Socio-Economic Basic Assessment for the proposed water pipeline at Duvha Coal fired Power Station

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Prepared for:

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1. INTRODUCTION

1.1 STUDY PURPOSE

The purpose of this report is to provide an unbiased assessment of the potential socio-economic issues from the proposed water pipeline project at Duvha Power Station, in Mpumalanga. This report presents a basic assessment of the potential socio-economic prospects and constraints that would arise from the implementation of this project.

Kayamandi Development Services (Pty) Ltd was appointed as sub-consultants by ILISO Consulting (Pty) Ltd to undertake the socio-economic assessment for the proposed water supply pipeline on behalf of Eskom Holdings SOC Ltd. Russell Aird and Nanja Churr, the specialist consultants from Kayamandi Development Services (Pty) Ltd, responsible for undertaking the study and compiling the report, are independent and do not have vested or financial interests in the proposed project being either approved or rejected.

1.2 PROJECT BACKGROUND AND DESCRIPTION

Duvha Power Station in Mpumalanga, South Africa, is a coal-fired power plant operated by Eskom. The Power Station receives water from the Vaal River Eastern Subsystem as well as the Komati Water Scheme (KWS). The KWS, which provides better quality of demineralised and potable water, is however **scheduled for an outage from the middle of 2016**, **which will impact the supply of Komati water to the Power Station**. Two outages on the raw water supply are expected. The Department of Water and Sanitation (DWS) is planning a three week inspection/repair on the KWS (which includes the Hendrina-Duvha pipeline) in 2016 and then a possibility for further refurbishment which could last between six to twelve months. When an outage occurs on the Komati KWS, the best possible use of Komati water must be found. Under the circumstances that the Power Station currently operates, there is only a supply for about 4.5 days, which is too short during the outage period. Due to the aforementioned outage, Eskom compiled a report entitled '***Duvha Water Supply During KWS Outage Concept Design***' in which 3 alternatives are investigated. One of three alternatives entailed utilising the system as is. The concept design report referred to above, noted that this is not an option as there is a risk to the availability and reliability of demineralised water supply to the power station and considering the state of the water treatment plant (WTP), the runtime will be reduced and it is highly probable that the required quantity of demineralised water will not be produced.

As such, two remaining alternatives, as detailed on hereunder, are considered further in this assessment, namely:

- Alternative 1: Emergency pipeline connection
- Alternative 2: Reservoir to WTP connection

1.2.1 Alternative 1: Emergency pipeline connection

In the Emergency Pipeline connection alternative (hereafter referred to as Alternative 1), the Blending Plant is bypassed and a pipeline is installed directly from the raw water reservoirs to the emergency supply pipeline route to transfer Komati water. This entails a reconfiguration of the reservoir pipework, at the raw water reservoirs to provide isolation of the Komati reservoir compartment, as provided in **Figure 1**.

As stipulated in the Eskom study entitled 'Works Information for Water Supply during KWS Outage' this alternative is described as having two sections, namely:

- The Komati Reservoir to WTP emergency pipeline (point 1 to 3 in **Figure 1**); and
- The WTP Emergency pipeline (point 3 to 5 in **Figure 1**).

Figure 1: Proposed Pipeline Route

Reservoir to WTP emergency pipeline

Figure 4 shows the required reconfiguration of the new pipeline. This new pipeline will run below ground parallel to the existing ash pipelines until the existing emergency line (point 1 to point 3). The line will be connected to the existing connection point of the emergency line, at point 3. A reconfiguration of the reservoir pipework, at point 1 will be done to provide isolation of the Komati reservoir compartment. The existing 400 mm drain valve will be used for a connection point to the new 450 mm HDPE pipe. The valve 00VA12S501 (**Figure 2**) will be closed to isolate the station's main supply lines and then opened for Vaal water to be directed to the south cooling water system.

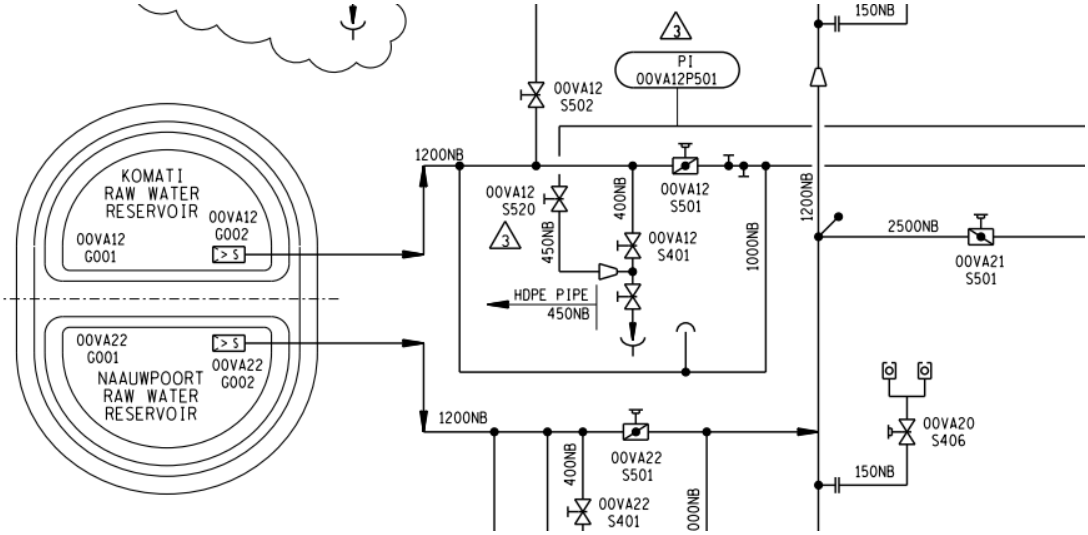


Figure 2: Interconnecting Valve

WTP Emergency pipeline

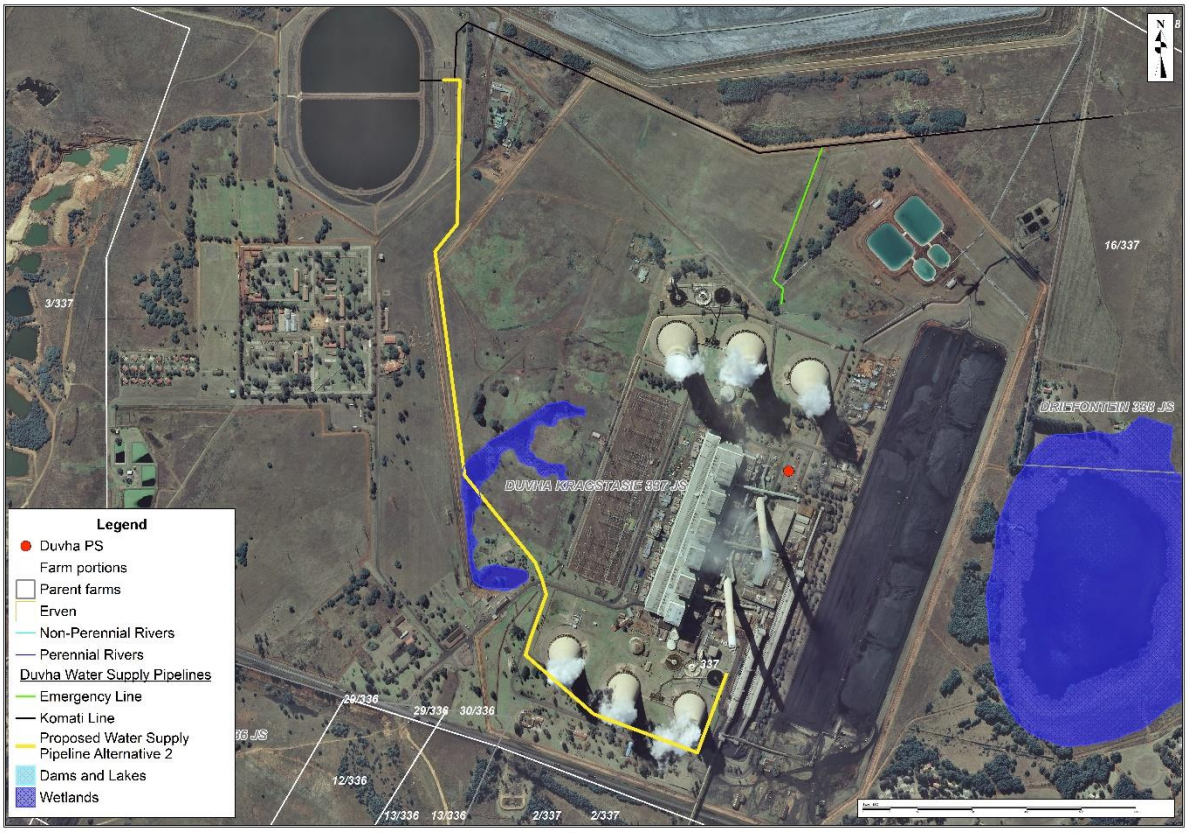
The 450mm line will be connected to the existing connection point of the existing emergency line which will then be decommissioned and removed completely. A new 450mm reservoir connection pipeline will be installed in place of the old 200mm emergency line from point 3 to the WTP (point 5). The pipeline between point 3 and 4 will be below ground, while above ground between point 4 and 5.

1.2.2 Alternative 2: Reservoir to WTP Connection

In the Reservoir to WTP connection alternative (hereafter referred to as Alternative 2), the proposed pipeline as with Alternative 1, will connect at the reservoir, be routed immediately south of the reservoir, route immediately South of the Southern Cooling Towers, and join the WTP, as shown in **Figure 3**.

Alternative 2 is approximately 2.510 km in length and the whole pipeline will be below ground (buried).

Figure 3: Alternative 2 site layout



The intended life for both alternatives is 35 years. Although the purpose of the pipeline is to supply Komati water to the WTP during the outage, the pipeline will add further flexibility for water management at Duvha Power Station. The pipeline can thus be used at any time in the future, if the supply of water to the power station is at risk.

1.3 PROJECT LOCATION AND DESCRIPTION OF LOCAL STUDY AREA AND SURROUNDS

The Power Station and the proposed water supply pipeline is situated in the eMalahleni Local Municipality (LM) that falls under the Nkangala District Municipality (DM) of the Mpumalanga Province with a population of 395 466 (119 874 households) and covering an area of 2 678 km² (StatsSA, 2011). The eMalahleni LM is predominantly an urban municipality where approximately 95% of the population is located in urban settlements Witbank (eMalahleni) and Middleburg being the largest towns in the municipality. The urbanised structure of the population is indicative of the labour concentrated around intense mining and manufacturing industries or other sources of employment. The proposed pipeline and the Duvha Power station are located within the Nauwpoort sub-place, which according to Stats SA 2011 is comprised of 142 households. Main economic activities in the area include: mining, manufacturing, and agriculture.

There is only one settlement, namely Speekfontein, situated within the Masakhane sub place (SP) that is located within the direct zone of influence within a 5km radius from the proposed pipeline. The settlement of Speekfontein had approximately 1642 households in 2011 with an average household size of 2.3 persons. According to the eMalahleni draft IDP (2015/16) in regards to the Speekfontein settlement, referred to as Duvha informal settlement, the draft IDP reveals that “Apart from the power station there is no economic base for the settlement. This poses serious doubts regarding the long term sustainability of the development. Unless a strategy can be designed to create long term job opportunities in this area, Council should be very cautious in formalising the settlement in its current location. Relocation and consolidation with an existing settlement in eMalahleni town could rather be considered”.

It is anticipated that some of the labour, goods, and services required for the construction phase could come from the Masakhane sub-place (SP), and from eMalahleni LM. However, this depends on the contractor appointed. Most of the required goods and services needed in construction will be sourced from the rest of the Mpumalanga Province, the Gauteng Province, and South Africa.

Socio-economically, the eMalahleni Local Municipality has the following general characteristics:

- A population of 395 466 people in 2011 with 95% living in urban areas with an increasing number of people moving from rural areas to the urban areas of the municipality
- The Municipality had a labour participation rate of 68% and a unemployment rate of 27% in 2011 and as such a large percentage of the population is living on the poverty line as a result of high unemployment rate (which has been increasing since 2005), low levels of education and skills, and low income levels, on par with that of the country as a whole
- Mining activities contribute significantly to local economic production
- The nearest town to the proposed pipeline is Witbank. The proposed site is situated approximately 15 km east of Witbank.
- Nearby the Power Station is an informal settlement, namely Speekfontein, referred as Duvha informal settlement, which maybe relocated

The predominant land use in the area surrounding the proposed site is classified as mining. To the north west of the Power Station is the Witbank Dam and further north west is the town of Witbank. With the exception of the Duvha Power Station buildings, land cover in the area is mostly the Witbank Dam, sports and recreation as well as pockets of small holdings around the Witbank Dam.

To the north-east of the reservoirs, from where the proposed pipelines are to start, is the mine complex, and the mine complex is surrounded mostly by coal mines and agriculture. The Duvha Power Station and associated cooling towers are a prominent feature within the landscape which engenders an industrial component to the landscape. The land area around Duvha power station is mainly flat with vegetation and several trees in the area. To the south of where the proposed pipelines end, south of the cooling towers, was a High School which is no longer in use. Eskom plans to demolish the buildings when funds are available. To the almost immediate South of the Reservoirs is also the Duvha Primary school which was established in 1982 with the power station developing available facilities. The Primary School is still in use. Further west of the Reservoirs, is an adjacent landowner Corobrik Pty Ltd. Corobrik is one of the largest manufacturer, distributor and exporter of bricks and allied building products in Africa. Another nearby landowner is Ingwe surface holdings.

Alternative 1, is situated in between the actual Duvha Power Station with the majority of the proposed pipeline within the immediate power station security fence. The immediate site along the Komati Reservoir to WTP emergency pipeline is currently vacant. The WTP Emergency pipeline between the two sets of cooling towers essentially entails replacement of existing pipeline within the built-up area of the Power Station which runs parallel to the east of the power generating facility and parallel to the west of the coal yard.

Alternative 2, is for the main part situated just within the immediate power station security fence. The immediate site along the majority of the route is currently vacant, except for crossings at parts with existing gravel and tar roads. Only the portion where the pipeline is proposed to be parallel to the Southern Cooling Towers is the pipeline near to existing built-up activities. Alternative 2 is also closer to the existing Duvha Primary School. The route does not go parallel to existing pipelines, although many sections of the route are parallel to existing Power station roads.

1.4 REPORT STRUCTURE

This report presents the findings of the socio-economic basic assessment and is organised according to the following sections:

- **Section 1:** Introduction
- **Section 2:** Study approach, assumptions and limitations
- **Section 3:** Socio-economic basic assessment
- **Section 4:** Need and desirability and summary of findings

2 STUDY APPROACH, ASSUMPTIONS & LIMITATIONS

The purpose of this section is to provide a brief overview of the methodology applied and the study assumptions and limitations.

2.1 STUDY APPROACH

The methodology for the socio-economic basic assessment entailed the following 3 steps:

Step 1: Inception: This step entailed consultation with the client regarding the particular requirements of the assessment, understanding the components of the study, and delineating the study area.

Step 2: Consideration of socio-economic situation: In order to determine the socio-economic aspects, consideration of the socio-economic profile of the study area was based on the experience and knowledge gained from undertaking the social impact study for the proposed Solar Photovoltaic Power Plant at Duvha power station in 2015. During the aforementioned study a detailed socio-economic base profile was compiled from interrogation of maps, aerial photographs, technical discussions, a site visit, and the following secondary documents:

- Mpumalanga Provincial Growth and Development Strategy (PGDS) (2004-2014)
- Mpumalanga Economic Growth and Development Path (MEGDP, 2011)
- Nkangala Local Economic Development Plan
- Nkangala Integrated Development Plan (2014/15)
- Nkangala Spatial Development Framework (SDF)
- eMalahleni Integrated Development Plan (2014/15)
- eMalahleni Draft SDF (2013/14)

Step 3: Socio-economic basic assessment: with consideration of the socio-economic fabric of the area, the identification of possible socio-economic aspects followed. Emphasis was placed on identifying all positive and negative issues on the immediately affected community, as well as other surrounding areas/activities impacted upon. Socio-economic impacts vary in both time and space. In terms of timing, all projects go through a series of phases, usually starting with initial planning, followed by implementation (construction), operation, and finally closure (decommissioning). The activities, and hence the type and duration of the socio-economic issues impacts associated with each of these phases differ and the issues have consequently been identified per phase. The significance of issues of the proposed development have been assessed by taking into account the extent, duration, intensity, frequency of the activity, frequency of the incident and the significance thereof. See Table 1.

The nature of the impact is an evaluation of the type of effect the activity will have on the socio-economic environment of the area. The extent of the impact is provided to indicate whether the impact would be limited to the footprint of the development, local area and surroundings, regional impact or national impact. The duration of the impact indicates the lifetime of the impact in terms of immediate, short term (0-3 years), medium term (3-10 years), long term (more than 10 years) and permanent impact. The intensity of the impact includes reference to whether the impact is destructive or benign and is indicated as low (where society is not affected), medium (where the socio-economic environment is modified), and high (where the socio-economic environment is altered to the extent that it will temporarily or permanently cease). The frequency of action of the impact is described as negligible, improbable, probable, highly probable and definite. The frequency of incident of the impacts is determined through a synthesis of the aspects produced, in terms of their nature, duration, intensity, extent and probability and is described as low, medium and high impacts.

Table 1: Impact Table ratings

Significance	*Environmental Significance Points*	*Colour Code*
High (positive)	>60	H
Medium (positive)	30 to 60	M
Low (positive)	<30	L
Neutral	0	N
Low (negative)	>-30	L
Medium (negative)	-30 to -60	M
High (negative)	<-60	H

The maximum value that can be achieved is 100 Significance Points (SP).

Status of Impact

+: Positive (A benefit to the receiving environment);
N: Neutral (No cost or benefit to the receiving environment)
-: Negative (A cost to the receiving environment)

Magnitude:=M

10: Very high/don't know
8: High
6: Moderate
4: Low
2: Minor
0: Not applicable/none/negligible

Duration:=D

5: Permanent
4: Long-term (ceases with the operational life)
3: Medium-term (3-10 years)
2: Short-term (0-3 years)
1: Immediate
0: Not applicable/none/negligible

Extent:=E

5: International
4: National
3: Regional
2: Local
1: Site only
0: Not applicable/none/negligible

Probability:=P

5: Definite/don't know
4: Highly probable
3: Medium probability
2: Low probability
1: Improbable
0: Not applicable/none/negligible

2.2 ASSUMPTIONS AND LIMITATIONS

This assessment is based on the following assumptions and pipeline associated infrastructure:

- **Planning and design:** this phase entails all the detailed design, testing, engineering, feasibilities, assessments, etc.
- **Construction**: Entails the design, supply and construction of a new, ultraviolet (UV) protected (in the case of above ground pipelines in Alternative 1), HDPE (high density polyethylene) pipelines. The actual construction period is not specified but is estimated at a couple of weeks/months (at most).
    - Alternative 1: Total length approximately 2.287 km below ground with a total cost of approximately R10 million.
    - Alternative 2: Total length approximately 2.510 km above ground with costs anticipated to be similar to that of Alternative 1 as the length is relatively the same.

  <u>Infrastructure components alternative 1:</u>
    - The **installation of a new underground pipeline** from the raw water reservoir to the existing emergency water line at a width of 45 cm and a length of 882 m. The new routing will require the pipeline to pass through the station perimeter fence. This will be done by routing the pipeline through an existing pipe culvert that runs under the security fence that is used by the Ash lines.
    - The **decommissioning and removal of the existing emergency pipeline**.

- The **replacement of the existing above ground pipeline** from the existing emergency water line connection up until the Water Treatment Plant (WTP) on the south side of the Power Station, but north of the cooling towers. The pipeline is to be replaced with a pipeline in width of 45 cm and a length of 1405 m. All existing supports will need to be refurbished and modified to accommodate the new pipe size in line with that of the new pipeline. This line will require new concrete sleeper supports to be added. The pipe support sleepers will be similar to that currently being used at the Power Station. The design will consist of concrete sleepers on dimension 600x300x300 mm placed at 2 m spacing from the blending plant to the start of the existing emergency pipeline supports.

Infrastructure components alternative 2:

- The **installation of a new underground pipeline** from the raw water reservoir to the WTP on the south side of the Power Station and to the South of Cooling Towers.

Construction activities include:

- The loads anticipated to be transported to the site, are not likely to necessitate the need for external access roads (external access to the power stations as well as to the pipeline route) to be upgraded.
- Sites preparation activities such as site clearing is expected.
- Earthworks will be required for Alternative 1 where the pipeline will be below ground.
- No contractors will be housed at a contractor's yard.
- It is assumed that all major infrastructure (pipelines, concrete sleeper supports, etc.) will be fabricated off-site and fitted/assembled on-site, although some precast concrete units could be cast on site depending on the contractor appointed.

- **Operation:** Note that after the proposed pipeline has been installed, operation of the system will only be required when the current system is required to be shut off. This will occur when the main Komati supply line is fully back in operation. This is envisaged to be between six weeks and 9 months. However, the design life of the works shall be 35 years from commissioning of the pipeline. Operational activities include:
  - Operating procedures could include routine and corrective maintenance on pipes/valves.
  - Maintaining a 2 m wide veld clearance around the above ground section of Alternative 1.
  - No additional employment is anticipated to be required due to operations.
- **Reconfiguration:** When the new supply line is not required, that is only when the Komati water flow has been reinstated or the main supply line work has been completed, the system will be reconfigured to operate as it currently is. However, the pipeline is designed such that it can be used at any time in the future, if the supply of water to the power station is at risk.

The following **constraints and limitations** were encountered during the study:

- Assessments of impact significance for socio-economic aspects often need to be made without quantification. These are based on a consideration of the likely magnitudes of impacts and/or expert judgements, unless otherwise specified or quantified.
- The basic assessment only considers the key aspects of the proposed pipeline and does not consider the no-go nor make comparisons with other pipeline projects.
- The basic assessment does not include consideration of mitigations, enhancement measures, cumulative impacts, nor residual impacts.
- The assessment of the potential socio-economic aspects was based on the experience and knowledge of the socio-economic conditions in the study area and surrounds gained from undertaking the social impact study for the proposed Solar Photovoltaic Power Plant at Duvha power station in 2015. During the aforementioned study a detailed socio-economic base profile was compiled from interrogation of maps, aerial photographs, technical discussions, a site visit, and numerous secondary documents. No site visit or socio-economic profile has thus

been compiled for this assessment, instead this desktop assessment is informed by the knowledge gained from experience in the study area and the study site.

3. SOCIO-ECONOMIC BASIC ASSESSMENT

This section describes the potential socio-economic aspects that could be arise from the proposed water supply pipeline for both Alternative 1 and 2. The identified socio-economic impacts are set out in Table 2.

Table 2: Identified socio-economic impacts per phase

IMPACTS	PHASES			
	Planning	Construction	Operational	System reconfiguration
New business sales, multiplier effects and economic stimulation	■	■	■	■
Employment and skills transferral	■	■	■	■
Effect of temporary workers		■		
Safety and security		■	■	
Nuisance, noise, disruptions, and change in quality of living environment		■	■	
Visual and land use patterns alteration and change in sense of space		■	■	
Safety and nuisance impacts on Duvha primary school and scholars		■		

As shown above, the socio-economic aspects of the development have been identified on four phases of the project: the planning/design phase (currently taking place), the construction phase, the operational phase, and the system reconfiguration phase (which entails operation as it currently is).

The above indicated impacts are discussed in detail hereunder for each of the development phases. The differences between the two alternatives are also noted for each impact.

4.1 NEW BUSINESS SALES, MULTIPLIER EFFECTS AND ECONOMIC STIMULATION

The potential socio-economic benefits perceived include:

- **Stimulation of economy**: the economy is expected to be stimulated, albeit limited, through increased financial spending in the economy, increased infrastructure investment, and increased expenditure by employees. This positive impact is likely to be experienced in terms of the increased markets for the sale of local goods for the new employment created and the direct employment.
- **Increased government income**: The stimulation of the economy would lead to increased government income through an increased in the tax base. The proposed development could also lead to the creation of other economic spin-offs that benefit the entire region.
- **An increase in new businesses sales**: New business sales, albeit limited for the local economy will occur, which refers to the value of all inter- and intra-sectoral business sales generated in the economy because of the introduction of an exogenous change in the economy. In layman's terms, new business sales equate to additional business turnover due to change in the economy, which means that over and above the originally invested money during the construction phase, revenue is generated due to the multiplier effect in the different sectors of the economy. The sectors that will experience the highest demand for additional output are manufacturing (i.e. supply of building materials during construction, trade (i.e. supply of final goods and services), finance, and business services (i.e. professional services). The increased employment expected, will impact positively upon the regional and local economy. Increased employment is associated with increased income and consequently with increased buying powers in the area, thus leading to new business sales to accommodate the new

demand of services and goods required. The employees will spend more, and more money will forced into the economy.

- **Increased standards of living:** The multiplier or spin-off effects from this economic activity and temporary employment will improve standards of living, increase disposable income and ability to purchase additional goods and/or establish other business enterprises.

In short, it is expected that the proposed development will lead to positive, albeit low, impacts on the economy, which will lead to increased business sales, increased employment opportunities, increased government income, and increased standards of living.

This impact is essentially relevant to the following phases:

- Planning phase
- Construction phase
- Operational phase
- System reconfiguration phase

4.1.1 NEW BUSINESS SALES AND ECONOMIC STIMULATION – PLANNING

During the **planning and design phase**, a number of local and non-local consultants such as engineers, environmental practitioners, development economists, etc. have been employed to do design, preliminary assessments and planning for the proposed pipeline.

Table 3: Summary of impact of new business sales and economic stimulation – planning phase

PHASE: PLANNING PHASE		
NATURE: New business sales, multiplier effects and economic stimulation		
IMPACT ASSESSMENT	**ALTERNATIVE 1**	**ALTERNATIVE 2**
MAGNITUDE	MINOR	MINOR
DURATION	IMMEDIATE	IMMEDIATE
EXTENT	NATIONAL	NATIONAL
PROBABILITY	MEDIUM PROBABLE	MEDIUM PROBABLE
SIGNIFICANCE	LOW (21)	LOW (21)
STATUS	POSITIVE	POSITIVE
ENHANCEMENT MEASURES: N.A		
CUMULATIVE IMPACTS: N.A		
RESIDUAL IMPACTS: None		

The **impact assessment** during the planning phase is assessed to be positive; minor in intensity; immediate in duration; national in extent (as consultants are from other Provinces); and medium probable. The impact is assessed to be of a low positive significance to the decision making process.

With regards to **pipeline route alternatives** there is no difference in impact between Alternative 1 and 2 in regards to new business sales during the planning phase.

4.1.2 NEW BUSINESS SALES AND ECONOMIC STIMULATION – CONSTRUCTION

During the **construction phase**, the project has the potential to have a positive impact on economic activity in the local area, region, province, and possibly nationally (depending on the location of the contractors). However, preliminary estimates indicate that a total of approximately R5 million will be spent on the entire construction phase representing a low investment.

Nonetheless, over and above the originally invested money during the construction phase, additional revenue would be generated due to the multiplier effect in the different sectors of the economy. The local area and its activities (businesses and shops, etc.) are also expected to be stimulated economically, due to the increased spending expected from the increased salaries and wages paid to

employees during construction. All of this will have a positive impact due to the increased direct employment by construction contractors, as well as stimulation of local businesses and informal traders. This impact will only be a short term impact until the construction phase is complete.

Table 4: Summary of impact of new business sales and economic stimulation – construction

PHASE: CONSTRUCTION PHASE		
NATURE: New business sales, multiplier effects and economic stimulation		
IMPACT ASSESSMENT	**ALTERNATIVE 1**	**ALTERNATIVE 2**
MAGNITUDE	MINOR	MINOR
DURATION	SHORT-TERM	SHORT-TERM
EXTENT	NATIONAL	NATIONAL
PROBABILITY	MEDIUM PROBABLE	MEDIUM PROBABLE
SIGNIFICANCE	LOW (24)	LOW (24)
STATUS	POSITIVE	POSITIVE
ENHANCEMENT MEASURES: • It is recommended that a local procurement policy be adopted to maximise the benefit to the local economy. • Eskom should seek to develop a database of local companies, specifically Broad Based Black Economic Empowerment (BBBEE) companies, which qualify as potential service providers (e.g. construction companies, security etc.) prior to the commencement of the tender process for construction contractors. These companies should be notified of the tender process and invited to bid for project-related work. • To source as much good and services as possible from the local area; engage with local authorities and business organisations to investigate the possibility of procurement of construction materials, goods and products from local suppliers where feasible.		
CUMULATIVE IMPACTS: None		
RESIDUAL IMPACTS: None		

The **impact assessment** during the construction phase is assessed to be positive; minor in intensity; short-term in duration; local, district, provincial, and national in extent; and medium probable. The impact is assessed to be of a medium positive significance to the decision making process.

With regards to **pipeline route alternatives** there is no difference in impact between Alternative 1 and 2 in regards to new business sales during the construction phase.

4.1.3 NEW BUSINESS SALES AND ECONOMIC STIMULATION – OPERATIONS AND RECONFIGURATION

During both the **operations phase and the reconfiguration phase,** the economy will be stimulated although to a far smaller degree. Negligible operational expenditure is expected. However during operations, the proposed development deals with the risks of uninterrupted production at the Power Station, which has knock-on effects on economic stimulation, income generation, etc. Some expenditure, with economic stimulation, albeit limited, is also expected from increasing spending to reconfigure the system.

With regards to **pipeline route alternatives** there is no difference in impact between Alternative 1 and 2 in regards to new business sales during both the operation and reconfiguration phase.

4.2 EMPLOYMENT AND SKILLS TRANSFER

The proposed employment opportunities from the development, and those that will arise from new business sales, albeit not all local, will be positive. In additional to employment, the proposed development also holds the potential for skills transfer. With an increase in employment, a definite transfer of skills will result. Skills development is a requisite for human resource development, and

will have a lasting impact on the economy. This impact is essentially relevant to the following phases: planning, construction, operation, and system reconfiguration.

4.2.1 EMPLOYMENT AND SKILLS TRANSFER – PLANNING

This phase implies the procurement of professional services of amongst others, engineers, environmental practitioners, town and regional planners, development economists, etc. that in most likelihood are not all situated within eMalahleni Local Municipality, but probably within Gauteng or elsewhere in the country. During this phase the amount of employment opportunities are limited and only temporary.

Table 5: Summary of impact of employment and skills transfer– planning phase

PHASE: PLANNING PHASE		
NATURE: Employment and skills transfer		
IMPACT ASSESSMENT	**ALTERNATIVE 1**	**ALTERNATIVE 2**
MAGNITUDE	MINOR	MINOR
DURATION	IMMEDIATE	IMMEDIATE
EXTENT	NATIONAL	NATIONAL
PROBABILITY	MEDIUM PROBABLE	MEDIUM PROBABLE
SIGNIFICANCE	LOW (21)	LOW (21)
STATUS	POSITIVE	POSITIVE
ENHANCEMENT MEASURES: N.A		
CUMULATIVE IMPACTS: N.A		
RESIDUAL IMPACTS: Improved knowledge and skills transfer		

The **impact assessment** during the planning phase is assessed to be positive; minor in intensity; immediate in duration; national in extent; and medium probability. The impact is assessed to be of a low positive significance to the decision making process.

With regards to **pipeline route alternatives** there is no difference in impact between Alternative 1 and 2 in regards to employment generation and skills transfer during the planning phase.

4.2.2 EMPLOYMENT AND SKILLS TRANSFER – CONSTRUCTION PHASE

Employment generally reflects the number of jobs created or lost because of the outside change in the economy. The construction period of this project is assumed to, at most, be a couple of weeks/months. Based on the relatively small capital injection for the proposed project, namely approximately R10 million, the amount of employment opportunities during the construction phase is limited and only temporary. Quantification of the exact number of employment during the construction phase is difficult, as it depends on the level of skills, contractor resources, and level of labour intensity employed. Some of the employment opportunities could be available for employment of the local workforce within the immediate surrounds of the project. The actual number is also likely to vary based on final designs of the proposed project, as well as the level of skills and resources of the contractor. Nonetheless, even though the exact number of employment opportunities is not known, the construction of the proposed project will require a workforce, albeit limited, and therefore direct employment will be generated. This is therefore a positive social impact. Once the development phase nears its end, the construction impact will diminish. In all likelihood, skills will be transferred in the form of "on-the-job" training during the construction phase. These skills will enable these individuals to seek other construction and related employment once the construction phase is complete.

Table 6: Summary of impact of employment and skills transfer– construction phase

PHASE: CONSTRUCTION PHASE
NATURE: Employment and skills transfer

PHASE: CONSTRUCTION PHASE		
IMPACT ASSESSMENT	**ALTERNATIVE 1**	**ALTERNATIVE 2**
MAGNITUDE	MINOR	MINOR
DURATION	SHORT-TERM	SHORT-TERM
EXTENT	NATIONAL	NATIONAL
PROBABILITY	MEDIUM PROBABLE	MEDIUM PROBABLE
SIGNIFICANCE	LOW (24)	LOW (24)
STATUS	POSITIVE	POSITIVE
ENHANCEMENT MEASURES: • Where reasonable and practical the contractors appointed by the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi- and low-skilled job categories. However, due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area. • Opportunities for training of workers should be maximised • Ways to enhance local community benefits with a focus on broad based BEE need to be explored • Local construction companies should be used whenever possible, especially for sub-contracting work. • Local suppliers should be used as far as possible. • Labour based construction methods should be used whenever practically possible. It is important to follow the principles of the Expanded Public Works Programme and apply effective labour-based construction technologies in order to increase the job creation effects.		
CUMULATIVE IMPACTS: Opportunity to upgrade and improve knowledge and skills in the area		
RESIDUAL IMPACTS: Improved pool of skills and experience in the region		

The **impact assessment** during the construction phase is assessed to be positive; minor in intensity; short-term in duration; national in extent; and medium probability. The impact is assessed to be of a low positive significance to the decision making process.

With regards to **pipeline route alternatives** there is no difference in impact between Alternative 1 and 2 in regards to employment generation and skills transfer during the construction phase.

4.2.3 EMPLOYMENT AND SKILLS TRANSFER – OPERATIONS PHASE

The pipeline will provide sufficient water, to deal with the period of water supply outage, which will allow the production activities at the Power Station to be unaffected, thus effectively potentially curbing periods of potential loss of employment from potential decrease in production activities. The operation phase of the Project will require a very small direct workforce, and it is probable that this could all be undertaken by existing Eskom staff. Routine activities would include monitoring and maintenance of the pipeline to ensure safe and consistent operation, vegetation control, etc. The operations, however do not entail additional energy production and the Power Station. Consequently no indirect and induced job creation potential exists.

Table 7: Summary of impact of employment and skills transfer– operations phase

PHASE: OPERATIONS PHASE		
NATURE: Employment and skills transfer and curbing loss of employment		
IMPACT ASSESSMENT	**ALTERNATIVE 1**	**ALTERNATIVE 2**
MAGNITUDE	MINOR	MINOR
DURATION	IMMEDIATE	IMMEDIATE
EXTENT	LOCAL	LOCAL
PROBABILITY	MEDIUM	MEDIUM

PHASE: OPERATIONS PHASE		
SIGNIFICANCE	LOW (15)	LOW (15)
STATUS	POSITIVE	POSITIVE
ENHANCEMENT MEASURES: None		
CUMULATIVE IMPACTS: None		
RESIDUAL IMPACTS: Potentially curbing a period of potential loss of employment from potential decrease in production activities.		

The **impact assessment** during the operation phase is assessed to be positive; minor in intensity; immediate in duration (as only for short periods in duration); local in extent; and medium probability. The impact is assessed to be of a low positive significance to the decision making process.

With regards to **pipeline route alternatives** there is no difference in impact between Alternative 1 and 2 in regards to employment generation during the operation phase.

4.2.4 EMPLOYMENT AND SKILLS TRANSFER – SYSTEM RECONFIGURATION

Once the potential water supply outage no longer applies, the possibility exists that the pipeline system could be reconfigured. This is anticipated to require a very small direct workforce, and it is probable that this could all be undertaken by existing Eskom staff. This reconfiguration will entail bringing the system back to the current state as is, although would not entail dismantling any of the existing infrastructure developed. The socio-economic impacts at a community level associated with employment from reconfiguration are likely to be limited/negligible.

With regards to **pipeline route alternatives** there is no difference in impact between Alternative 1 and 2 in regards to employment generation during system reconfiguration. However, in the case of alternative 1, a new emergency pipeline route has been created which can be utilised for the lifetime of the pipeline.

Table 8: Summary of impact of employment– system reconfiguration

PHASE: RECONFIGURATION PHASE		
NATURE: Employment		
IMPACT ASSESSMENT	**ALTERNATIVE 1**	**ALTERNATIVE 2**
MAGNITUDE	NEGLIGIBLE/MINOR	NEGLIGIBLE/MINOR
DURATION	PERMANENT	PERMANENT
EXTENT	LOCAL	LOCAL
PROBABILITY	LOW	LOW
SIGNIFICANCE	LOW (NEUTRAL)	LOW (NEUTRAL)
STATUS	NEUTRAL	NEUTRAL
ENHANCEMENT MEASURES: n.a		
CUMULATIVE IMPACTS: n.a		
RESIDUAL IMPACTS: n.a		

The **impact assessment** during the reconfiguration phase is neutral, minor/negligible in intensity; permanent in duration; local in extent; and low probability. The impact is assessed to be of a low positive or neutral significance to the decision making process.

4.3 EFFECT OF TEMPORARY WORKERS

Given the low employment during operations, this impact is essentially only relevant during the construction phase, which is temporary and estimated to last, at most, a couple of weeks/months. No accommodation will be provided for contractors on site. The following onsite facilities can be expected: chemical toilets, access to water and electricity, site office, laydown area, etc.

Development invites growth in new jobs in a community and draws new workers and their families into the community, either as permanent or temporary residents. When this occurs, the incoming population could affect the social environment in various ways including increased demand for housing and social services (e.g., health care, day care, education, recreational facilities). The presence of the temporary workforce is however not expected to pose major potential risks to social networks in the area, specifically to the local community of Duvha and Speekfontein, in that the estimated workforce is not substantial (see previous impact). As such, it is not expected that the workforce will change in the composition of the population in the area, nor the density of the population, etc.

Depending on the contractors and their use of local labour, it is reasonable to assume that some of the low skilled workers, could be sourced locally. Employing members from the local community to fill the semi and low-skilled job categories will reduce the risk posed by construction workers to local communities. While the estimated construction workers from outside, which could be all of the required workforce, is overall likely to be low, the potential threat posed by construction workers to the community as a whole is also likely to be low as the overall number of workforce required is not significant. The temporary workforce is thus not expected to impact on the socio-economic dynamics of the area, nor create increased pressure on infrastructure and services.

Table 9: Summary of impact of temporary workers– construction phase

PHASE: CONSTRUCTION PHASE		
NATURE: In-migration of temporary workers and effect on social dynamics of area and increased pressure on socio-economic infrastructure and services		
IMPACT ASSESSMENT	**ALTERNATIVE 1**	**ALTERNATIVE 2**
MAGNITUDE	MINOR	MINOR
DURATION	SHORT-TERM	SHORT-TERM
EXTENT	LOCAL	LOCAL
PROBABILITY	LOW	LOW
SIGNIFICANCE	LOW (12)	LOW (12)
STATUS	NEGATIVE	NEGATIVE
ENHANCEMENT MEASURES: • Employment criteria should be communicated to the community in advance (e.g. in newspapers, community forum notice boards, etc); • Local, unemployed labour should be employed as far as possible; • Accommodation for non-local members of the workforce, should as far as practically possible be arranged so that unskilled labourers are not left to their own in which case non-local labourers are likely to accommodate themselves in Speekfontein; • Where possible, Eskom should consider to make it a requirement for contractors to implement a 'locals first' policy for construction jobs, specifically semi and low-skilled job categories. This will reduce the potential impact that this category of worker could have on local family and social networks. • The contractor should make necessary arrangements to enable workers from outside the area to return home during the construction phase over weekends (or regular basis) and after the construction phase. This would reduce the risk posed by non-local construction workers to local family structures and social networks.		
CUMULATIVE IMPACTS: n.a		
RESIDUAL IMPACTS: None.		

The **impact assessment** during the construction phase is assessed to be minor in intensity; short-term in duration; local in extent; and a low probability. The impact is assessed to be of a low negative significance to the decision making process.

With regards to **pipeline route alternatives** there is no difference in impact between Alternative 1 and 2 in regards to in-migration of temporary workers.

4.4 SAFETY AND SECURITY IMPACTS

This impact is essentially relevant to the construction and operational phase. Potential safety hazards are also posed on school children, although the impacts related to the school children are discussed separately. See impact 7 in this regard.

4.4.1 SAFETY AND SECURITY IMPACTS– CONSTRUCTION

During the construction phase, safety and security problems are foreseen due to people having to gain access to private land. Individuals could sustain permanent physical harm during the construction period from the noise, dust and stress levels. It can be mentioned that only a few dwellings are located near the pipeline route, therefore safety and security impacts could be expected more for the construction workers. The proposed construction activities of the pipeline could however also pose a safety risk to workers at the Power Station as the pipelines are within the 'compounds' of the Power Station.

The influx of workers into the area especially non-local job seekers could lead to a temporary increase in the level of crime during the construction phase. Apart from everyday safety and security concerns, it is normal during most construction phases and construction activities to experience an increase of persons in search of employment.

An increase in traffic can be expected from the rise in construction vehicles, especially during peak material delivery and construction processes. Note however that the material delivery vehicles will not be there all the time during the construction period.

Access to the proposed routes are accessible via the Old Bethal Road which is accessible from the R544 which connects with the N12 and the N4. The movement of construction related activities along the Old Bethal Road does have the potential to impact other road users, albeit minimally so.

Other safety concerns evident during the construction phase, relate to the physical nature of the actual construction labourers as they undergo health and safety risks. These include:

- Over exposure to the sun, heat stroke/exhaustion, dehydration
- Risk of slipping and falling from structures
- Risk of injuries while operating heavy machinery/vehicles
- Risks associated with possible asbestos when repairing the hoppers
- Etc.

Table 10: Summary of impact of safety and security - construction phase

PHASE: CONSTRUCTION PHASE		
NATURE: Safety and security		
IMPACT ASSESSMENT	**ALTERNATIVE 1**	**ALTERNATIVE 2**
MAGNITUDE	MINOR	MINOR
DURATION	SHORT TERM	SHORT TERM
EXTENT	LOCAL	LOCAL
PROBABILITY	LOW	LOW
SIGNIFICANCE	LOW (12)	LOW (10)
STATUS	NEGATIVE	NEGATIVE
ENHANCEMENT MEASURES: • Safety at and around the construction site should be ensured by limiting any risks, barricading off the construction area to avoid unauthorised access and use of security personnel		

PHASE: CONSTRUCTION PHASE
• Employing local community members could minimise the potential for criminal activity or perceived perception of an increase in criminal activity due to the presence of an outside workforce and influx of people • Working hours should be kept between 7am and 5pm • The perimeter of the construction site should be appropriately secured to prevent any unauthorised access to the site; the fencing of the site should be maintained throughout the construction period • No unauthorised entry to the site is to be allowed; access control and a method of identification of site personnel are required at all times • Security lighting should be implemented • All vehicles must be road worthy and drivers must be qualified and made aware of the potential road safety issues and follow the speed limits. • Adequate signage along the Old Bethal road needs to be provided to warn motorists of the construction activities taking place • Risks that labourers undergo during the construction of the proposed development can be minimised by ensuring that proper safety gear are administered and safety precautions are taken. Basic concepts and information should be communicated to labourers so that they are well informed of the risks of over exposure to the sun and stay hydrated throughout the construction phase. • Liaise with existing forums in the community to communicate information to the community and to assist in the monitoring of compliance. • Aim to appoint as many locally unemployed from Speekfontein to lessen risk of unacceptable social behaviour.
CUMULATIVE IMPACTS: Not applicable; no other known developments in the immediate vicinity.
RESIDUAL IMPACTS: n.a

The **impact assessment** during the construction phase is assessed to be low; short-term in duration; local in extent; and a low probability. The impact is assessed to be of a low negative significance to the decision making process.

During the construction phase, with regards to **pipeline route alternatives,** there is no difference in magnitude of impact between Alternative 1 and 2 in regards to safety and security. Alternative 1 however traverses the built-up area of the Power Station and potentially has a greater risk to safety and security of the existing workforce at the Power Station. This however is mitigatable through barricading off the construction area.

4.4.2 SAFETY AND SECURITY IMPACTS– OPERATION

During the operation phase a portion of pipeline Alternative 1, is above ground and is at risk of being damaged from exposure to the elements such as sunlight, fire, etc.

Table 11: Summary of impact of safety and security - operation phase

PHASE: OPERATION PHASE		
NATURE: Health, safety and security		
IMPACT ASSESSMENT	**ALTERNATIVE 1**	**ALTERNATIVE 2**
MAGNITUDE	MINOR	No impact as pipeline below ground
DURATION	MEDIUM TERM	
EXTENT	LOCAL	
PROBABILITY	LOW	
SIGNIFICANCE	LOW (12)	

PHASE: OPERATION PHASE		
STATUS	NEGATIVE	
ENHANCEMENT MEASURES: • Mitigate the area surrounding the pipelines through bush 2 m wide bush clearing • Where the pipeline is above the ground ensure that ultraviolet (UV) protected materials are used for the pipelines		
CUMULATIVE IMPACTS: n.a		
RESIDUAL IMPACTS: n.a		

The **impact assessment** during the construction phase is assessed to be low in intensity; medium in duration; local in extent; and a low probability. The impact is assessed to be of a low negative significance to the decision making process.

During the operation phase, with regards to pipeline route alternatives, Alternative 2 is not affected, whereas a portion of the Alternative 1 is above ground and thus at risk to veld fires and damage from the elements.

4.5 NUISANCE, NOISE, AND OTHER DISRUPTIONS AND CHANGE IN QUALITY OF LIVING ENVIRONMENT

Changes in the routine living, activities, movement patterns and infrastructures (to a lesser degree) of residents/employees in the impact areas will be brought about by alteration to environment, noise, transportation route affects, etc. These impacts will be mainly significant during the construction phase and to a far lesser degree in the operation phase. Visual impacts on the physical environment are addressed separately in the impact that follows.

4.5.1 NUISANCE, NOISE, DISRUPTIONS– CONSTRUCTION

The influx of construction workers and construction activities will entail an increase in the traffic population as construction vehicles will have to go to the construction sites for construction purposes to deliver construction material, and to transport construction rubble. The increase in the number of road users is not an impact, but merely a change process. However, the number of construction vehicle road users may change the movement patterns of other road users in such a way that their movement patterns are disrupted, their safety levels are impacted on, and their stress and/or frustration levels increased. Although temporary, the construction phase will be responsible for the greatest amount of disruption caused during the entire process, albeit minor in intensity. It should however be noted, that relatively minor construction activities is required, as the proposed pipeline is at most approximately 2.5 km long.

Socio-economic impacts experienced in the physical environment relate to exposure to dust, noise, odour, vibration, etc. The impacts related to the quality of the living and working environment refer to how appropriate, from a socio-economic point of view, the study area is to live and work in. These impacts relate directly to the biophysical environment and are assessed according to both a perceived and actual dimension.

Impacts associated with construction related activities include noise, dust and disruption to adjacent properties. Noise in this regard can be described as any loud, unpleasant or disagreeable sounds that occur as a result of demolishing activities, transport and movement and construction. These noises can be of great irritation to those residing or working close to the proposed routes.

Digging of land for submersion of the pipeline will require mechanical and human effort while initial transport of pipeline material and machinery to the point of construction will disrupt the flow of

traffic. The movement of heavy machinery, possible drilling, and numerous trucks and land graders will most certainly be noisy, disruptive and could cause temporary access problems.

It should also be noted that while not intentional, it is possible that in the event of construction running behind schedule (and outage affecting Power Station operations), that construction works and related disruptions could be round the clock (i.e. 24 hours, day and night).

While it is usually simpler to identify, quantify and make provision for vehicular access problems, this is not always the case with pedestrian access, water access, electricity access, etc. These problems need to be taken into account during the planning of the proposed pipeline in order to avoid serious inconveniences. Some of aspects could include:

- Damage to fencing
- Damage to other water access pipelines
- Disruption of electricity, etc.

Certain other aspects such as emotional distress as a result of the construction cannot be quantified, but should not be discarded. Noise and vibration disturbances during construction will also lead to disturbances. During construction phase noise from the construction site will hinder those in relatively close distance from the site.

The noise pollution can have a nuisance impact on economic activity at Corobrik, as well as to those working and living around the construction site. The noise could also influence concentration of learners while doing homework and studying from home. Some disruptions in quality of living environment for the nearby Speekfontein residents as well as immediately surrounding farms and landowners could also be expected, albeit of a low magnitude and mostly only nuisance related.

In terms of noise impact, the National Noise Regulations define an increase of 7 dB as disturbing. It is therefore advised that noise levels be kept within 7 dB of the baseline data. Noise reduction is essential and contractors must endeavour to limit unnecessary noise, especially loud talking, shouting, whistling, radios, sirens, hooters or vehicle revving, etc.

As such, during the **construction phase**, it is expected that there will be a decrease in the quality of the physical environment, albeit of a low magnitude. Noise levels, traffic volumes, dust, etc. will increase as result of the construction activities.

Table 12: Summary of impact of nuisance, noise, disruptions – construction phase

PHASE: CONSTRUCTION PHASE		
NATURE: Nuisance, noise, disruptions, dust and change in quality of living environment		
IMPACT ASSESSMENT	**ALTERNATIVE 1**	**ALTERNATIVE 2**
MAGNITUDE	MINOR	MINOR
DURATION	SHORT-TERM	SHORT-TERM
EXTENT	LOCAL	LOCAL
PROBABILITY	HIGHLY PROBABLE	HIGHLY PROBABLE
SIGNIFICANCE	LOW (24)	LOW (24)
STATUS	NEGATIVE	NEGATIVE
ENHANCEMENT MEASURES: • The Contractors should plan the construction of the pipeline such that there is no interruption to the current flow of traffic in areas that are used by vehicles. This may be achieved by means of temporary re-routing of traffic. • Scrap bins should be made available by the Contractor • The movement of construction workers on and off the site should be closely managed and monitored by the contractors. In this regard the contractors should be		

PHASE: CONSTRUCTION PHASE
responsible for making the necessary arrangements for transporting workers to and from site on a daily basis. • Dust suppression measures must be implemented when (and if) required • Residents from Speekfontein and at Duvha Park in close proximity to the development site should be notified 24 hours prior to any planned activities that will be unusually noisy. • The existing stakeholders forum should be utilised to discuss traffic, dust, noise and other construction related concerns • Construction related activities should be limited to work days (Monday to Friday daylight hours) and the impact on traffic patterns should be mitigated by instating traffic off-peak times
CUMULATIVE IMPACTS: None
RESIDUAL IMPACTS: None

The **impact assessment** during the construction phase is assessed to be minor in intensity for Alternative 1 and 2; short-term in duration; local in extent; and a highly probable. The impact is assessed to be of a medium negative significance to the decision making process.

After careful analysis of the proposed pipeline routes, it is noted that alternative 2 could pose slightly more disruptions to nearby scholars and Corobrik than compared with alternative 1. For Alternative 2, no structures are identified to be within the immediate pipeline servitude. Alternative 2 however also requires more intensive earthworks since the entire pipeline needs to be situated underground. Alternative 1, albeit replacement of pipeline within existing servitude, is done so within the built up area of the Power Station, albeit the portion that is above ground, and thus possibly more disruptive to Power Station workers in the vicinity, but less so that if it was to be placed underground.

4.5.1 NUISANCE, NOISE, DISRUPTIONS– OPERATION

During the operation phase a certain amount of maintenance may need to be carried out periodically. This will include repair to pipelines, fences, beams, valves, etc.

Table 13: Summary of impact of nuisance, noise, disruptions – operation phase

PHASE: OPERATION PHASE		
NATURE: Nuisance, noise, disruptions, dust and change in quality of living environment		
IMPACT ASSESSMENT	**ALTERNATIVE 1**	**ALTERNATIVE 2**
MAGNITUDE	MINOR/NEGLIGIBLE	MINOR/NEGLIGIBLE
DURATION	SHORT-TERM	SHORT-TERM
EXTENT	SITE	SITE
PROBABILITY	LOW PROBABLE	LOW PROBABLE
SIGNIFICANCE	LOW (8)	LOW (8)
STATUS	NEGATIVE	NEGATIVE
ENHANCEMENT MEASURES: None		
CUMULATIVE IMPACTS: None		
RESIDUAL IMPACTS: None		

The **impact assessment** during the operation phase is assessed to be minor/negligible in intensity; short-term in duration; site extent only; and a low probability. The impact is assessed to be of a low negative significance to the decision making process.

Whilst there is no difference in magnitude of the impact, where pipeline problems occur below ground, digging may need to be done in order to access the problem, this will lead to further temporary disruption and noise to address the problem. Note in this regard that the entre pipeline for

Alternative 2 is below ground, whereas only a portion of Alternative 1 is below the ground. Alternative 2 thus possibly could have a greater likelihood of requiring to undertaking digging to access any problems.

4.6 VISUAL LAND USE PATTERNS ALTERATION AND CHANGE IN SENSE OF PLACE AND OTHER SPATIAL CONSIDERATIONS

The sense of place is developed over time as the surrounding community embraces the surrounding environment, becomes familiar with its physical properties, and creates its own history. The sense of place is created through the interaction of various characteristics of the environment, including atmosphere, visual resources, aesthetics, climate, lifestyle, culture and heritage. Importantly though it is a subjective matter and is dependent on the demographics of the population that resides and works in the area and their perceptions regarding trade-offs. An impact on the sense of place is one that alters the visual landscape to such an extent that the user experiences the environment differently, and more specifically, in a less appealing or less positive light.

As is customary with any new development, conversion and diversification of land use will occur with visual effects. This refers to the change in the way land is used, both in terms of the area of land appropriated for a particular activity, the intensity of the use of the land and whether there are areas of land not used for production, and in terms of the type of land use activities and the pattern or mix of those activities.

The socio-economic impacts associated with the impact on sense of place relate to the change in and visual impact from the proposed pipeline route. Note however that the project is located next to an operational large coal-fired power station. This activity dominates the landscape and sense of place.

Note however that since the proposed pipeline is to constructed on Eskom owned land, no families will need to be relocated and no other owners will lose portions of their land as a result of the delivery of the pipeline.

This impact is essentially relevant to the following phases:

- Construction phase
- Operational phase

4.6.1 VISUAL AND LAND USE PATTERNS ALTERATION AND CHANGE IN SENSE OF PLACE AND OTHER SPATIAL CONSIDERATIONS – CONSTRUCTION

Aesthetic quality on the surrounding landscape will most notably occur during the construction phase. Factors such as the width of servitude and size of the delivery pipeline have a temporary influence on the visual quality of the landscape during the construction phase. Other visual intrusions during the construction phase include:

- Barricades erected in the construction servitude area
- Prefab offices and vehicle storage places
- The construction area along the length of the pipeline.

Land use patterns will be altered during both the construction and operation phases.

During the construction phase land uses patterns will be temporarily disrupted in between the construction servitude for the entire length of the pipeline. However all of the above will be temporary in nature during the construction period. The construction activities will cause noise and disruptions from vehicles and machinery. These activities will alter the existing land use patterns along the route to construction related activities which have a visual impact, but will be overshadowed by the adjacent power station activities.

The **construction phase** will see a total transformation from the current setting and landscape of the proposed route and immediate surrounds. It is inevitable that the visual impact during the construction phase will be affected by dust, transportation vehicles, etc. Potential visual impacts caused by construction activities will include the visual changes brought about by clearance of vegetation, worker presence and activity, dust emissions, etc.

Table 14: Summary of impact of visual and land use patterns alteration – construction phase

PHASE: CONSTRUCTION PHASE		
NATURE: Impact of visual and land use patterns alteration		
IMPACT ASSESSMENT	**ALTERNATIVE 1**	**ALTERNATIVE 2**
MAGNITUDE	MINOR	MINOR
DURATION	SHORT-TERM	SHORT-TERM
EXTENT	LOCAL	LOCAL
PROBABILITY	MEDIUM PROBABILITY	MEDIUM PROBABILITY
SIGNIFICANCE	LOW (15)	LOW (18)
STATUS	NEGATIVE	NEGATIVE
ENHANCEMENT MEASURES: • Dust suppression measures must be implemented when required • Residents from Speekfontein and at Duvha Park in close proximity to the development site should be notified 24 hours prior to any planned activities that will be disruptive. • The existing forum with adjacent landowners should be used to serve as liaison between the affected stakeholders and the developer and to discuss traffic, dust, noise and other construction related concerns • Little measures exist to control the visual impact caused by the construction activities, although measures can be put in place to ensure that construction yards where building material is stored and temporary worker's houses and site offices are located cause minimum visual distraction. • Project developers should demarcate construction boundaries and minimise areas of surface disturbance.		
CUMULATIVE IMPACTS: N.a		
RESIDUAL IMPACTS: n.a		

The **impact assessment** during the construction phase is assessed to be minor in intensity; short-term in duration; local in extent; and a medium probability. The impact is assessed to be of a low negative significance to the decision making process.

With regards to **pipeline route alternatives**, during the construction phase, route Alternative 2 could pose slightly more visual disruptions to nearby scholars and Corobrik than compared with route Alternative 1. Route alternative 2 will also entail more visual disruptions from the fact that the entire length of the pipeline will be underground and thus the entire length of the route requires ground clearance.

4.6.2 VISUAL AND LAND USE PATTERNS ALTERATION AND CHANGE IN SENSE OF PLACE AND OTHER SPATIAL CONSIDERATIONS – OPERATIONS

During the operation/maintenance phase, the visual and land use patterns alteration and change in sense of place will be more intense for Alternative 1 than Alternative 2. The first portion of Alternative 1 is subterranean, whilst the second portion is replacement of pipeline within existing pipeline servitude above ground. However, Alternative 1 will mostly follow existing routes, even below the ground surface (parallel to ash lines) and will thus not significantly impact on the land use of the area permanently during the operation phase. Alternative 2, however will be below ground with no real visible permanent land use changes. The below figure provides an indication of what the 45 cm wide pipeline may look like for the sections above the ground of Alternative 1.

Figure 1: Current pipelines at Power Station

The following viewers will be exposed to visual alteration:

- Nearby residents and motorists using internal roads in the area
- Power Station employees
- Surrounding scholars from Duvha Primary

During operations, the components associated with the second portion of the proposed pipeline for route Alternative 1 will have a visual impact and, in so doing, impact on the landscape and sense of the place of the area. However, the impact associated with pipelines is relatively minor due cumulative to the large amount of existing visual pipelines, buildings, etc. Note that the visual integrity of the area has also been impacted by the existing Duvha Power station and its infrastructure.

Table 15: Summary of visual and land use patterns alteration - operation

PHASE: OPERATION PHASE		
NATURE: Visual and land use patterns alteration and change in sense of place and other spatial considerations		
IMPACT ASSESSMENT	**ALTERNATIVE 1**	**ALTERNATIVE 2**
MAGNITUDE	MINOR	No impact as pipeline below ground
DURATION	LONG-TERM	
EXTENT	LOCAL	
PROBABILITY	IMPROBABLE	
SIGNIFICANCE	LOW (7)	
STATUS	NEGATIVE	
ENHANCEMENT MEASURES: None		

The **impact assessment** during the operation phase of Alternative 1 is assessed to be minor in intensity; long-term in duration; local in extent; and improbable because during operations it is within the same servitude as the initial pipeline replaced. The impact is assessed to be of a low negative significance to the decision making process.

With regards to **pipeline route alternatives**, during operations, **alternative 2** poses no visual intrusion as it is subterranean.

4.7 SAFETY AND NUISANCE IMPACTS ON DUVHA PRIMARY SCHOOL AND SCHOLARS

Directly to the West of the centre of the proposed pipeline route alternative 2, within approximately 100m of the proposed route, is the Duvha Primary school. The Duvha Primary School is situated to the South of the Vaal Reservoir, within approximately 500m from the edge of the Vaal Reservoir.

The Duvha primary school and its facilities was established in 1982 by the power station. The Duvha Primary School currently has approximately **465 primary school going pupils**. The Duvha Primary school, and more specifically young primary school going aged scholars are likely to be impacted during the construction phase.

Construction activities will cause noise, nuisance, dust, visual disturbance, and mostly importantly safety concerns which could impact the scholars. The school is located very close to the proposed construction activity and construction vehicles, construction workers, and construction activities pose a large threat to the safety of learners. Construction related noise and dust pollution can also have an effect on school activities as it could cause lack of concentration and as a result lack of productivity, as well as influencing concentration of learners while doing homework and studying.

The safety and security threat for scholars is compounded since approximately 465 primary school going aged children, many of which walk, unsupervised by an adult, to and from school, are likely at threat. Primary school kids are likely to be inquisitive and could be tempted to investigate the site, machinery, talk to the construction workers, and be in direct contact with construction vehicles as the gravel road that passes by the school will most likely be used by construction vehicles to access construction sites. The scholars are thus at risk from the construction vehicles, falling into excavated trenches, and from being in direct contact with construction workers and construction vehicles entering and exiting the site.

This impact is only temporary since safety and noise pollution will only be evident during the construction phase.

Table 16: Summary of impact on Duvha Primary School– construction phase

PHASE: CONSTRUCTION PHASE		
NATURE: Impact on Duvha Primary school		
IMPACT ASSESSMENT	**ALTERNATIVE 1**	**ALTERNATIVE 2**
MAGNITUDE	MODERATE	HIGH
DURATION	SHORT-TERM	SHORT-TERM
EXTENT	LOCAL	LOCAL
PROBABILITY	HIGH PROBABILITY	HIGH PROBABILITY
SIGNIFICANCE	MEDIUM (40)	MEDIUM (48)
STATUS	NEGATIVE	NEGATIVE
ENHANCEMENT MEASURES: • Dust and noise generation should be minimised as much as possible • Traffic calming measures should be put in place to deter any unnecessary through-traffic through the surrounding school environs • Dust suppression measures must be implemented • Scholars, teachers, scholars parents should be notified days in advance prior to any planned activities that will be unusually noisy and that will pose a lot of construction vehicles in and around the area • School children should be well briefed of the proposed construction activities and what they should and shouldn't do • Safety at and around the construction site as well as along the gravel road leading to the school should be ensured through barricading off the construction area, and creating a dedicated and barricaded walking area along the gravel route for scholars, so as to avoid any possible conflict with construction vehicles and scholars so as to limit any risks of injury • The perimeter of the construction site and walkway should be appropriately secured to prevent any unauthorised access to the site. The fencing should be maintained throughout the construction period.		

PHASE: CONSTRUCTION PHASE
• Security personnel should ensure that no scholars and construction workers interact and that both construction workers and scholars abide by the rules. Security personnel should also man the intersection to ensure safe crossings for school children and to ensure that no school children wander around the gravel road and the construction site • Construction vehicles should be avoided during peak school start and closing times • No unauthorised entry to the site is to be allowed; access control and a method of identification of site personnel are required at all times • All vehicles must be road worthy and drivers must be qualified and made aware of the potential road safety issues relating to scholars in the area and follow the speed limits • Employing local community members could minimise the potential for criminal activity or perceived perception of an increase in criminal activity due to the presence of an outside workforce and influx of people

The **impact assessment** during the construction phase is assessed to be minor in intensity for both pipeline Alternative 1 and Alternative 2; short-term in duration; local in extent; and medium probable. The impact is assessed to be of a low negative significance to the decision making process.

With regards to **pipeline route alternatives** for the impact on Duvha Park Primary, route alternative 1 is preferred as the route is located further away than route alternative 2 from the primary school. Pipeline Route alternative 1, is nonetheless also likely to be a concern to the scholars as the gravel road that passes by the school, as with Alternative 2, will most likely be used by construction vehicles to access construction sites.

4. NEED AND DESIRABILITY AND SUMMARY OF FINDINGS

The KWS, which provides better quality of demineralised and potable water, is **scheduled for an outage**, **which will impact the supply of Komati water to the Power Station**. The pipeline alternatives are proposed as the best possible use of Komati water during the outage. Under the circumstances that the Power Station currently operates, there is only a supply for about 4.5 days, which is too short during the outage period. Without these proposed alternatives, there is a risk to the availability and reliability of demineralised water supply to the power station and considering the state of the water treatment plant (WTP), the runtime will be reduced and it is highly probable that the required quantity of demineralised water will not be produced. As such, utilising the system as is, is undesirable and unfeasible, considering that potable water will need to be produced from the Vaal water; which the plant is not optimised to produce and will require additional modification to the WTP.

In order to mitigate the impact of the outage, the reserve capacity of the Komati water reservoir will be maximised by only using Vaal water as source of make up for the condenser cooling water systems which requires modification to pipe network to achieve supply of Vaal water for cooling and Komati water for water treatment plant.

The project provides a source of additional income and temporary employment while introducing relatively minimal construction related negative impacts with scope for mitigation. The potential negative social impacts associated with the construction phase are typical of construction related projects. The construction related activities that have the potential to cause negative socio-economic impacts are mostly of a minor or low magnitude and can be reduced with the implementation of mitigation measures. The most significant impact that needs careful adherence to the suggested mitigations relate to the concern for safety of scholars at the very nearby Duvha Primary school during the construction phase.

Herewith a summary of responses to need and desirability components for the proposed water pipeline:

- The proposed development is not provided for in the infrastructure planning of the municipality, but there is no anticipated negative impact on municipal infrastructure and the proposed development will be provided for and maintained by Eskom.
- The property is owned by Eskom and there are minimal to no other land use options along the proposed pipeline routes.
- The proposed routes are not part of existing environmental management priority zones or programs. The proposed land use would not require active environmental management but rather mitigation of potential negative environmental impacts, of low magnitude, during the construction phase of the project
- The proposed pipelines will not be unlike infrastructure found around the Duvha Power station and is thus not proposed in a pristine unscathed area. The main impact of the project is construction related safety and nuisance impact from noise and construction activity in particular to nearby residents, employees, and scholars.
- The development will impact on people's health and wellbeing in terms of noise, odours, visual character and sense of place. During construction noise and dust emissions might occur due to the transport of material and workers to/from the site, however this issue will be of temporary duration. In addition, the location of the proposed activity in a rural location with a low density of inhabitants in the surrounding makes noise and dust emissions impacts to be negligible for local Speekfontein residents. Furthermore, socio-economic benefits are likely to result from the development such as creation of temporary jobs.
- The proposed land use will not result in unacceptable cumulative impacts.

A summary of the identified socio-economic impacts and their significance ratings, for both alternatives are set out below.

Table 17: Summary of socio-economic impact significance ratings for both Alternatives

IMPACTS	ALTERNATIVE 1				ALTERNATIVE 2			
	Planning	Construction	Operational	Reconfiguration	Planning	Construction	Operational	Reconfiguration
New business sales, multipliers, stimulation	L	L	N	N	L	L	N	N
Employment and skills transferral	L	L	L	N	L	L	L	N
Effect of temporary workers		L				L		
Safety and security		L	L			L		
Nuisance, noise, disruptions		L	L/N			L	L/N	
Visual, land use and sense of space alterations		L	L			L		
Safety and nuisance impacts on Duvha School		M				M		

From a socio-economic perspective it is concluded that both positive and negative social impacts have been identified. The assessment of the key issues indicated that there are no negative impacts that can be classified as fatal flaws and which are of such significance that it cannot be successfully mitigated. Stated differently, the proposed development is unlikely to result in any permanent damaging socio-economic impacts. The overall positive impact during operation is that the proposed pipeline mitigates the risk to the availability and reliability of demineralised water supply to the power station and the threat from reduced runtime. The intended life of the pipeline is 35 years, and although the pipeline is to supply Komati water to the WTP during the outage, the pipeline will add further flexibility for water management at Duvha Power Station and can be at any time in the future,

if the supply of water to the power station is at risk. The overall potential negative impact associated with the operation phase is that a portion of the pipeline is above ground for Alternative 1 which will be visible and at risk from the elements. However it is not really introducing a new change in land use as it essentially entails replacement of existing pipeline within the existing route of the previous pipeline. Furthermore, this is within an already built-up area.

With regards to **pipeline route alternatives**, for the majority of the impacts there is no difference in impact between alternative 1 and 2 as both are relatively equal in length, similar capital expenditures, expected employment creation, etc. From a social perspective, site alternative 1 is slightly more preferable to site alternatives 2 during the construction phase, with regards to the adjacent Duvha Primary School, as it is located further away from the school and is within the existing pipeline route servitudes. However, unlike Alternative 2, during operations, a portion of Alternative 1 is above ground, whereas the entire pipeline during operations for Alternative 2 is below ground. As such, during operations Alternative 1 has low negative impacts on visual change and risk from the elements. Both routes are however socio-economically acceptable.

When considering the overall costs and benefits of the project it is found that the latter is more prominent allowing for the achievement of a net socio-economic benefit. With respect to risks and negative impacts, these should prove relatively minor with mitigation. It is therefore recommended that the proposed water pipeline be supported. In other words, in terms of the potential socio-economic impacts arising from the project, it is found that there is no obvious reason for the competent authority to reject the application on socio-economic grounds for both Alternatives.