

14. TRAFFIC AND TRANSPORT

14.1. Status Quo Conditions

The following section summarises the present conditions related to transportation for the proposed development of the Matimba B Power Station:

14.1.1. Description of Road Infrastructure

Photographs of the most significant road junctions are shown together with a map index in Appendix N.

The present Matimba Power Station is located some 10 km from the residential township of Onverwacht located on an east-west aligned provincial tarred road with end destination of Stockpoort (Botswana /RSA border). This township itself is located 3 km west of Lephalale.

The Grootegeluk Mine and Marapong township are located a further 3 km northwest on the same road.

Some 8 km west of Onverwacht is a tarred road to Steenbokpan proceeding due west. Off this road is another turnoff due south to Afguns. For ease of description the roads will be described by their end destination.

A map highlighting these roads is shown in Figure 14.1.

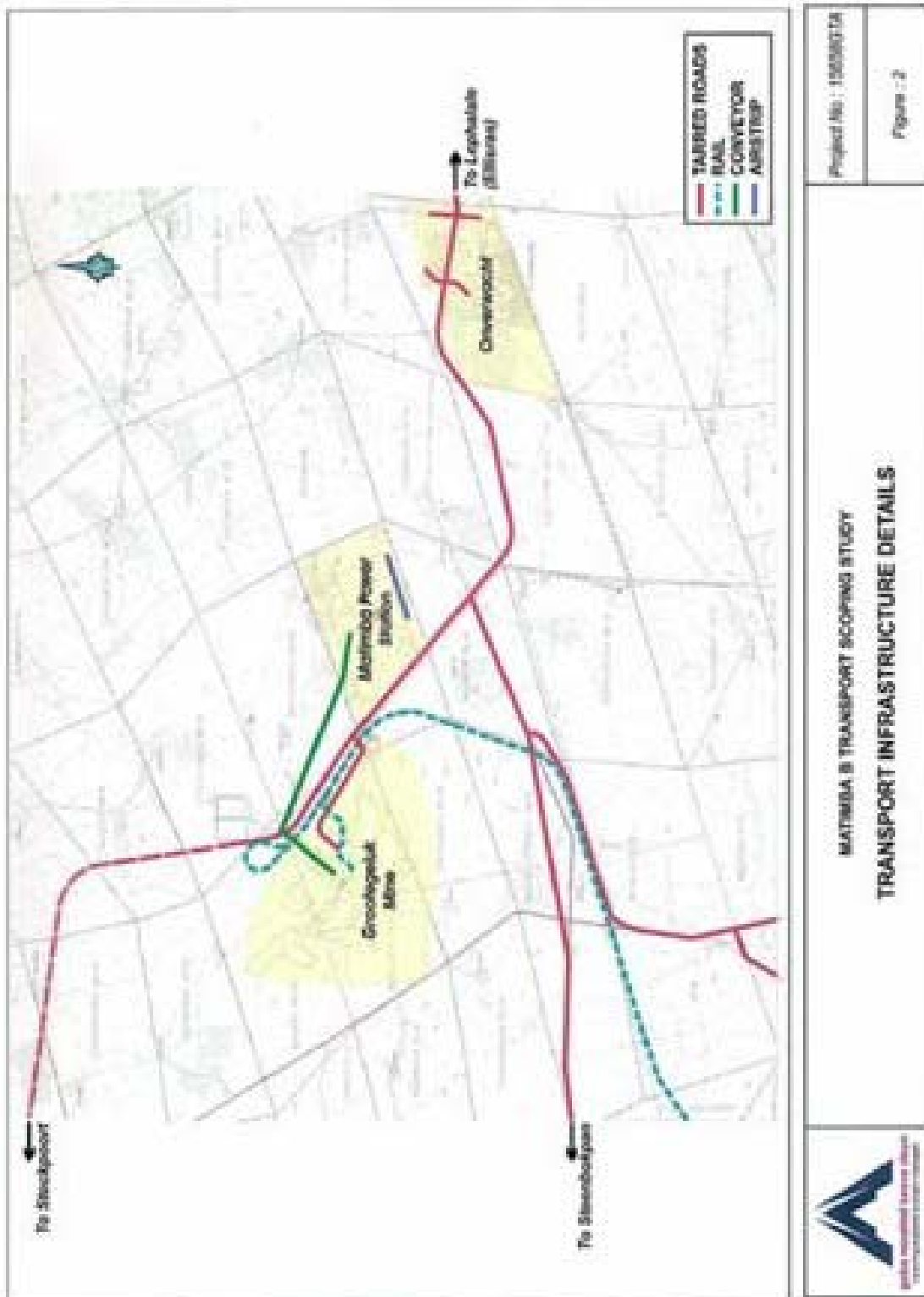


Figure 14.1: Transport Infrastructure Details

14.1.2. Description of Travel Patterns

Detailed 12-hour classified traffic counts were undertaken in April 2005 at the following locations:

- Nelson Mandela Drive & Apiesdoring (Onverwacht)
- Stockpoort Road & Steenbokpan Road
- Stockpoort Road & Matimba Power Station access
- Stockpoort Road & Grootegeluk Mine/Marapong

A summary of the counts is shown in Appendix O for the morning peak, afternoon peak and 12-hour time periods.

The traffic counts undertaken in April 2005 indicate that 94% of the daily traffic to the present Matimba Power Station originates from Lephalale/Onverwacht, with the remaining 6% coming from the Grootegeluk Mine itself. No traffic comes from the Steenbokpan or Afguns roads.

The peak hour of vehicular traffic at the Matimba Power Station access gate was observed to be between 06:30 and 07:30 in the morning and between 15:45 and 16:45 in the afternoon, consistent with shift work at the facility.

There is a significant vehicular movement to/from the Marapong township (adjacent to Matimba) from/to Lephalale/Onverwacht during the morning and afternoon peaks.

Vehicular traffic to/from the Grootegeluk Mine is similar in magnitude to that to/from the Matimba Power Station.

14.1.3. Location of Employee Residences

The travel patterns established from the traffic counts indicate clearly that the major source of employees or their residential areas are located in Onverwacht, Marapong and Lephalale itself. This is not expected to change significantly for the operation of Matimba B Power Station.

14.1.4. Other Transport Infrastructure

A railway line from Thabazimbi to the Grootegeluk Mine (which loops at the end of the line) is located just north of the mine and the mine itself has a rail siding branching from the main rail line.

There is presently a conveyor line supplying the Matimba Power Station with coal, which traverses the provincial road to Stockpoort.

Matimba Power Station is also served by a private air strip located on the southern side of the site. The transport infrastructure mentioned is depicted in Figure 14.1.

14.2. Assumptions for Traffic/Transport Scoping

14.2.1. Proposed Power Station

- Present Matimba Power Station output is 4000 MW.
- Matimba B is proposed to have a maximum capacity of 4800 MW.
- The proposed power station will require at least one major access road for employees from the nearest provincial road to the site.
- The number of employees and vehicles generated/attracted to the proposed Matimba B Power Station will be based on the proportion of the power station output. As a result, a significant workforce would need to be housed most probably in the expansion of the present residential areas of Onverwacht and Marapong.
- The four alternative farms under consideration are only large enough to accommodate the proposed power station footprint of Matimba B.

14.2.2. Coal Supply

- The coal supply from the Grootegeeluk Mine is infinite in magnitude for the design life of both the present and proposed power station.
- Coal supply transport will be undertaken via ground level conveyors.

14.2.3. Ash Handling

- The transport of ash from the power station to the ash dump will be via ground level conveyor systems.
- The adjacent farms to the four alternative power station sites are required for the footprint of ancillary facilities, ash processing and dumps.

14.3. Transport Impacts And Considerations

14.3.1. Transport of Employees

The distance, time and cost of transporting employees from their residences to work at the proposed new Matimba B Power Station and back is required to be evaluated for each site alternative with Onverwacht and Marapong being the major residential areas. In vehicular terms, Marapong presently contributes 16% and Onverwacht/Lephalale 82% to the Matimba Power Station traffic.

In broad terms the nature and magnitude of traffic to Matimba Power Station is expected to double with the employee traffic being directed to the location of the new Matimba B Power Station site.

This traffic is evaluated at the key intersections along the present Stockpoort and Steenbokpan provincial roads during the peak hours. The specific impact on the road pavement is also required to be evaluated.

This traffic impact is expected to be large/significant in nature, but mainly local in extent.

14.3.2. Coal Supply Transportation

The length of conveyor required to serve each site from the Grootegeluk Mine coal washing plant will be the major determining factor of capital and operational transport cost of Coal Supply for each site. The conveyor would need to be located on either Grootegeluk Mine property or on the envisaged Eskom owned property of the proposed Power Station site.

Another consideration is the number and extent of road/or rail crossings for the coal conveyor. These are generally provided under the road/rail for ground level conveyor systems. This aspect has been evaluated under Section 14.4.1 in the site selection assessment.

This traffic impact is expected to be moderate in nature and mainly local in extent.

14.3.3. Ash Transportation

The length of conveyor required to/from each power station site to ash dump/processing site will be the determining factor of capital and operational transport cost of Ash Transportation for each site. The ash conveyor would need to be located on either Grootegeluk Mine property or on the envisaged Eskom owned property of the proposed Power Station site.

Another consideration is the number and extent of road/or rail crossings for the ash conveyor and has been evaluated under Section 14.4.1.

This traffic impact is expected to be moderate in nature and mainly local in extent.

14.3.4. Construction Traffic

It is estimated that the construction of the new Matimba B Power Station will require some 42 months. During this period the transportation of large components to the site will be necessary from time to time. During all this time the nature and extent of this traffic impact needs to be evaluated for its effect on the traffic operating conditions and pavement condition of the roads affected.

The origin of the construction traffic may be quite dispersed in extent but any of the main provincial roads and obviously the Stockpoort and Steenbokpan road would need to be considered for evaluation. A detailed evaluation in this regard would need to be undertaken during the Environmental Impact Assessment phase, once a preferred site has been selected.

This traffic impact is expected to be large/significant in nature but could be regional in extent.

14.3.5. Transportation of Components during Construction

Both road and rail modes are available to all sites for the transport of large components of the power station during construction. Therefore this should not influence the choice of site in any significant way. The implications if road-based abnormal loads are necessary are significant, but these will be fully explored during the Environmental Impact Assessment phase of the study when a preferred site has been selected.

14.4. Transport Evaluation of Alternative Sites

The transport impact for each alternative site under consideration was undertaken using the parameters described in Section 14.3.

14.4.1. Power Station Site Selection

The site selection representative transport costs are shown in Appendix P for the power station site and ancilliary services site. All the various representative transport costs were then added for each site and the best site selected as the one with the lowest transport cost.

The transport costs for the ancilliary services site was based on the power station sites. The process of site suitability was expressed as a numerical score used by all specialists to select the best site. This is indicated in Tables 14.1 and 14.2. All the various representative transport costs were added for each site and the best site selected as the one with the lowest transport cost (refer to Tables 1 – 6 in Appendix P).

- *Transport of Employees*

As the main sources of this traffic are Marapong (16%) and Onverwacht (84%) in daily vehicular traffic terms, the farms of Nelsonskop and Appelvlakte rate as more preferred than Naauwontkomen and Eenzaamheid. This is related to the distance between the residential areas and the proposed sites. The weighted distance from the traffic origin to the power station site has been calculated to represent the transport costs for employee trips and is shown in Tables 1 – 6 in Appendix P. In summary Nelsonskop rates the highest with a distance of 12,49km, and Eenzaamheid rates lowest with a distance of 18,3km.

- *Transport of Coal Supply*

The most direct conveyor line distance from the Grootegeluk Mine washing plant to the centre of gravity of the various sites was used to represent the proportional coal conveyor cost to each site. In this respect the distance to Appelvlakte (4 km) is the least, followed by Nelsonskop (5,7 km), Naauwontkomen (9 km) and Eenzaamheid (13,9 km).

- *Infrastructure Changes (Power Station and Coal conveyor)*

This category was used to define the additional costs required for the coal supply conveyor to have to cross (usually under) a roadway or railway line. The number of crossings was used to represent the costs envisaged. In addition, should the farm Naauwontkomen be used for the location of the Power Station then the provincial road to Steenbokpan would be required to be realigned. The cost of this potential re-alignment was represented as a deviation construction length of 2 km.

- *Construction Traffic*

Although the amount of generated construction traffic is difficult to quantify, it is, however, most probable that the majority of it will originate either south or north of Nelson Mandela Drive (through Onverwacht). The cost of construction traffic was represented by the road distance to the new power station site from the Nelson Mandela Drive/Main Road 510 junction. This road length would most likely have to be rehabilitated or reconstructed after the 42 month construction period. In this respect the construction traffic cost is estimated as 18,7 km for both Nelsonskop and Naauwontkomen, 19,85 km for Appelvlakte, and 23,2 km for Eenzaamheid.

- *Ash Transport*

The transport cost of ash transport was calculated for each site against each potential power station site (refer to Tables 1 – 6 in Appendix P). The representative best average site has been calculated to determine the most preferred ancillary services site.

- *Infrastructure Changes (Ash conveyor and Ancillary Services)*

This category was used to define the additional costs required for the ash conveyor to have to cross (usually under) a roadway or railway line. The number of crossings was used to represent the costs envisaged. In addition, should the farm Naauwontkomeen be used for the location of the ancillary services, then the provincial road to Steenbokpan would be required to be realigned. The cost of this was represented as a deviation construction length of 2 km.

14.5. Conclusions

14.5.1. Results of Site Selection

The site selection results are reflected in Tables 14.1 and 14.2. The preferred site for the location of the Matimba B Power Station from a traffic/transport viewpoint is the farm Nelsonskop. Assuming the above, the preferred site for the location of ancillary services is the farm Appelvlakte.

Table 14.1: Site selection based on transport issues: Power Station

Farm	Employee Transport	Coal Supply	Infrastructure Changes	Construction Traffic	Sum
Appelvlakte 448 LQ	4	5	4	3	16
Nelsonskop 464 LQ	5	4	5	3	17
Naauwontkomeen 509 LQ	4	3	2	4	13
Eenzaamheid 687 LQ	3	3	3	4	13

Table 14.2: Site selection based on transport issues: ancillary site

Farm	Ash Transport	Infrastructure Changes	Sum
Appelvlakte 448 LQ	4	5	9
Nelsonskop 464 LQ	5	5	10
Naauwontkomen 509 LQ	4	2	6
Eenzaamheid 687 LQ	3	5	8
Droogeheuvel 447 LQ	3	5	8
Zongezien 467 LQ	3	5	8
Kuipersbult 511 LQ	3	5	8
Kromdraai 609 LQ	2	5	7

14.5.2. Site Preference Rating

The site preference rating for the sites in terms of traffic and transport is outlined in Tables 14.3 and Table 14.3.

Table 14.3: The Site Preference Rating of the alternative Sites for the power station with regards to traffic and transport

Farm name	Site Preference Rating
Farm Appelvlakte 448 LQ	4 (preferred)
Farm Nelsonskop 464 LQ	5 (ideal)
Farm Naauwontkomen 509 LQ	3 (acceptable)
Farm Eenzaamheid 687 LQ	3 (acceptable)

The Farm Nelsonskop 464 LQ is considered the preferred site for the construction of the power station from a traffic and transport point of view, based on the associated calculation transport cost.

Table 14.4: The Site Preference Rating of the alternative sites for the ancillary infrastructure with regards to traffic and transport

Farm name	Site Preference Rating
Farm Appelvlakte 448 LQ	5 (ideal)
Farm Nelsonskop 464 LQ	5 (ideal)
Farm Naauwontkomen 509 LQ	3 (acceptable)
Farm Eenzaamheid 687 LQ	4 (preferred)
Farm Droogeheuvel 447 LQ	4 (preferred)
Farm Zongezien 467 LQ	4 (preferred)
Farm Kuipersbult 511 LQ	4 (preferred)
Farm Kromdraai 690 LQ	3 (acceptable)

The farms Appelvlakte 448 LQ and Nelsonskop 464 LQ are considered the preferred sites for the establishment of the ancillary infrastructure based on the associated calculated transport costs.

14.5.2. General

- The traffic/transport issues considered through the Transport Scoping and Site selection study included:
 - * Transport of Employees
 - * Coal Supply Transportation
 - * Ash Transportation
 - * Changes to Infrastructure required for the issues above
 - * Construction Traffic
- The preferred site for the Matimba B Power Station from a traffic /transportation viewpoint is Nelsonskop.
- The preferred site for the ancillary services is Appelvlakte.
- The preference ratings are based on the identified transport issues and the associated calculated transport costs.
- The detailed traffic impact evaluation for the Matimba B Power Station will need to be undertaken as this impact will be significant. This study will be undertaken during the Environmental Impact Assessment phase, once a preferred site has been nominated for development.

14.6. Recommendations

It is recommended that the detailed Traffic Impact Study be undertaken in the Environmental Impact Assessment Phase once the most appropriate site has been nominated. The following transportation issues related to the proposed development should be considered during the Traffic Impact Study:

- Construction transport mainly related to the transport of very large, bulky components, which may need to be transported to the site from time to time. This should include recommendations with regards to possible routes to be used, as well as any permits that may be required.
- Construction traffic (employees and heavy construction vehicles) specifically related to the physical construction of the power station over a period of approximately 42 months.
- One of the issues which is a sub-set of Construction Traffic and traffic related to the transport of large components is pavement loading. It is well known that the pavement condition of the Provincial road (R33) between Vaalwater and Lephalale is poor. Concerns as to the impact of the afore-mentioned traffic on the pavement conditions should be assessed.