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SCOPING REPORT:
PROPOSED PAARDEVLEI SOLAR PHOTOVOLTAIC FACILITY, WESTERN CAPE PROVINCE

TRANSPORT STUDY

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Final Issue

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SYNOPSIS

Preparation of a Transport Study for the Proposed Paardevlei Solar Photovoltaic Facility in the Limpopo Province, pertaining to all relevant traffic and transportation engineering aspects.

KEY WORDS:

Scoping Report, Solar Energy, Transport Study, Photovoltaic, PV

QUALITY VERIFICATION

This report has been prepared under the controls established by a quality management system that meets the requirements of ISO 9001: 2015 which has been independently certified by DEKRA Certification.

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PROPOSED PAARDEVLEI SOLAR PHOTOVOLTAIC FACILITY, WESTERN CAPE PROVINCE

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1 INTRODUCTION AND METHODOLOGY

1.1 Scope and Objectives

The City of Cape Town is currently proposing the development of a Solar Photovoltaic (PV) Facility and Battery Energy Storage System (BESS) on municipal owned vacant land within Somerset West, known as Paardevlei.

The preparation of the Paardevlei Solar PV Facility and BESS project falls under the framework of support where C40 Cities Finance Facility (CFF) engages primary and secondary cities worldwide to mobilize financial resources for transformative actions, which significantly reduce their greenhouse gas emissions and build climate resilience.

The project site is located between Macassar and Somerset West, approximately 38km southeast of Cape Town and 17km south of Stellenbosch, as shown in **Figure 1-1**

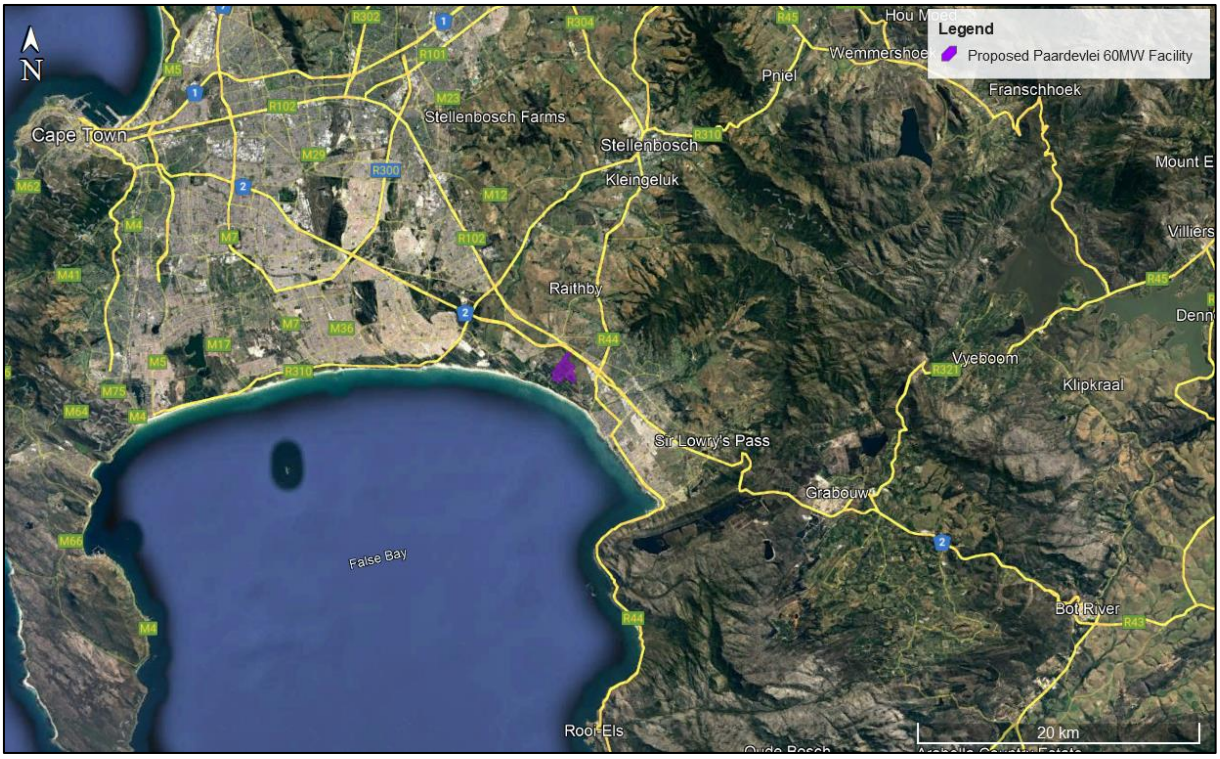

Figure 1-1: Proposed Paardevlei Solar PV Facility

As part of the Environmental Impact Assessment (EIA) process undertaken, the services of a Transportation Specialist are required to conduct a Transport Study.

The following two main transportation activities will be investigated:

- Abnormal load vehicles transporting components to the site.

- The transportation of construction materials, equipment and people to and from the site/facility.

The transport study will aim to provide the following objectives:

- Assess activities related to traffic movement for the construction and operation (maintenance) phases of the facility.
- Recommend a preliminary route for the transportation of the components to the proposed site.
- Recommend a preliminary transportation route for the transportation of materials, equipment and people to site.
- Recommend alternative or secondary routes where possible.

1.2 Terms of Reference

General:

A specialist report prepared in terms of the Regulations must contain the following:

(a) details of-
  (i) the specialist who prepared the report; and
  (ii) the expertise of that specialist to compile a specialist report including a curriculum vitae;

(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;

(c) an indication of the scope of, and the purpose for which, the report was prepared;
  (cA) an indication of the quality and age of base data used for the specialist report
  (cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;

(d) the duration date and season of the site investigation and the relevance of the season to the outcome of the assessment;

(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;

(f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;

(g) an identification of any areas to be avoided, including buffers;

(h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;

(i) a description of any assumptions made and any uncertainties or gaps in knowledge;

(j) a description of the findings and potential implications of such findings on the impact of the proposed activity or activities;

(k) any mitigation measures for inclusion in the EMPr;

(l) any conditions for inclusion in the environmental authorisation;

(m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;

(n) a reasoned opinion-
  (i) whether the proposed activity, activities or portions thereof should be authorised; and (considering impacts and expected cumulative impacts).
  (iA) regarding the acceptability of the proposed activity or activities, and

(ii) if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;

(o) a description of any consultation process that was undertaken during the course of preparing the specialist report;

(p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and

(q) any other information requested by the competent authority.

Specific:

- Extent of the transport study and study area;
- The proposed development;
- Trip generation for the facility during construction and operation;
- Traffic impact on external road network;
- Accessibility and turning requirements;
- National and local haulage routes;
- Assessment of internal roads and site access;
- Assessment of freight requirements and permitting needed for abnormal loads; and
- Traffic accommodation during construction.

1.3 Approach and Methodology

The report deals with the traffic impact on the surrounding road network in the vicinity of the site:

- during the construction of the access roads;
- construction of the facility; and
- operation and maintenance during the operational phase.

This transport study was informed by the following:

Site Visit and Project Assessment

- Overview of project background information including location maps, component specs and any possible resulting abnormal loads to be transported.
- Research of all available documentation and information relevant to the proposed facility; and
- Site visit to gain sound understanding of the project.

The transport study considered and assessed the following:

Traffic and Haul Route Assessment

- Estimation of trip generation;
- Discussion on potential traffic impacts;
- Assessment of possible haul routes; and
- Construction and operational (maintenance) vehicle trips.

Site layout, Access Points and Internal Roads Assessment per Site

- Description of the surrounding road network;

- Description of site layout;
- Assessment of the proposed access points; and
- Assessment of the proposed internal roads on site.

1.4 Assumptions and Limitations

The following assumptions and limitations apply:

- This study is based on the project information provided by the Client.
- According to the Eskom Specifications for Power Transformers (Eskom Power Series, Volume 5: Theory, Design, Maintenance and Life Management of Power Transformers), the following dimensional limitations need to be kept when transporting the transformer – total maximum height 5 000mm, total maximum width 4 300 mm and total maximum length 10 500 mm.
- Maximum vertical height clearances along the haulage route is 5.2 m for abnormal loads.
- Imported elements will be transported from the most feasible port of entry, which is deemed to be the Port of Saldanha.
- If any elements are manufactured within South Africa, these will be transported from their respective manufacturing centres, which would be either in the greater Johannesburg area for the transformer, inverter and the support structures and in Pinetown/Durban, Cape Town or Johannesburg for the PV modules.
- All haulage trips will occur on either surfaced national and provincial roads or existing gravel roads.
- Construction materials will be sourced locally as far as possible.

1.5 Source of Information

Information used in a transport study includes:

- Project Information provided by the Client;
- Google Earth.kmz provided by the Client;
- Google Earth Satellite Imagery;
- Road Traffic Act, 1996 (Act No. 93 of 1996)
- National Road Traffic Regulations, 2000
- SANS 10280/NRS 041-1:2008 - Overhead Power Lines for Conditions Prevailing in South Africa
- The Technical Recommendations for Highways (TRH 11): “Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads
- Information gathered during the site visit; and
- Project research of all available information.

2 DESCRIPTION OF PROJECT ASPECTS RELEVANT TO THE TRANSPORT STUDY

2.1 Port of Entry

It is assumed that if components are imported to South Africa, it will be via the Port of Saldanha. The Port of Saldanha, located 181km from the proposed site, is the largest and deepest natural port in the Southern Hemisphere able to accommodate vessels with a draft of up to 21.5m. The port covers a land and sea surface of just over 19,300ha within a circumference of 91km with

maximum water depths of 23.7m. Unique to the port is a purpose-built rail link directly connected to a jetty bulk loading facility for the shipment of iron ore. The Port is operated by Transnet National Ports Authority.

The Port of Cape Town (47km from the proposed site) could be considered for the import of smaller components as the Port is not able to accommodate abnormal loads. In addition, vehicles traveling from the Port would experience major traffic delays in the metro throughout the day.

2.2 Transportation requirements

It is anticipated that the following vehicles will access the site during construction:

- Conventional trucks within the freight limitations to transport building material to the site;
- 40ft container trucks transporting solar panels, frames and the inverter, which are within freight limitations;
- Flatbed trucks transporting the solar panels and frames, which are within the freight limitations;
- Light Differential Vehicle (LDV) type vehicles transporting workers from surrounding areas to site;
- Drilling machines and other required construction machinery being transported by conventional trucks or via self-drive to site; and
- The transformers will be transported as abnormal loads.

2.3 Abnormal Load Considerations

It is expected that the transformers will be transported with an abnormal load vehicle. Abnormal permits are required for vehicles exceeding the following permissible maximum dimensions on road freight transport in terms of the Road Traffic Act (Act No. 93 of 1996) and the National Road Traffic Regulations, 2000:

- Length: 22m for an interlink, 18.5m for truck and trailer and 13.5m for a single unit truck
- Width: 2.6m
- Height: 4.3m measured from the ground. Possible height of load – 2.7m.
- Weight: Gross vehicle mass of 56t resulting in a payload of approximately 30t
- Axle unit limitations: 18t for dual and 24t for triple-axle units
- Axle load limitation: 7.7t on the front axle and 9t on the single or rear axles

Any dimension / mass outside the stated, will be classified as an Abnormal Load and will necessitate an application to the Department of Transport and Public Works for a permit that will give authorisation for the conveyance of said load. A permit is required for each Province that the haulage route traverses.

2.4 Further Guideline Documentation

The Technical Recommendations for Highways (TRH 11): “Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads” outlines the rules and conditions that apply to the transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in applying for exemption permits are described and discussed. Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges and culverts.

The general conditions, limitations and escort requirements for abnormally dimensioned loads and vehicles are also discussed and reference is made to speed restrictions, power / mass ratio, mass distribution and general operating conditions for abnormal loads and vehicles. Provision is also made for the granting of permits for all other exemptions from the requirements of the Road Traffic Act and the relevant regulations.

2.5 Permitting – General Rules

The limits recommended in TRH 11 are intended to serve as a guide to the Permit Issuing Authorities. It must be noted that each Administration has the right to refuse a permit application or to modify the conditions under which a permit is granted. It is understood that:

a) A permit is issued at the sole discretion of the Issuing Authority. The permit may be refused because of the condition of the road, the culverts and bridges, the nature of other traffic on the road, abnormally heavy traffic during certain periods or for any other reason.
b) A permit can be withdrawn if the vehicle upon inspection is found in any way not fit to be operated.
c) During certain periods, such as school holidays or long weekends an embargo may be placed on the issuing or permits. Embargo lists are compiled annually and are obtainable from the Issuing Authorities.

2.6 Load Limitations

The maximum load that a road vehicle or combination of vehicles will be allowed to carry legally under permit on a public road is limited by:

- the capacity of the vehicles as rated by the manufacturer;
- the load which may be carried by the tyres;
- the damaging effect on pavements;
- the structural capacity on bridges and culverts;
- the power of the prime mover(s);
- the load imposed by the driving axles; and
- the load imposed by the steering axles.

2.7 Dimensional Limitations

A load of abnormal dimensions may cause an obstruction and danger to other traffic. For this reason, all loads must, as far as possible, conform to the legal dimensions. Permits will only be considered for indivisible loads, i.e. loads that cannot, without disproportionate effort, expense or risk of damage, be divided into two or more loads for the purpose of transport on public roads. For each of the characteristics below there is a legally permissible limit and what is allowed under permit:

- Width;
- Height;
- Length;
- Front Overhang;
- Rear Overhang;
- Front Load Projection;
- Rear Load Projection;

- Wheelbase;
- Turning Radius; and
- Stability of Loaded Vehicles.

2.8 Transporting Other Plant, Material and Equipment

In addition to transporting the specialised equipment, the normal Civil Engineering construction materials, plant and equipment will need to be transported to the site (e.g. sand, stone, cement, gravel, water, compaction equipment, concrete mixers, etc.). Other components, such as electrical cables, pylons and substation transformers, will also be transported to site during construction. The transport of these items will generally be conducted with normal heavy loads vehicles, except for the transformers which require an abnormal load vehicle.

3 DESCRIPTION OF THE AFFECTED ENVIRONMENT

3.1 Description of the site

The proposed Paardevlei Solar PV Facility and BESS project will be a 30 to 60MW facility on City of Cape Town owned land portions (with a total extent of 152 ha), as shown in **Figure 3-1,** connected directly to an existing 132kV switching station located near the site. Construction is planned to start in the 1st quarter of 2026.

The development is proposed on the following erven:

- Portion 11 Helderberg Sleeper Plantation 787;
- Portion 38 (Remaining Extent) Farm 794;
- Portion 10 Helderberg Sleeper Plantation 787;
- Portion 0 (Remaining Extent) of Farm 792; and
- Portion 37 Farm 794

Figure 3-1: Aerial View of the Proposed Paardevlei Development

3.2 National Route to Site for Imported Components

There are two viable options for the port of entry for imported components - the Port of Cape Town and the Port of Saldanha in Cape Town.

The Port of Cape Town is located approximately 47km travel distance from the proposed site whilst the Port of Saldanha is located approximately 181km travel distance from the proposed site. The Port of Saldanha is the preferred port of entry, however, the Port of Cape Town can be used as an alternative should the Port of Saldanha not be available.

The preferred route from the Port of Saldanha is shown in green in **Figure 3-2**. The route follows the R399 north to the TR8501, then east until it reaches the R27, then south on the R27 till the

M19, then east on the M19 till the N7, then south on the N7 till the N2, then east on the N2 until it reaches the R44, then south on the R44 before branching off on to Centenary Drive towards the proposed site.

The alternative route from the Port of Cape Town is shown in orange in **Figure 3-2**. The route follows the N2 to the east until it reaches the R44, then south on the R44 before branching off on to Centenary Drive towards the proposed site.

Should both the Port of Cape Town and the Port of Saldanha not be available, Port of Ngqura in the Eastern Cape may be considered as an alternative option.

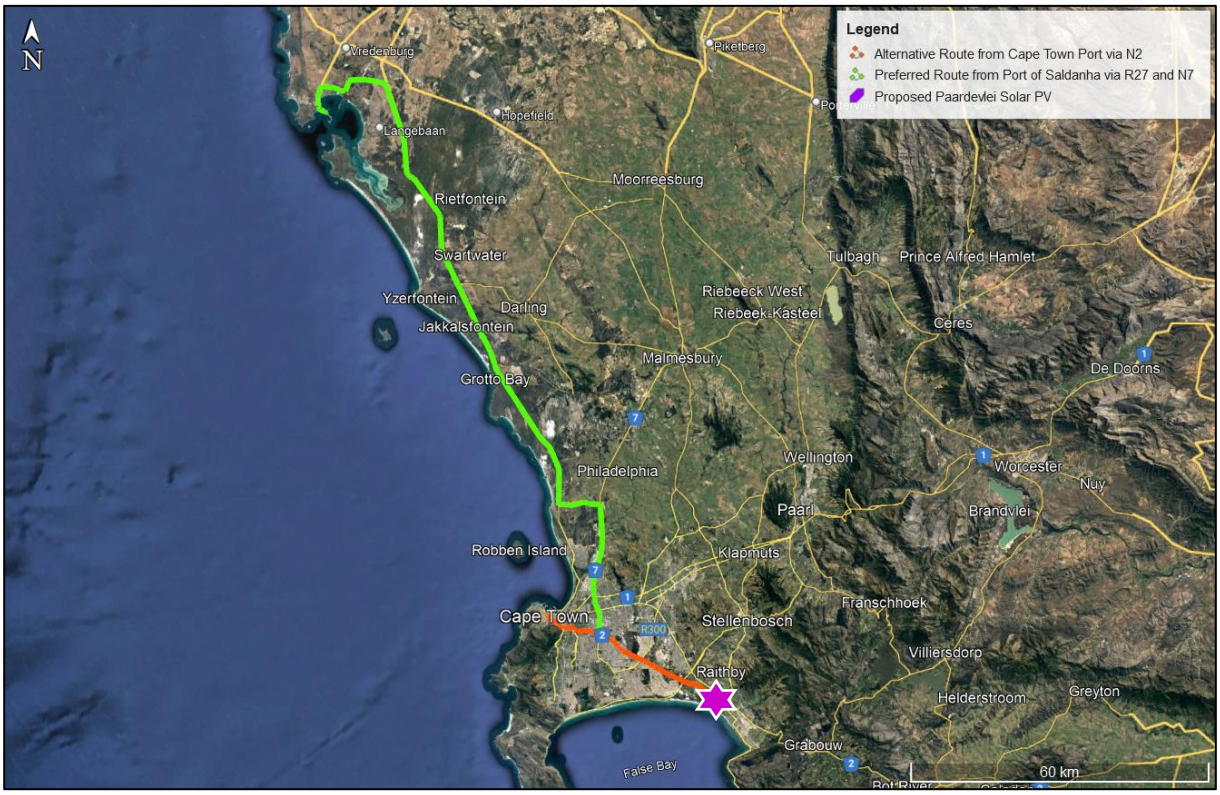

Figure 3-2: Preferred and Alternative Routes

It is critical to ensure that the abnormal load vehicle will be able to move safely and without obstruction along the preferred route. The preferred route should be surveyed prior to construction to identify any problem areas, e.g., intersections with limited turning radii and sections of the road with sharp horizontal curves or steep gradients, that may require modification. After the road modifications have been implemented, it is recommended to undertake a “dry-run” with the largest abnormal load vehicle, prior to the transportation of any components, to ensure that the delivery will occur without disruptions.

It needs to be ensured that the gravel sections of the haulage routes remain in good condition and will need to be maintained during the additional loading of the construction phase and reinstated after construction is completed.

3.3 Route for Components manufactured locally

As mentioned in Section 1.4 (Assumptions and Limitations), it is anticipated that elements manufactured within South Africa will be transported to the site from the Cape Town, Johannesburg and Pinetown/Durban areas. It is also assumed that the transformer, which will be transported with an abnormal load vehicle, will be transported from the Johannesburg area and therefore it needs to be verified that the route from the manufacturer to the site does not have any load limitations for abnormal vehicles. At this stage, only a high-level assessment can be undertaken as no information of the exact location of the manufacturer is known and all road structures (such as bridges and culverts) need to be confirmed for their load bearing by SANRAL or the respective Roads Authority.

3.4 Route from Cape Town to Proposed Site

Components, such as PV panels, manufactured in Cape Town will be transported to site via road as shown in **Figure 3-3**. Haulage vehicles will travel from Cape Town on the N2 to the east until it reaches the R44, then south on the R44 before branching off on to Centenary Drive towards the proposed site.

Haulage vehicles will mainly travel on the national highway and the total distance to the proposed site is approximately 47km.

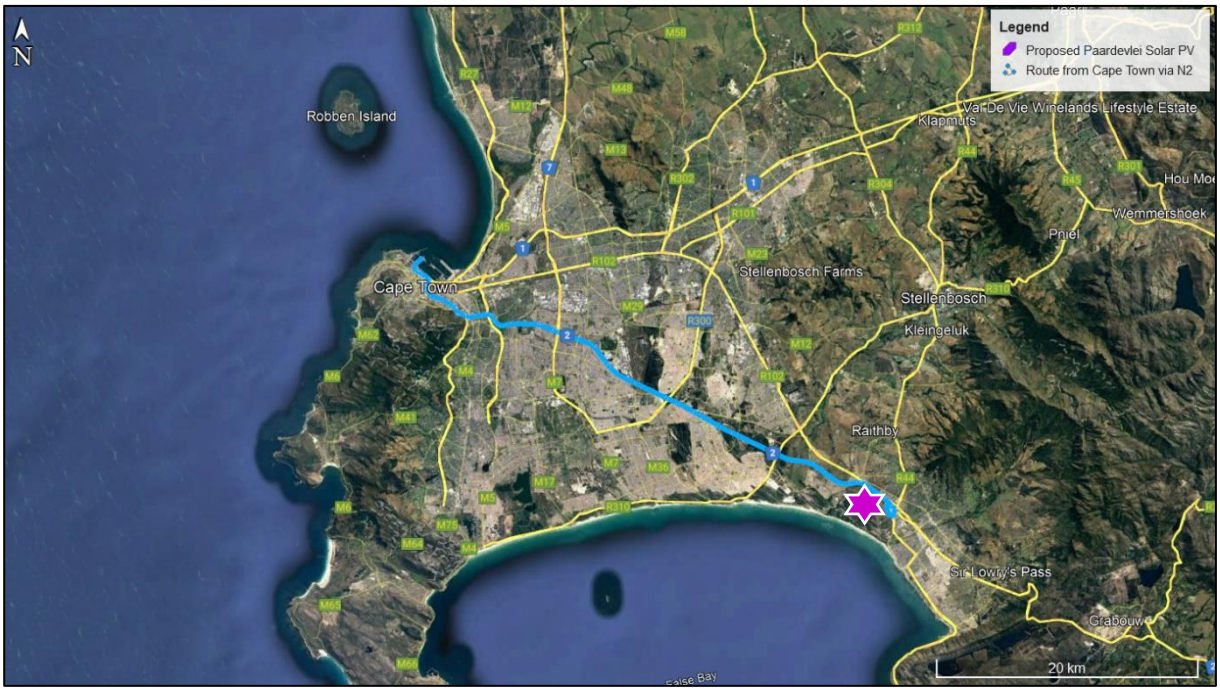

Figure 3-3: Route from Cape Town to Proposed Site

3.5 Route from Johannesburg to Proposed Site

It is assumed that the inverter and support structure will be manufactured in the Johannesburg area and transported to site. The travel distance is around 1 387km, and no road limitations are expected on this route for normal loads vehicles as it will mainly follow national and provincial roads. The route is shown in **Figure 3-4**.

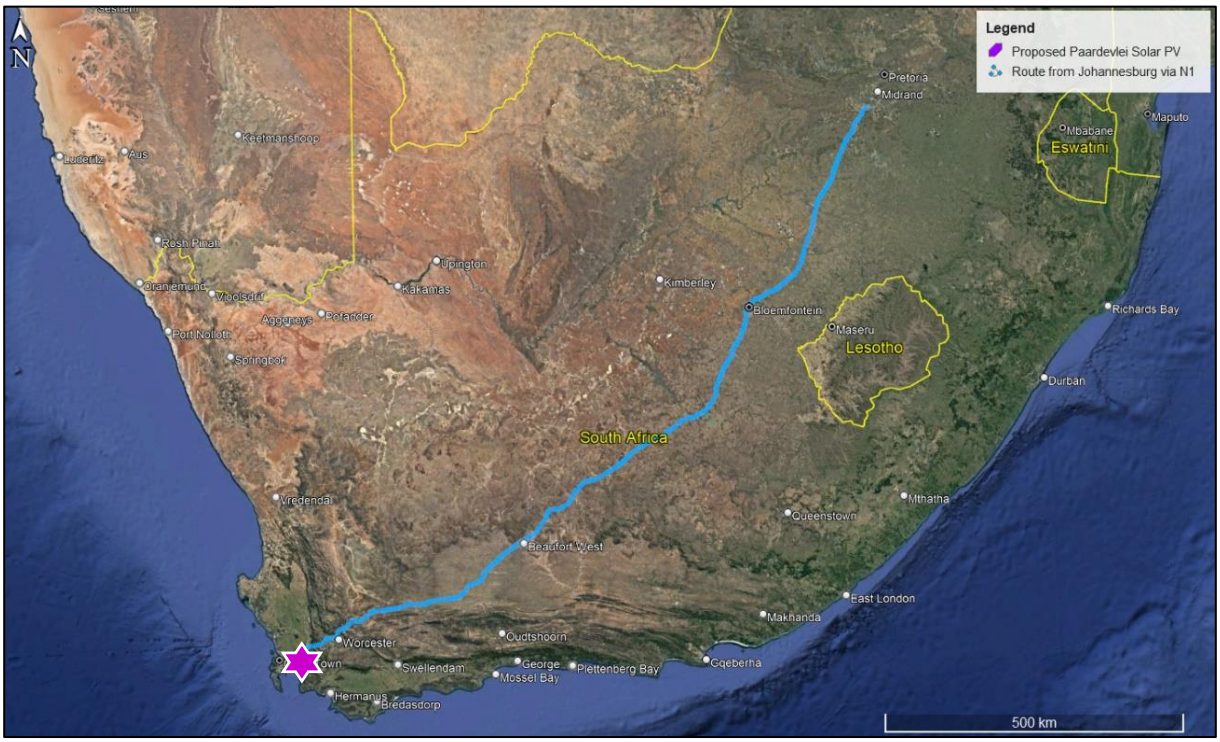

Figure 3-4: Route from Johannesburg to Proposed Site

3.6 Route from Pinetown / Durban to Proposed Site

If the PV panels are manufactured in South Africa, they could possibly be manufactured in the Pinetown area, close to Durban and transported to site via road. These elements are normal loads and no road limitations are expected along the routes, which is shown in **Figure 3-5**. Haulage vehicles will mainly travel on national and provincial roads and the total distance to the proposed site is approximately 1 632km.

Figure 3-5: Route from Durban to Proposed Site

3.7 Route from Johannesburg Area to Site – Abnormal Load

It is assumed that the transformer will be manufactured locally in South Africa and be transported from the Johannesburg area to site. As the transformer will be transported with an abnormal load vehicle, the route planning needs a more detailed investigation of the feasible routes considering any limitations due to existing road features. Furthermore, a load of abnormal dimensions may cause an obstruction and danger to other traffic and therefore the transformer needs to be transported as far as possible on roads that are wide enough for general traffic to pass. It is expected that the transformer can be transported to site via the same route used for normal loads.

There are several bridges and culverts along this route, which need to be confirmed for load bearing and height clearances. The transport vehicle will also need to navigate through various turns along the road, as well as small Towns. According to the desktop study, all turning movements along the route are manageable for the abnormal vehicle.

There are, however, many alternative routes which can be investigated if the route or sections of the route should not be feasible.

3.8 Proposed Access to the Proposed Development

The proposed main access to the site is a gravel road located off Ou Paardevlei Road, as shown in **Figure 3-6**. The proposed access road will link to the internal road network of the facility.

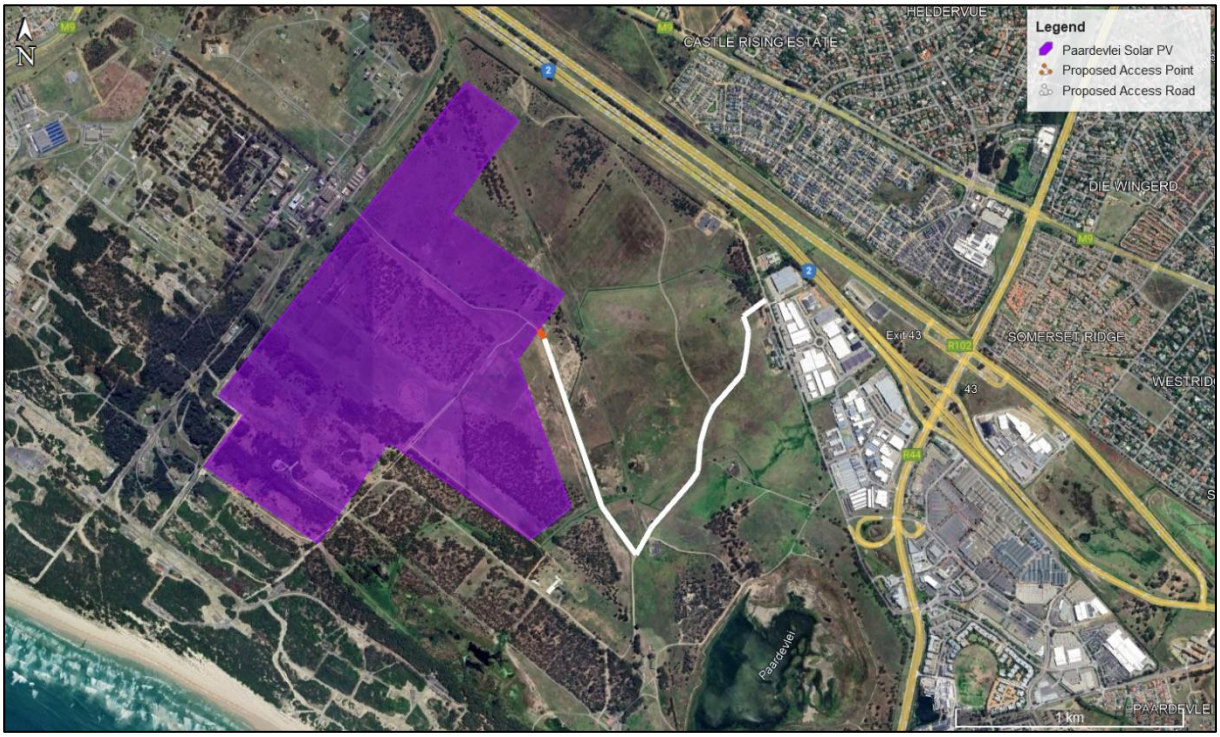

Figure 3-6: Proposed Access Road

Figure 3-7: Existing Military Base Road at the Proposed Access Point

The **proposed access road and access point to the development are deemed suitable** from a traffic and transport engineering perspective.

3.8.1 General Road Requirements

A minimum required road width of 4 m needs to be maintained and all turning radii must conform with the specifications needed for the abnormal load vehicles and haulage vehicles. It needs to be ensured that the gravel sections of the haulage routes remain in good condition and will hence need to be maintained during the additional loading of the construction phase and then reinstated after construction is completed. The gravel roads will require grading with a grader to obtain a flat even surface and the geometric design of these gravel roads needs to be confirmed at detailed design stage.

3.9 Main Route for the Transportation of Materials, Plant and People to the proposed site

The nearest towns in relation to the proposed development site are Cape Town and the nearest suburb is Somerset West. It is envisaged that most materials, water, plant, services and people will be procured within a 50km radius of the proposed facility.

Concrete batch plants and quarries in the vicinity could be contracted to supply materials and concrete during the construction phase, which would reduce the impact on traffic on the surrounding road network. Alternatively, mobile concrete batch plants and temporary construction material stockpile yards could be commissioned on vacant land near the proposed site. Delivery of materials to the mobile batch plant and the stockpile yard could be staggered to minimise traffic disruptions.

4 APPLICABLE LEGISLATION AND PERMIT REQUIREMENTS

Key legal requirements pertaining to the transport requirements for the proposed development are:

- Abnormal load permits, (Section 81 of the National Road Traffic Act)
- Port permit (Guidelines for Agreements, Licenses and Permits in terms of the National Ports Act No. 12 of 2005), and
- Authorisation from Road Authorities to modify the road reserve to accommodate turning movements of abnormal loads at intersections.

5 IDENTIFICATION OF KEY ISSUES

5.1 Identification of Potential Impacts

The potential transport related impacts are described:

5.1.1 Construction Phase

Potential impact

- Construction related traffic
- The construction traffic would also lead to noise and dust pollution.
- This phase also includes the construction of roads, excavations, trenching for electrical cables and other ancillary construction works that will temporarily generate the most traffic.

5.1.2 Operational Phase

Potential impact

- During operation, it is expected that staff and security will visit the facility.
- Maintenance vehicles are expected on site at times.
- Should municipal water not be available, water will have to be transported to the site.

5.1.3 Cumulative Impacts

Potential impact

- Traffic congestion/delays on the surrounding road network.
- Noise and dust pollution

6 ASSESSMENT OF IMPACTS AND IDENTIFICATION OF MANAGEMENT ACTIONS

6.1 Trip Generation – Construction Phase

From experience on other projects of similar nature, the number of heavy vehicles per 7MW installation is estimated to range between 200 and 300 trips depending on the site conditions and requirements. For the 60MW, the total trips can therefore be estimated to be between 1 714 and 2 571 heavy vehicle trips, which will generally be made over a 12-month construction period. Choosing the worst-case scenario of 2 571 heavy vehicles over a 12-month period travelling on an average of 22 working days per month, the resulting daily number of vehicle trips is 10. Considering that the number of vehicle trips during peak hour traffic in a rural environment can roughly be estimated at around 20-40% of the average daily traffic, the resulting peak hour vehicle trips for the construction phase are approximately 2 - 4 trips.

If the panels are imported instead of manufactured within South Africa, the respective shipping company will be able to indicate how the panels can be packed (for example using 2MW packages and 40ft containers). These can then be stored at the port and repacked onto flatbed trucks.

It is assumed that during the peak of the construction period, 150 employees will be active on site. Staff trips are assumed to be:

Table 6-1: Estimation of daily staff trips

Vehicle Type	Number of vehicles	Number of Employees
Car	7	7 (assuming single occupant)
Bakkie	12	18 (assuming 1.5 occupants)
Taxi – 15 seats	3	45
Bus – 80 seats	1	80
Total	**23**	**150**

It is difficult to accurately estimate the construction traffic for the transportation of materials as it depends on the type of vehicles, tempo of the construction, source/location of construction material etc. However, it is assumed that at the peak of construction, approximately 150 construction vehicle trips will access the site per day.

The total estimated daily site trips, at the peak of construction, are shown in the table.

Table 6-2: Estimation of daily site trips

Activity	Number of trips
Component delivery	10
Construction trips	150
Total	**160**

The impact on the surrounding road network and the general traffic is therefore deemed nominal, with mitigation, as the 160 trips will be distributed across a 9-hour working day. Most of the trips will occur outside the peak hours.

The significance of the transport impact without mitigation measures during the construction phase can be rated as medium. However, considering that this is temporary and short term in nature, the impact can be mitigated to an acceptable level.

6.2 Trip Generation – Operational Phase

During operation, it is assumed that approximately eight (8) full-time employees will be stationed on site and hence vehicle trips generated are low and will have a negligible impact on the external road network.

The solar modules would need to be cleaned twice a year. The Developer is currently investigating the availability of service and as such a worst-case scenario of transporting water to site has been assessed. The following assumptions have been made to estimate the resulting trips generated from transporting water to the site:

- 5 000 litre water bowsers to be used for transporting the water
- Approximately 5 litres of water needed per panel
- Assuming that a maximum of 350 000 solar modules are used, this would amount to approximately 350 vehicle trips
- Solar modules will be cleaned twice a year.

It is expected that these trips will not have a significant impact on external traffic. However, to limit the impact, it is recommended to schedule these trips outside of peak traffic periods and to clean the solar modules over the course of a few days i.e., spread the trips over a few days. Additionally, the provision of rainwater tanks on site would decrease the number of trips.

6.3 Proposed general mitigation measures to reduce traffic impact

The following are general mitigation measures to reduce the impact that the additional traffic will have on the road network and the environment.

- The delivery of components to the site can be staggered and trips can be scheduled to occur outside of peak traffic periods.
- Dust suppression of gravel roads located within the site boundary, including the main access road to the site and the site access road, during the construction phase, if required.
- Regular maintenance of gravel roads located within the site boundary, including the access road to the site, by the Contractor during the construction phase and by the Owner/Facility Manager during the operation phase, if required.
- The use of mobile batch plants and quarries near the site would decrease the traffic impact on the surrounding road network, if available and feasible.
- Staff and general trips should occur outside of peak traffic periods as far as possible.
- The Contractor is to ensure that all drivers entering the site adhere to the traffic laws.
- Vehicular movements within the site boundary are the responsibility of the respective Contractor and the Contractor must ensure that all construction road traffic signs and road markings (where applicable) are in place. It should be noted that traffic violations on public roads is the responsibility of Law Enforcement and the public should report all transgressions to Law Enforcement and the Contractor.
- If required, low hanging overhead lines (lower than 5.1m) e.g., Eskom and Telkom lines, along the proposed routes will have to be moved (to be arranged by haulage company)

to accommodate the abnormal load vehicles. The Contractor and the Developer is to ensure that the haulage company is aware of this requirement.
The haulage company is to provide evidence to the Contractor and the Developer that any affected overhead lines have been moved or raised.

- The preferred route should be surveyed to identify problem areas (e.g., intersections with limited turning radii and sections of the road with sharp horizontal curves or steep gradients, that may require modification). After the road modifications have been implemented, it is recommended to undertake a "dry-run" with the largest abnormal load vehicle, prior to the transportation of any components, to ensure that delivery will occur without disruptions. This process is to be undertaken by the haulage company transporting the components and the contractor, who will modify the road and intersections to accommodate abnormal vehicles. The "dry-run" should be undertaken within the same month components are expected to arrive. The haulage company is to provide evidence that the route has been surveyed and deemed acceptable for the transportation of the abnormal load.
- The Contractor needs to ensure that the gravel sections of the haulage routes (i.e., the site access road and the main access road to the site) remain in good condition and will need to be maintained during the additional loading of the construction phase and reinstated after construction is completed.
- Design and maintenance of internal roads. The internal gravel roads will require grading with a grader to obtain a camber of between 3% and 4% (to facilitate drainage) and regular maintenance blading will also be required. The geometric design of these gravel roads needs to be confirmed at detailed design stage. This process is to be undertaken by a civil engineering consultant or a geometric design professional.

6.4 Significance of impact with mitigation measures

It should be noted that the construction phase is temporary and short term in nature and the associated impacts can be mitigated to an acceptable level.

The proposed mitigation measures for the construction traffic will result in a reduction of the impact on the surrounding road network and the impact on the local traffic will be very low as the existing traffic volumes are deemed to be low. The dust suppression will result in significantly reducing the impact.

7 CONSIDERATION OF ALTERNATIVES

The following alternatives were considered in relation to the proposed activity:

7.1 No-Go Alternative

The no-go alternative implies that the proposed Paardevlei PV Solar PV Facility does not proceed. This would mean that there will be no negative environmental impacts and no traffic impact on the surrounding network. However, this would also mean that there would be no socio-economic benefits to the surrounding communities, and it will not assist government in meeting the targets for renewable energy. Hence, the no-go alternative is not a preferred alternative.

7.2 Location Alternative

No other possible sites were identified.

7.3 Battery storage facility

The following battery storage technology are being considered:

- Lead-acid
- Lithium-ion
- Hydrogen and flow batteries (fuel cells)
- Molten-salt

7.4 Layout alternatives

The following PV layout alternatives are being proposed based on the studied PV configurations:

- 12m pitch;
- 1 panel in portrait (East and west) and 90 panels long(N-S) –5m pitch; and
- 1 panel portrait –90 panels long on 1 tracker axis (N_S) –5.25m.

7.5 Specialist Comment on Alternatives

From a transport engineering perspective, any alternatives, as described, will only impact on the road network should there be changes made to the access road and access point, and should the development increase in size i.e., there will be an increase in the number of trips generated by the facility. The alternatives listed will not impact the traffic on the surrounding road network and are deemed acceptable.

8 TRANSPORTATION IMPACT

8.1 Extent of Study Area

Based on experience with similar traffic studies, the anticipated traffic impact on the surrounding road network and its location within the wider road network, the following intersections were included in the scope of this study:

1. N2 / Broadway Boulevard (R44) Both the north and south interchanges
2. Ou Paardevlei Road / Broadway Boulevard (R44) / Gutsche Road
3. Centenary Drive / Barker Road
4. Ou Paardevlei Road / Centenary Drive
5. Ou Paardevlei Road / Olive Way
6. Ou Paardevlei Road / De Beers Access Road

8.2 Peak Hours Analysed

The critical peak hour or critical traffic scenario from a road capacity point of view occurs when the traffic generated by the development is at a maximum, or when the highest combination of existing external traffic and traffic generated by the development occurs. For the given development, the critical peak hours occur generally during the morning peak (AM), and the afternoon peak (PM).

8.3 Assessment Scenarios

To determine the impact of the development traffic on the surrounding road network, the following scenarios were used for the analyses.

- Scenario 1 – Background Traffic (2023) demand **without the proposed development**. The purpose of this scenario is to obtain the present levels of service (LOS) on the adjacent road network.
- Scenario 2 - Future Traffic (2028) **without the proposed development**. The purpose of this scenario is to establish the future levels of service and operating conditions on the surrounding road network in a 5-year horizon.
- Scenario 3 - Future Traffic (2028) **with the proposed development.** The purpose of this scenario is to establish the future impact of the proposed development on the existing road network.

9 SURROUNDING ROAD NETWORK

The road classifications has been derived from the *COTO's South African Road Classification and Access Management Manual (TRH26, 2012)* and the Public Right of Way Map shown in the City of Cape Town's *Standards and Guidelines for Roads & Stormwater (2022).*

9.1 The Proposed Development Access Road / De Beers AFC Access Road

The proposed development access road is currently an unclassified internal road. The road is 5.0m and unsurfaced. It currently provides access to the De Beers AFC Football club and will become the main access road for the proposed development.

Figure 9-1: Proposed Development Access Road / De Beers AFC Access Road

9.2 Ou Paardevlei Road

Ou Paardevlei Road is a Class 5 Local Street. The road is a 6.4m single carriageway with one lane per direction and is located to the east of the proposed development. There are no surfaced shoulders on either side of the road. This road links Broadway Boulevard (R44) to the Somerset West Industrial Area.

Figure 9-2: Ou Paardevlei Road

9.3 Olive Grove Access Road / Olive Way

The Olive Grove access road, also referred to as Olive Way is an unclassified internal road. The road is an 8.0m single carriageway with one lane per direction and is located to the east of the proposed development. There are no surfaced shoulders on either side of the road. This road provides internal circulation within the Olive Grove Industrial Estate.

Figure 9-3: Olive Grove Access Road / Olive Way

9.4 Centenary Drive

Centenary Drive is a Class 3 Minor Arterial. The road is a 6.4m single carriageway with one lane per direction and is located to the east of the proposed development. There are no surfaced shoulders on either side of the road. This road links Broadway Boulevard (R44) to the Somerset West Industrial Area via Ou Paardevlei Road.

Figure 9-4: Centenary Drive

9.5 Barker Road

Barker Road is a Class 5 Local Street. The road is a 12.8m single carriageway with two lanes per direction and is located to the east of the proposed development. There are surfaced shoulders present on both sides of the road. This road links Broadway Boulevard (R44) to Somerset Mall.

Figure 9-5: Barker Road

9.6 Broadway Boulevard (R44)

Broadway Boulevard is a Class 2 Major Arterial. The road is a 20m dual carriageway with two lanes per direction, a 4.5m median is present and the road is located to the east of the proposed development. There are surfaced shoulders present on both sides of the road. This road links to Somerset West to the south, with Stellenbosch to the north.

Figure 9-6: Broadway Boulevard (R44)

9.7 N2

The N2 is a Class 1 Principle Arterial. The road is a 40m dual carriageway with two lanes per direction, a 16.0m median is present and the road is located to the east of the proposed development. There are surfaced shoulders present on both sides of the road. This road links to Somerset West to the south, and Stellenbosch to the north.

Figure 9-7: N2

9.8 Proposed Road Network Upgrades

According to the City of Cape Town's (CoCT) *Standards and Guidelines for Roads & Stormwater (2022),* Public Right of Way (PRoW) Map, there are proposed upgrades and new roads that may impact the proposed development.

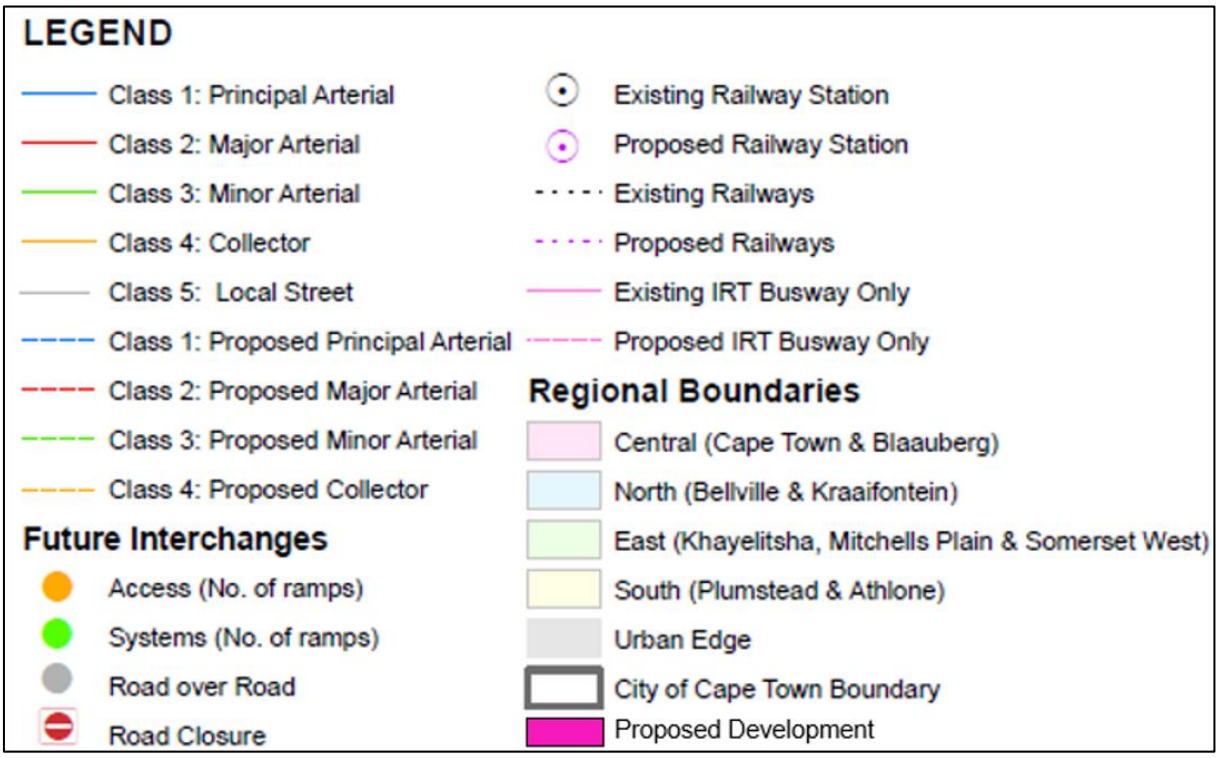

Figure 9-8: CoCT PRoW Legend

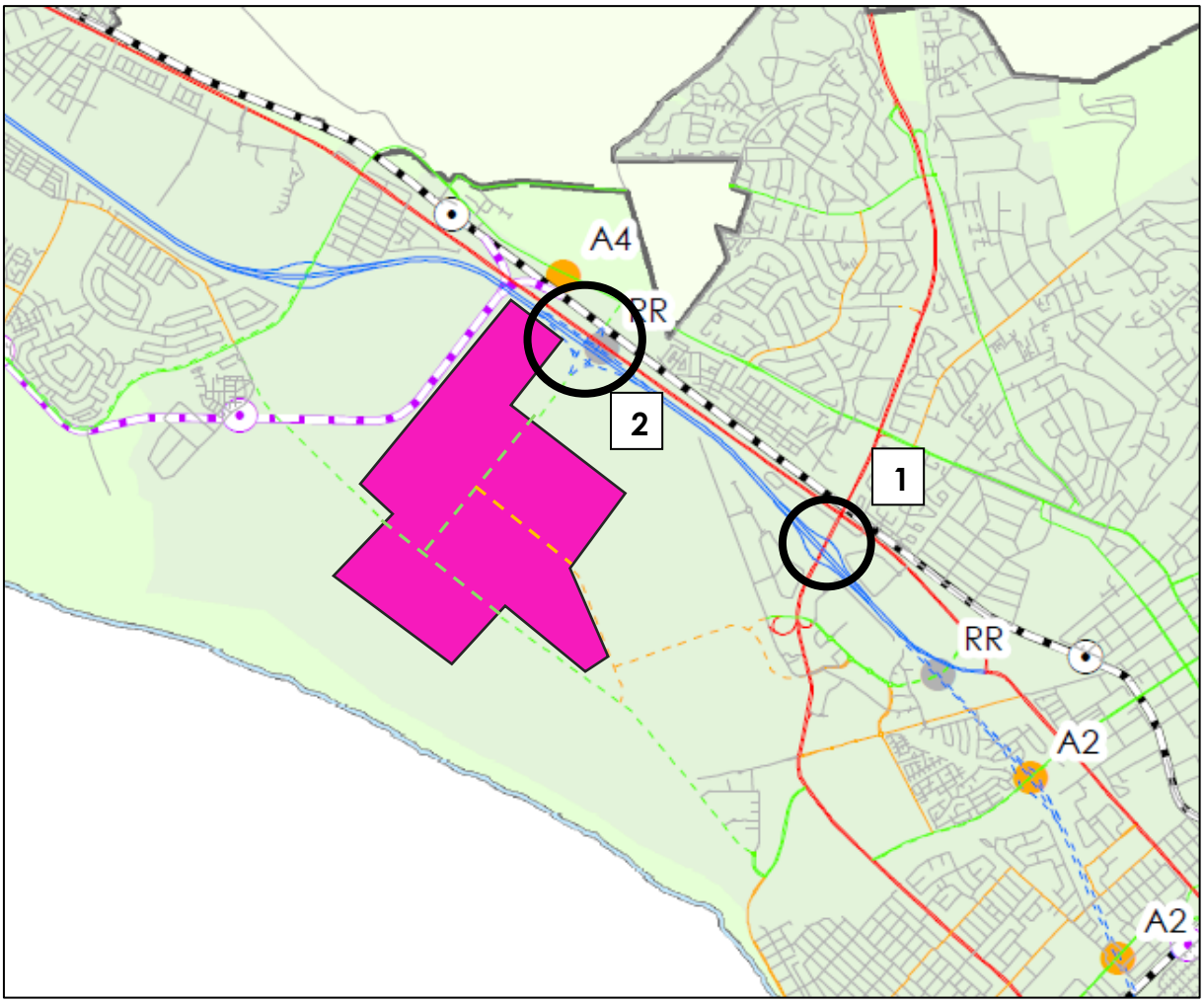

Figure 9-9: CoCT PRoW

1. The intersection of the N2 and Broadway Boulevard (R44) is an existing intersection that is earmarked for upgrade. This upgrade would be facilitated by the South African National Roads Agency SOC Limited's (SANRAL) as the N2 falls under their jurisdiction. The upgrade is part of an existing contract (upgrade of Broadway Boulevard) that includes intersection and traffic signal upgrades at the N2 on-and off-ramps.
2. The intersection of Ou Paardevlei Road and Broadway Boulevard. The upgrade is part of an existing contract (upgrade of Broadway Boulevard) that includes intersection and traffic signal upgrades at the Ou Paardevlei Road/Broadway Boulevard intersection.
3. An interchange along the N2 is proposed. This proposed interchange would be facilitated by SANRAL as the N2 falls under their jurisdiction. There is no proposed timeline for this interchange.
   The following should be noted:
   - The proposed interchange, when constructed, will provide a direct access route to the facility, thus becoming the main access route to the facility.
   - In the event that the proposed Paardevlei interchange is not implemented, the proposed access route to the facility will be via Ou Paardevlei Road, as assessed in this report. This is considered a viable access route to the facility as the N2 on-and-off ramp intersections, and the intersection of Ou Paardevlei Road/Broadway Boulevard will be upgraded as part of the current Broadway Boulevard project. The abovementioned upgrades and construction of the

proposed Paardevlei interchange will only improve the capacity operations of these intersections, which are currently operating adequately in terms of level of service.

9.8.1 Proposed Road Network Upgrades – CoCT Input

Upon consultation with the CoCT regarding the proposed road upgrades and interchange, all proposed upgrades were deemed "high level" with no specific project correlation and/or timeline. The proposed roads are not fixed or "cast in stone" as alignments and the class of roads could change based on surrounding developments or land use changes.

9.8.2 Proposed Road Network Upgrades – SANRAL Input

SANRAL was contacted on numerous occasions but have yet to respond. Responses received will be included in the EIA phase.

10 SITE ACCESS

One site access point is proposed and will be located off Ou Paardevlei Road at the intersection of Sunco and De Beers AFC Football club access road. The access point will connect off an existing intersection and no new intersections are being introduced by the site.

To maintain clear sight lines, it is proposed that sight triangles be kept clear of obstructions, including street furniture and landscaping elements. However, objects less than 0.6m in height, such as street signs, may be placed in the triangle.

The detail design of the access road will need to provide suitable lane widths to accommodate light as well as heavy vehicle traffic. The detailed investigation into the access layout will form part of the design stage.

11 PARKING

It is proposed to accommodate one site access point. The proposed development access road is currently an unclassified internal road. The road is 5.0m and unsurfaced. It currently provides access to the De Beers AFC Football club and will become the main access road for the proposed development. Access spacing assessments are therefore not required.

To determine the minimum number of parking bays required for the facility, a conservative Gross Leasable Area (GLA) of approximately 100m^2 was assumed. This is based on the expected number of workers (8 workers) to be stationed at the facility.

A parking ratio of 4 bays per 100m^2 GLA (Offices) was applied as per the City of Cape Town Municipal Planning By-Law.

Table 11-1: Proposed Parking Requirement

Land Use Description	Proposed Parking Ratio	Resulting Bays
Offices (100m^2 GLA)	4 bays/100m^2 GLA	4
Total		**4**

12 TRAFFIC FLOWS

12.1 Existing Traffic Volumes

Traffic counts were conducted at the specific intersections (see **Figure 12-1**) during:

1. Morning peak period on Thursday, 16th November 2023, and
2. Afternoon peak period on Thursday, 16th November 2023.

The overall peak hours were observed from 07h15 to 08h15 for the AM period, and 16h15 to 17h15 for the PM period.

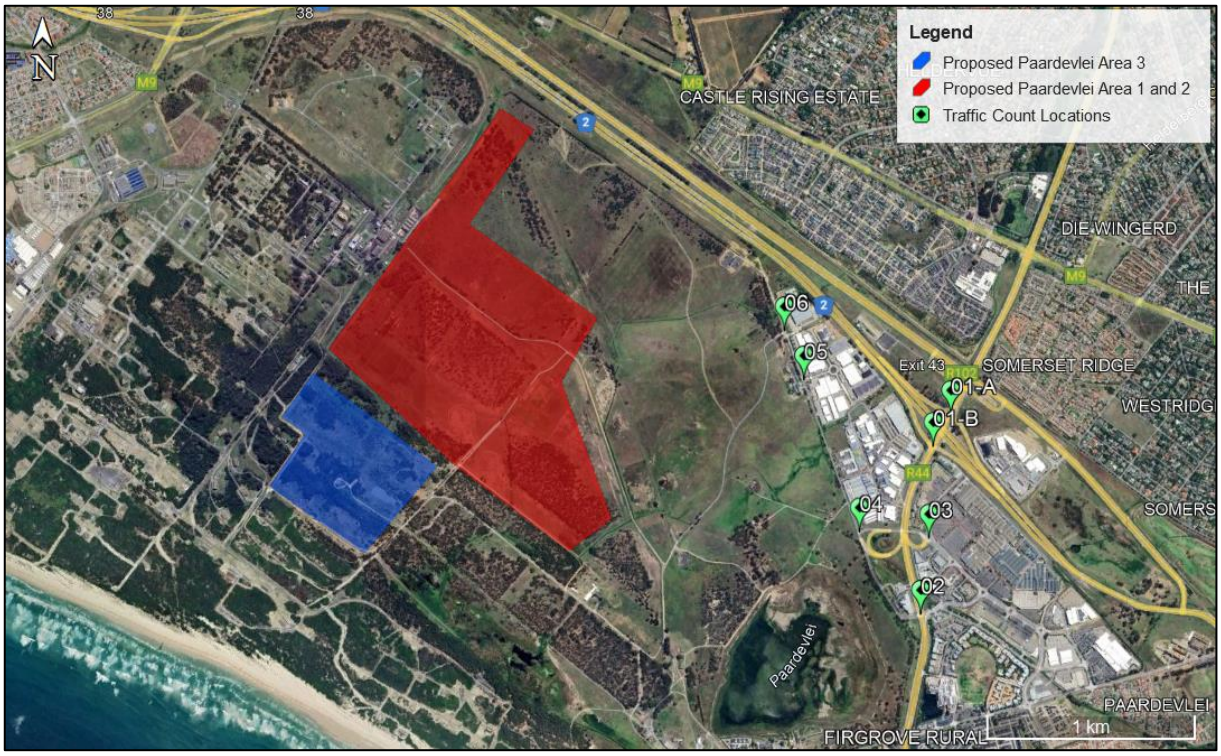

Figure 12-1: Traffic Count Locations

12.2 Future Background Traffic Volumes

It is a requirement that the traffic impact of the development be assessed with the background traffic that will exist in a 5-year design horizon, i.e., 2028. The expected 2028 traffic volumes were derived by applying a 2% per annum growth rate. The 2% growth rate is estimated to be an above-average annual traffic growth rate for an urban environment and the current economic environment.

13 TRIP GENERATION

13.1 Trip Generation – Construction Phase

The trips generated are outlined in **Chapter 6** and correspond to the following tables which highlight the number of additional trips to the Proposed Paardevlei Facility.

Table 13-1: Estimation of daily staff trips

Vehicle Type	Number of vehicles	Number of Employees
Car	7	7 (assuming single occupant)
Bakkie	12	18 (assuming 1.5 occupants)
Taxi – 15 seats	3	45
Bus – 80 seats	1	80
Total	**23**	**150**

Table 13-2: Estimation of daily site trips

Activity	Number of trips
Component delivery	10
Construction trips	150
Total	**160**

13.2 Latent Development Traffic

No information could be obtained regarding any approved latent developments in the area. To account for the potential increase in traffic due to latent development, a 2% traffic growth rate was assumed. This rate is deemed above-average for an urban environment and the current economic environment.

13.3 Trip Distribution and Assignment

The development traffic for the proposed development was distributed on the surrounding road network taking the following into account:

- Proposed links with surrounding road network,
- Present traffic patterns, and
- Available public transport services in the vicinity of the site.

14 INTERSECTION CAPACITY ANALYSIS

The capacity analysis included the following intersections:

- N2 / Broadway Boulevard (R44) Both the north and south interchanges
- Ou Paardevlei Road / Broadway Boulevard (R44) / Gutsche Road
- Centenary Drive / Barker Road
- Ou Paardevlei Road / Centenary Drive
- Ou Paardevlei Road / Olive Way
- Ou Paardevlei Road / De Beers Access Road

The capacity analysis of the intersections was conducted using the AutoJ Analysis software. The purpose of the analysis is to determine the current and future expected traffic impacts on the surrounding road network.

14.1 Results of Capacity Analysis

To assess the impact of the proposed development on the road network, the results of the capacity analyses **with** and **without** the proposed development are compared. It is therefore imperative to summarises the level of service (LOS – see definitions in **Table 14-1**), volume/capacity ratio (v/c) and average delay (in seconds) for each approach as well as for the overall intersections.

Table 14-1: Level of Service Definition

Level of Service (LOS)	Delay (d) in seconds		DEGREE OF PERFORMANCE
	Signals and Traffic Circles	Stop and Yield Controlled	
A	$d \leq 10$	$d \leq 10$	Excellent intersection performance
B	$10 < d \leq 20$	$10 < d \leq 15$	Good intersection performance
C	$20 < d \leq 35$	$15 < d \leq 25$	Fair intersection performance (improvements may be needed in future)
D	$35 < d \leq 55$	$25 < d \leq 35$	Poor Intersection performance
E	$55 < d \leq 80$	$35 < d \leq 50$	
F	$d > 80$	$d > 50$	

The average delay is calculated from the time a vehicle comes to a stop to driving over stop line at a respective approach. In a research project, it was found that drivers accept a maximum delay or waiting time of around 55 seconds at a signalised intersection, but only 35 seconds at a stop-controlled intersection. Thereafter the driver will become impatient, and the intersection is deemed to not operate well anymore. Another factor that plays a role when calculating the level of service at an intersection is the queuing distance, which is the number of vehicles waiting at an intersection.

14.1.1 Intersection Capacity Analysis Results

Table 14-2: "Without Development" Capacity Analysis

Intersection		Background Traffic 2023 "Without Development"						Future Traffic 2028 "Without Development"					
		AM Peak			PM Peak			AM Peak			PM Peak		
		v/c	Delay (sec)	LOS	v/c	Delay (sec)	LOS	v/c	Delay (sec)	LOS	v/c	Delay (sec)	LOS
Ou Paardevlei Road / De Beers AFC Access Road	Ou Paardevlei Road (North approach)	0.01	0.0	LOS A	0.05	0.0	LOS A	0.01	0.0	LOS A	0.05	0.0	LOS A
	Ou Paardevlei Road (South approach)	0.01	0.0	LOS A	0.03	0.0	LOS A	0.05	0.0	LOS A	0.03	0.0	LOS A
	De Beers AFC Access Road (West approach)	0.00	0.0	LOS A	0.00	0.0	LOS A	0.00	0.0	LOS A	0.00	0.0	LOS A
	Sunco Access Road (East approach)	0.00	8.0	LOS A	0.03	8.0	LOS A	0.00	8.0	LOS A	0.03	8.0	LOS A
	Overall	0.04	0.0	LOS A	0.04	2.0	LOS A	0.04	0.0	LOS A	0.04	2.0	LOS A
Ou Paardevlei Road / Olive Grove Access Road (Olive Way)	Ou Paardevlei Road (North approach)	0.01	0.0	LOS A	0.06	0.0	LOS A	0.01	0.0	LOS A	0.07	0.0	LOS A
	Ou Paardevlei Road (South approach)	0.18	1.0	LOS A	0.07	0.0	LOS A	0.19	1.0	LOS A	0.08	0.0	LOS A
	Heartlands Baby Sanctuary Access Road (West approach)	0.00	0.0	LOS A	0.01	0.0	LOS A	0.00	0.0	LOS A	0.01	0.0	LOS A
	Olive Grove Access Road [Olive Way] (East approach)	0.06	9.0	LOS A	0.44	11.0	LOS A	0.06	9.0	LOS A	0.44	11.0	LOS A
	Overall	0.15	2.0	LOS A	0.30	7.0	LOS A	0.16	2.0	LOS A	0.30	7.0	LOS A
Ou Paardevlei Road / Centenary Drive	Ou Paardevlei Road (North approach)	0.59	17.0	LOS C	2.34	1032.0	LOS F	0.66	21.0	LOS C	2.61	1101.0	LOS F
	Ou Paardevlei Road (South approach)	1.38	585.0	LOS F	0.53	13.0	LOS B	1.51	705.0	LOS F	0.59	15.0	LOS B
	Centenary Drive (East approach)	1.29	489.0	LOS F	0.85	28.0	LOS E	1.29	489.0	LOS F	0.85	28.0	LOS E
	Overall	1.15	407.0	LOS F	1.86	733.0	LOS F	1.22	455.0	LOS F	2.08	791.0	LOS F
Barker Road / Centenary Drive	Barker Road (North approach)	0.06	9.0	LOS A	0.32	9.0	LOS A	0.06	9.0	LOS A	0.35	9.0	LOS A
	Barker Road (South approach)	0.20	8.0	LOS A	0.26	8.0	LOS A	0.21	9.0	LOS A	0.27	9.0	LOS A
	Centenary Drive (West approach)	0.08	12.0	LOS A	0.32	20.0	LOS B	0.08	11.0	LOS A	0.32	19.0	LOS B
	Centenary Drive (East approach)	0.08	12.0	LOS A	0.32	20.0	LOS B	0.08	11.0	LOS A	0.34	20.0	LOS B
	Overall	0.16	9.0	LOS A	0.30	13.0	LOS B	0.17	9.0	LOS A	0.31	13.0	LOS B
Ou Paardevlei Road / Broadway Boulevard (R44) / Gutsche Road	Broadway Boulevard [R44] (North approach)	0.50	8.0	LOS A	0.80	16.0	LOS B	0.54	8.0	LOS A	0.87	22.0	LOS C
	Broadway Boulevard [R44] (South approach)	0.69	37.0	LOS D	0.55	106.0	LOS F	0.75	38.0	LOS D	0.57	99.0	LOS F
	Ou Paardevlei Road (West approach)	0.18	24.0	LOS C	0.91	231.0	LOS F	0.19	24.0	LOS C	0.92	266.0	LOS F
	Gutsche Road (East approach)	0.31	22.0	LOS C	0.51	44.0	LOS D	0.32	23.0	LOS C	0.54	51.0	LOS D
	Overall	0.57	23.0	LOS C	0.71	55.0	LOS E	0.62	24.0	LOS C	0.76	59.0	LOS E
Broadway Boulevard (R44) / N2 [Westbound]	Broadway Boulevard [R44] (North approach)	0.73	18.0	LOS B	0.87	24.0	LOS C	0.78	20.0	LOS B	0.93	37.0	LOS D
	Broadway Boulevard [R44] (South approach)	0.74	26.0	LOS C	0.52	13.0	LOS B	0.77	30.0	LOS C	0.54	13.0	LOS B
	N2 (East approach)	0.70	30.0	LOS C	0.68	34.0	LOS C	0.72	32.0	LOS C	0.72	40.0	LOS D
	Overall	0.73	23.0	LOS C	0.72	20.0	LOS B	0.77	25.0	LOS C	0.77	28.0	LOS C
Broadway Boulevard (R44) / N2 [Eastbound]	Broadway Boulevard [R44] (North approach)	0.64	14.0	LOS B	0.78	19.0	LOS B	0.67	15.0	LOS B	0.83	21.0	LOS C
	Broadway Boulevard [R44] (South approach)	0.59	13.0	LOS B	0.54	12.0	LOS B	0.63	14.0	LOS B	0.57	12.0	LOS B
	N2 (West approach)	0.67	25.0	LOS C	0.76	30.0	LOS C	0.7	27.0	LOS C	0.80	34.0	LOS C
	Overall	0.63	17.0	LOS B	0.70	19.0	LOS B	0.66	17.0	LOS B	0.74	21.0	LOS C

Table 14-3: "With Development" Capacity Analysis

Intersection		Total Traffic 2028 "With Development"					
		AM Peak			PM Peak		
		v/c	Delay (sec)	LOS	v/c	Delay (sec)	LOS
Ou Paardevlei Road / De Beers AFC Access Road	Ou Paardevlei Road (North approach)	0.01	0.0	LOS A	0.05	0.0	LOS A
	Ou Paardevlei Road (South approach)	0.08	0.0	LOS A	0.04	0.0	LOS A
	De Beers AFC Access Road (West approach)	0.02	9.0	LOS A	0.06	9.0	LOS A
	Sunco Access Road (East approach)	0.00	8.0	LOS A	0.03	8.0	LOS A
	Overall	0.06	1.0	LOS A	0.05	3.0	LOS A
Ou Paardevlei Road / Olive Grove Access Road (Olive Way)	Ou Paardevlei Road (North approach)	0.02	0.0	LOS A	0.09	0.0	LOS A
	Ou Paardevlei Road (South approach)	0.22	1.0	LOS A	0.09	0.0	LOS A
	Heartlands Baby Sanctuary Access Road (West approach)	0.00	0.0	LOS A	0.01	0.0	LOS A
	Olive Grove Access Road [Olive Way] (East approach)	0.06	9.0	LOS A	0.47	11.0	LOS A
	Overall	0.18	2.0	LOS A	0.30	6.0	LOS A
Ou Paardevlei Road / Centenary Drive	Ou Paardevlei Road (North approach)	0.72	26.0	LOS D	2.76	1134.0	LOS F
	Ou Paardevlei Road (South approach)	1.64	795.0	LOS F	0.63	16.0	LOS C
	Centenary Drive (East approach)	1.32	524.0	LOS F	0.86	29.0	LOS D
	Overall	1.3	507.0	LOS F	1.86	817.0	LOS F
Barker Road / Centenary Drive	Barker Road (North approach)	0.07	10.0	LOS A	0.35	9.0	LOS A
	Barker Road (South approach)	0.21	9.0	LOS A	0.27	9.0	LOS A
	Centenary Drive (West approach)	0.09	10.0	LOS A	0.32	19.0	LOS B
	Centenary Drive (East approach)	0.08	10.0	LOS A	0.34	20.0	LOS B
	Overall	0.17	9.0	LOS A	0.31	13.0	LOS B
Ou Paardevlei Road / Broadway Boulevard (R44) / Gutsche Road	Broadway Boulevard [R44] (North approach)	0.55	9.0	LOS A	0.87	22.0	LOS C
	Broadway Boulevard [R44] (South approach)	0.75	38.0	LOS D	0.57	98.0	LOS F
	Ou Paardevlei Road (West approach)	0.19	25.0	LOS C	0.93	293.0	LOS F
	Gutsche Road (East approach)	0.33	23.0	LOS C	0.56	55.0	LOS D
	Overall	0.62	24.0	LOS C	0.77	62.0	LOS E
Broadway Boulevard (R44) / N2 [Westbound]	Broadway Boulevard [R44] (North approach)	0.79	21.0	LOS C	0.93	38.0	LOS D
	Broadway Boulevard [R44] (South approach)	0.77	31.0	LOS C	0.55	13.0	LOS B
	N2 (East approach)	0.73	33.0	LOS C	0.72	40.0	LOS D
	Overall	0.78	26.0	LOS C	0.77	29.0	LOS C
Broadway Boulevard (R44) / N2 [Eastbound]	Broadway Boulevard [R44] (North approach)	0.68	15.0	LOS B	0.83	21.0	LOS C
	Broadway Boulevard [R44] (South approach)	0.63	14.0	LOS B	0.58	12.0	LOS B
	N2 (West approach)	0.71	27.0	LOS C	0.80	34.0	LOS C
	Overall	0.67	17.0	LOS B	0.74	21.0	LOS C

Table 14-4: "Proposed Intersection Upgrades" Capacity Analysis

Intersection		Proposed Upgrades 2028 "With Development"					
		AM Peak			PM Peak		
		v/c	Delay (sec)	LOS	v/c	Delay (sec)	LOS
Ou Paardevlei Road / Centenary Drive	Ou Paardevlei Road (North approach)	0.23	11.0	LOS A	0.65	12.0	LOS A
	Ou Paardevlei Road (South approach)	0.59	16.0	LOS A	0.18	5.0	LOS A
	Centenary Drive (East approach)	0.52	19.0	LOS A	0.59	28.0	LOS B
	Overall	0.47	16.0	LOS A	0.58	14.0	LOS A
Ou Paardevlei Road / Broadway Boulevard (R44) / Gutsche Road	Broadway Boulevard [R44] (North approach)	0.64	15.0	LOS B	1.32	572.0	LOS F
	Broadway Boulevard [R44] (South approach)	0.67	11.0	LOS B	0.52	13.0	LOS B
	Ou Paardevlei Road (West approach)	0.22	30.0	LOS C	0.88	262.0	LOS F
	Gutsche Road (East approach)	0.38	27.0	LOS C	0.51	34.0	LOS C
	Overall	0.63	15.0	LOS B	1.01	355.0	LOS E

14.2 Discussion of Intersection Capacity Analysis Results

Ou Paardevlei Road / De Beers AFC Access Road

2023 Without Development Scenario:

The intersection operates adequately at LOS A during both the AM and PM peak hours.

2028 Without Development Scenario:

The intersection continues to operate adequately at LOS A during both the AM and PM peak hours.

2028 With Development Scenario:

The intersection will continue to operate adequately at LOS A during both the AM and PM peak hours.

Ou Paardevlei Road / Olive Grove Access Road (Olive Way)

2023 Without Development Scenario:

The intersection operates adequately at LOS A during both the AM and PM peak hours.

2028 Without Development Scenario:

The intersection continues to operate adequately at LOS A during both the AM and PM peak hours.

2028 With Development Scenario:

The intersection will continue to operate adequately at LOS A during both the AM and PM peak hours.

Ou Paardevlei Road / Centenary Drive

2023 Without Development Scenario:

The intersection operates poorly at LOS F during both the AM and PM peak hours. This can be attributed to the high volume of traffic on Ou Paardevlei Road.

2028 Without Development Scenario:

The intersection continues to operate poorly at LOS F during both the AM and PM peak hours.

2028 With Development Scenario:

The intersection will continue to operate poorly at LOS F during both the AM and PM peak hours.

2028 Proposed Upgrade with Development Scenario:

Signalization of the intersection is required to improve the capacity operations, as shown in **Figure 14-1**. The proposed intersection upgrade will lead to an improved LOS A during both the AM and PM peak hours. It should be noted that the intersection is to be upgraded as part of the existing Broadway Boulevard contract.

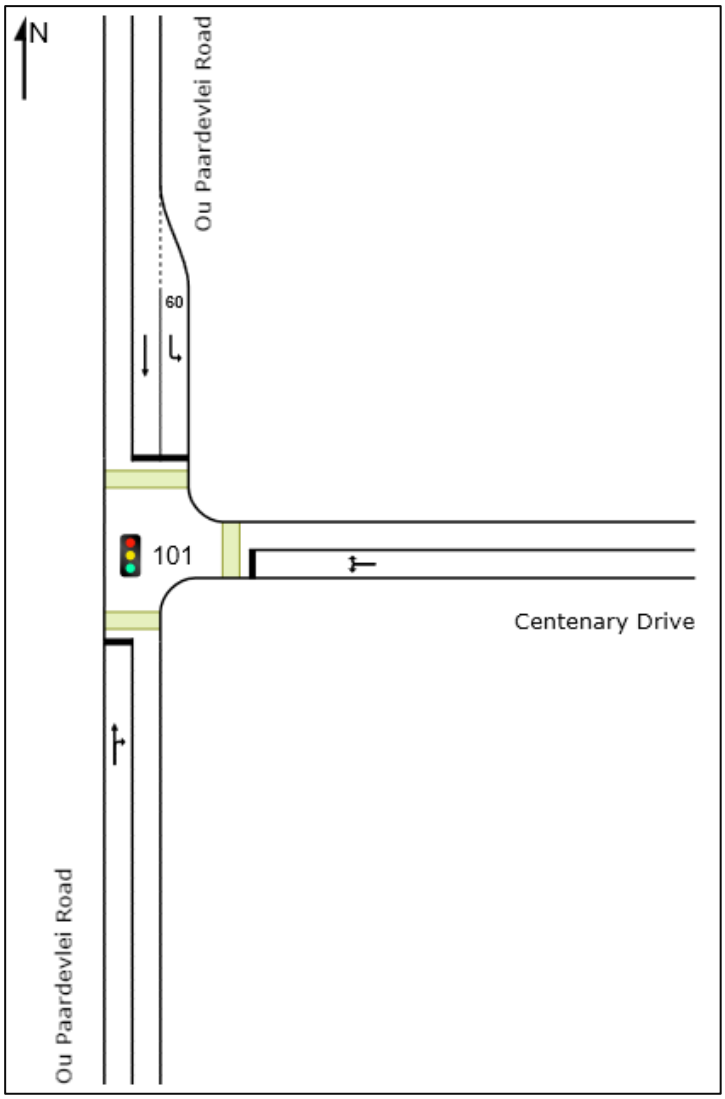

Figure 14-1: Proposed upgrade at the Ou Paardevlei Road / Centenary Drive Intersection

Ou Paardevlei Road / Broadway Boulevard (R44) / Gutsche Road

2023 Without Development Scenario:

The intersection operates adequately at LOS C during the AM and poorly at LOS E PM peak hours.

2028 Without Development Scenario:

The intersection continues to operate adequately at LOS C for the AM and poorly at LOS E PM peak hours.

2028 With Development Scenario:

The intersection will continue to operate adequately at LOS C for the AM and poorly at LOS E PM peak hours.

2028 Proposed Upgrade with Development Scenario:

Additional lanes and signal timing optimisation scenarios were modelled but did not impact significantly on the LOS. This is due to the high volume of through traffic on the Broadway Boulevard. It should be noted that wider road network upgrades are

required to improve capacity improvements. It should also be noted that the intersection is to be upgraded as part of the existing Broadway Boulevard contract.

Barker Road / Centenary Drive

2023 Without Development Scenario:

The intersection operates adequately at LOS A and B for the AM and PM peak hours respectively.

2028 Without Development Scenario:

The intersection continues to operate adequately at LOS A and LOS B for the AM and PM peak hours respectively.

2028 With Development Scenario:

The intersection will continue to operate adequately at LOS A and B for the AM and PM peak hours respectively.

Broadway Boulevard (R44) / N2 [Westbound]

2023 Without Development Scenario:

The intersection operates adequately at LOS C and B for the AM and PM peak hours respectively.

2028 Without Development Scenario:

The intersection operates adequately at LOS C for both the AM and PM peak hours.

2028 With Development Scenario:

The intersection will continue to operate adequately at LOS C for both the AM and PM peak hours.

Broadway Boulevard (R44) / N2 [Eastbound]

2023 Without Development Scenario:

The intersection operates adequately at LOS B for both the AM and PM peak hours.

2028 Without Development Scenario:

The intersection operates adequately at LOS B for the AM and adequately at LOS C for the PM peak hours.

2028 With Development Scenario:

The intersection will operate adequately at LOS B for the AM and adequately at LOS C for the PM peak hours.

15 CONCLUSIONS AND RECOMMENDATIONS

This report addressed key issues and alternatives to be considered for the proposed Paardevlei Solar PV Facility.

- The site is currently undeveloped and is located on the following farm portions:
  - Portion 11 Helderberg Sleeper Plantation 787;
  - Portion 38 (Remaining Extent) Farm 794;
  - Portion 10 Helderberg Sleeper Plantation 787;
  - Portion 0 (Remaining Extent) of Farm 792; and
  - Portion 37 Farm 794.
- The preferred Port of Entry for imported components is the Port of Saldanha.
- The proposed access road located off Ou Paardevlei Road is deemed suitable.
- An interchange is proposed along the N2, which would give a direct access route to the facility, thus becoming the main access route to the facility.
- In the event that the proposed Paardevlei interchange is not implemented along the N2, the proposed access route to the facility will be via Ou Paardevlei Road, as assessed in this report. This is considered a viable access route to the facility as the N2 on-and-off ramp intersections, and the intersection of Ou Paardevlei Road/Broadway Boulevard will be upgraded as part of the current Broadway Boulevard project. The abovementioned upgrades and construction of the proposed Paardevlei interchange will only improve the capacity operations of these intersections, which are currently operating adequately in terms of level of service.
- The construction phase traffic, although significant, will be temporary and can be mitigated to an acceptable level.
- During operation, it is expected that 8 permanent staff will be stationed at the facility, with security and maintenance teams periodically visiting the facility. The traffic generated during this phase will be minimal and will not have an impact on the surrounding road network.
- The construction and decommissioning phases of a development is the only significant traffic generator and therefore noise and dust pollution will be higher during this phase. The duration of this phase is short term i.e., the impact of the traffic on the surrounding road network is temporary and solar facilities, when operational, do not add any significant traffic to the road network.
- Based on the 100m^2 GLA, it is proposed that a minimum of 4 (four) parking bays be provided.
- A capacity analysis of the following intersections was undertaken:
  - N2 / Broadway Boulevard (R44) Both the north and south interchanges
  - Ou Paardevlei Road / Broadway Boulevard (R44) / Gutsche Road
  - Centenary Drive / Barker Road
  - Ou Paardevlei Road / Centenary Drive
  - Ou Paardevlei Road / Olive Way
  - Ou Paardevlei Road / De Beers Access Road
- With the exception of the Ou Paardevlei Road / Broadway Boulevard (R44) / Gutsche Road and the Ou Paardevlei Road / Centenary Drive intersections, the remaining intersections operate adequately during all analysed scenarios.
  - The Ou Paardevlei Road / Broadway Boulevard (R44) / Gutsche Road intersection operates poorly during the PM peak hours across all analysed scenarios. Additional

lanes and signal timing optimisation scenarios were modelled but did not impact significantly on the LOS. This is due to the high volume of through traffic on the Broadway Boulevard. It should be noted that wider road network upgrades are required to improve capacity improvements. It should also be noted that the intersection is to be upgraded as part of the existing Broadway Boulevard contract.

- The Ou Paardevlei Road / Centenary Drive intersection operates poorly for both the AM and PM peak hours across all analysed scenarios. Signalization of the intersection is required to improve the capacity operations, as shown in **Figure 15-1**. The proposed intersection upgrade will lead to an improved LOS A during both the AM and PM peak hours. It should be noted that the intersection is to be upgraded as part of the existing Broadway Boulevard contract.

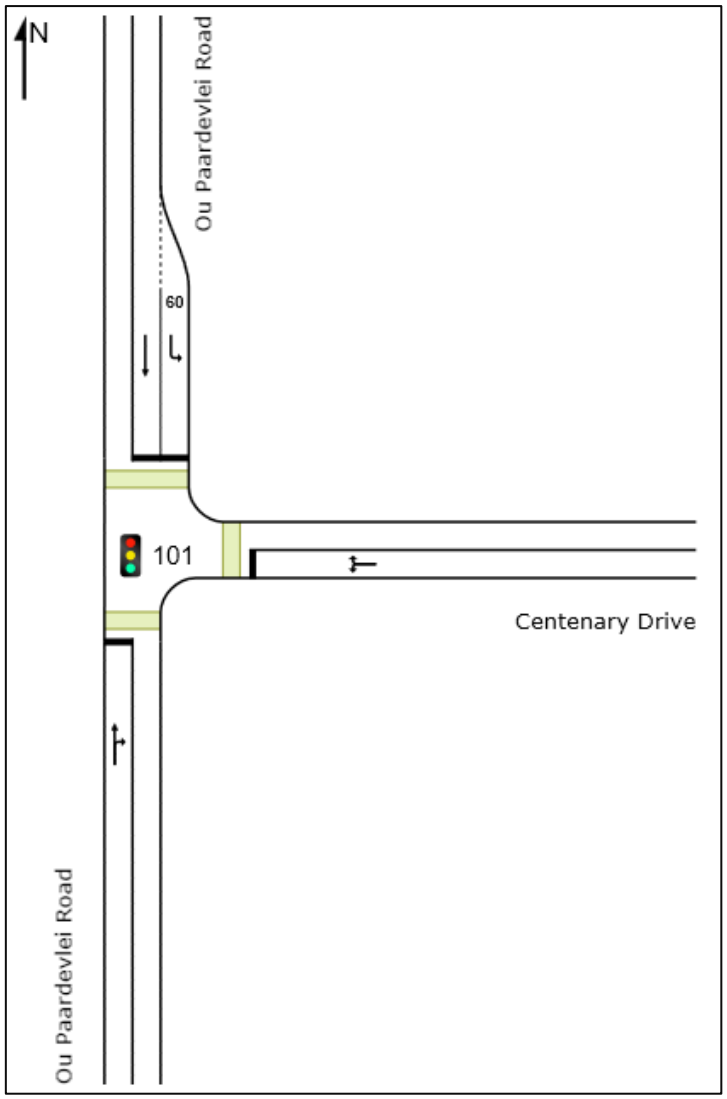

Figure 15-1: Proposed upgrade at the Ou Paardevlei Road / Centenary Drive Intersection

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