ECONOMIC SPECIALIST REPORT TO FORM PART OF THE ENVIRONMENTAL IMPACT ASSESSMENT OF THE PROPOSED EXPANSION OF THE DUNDEE PRECIOUS METALS SMELTER IN TSUMEB, NAMIBIA

Draft Report

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Submitted to:

SLR Consulting
on behalf of

DUNDEE PRECIOUS METALS TSUMEB

EXECUTIVE SUMMARY

Dundee Precious Metals Tsumeb (DPMT) is proposing an expansion of their copper smelting plant adjacent to the town of Tsumeb, Namibia, to increase their concentrate processing capacity from 240,000 to 370,000 tons per annum. Being both the largest industrial operation in the Oshikoto District, as well as the largest single employer by a substantial margin, DPMT's proposed expansion has the potential to affect the local and regional economic environment in a significant way. This report provides economic specialist inputs into the EIA for the proposed expansion.

DPMT's financial feasibility assessment of the project has weighed up the risks and rewards associated with the project and found that it should be **financially viable** to the degree required to make the necessary investments. It is recognised that the project will not be without commercial risks. From a financial viability point of view, it is somewhat artificial to consider the expansion project in isolation even though it is the subject of its own EIA process. It is better to consider it as an important **component of an overall programme** aimed at improving environmental performance and increasing production at the plant. The decision to invest approximately US$240 million (N$3.2 billion) in the construction of the acid plant in 2015 was essentially made with the intention of curbing excessive sulphur dioxide emission, thereby being able to continue to operate, and with a view to pursuing an expansion in production along with increased efficiencies. Without this expansion, it is not clear that DPMT would be able to generate the additional revenues required to cover the cost of the acid plant and other enhancements thereby increasing risk to the continued operation of the plant.

An important aspect of economic desirability is the **compatibility of the project with key policy and planning guidance**. The social specialist study has conducted a comprehensive review of compatibility with socio-economic policy and planning including a consideration of Vision 2030, the Fourth National Development Plan (NDP4), Namibia's Industrial Policy and the Logistics Master Plan for Namibia. The overall conclusion from the review is that the proposed DPMT project would be largely compatible with key economic policies and plans provided environmental and other impacts can be adequately mitigated. The project would also be in keeping with the principles of the Growth at Home execution strategy for industrialisation produced by the Ministry of Trade and Industry which encourages greater industrial activity, local value addition and economic activity in areas where other opportunities are limited and socio-economic needs are greatest.

The plant would have a positive impact associated with **construction phase expenditure** increases in the local area and region given the size of the new spending injections associated with it. An estimated N$722 million expenditure on the construction of the project is anticipated, which should result in approximately 185 person-years of employment spread across up to two years. These jobs would be associated with a total direct labour income of N$53 million. In addition to the above direct employment and associated income opportunities, a significant number of temporary indirect and induced opportunities would be associated with the project. These would stem primarily from expenditure by the applicant in the local area and region as well as expenditure by workers hired for the construction phase.

Following the expansion, total **operational expenditure** associated with the plant should be approximately N$1.577 billion per annum in 2016 terms, up approximately N$288 million from the N$1.289 billion budgeted for next year. The plant currently sustains 667 direct jobs, of which 457 are employees and 210 are contractors. These jobs are associated with annual salary payments of around N$168 million. No direct jobs would be generated by the expansion, although two additional contractors who would be required to work at the plant. Employment impact (and skills development impacts detailed more extensively in the social specialist report) would thus be experienced through the operational expenditure on suppliers.

DPMT currently supports between 337 and 510 jobs indirectly at its direct suppliers. Between 16 and 32 first round indirect jobs are likely to be generated at these suppliers by the expansion, of which between 7 and 14 jobs are likely to be created in Tsumeb, with the remainder split between Walvis Bay and Windhoek. For Namibia, it was estimated that the total additional income associated with these jobs would be between N$4 million and N$8 million. For Tsumeb-based jobs the additional income was estimated to be between N$1.7 million and N$3.5 million. Note that these estimates take into consideration the 'first round' of expenditure on DPMT's suppliers thereby capturing a significant portion of total eventual impacts which would include indirect and induced impacts from subsequent rounds of spending (i.e. supplier that benefit from first round expenditure would, in turn, spend on their suppliers and so on). Positive impacts during the operational phase have been given a moderate overall rating given jobs and income effects.

DPMT's **Corporate Social Responsibility (CSR)** budget for 2016 was approximately N$12 million. Of this, N$7 million was allocated to spending on housing for the company's employees, while the remaining N$5 million was earmarked for spending on the Tsumeb Community Trust (N$3.75 million) and other donations (N$1.25 million). In line with increased revenue and operational expenditure, and based on recently increased budget allocations to the Trust, the expectation is that there will also be an increase in the quantity of revenues which are directed to CSR spending. It is difficult to ascertain the magnitude of this increase and how proportional it will be to increase revenue or profit. Nevertheless, it is considered most likely that impacts with mitigation would be of a moderate significance during operations at the local level.

The scale of the expansion and its export orientation should ensure that it makes a significant contribution in terms of **macro-economic benefits**. Foreign exchange earnings for the country (equivalent to foreign exchange revenue for DMPT) resulting from the expansion would average around US$66 million per year for copper blister and sulphuric acid exports. These would be in addition to current earnings of approximately US$140 million per year. The annual foreign exchange revenues over 30 years were converted into present value terms using a 4% base discount rate. This resulted in a present value estimate of about US$970 million (~N$13 billion) for the base case. Note that these benefits would be offset by imports and the repatriation of a portion of profits to foreign lenders and shareholders. Although it was beyond scope to quantify the degree of offsetting, net positive impacts on the balance of payment should remain significant. Impacts have been rated moderate to high positive with mitigation.

It is considered most likely that the expansion project would achieve an **overall positive economic impact** provided the financial projections of the applicant prove reasonably accurate and provided adequate mitigation measures are instituted. Note that these must include measures to ensure that environmental risk is kept to within acceptable levels. The no-go would entail no additional economic benefits at best. At worst, the continued financial viability of the plant, and the benefits associated with current operations, may be put at risk. The expansion is one of the later phases of an overall optimisation and expansion which has required substantial investment. Recovering the costs of this investment would be significantly more challenging should the proposed expansion not go ahead.

Cumulative impacts were defined as the impacts associated with existing DPMT operations plus the impacts of the expansion. These impacts would have a high significance rating for project expenditure including impacts on jobs and incomes, CSR spend and foreign exchange earnings given the addition of the significant benefits associated with the existing DPMT operation.

CONTENTS

1 INTRODUCTION

Dundee Precious Metals Tsumeb (DPMT) is proposing an expansion of their copper smelting plant adjacent to the town of Tsumeb, Namibia, to increase their concentrate processing capacity from 240,000 to 370,000 tons per annum (tpa).

SLR Consulting have been appointed by DPMT, the applicant, to conduct the Environmental Impact Assessment (EIA) process for the proposed project. This report contains an economic specialist study that forms part of the assessment phase of the EIA process. Its brief was to:

- Describe the existing economic characteristics/context of the local area and broader region.
- Identify and assess potential economic impacts at local as well as wider scales as relevant. These are expected to include the following:
    - Degree of fit with economic development plans and policies.
    - Broad level review of the financial viability/risks associated with the project.
    - Impacts associated with project expenditure on direct and indirect employment and household incomes.
    - Impacts on selected macroeconomic indicators with a focus on foreign exchange
    - Impacts associated with environmental impacts that cannot be mitigated and have economic implications.
- Assess any other impacts that emerged as part of the assessment process

1.1 Specialist expertise

Dr van Zyl of Independent Economic Researchers holds a PhD in economics from the University of Cape Town and has seventeen years' experience focusing on the analysis of projects and policies with significant environmental and development implications. He has been involved in over 60 economic and socio-economic appraisals of roads and other infrastructure projects, industrial developments, mixed use developments, mining, energy projects, conservation projects and eco-tourism initiatives throughout southern Africa. The majority of these appraisals have involved the use of economic impact assessment tools and cost-benefit analysis in order to inform decision-making. He has lead, participated in and co-ordinated research in socio-economic impact assessment, environmental resource economics (incl. environmental valuation, payments for ecosystem services, policy reform) and strategic assessment.

1.2 Declaration of independence

I, Dr Hugo Van Zyl, as the appointed independent specialist hereby declare that I:

- act/ed as the independent specialist in this application;
- regard the information contained in this report as it relates to my specialist input/study to be true and correct, and
- do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed;
- have and will not have vested interest in the proposed activity proceeding;

Signature of the specialist: 

Name of company: Independent Economic Researchers

Date: January 2017

2 APPROACH

The approach adopted involved the following steps in line with accepted EIA practice:

1. Investigate the existing socio-economic context within which the project would be established
2. Identify economic impacts
3. Assess economic impacts without mitigation
4. Propose mitigation measures if relevant
5. Re-assess economic impacts with mitigation

Information was gathered from the following sources in order to investigate the existing socio-economic situation that would be affected by the project:

- Information generated during consultations with the public and authorities including information generated by the social specialists.
- Census 2011 and Census 2001 data.
- Local economic development and planning documents.

Guidance on approach was taken from the Department of Environmental Affairs and Development Planning (Western Cape, South Africa) guidelines on economic specialist input to EIA processes (van Zyl *et al.*, 2005). While these guidelines were developed as part of a South African guideline process, they are based on international best practice. They include technical guidance and guidance on the appropriate level of detail required for the assessment in order that it is adequate for informing decision-making without going into superfluous detail (i.e. superfluous detail in this report as well as superfluous detail when the briefs of other specialist studies forming part of the EIA are taken into account).

Impact significance ratings were generated using standard guidelines for impact rating provided by the Environmental Assessment Practitioner (see Appendix 1 for an outline of these guidelines). Once impacts had been assessed, mitigation measures were identified to prevent or reduce adverse impacts and enhance positive ones during all phases of the proposed project.

Cumulative impact where also assessed and focused on the impact of the expansion in addition to the existing DPMT operations.

2.1 Assumptions and limitations

The following assumptions and limitations apply to this study:

- All technical, financial, costing and other information provided by the applicant, the applicant's project team, other specialists and official sources is assumed to be correct unless there is a clear reason to suspect incorrect information.

- The degree of detail achievable in the assessment of impacts that rely on the findings of other specialist studies is highly reliant on the degree of detail contained in those specialist studies.

- The quantification of economic impacts in order to inform the assessment of the significance of impacts was not possible, nor considered necessary, for all impacts. Where possible, quantification focused on impacts considered to be most important in the overall assessment.

- The findings of the assessment reflect the best professional assessment of the authors drawing on relevant and available information within the constraints of time and resources thought appropriate and made available for the assessment. See Appendix 2 for the disclaimer associated with this report.

3 PROJECT DESCRIPTION

The Final Environmental Scoping Report for the EIA provides a detailed project description, key elements of which are summarized in this section. The DPMT smelter is a major industrial plant located approximately 2km north east of the town centre of Tsumeb in the Oshikoto Region of Namibia, (see map in Figure 3.1).

Figure 3.1 The town of Tsumeb, showing the location of the DPMT smelter

Source: Google Earth

The original Tsumeb smelter was established by the Tsumeb Corporation Limited in 1963. The smelter was acquired by Dundee Precious Metals (DPM) in 2010 with the objective to treat copper concentrate. DPM currently operates the Chelopech gold and copper mine in Bulgaria, which is the largest underground gold-copper mine in Europe, producing copper concentrate with high gold, silver and also an arsenic content. The copper concentrate arrives through Walvis Bay and is smelted exclusively at Tsumeb to produce a 98.5% pure blister copper which also contains gold and silver. The Tsumeb Smelter is one of the few in the world that is capable of treating complex concentrates such as those produced at Chelopech.

Since 2010, Dundee Precious Metals Tsumeb (DPMT) has embarked on a modernization program to expand the plant to increase production and improve the environmental performance. This has included the following projects:

- Addition of a second oxygen plant (2012)
- Improvement of the off-gas handling systems (2012-2013)
- Closure of the reverberatory furnace (2013)
- Addition of a 1,540 t/d acid plant (2015)
- Addition of two new and larger 13 ft by 30 ft Peirce-Smith converters (2015)
- A new effluent treatment plant

The above measures have brought the smelter capacity to an annualized rate of 240,000 tons per annum (tpa) of copper concentrates. At this production rate the Ausmelt represents the plant bottleneck on account of lack of matte holding capacity to feed the converters. The new oxygen plant and acid plant have capacity to treat up to ~400,000 tpa of concentrate. With additional custom concentrates available and further areas for operational improvements identified, DPMT is planning the expansion of their current operations in order to increase their concentrate processing capacity from 240,000 to 370,000 tpa. This would require the following to be implemented:

- Upgrade Ausmelt feed and furnace
- Install a rotary holding furnace (RHF)
- Implement slow cooling of RHF and converter slag
- Upgrade slag mill to improve copper recovery and handle increased tonnage from slow cooled slags
- Install a third Peirce-Smith (PS) converter

4 DESCRIPTION OF THE AFFECTED SOCIO-ECONOMIC ENVIRONMENT

This section outlines the socio-economic context within which the proposed project would be established. This is done to provide information on the socio-economic environment and assist in the assessment of project impacts. In keeping with the nature of the proposed project, it focuses on providing data on Namibia, Oshikoto, Tsumeb and Walvis Bay.

4.1 Demographics

Tsumeb had a population of 19,840 in 2011 up from 14,907 in 2001, implying that the town had grown by 33% in this ten-year period. This was more than twice both the national (15%) and regional (13%) growth rates over the same period (NSA, 2012a; NSA 2012b). Growth since 2011 has also been robust according to municipal officials and other sources. Though not based on official statistics, the Tsumeb community needs

assessment conducted for DPMT in 2015 found it likely that Tsumeb's population has grown by at least 25% since 2011 to over 25,000 inhabitants driven primarily by the growth of informal settlements (Yarmoshuk, 2015). Walvis Bay also had a relatively high growth rate between 2001 and 2011 (28% as shown in Table 4.1) and has continued with robust growth since then.

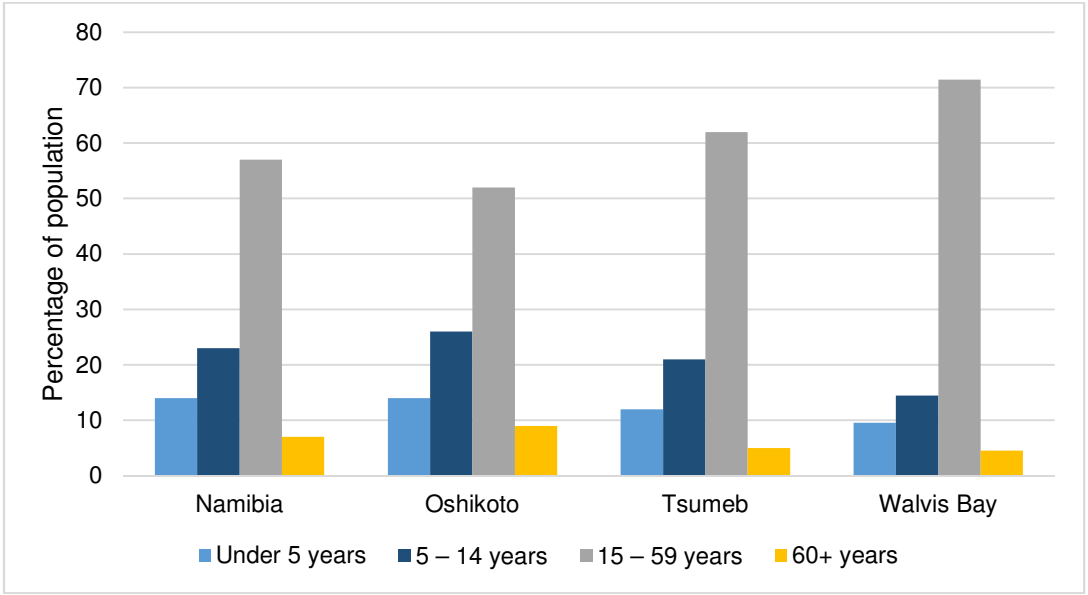
Table 4.1 Population by area, 2011

Population	Namibia	Oshikoto	Tsumeb	Walvis Bay
2001	1 830 330	161 007	14 907	27 941
2011	2 113 077	181 973	19 840	35 828
Growth	15%	13%	33%	28%

Source: NSA, 2012a; NSA, 2012b; NSA, 2012c; NPC, 2003

With regards to age composition, Figure 4.1 shows that 62% of Tsumeb's population was between the ages of 15 and 59 in 2011. This is higher than the figure for Oshikoto (52%) and Namibia (57%). For Walvis Bay the proportion of people in this category was even higher – 71%. The relatively higher estimates for Tsumeb and Walvis Bay are consistent with their drawing in of working age individuals.

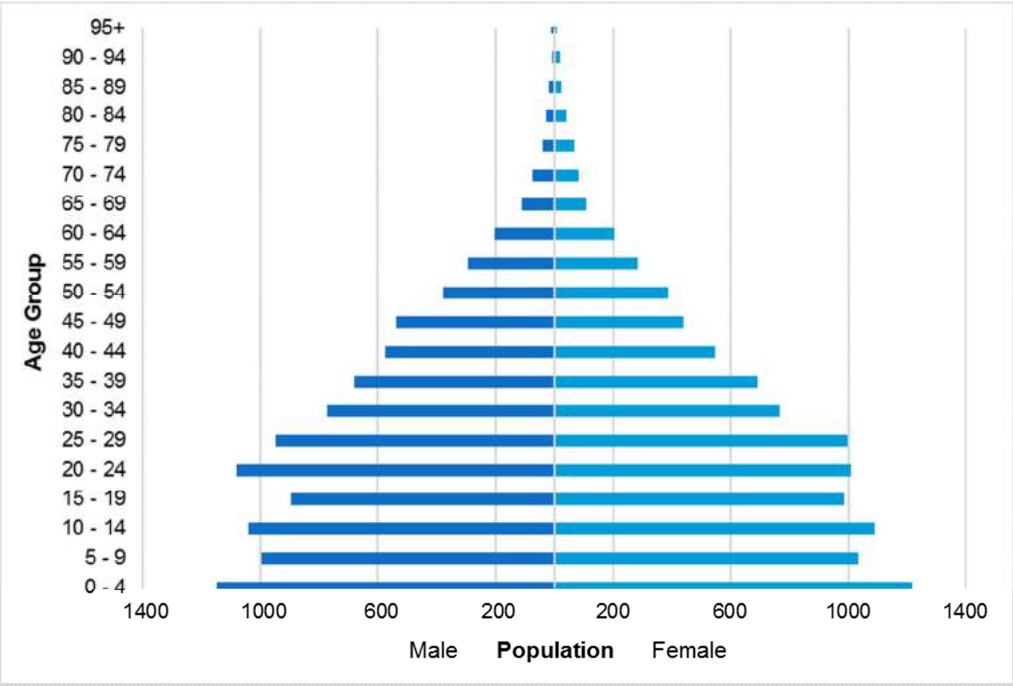
Figure 4.1 Age composition by area, 2011



Source: NSA, 2012a; NSA, 2012b; NSA, 2012c; NSA, 2012d

Figure 4.2 shows the population pyramid for Tsumeb which indicates it relatively young structure. The figure also shows that there is a larger number of people in the 0 – 4 age group than any of the others, a trait which is typical of a population with simultaneously high levels of fertility and mortality.

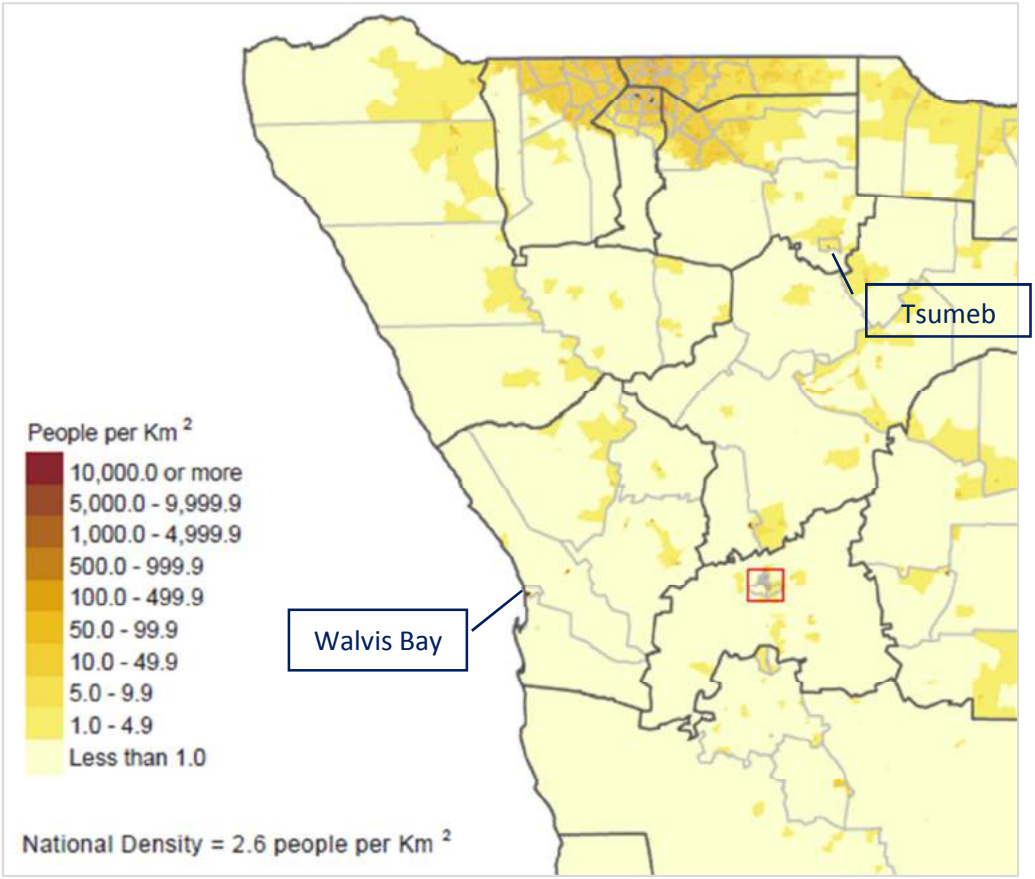
Figure 4.2 Population Pyramid, Tsumeb



Source: NSA, 2012a

Namibia had an average population density of 2.6 people per km^2 in 2011 (NSA, 2012e). Figure 4.3 shows that this density varies significantly across the country as well as within the region of Oshikoto. Tsumeb is the most densely populated part of Oshikoto, and can be seen in Figure 4.3 as a darker pixel in the south of the region of Oshikoto. Walvis Bay, another densely populated and fast growing town is also indicated on the map.

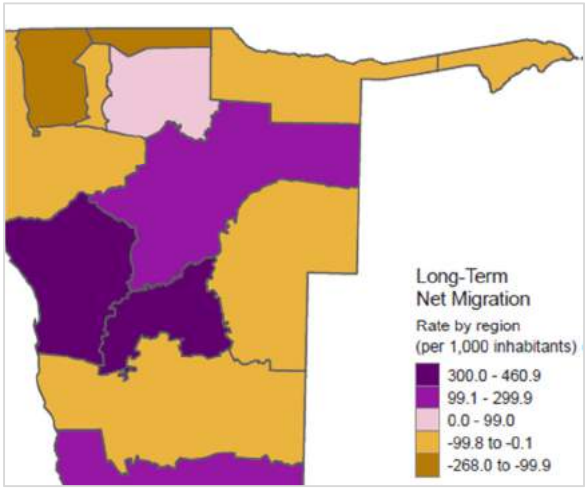
Figure 4.3 Population density for selected parts of Namibia, 2011



Source: NSA, 2012e

Census 2011 data allows for the consideration of migration rates at the regional level. Oshikoto had experienced net in-migration of between 0 – 99 people per 1000 inhabitants in the long term. Figure 4.4 shows that this rate is relatively low implying that in/out-migration has played a small role in population growth within Oshikoto. Erongo had experienced a higher rate of between 300 and 460 people per 1000 inhabitants during the same period (NSA, 2012b).

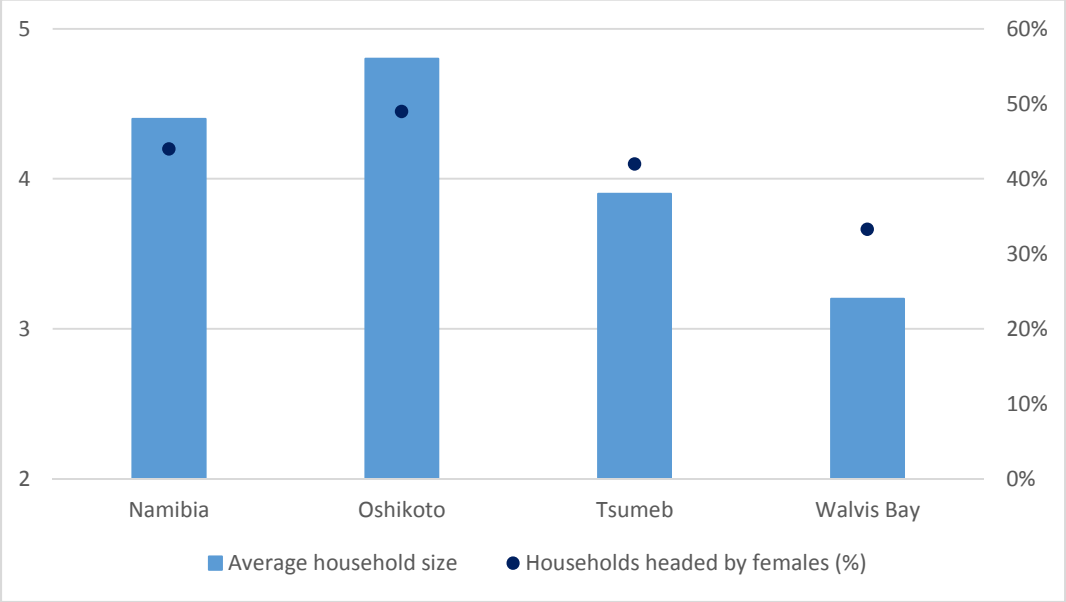
Figure 4.4 Long term net migration rates for the regions of Namibia, 2011



Source: NSA, 2012e

The average household size in Tsumeb is 3.9, which is close to the national average of 4 (Figure 4.5). For Oshikoto the figure is higher, at 4.8, and for Walvis Bay it is smaller at 3.2. Walvis Bay also has a relatively low proportion of households which are headed by females – 33% as opposed to 44% nationally, 49% for Oshikoto and 42% for Tsumeb.

Figure 4.5 Household indicators by area, 2011

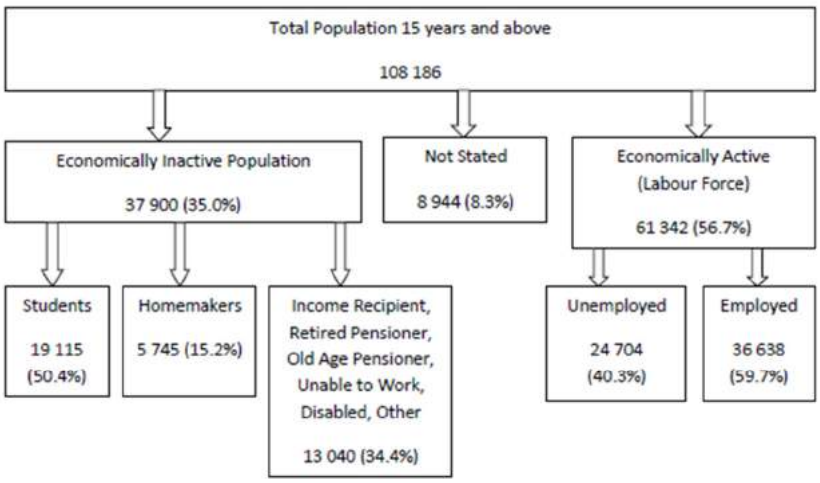


Source: NSA, 2012a; NSA, 2012b; NSA, 2012d

4.2 Employment

The 2011 Census categorises the population over 15 years-old as economically active and inactive. Those who are economically active are categorised into those who are employed and those who are not, while the economically inactive population is categorised as students, homemakers and other categories as shown in Figure 4.6 which focused on the Oshikoto region.

Figure 4.6 Schematic showing activity status breakdown for Oshikoto, 2011



Source: NSA, 2012a

Tsumeb and Walvis Bay have relatively high proportions of economically active people – 74% and 81% respectively as compared to 64% for Namibia. These figures are shown in Table 4.2, along with a breakdown between economically active people who are employed and unemployed. The table shows that Walvis Bay has a relatively low unemployment rate of 27% when compared to Tsumeb's 36%, Oshikoto's 40% and the national average of 37%[1].

Table 4.2 Activity status for population 15 years-old and above by area, 2011

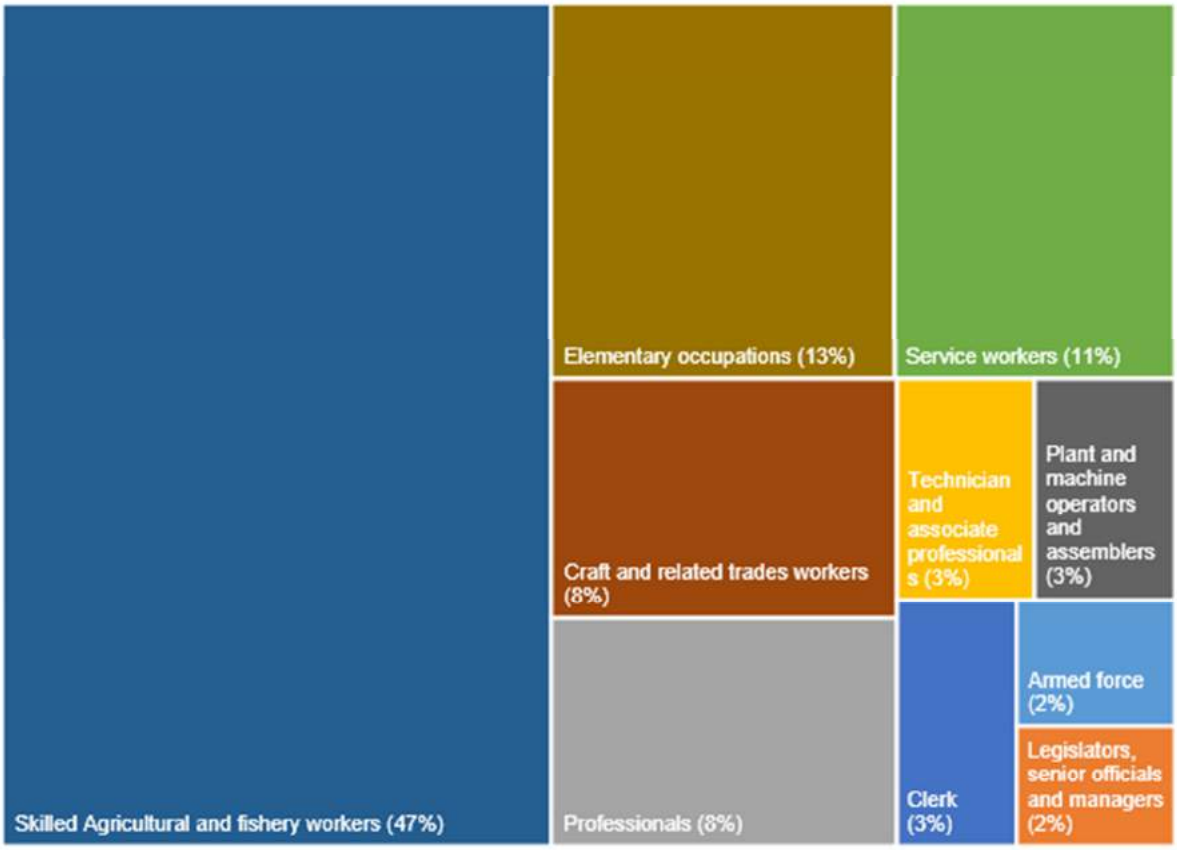
	Namibia		Oshikoto		Tsumeb		Walvis Bay	
Activity status	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Economically Active	**847 415**	**64%**	**61 342**	**57%**	**9 607**	**74%**	**20 821**	**81%**
Employed	534 912	40%	36 638	34%	6 135	47%	15 250	60%
Unemployed	312 503	24%	24 704	23%	3 472	27%	5 571	22%
Economically inactive	**379 370**	**29%**	**37 900**	**35%**	**2 354**	**18%**	**3 524**	**14%**
Student	195 591	15%	19 115	18%	1 268	10%	1 760	7%
Homemaker	55 972	4%	5 745	5%	264	2%	463	2%
Income Recipient	4 939	0.4%	410	0.4%	25	0.2%	112	0.4%
Retired Pensioner	14 619	1%	961	1%	192	1%	408	2%
Old Age Pensioner	88 646	7%	10 550	10%	489	4%	675	3%
Unable to Work (Ill)	7 794	1%	409	0.4%	37	0.3%	49	0.2%
Unable to Work (Disabled)	7 303	1%	535	0.5%	45	0.3%	57	0.2%
Other	4 506	0.3%	175	0.2%	34	0.3%	204	1%
Don't Know	**97 449**	**7%**	**8 944**	**8%**	**1 069**	**8%**	**1 043**	**4%**
Total	**1 324 234**	**100%**	**108 186**	**100%**	**13 030**	**100%**	**25 592**	**100%**

Source: NSA, 2012a; NSA, 2012b; NSA, 2012c; NSA, 2012d

For Oshikoto's employed population, agriculture is the most common occupation (47%), followed by elementary occupations (13%), service workers (11%), craft and related trades workers (8%) and professionals (8%). Various occupation categories make up the remaining 13%, as shown in Figure 4.7.

[1] Note that the methods used to measure unemployment have since 2011 been updated. Official unemployment rates are therefore much lower in recent years, but the actual phenomenon of joblessness which the rates seek to measure has remained relatively similar in magnitude.

Figure 4.7 Relative proportions of occupations for employed population in Oshikoto, 2011



Source: NSA, 2012a

As with occupation categories, Census 2011 data on the main industries within which workers are employed reveals that Oshikoto is heavily reliant on agriculture where 49% of jobs are to be found (Table 4.3). This is substantially higher than the national average of 30%. The next most prominent employer is administrative and support service activities (7% of jobs), followed by education and activities of private households (6% of jobs each). The manufacturing sector only contributes 1,123 (or 3%) to total direct employment in Oshikoto. This serves to emphasise the importance of plants such as DPMT, which employs 457 people, in providing diversification.

Table 4.3 Main industry of employed population aged 15 years-old and above by area, 2011

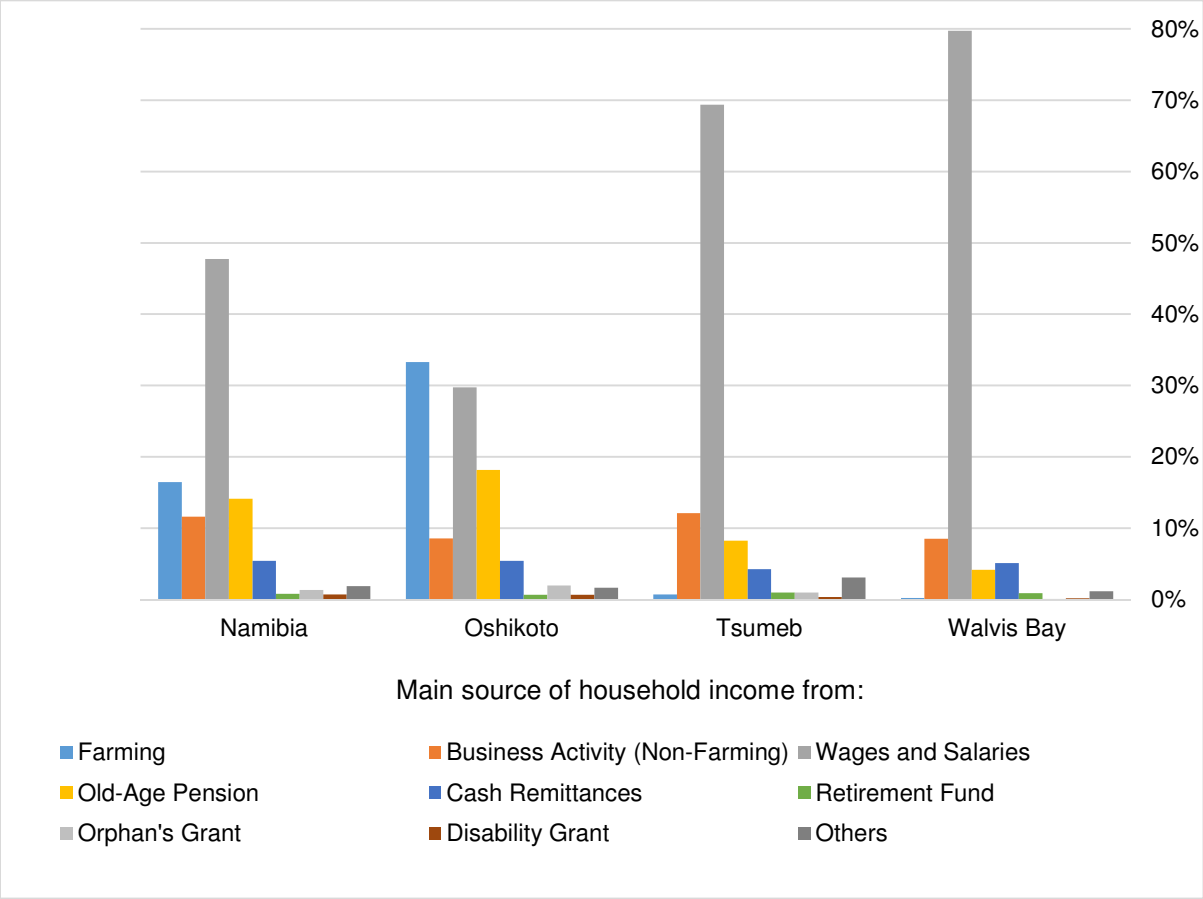
	Namibia		Oshikoto	
Main industry	**Number**	**Percent**	**Number**	**Percent**
Agriculture Forestry and Fishing	159 485	30%	17 860	49%
Mining And Quarrying	17 598	3%	929	3%
Manufacturing	30 137	6%	1 123	3%
Electricity Gas Steam and Air conditioning supply	1 029	0%	44	0%
Water Supply Sewerage Waste Management and	1 691	0%	58	0%
Construction	38 483	7%	1 713	5%
Wholesale and Retail trade; Repair of motor vehicles	39 286	7%	1 880	5%
Transportation and Storage	21 402	4%	997	3%
Accommodation and Food Service activities	19 167	4%	963	3%
Information and Communication	5 481	1%	134	0%
Financial Insurance Activities	11 510	2%	279	1%
Real estate Activities	779	0%	3	0%
Professional Scientific and Technical activities	9 352	2%	260	1%
Administrative and Support service activities	46 491	9%	2 435	7%
Public Administration and Defence; compulsory social	34 102	6%	1 464	4%
Education	31 722	6%	2 285	6%
Human Health and Social work activities	16 436	3%	975	3%
Arts Entertainment and Recreation	2 807	1%	88	0%
Other Services activities	14 100	3%	682	2%
Activities of Private Households	30 421	6%	2 229	6%
Activities of extraterritorial organisation and bodies	282	0%	8	0%
Don't Know	3 151	1%	229	1%
Total	**534 912**	**100%**	**36 638**	**100%**

Source: NSA, 2012a; NSA, 2012d

4.3 Income and poverty levels

Given the significance of agriculture in terms of job provision, it is not surprising that farming accounts for a large source of primary incomes both nationally (16%) and in Oshikoto (33%) (Figure 4.8). In urban areas such as Tsumeb, however, 69% of households reported that wages and salaries provide the main source of income, while in Walvis Bay this figure was even higher at 80%. Also at a national level, far more households reported wages and salaries to be their primary source of income (48%) than they did farming (16%).

Figure 4.8 Proportion of households which attributed main source of income to various sectors, 2011

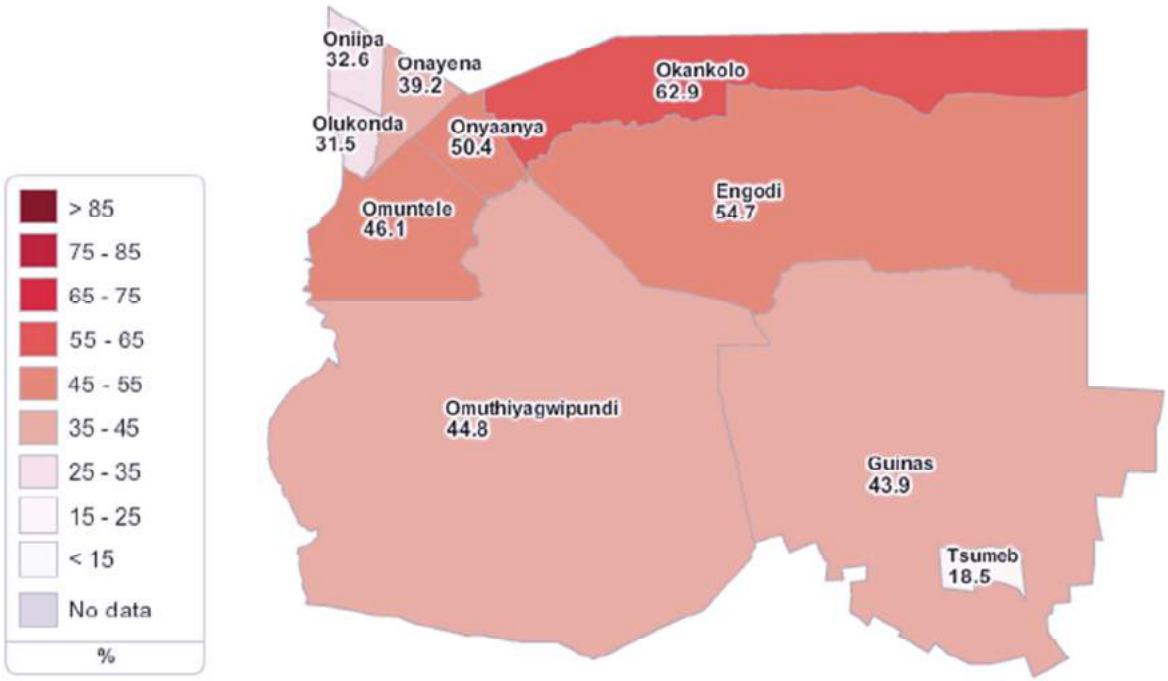


Source: NSA, 2012a; NSA, 2012b; NSA, 2012c; NSA, 2012d

The National Planning Commission (NPC) has combined 2003/04 and 2009/10 Namibia Household Income and Expenditure Survey data with 2001 and 2011 Census data to develop 'Poverty Maps' of the country. Figure 4.9 shows the Poverty Map for Oshikoto which reveals that around 18.5% of Tsumeb's population could be classified as poor in 2011.[2] This is significantly lower than the average for Oshikoto – 42.6% (NPC, 2014).

[2] The poverty line was derived by the NPC using an absolute poverty measure based on the estimates of cost of basic needs as adopted by Namibia Statistics Agency. When the annual per adult equivalent consumption is below this poverty line, an individual is considered to be poor. In 2010 the poverty line of annualised per adult equivalent expenditure was N$4 536.

Figure 4.9 Percent of the population classified as poor by constituency in Oshikoto, 2011

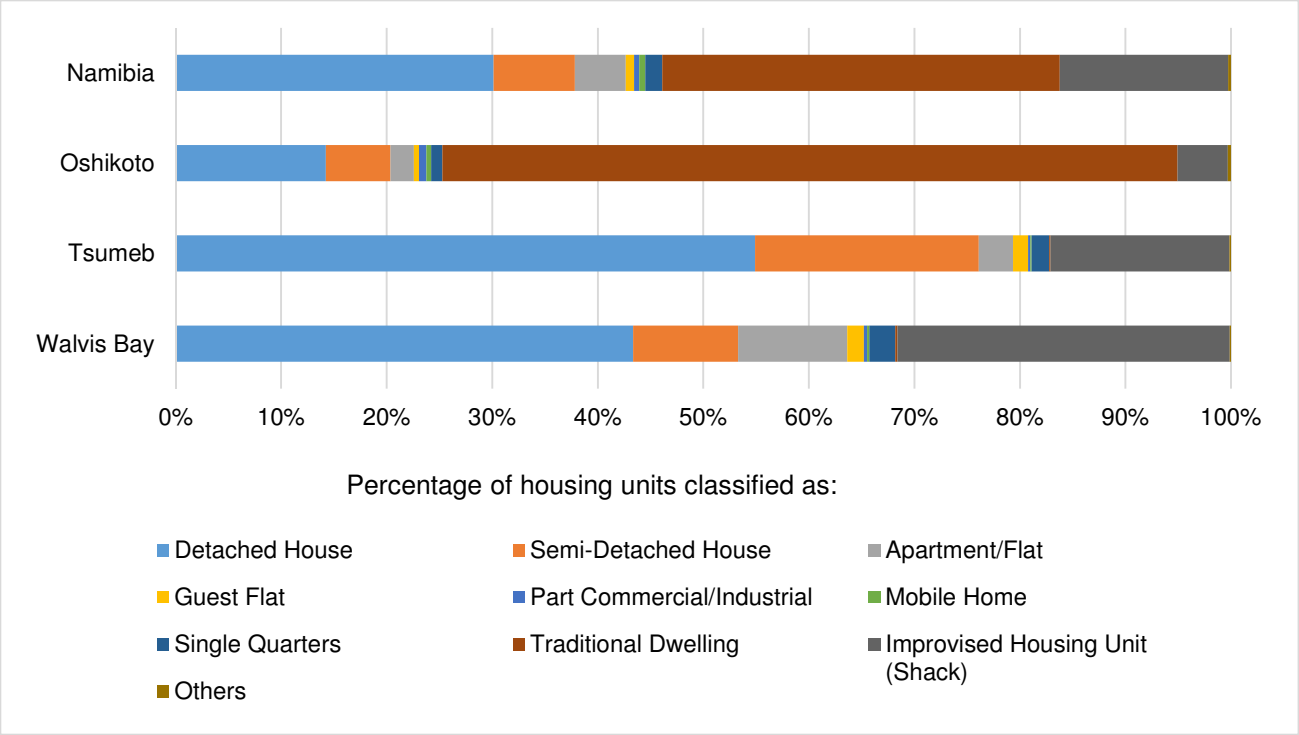


Source: NPC, 2014

4.4 Housing and municipal services availability

The majority of Tsumeb's households (55%) live in detached houses while roughly 17% live in improvised housing units (i.e. shacks) in keeping with the national average (see Figure 4.10). Walvis Bay also has a high proportion of formal dwellings, although almost a third of Walvis Bay's population lives in improvised housing units. Oshikoto has a very high proportion of people living in traditional dwellings in keeping with it rural character.

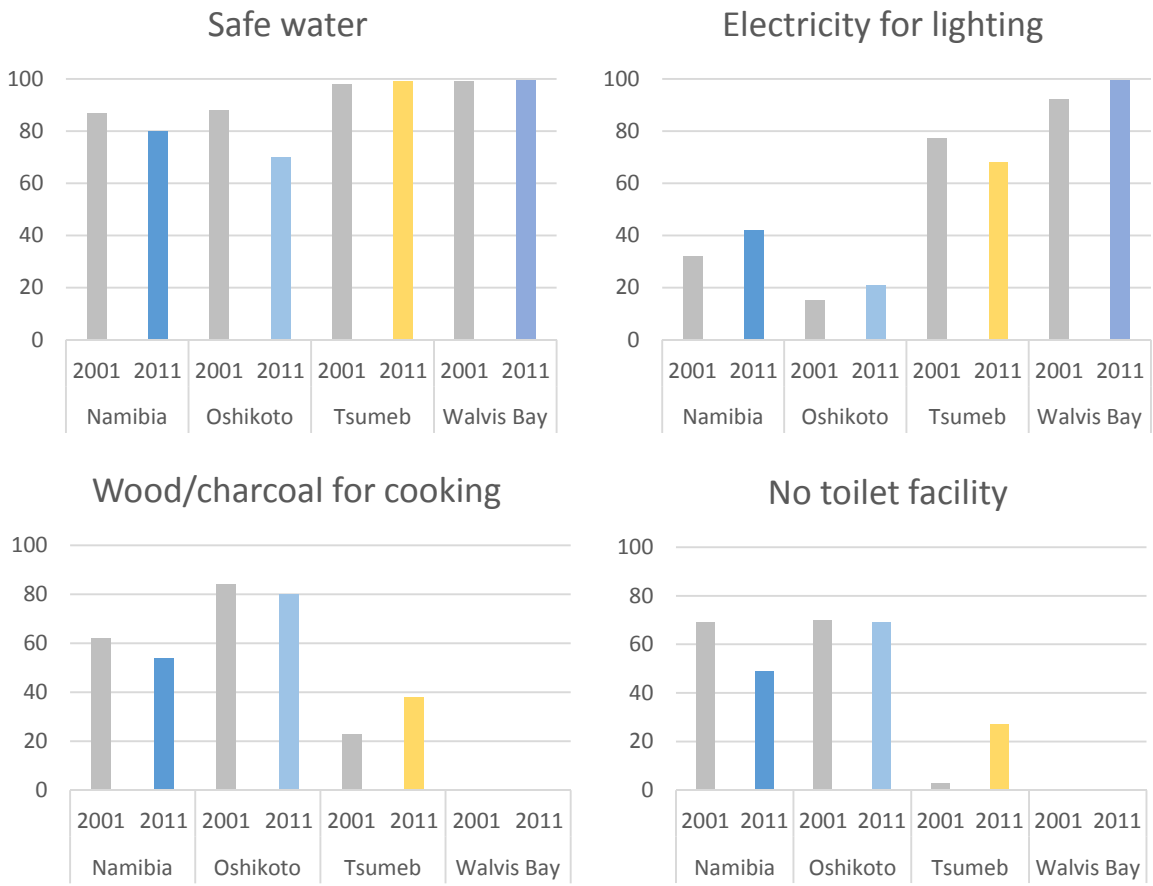
Figure 4.10 Relative proportions of dwelling types by area, 2011



Source: NSA, 2012a; NSA, 2012b; NSA, 2012c; NSA, 2012d

Figure 4.11 shows that households in Tsumeb have relatively high service levels compared to the rest of Oshikoto and to Namibia as a whole. In both 2001 and 2011, Tsumeb's households had higher access levels to safe water and electricity for lighting, and also fewer households used wood/charcoal for cooking. Furthermore, more households had access to a toilet facility. The figure also shows that Walvis Bay outperformed Tsumeb and the rest of the country in terms of all four of the service level indicators.

Figure 4.11 Key service level indicators by area, 2001 and 2011

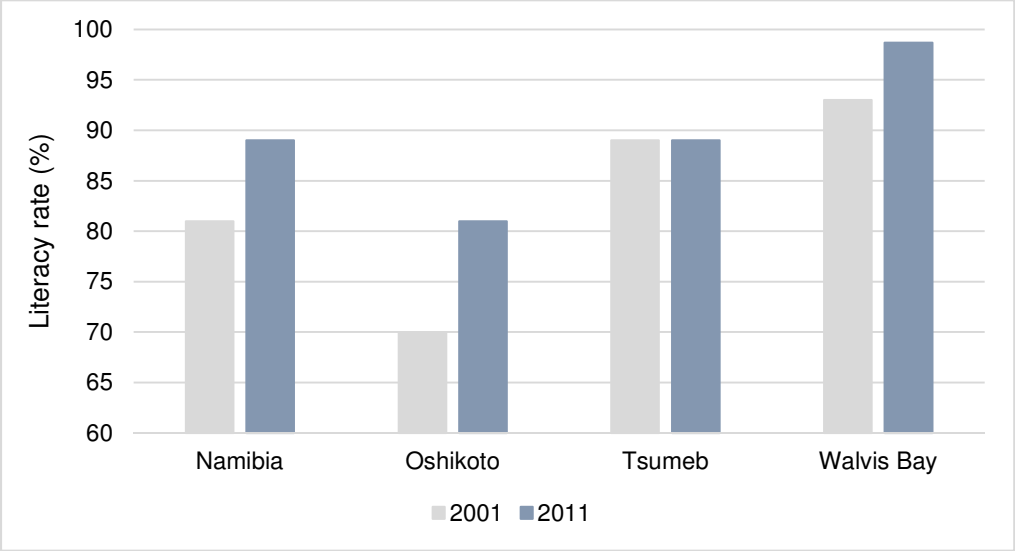


Source: NSA, 2012a; NSA, 2012b; NSA, 2012c; NSA, 2012d; NPA, 2003

4.5 Education and literacy

Between 2001 and 2011, the Namibian literacy rate rose by 8 % from 81% to 89% (see Figure 4.12). During the same period, Oshikoto's literacy rate rose from 70% to 81%, while Tsumeb's remained at 89%. Walvis Bay had a very high literacy rate of 98.8% in 2011, up from 93% in 2001.

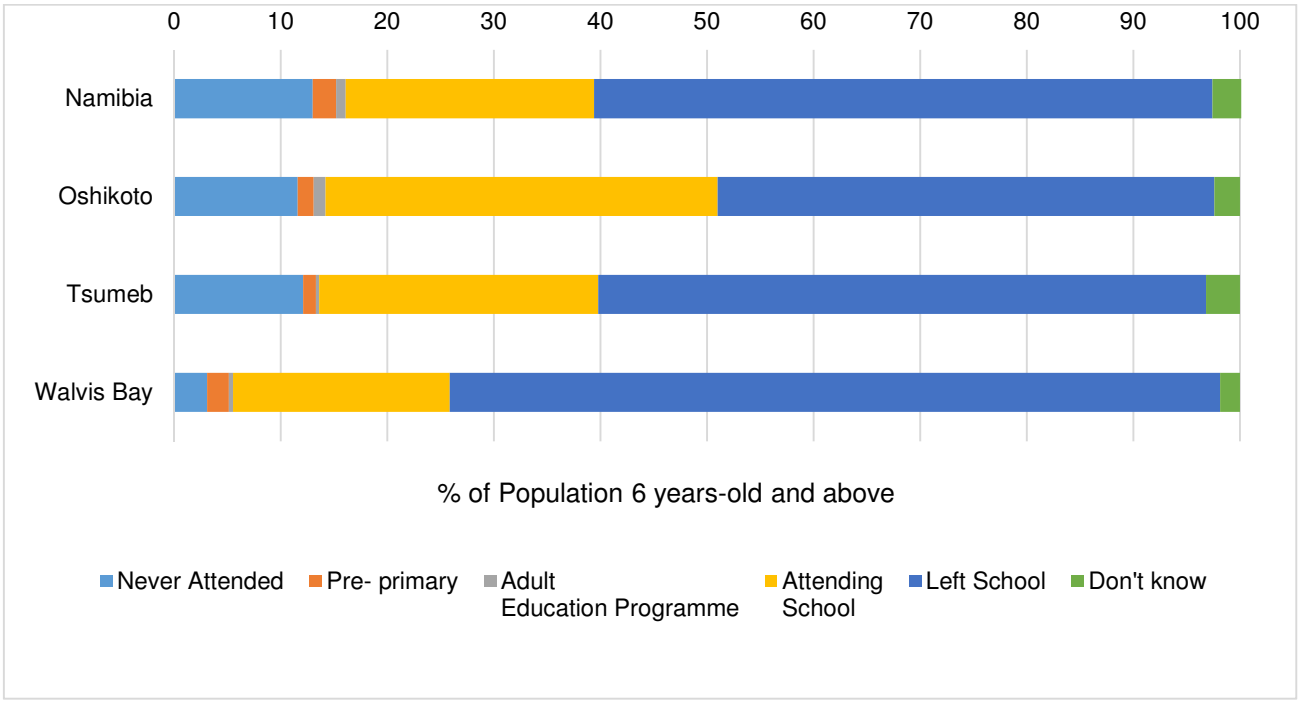
Figure 4.12 Literacy rates by area, 2001 and 2011



Source: NSA, 2012a; NSA, 2012b; NSA, 2012c; NSA, 2012d; NPC, 2003

In 2011, approximately 12% of Tsumeb's population over six years old had never attended school (Figure 4.13). This is similar to the average for Oshikoto and very slightly better than the average for Namibia which stood at 13%. It is significantly worse than the 3% average for Walvis Bay.

Figure 4.13 School attendance of population older than 6 years by area, 2011



Source: NSA, 2012a; NSA, 2012b; NSA, 2012c; NSA, 2012d

5 IDENTIFICATION OF IMPACTS AND ASSESSMENT

The following impacts or issues were identified as relevant for assessment based on best practice guidance for economic specialist inputs to EIAs, impacts being assessed by other specialists, interested and affected party (I&AP) inputs and the nature of the project and receiving environment:

1. Financial viability and risks
2. Compatibility with key policy and planning imperatives
3. Impacts linked to construction and operational expenditure
4. Impacts linked to expenditure on corporate social responsibility
5. Macro-economic impacts focused on foreign exchange impacts

In order to avoid overlap, the social specialist report deals with the potential socio-economic impacts from negative environmental externalities or risks. As these are a critical part of the overall socio-economic impact, the results of this economic specialist report must be considered alongside those of the social specialist report.

The sections that follow provide assessments of the impacts identified above and suggest management and mitigation actions to avoid or reduce negative impacts or to enhance positive benefits.

5.1 Financial viability and risks

Long term positive economic impacts can only flow from a project that is financially sustainable (i.e. financially viable in the long term with enough income to cover costs). With this in mind, the viability of the project is broadly considered in this section.

Discussions with the applicant revealed that the financial viability of the project has been considered at length as part of ongoing feasibility assessment and optimisation. In their view, the expected rewards of the project outweigh risks, making it financially viable to make the necessary investment (T. Loftie-Eaton, DPMT, pers com). That said, it is recognised by DPMT that the project will not be without commercial risks including those associated with cost control, demand and price levels and competition from other market players (although the smelter occupies a niche as one of the few smelters worldwide capable of treating complex copper-gold concentrates with high gold, silver and arsenic contents).

It is somewhat artificial, from a financial viability point of view, to consider the expansion project in isolation even though it is the subject of its own EIA process. It is better to consider it as an important component of an overall programme aimed at improving environmental performance and increasing production at the plant. For example, the decision to invest approximately US$240 million (N$3.2 billion) in the construction of the acid plant in 2015 was essentially made with the intention of pursuing an expansion in production. Without this expansion, it is not clear that DPMT would be able to generate the additional revenues required to cover the cost of the acid plant and other enhancements thereby increasing risk to the continued operation of the plant.

It is important to bear in mind that financial sustainability/viability is never a certainty as is the case for virtually all commercial ventures. As a rule, applicants can only assess risks and costs to the degree possible and make an informed decision on whether they are worth taking relative to the rewards on offer. In essence, the applicant has considered financial feasibility issues in detail and a broad review of the reasoning and assumptions used by the applicant indicate that the calculated risk that they are willing to take is not

misplaced. The available evidence provides no reason to conclude that financial failure is clearly likely and, as such, provides no clear basis to argue against the desirability of the development.

5.2 Compatibility with key policy and planning guidance

A critical aspect of economic desirability is the compatibility of the project with key policy and planning guidance. The social specialist study has conducted a comprehensive review of compatibility with socio-economic policy and planning that is not repeated here. The review includes a consideration of the following documents (see more details in Barbour, 2017):

- Vision 2030
- The Fourth National Development Plan (NDP4)
- Namibia's Industrial Policy
- The Logistics Master Plan for Namibia

The overall conclusion from the review is that the proposed DPMT expansion would be largely compatible with key economic policies and plans provided environmental and other impacts can be adequately mitigated.
Note also that the Ministry of Trade and Industry (MTI) produced an execution strategy for industrialisation in 2015 called Growth at Home (MTI, 2015). Growth at Home identifies six sectors that show promise in terms of their potential to deliver economic growth and job creation:

- Agro-processing
- Fish-processing
- Steel manufacturing and metal fabrication
- Automotive industry
- Chemical industry
- Jewellery industry

Overall, the Strategy emphasises the importance of beneficiation as a means to stimulate economic activity. Industrial policy is thus focused on encouraging greater industrial activity and local value addition. Emphasis is also placed on encouraging such activity in areas where other opportunities are limited and socio-economic needs are greatest (MTI, 2015). The proposed expansion would increase the amount of foreign revenue generated by DPMT through value addition and provide benefits in a region with relatively high socio-economic needs. It should thus achieve in-principle compatibility with the Strategy.

5.3 Impacts associated with project expenditure

The construction and operational phase of the project would both result in spending injections that would lead to increased economic activity best measured in terms of impacts on employment and associated incomes focusing on the local area and region.

All expenditures will lead to linked direct, indirect and induced impacts on employment and incomes. Taking employment as an example, impacts would be direct where people are employed directly on the project in question (e.g. jobs such as construction workers). Indirect impacts would be where the direct expenditure associated with a project leads to jobs and incomes in other sectors (e.g. purchasing building materials maintains jobs in that sector) and induced impacts where jobs are created due to the expenditure of employees and other consumers that gained from the project. Ordinarily, direct impacts are the most

important of these three categories as they are the largest and more likely to be felt in the local area. They can also be estimated with the highest degree of certainty. The quantification of indirect and induced impacts is a less certain exercise due to uncertainty surrounding accurate multipliers. In the case of the project being considered presently, indirect impacts during the operational phase are an important aspect of its overall impact as it will have limited direct impacts. They were thus assessed in detail, focusing on first round indirect impacts based on primary data from suppliers and thereby avoiding multiplier analysis and its associated uncertainties. Other unquantified indirect and induced impacts were also borne in mind qualitatively when providing overall impact significance ratings.

5.3.1 Construction phase impacts

Construction expenditure would constitute a positive injection of new investment. Preliminary estimates indicate that a total of around N$722 million would be spent on all aspects of construction which could last up to two years (see Table 5.1).[3]

Table 5.1: Construction phase expenditure

Construction and establishment component	Expenditure (2016 N$ million)	% of total costs that would go to suppliers in the local municipal area (ie Tsumeb)	% of total costs that would go to suppliers in the rest of Oshikoto	% of total costs that would go to suppliers in the rest of Namibia	% of total costs that would be direct imports
Civils, structural	85	37%	9%	54%	0%
Machinery and equipment	314	10%	3%	8%	78%
Electrical and instrumentation	69	16%	5%	42%	37%
Indirects	254	32%	1%	10%	57%
Total	**722**				

The project would have a positive impact on commercial activity particularly in the local area and region during construction given its size and the expenditure associated with it outlined above. During the construction phase the building construction, civil and other construction and specialist industrial machinery sectors would benefit substantially. The structural metal products, wholesale and retail trade and construction materials sectors would also stand to gain due to indirect linkages.

Table 5.2 also gives a tentative indication of what percentage of construction expenditure would go to suppliers from Tsumeb, the rest of Oshikoto, the rest of the country and what would be imported. Imports would primary come in the form of specialised machinery and equipment not available in Namibia. Table 5.2 shows the likely construction spend per area using the overall amounts and percentages in Table 5.1. About N$155.8 million should be spent in the local area. A further N$26.2 million is expected to be spent in the other parts of Oshikoto; N$127.4 million in the remaining parts of Namibia and a further N$413.5 million is projected to be spent on imports.

[3] Note that all data on expenditure during construction and operation, jobs and their likely geographic spread were sourced from DPMT.

Table 5.2: Construction phase expenditure per geographic area

Expenditure category	Spend on suppliers in the local municipal area (ie Tsumeb) (N$ million)	Spend on suppliers in the rest of Oshikoto (N$ million)	Spend on suppliers in the rest of Namibia (N$ million)	Spend on direct imports (N$ million)
Civils, structural	31.6	7.9	45.5	-
Machinery and equipment	32.8	10.9	26.2	244.1
Electrical and instrumentation	10.9	3.6	29.2	25.2
Indirects	80.6	3.8	26.5	144.1
Total	**155.8**	**26.2**	**127.4**	**413.5**

5.3.1.1 Employment and incomes during construction

Table 5.3 outlines the total construction phase employment that would be associated with the project based on the applicant's expectations. Bear in mind that the estimates are not to be regarded as highly accurate and are meant to give an indication of potential employment impacts. A total of 185 person-years of employment are expected to be generated during construction (a person year is equivalent to the amount of work performed by an average full-time worker during the course of one year). This estimate does not specify the average number of people who will be employed at any given time during construction, a figure which will probably vary considerably, with more workers at some times and less at others. Most of the construction phase jobs will be in the medium skill (100 person-years) and high skill (57 person-years) categories, with 29 person-years' worth of the employment requiring people with a low level of skill. This is due to the highly technical nature of the construction.

Table 5.3: Estimated direct temporary employment during construction (person-years)

Low skill	Medium skill	High skill	Total
29	99	57	185

It is anticipated that approximately 90 of these person years of work would be allocated to people from the local area and 47 to those from the rest of the Oshikoto Region (see table below). Note that these estimates are based largely on a fairly broad assessment of the availability of labour in these areas and it is the applicant's intention to use a greater proportion of labour from the local area if possible.

Table 5.4: Likely spread of construction jobs per area

	Low skill	Medium skill	High skill	Total
Anticipated % of workers from the local area	80%	50%	30%	
Corresponding number of workers	23	50	17	**90**
Anticipated % of workers from the rest of Oshikoto	20%	30%	20%	
Corresponding number of workers	6	30	11	**47**
Anticipated % of workers from the rest of Namibia	0%	20%	30%	
Corresponding number of workers	-	20	17	**37**
Anticipated % of workers from other countries	0%	0%	20%	
Corresponding number of workers	-	-	11	**11**
Total	**29**	**99**	**57**	**185**

Another way to quantify the positive impacts resulting from construction phase employment is to consider the salaries which would be paid to employees. Table 5.5 shows the estimate that just over N$53 million would be paid as salaries during construction based on likely salary averages. The divisions between the various skill levels are also shown.

Table 5.5 Total salaries and wages associated with the construction phase of the project (N$)

Low skill	Medium skill	High skill	Total
2 782 000	24 815 000	25 543 000	**53 140 000**

In addition to the above direct employment and associated income opportunities, a significant number of temporary indirect and induced opportunities would be associated with the project. These would stem primarily from expenditure by the applicant in the local area and region as well as expenditure by workers hired for the construction phase.

5.3.2 Operational phase impacts

The expansion will basically entail a substantial increase in the plant's capacity to treat copper concentrate, leading to an increase in production as outlined in Section 3. The key operational phase impacts associated with the project would flow from increased expenditure on operations at the plant following the expansion. Once full production has been reached (370,000 tpa), total operational expenditure associated with the plant should be approximately N$1.577 billion per annum in 2016 terms, up approximately N$288 million from the N$1.289 billion budgeted for next year.

Aside from the amounts involved, the nature of this expenditure will play a key role in determining impacts. For example, while there would be increased expenditure on key suppliers, the expansion would not require the hiring of new staff. In the following sections, current levels of employment and supplier expenditure at the plant are outlined in order to provide context after which the impacts of the expansion are assessed with a focus on first round indirect employment impacts.

5.3.2.1 Employment and incomes during operations

Table 5.6 outlines the operational phase employment opportunities currently associated with DPMT. The plant currently sustains 667 direct jobs, of which 457 are employees and 210 are contractors. This is a significant number of opportunities and makes DPMT the largest single employer in Tsumeb by some margin. Furthermore, the jobs are associated with annual salary payments of around N$168 million.

As mentioned previously, the expansion will not require that additional staff be hired at the plant. There is an exception in the case of contractors, in that two additional staff will be required for refractory and mechanical maintenance. Additional direct employment due to the expansion would be limited to these two contractors.

Table 5.6: Operational employment

Operational job categories	Number of workers currently at DPMT				Total paid in salaries in most recent year (N$)
	Low skilled	Medium skilled	Highly skilled	Total	
Technical and engineering services	14	21	22	**57**	28 000 000
Operators	194	79	10	**283**	49 000 000
Administrative staff	9	20	17	**46**	25 000 000
Guesthouse	6	1	0	**7**	1 000 000
Security	6	7	1	**14**	3 000 000
Health & Safety	8	2	5	**15**	5 000 000
Environment	2	3	2	**7**	3 000 000
Supply Chain	10	10	8	**28**	10 000 000
Contractors	158	26	26	**210**	44 000 000*
Total	**407**	**169**	**91**	**667**	**168 000 000**

**Salaries for contractors were estimated based on the average salaries of direct employees in the same skill categories*

The bulk of additional employment resulting from the expansion would result from indirect job opportunities. These would stem primarily from increased expenditure by the applicants in the local area and region, predominantly on the following items described in more detail below:

- Electricity
- Transport and handling services
- Engineering services
- Local municipal services

Electricity is currently supplied directly to DPMT by NamPower and would need to increase for the expansion. Due to the economies of scale associated with electricity provision, increased employment would be minimal despite the substantial increase in expenditure on electricity

In terms of transport and handling services, Table 5.7 provides some idea of DPMT's current transport needs. Considering that the quantity of copper concentrate imported is likely to increase by approximately 55%, with export quantities increasing accordingly, there will be a significant increase in the company's transport requirements which are also approximated in the table.

Table 5.7 Current transport requirements and approximate future requirements after expansion

Direction and nature of load	Approximate volume per month	Current		Likely after expansion in production	
		Truck trips per month	Train wagons per month (wagon capacity 42 Mt)	Truck trips per month	Train wagons per month (wagon capacity 42 Mt)
Inbound					
Concentrate and other imports through Walvis Bay	20 000 - 24 000 Mt	404	238	606	357
Coal imports through Walvis Bay	800 t	0	20	0	30
Total		**404**	**258**	**606**	**387**
Outbound					
Blister exports through Walvis Bay	3 000 - 4 000 Mt	115	0	173	0
Sulphuric acid to Rossing Mine	18 000 Mt	0	400	0	600
Sulphuric acid to Tschudi Mine	2 500 Mt	60	0	90	0
Total		**175**	**400**	**263**	**600**

DPMT relies on companies such as Grindrod for handling and storage of concentrate at the Walvis Bay port bulk terminal. The company employs 26 staff and it was determined that Grindrod currently relies on DPMT for a substantial portion of its turnover. It will be a key beneficiary form the expansion due to increased volumes through the part of the port which is manages.

Engineering and maintenance services are primarily provided to DPMT by a few companies located in Tsumeb and Windhoek. Quant is, for example, a significant supplier of such services and it employs a total of 181 employees. It was estimated that over half of Quant's turnover comes from DPMT. It is also likely that Quant and other engineering and maintenance suppliers will receive moderately larger amounts of work from DPMT if the expansion goes ahead.

DPMT relies on the municipality primarily for the provision of potable water. The municipality currently generates about N$2.7 million per year from water sales to DPMT, and this will likely increase by about 20% with the finalization of the expansion. As with electricity, this would provide financial benefits, but is unlikely to result in additional jobs due to economies of scale.

In order to get an adequate indication of additional indirect employment at DPMT's suppliers as a result of the expenditure increases outlined above, DPMT's supplier database was used to obtain expenditure on suppliers, categorised according to the degree to which they rely on DPMT for their business turnover. Data were also obtained on the number of employees working at these suppliers. A roughly direct relationship between turnover and employment was then assumed in order to estimate the number of jobs at all local suppliers reliant on DPMT business. For example, if a supplier has 20 employees, and that supplier is reliant on DPMT for 50% of their turnover, then DPMT was assumed to support roughly 10 jobs. Each supplier was then analysed to determine the extent to which they would experience increased demand resulting from the expansion. The results are presented in Table 5.8. The table shows that DPMT currently indirectly supports between 337 and 510 jobs at its suppliers. Between 16 and 32 first round indirect jobs are likely to be generated by the expansion, of which between 7 and 14 jobs are likely to be created in Tsumeb, with the remainder split between Walvis Bay and Windhoek.

Table 5.8 Indirect first round employment during the operational phase

	Current	After upgrade	Additional
Indirect jobs supported in Tsumeb	86 - 138	93 - 152	7 - 14
Indirect jobs supported in Walvis Bay	28 - 42	32 - 49	4 - 7
Indirect jobs supported in the rest of Namibia	220 - 322	224 - 333	5 - 11
Indirect jobs supported in other countries	3 - 8	3 - 8	0 - 0
Total	337 - 510	353 - 542	16 - 32

The income associated with the above indirect first round jobs can be estimated by considering a likely average income for each of the additional employees. Assuming that the average additional employee earns N$250 000 per annum, we can estimate that the total additional income associated with the above jobs in Namibia is between N$4 million and N$8 million. For Tsumeb the additional income was estimated to be between N$1.7 million and N$3.5 million.

Note that the estimates above take into consideration the 'first round' of expenditure on DPMT's suppliers thereby capturing a significant portion of total eventual impacts which would include indirect and induced impacts from subsequent rounds of spending (i.e. supplier that benefit from first round expenditure would, in turn, spend on their suppliers and so on). Impacts from subsequent rounds of spending were not quantified, but their likely magnitude was taken into consideration when impact significance ratings were determined.

5.3.3 Mitigation and significance of impacts

Mitigation and Management

The applicant's procurement processes, hiring and training of staff should act as a departure points when considering benefit enhancement measures, both during construction and in the operational phase. Among other things, this plan deals with giving preference to local and historically disadvantaged individuals and companies.

Mitigation in the form of benefit enhancement should focus on three areas:

1. Targets should preferably be set for how much local labour should be used based on the needs of the applicant and the availability of existing skills and people that are willing to undergo training. Opportunities for the training of unskilled and skilled workers from local communities should be maximized. The local municipality has a database of mostly lower skilled local people who are looking for work that should be drawn on.
2. Local sub-contractors should be used where possible and contractors from outside the local area that tender for work should also be required to meet targets for how many locals are given employment.
3. The applicant should explore ways to enhance local community benefits with a focus on well-conceived projects that are clearly aligned with local needs and acceptable to the municipality.

The social specialist study also provides more details on appropriate benefit enhancement measures.

Significance of impacts

An assessment of the significance of the impacts based on the findings above (both without and with mitigation measures) is presented in the tables below - one for the construction phase and one for the operational phase. Impacts from expenditure are positive for both, with the geographic scale being perhaps the most significant differentiator along with duration of the impact.

During construction, impacts with mitigation would be of a low significance at a local level given the size of the expenditure injection, its duration under two years and the number of potential employment and income generation opportunities involved at the local level.

New impacts during operations form the expansion would be distributed fairly evenly between the town of Tsumeb, Walvis Bay and Windhoek. These impacts have been given a medium significance rating with mitigation.

Cumulative impacts would have a high significance rating given the addition of the significant jobs and other benefits associated with the existing DPMT operation.

The no-go would have no impact relative to these benefits at best as there would be no additional expenditure injection. At worst, the continued financial viability of the plant and the benefits associated with current operations may be put at risk as discussed in Section 5.1. The expansion is one of the later phases of an overall optimisation and expansion which has required substantial investment. Recovering the costs of this investment would be significantly more challenging should the proposed expansion not go ahead.

Table 5.9: Impact significance rating – impacts associated with project expenditure during construction

Potential impact of the DPMT smelter expansion on the economy	Unmitigated assessment						Mitigation measures	Mitigated assessment					
	Severity	Duration	Spatial Scale	Consequence	Probability	Significance		Severity	Duration	Spatial Scale	Consequence	Probability	Significance
IMPACT: Project expenditure - construction **Severity:** Positive impacts associated with increased expenditure during construction will be **low** with and without mitigation. **Duration:** The duration will be for two years, and is therefore rated **low** **Spatial scale:** Impacts would primarily be experienced at the local to national scale, although the local spend on construction will generate the most significant economic benefits for the town of Tsumeb. The rating is considered **moderate** with and without mitigation. **Consequence:** Based on the above assessment the determining consequence is **low** in both the unmitigated and mitigated cases. **Probability:** Probability of occurrence is **high.** **Significance:** Summarising the above assessment, the overall significance is rated as **low** in the unmitigated case and also **low** in the mitigated case.	**L**	**L**	**M**	**L**	**H**	**L**	**Objective:** Maximise benefits to local and previously disadvantaged population. **Actions:** Set targets for how much local labour should be used. Opportunities for the training of unskilled and skilled workers from local communities should be maximized. Local sub-contractors should be used where possible and contractors from outside the local area that tender for work should also be required to meet targets for how many locals are given employment. The applicant should explore ways to enhance local community benefits with a focus on well-conceived projects that are clearly aligned with local needs and acceptable to the municipality. **Emergency situations:** None identified.	**L**	**L**	**M**	**L**	**H**	**L**

Table 5.10: Impact significance rating – impacts associated with project expenditure during the operational phase

Potential impact of the planned Dundee smelter expansion on the economy	Unmitigated assessment						Mitigation measures	Mitigated assessment					
	Severity	Duration	Spatial Scale	Consequence	Probability	Significance		Severity	Duration	Spatial Scale	Consequence	Probability	Significance
RISK: Project expenditure - operational **Severity:** Positive impacts associated with increased expenditure during operations will be **low** without mitigation and **low to moderate** with mitigation. **Duration:** Duration would be for the life of the project and is thus considered **moderate** as per the impact rating guidelines provided. **Spatial scale:** Impacts would be experienced on the local to national scales including Tsumeb, Walvis Bay and Windhoek. The rating is considered **high** with and without mitigation. **Consequence:** Based on the above assessment the consequence is **low** in the unmitigated case and **moderate** in the mitigated case. **Probability:** Probability of occurrence is **high.** **Significance:** Summarising the above assessment, the overall significance is rated as **low** in the unmitigated case and **moderate** in the mitigated case.	L	M	H	L	H	L/M	**Objective:** Maximise benefits to local and previously disadvantaged population. **Actions:** Set targets for how much local labour should be used. Opportunities for the training of unskilled and skilled workers from local communities should be maximized. Local sub-contractors should be used where possible and contractors from outside the local area that tender for work should also be required to meet targets for how many locals are given employment. The applicant should explore ways to enhance local community benefits with a focus on well-conceived projects that are clearly aligned with local needs and acceptable to the municipality. **Emergency situations:** None identified.	L/M	M	H	M	H	M

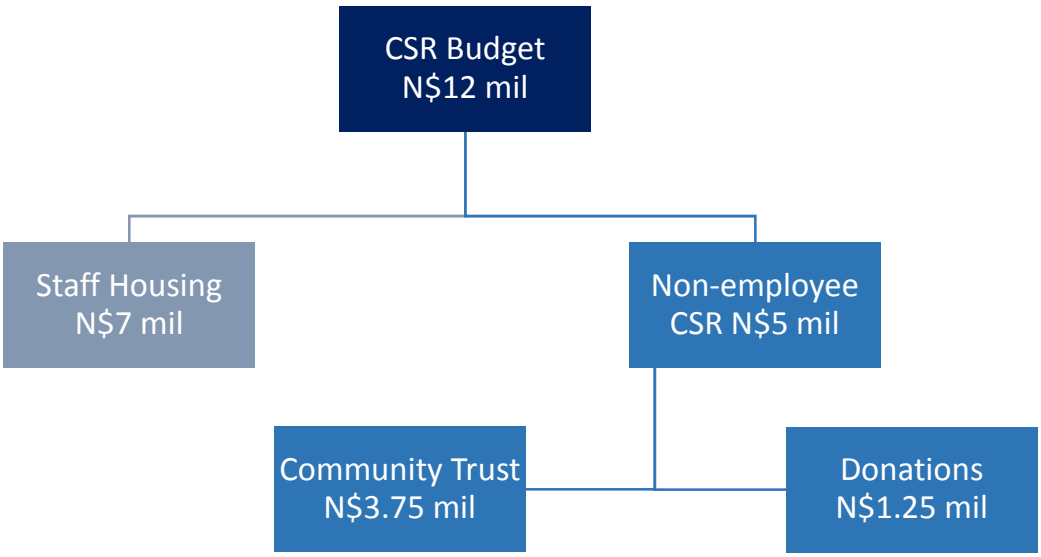
5.4 Impacts associated with corporate social responsibility expenditure

Being the largest company in Tsumeb, DPMT is well positioned to support the surrounding community through its corporate social responsibility (CSR) programmes. This section will explore DPMT's current contribution to the local economy through CSR and the potential for increases associated with the expansion.[4]

5.4.1 Current spending on CSR

DPMT's CSR budget for 2016 was approximately N$12 million. Of this, N$7 million was allocated to spending on housing for the company's employees, while the remaining N$5 million was earmarked for spending on the Tsumeb Community Trust (N$3.75 million) and on other donations (N$1.25 million). The breakdown is shown in Figure 5.1. Part of the funding for DPMT's CSR programmes comes from an annual scrap metal auction. These auctions have generated a total of N$291 000 over the past three years and there should be scope to increase this amount.

Figure 5.1 DPMT's Corporate Social Responsibility budget for 2016



As part of the company's staff housing scheme, the N$7 million budgeted in 2016 was to be used to construct 60 houses for employees. Prior to 2016, a total of 67 houses had already been constructed, with staff required to contribute an average of 20% towards the overall cost.

For non-employee CSR, DPMT has a policy which stipulates that 75% should go to the Trust and 25% should be earmarked for spending in a more flexible way mostly on donations. This explains the 2016 allocation as shown in the diagram above.

The Tsumeb Community Trust was registered in 2010 and is governed by a board of directors made up of nine representatives including one from DPMT. The Trust is guided by a spending allocation as shown in Table 5.11. The table outlines the five priority areas of investment for the Trust, including education, small and medium sized enterprises (SME) development, social welfare, environment and arts and culture. An

[4] Information provided by Mr Andre Struwig, Tsumeb Community Trust Administrator.

additional category labelled 'other' is also included which allows the Trust to allocate money to causes which are not necessarily within the five focus areas or which are difficult to categorise. Spending through the trust is largely directed according to the guidance provided by the 2015 Tsumeb Community Needs Assessment (CNA – Yarmoshuk, 2015)

Table 5.12 shows that education projects received the largest share of funding in 2016 (N$4.5 million) as per the target allocation. SME development also received a significant share of the funding (N$2.4 million) followed by social welfare (N$1.5 million), environment (N$639,000), and arts and culture (N$347,000). The total amount spent since the trust was established is just over N$10 million, with N$3 million of this spending occurring in 2015 and N$3.75 million budgeted to occur in 2016 representing a 25% increase.

Table 5.11 Spending allocations within the Community Trust, 2010 - 2015

	Current target allocation of spending	Total spent between 2010 and 2015 (N$)	Actual allocation of spending
Education	40%	4,470,000	44%
SME Development	30%	2,428,000	24%
Social Welfare	15%	1,497,000	15%
Environment	7.5%	639,000	6%
Arts, Culture	7.5%	347,000	3%
Other		427,000	4%
Administration costs		332,000	3%
Total	100%	**10,140,000**	100%

In the area of education, the CNA recommended that the Trust invest in 13 schools in the Oshivelo Circuit. These schools serve 7,978 students from Tsumeb and the surrounding areas. The CNA identified the following as priorities for the schools:

1. Toilets not in use
2. Maintenance of the classrooms and buildings
3. Chair shortages
4. Desk shortages
5. Classroom shortages

It was also recommended that the trust should support the Teacher Resource Centre serving the Oshivelo Circuit, as well as the public library and other secondary schools provided that a clear lead can be identified for each project (Yarmoshuk, 2015).

The allocation of funds within the SME development category is primarily determined by board members representing the Namibian Chamber of Commerce and Industry (NCCI). Companies which apply for funding (typically 40 to 50 per year) are grouped according to sector, as one of the allocation principles is to fund SMEs from a broad array of sectors. The NCCI also selects companies which are perceived as creative and which are deemed to be targeting a significant enough market. Companies have in the past been allocated an average of N$18,000 per year, with values ranging between N$2,500 and N$73,000 per year (Yarmoshuk, 2015). There has in recent times been a shift of focus towards concentrating more of the funding stream towards companies which have demonstrated strong performance as well as potential for further growth. A total of 83 SMEs have received funding from the DPMT Community Trust. As of 2016, 70 of these were still operational and 20 had shown significant growth.

The SME development programme is currently undergoing a change in focus, with a greater emphasis on monitoring the performance of beneficiaries as well as a stronger focus on training and mentoring beneficiaries to ensure a greater chance of success where funds are allocated.

In terms of improving the social welfare of the area, the CNA identified the following as key issues needing to be addressed (Yarmoshuk, 2015: 11):

1. "Alcohol abuse
2. Crime
3. Dependency syndrome
4. Engaging men in productive activity
5. Human health and hygiene
6. Housing, need for low-cost/high density housing
7. Idle Youth
8. Limited capacity of Tsumeb Municipality
9. Maintenance of building, infrastructure, facilities
10. Poor service attitude of many young employees
11. Poverty
12. Racism
13. Unemployment
14. Unskilled employees
15. Violence against women ("gender violence"), including sexual assault (i.e. rape)"

The CNA pays particular attention to plans which could potentially uplift the youth of the area, as well as health interventions and integrated support through the municipalities existing strategic plan, which includes focuses on strengthening the economy; strengthening partnerships; building institutional capacity; improving service delivery; and social development. Given that the CNA was carried out with the explicit purpose of informing DPMT's CSR programmes, it is likely that CSR has gone, and will continue to go, some way towards addressing the issues identified above.

5.4.2 Potential for CSR spending increases

Section 5.3.2 outlined the increase in operational expenditure which will accompany the expansion of operations at the plant. Section 5.5 discusses the resulting changes in revenue and foreign exchange flows which are likely to be seen with the expansion. In line with these increases, and on the basis of recently increased budget allocations to the Trust, the expectation is that there will also be an increase in the quantity of revenues which are directed to CSR spending. It is, however, difficult to ascertain the magnitude of this increase and how proportional it will be to increased revenue or profit.

5.4.1 Mitigation and significance of impacts

Mitigation and management

No additional mitigation measures are proposed, given that the programmes invested in by the applicant already aim to maximise their contribution to the welfare of the local population.

Significance of impacts

An assessment of the significance of the impacts based on the findings above (both without and with mitigation measures) is presented in Table 5.12.

Impacts with mitigation would be of moderate significance during operations at the local level given the likely size of additional expenditure and the level of economic development associated therewith.

Cumulative impacts would have a high significance rating given the addition of the significant CSR spending associated with the existing DPMT operation.

The no-go alternative would maintain the status quo in terms of CSR investment at best. At worst, the continued financial viability of the plant and the benefits associated with current operations may be put at risk as discussed in Section 5.1. The expansion is one of the later phases of an overall optimisation and expansion which has required substantial investment. Recovering the costs of this investment would be significantly more challenging should the proposed expansion not go ahead.

Table 5.12: Impact significance rating – impacts associated with investment in corporate social responsibility

Potential impact of the planned DMPT smelter expansion on the economy.	Unmitigated assessment						Mitigation measures	Mitigated assessment					
	Severity	Duration	Spatial Scale	Consequence	Probability	Significance		Severity	Duration	Spatial Scale	Consequence	Probability	Significance
IMPACT: Increased CSR investment **Severity:** Improvements in social wellbeing from CSR investment are predicted to increase in line with increased revenue generated by the plant. The severity is considered **low to moderate** in the unmitigated case and **moderate** in the mitigated case. **Duration:** Duration would be for the life of the project and is thus considered **moderate** as per the impact rating guidelines provided. **Spatial scale:** The CSR investments targets the local area specifically. The spatial scale was thus rated **low.** **Consequence:** Based on the above assessment the determining consequence is **low to moderate** in the unmitigated case and **moderate** in the mitigated case. **Probability:** Probability that CSR spending will increase in line with the increased revenue generated by the project is considered **moderate** in the unmitigated case and also **moderate** in the mitigated case. **Significance:** Summarising the above assessment, the overall significance is rated as **low to moderate** in the unmitigated case and **moderate** in the mitigated case.	L/M	M	L	L/M	M	L/M	**Objective:** No mitigation measures are proposed, given that the programmes invested in already aim to maximise their contribution to the welfare of the local population. **Actions:** No actions are suggested. **Emergency situations:** None identified.	M	M	L	M	M	M

5.5 Macro-economic impacts focused on foreign exchange revenue

The scale of the expansion and its export orientation should ensure that it makes a significant contribution in term of macro-economic benefits. The key variable chosen for the measurement of these benefits is foreign exchange earnings bearing in mind that DPMT does not pay corporate tax due to its Export Processing Zone status.

Current and likely post-expansion foreign exchange earnings for the country (equivalent to foreign exchange turnover for DPMT) were calculated as shown in Table 5.13 based on information provided by DPMT. Foreign exchange earnings resulting from the expansion would average around US$66 million per year for copper blister and sulphuric acid exports. These would be in addition to current earnings of approximately US$140 million per year.

Table 5.13 The relationship between inputs, outputs and foreign exchange earnings for the country

	Current	Once expansion complete		Additional due to expansion once fully operational
		1st year after construction (2019)	2nd year onwards (2020)	
Inputs				
Imports of concentrate (tpa)	240,000	300,000	370,000	130,000
Outputs/production				
Copper blister				
Export volumes (tpa)	60,000	75,000	92,500	32,500
Net forex revenue (US$)	126,829,000	155,536,000	182,625,000	**55,796,000**
Sulphuric acid				
% of sulphur dioxide than can be sold	100%	100%	100%	
Export volumes (tpa)	182,000	257,000	323,000	141,000
Revenue from exports (US$)	13,650,000	19,275,000	24,225,000	**10,575,000**
Namibian sales volumes (tpa)	40,000	40,000	40,000	
Revenue from local sales	4,211,000	4,211,000	4,211,000	

The annual foreign exchange revenues over 30 years were converted into present value terms using a 4% base discount rate. This resulted in a present value estimate of about US$970 million (~N$13 billion) for the base case increasing to US$1.3 billion if a 2% discount rate is used and decreasing to US$746 million for a 6% rate (see Table 5.14). Note that these benefits would be offset by imports and the repatriation of a portion of profits to foreign lenders and shareholders. Although it was beyond scope to quantify the degree of offsetting, net positive impacts on the balance of payment should remain significant. While construction would rely on significant imports of specialised equipment, the operational expenditures on the plant are not especially import intensive.[5] Depending on where finance is sourced for the expansion (and was sourced for other capital projects such as the acid plant), repatriation of profits may be required to service loans.

[5] Note that copper concentrate is not an imported expense item as DPMT is paid in foreign exchange to process the concentrate and therefore does not count it as an expense.

Table 5.14: Present value of foreign exchange revenues

Annual average smoothed over 30 years (US$ million)	Present Value using discount rate of (US$ million):		
	2%	4%	6%
57	1,295	**969**	746

5.5.1 Mitigation and significance of impacts

Mitigation and Management

Mitigation should focus on ensuring that Namibian suppliers of goods and services are favoured by DPMT where possible.

Significance of impacts

An assessment of the significance of the combined macro-economic impacts of the expansion based on the findings above is presented in Table 5.15. Given the levels of foreign exchange which would be generated as a result of the expansion, but also considering the potential for some outflows, impacts have been rated moderate to high positive with mitigation.

Cumulative impacts would have a high significance rating given the addition of the significant foreign exchange earnings associated with the existing DPMT operation.

The no-go alternative would maintain the status quo in terms of foreign exchange earnings at best. At worst, the continued financial viability of the plant and the benefits associated with current operations may be put at risk as discussed in Section 5.1. The expansion is one of the later phases of an overall optimisation and expansion which has required substantial investment. Recovering the costs of this investment would be significantly more challenging should the proposed expansion not go ahead.

Table 5.15: Impact significance rating – impacts associated with foreign exchange earnings

Potential impact of the planned DPMT smelter expansion on the economy.	Unmitigated assessment						Mitigation measures	Mitigated assessment					
	Severity	Duration	Spatial Scale	Consequence	Probability	Significance		Severity	Duration	Spatial Scale	Consequence	Probability	Significance
IMPACT: Increased foreign exchange earnings **Severity:** Foreign exchange earnings are likely to have a strong positive impact on the economy. The severity of this impact is thus considered **moderate to high**. **Duration:** Duration would be for the life of the project and is thus considered **moderate** as per the impact rating guidelines provided. **Spatial scale:** Foreign exchange earnings will be used to fund operational expenditure and CSR investment and improve the country's balance of payments, which will have both local and national impacts. The scale was rated **high.** **Consequence:** Based on the above assessment the determining consequence is **moderate to high.** **Probability:** Probability of occurrence is **high.** **Significance:** Summarising the above assessment, the overall significance is rated as **moderate to high**, in the unmitigated and mitigated cases.	**M/H**	**M**	**H**	**M/H**	**H**	**M/H**	**Objective:** Ensuring that Namibian suppliers of goods and services are favoured by DPMT where possible. **Actions:** DPMT to purchase from Namibian suppliers where possible. **Emergency situations:** None identified.	**M/H**	**M**	**H**	**M/H**	**H**	**M/H**

6 CONCLUSION

Having assessed the economic impacts of the project, it is considered most likely that it would achieve an overall positive impact provided the financial projections of the applicant prove reasonably accurate and provided adequate mitigation measures are instituted. Note that these must include measures to ensure that environmental risk are kept to within acceptable levels.

The most significant benefits are anticipated to be at a national level in the form of foreign exchange earnings. Operational phase impacts at a local and regional level would not include additional direct jobs. Instead, benefits would be indirect in nature and flow from increased expenditure on DPMT suppliers. These would be distributed fairly evenly between suppliers in Tsumeb, Walvis Bay and Windhoek. Increased spending on corporate social responsibility, especially through the Community Trust, should also result in significant additional benefits in Tsumeb.

The no-go would entail no additional economic benefits at best. At worst, the continued financial viability of the plant, and the benefits associated with current operations, may be put at risk. The expansion is one of the later phases of an overall optimisation and expansion which has required substantial investment. Recovering the costs of this investment would be significantly more challenging should the proposed not go ahead.

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8 APPENDICES

Appendix 2: Impact Assessment Criteria and Summary Impact Table

Both the criteria used to assess the impacts and the methods of determining the significance of the impacts are outlined in the following table. Part A provides the definition for determining impact consequence (combining severity, spatial scale and duration) and impact significance (the overall rating of the impact). Impact consequence and significance are determined from Part B and C. The interpretation of the impact significance is given in Part D.

*PART A: DEFINITION AND CRITERIA**		
Definition of SIGNIFICANCE		**Significance = consequence x probability**
Definition of CONSEQUENCE		**Consequence is a function of severity, spatial extent and duration**
Criteria for ranking of the SEVERITY/NATURE of environmental impacts	**H**	Substantial deterioration (death, illness or injury). Recommended level will often be violated. Vigorous community action. Irreplaceable loss of resources.
	M	Moderate/ measurable deterioration (discomfort). Recommended level will occasionally be violated. Widespread complaints. Noticeable loss of resources.
	L	Minor deterioration (nuisance or minor deterioration). Change not measurable/ will remain in the current range. Recommended level will never be violated. Sporadic complaints. Limited loss of resources.
	L+	Minor improvement. Change not measurable/ will remain in the current range. Recommended level will never be violated. Sporadic complaints.
	M+	Moderate improvement. Will be within or better than the recommended level. No observed reaction.
	H+	Substantial improvement. Will be within or better than the recommended level. Favourable publicity.
Criteria for ranking the DURATION of impacts	**L**	Quickly reversible. Less than the project life. Short term
	M	Reversible over time. Life of the project. Medium term
	H	Permanent. Beyond closure. Long term.
Criteria for ranking the SPATIAL SCALE of impacts	**L**	Localised - Within the site boundary.
	M	Fairly widespread – Beyond the site boundary. Local
	H	Widespread – Far beyond site boundary. Regional/ national

PART B: DETERMINING CONSEQUENCE					
			SEVERITY = L		
DURATION	Long term	**H**	**Medium**	**Medium**	**Medium**
	Medium term	**M**	**Low**	**Low**	**Medium**
	Short term	**L**	**Low**	**Low**	**Medium**
			SEVERITY = M		
DURATION	Long term	**H**	**Medium**	**High**	**High**
	Medium term	**M**	**Medium**	**Medium**	**High**
	Short term	**L**	**Low**	**Medium**	**Medium**
			SEVERITY = H		
DURATION	Long term	**H**	**High**	**High**	**High**
	Medium term	**M**	**Medium**	**Medium**	**High**
	Short term	**L**	**Medium**	**Medium**	**High**
			L	**M**	**H**
			Localised Within site boundary Site	Fairly widespread Beyond site boundary Local	Widespread Far beyond site boundary Regional/ national
			SPATIAL SCALE		
PART C: DETERMINING SIGNIFICANCE					
PROBABILITY (of exposure to impacts)	Definite/ Continuous	**H**	**Medium**	**Medium**	**High**
	Possible/ frequent	**M**	**Medium**	**Medium**	**High**
	Unlikely/ seldom	**L**	**Low**	**Low**	**Medium**
			L	**M**	**H**
			CONSEQUENCE		

PART D: INTERPRETATION OF SIGNIFICANCE	
Significance	**Decision guideline**
High	It would influence the decision regardless of any possible mitigation.
Medium	It should have an influence on the decision unless it is mitigated.
Low	It will not have an influence on the decision.

***H = high, M= medium and L= low and + denotes a positive impact.**

Appendix 3: Disclaimer

The primary role of this study is to inform the decision-making processes being undertaken by the relevant environmental authorities with regards to the proposed project. Due care and diligence has been applied in the production of the study. However, ultimate responsibility for approving, denying or requiring changes to the proposed project application rests with the relevant environmental authorities (and other government bodies where relevant) who also bear responsibility for interrogating and determining how assessment information from this economic specialist study along with other information is to be used to reach their decisions. Independent Economic Researcher and Dr Hugo van Zyl can therefore not be held responsibility or liable for any consequences of the decisions made by the relevant environmental authorities with regard to the proposed project. This includes any financial, reputational or other consequences that such decisions may have for the applicant, the Environmental Assessment Practitioner responsible for conducting the Environmental Impact Assessment process or for the environmental authorities themselves.