further economic development	n.a.	n.a.	n.a.	75%	75%
	Total	**61%**	**62%**	**66%**	**63%**	**64%**

[2] "Other residents" includes children, pensioners and all other individuals not in work.

Oil & gas

After an approximately 3-4 year employment surge to construct infrastructure required for oil production, resident employment and population effects directly from oil are expected to be minimal. However, there will be some impacts associated with the large fly-in/fly-out workforce required to operate the Sea Lion oil production platform. This workforce is expected to require only minimal community and government services.

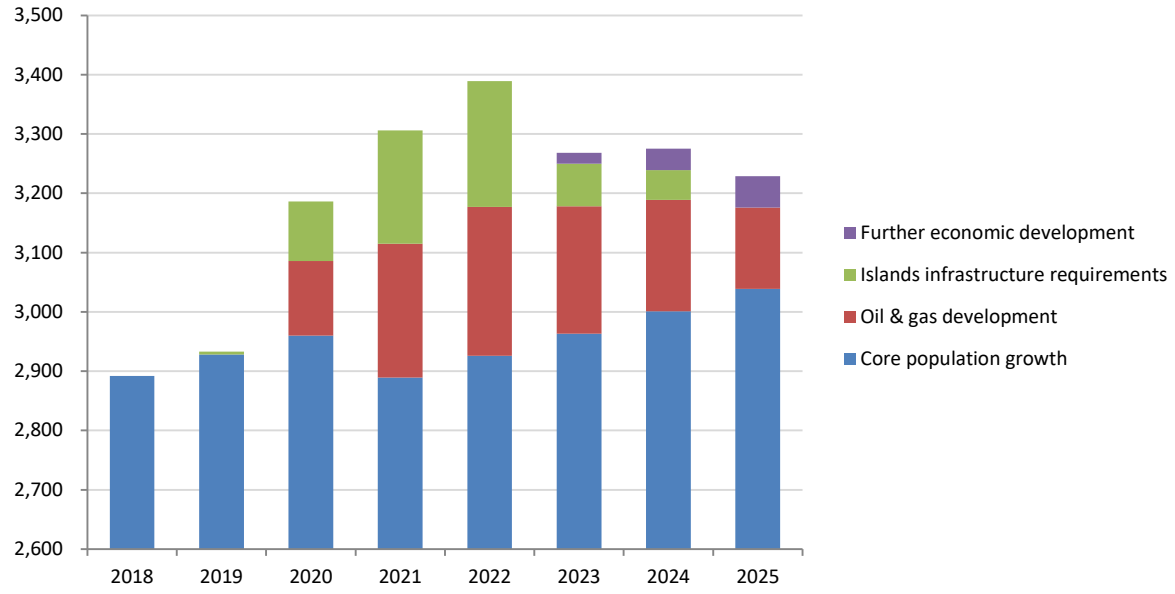
Table 2: Oil & gas development, summary of workforce and population effects – assuming sanction in Q1 2020

	2020	2021	2022	2023	2024	Steady state
Direct employment	45	109	132	102	88	44
Indirect employment	27	42	46	41	34	19
Induced employment	4	8	10	8	7	4
Public sector employment	42	42	42	42	42	42
Total employment	**118**	**201**	**230**	**193**	**171**	**109**
Adult dependents	3	10	9	9	7	9
Children dependents	5	15	13	13	11	13
Total population	**126**	**226**	**252**	**215**	**189**	**131**

Table 3: Population in employment and other residents, by population category, 2018-2025

		2018	2019	2020	2021	2022	2023	2024	2025
Population in employment	Core population growth	1,774	1,819	1,845	1,794	1,811	1,836	1,871	1,892
	Oil & gas development	-	-	118	201	229	193	170	115
	Islands infrastructure requirements	-	5	92	174	194	68	47	-
	Further economic development	-	-	-	-	-	13	27	40
	Total	**1,774**	**1,824**	**2,055**	**2,168**	**2,234**	**2,110**	**2,114**	**2,046**
Other residents	Core population growth	1,118	1,109	1,115	1,095	1,115	1,127	1,130	1,147
	Oil & gas development	-	-	8	25	22	22	18	22
	Islands infrastructure requirements	-	-	8	17	19	5	3	-
	Further economic development	-	-	-	-	-	5	9	13
	Total	**1,118**	**1,109**	**1,131**	**1,138**	**1,155**	**1,158**	**1,161**	**1,183**
Total	Core population growth	2,892	2,928	2,960	2,889	2,926	2,963	3,001	3,039
	Oil & gas development	-	-	126	226	251	215	188	137
	Islands infrastructure requirements	-	5	100	191	212	72	50	-
	Further economic development	-	-	-	-	-	18	36	53
	Total	**2,892**	**2,933**	**3,186**	**3,306**	**3,389**	**3,268**	**3,275**	**3,229**

Figure 2: Total population by population category, 2018-2025



Short-term Impacts

Should the Sea Lion project be sanctioned in early 2020, we expect oil construction activity to contribute to a temporary population surge, likely beginning in late 2020 and continuing to the end of 2024. This period of increased activity is expected to coincide with planned FIG construction of the new port, power station, air terminal, housing, vulnerable persons facility and other essential infrastructure. During this period, there will be a significant influx of temporary trades, services and support personnel.

At the peak, expected approximately in years 2-4 of the Sea Lion campaign, there could be as many as 400 temporary workers involved in the construction of infrastructure. This could put a short-term strain on services including policing, customs and immigration, accommodation, and food supplies. However, experience from previous exploration campaigns, as well as the economic growth seen over the last 5 years, suggests that the retail and business services sector can adapt quickly to increased demand. While there will be increased shipping and transportation activities associated with oil development, the industry will self-supply and use their own infrastructure (for example the Temporary Docking Facility), reducing strain on existing services.

Social impacts monitoring

While long term impacts from economic development are expected to be modest in terms of overall population growth, there is the potential for negative social consequences, both during peak employment years and in the steady-state, particularly if the Falkland Islands is unsuccessful in attracting permanent settlers. Economic and social impacts are analysed within Chapter 1.

There are a number of actions that FIG can take to proactively minimise negative social effects, including minimising the proportion of temporary residents within the population, maintaining public and private sector service levels and encouraging localisation of benefits. It is also proposed that Falkland Islands Government develop a set of key social indicators (along with baseline data on the current state) to support ongoing monitoring of social wellbeing and allow corrections and early government action should potential problems be identified.

Introduction

The round of oil and gas exploration that started in 2010 resulted in the first commercially exploitable discoveries of oil in the waters of the Falklands. The potential development of an oil & gas sector could have a significant socio-economic impact on the Islands, with its small resident population (2,834 usually resident population as recorded by the 2016 Falkland Islands Census). Oil & gas will drive a significant temporary inflow of workers to the Falklands during the infrastructure construction phase and a much smaller, semi-permanent increase in the steady-state production period. An additional, rotational worker cohort will be located offshore, and will only be present onshore for brief periods during crew changeover.

Development of an oil & gas industry, and its expected socio-economic impacts, fits within the broader context of economic development and population growth projected for the Falkland Islands over the next 15 years. These projections are driven by organic growth that can be expected in any viable economy, as well as by anticipated stimulus from government investments in economic infrastructure including a new port, power station and air terminal, enhanced air links, improvements in IT connectivity and housing development, amongst others.

The anticipated development of the Sea Lion oil project will provide additional stimulus to an already growing economy and workforce, but is only one of a number of opportunities that can be expected over the next 20 years if the Falkland Islands is to remain a thriving community. Additional growth can be expected from extensions or enhancements to existing industries including tourism, fisheries and agriculture, support industries such as construction and potential new sectors such as science and research, port services and aquaculture.

However, geographic remoteness and a harsh natural environment can be expected to act as a natural constraint, against unsustainable population growth, supported by robust immigration laws that require a pre-existing employment offer in most cases. By the end of 2035, our population models anticipate a permanent population level of just over 4,000 individuals, supporting a little less than 2,600 jobs. This would represent an annualised increase of 1.9% per year over 15 years, or about 63 new residents each year.

Methodology and definitions

This paper considers potential socio-economic impacts of oil & gas development, most particularly with respect to the impacts of employment and population growth but also with regard to micro and macro-economic impacts that have been observed in other jurisdictions where a new, economically dominant, sector is introduced. Oil & gas development is placed within the broader context of expected developments within the Falkland Islands economy and as one significant component of a number of contributing factors to socio-economic change that we expect to occur in the coming years.

Population forecasts included in this paper are based on a **population growth model** developed in June 2018 by the FIG Policy and Economic Development Unit, which aimed at projecting population growth in the Falkland Islands under a number of scenarios and based on a number of assumptions, and which has been regularly updated over the following year based on new information being available. This model has been developed to include estimates of government staffing growth to meet the requirements of serving a growing population.

The population growth model covers a time horizon of 20 years, including:

- 2016: the base year;
- 2017-2035: the projected years.

In the model, forecasts of total population growth result from the layering up of a number of population categories:

1. core population growth;
2. population growth driven by oil & gas development;
3. population growth driven by the planned Islands infrastructure requirements; and
4. population growth driven by further economic development enabled by oil & gas development and infrastructure construction.

In the following chapters, these contributors to population growth are discussed separately.

Population forecasts are presented with reference to a number of population categories and time horizons. The following **population categories** are considered:

- Permanent population: Falkland Islands status holders and Permanent Residence Permit (PRP) holders;
- Temporary population: Work Permit holders (and their dependents) and people belonging to other immigration categories.

For the purposes of this forecast, the following **time horizons** are considered,

- Last Census: end of 2016
- Current time: end of 2019
- Immediate growth: end of 2022
- Short term growth: end of 2025
- Long term growth: end of 2035

Time horizons are purposely aggressive and assume the most optimistic start dates for the Sea Lion project (Chapter 3), as well as for Islands Infrastructure projects (Chapter 4), in order to ensure robust planning. However, this forecast has not included speculative development such as a second phase of oil development or an aquaculture initiative – it is recommended that socio-economic forecasting be revisited if major new economic activity becomes likely.

1. Economic and Social Considerations

This section describes some of the key concerns related to potential micro and macro-economic impacts from the development of a resource extraction industry within the Falkland Islands. While the size and structure of the economy will insulate the Falkland Islands from many of the negative effects experienced in other jurisdictions related to the development of a new, fiscally dominant industry sector, the Falkland Islands Government has also had the benefit of a long lead-in time, during which it has been possible to identify best practices and mitigation measures.

1.1. Potential Economic Effects

Due to the unique economic circumstances of the Falkland Islands, we can expect the economy to be largely shielded from some of the potentially damaging impacts of a dominant hydrocarbon extraction/export sector. Here, we briefly consider two effects of the development of a dominant resource sector, which have been described in other jurisdictions as having the potential for detrimental impacts on the broader national economy.

1.1.1. Dutch Disease

This effect is said to occur when the export revenues and economic activity associated with a newly dominant resource industry crowd out productive economic activity in other sectors. There are two mechanisms, *resource movement effect* and *spending effect*. The first occurs when capital and labour shift from existing sectors (called tradable and non-tradable[3]) to the boom sector, leading to a rise in imports (in the tradable sector) and price increases in the non-tradable sectors – ultimately leading to exchange rate increases, drop in export competitiveness and increases in imports. The second (*spending effect)* occurs when demand for labour in the non-tradable sector increases, at the expense of the tradable sectors. The tradable sectors cannot raise wages sufficiently to compete for existing labour, as this would make their products uncompetitive, thus leading to a decline in activity in the tradable sectors.

In the Falkland Islands, the tradable sectors are based in untransformed or minimally transformed raw commodities which do not take significant inputs from the local economy (in the case of the fisheries), or rely on a foreign temporary workforce (meat processing and agricultural labour). An additional tradable sector is tourism, which is a premium-priced product that already relies on an imported workforce to supplement the local labour supply. The non-tradable sectors (retail, construction, transportation, professional services) are similarly accustomed to supplementing the labour supply with foreign workers.

1.1.2. Enclave Effects

This potentially damaging impact to a local economy occurs when a dominant, extractive export industry is present, unconnected to the wider domestic economy and controlled outside of the host jurisdiction. Enclave effects are typically observed in post-colonial dependencies when international operators, usually from the colonising country, extract resources for export and repatriate revenues away from the host jurisdiction, using only basic labour and low value services from the host country and leaving few economic benefits aside from what can be captured from taxation.

In the Falkland Islands, the fishery sector can be expected to remain co-dominant with oil in terms of contribution to government revenues. There is no unemployment in the Falkland Islands, so it is already assumed that every new job created, including for oil, will require the injection of an

[3] Respectively, sectors whose output in terms of goods and services are or could be traded internationally; and sectors whose jobs can realistically only be performed by domestic workforce and whose outputs are consumed domestically

additional worker into the labour force. To ensure that maximum economic benefits from oil development can be captured by domestic suppliers according to their capacity, the Falkland Islands Government (FIG) has worked with the oil industry to develop and implement local content requirements. Industry, in turn, has engaged with local businesses to ensure that those who are interested had sufficient time to augment their capacity to supply goods and services.

These actions are commensurate with the size of our population and the geographic, logistics and political challenges which make the development of a permanent, competitive, dedicated oilfield supply and services sector unreasonable. This is particularly the case with respect to the development of the Sea Lion oilfield, as there is no guarantee of activity beyond the life of the existing project (Phase 1) and decisions on future phases will rest on factors largely related to global demand and supply.

1.2. Currency and public revenues

Falkland Islands currency (FKP) is pegged to the UK pound (GBP) and therefore will not experience exchange rate effects that can sometimes be seen in small economies with a dominant resource-extraction sector, where currency value is artificially inflated to the detriment of other export sectors of the economy. While the Sea Lion oilfield project will increase the Falkland Island's GDP and exports, the FKP is not a tradable currency and the revenues that will accrue back to the UK are too small to have a significant impact on the UK economy as a whole. Equally, many of the fiscal levers used to control currency inflation and devaluation, such as setting lending rates or setting government bond rates, are not available to the Falkland Islands.

As an economy that imports almost all goods and most services, the Falkland Islands is vulnerable to currency fluctuations in its export partners, particularly the United Kingdom, so inflation in the Falkland Islands is largely tied to global, rather than local, factors. However, Falkland Islands exports are largely transacted in Euros and USD, so a weak GBP, while potentially driving up the cost of imports and inputs from third countries, can also increase revenues generated from exports and government investments.

Revenues to the Falkland Islands Government are comprised primarily of personal and corporate tax remittances, resource rents and license fees, and interest earned on invested government reserves. There are no consumption taxes on goods or services (other than excise taxes on tobacco and alcohol), medical services taxes, property or capital gains taxes. As such, FIG revenues are currently dependent on both availability of fish stocks in its waters and on global demand and pricing for its exports.

1.2.1. Mitigation of macro-economic impacts

The Falkland Islands Government has a demonstrated track record in the prudent management of revenues from a dominant resource industry (fisheries) that is both highly volatile and the main contributor to Gross Domestic Product. In addition to maintaining balanced (or surplus) budgets, FIG maintains reserves of at least 2.5 times annual operational spending, most of which is externally invested by professional, third party investment managers. The addition of a hydrocarbons export industry could provide more predictability to revenue streams for government, allowing it to commit to investments in infrastructure, education and services that will further strengthen the economy and support sustainable growth.

While some of the expected revenues from oil will be used to fund the necessary increases in government capacity to ensure robust and appropriate regulatory oversight, internal security, environmental management and fiscal oversight, FIG plans to ensure that 'surplus' revenues from hydrocarbons are segregated in investments to be used to cover contingent liabilities, as well as supporting a 20-year plan for necessary investments in economic and social infrastructure.

Experience from other jurisdictions has shown that the most effective way to mitigate the potential for negative macro-economic impacts from a dominant, resource extraction sector, in small and underdeveloped economies, is for governments to ensure that revenues are reinvested in education and infrastructure that will support economic participation, diversification and increased competitiveness, along with investment of surpluses in segregated funds to provide revenue stability for future generations.[4]

1.3. Consumer inflation and cost-of-living

1.3.1. Housing

There is a real and acknowledged short-term risk of housing shortages that would drive up the cost of private sector rental accommodation. 70% of permanent residents in the Falkland Islands own their homes; this falls to 8% for the temporary population. Absent proactive government policy to enable home ownership for temporary workers, we expect this trend to continue. While all contractors employed directly by the Falkland Islands Government, and some permanent residents, live in rent-controlled, government supplied housing, the rest of the workforce relies on market accommodation. Experience from previous oil exploration activity, when competition for rental housing was severe, demonstrated that market prices rose significantly and have remained high even once the oil activity ended. Local market response to supply new rental housing stock to meet current and future demand has been slow, as both the timing and quantity remain uncertain.

Since the previous oil campaign ended, significant new government housing has partially filled the gap, as has the release of serviced residential building plots, which are preferentially available at a subsidised rate to the local population (those with Permanent Residence or Falkland Islands Status).

It is recognised that additional short term and permanent accommodation solutions will be required to service expected labour force requirements during the coming five years. Most of the temporary construction workforce for both oil and Islands infrastructure projects is expected to be housed in existing or new single-room, 'budget-hotel' style accommodation with full board and recreational amenities on site. The oil industry is required to source and finance its short-term accommodation needs from outside of existing residential supply. However, there may be demand to lease traditional homes for incoming professionals and managerial associated with the development, and their families in some cases.

FIG has been working to identify solutions to increase both short term accommodation and permanent housing, including attraction of foreign housing developers and general contractors with the capacity to quickly finance and construct appropriate infrastructure while ensuring that local suppliers are not crowded out.

To accommodate a total estimated population of 4,024 by 2035 (increase in the permanent population of 1,190 between 2016 and 2035; an average of 79 residents per year) it is estimated that a total mixed housing stock of 1,645 dwellings will be required, located primarily in Stanley. This assumes an average household size of 2.4, in line with findings from the 2016 Census. Based on FIG Public Work's 'Service Charge Master List' for 2018/19, we estimate the current, habitable housing supply at 1,305 units across Stanley and Camp.

1.3.2. Retail prices

As described previously, the Falkland Islands produces very few value added goods for either export or domestic consumption aside from some craft-style production. Instead, demand for consumer

[4] Poteete, Amy R. (April, 2009). *Is Development Path Dependent or Political? A re-interpretation of mineral-dependent development in Botswana*. Journal of Development Studies, V45, No.1. pp 544-571.

goods is met through imports, either from local retailers or increasingly, through online purchasing from the UK. The availability and quality of both essential and non-essential goods are comparable to what is typically present in a much larger community. Consumer services are available in the local market, although supply is currently insufficient to satisfy existing demand in some areas, notably construction, building and renovation trades and personal services. The same is true for business consumption of both goods and services.

With a non-tradable, pegged currency and no central bank, the FIG has limited ability to influence inflation through monetary policy, including measures such quantitative easing or tightening, setting prime lending rates or issuing government debt. However, prices for many essential goods and services including fuel, energy, telecommunications, intra-Islands transportation and international travel are either regulated or subsidised by government to keep costs relatively stable and affordable for the resident population. There is no value-added tax in the Falkland Islands, eliminating another frequently observed source of price inflation.

The private sector has demonstrated its ability to increase retail offerings to meet local demand without raising prices opportunistically and has had a number of years since the last oil campaigns to diversify its supply chains, with product now arriving from the UK, Chile and Uruguay. The presence of additional demand for fresh and frozen foods will likely have the effect of increasing product choice for local consumers.

In addition, the prevalence of on-line shopping, with relatively inexpensive and easy shipping available from the UK, provides alternatives to consumers and has introduced a level of price competition that would not normally be present in a small and isolated market. These factors can reasonably be expected to moderate increases in retail prices.

There is a moderate to high risk of cost increases and constrained availability for services such as construction, home repair and vehicle maintenance if this already constrained supply is diverted to fill increased industrial and commercial demand. Supply is already insufficient to meet current demand and there are no easy, short-term solutions other than the attraction of new capacity from outside the Falkland Islands either on a temporary or permanent basis.

1.4. General labour force effects

It is understood that hydrocarbon sector jobs are relatively well paid and FIG will work with the oil industry on increasing opportunities for professional and skilled trades training to enable Falkland Islanders to pursue long-term employment within the sector. However, as noted throughout this paper, it is acknowledged that these opportunities will lead to labour shortages in other areas, which will need to be filled through additional foreign recruitment.

Long term social cohesion will largely depend on how successful the Falkland Islands are at converting temporary workers to permanent residents, as a high percentage of transient workers (churn) has been demonstrated to have negative effects on small communities, particularly in remote locations and particularly if there is significant income inequality between the transient and permanent populations[5].

The Falkland Islands Government has recognised this risk, which is already present due to existing labour shortages and immigration patterns. Concurrent to its oil readiness programme, a population growth strategy is being formulated, including identification of policies and measures to encourage long term or permanent settlement. This in turn will enable more informed planning of public services and investments, including health care, education and public works.

[5] Keith Storey (2010); Morris, Robyn (2012). *Op.cit.*

1.5. Sector impacts

The Falkland Islands economy depends on exports of untransformed or minimally transformed commodities – fish, wool and meat (the agriculture sector). There is also a growing tourism industry which relies on both imported and domestic inputs (capital, labour and goods). The retail and wholesale sector, while locally based, is comprised primarily of imports. There are some locally owned services, both professional and skilled trades, as well as some personal services – but supply and capacity is constrained by labour shortages, natural geographic factors and an immigration system that discourages new market entrants by limiting entrepreneurial or investor class immigration.

Consequently, it is already understood that most new capital investment in the Falkland Islands, whether government or private-sector led, will have to be supported by the importation of goods, services and labour. This is the case whether or not the demand met directly through foreign contractors or indirectly through existing domestic suppliers (who either constrain supply for other buyers or import the labour, services and goods required to increase their own capacity). While a fraction of the new jobs created can be met through the entrance of school leavers into the workforce, there are insufficient numbers to meet demand. In addition, there is a cultural and social expectation that graduating students may want to pursue social and economic opportunities outside the Falklands, which particularly constrains local skilled and professional labour availability. Therefore, it is assumed that the majority of new jobs created will be filled by mostly temporary, foreign workers.

1.5.1. Fishing

The fishing industry relies on an almost entirely foreign workforce and no significant value-adding or secondary processing is carried out in the Falkland Islands, largely due to availability and cost of labour and other inputs as well as distance from end markets. Falklands-based employment in this sector is predominantly domestic, and largely executive, managerial and administrative. There are very few direct jobs, particularly given the revenues generated into the local economy. It is expected that there would be little competition for labour or other inputs between the fishing and oil industries, given the nature and quality of the existing jobs.

1.5.2. Agriculture

Jobs in agricultural production are based in Camp (rural areas) and characterised by small, independent farms who import seasonal or year-round labour to help with tasks such as shearing and general farm work, as well as to support secondary businesses such as tourism. As with all of the Falkland Islands, there are shortages of skilled labour to support construction, transportation and machinery and vehicle maintenance; in Camp, these are exacerbated by remoteness and transportation and communications deficits.

The meat processing industry, concentrated in a single abattoir (Falkland Islands Meat Company), relies almost entirely on foreign labour, mostly temporary and seasonal. The industry supplies the domestic market but exports the bulk of its production and currently faces threats from the imposition of tariffs in its primary export markets; these are unrelated to the factors discussed in this paper. However, there is the real prospect that provisioning the oil industry could provide a new and profitable buyer to replace previous export market demand. Minimal competition for labour is expected from the oil sector, as these workers are recruited directly to the available jobs and are unlikely to have transferable skills.

The last Census, conducted in 2016, showed a reversal of the trend towards de-ruralisation, with Camp population increasing for the first time in more than a decade. This is due, at least in part, to FIG policies and investments that support living in Camp including subsidised transportation of both people and goods between the Islands by air and sea, subsidised operation of an abattoir to provide

a secondary income from livestock, investments in telecommunications and transportation infrastructure such as ramps, jetties and air strips, supports for livestock improvements, and direct grants and loans for the development of Camp businesses (including tourism).

However, careful monitoring and vigilance is recommended to ensure that Camp remains viable, attracting a sufficient workforce and able to access the goods and services it requires.

1.5.3. Tourism

The growing tourism sector relies on both foreign and local labour as well as on imports of goods and services. The sector generates a relatively high number of jobs, which are primarily seasonal and may be filled by individuals taking second or third jobs to supplement their primary incomes. Supply of tourism product, including accommodation and hospitality services, is sufficient to meet current tourism demand, although there are periods during peak season where availability is limited, particularly outside of Stanley. Increases in the number of cruise ships and passengers visiting the Falklands have put short-term strain on some government services, as well as on the tourism sector itself. However, the industry and government have shown resourcefulness in resourcing to meet these very short-term surges, which are typically known well in advance. Additionally, government has been able to ensure that essential services, such as customs and immigration, policing and emergency health care are resourced appropriately, including an ongoing programme of emergency preparedness.

The tourism sector could be vulnerable to impacts of oil development activities, particularly during the labour intensive construction phase, before production starts. This could take the form of competition for labour, but is more likely to create competition for available accommodation and transportation to and from the Falklands, crowding out tourists in favour of workers. While Stanley-based tourism operators would benefit from providing services to the transient workforce, this could come at the expense of tourism operators outside of Stanley if it becomes more difficult for tourists to obtain flights to and from the Falklands.

Mitigation measures planned include the imminent introduction of a weekly commercial flight from Sao Paolo to the Falklands, expected to begin in November 2019. This second commercial flight will more than double seat capacity, supporting increased economic development in all sectors. Planning is also underway for a new air terminal and enhanced passenger handling at the Mount Pleasant Airport; this activity is reflected in FIG's short term capital and operational plans. During the construction phase of the Sea Lion project, it is expected that the oil industry will supplement available commercial flights with charter flights as necessary.

1.6. Social impacts

With the exception of a short-term construction phase that can be largely managed through a controlled, temporary and transient workforce, we expect that overall population growth over the next 15 years will be modest and sustainable, at an annualised growth rate of 1.9% per year to meet expected labour force requirements. All of this growth will need to come through immigration, as the baseline permanent population (as at 2016 Census) is expected to decline at a rate of 0.3% per year, reflecting an aging population and declining birthrates.

Long term social cohesion will largely depend on how successful the Falkland Islands are at converting temporary workers to permanent residents, as high percentages of transient workers within a population (churn), have been demonstrated to have negative effects on small communities, particularly in remote locations[6]. As of the 2016 Census, 24% of Falkland Islands

[6] Storey, Keith (2010). *op.cit.*
Morris, Robyn (2012). *op.cit*.

residents were classified as temporary, primarily work permit holders and their dependents. By 2035, if current conversion rates continue, 37% of the resident population will be temporary.

Temporary workers consume public services and spend in the local community, but transfer most of their wealth and knowledge with them when they leave the country. This means that the host jurisdiction does not get the full long term benefit from that worker's efforts. A high percentage of temporary workers also puts strain on the community's ability and willingness to integrate newcomers. FIG's analysis of existing churn rates tell us that, based on the current average conversion rate (2.8%) and length of stay of people in the temporary population pool (3.8 years), an average inflow of around **348 immigrants per year** would be needed to sustain the foreseen population growth of 63 persons per year between 2016 and 2035.

In addition, this degree of impermanency makes it difficult to plan for schools and social services and encourages segregation between groups within the community. Migrants who settle permanently are more likely to contribute and engage positively in their adopted community and to adapt to the dominant culture over time.

It would benefit social stability to encourage the oil industry to 'localise' some of its steady-state onshore workforce, encouraging long term settlement and integration of workers and their families into the Falkland Islands community. Similarly, recruitment campaigns to fill permanent positions in government and throughout the economy should focus on encouraging permanent settlement rather than short term work permits, wherever practical.

1.6.1. Short term considerations

Our projections anticipate that there could be a significant workforce 'bulge' during the next 5 years (dependent on project timing) with potentially more than 460 additional temporary residents at the peak (single year maximum), made up primarily of male, single workers (423) who are mainly expected to be housed in fully catered, single-room communal accommodation, whether temporary or permanent. While these workers are in the Falklands, they can be expected to consume some services, primarily in the private sector (food and beverage services, recreation, consumer goods) during their leisure time.

In line with previous oil exploration campaigns, it is expected that the oil industry will maintain a strict, zero-tolerance policy with respect to alcohol use and anti-social behaviour for both its onshore and offshore workforces and that workers will be largely rotational during the field development phase.

An equivalent number of non-oil related temporary workers could also be present during the same time period. This population is likely to resemble the existing foreign temporary skilled and unskilled trades labour force working in the Falkland Islands in terms of social expectations, characteristics and consumption of goods and services.

Implications for government resource requirements, to ensure sufficient capacity and prepare for this temporary population bulge, are currently under consideration as part of FIG's oil readiness preparations.

1.6.2. Social impacts monitoring

While long term impacts from economic development are expected to be modest in terms of overall population growth, there is the potential for negative social consequences, both during peak employment years and in the steady-state, particularly if the Falkland Islands is unsuccessful in attracting permanent settlers. Negative social impacts can manifest objectively, in such measures as

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Australian House of Representatives Standing Committee on Regional Australia (2013). *Cancer of the Bush or Salvation for our Cities?* Chapter 3: 'Fly-in' communities.

increases in risky, illegal or anti-social behaviour, widening income gaps between the permanent and temporary population, cost of living increases or shortages of essential services. They can also manifest subjectively in people's sense of happiness and well-being, or feelings of community closeness and cohesion.

Work done in 2015 by Regeneris Consulting for the Falkland Islands Government[7] suggested monitoring a range of indicators on a regular basis, using objective and subjective data from a number of sources, including a biennial FI Residents Survey, RFIP and KEMH statistics and the 5-year Census. A modified set of key indicators is proposed below, with a notation on whether baseline data is required:

Proposed socio-economic indicators

	Social Effect	**Indicator**	**Baseline data required?**	**Source**
A. Health and well-being	1. Mental Health	Annual number of individuals accessing mental health services	Baseline data required	KEMH/Public Health
	2. Substance Abuse	Rates of drug and alcohol consumption	Existing (Census and survey data)	Census/Public Health/KEMH
	3. Self-harm	Sexually transmitted infection rates	Existing (KEMH) – need to assemble 5 year data	KEMH
B. Safety and security	4. Crime rates	Number of violent crime, property crime and 'nighttime crime'	Existing (quarterly RFIP reports) – need to assemble 5-year data	RFIP
	5. Road safety violations	Number of road traffic collisions	Existing (quarterly RFIP reports) – need to assemble 5-year data	RFIP
C. Quality of Life/Well-being	6. Happiness	Happiness index[8]	Need to establish baseline	Policy (new) – annual survey
D. Economic prosperity	7. Income inequality	Gini ratio (gap between highest and lowest income earners)	Required; currently in development	Policy – tax data
	8. Cost of living	RPI	Existing	Policy
	9. Long term opportunity	• Rate of out-migration of Falkland Islands permanent residents (including students) • Rate of return • Percentage of permanent versus temporary residents	Required	Immigration/Census

[7] Regeneris Consulting Ltd (July 2015). *Social Effects Monitoring Programme for Oil and Gas Development in the Falkland Islands*

[8] The Happiness Index is a simple, global benchmark that measures subjective happiness on a scale of 0-10 (10 represents the best possible life for you and 0 represents the worst possible life for you) and includes a sub-survey of the relationship between happiness and immigration. Compiled and reported annually by 156 countries, the HI will allow Falkland Islands to benchmark against the world, as well as to benchmark specifically against 117 immigrant-receiving nations.

2. Core population growth

We define **core population growth** as growth in population in the absence of any new economic stimulus from oil & gas production, infrastructure investment, or further economic development driven by economic stimulus.

According to the 2016 Falkland Islands Census, in 2016 the usually resident population of the Falkland Islands (excluding MPC) was equal to 2,834 people, of which:

- 2,167 in the permanent population pool (Falkland Islands status holders and Permanent Resident Permit holders), or 76.5% of total population;
- 667 in the temporary population pool (Work Permit holders and other immigration categories), or 23.5% of total population.

The methodology adopted to estimate core population growth can be summarized as follows:

1. Estimate of growth in the permanent and temporary population pools as if they were watertight compartments – that is, as if movements between them were not possible, i.e. as if conversions from the temporary to the permanent population pool were not allowed to happen (please see Paragraphs 2.1 and 2.2 below);

2. Estimate of the number of movements from the temporary to the permanent population pool (please see Paragraph 2.3 below).

2.1. Baseline growth of permanent population

We define **baseline growth of permanent population** as the forecasted growth of the permanent population pool only due to natural growth (i.e. births and deaths) and migration (either outward and inward) of people already holding Falkland Islands status or PRP (as of Census 2016); that is, before adding the contribution of movements from the temporary population pool (i.e. conversions).

2.1.1. Methodology

Baseline growth of the permanent population pool is estimated based on the following formula:

	Permanent population pool at the beginning of year i
+	Natural population balance in year i
+	Net migration balance in year i
=	Permanent population pool at the beginning of year i+1

The **natural population balance** can be defined as follows:

	Number of births in year i
–	Number of deaths in year i
=	Natural population balance in year i

The **net migration balance** only takes into account Falkland Islands Status holders or PRP who emigrate abroad or come back to reside in the Falkland Islands from abroad, but not people moving to the permanent population pool from the temporary population pool:

Status or PRP holders coming back to reside in the Falkland Islands in year i

– Status or PRP holders emigrating abroad in year i

= Net migration balance in year i

Projected growth of the permanent population pool has been estimated based on a number of parameters, namely:

- **Probability of giving birth**, by year of age – applied to the number of women in each yearly cohort (18 years of age or more), to estimate the annual number of new-borns between 2017 and 2035. Rates of probability of giving birth by age have been derived from an analysis of births data between 2012 and 2016 (see Figure 3 below).

- **Probability of dying**, by sex and year of age – applied to the number of men and women in each yearly cohort, to estimate the annual number of deaths between 2017 and 2035. Rates of probability of dying by sex and age have been derived from an analysis of deaths data between 2012 and 2016 (see Figure 3 below).

- **Probability for F.I. Status or PRP holders of emigrating abroad vs. coming back to reside in the Falkland Islands**, by age – applied to population counts to estimate the net migration balance. This parameter has been derived from an analysis of differences between estimated/theoretical 2016 population counts (based on the number of births and deaths between 2012 and 2016 only, i.e. natural population growth) and actual 2016 population counts (see Figure 4 below).

Figure 3: Probability of giving birth and probability of dying

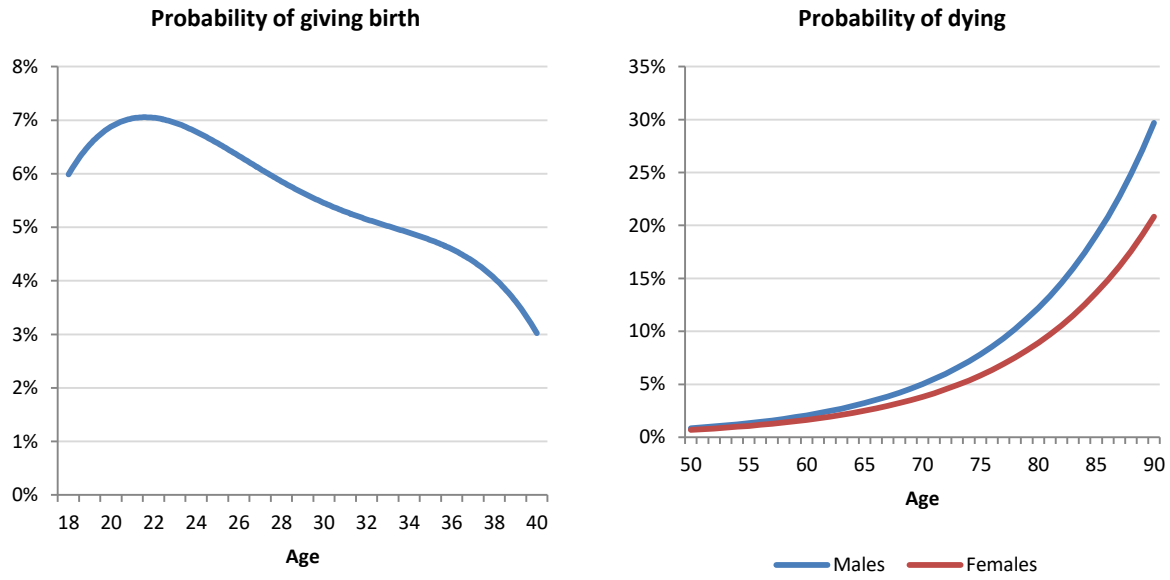
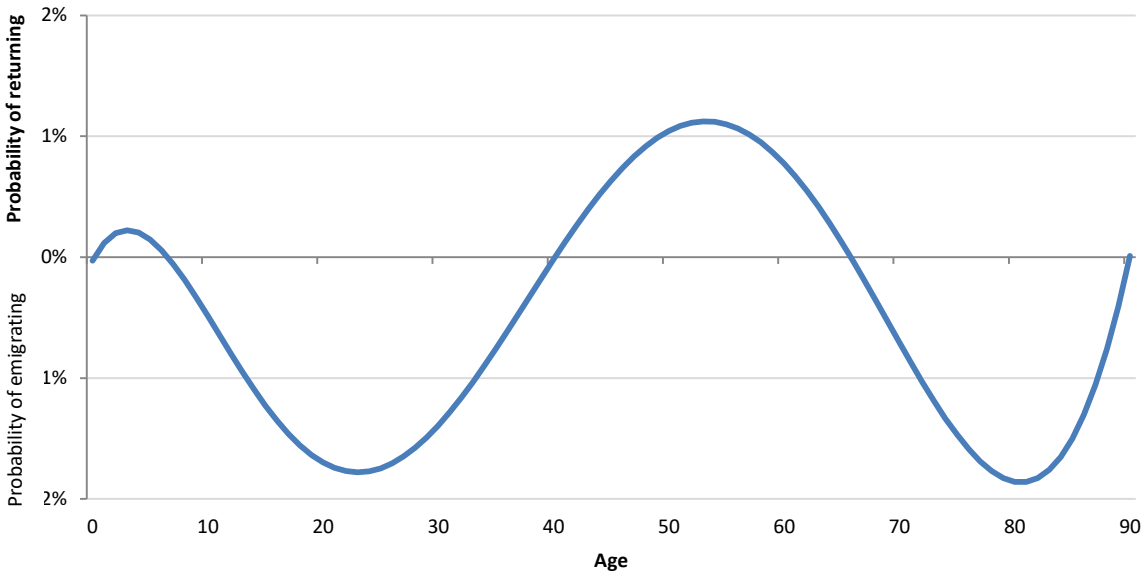


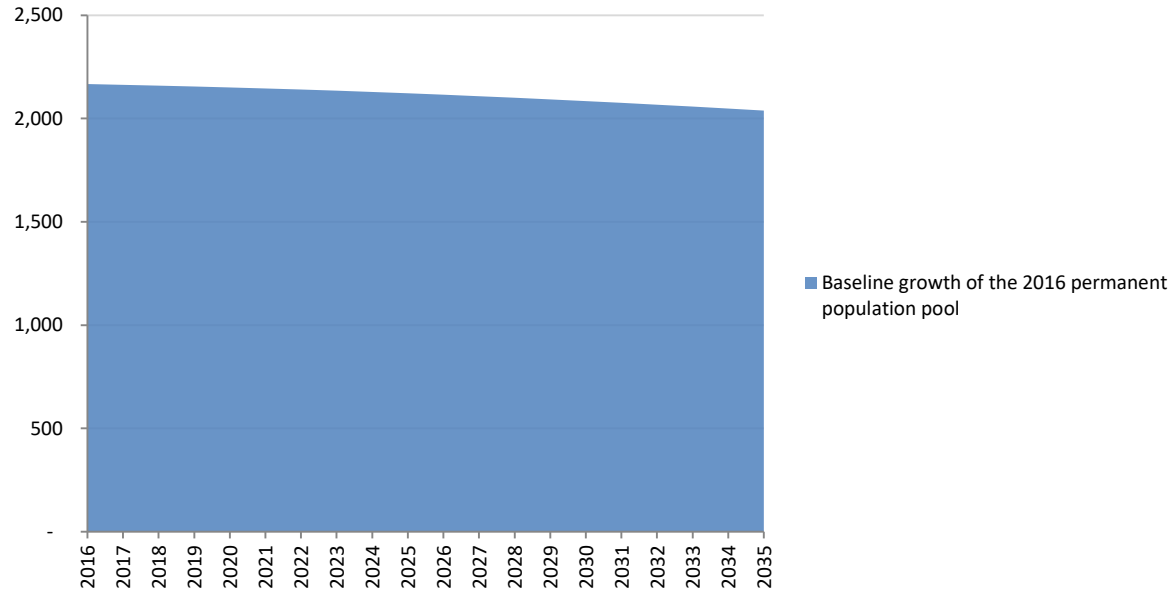
Figure 4: Probability of emigrating abroad and probability of returning



2.1.2. Results

Based on the methodology and assumptions described above, a slight decline in the permanent population pool can be foreseen over the forecasting period. Before taking into account the contribution of movements from the temporary population pool, permanent population can be expected to decrease from 2,167 in 2016 to 2,039 in 2035, at an average rate of decline of -0.3% per year (see Figure 5).

Figure 5: Baseline growth of permanent population



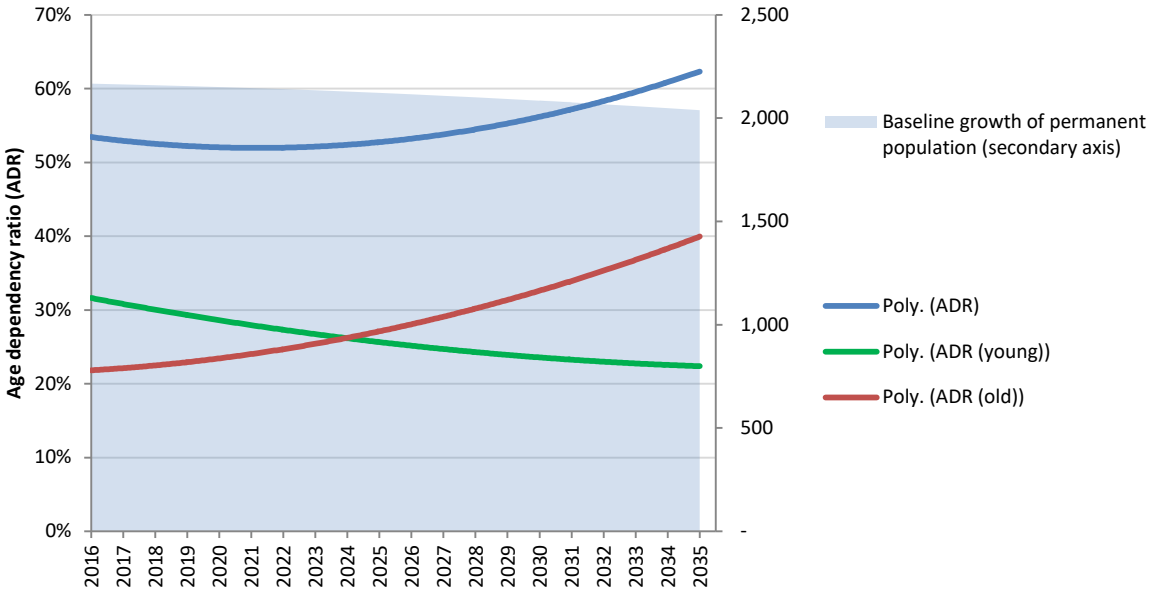
Based on the analysis of forecasted age dependency ratios, population ageing can be foreseen within this group. Age dependency ratios can be defined as follows:

- overall age dependency ratio (**ADR**) – ratio of dependents (people younger than 15 or older than 65) to the working-age population (people aged 15-65);
- age dependency ratio, young (**ADR young**) – ratio of younger dependents (people younger than 15) to the working-age population;

- age dependency ratio, old (**ADR old**) – ratio of older dependents (people older than 65) to the working-age population.

Figure 6 below shows that the overall ADR can be foreseen to grow from 53% in 2016 to 64% in 2035, driven by a decrease of the ADR young from 31% to 23% and an increase of the ADR old from 22% to 40%.

Figure 6: Age dependency ratios



2.2. Baseline growth of temporary population

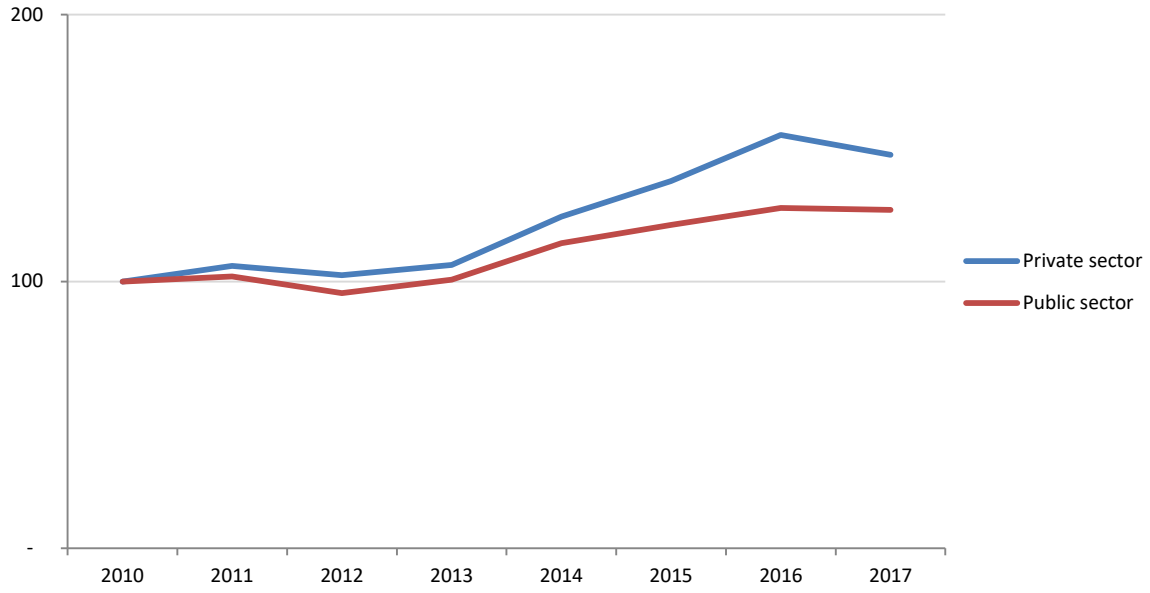
We define **baseline growth of temporary population** as the forecasted growth of the temporary population pool due to the foreseeable future migration inflows, before netting out the number of movements to the permanent population pool (i.e. conversions).

2.2.1. Methodology

Baseline growth of the temporary population pool has been estimated based on evidence of the average annual increase in the number of Work Permit holders, by employer, between 2010 and 2017 (source: analysis of data from FIG Customs & Immigration). A number of major employers have been assessed individually, while smaller employers have been assessed at an aggregate level (please see Figure 7 below, where all private sector employers have been aggregated due to confidentiality reasons).

Between 2010 and 2017, the number of people in the temporary population pool has been growing at an average rate of 4.6% per year, with growth rates for the public and private sectors being, respectively, 3.6% and 6.0%. The average annual increase in the number of people in the temporary population pool has been equal to 0.75% of total population (meaning that, with a starting population of, e.g. 2600 in year i, the number of people in the temporary population pool increased by 20 during that year).

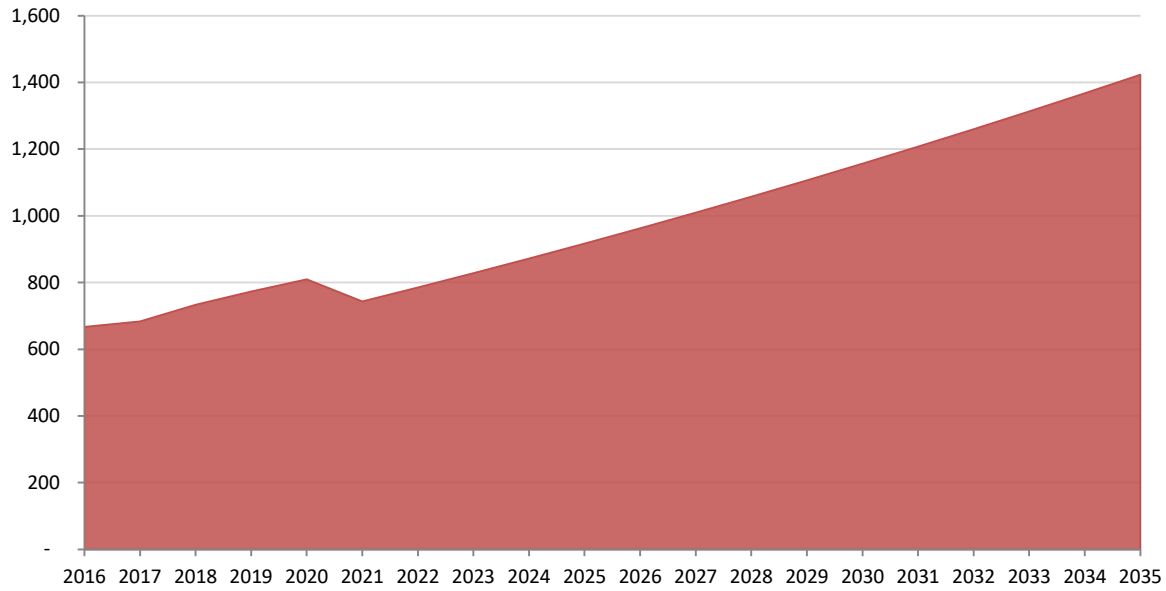
Figure 7: Growth in temporary population pool, by employer (index, 2010 = 100)



2.2.2. Results

Based on the methodology and assumptions summarized in the previous paragraph, the size of the temporary population (before netting out the number of conversions to the permanent population) can be expected to increase at an average rate of growth of 4.1% per year over the forecasting period, from 667 in 2016 to 1,423 in 2035 (see Figure 8).

Figure 8: Baseline growth of temporary population



The average growth rate expected for the future is lower than the historic one observed over 2010-2017 because some of the drivers of growth over that period are expected to come to an end over the forecasted period (e.g., the number of workers employed in the demining sector are expected to leave the Islands when the demining programme will end).

However, the expected average growth rate is still significant, particularly given the limited market size and growth prospects, other things being equal, of the non-resource sectors of the economy. This significant population growth (+756 between 2016 and 2035) appears to be a realistic estimate when considering that the Falkland Islands economy is currently characterized by a considerable gap

between supply and demand of good and services, with imports representing a substantial share of both household consumption and companies' intermediate consumption. Hence, forecasts of future growth in temporary population, presented above, are coherent with the assumption that the local economy would be able to progressively close this gap through import substitution, thus reducing foreign dependency through increased local provision of services. This process, in turn, would progressively attract additional workforce and population to the Islands.

Moreover, baseline growth projections for the temporary population include employment that will be created, both in the public and private sector, following infrastructure developments which have already been planned, as, for example, jobs needed to support operation of the second commercial flight connecting the Falkland Islands with Brazil, jobs needed to run the new Vulnerable Persons Unit 'Tussac House', and jobs created in the new port facility during operation stage. We expect some additional employment and population growth due to increased economic development activity driven in part by the availability of enhanced infrastructure. This additional impact is described in Chapter 5.

2.3. Movements from temporary to permanent population

People who have been ordinarily resident in the Falkland Islands for at least three consecutive years can submit an application for a Permanent Residence Permit (PRP). There are two ways in which applicants of 18 years or older can qualify for a PRP:

- assessment against a points based application – scored over a series of different areas, including income, employment and work experience, property and cash assets, age, and length of residence in the Falkland Islands; or
- being the partner (of three years or more) of a FI status holder or PRP holder.

All applicants must show that they are of good character, have a good command of the English Language, have satisfactory accommodation and are medically fit. The granting of PRP is subject to a quota system which is currently 44 per year split over 4 quarters.

Persons with British citizenship and persons naturalised as a British Overseas Territories citizen who have been ordinarily resident in the Falkland Islands for at least seven years can apply for FI status.

2.3.1. Methodology

Conversion rates measures the percentage of individuals that move from the temporary population pool (Work Permit holders and their dependents + people belonging to other immigration categories) to the permanent population pool (Falkland Islands Status holders + Permanent Residence Permit holders). We define **annual conversion rates** as a measure of the relative number of movements which occur during a certain year:

$$\text{Annual conversion rate} = \frac{\text{Number of movements from the temporary to the permanent population pool, during year } i}{\text{Size of the temporary population pool at the beginning of year } i}$$

Based on an analysis of data from FIG Customs & Immigration, we find the average annual conversion rate[9] to be equal to 2.8%, meaning that, out of 100 people in the temporary population pool, every year, on average, there are 3 who will become permanent residents. This is the same of saying that every person in the temporary population pool has, *every year*, a 2.8% probability of moving to the permanent population pool.

[9] When estimated over the 10-years period 2008-2017, and excluding workers employed at MPC and workers with a Work Permit of less than one year.

Since the average length of stay of Work Permit holders is equal to 3.8 years[10], it follows that every person in the temporary population pool has, *over his/her entire period of stay*, a 10.5% probability of moving to the permanent population pool. This means that, out of 100 people coming to the Falkland Islands on a Work Permit, on average 10 decide to remain and convert to PRP or Falkland Islands Status, while the rest of them leave the Falkland Islands upon expiry of their Work Permit and return to their country of origin (or any other destination).

Therefore, we define **absolute conversion rates** as a measure of the relative number of movements which occur during the entire period of stay of people in the temporary population pool. Absolute conversion rates can be calculated dividing the number of movements from the temporary to the permanent population pool during a certain year by the number of people exiting the temporary population pool during the same year.[11]

$$\text{Absolute conversion rate} = \frac{\text{Number of movements from the temporary to the permanent population pool, during year i}}{\text{Number of people in the temporary population pool exiting the pool during year i}}$$

We find conversion rates to vary depending on a number of factors, including employer and length of stay. Figure 9 shows conversion rates based on the employer being FIG or in the private sector[12]. The private sector appears to be more successful than FIG at retaining its overseas labour force.

Figure 9: Conversion rates, by public sector vs. private sector (average over 2008-2017)

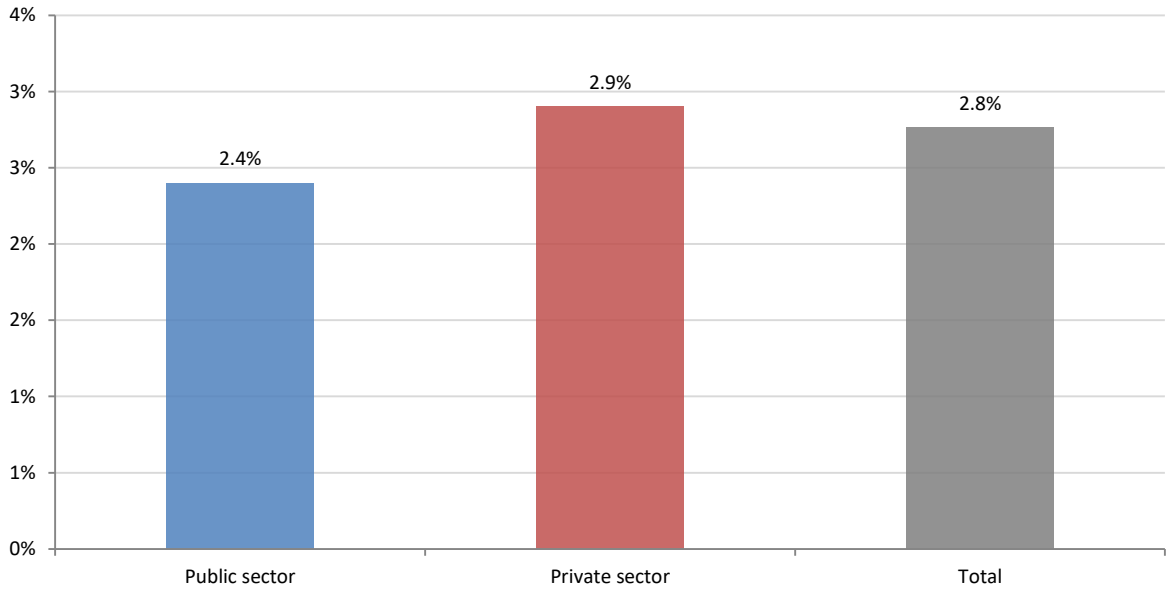


Figure 10 shows absolute conversion rates by length of stay in the temporary population pool at the time of conversion to the permanent population pool. As expected, conversion rates increases after the 3rd year of residence in the Falkland Islands, as before that time Work Permit holders are not able to apply for PRP.[13]

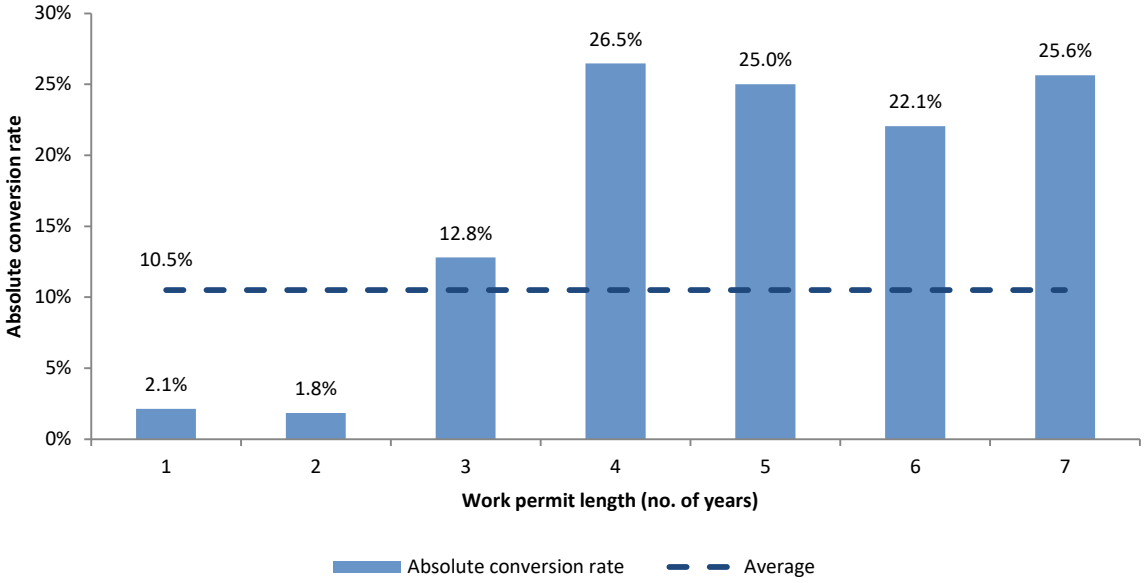
[10] When applying the same restriction listed in Footnote 9.

[11] The number of people exiting the temporary population pool during a certain year include Work Permit holders (and their dependents) leaving the Falkland Islands upon expiry of their Work Permit, as well as people moving from the temporary to the permanent population pool.

[12] Work Permit holders are classified based on the employer sponsoring their first Work Permit.

[13] It could be argued, therefore, that calculations to estimate the average absolute conversion rate would need to exclude all Work Permit holders with a length of stay of less than 3 years; that way, the average absolute conversion rate would be equal to 28% instead of 12.5%. However, we believe it is appropriate to include Work Permit holders with a length of stay of less than 3 years, since we wish to understand changes to the total proportion of temporary to permanent population. Relying on an increasing proportion of temporary workers to fill permanent positions will have

Figure 10: Absolute conversion rate by length of stay in the temporary population pool (average 2008-2017)

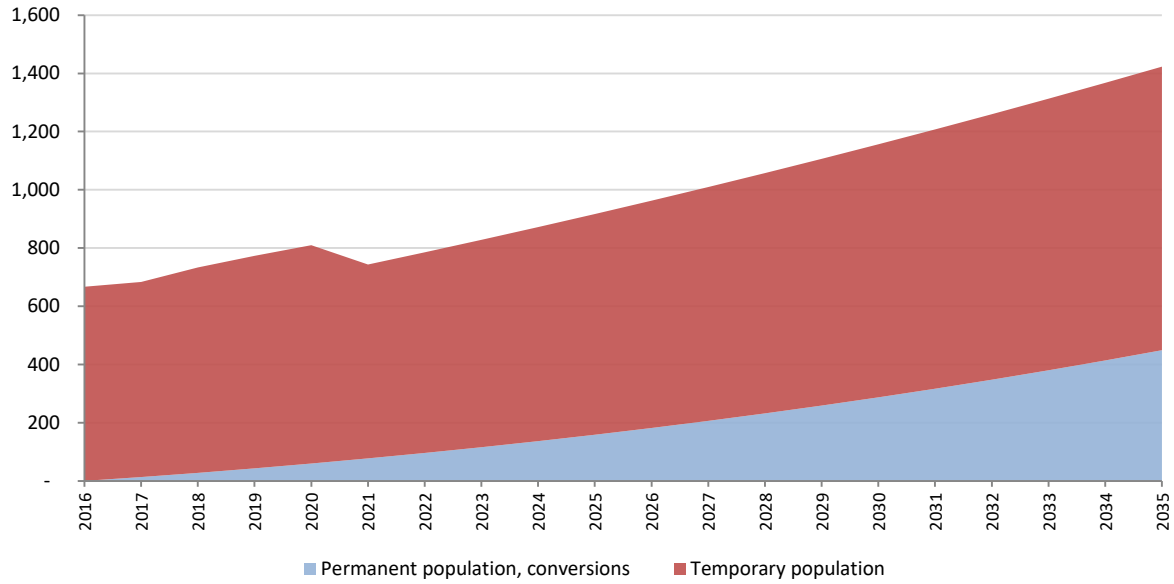


2.3.2. Results

Based on the methodology and assumptions described above, we expect the number of conversions from the temporary to the permanent population pool to be equal, on average, to 25 per year between 2020 and 2035.

Figure 11 updates the findings shown in Figure 8 above by isolating the number of conversions to the permanent population pool from total baseline growth in temporary population.

Figure 11: Growth in temporary population and conversions to permanent population



impacts for labour costs, productivity, economic output, infrastructure and service requirements, and community stability.

2.4. Core population growth – Summary

Table 4 and Figure 12 below report our projections of core population growth between 2016 and 2035, with a breakdown by population category.

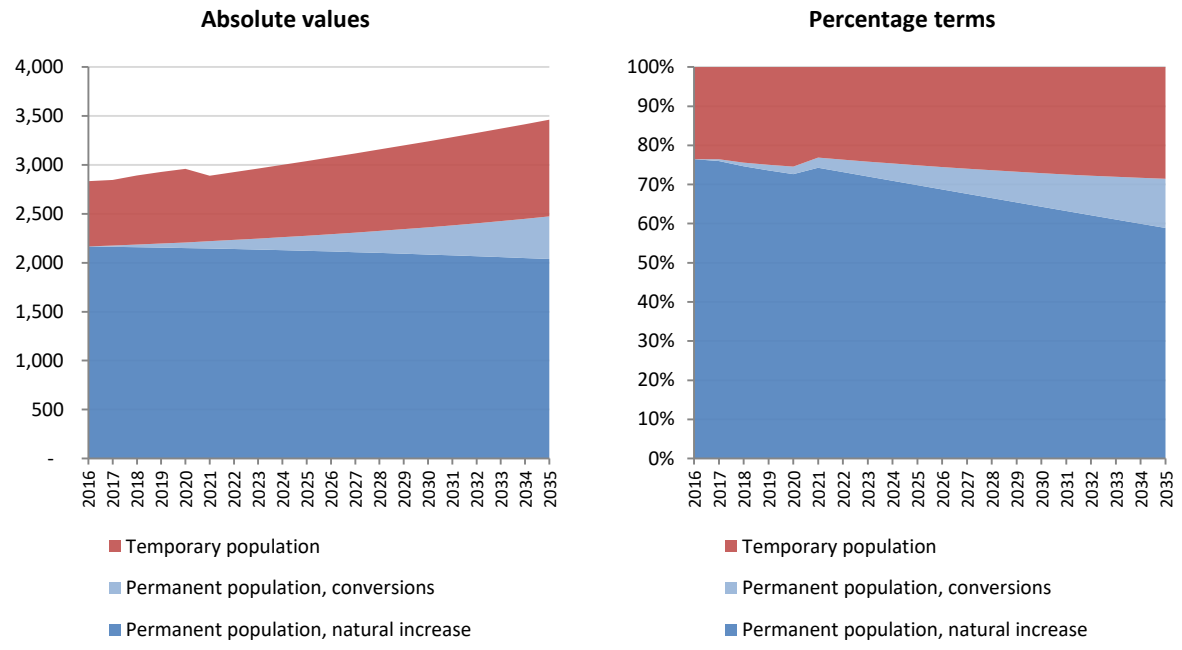
Results show that, between 2016 and 2035:

- **core population, permanent** (including baseline growth in permanent population and conversions from the temporary population pool) can be foreseen to grow from 2,167 in 2016 to 2,474 in 2035, at an average rate of growth of 0.7% per year;
- **core population, temporary** (i.e. baseline growth in temporary population net of conversions to the permanent population pool) can be foreseen to grow from 667 in 2016 to 988 in 2035, at an average rate of growth of 2.1% per year; this population pool is foreseen to grow from 24% to 29% of total population over the considered period;
- without the impact of oil development or additional economic development, the overall **core population** can be expected to increase from 2,834 in 2016 to 3,462 in 2035, at an average rate of growth of 1.1% per year.

Table 4: Projections of workforce and population growth

	Census End 2016	Current End 2019	Immediate End 2022	Short term End 2025	Long term End 2035
Baseline growth in permanent population	2,167	2,155	2,141	2,122	2,039
Conversions to permanent population	-	42	93	154	435
Core population, permanent	**2,167**	**2,197**	**2,234**	**2,276**	**2,474**
Core population, temporary	667	731	692	763	988
Core population	**2,834**	**2,928**	**2,926**	**3,039**	**3,462**
Core population, temporary (% of core population)	24%	25%	24%	25%	29%

Figure 12: Projections of core population growth



3. Oil & gas development

The round of exploration for oil and gas that started in 2010 has resulted in the first commercially developable discoveries of oil in the waters of the Falklands. Work on the development of the Sea Lion field by Premier Oil is underway, following the initial discovery by Rockhopper Exploration in 2010. The potential development of an oil & gas production project could have significant socio-economic impacts and drive an inflow of workers both temporarily during the infrastructure construction phase, and more permanently over the steady-state production phase.

We consider the following population impacts from oil & gas development:

1. Direct, indirect and induced employment;
2. Public sector employment;
3. Population effects.

3.1. Direct, indirect and induced employment from oil development

A number of additional workers would be employed onshore in the Falkland Islands directly by the oil licensees (direct jobs) or by companies supplying goods or services to them (indirect jobs). A number of employees would also be required in jobs induced by the spending of the individuals directly or indirectly employed (induced jobs).

In the following paragraphs, direct, indirect, and induced jobs will be analysed separately.

3.1.1. Direct jobs

Direct job creation estimates have been produced by Premier Oil (PMO) and shared with FIG on 13/12/2018. These are shown in Table 5. In this paper, direct jobs are assumed to be equal to "Onshore jobs", as discussions with Premier Oil have confirmed that "offshore jobs" are expected to be filled by a transient and rotating workforce which will only be present on the Falkland Islands during crew changes and are not expected to consume public services.

Table 5: Premier Oil workforce assumptions, December 2018

	Y1[14]	Y2	Y3	Y4	Y5	Y6 to Y23
Onshore jobs	45	109	132	102	88	44
Offshore jobs	45	180	301	299	253	148
Total jobs	**90**	**289**	**432**	**401**	**341**	**192**

3.1.2. Indirect jobs

Premier Oil listed onshore personnel requirements across the following functions:

Local	Expat
• PMO Stanley Office • Port Facility Laydown & Storage Base – Contractors • Helicopter Pilots – Crew and Engineering • Production Chemicals Storage Base – Operation	• PMO Stanley Office: FI Rep and Country Manager • Laydown & Storage Base – Contractors • Helicopter Pilots – Crew and Engineering • MODU Drilling Service Contractors / Tool Servicing • FPSO Production Service Contractors Onshore • Subsea Installation Onshore • FPSO Installation, Hook-up & Commissioning

[14] We assume 2020 as 'Year 1'.

Premier Oil refers to some of the job functions they require as "local" and some as "expat"; what these terms mean is not explained. For the purposes of this paper, and consistent with discussions with PMO, it is assumed that local jobs are ones that could be filled by local people, that is, that they do not require specialist skills that are unlikely to be found in the Islands, while expat jobs are unlikely to be filled by Falkland Islanders, although presumably there would be no barrier to a suitably qualified Falkland Islander being hired into these positions.

As there is full employment in the Falkland Islands, it may not in fact be possible to fill local positions with local people. For every oil-related job that is taken up by a local worker, we must assume that this will create a corresponding vacancy for another employer. Therefore, for the purposes of this paper, we assume that every new job created, whether classified as local or expat by Premier Oil, will require recruitment of workers from overseas.

This list does not cover all the activities that might be required for the project to operate successfully. In its 2013 Socio-Economic Impact Study[15], consultant Regeneris assumed that the following jobs would be required in addition to the ones listed above:

- Supply boats companies (onshore);
- Crew logistics (including flights, travel around islands);
- Security;
- Other onshore services (IT, accountancy, telecoms, training, environmental consultancy etc.).

For the purposes of this paper, it is assumed that these additional functions will still be required for Sea Lion Phase 1. However, the number of personnel in each of these functions has been scaled down in line with Premier Oil's revised employment forecasts. The revised estimates of indirect jobs are as in the following table.

Table 6: Indirect jobs assumptions

	Development phase	Production phase
Supply boats companies	5	2
Crew logistics	20	7
Security	15	7
Other onshore services	6	3
Total	**46**	**19**

3.1.3. Induced jobs

Multipliers analysis has been carried out based on Input-Output Tables (IOT) constructed by the Policy and Economic Development Directorate using the previously created 2012 Supply and Use Tables (SUT). IOTs allow deriving a number of multipliers, which describe the relationship between the initial injection in the economy and the resulting impact on the wider economy in terms of increased production, value added, and employment. This IOT is considered to be more representative of the actual structure of the Falkland Islands economy and allows a more accurate estimate of impacts from economic activity.

Multipliers are highly dependent on a number of local conditions, including the following:

- **The diversity of economic activities.** Little diversity leads to high imports, and high imports in turn lead to low multipliers and effects, since imports represent leakages out of the local economy. Multipliers estimated for the Falkland Islands are low, due to the high proportion of imports both for industry procurement and household spending.

[15] Regeneris Consulting Ltd (May 2013). Socio-Economic Study of Oil and Gas Development in the Falklands.

- **The labour intensity of the sector.** The larger the share of labour as an input, the higher the employment multipliers can be expected to be. We can therefore expect high employment multipliers in low capital-intensive sectors (such as the accommodation and food & beverage sector) and low employment multipliers in high capital-intensive sectors.

- **The consumption pattern of the local population.** If a greater share of wages is spent on consumption rather than savings or taxes, the induced multipliers are expected to be stronger. Multipliers estimated for the Falkland Islands are low, due to the low proportion of spending (and, in particular, of spending in the local market) over total income.

Table 7 reports employment multipliers estimated for the wider Falkland Islands economy. "Employment multiplier I" shows the ratio of direct + indirect jobs over directs jobs, while "Employment multiplier II" shows the ratio of direct + indirect + induced jobs over directs jobs. This paper estimates induced jobs using these multipliers. Based on these assumptions, for every 100 direct and indirect jobs, 5 additional jobs will be created in the broader economy as a result of additional spending by individuals directly or indirectly employed.[16]

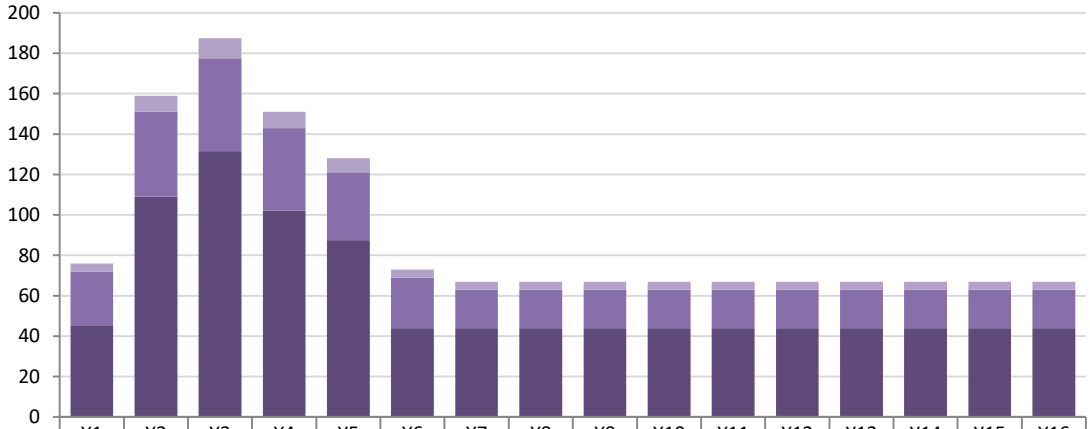
Table 7: Employment multipliers

	Employment multiplier I	Employment multiplier II
Total economy	1.39	1.46

3.1.4. Direct, indirect and induced employment – results

Figure 13 provides estimates of the size of direct, indirect, and induced employment from oil & gas development. Additional employment reaches a maximum of 188 at Year 3 and declines to 67 in the steady state (Year 7 onwards).

Figure 13: Sea Lion Phase 1, additional direct, indirect and induced employment



	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15	Y16
Induced	4	8	10	8	7	4	4	4	4	4	4	4	4	4	4	4
Indirect	27	42	46	41	34	25	19	19	19	19	19	19	19	19	19	19
Direct	45	109	132	102	88	44	44	44	44	44	44	44	44	44	44	44
Total	76	159	188	151	128	73	67	67	67	67	67	67	67	67	67	67

[16] This result can be obtained as the ratio of the difference between the "Employment multiplier II" and the "Employment multiplier I" to the "Employer multiplier I", i.e. (1.46 – 1.39) / 1.39 = 0.05

Comparison with Regeneris' 2013 estimates

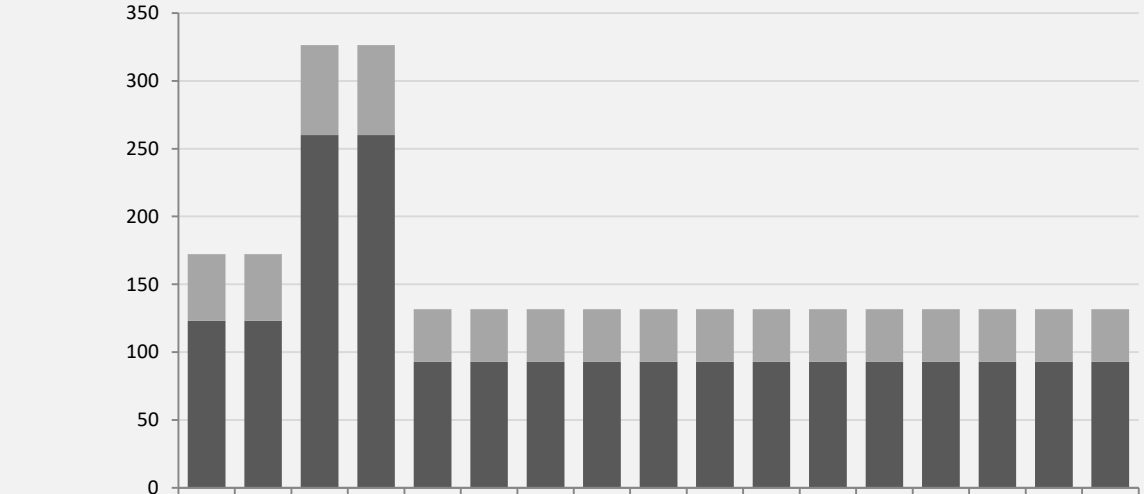
These estimates in this report are significantly lower than those originally made by Regeneris in 2013 (Figure 14). In the years since the Regeneris report, expectations of the pace and extent of development have been significantly revised. Unlike the pace of development anticipated in 2013, there is currently only one field expected to be developed in the near term. In addition, with regards to the Sea Lion project, Premier Oil has significantly refined and streamlined its development and production requirements and its current personnel estimates are lower than previous assumptions.

In our current estimates, direct and indirect onshore employment for Phase One of the Sea Lion development peaks at 188, compared to 326 in Regeneris' estimates. This difference is primarily driven by Regeneris' assumption that the development phase would require "100 direct jobs involved in a flowlines assembly base" for two years. This requirement has been removed from Premier's current field development plans.

Steady state direct and indirect employment (i.e. from Year 7 onward) is now estimated at 63, compared to 93 in the Regeneris estimates.

The ratio of induced employment to direct and indirect employment is much lower in the new estimates than in the Regeneris estimates. This is because new economic multipliers have been developed and applied to more accurately represent the structure of the Falklands economy, and in particular the high import content of goods and services.[17]

Figure 14: 2013 Regeneris estimates, additional direct, indirect and induced employment



	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17
Induced	49	49	66	66	39	39	39	39	39	39	39	39	39	39	39	39	39
Direct & Indirect	123	123	260	260	93	93	93	93	93	93	93	93	93	93	93	93	93

[17] Regeneris adopted the same broad approach to estimating induced jobs, but used multiplier assumptions based on the UK, rather than Falkland Islands economy. This overstated the effect of additional consumer demand on jobs, as the Falkland Islands economy is far more dependent on imports than the UK economy.

3.2. Public sector employment

Additional residents, including additional workers and their dependents, will consume public services; this will require FIG to hire more employees to maintain the standard of the services currently provided.

Additional public sector employment can be split into three categories:

- Increased FIG employment directly related to oil;
- employment in education;
- other public services.

In the following paragraphs these three categories will be analysed separately.

3.2.1. Employment in FIG roles directly related to oil

FIG would need to hire additional employees to work specifically on oil related matters. The previous Head of Tax estimated that the Taxation Office would likely need to double in size. Additional officers will be required for direct regulation within the Directorate of Mineral Resources, as well as in other Directorates (e.g. Legal, Policy, Emergency planning).

For this purposes of socio-economic impact forecasting, and following consultation with the Directorate of Mineral Resources, we have assumed that 30 additional jobs will be created in FIG for roles directly related to oil. This capacity increase will be required primarily in Minerals, Taxation, Finance and Environment, as well as in other FIG Directorates, including Health, Emergency Services and Island Security, and the Attorney General's Chamber.[18] As part of the Falkland Islands Government oil readiness preparations, detailed work is ongoing to more accurately identify resource requirements by service, and will be available as a separate report, by the end of 2019.

3.2.2. Employment in education

Based on the ratios observed in the 2016 Census, the ratio of children to work permit holders can be estimated at 0.15. In their 2013 study, Regeneris estimated that 1 new education worker would be required for every 18 schoolchildren; FIG policy is to maintain a ratio of 1 teacher for every 20 schoolchildren. In our estimate of new teachers required due to the expected population increases due to Sea Lion activity, we adopt the more conservative Regeneris assumption.

Therefore, we foresee that the increase in the number of schoolchildren due to Sea Lion Phase 1 economic activity (please see Paragraph 3.3 for more details) will require the hiring of **one additional teacher** in the oil steady state (as with general public sector workers, it is assumed that FIG will not permanently employ more teachers than this in response to a short-term spike in population during the development phase). However, the actual number of teachers cannot be accurately predicted, as it will be dependent on the age of children immigrating to the Falkland Islands and existing student demographics in any given year.

3.2.3. Other public sector employment needs

Discussions between Regeneris and FIG Directors in 2013 suggested that the relationship between additional residents and additional employment in public service (excluding education) would be as in the following table.

[18] According to Stephen Luxton (Director of Mineral Resources), additional FIG roles directly related to oil can be assumed to be between 10 on the low side and 30 on the high side (source: mail received on 11/04/2019). The assumption adopted in this report corresponds to the high end of the range.

Table 8: Additional employment in public service (excluding employment in education)

Additional residents	250	500	1000	1250
Extra staff FTE	24.6	36.3	57.1	68.7
Staff FTE per 100 extra population	9.8	7.2	5.7	5.5

This paper continues to use the assumption of 9.8 FIG staff per 100 additional residents and applies it to the expected number of additional residents in each year to estimate the number of additional government employees required to maintain existing standards of service for an increased population. We believe this assumption is still valid as it appears to be coherent with data from the Census: between 2012 and 2016 population in the Falkland Islands (excluding MPC) grew by 370, while FIG employment grew by 40, thus at a rate of 10.8 public sector employees / 100 extra population. This estimate is conservative and does not take into account the potential for productivity or efficiency improvements.

It is expected that expatriate onshore employees will predominantly work on a rotational basis, spending only a few weeks on the Islands before spending a similar period elsewhere. These employees are likely to place only a small demand on public services (for example, they are unlikely to use medical services other than in an emergency). The remaining direct and indirect employees, as well as induced employees, are likely to be more similar to the existing population in the way that they consume public services.

Based on the current projections, direct, indirect and induced employees and their dependents would generate demand for **eight more public sector employees** in the steady state. In practice, FIG may choose not to increase public sector employment beyond this in the years before the steady state is reached, even though population numbers could be higher for that period. For the purposes of this paper, it is assumed that FIG will employ eight extra workers (excluding teachers and those in jobs directly related to oil) throughout the project.

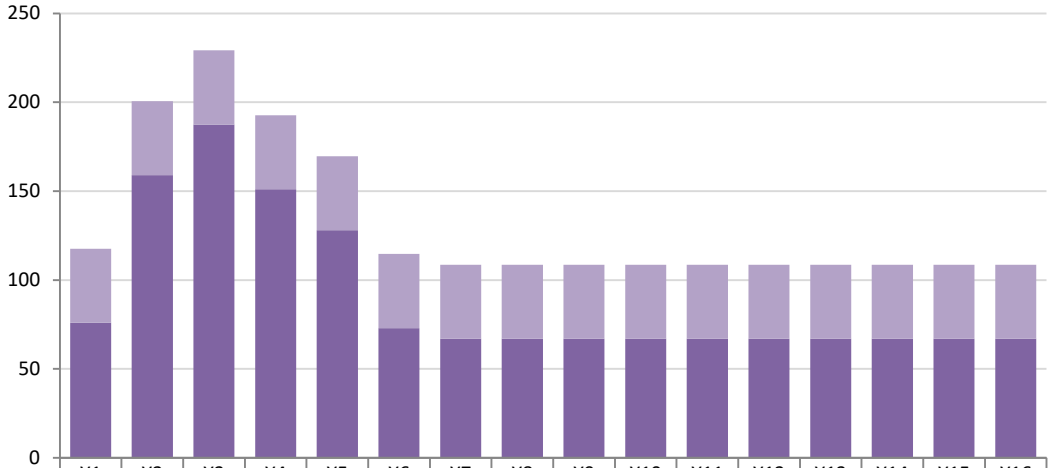
3.2.4. Public sector employment – results

Table 9 reports a summary of the additional public sector employment needs, while Figure 15 shows additional public sector employees alongside direct, indirect, and induced employees.

Table 9: Public sector employment - summary

	FIG roles directly related to oil	Employment in education	Other public sector employment	Jobs induced by the additional FIG workers	Total
Public Sector employment	30	1	8	3	42

Figure 15: Sea Lion Phase 1, additional direct & indirect, induced, and public sector employment

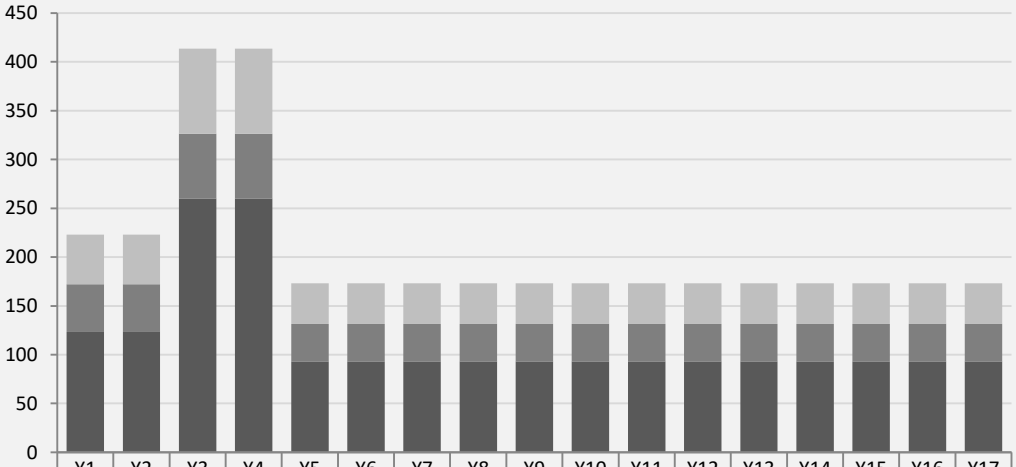


	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15	Y16
Public sector	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42
Direct indirect & induced	76	159	188	151	128	73	67	67	67	67	67	67	67	67	67	67
Total	118	201	229	193	170	115	109	109	109	109	109	109	109	109	109	109

Comparison with Regeneris' 2013 estimates

As with the estimates of direct, indirect and induced employment, the estimates of additional public sector employment are lower than Regeneris' original estimates. This is primarily due to lower estimates of direct, indirect and induced employment from Sea Lion activity, and also because of revised assumptions about the impact of additional onshore employees on the Island's population (these are explained in the paragraph "Population effects").

Figure 16: 2013 Regeneris estimates, additional direct, indirect, induced and public sector employment



	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17
Super-Multiplier	51	51	87	87	41	41	41	41	41	41	41	41	41	41	41	41	41
Induced	49	49	66	66	39	39	39	39	39	39	39	39	39	39	39	39	39
Direct & Indirect	123	123	260	260	93	93	93	93	93	93	93	93	93	93	93	93	93

Note: The Regeneris report referred to additional public sector jobs as "super-multiplier" jobs.

3.3. Population effects

The Sea Lion Phase 1 project would increase the population of the Falkland Islands for the period of the project. "Population" will, for the purposes of this paper, refer to persons who are present in the Falkland Islands other than persons who are in short-term transit through the Islands. So offshore oil workers in transit and visitors on business will be excluded, while onshore oil workers will be included even if they do not intend to remain in the islands in the long term.

It also refers to the number of people on the Islands at any one time. So, the figure for additional population could remain constant across two years even if not one individual additional resident remained resident for both years.[19] As the Falkland Islands has full or near-full employment, each additional job would require at least one additional person relocating to the Falkland Islands (while some oil jobs may be filled by Falkland Islanders, someone else would be needed to fill their old job). Some of these additional employees would be expected to bring dependents with them, so the effect on population will exceed the effect on employment.

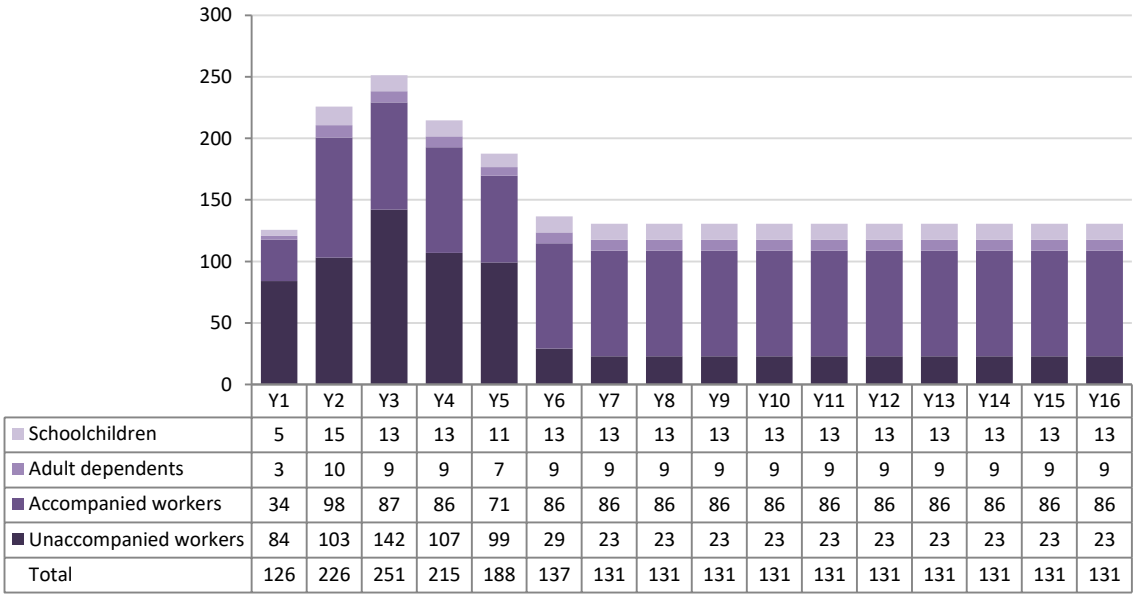
Based on information provided by Premier Oil, it seems likely that almost all onshore expat employees will work on a rotational basis. Therefore it is assumed that these workers (which amount for about 30% of total onshore workers at steady state) will not bring dependents with them. It is also assumed that people employed on infrastructure construction projects will be unaccompanied.

The next table details the assumptions made to estimate the number of dependents (spouses and children) of accompanied workers. These estimates are based on an analysis of 2016 Census data on the number of Work Permit holders and their dependents.

Table 10: Assumptions on ratios of dependents to work permits holders

	Value
Ratio of adult dependents to work permits holders	0.10
Ratio of children to work permits holders	0.15
Total	**0.25**

Figure 17: Sea Lion Phase 1, population effects



	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15	Y16
Schoolchildren	5	15	13	13	11	13	13	13	13	13	13	13	13	13	13	13
Adult dependents	3	10	9	9	7	9	9	9	9	9	9	9	9	9	9	9
Accompanied workers	34	98	87	86	71	86	86	86	86	86	86	86	86	86	86	86
Unaccompanied workers	84	103	142	107	99	29	23	23	23	23	23	23	23	23	23	23
Total	126	226	251	215	188	137	131	131	131	131	131	131	131	131	131	131

[19] However, the rate of churn in additional employees will likely have an effect on the administrative burden. For example, FIG will incur a cost in processing each individual work permit application. There may also be some social implications of an increasingly transient population.

Estimates of population effects are shown in Figure 17. Sea Lion Phase 1 is expected to increase the Falklands population by **131** people in the steady state (to put this in context, the Stanley population increased by 340 between 2012 and 2016). **109** of these people will be workers, with the remainder being dependents, around two thirds of whom will be children[20].

A sensitivity analysis was completed to create a credible 'upper bound' for population, based on higher ratios of dependents and children to work permit holders (see Appendix A). In this high case scenario, activity related to Sea Lion Phase 1 would increase the Falkland Islands population by **152** persons in the steady state.

Comparison with Regeneris' 2013 estimates

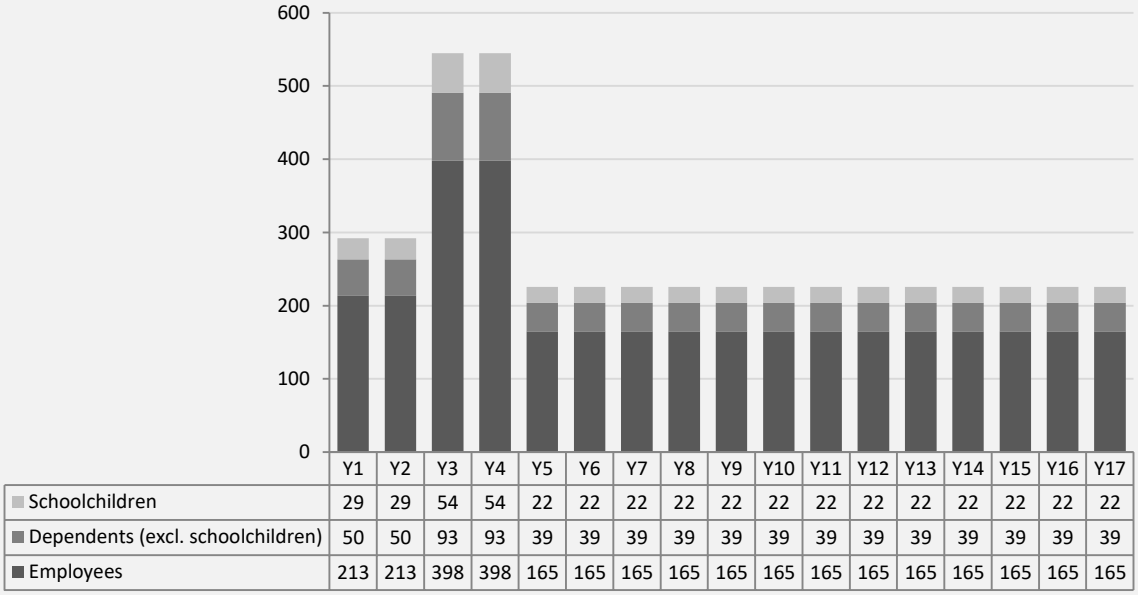
The next table compares the assumptions used in the original Regeneris model, based on data from the 2012 Census, with those used in this paper based on 2016 Census, to estimate the number of dependents of accompanied workers.

Table 11: Assumptions on ratios of dependents to work permits holders

	Source	Ratio of adult dependents to work permits holders	Ratio of children to work permits holders
Regeneris report	Census 2012	0.20	0.17
2019 report	Census 2016	0.10	0.15

Our current estimates are significantly lower than the original projections from the Regeneris report. This is mainly due to differences in employment estimates, as well as the further assumption made in this paper that expatriate oil workers will be unaccompanied.

Figure 18: 2013 Regeneris estimates, population effects



	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17
Schoolchildren	29	29	54	54	22	22	22	22	22	22	22	22	22	22	22	22	22
Dependents (excl. schoolchildren)	50	50	93	93	39	39	39	39	39	39	39	39	39	39	39	39	39
Employees	213	213	398	398	165	165	165	165	165	165	165	165	165	165	165	165	165

[20] The number of adult dependents may seem low; this is due to the fact that the majority of adult dependents accompanying a work permit holder will also enter the workforce while they are resident here; these are already included in the indirect, induced, or public sector jobs, so including them within the dependents group would have led to an overestimate due to double-counting.

3.4. Oil & gas development – Summary

A summary of workforce requirements and population effects driven by oil & gas development is shown in Table 12.

Table 12: Oil & gas development, summary of workforce and population effects

	Y1	Y2	Y3	Y4	Y5	Y6 to Y23
Direct employment	45	109	132	102	88	44
Indirect employment	27	42	46	41	34	19
Induced employment	4	8	10	8	7	4
Public sector employment	42	42	42	42	42	42
Total employment	**118**	**201**	**230**	**193**	**171**	**109**
Adult dependents	3	10	9	9	7	9
Children dependents	5	15	13	13	11	13
Total population	**126**	**226**	**252**	**215**	**189**	**131**

4. Islands infrastructure requirements

The Falkland Islands Government has laid out an ambitious capital programme that will be implemented in the following years, to support the strategic priorities outlined in both the Economic Development Plan and The Islands Plan. As described in the National Infrastructure Plan, the programme will offer significant opportunities to attract international inward investment, and lay the foundations to support future economic expansion.

The short-term (2019- 2024) capital programme includes:

- construction of a new power station;
- construction of a new waste management facility;
- roads improvement works;
- design and construction of a new sea port, a vital investment that will support the growth of the Falkland Islands fishing and tourism industry, scientific research sector, as well as its imports and exports;
- design and construction of a new multi-purpose sports facility;
- acceleration of investments in housing, including collaboration with the Ministry of Defence, for the short-term provision of 70 new high quality houses;
- design and construction of the new Falklands College, replacing the existingTraining Centre to support workforce development;
- design and construction of “Tussac House”, a long term care facility;
- design and construction of a new surgical theatre at the King Edward Memorial Hospital (KEMH);
- design and construction of a new airport terminal building at Mount Pleasant Airport.

Consistent with the assumptions and methodology applied to estimate the total employment impacts of potential oil & gas investments, we estimate workforce and population growth driven by infrastructure projects as the sum of:

- direct employment during the construction phase;
- direct employment during the operation phase;
- indirect and induced employment;
- public sector employment; and
- population effects.

4.1. Direct, indirect and induced employment from capital projects

The following paragraphs will discuss direct, indirect and induced employment separately.

4.1.1. Direct employment

Table 13 reports the assumed workforce requirement for the construction phase of the planned capital projects (projects are sorted in chronological order). Data have been validated by FIG Development and Commercial Services Directorate on 19/09/2019.

Table 13: Infrastructure projects; employment assumptions

Employment	Number of workers (minimum)	Number of workers (maximum)	Time period
KEMH	15	20	2020-2022
Falkland College	4	4	2019-2020
Tussac House	30	40	2020-2022
FIG/MOD housing	15	20	2021-2023
MPA terminal	15	25	2021-2022
Sport Centre	10	15	2021-2022
Power station	20	30	2021-2022
Port (design phase)	10	15	2020-2021
Port (construction phase)	30	40	2022-2024
Waste management	5	5	2020-2021
Roads improvement	6	6	2020-2024

Our assumptions of workforce requirement reflect an average of expected minimum and maximum employment needs, as well as the expected time period over which infrastructure development would take place, and are shown in Table 14.

Table 14: Infrastructure projects; direct jobs assumptions

	2019	2020	2021	2022	2023	2024	2025
Direct jobs	4	80	151	169	59	41	-

4.1.2. Indirect and induced jobs

Table 15 reports the assumed employment multipliers, derived from the 2012 Falkland Islands Input-Output tables, with reference to the construction sector.[21] Based on these assumptions, for every 100 direct jobs, 13 jobs will be created by companies downstream in the construction sector's supply chain (i.e. indirect jobs), while 2 jobs will be created in the broader economy as a result of additional spending by individuals directly and indirectly employed (i.e. induced jobs).

Table 15: Employment multipliers, construction sector

	Employment multiplier I	Employment multiplier II
Construction sector	1.13	1.15

Table 16 reports our forecast of the number of indirect and induced jobs stimulated by the planned / expected infrastructure development.

Table 16: Infrastructure projects; indirect and induced jobs assumptions

	2019	2020	2021	2022	2023	2024	2025 and onwards
Indirect jobs	1	10	20	22	8	5	-
Induced jobs	-	2	3	3	1	1	-

[21] For an explanation of the meaning of "Employment multiplier I" and "Employment multiplier II", please see Paragraph 3.1.3.

4.2. Population effects

The next table details the assumptions made to estimate the number of dependents of the additional workers needed in the construction sector (direct jobs) as well as in the other sectors of the economy (indirect and induced jobs). Ratios of number of dependents to number of workers for the construction sector are assumed to be equal to one third of those assumed for the wider economy, to reflect that construction workers would represent a more transient population compared with workers migrating to the Falkland Islands to take jobs in other sectors of the economy.

Table 17: Assumptions on ratios of dependents to work permits holders

	Construction	Other sectors of the economy
Ratio of adult dependents to work permits holders	0.03	0.10
Ratio of children to work permits holders	0.05	0.15
Total	**0.08**	**0.25**

Table 18 details the number of dependents (spouses and children) based on the assumptions detailed above.

Table 18: Infrastructure projects; population effects

	2019	2020	2021	2022	2023	2024	2025 and onwards
Adult dependents	-	3	7	7	1	1	-
Schoolchildren	-	5	10	11	3	2	-

4.3. Islands infrastructure requirements – Summary

A summary of workforce requirements and population effects driven by infrastructure development is shown in Table 19. Infrastructure development is expected to increase the Falklands population by a maximum of **212** people in 2022 (194 of which will be workers, while 18 will be dependents, including 11 children).

Table 19: Islands infrastructure requirements, population effects

	2019	2020	2021	2022	2023	2024	2025 and onwards
Direct jobs	4	80	151	169	59	41	-
Indirect jobs and induced jobs	1	12	23	25	9	6	-
Population effects	-	8	17	18	4	3	-
Total	**5**	**100**	**191**	**212**	**72**	**50**	**-**

5. Further economic development

Expenditure injections into an economic system (such as, in our case, investment in oil & gas development, infrastructure and other capital projects) become a source of additional demand throughout the supply chain, as well as generating additional income and jobs for the existing workforce. The process of the re-spending of revenues and incomes in other sectors of the economy creates additional economic activity and is known as the **multiplier effect**.

This economic mechanism generates three types of effects:

- the **direct effect** is the initial injection / investment, which creates additional output for particular businesses or industries (e.g. the construction sector);
- secondly, the **indirect effect** brings the additional revenue for the businesses that supply the necessary inputs, and so on down the supply chain;
- finally, the private households that benefit from the direct and indirect effects spend a proportion of their increased incomes on consumption – this is the **induced effect**.

The analysis and estimate of indirect and induced effects (which jointly constitute what is commonly called the **secondary effect**) on employment has been carried out in the previous sections.

We believe that significant investment in a new industry, as well as in key infrastructure and capacity (for example, the new port or the second commercial flight), will have an additional stimulating impact on economic development and consequent population growth. Further, to stimulate output and revenue downstream in the supply chain, and thanks to increased levels of household income and spending, the new infrastructure endowment will generate **further economic development** in the national economy through a number of mechanisms, including increased connections to export markets, investment stimulation, productivity gains, and by laying the necessary[22] foundation for the emergence of new economic ventures and economic sectors. Further economic development will also include further infrastructure investment, currently not included in our longer term population projections to minimise the risk of double-counting.

We assume that, if oil & gas development is sanctioned, the annual rate of growth of population will increase by 0.5% from 2024 (i.e. the first assumed year of oil production). Similarly, we assume that, as a consequence of the planned capital investment (in particular, the construction of the new port), the annual population growth rate will increase by a further 0.5% from 2026 (i.e. the first assumed year of operation of the port).

We estimate that, due to further economic development enabled by oil & gas development as well as capital investment, employment will grow slightly and the Falkland Islands population could be expected to grow by 33 additional people per year, on average between 2023 and 2035.

[22] Although probably not sufficient by themselves: further investment will be needed (e.g. in telecommunications) to enable new ventures to operate successfully.

6. Conclusions – Total population growth

6.1. Totals by category

Table 20 and Figure 19 show our population projections to 2035, and include:

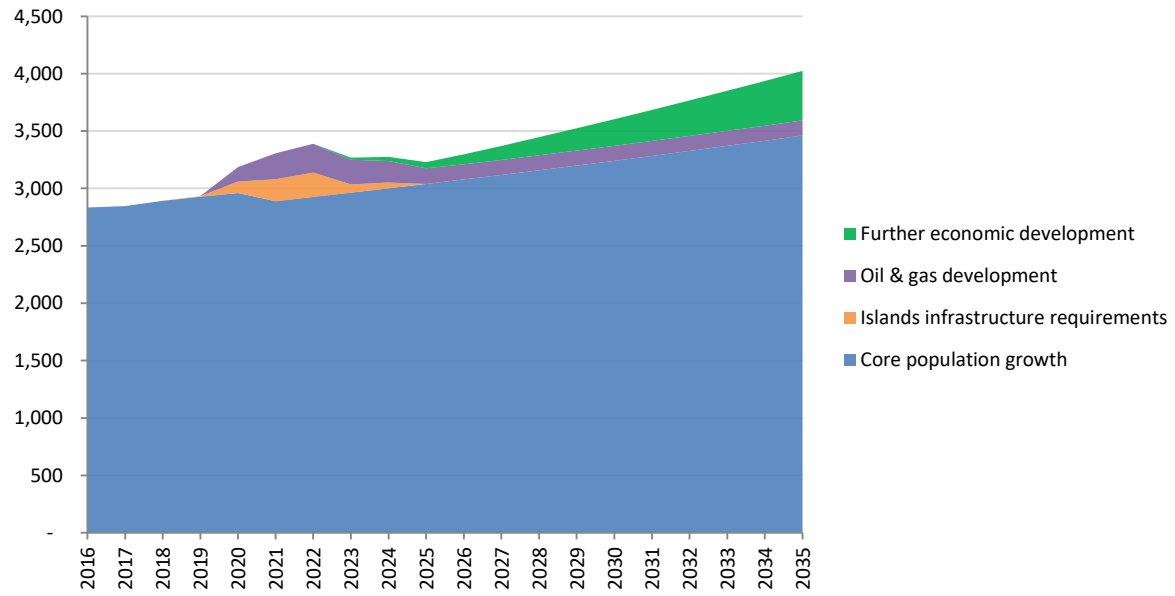
- core population growth (see Chapter 2);
- population growth driven by oil & gas development (see Chapter 3);
- population growth driven by Islands infrastructure development (see Chapter 4); and
- population growth driven by the foreseeable further economic development enabled by oil & gas development and the new infrastructure endowment (see Chapter 5).

Total population is forecasted to grow from 2,843 in 2016 to 4,024 in 2035, at an average rate of growth of 1.9% per year (i.e. 63 people per year). The most abrupt increase in population is expected to happen before the end of 2022 (+16% over end 2019, i.e. +456 people).

Table 20: Projections of workforce and population growth

	Census End 2016	Current End 2019	Immediate End 2022	Short term End 2025	Long term End 2035
Core population growth	2,834	2,928	2,926	3,039	3,462
Oil & gas development	-	-	251	137	131
Islands infrastructure requirements	-	5	212	-	-
Further economic development	-	-	-	53	431
Total population	**2,834**	**2,933**	**3,389**	**3,229**	**4,024**

Figure 19: Population growth projections



6.2. Share of population in employment

In 2016, as recorded by the last Falkland Islands Census, 1,728 people, or 61% of total population (excluding MPC) were classified as "employed". In the permanent population pool, the share of population in employment was equal to 57%, while the corresponding figure for the temporary population pool was 75%.

Figures on the share of population in employment over total population (including children and pensioners) do not reflect the labour force participation rate – which is remarkably high in the Falkland Islands (89% in 2016; for comparison, the UK rate was 78% in the same year).

Table 21 details the assumptions made on the projected share of population in employment, by population category. Methodology and data sources vary for each considered population category:

- when looking to core population growth, the split between population in employment and other residents is based on data from the Falkland Islands Census 2016 (and for baseline growth of permanent population, on our projections of the age dependency ratio (ADR) in future years);
- in the case of oil & gas development and Islands infrastructure requirements, the split is based on the detailed analysis carried out in Chapters 3 and 4, where the number of workers and dependents are estimated separately;
- in the case of the additional population growth expected from further economic development, we have assumed that the split will reflect the actual one observed for temporary population in 2016.

Table 21: Share of population in employment, by population category – Assumptions

Population category		Source	Value
Core population growth	Baseline growth in permanent population	Analysis of Census 2016 data and projected ADR	Decreasing from 57% (2016) to 53% (2035)
	Baseline growth in temporary population	Analysis of Census 2016 data	75%
Oil & gas development		Ad-hoc analysis (see Chapter 3)	91% on average in 2020-2025 and 84% in steady state
Islands infrastructure requirements		Ad-hoc analysis (see Chapter 4)	89% on average in 2019-2025 and 82% from 2026 onwards
Economic development		Assumed at the same level as baseline growth in temporary population	75%

Table 22 shows our projections of the number of people in employment vs. other residents, by population category, in the base year and over the four projected time horizons. Total population in employment is forecasted to increase from 1,732 in 2016 to 2,589 in 2035, or from 61% to 64% when expressed as a share of total population. As noted in the Executive Summary, the actual (2016) and expected labour force participation rate, which includes only population between the ages of 15-64, is much higher (observed rate in 2016 was 89%).

Table 22: Population in employment and other residents, by population category

		Census End 2016	Current End 2019	Immediate End 2022	Short term End 2025	Long term End 2035
Population in employment	Core population growth	1,732	1,819	1,811	1,892	2,155
	Oil & gas development	-	-	229	115	109
	Islands infrastructure requirements	-	5	194	-	-
	Further economic development	-	-	-	40	325
	Total	**1,732**	**1,824**	**2,234**	**2,047**	**2,589**
Other residents	Core population growth	1,102	1,109	1,115	1,148	1,308
	Oil & gas development	-	-	22	22	22
	Islands infrastructure requirements	-	-	19	-	-
	Further economic development	-	-	-	13	106
	Total	**1,102**	**1,109**	**1,156**	**1,183**	**1,436**
Share of population in employment over total population	Core population growth	61%	62%	62%	62%	62%
	Oil & gas development	n.a.	n.a.	91%	84%	83%
	Islands infrastructure requirements	n.a.	n.a.	91%	n.a.	n.a.
	Further economic development	n.a.	n.a.	n.a.	75%	75%
	Total	**61%**	**62%**	**66%**	**63%**	**64%**

6.3. Permanent vs. temporary population

This section updates the findings of Paragraph 2.3 ("Movements from temporary to permanent population", with respect to core population growth only) by taking all population drivers into account. These include the number of movements from the temporary to the permanent population pool (PRP or Falkland Islands Status) from within the "core population growth" category, as well as from workers (and their dependents) employed in the oil & gas sector, in the construction and operation of the new Islands infrastructure endowment, public sector workers and those attracted by further economic development. As discussed in Section 1, higher proportions of temporary workers within a population are associated with higher levels of social dissatisfaction as these individuals are less likely to invest in the social and economic life of the community, and less likely to integrate within the local culture.

The following scenarios ("conditions") are assumed:

- **Condition 1**: conversion rates from temporary population to permanent population are assumed to remain at the current level (i.e. last 10-years averages);
- **Condition 2**: conversion rates from temporary population to permanent population are assumed to increase to such an extent that the share of temporary population over total population is the same in 2035 as in 2016 (i.e. 24% of total population).

6.3.1. Condition 1

Table 23 details the annual conversion rates assumed in Condition 1. Annual conversion rates for the public and private sector are those already discussed in Paragraph 2.3.1, while the average annual conversion rate (2.8%) is assumed for oil & gas workers (in steady state), workers operating the new Islands infrastructure, as well as additional employment driven by further economic development. Conservatively, it is assumed that no worker employed in construction of the oil & gas infrastructure, or in the construction of the new Islands infrastructure endowment, will convert to PRP or Falkland Islands status.

Table 23: Annual conversion rates assumed in Condition 1

	Construction phase	Steady state / operation
Public sector		2.4%
Private sector		2.9%
Oil & gas development	0%	2.8%
Islands infrastructure development	0%	2.8%
Economic development		2.8%

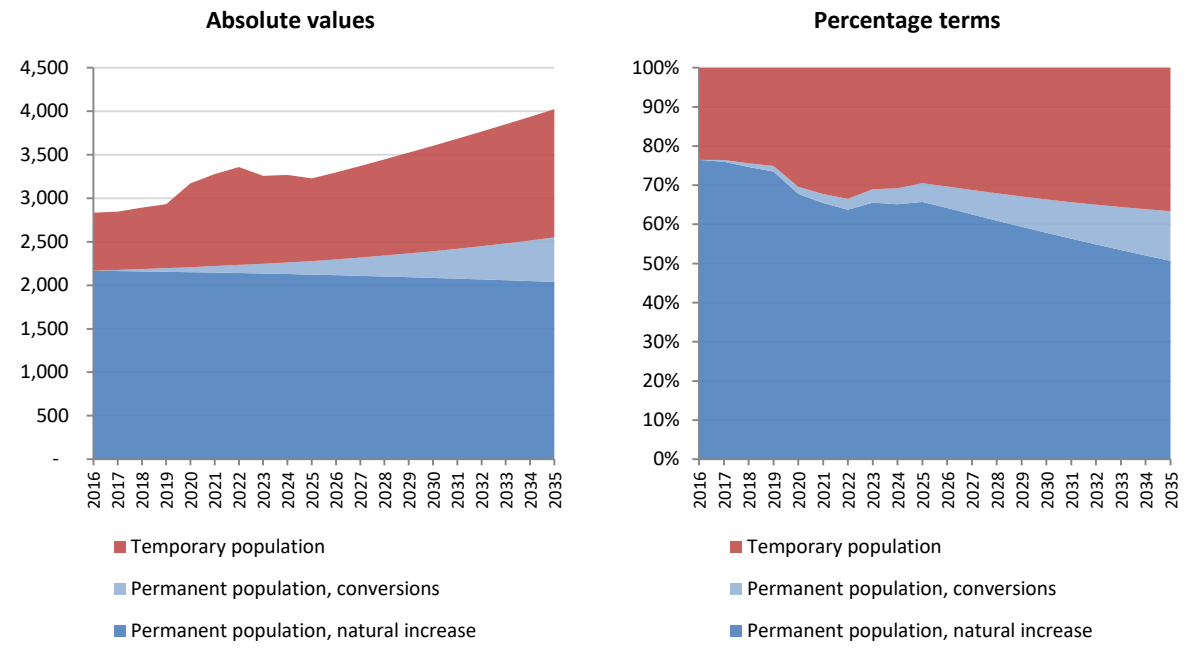
Based on the methodology and assumptions described above, we expect the number of conversions from the temporary to the permanent population pool to be equal, on average, to 29 per year between 2020 and 2035.

Table 24 and Figure 20 show our population projections with a breakdown by permanent population and temporary population, as well as the % proportion of temporary population over total population, in the base year and in the four projected time horizons, under Condition 1. Currently, about a quarter of the Falkland Islands population can be classified as temporary. Without a concerted effort to encourage individuals to stay and take up permanent residence and ultimately Falkland Island status, this percentage is set to increase over the long run.

Table 24: Population projections, permanent vs. temporary population (Condition 1)

	Census End 2016	Current End 2019	Immediate End 2022	Short term End 2025	Long term End 2035
Permanent population, baseline growth	2,167	2,155	2,141	2,122	2,039
Permanent population, conversions	-	42	93	155	511
Permanent population	**2,167**	**2,197**	**2,234**	**2,277**	**2,550**
Temporary population	667	736	1,155	952	1,474
Total population	**2,834**	**2,933**	**3,389**	**3,229**	**4,024**
Temporary population (% of total population)	24%	25%	34%	29%	37%

Figure 20: Population projections, permanent vs. temporary population (Condition 1)



Conversion rates are associated with *churn rates*, which refer to the rates of rotation of overseas labour within the Falkland Islands, moving in for specified periods and subsequently moving out. The Labour Force Development Specialist has identified the existence of a significant problem associated with a high average churn rate in the Falkland Islands.

In practice, the analysis of churn rates tell us that, based on the current average conversion rate (2.8%) and length of stay of people in the temporary population pool (3.8 years), an average inflow of around **348 immigrants per year** would be needed to sustain the foreseen population growth, that is, to allow population to grow by 63 persons per year between 2016 and 2035.

With high churn rates, a higher number of individuals are needed to fill the required overseas job posts, than what would be needed in case of lower churn rates. The reasons for the high churn rates are varied and multifaceted; a common theme emerging from the interviews conducted by the Labour Force Development Specialist with workers who are leaving the Falkland Islands is a perception that the community could do more to welcome new members and there are very significant barriers that exist to full integration.

The churn rate is important when considering how to manage societal effects of population increase, as a consistently high temporary workforce can be associated with less community cohesion, and increased forecasting uncertainty for both government and private sector goods and services provision, and thus less local capture of the economic benefits of increased employment.

For illustration, the next paragraph provides a hypothetical scenario in which conversion rates are higher, and therefore churn rates are lower.

6.3.2. Condition 2

Table 25 details the annual conversion rates assumed in Condition 2. Annual conversion rates of about double the size as those assumed in Condition 1 are needed, in order for the share of temporary population to converge to its 2016 level in the long run (2035).

Table 25: Annual conversion rates assumed in Condition 2

	Construction phase	Steady state / operation
Public sector		5.2%
Private sector		6.2%
Oil & gas development	0%	5.8%
Islands infrastructure development	0%	5.8%
Economic development		5.8%

In Condition 2, the number of conversions from the temporary to the permanent population pool is forecasted to be equal, on average, to 62 per year between 2020 and 2035.[23]

Table 26 reports our population projections with a breakdown by permanent population and temporary population, as well as the % proportion of temporary population over total population, in the base year and in the four projected time horizons, under Condition 2.

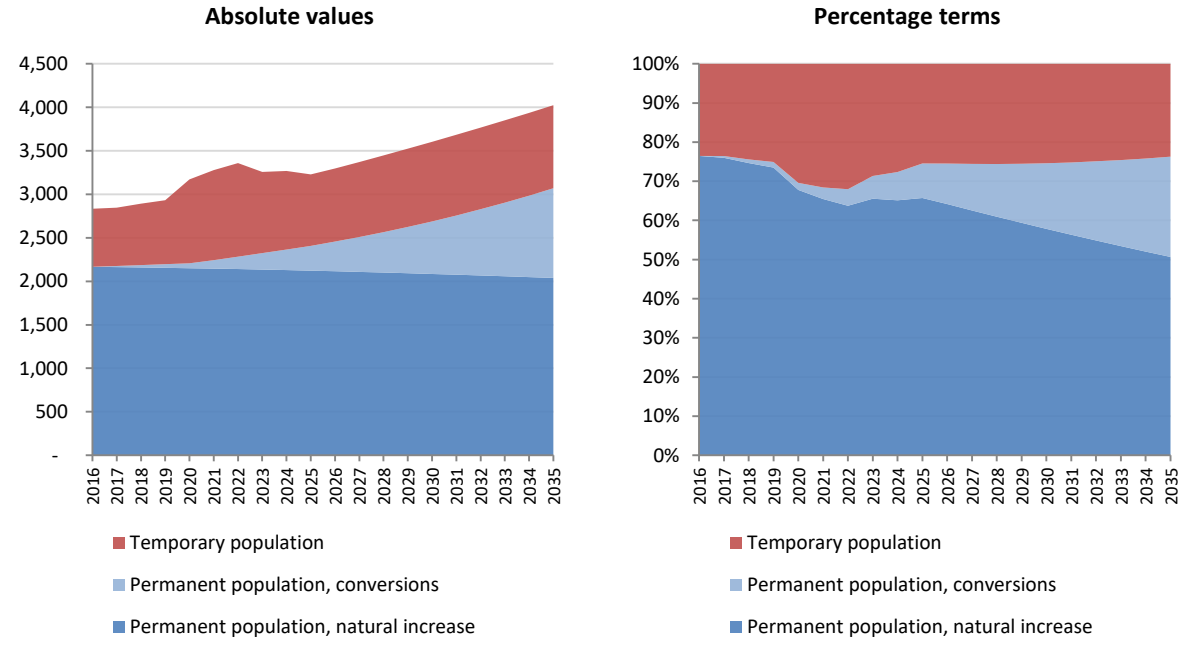
[23] The granting of Permanent Residence Permits (PRP) is subject to a quota system which is currently capped at 44 per year; therefore, amendments in legislation would be required for the forecasts under Condition 2 to be achievable.

Table 26: Population projections, permanent vs. temporary population (Condition 2)

	Census End 2016	Current End 2019	Immediate End 2022	Short term End 2025	Long term End 2035
Permanent population, baseline growth	2,167	2,155	2,141	2,122	2,039
Permanent population, conversions	-	42	142	285	1,031
Permanent population	**2,167**	**2,197**	**2,283**	**2,407**	**3,070**
Temporary population	667	736	1,106	822	954
Total population	**2,834**	**2,933**	**3,389**	**3,229**	**4,024**
Temporary population (% of total population)	24%	25%	33%	25%	24%

Figure 21 provides a graphical representation of the split between permanent and temporary population under Condition 2.

Figure 21: Population projections, permanent vs. temporary population (Condition 2)



The analysis of churn rates under Condition 2 (that is, assuming conversion rates to be equal, on average, to about 6%) shows that an average inflow of around **293 immigrants per year** (down from 348 per year) would be needed to sustain the same foreseen population growth.

Appendix A – Oil activity sensitivity analysis

A sensitivity analysis on some of the assumptions adopted in this paper can be useful to identify the upper bound to projected growth in workforce and population due to oil development activities.

Assumptions on ratios of dependents to work permit holders

The next table reports a comparison of assumptions on ratios of dependents to work permit holders that can be made in two scenarios:

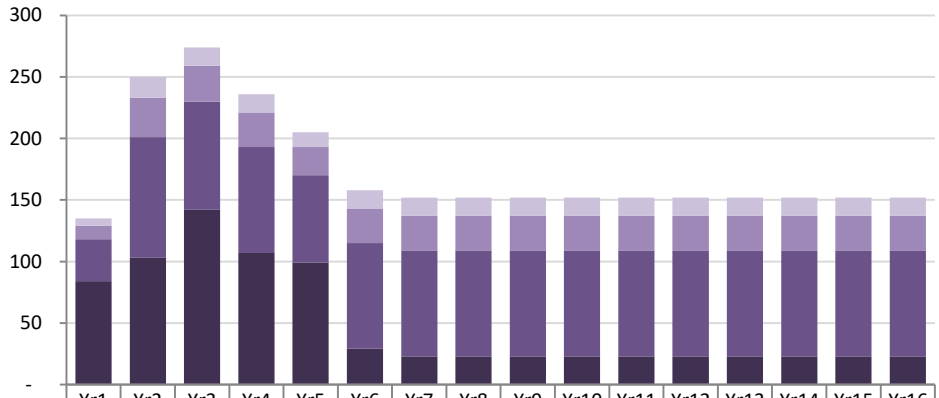
- the "base case", i.e. the assumptions discussed before in this paper (please see in Chapter 3.3);
- a "high case" assuming higher ratios of dependents to each work permit holder.

Table 27: Assumptions on ratios of dependents to work permits holders, 2019 update base case and high scenario

	Source	Ratio of dependents to work permits holders	Ratio of children to work permits holders
Base case	Census 2016	0.25	0.15
High case	Assumptions	0.50	0.17

Estimates of population effects in the high case are shown in Figure 22. In this scenario, activities related to Sea Lion Phase 1 could be expected to increase the Falklands population by 152 people in the steady state.

Figure 22: Sea Lion Phase 1, population effects



	Yr1	Yr2	Yr3	Yr4	Yr5	Yr6	Yr7	Yr8	Yr9	Yr10	Yr11	Yr12	Yr13	Yr14	Yr15	Yr16
Total children dependents	6	17	15	15	12	15	15	15	15	15	15	15	15	15	15	15
Total adult dependents	11	32	29	28	23	28	28	28	28	28	28	28	28	28	28	28
Accompanied workers	34	98	88	86	71	86	86	86	86	86	86	86	86	86	86	86
Unaccompanied workers	84	103	142	107	99	29	23	23	23	23	23	23	23	23	23	23
Total	135	250	274	236	205	158	152	152	152	152	152	152	152	152	152	152