RE Capital 11 (Pty) Ltd. Solar development.

November 28

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Draft Environmental Impact Layout Report pertaining to the Dyason's Klip RE Capital 11 (Pty) Ltd. project near Upington. Compiled by Solek Renewable Energy Engineers.

Draft EI Layout Report

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Abbreviations and Acronyms

- AC Alternate Current
- CPV Concentrated Photovoltaic
- DC Direct Current
- DEA National Department of Environmental Affairs
- EIA Environmental Impact Assessment
- IPP Independent Power Producer
- MV Medium Voltage
- MW Mega Watt (Power)
- MW_p Mega Watt Peak (Maximum peak power production)
- PV Photovoltaic
- SANRAL South African National Roads Agency Limited
- REIPPPP Renewable Energy Independent Power Producer Procurement Programme

1 Introduction

RE Capital 11 (Pty) Ltd. Solar Energy Facility as an Independent Power Producer (IPP) is proposing the establishment of a commercial solar energy facility on the Reminder of Farm 454 Dyasonsklip. The farm is situated 20 km west of Upington in the Northern Cape. The facility is to be known as RE Capital 11 (Pty) Ltd.

The proposed facility has a contracted peak capacity of be 75 MW_p. with an estimated footprint between 200 and 220ha. The preliminary study area of 510ha has been assessed by the environmental specialists as part of Environmental impact assessment process. The footprint in the EIA is larger than what is physically required for the proposed development, so as to ensure ample development space is available after potential environmentally sensitive areas are excluded, as a function of specialist studies and recommendations. The estimated portion of land each component of the facility will typically occupy is summarised in the table below.

Table 1: Component size and percentage for the plant

Component	Estimated extent of 75 MW plant	Percentage of selected area (± 200 ha)	Percentage of whole farm (±4769.4155 ha)
PV modules	180 ha (1.8 km^2)	90%	3.7%
Internal roads	18 ha (0.18 km^2)	9%	0.37%
Auxiliary buildings	2 ha (0.02 km^2)	1%	less than 0.1%

The proposed infrastructure that is planned to be constructed includes CPV modules, or a series of solar PV arrays, inverters, internal electrical reticulation, and an internal road network. It will also be necessary to construct an onsite substation which would typically include a transformer to allow the generated power to be connected to Eskom's electricity grid. Auxiliary buildings, including ablution, workshops, storage areas and fencing are planned to be erected. A distribution line will also be required to distribute the generated electricity from the site to the Eskom substation and grid. This grid connection is to be assessed as part of a separate environmental process.

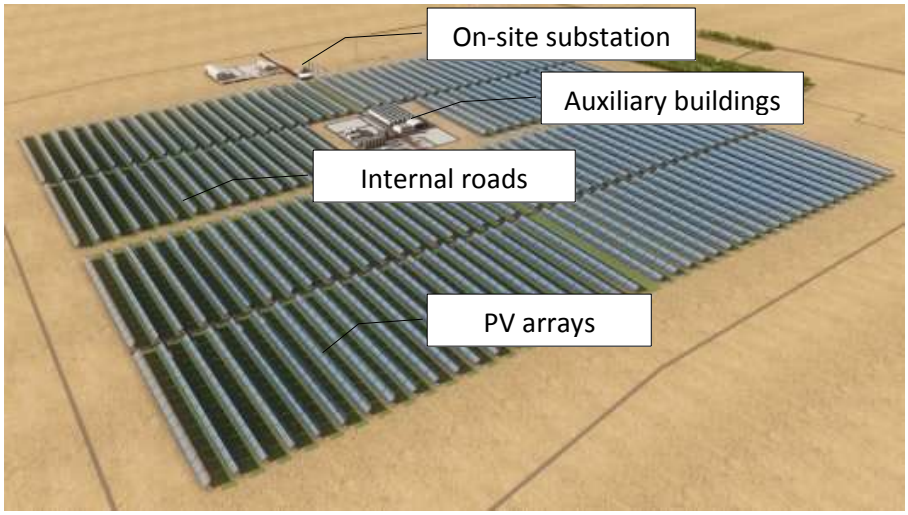

Figure 1: A typical layout of a solar PV plant

Determining the optimal layout is a costly process which would normally take place once an IPP tender has been awarded to the bidder. For the purpose of the environmental impact assessment, the typical layout, alternatives and a preliminary high level layout has been developed. This layout report aims to portray these layout options and the developed preferred high-level site layout.

The final layout design presented for this Environmental Impact report (EIR) has taken into account the site constraints identified, the developed environmental management plan and recommendations made by the various EIA specialists. With the actual construction, the final plant layout will stay the same in terms of footprint and size, but the exact location of the different components may change within the 220 ha Preferred Site boundary.

2 Layout Progression

Since project inception, the layout of the facility underwent changes. The initial facility layout was included within the draft scoping report and progressed to this latest Layout Report submitted with the draft environmental impact report. This portion of the layout report elaborates on the layout progression since inception.

It should be noted that for the purpose of this impact phase reference will be given to RE Capital 3 solar projects (a similar PV solar facility) previously developed, and received DEA ROD approval, on the same Remainder of Farm 454, Dyason's Klip. Figure 2 below illustrates the location of RE Capital 3 solar projects. With regard to RE Capital 11 site location as well as the planning of access roads and power lines for grid connection, RE Capital 3 projects have been taken into consideration.

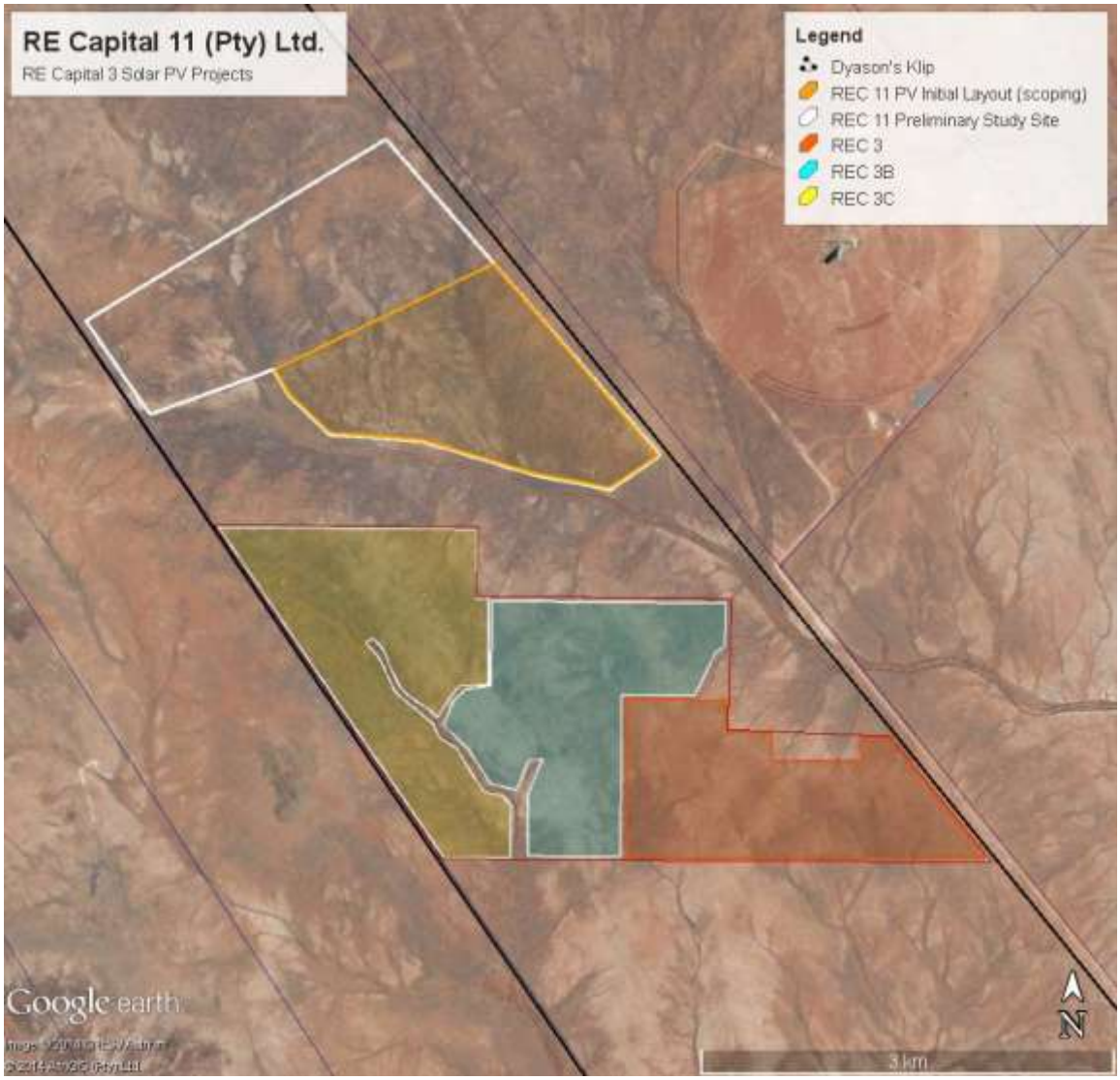

Figure 2: RE Capital 3 solar projects

2.1 Preliminary Study Site

As part of the scoping phase different locations within an identified study site for the proposed facility were investigated. A preliminary study site of 510 ha was identified as part of this scoping study area for the scoping phase of the RE Capital 11 (Pty) Ltd. Solar Development project. The preliminary study site was selected due to initial project planning of multiple solar facilities and therefore the reason for the large area. During the planning stages the possible higher sensitive areas within the preliminary study site have already been excluded.

In addition the land is considered to have a low agriculture potential, with limited carrying capacity, as per the Agriculture Potential specialist report. The usage of this low agricultural potential land is believed to have little effect on food security and the corresponding production of food.

The identified 510 ha study area is referred to as the “Preliminary Study Site”. Please refer to the engineering report (Solek REC 11, November 2014) for more details regarding the Preferred Layout and corresponding expected infrastructure. The infrastructure includes components such as frames, solar modules, roads, workshop and admin office area, laydown area, and an onsite substation.

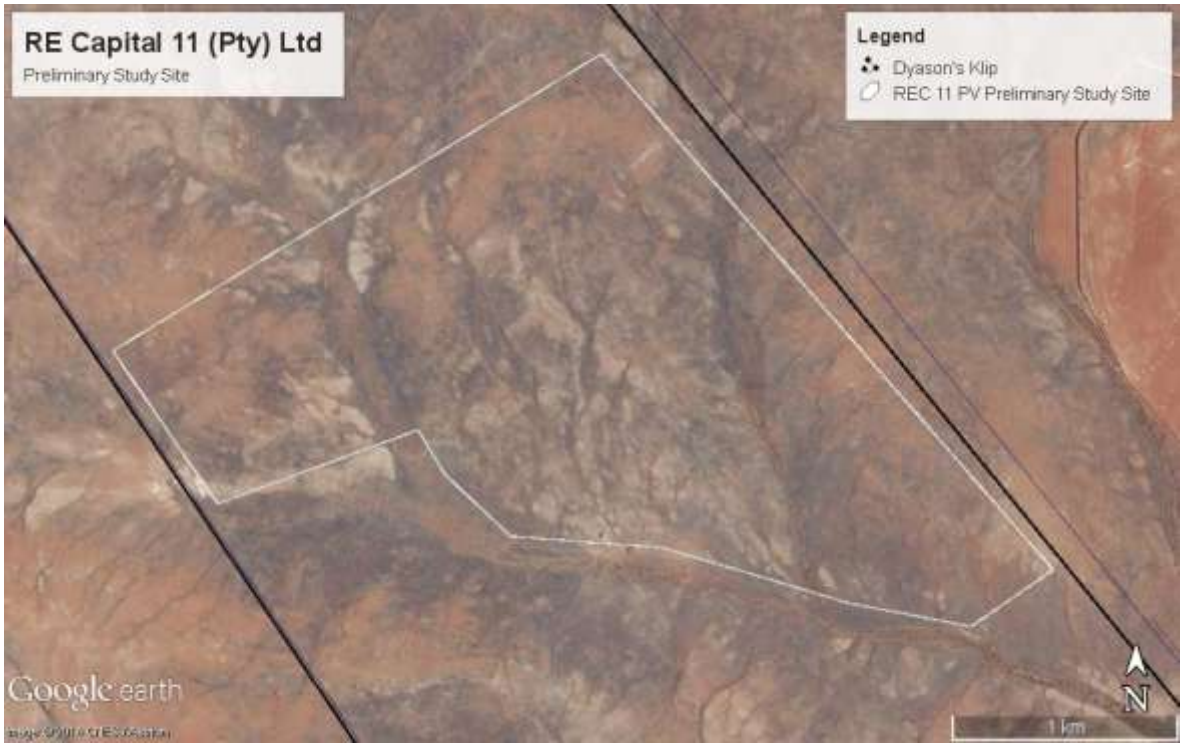

Figure 3: Preliminary Study Site

2.2 Layout Alternatives

As part of the scoping phase numerous layouts and technologies were taken into consideration before the proposed site area was decided upon. This section of the report portrays the alternative layout considered and the initial layout, as included within the scoping phase and the corresponding reports.

2.2.1 Initial Layout (scoping phase)

The major points which lead to the Initial layout within the scoping phase are listed below.

- Area of approximately 240 ha , to ensure the project would be economically viable , allowing for exclusions of environmental sensitive areas;
- Minimal disturbance to seasonal water washes and highly sensitive areas;
- Road access to the site with regard to distance and minimal disturbance to sensitive areas;
- Grid connection taking into consideration minimal distance and minimal disturbance to sensitive areas.

The factor having the single biggest influence on the crossing of seasonal washes and sensitive areas are the mounting technology. The preferred technology should allow arrays to be constructed over the wash lines and high sensitivity areas while having a minimal effect on the vegetation and soil, mitigating the chances of erosion.

In order to avoid possible higher sensitive areas the initial layout within the scoping phase has been selected and excluded the possible high sensitive areas. This was included in the scoping phase as the preferred alternative subject to refinement.

Figure 4: Initial Layout (Scoping phase)

As mentioned above, the solar arrays will be placed in such a way that would have the least influence on the drainage lines while avoiding the ecological sensitive areas where practically possible. Although the annual rainfall within this region is extremely low, the drainage lines were carefully considered and the most viable alternative selected.

Because of the relatively dry climate and low rainfall, natural vegetation tends to be denser within the drainage washes, thus the layout which has the smallest impact on the seasonal washes would generally also have the smallest impact on the vegetation.

2.3 Alternative Layout

An Alternative Layout to the Preferred Layout has been selected within the Preliminary Study Site. This Alternative Layout is illustrated in Figure 5. The main reason for this Alternative Layout is the size and Layout type that could benefit facility layout design. The Alternative layout has not been selected as preferred layout due to the commercial benefit of future projects. The environmental impact of the Preferred and Alternative layouts as per environmental reports and mitigation measures is believed to be similar in nature.

Based on the ecology report and sensitive areas the specialist recommended that the blind drainage between the main drainage lines, as illustrated in Figure 5, being included in this layout but being built over to keep the facility design compact. The specific PV technology and detail facility design will take this blind drainage line into account and refer to mitigation measure and actions being described in the ecology and environmental report.

Figure 5: Alternative Layout excluding high sensitive areas.

2.4 Preferred Layout

As part of the Environmental Impact assessment phase the specialist reports, sensitive areas have been included and mapped in order to evaluate layout alternatives and to determine the preferred layout for the Impact Assessment phase of the EIA. The possible drainage lines and sensitive areas have been assessed and confirmed by the specialist studies namely ecological, archaeology, agricultural and visual studies.

The initial scoping phase layout has been altered, so as to avoid sensitive areas and to reduce the environmental impact of the solar facility on the area, based on the outcomes of the specialist assessments.

The figure below indicates sensitive areas as per specialist findings and reports, relating to seasonal washes and drainage lines within the Preliminary Study Site.

The preferred site layout as part of the Environmental Impact phase and as a result of the specialist findings are illustrated in the figure below. This preferred site layout covers an area of 228ha which excludes the identified high sensitive areas. An exclusion distance of 32m from the centre of the drainage line to each side has been used in the preferred layout.

It should be noted that according the ecology report and feedback from the specialist, specific small sensitive areas (blind drainage lines) identified is included in the preferred layout. The detail facility design, also taking the specific PV technology into account, will take these areas into consideration. The ecology specialist recommended that the medium high areas being excluded, but recommended that the blind drainage line between the main drainage lines being built over to keep the facility design compact. The preferred layout selection took into account possible future project developments within the Preliminary Study site.

The preferred layout has been selected above the Alternative Layout, due to the commercial project side and future planned solar projects as well as high sensitive areas being excluded within the preferred layout.

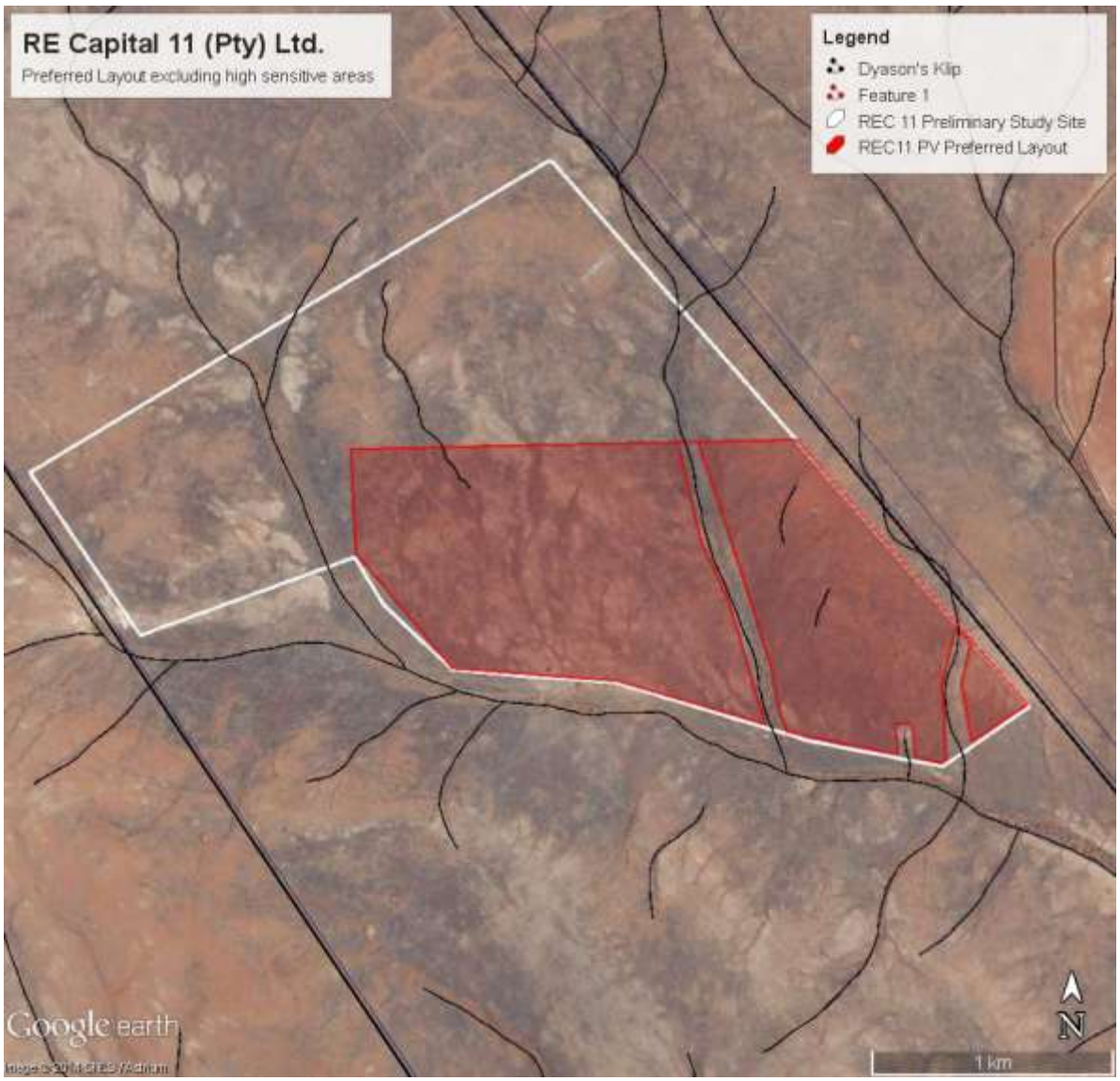

Figure 6: Preferred Layout excluding high sensitive areas.

2.5 Facility layout and components

Within the preferred layout the figure below illustrate of how the typical layout will look like.

Please refer to the Engineering report for a detailed list of components and a corresponding explanation in more detail. The Engineering Report with elaborated components and layouts will be incorporated within the Final Environmental Impact Assessment phase.

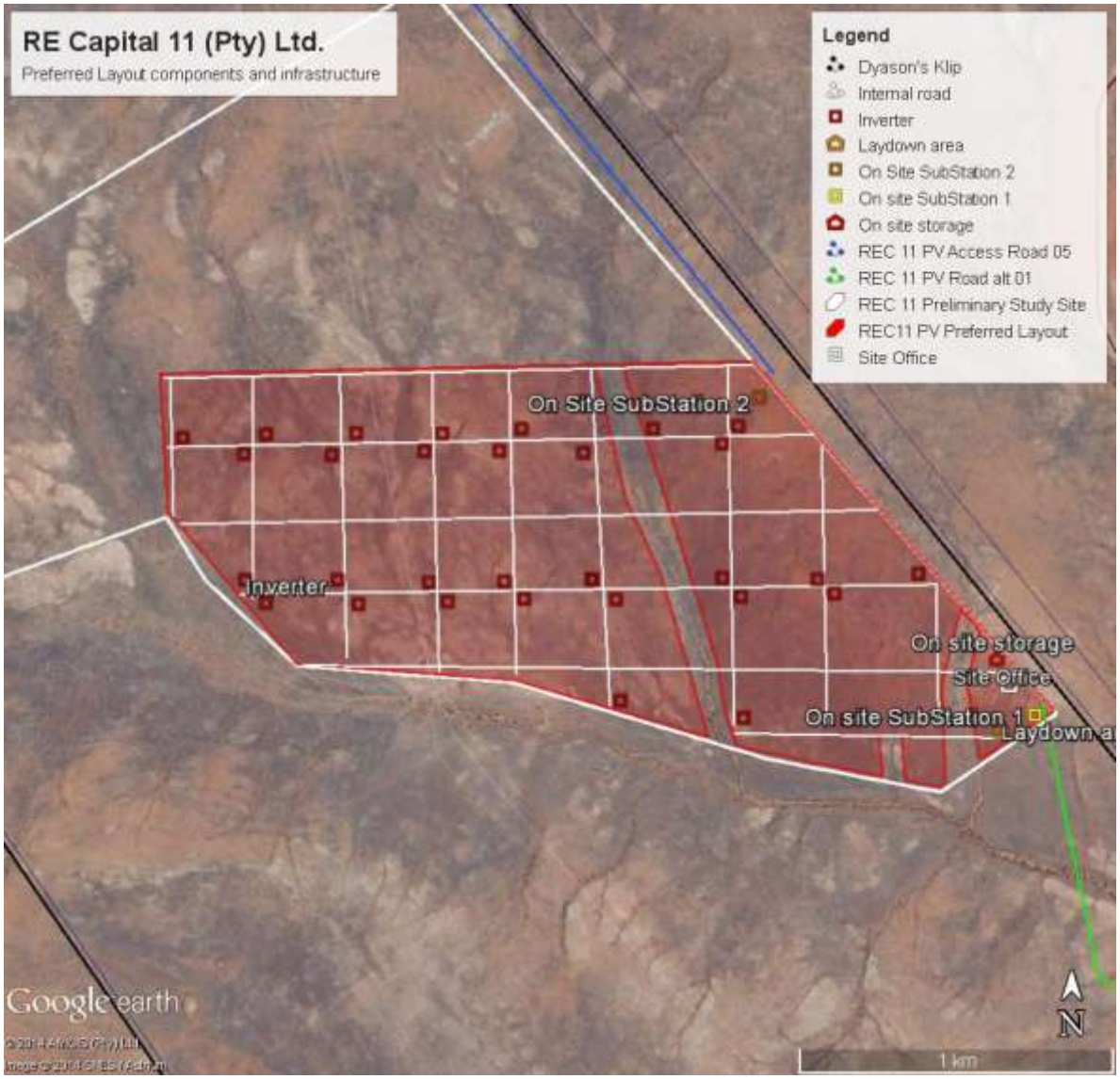

Figure 7: Preferred Layout facility components and infrastructure

Components include solar modules, roads, workshop and admin office area, laydown area and an onsite substation. The exact position of these components will be determined in the final plant design after preferred bidder status.

The infrastructure of the Preferred Layout will have a footprint of approximately 220 ha and is aimed at having the lowest possible environmental impact while keeping the project economical viable.

2.5.1 General Explanation of the Layout:

A general explanation of the components of the layout will be discussed below. For a more detailed overview, refer to the Engineering Report.

2.5.1.1 Solar Panel Area

The solar arrays are put together with strings of solar modules connected in series, which can be mounted onto single or double axis tracking systems. These frames are typically installed with the single tracking axis in an east-west direction to maximise the system's output. The standardised length of a solar array would typically be between 50 m and 300 m long.

Where a tracker system is used, each of the modules is controlled individually and standardised systems are preferred for economic and practical reasons.

The solar modules will be placed in such a way that it would have the least influence on the washes and avoiding the ecological boundaries set where practically possible.

2.5.1.2 Mounting of the Modules

As discussed in the Engineering Report, the foundation of mountings can either be laid in a small concrete block, driven piers, or a deep seated screw mounting system. The impact on agricultural resources and production of these alternatives are considered equal, although the concrete option will require greater inputs during decommissioning in order to remove the concrete from the soil. As far as practically feasible the poles would be driven in as far as possible from all washes, and taking the ecological constraints into account.

Figure 8: Rammed or screwed mounting method on fixed frame (image www.expo21xx.com)

The physical process of ramming the anchors into the ground is done using special equipment (typically on tracks). In the case where earth screws or rock anchors would be more suitable, the rammed pole would be replaced by one of the former. The figure below shows equipment being used in the ramming process. Some of the ground covering in the medium sensitivity area will be cleared to do the frame installation accurately. Although the site is very flat, some minor excavation may be necessary in certain medium sensitivity areas.

In the areas of high sensitivity, vegetation would be left in place to avoid the risk of erosion. In the unlikely case where brush or trees are high enough to cast shadows they would be trimmed to size.

Figure 9: Installation of frame foundation (Image from www.aceinfra.com and www.kaska.eu)

2.5.1.3 Grid Connection and Cabling

NOTE: The grid connection is being assessed in a separate environmental process, but is described below in order to provide context.

The electrical feeding line (or two lines, depending on the line capacity) is proposed to be constructed to connect the proposed RE Capital 11 project site to the new authorised Eskom Upington MTS. Different grid connection alternative is investigated to reach the MTS substation.

The electrical power line(s) is planned to run along farm border fences so as to minimise further landscape fragmentation, the effect on the environment and practicalities of utilising the farm as far as possible.

A 75 MW installation will have various electrical components to meet the national grid code requirements in order to supply generated electricity onto the national grid. The installed infrastructure will ensure the correct conversion of produced power from the generated panel Direct Current (DC) to Alternate Current (AC), this conversion from DC to AC is done by means of inverter stations. A single inverter station is connected to a series of arrays and would be placed along the service roads to give quick and easy access.

A number of inverter stations will be installed, of which each of these inverter stations are connected to the on-site substation from where a power line is constructed. The power line is constructed from the substation to the point of supply either directly to the MTS substation or onto an existing power line (loop-in/loop-out).

The final placement of the inverter stations and on-site substation would take the ground conditions into consideration, meaning that suitable areas with a minimal impact on the environment would be preferred. Interconnecting cables may be trenched where practically possible. High sensitivity areas will be avoided as far as possible, however, in areas of high sensitivity cables would be mounted to the structure (as far as reasonably possible) to avoid excessive excavation works and clearing of vegetation should this be required. An inverter station would typically be built into a transportable container and will have an onsite footprint of 56 m² (14m x 4m). The on-site substation is expected to have a footprint of approximately 400m^2 (20m x 20m).

2.5.1.4 Auxiliary Building Area

The main storage, workshop, ablution, and administration facilities are placed in an area where there will be easy access. The final storage and administration areas would also be selected to minimise their impact on the environment by considering the ground conditions and the ecology of the surrounding areas. Since this area may host more human activity than most other parts of the solar facility, it is important to take the surrounding habitat into consideration.

The structure erected should not be more than 2000 square meters in area and is referred to in the preceding drawings as the Storage and Admin facility. Water to the facilities will be supplied by ten 10 kl water tanks. These tanks will also be used as redundant water for operation of the plant.

2.5.1.5 Construction of Roads

Precautionary measures must be taken to mitigate the risk of ground disturbances where access roads will be constructed. By incorporating precast concrete infrastructure into the construction of these roads the risk of the roads acting as water channels could be avoided. Special attention to drainage, water flow and erosion will be given and potential risks will be mitigated by applying appropriate building methods.

3 Access Routes

As part of this scoping phase five access road alternatives were investigated. Previous REIPPP round 4 projects and access roads on the same farm land area as well as no objection from SANRAL regarding the access from the N14 at the current Dyason's Klip farm entrance has been taken into consideration during the planning phase.

A developed Transport and Traffic Management Plan has been included within the draft report of the Environmental Impact Assessment phase. This traffic management and transportation plan was developed to investigate, plan and describe implications around increased traffic loads and potential route scenarios. The plan furthermore gives proposed solutions and preventative steps to be taken by the development.

Three similar Solar PV sites have been developed on the Remainder of Farm 454, Dyason's Klip. These developments have already received an Environmental Authorisation (EA) from the Department of Environmental Affairs.

The development of RE Capital 3 solar projects and the corresponding layout is discussed within the layout progression section of this report and depicted in Figure 2. During the planning of RE Capital 11 site location, its corresponding access roads and power lines for grid connection the RE Capital 3 projects have been taken into consideration in order to minimise the duplication of associated infrastructure as far as possible.

3.1 Access to the Site

Different access route alternatives towards the site are described within this section of the report. The preferred access route are further described and motivated accordingly.

Three entrance options to the project site are described within this section of the report. Figure 10 depicts the various entrance routes and entrance options towards the proposed RE Capital 11 (Pty) Ltd. site.

The first entrance (1) being directly from the N14 from the existing entrance of the Remainder of Farm 454, Dyason's Klip. The second possible entrance (2) being the existing Abengoa entrance (Khi Solar One development) and access road from the N14. The third possible entrance (3) being the entrance to Dyason's Klip farm from the district road (D3276) on the North of the Dyason's Klip farm.

Solek had previous engagements with "South African National Road Agency" (SANRAL) regarding entrance from the N14 for RE Capital 3 developments on the Remainder of Farm 454, Dyason's Klip. SANRAL agreed that the existing farm entrance or the existing Abengoa entrance may be used.

3.2 Route Alternatives

As part of the scoping phase five different route alternatives have been included within the considered access routes. Each of these five access routes utilises one of the discussed entrance options.

3.2.1 Alternatives 1 and 2

Access road alternatives 1 and 2 utilise the same planned and assessed access roads than that of the Round 4 REIPPP proposed projects (formerly known as RE Capital 3 (Pty) Ltd project). The access road was planned to follow the existing farm road as far as possible in order to minimize the environmental impact.

From the point where the Round 4 project assessed access roads end (Southern border of RE Capital 3 (Pty) Ltd project site), the two alternative access roads is directed either to the eastern boundary of RE Capital 3 or the western boundary of RE Capital 3.

Route alternative 1 pass RE Capital 3 development towards the western boundary of RE Capital 3 and pass through the 50 meter separation corridor of RE Capital 3B and RE Capital 3C solar farm development.

Route alternative 2 pass RE Capital 3 development towards the eastern boundary of RE Capital 3 and pass through the 50 meter separation distance between the RE Capital 3 eastern border and the farm border.

3.2.2 Alternatives 3 and 4

Access road alternatives 3 and 4 is planned to utilise the existing Abengoa entrance and access road on the neighbouring farm (eastern side of Dyason's Klip) which was constructed for the Abengoa Khi Solar One project. This neighbouring access road runs through Rooi Punt, Tungsten Lodge entering through the McTaggarts Camp entrance from the N14 at Point 2 depicted within Figure 10.

Access road alternative 3 and access road alternative 4 differs from each other in the way by which they cross over to the Dyason's Klip farm property.

Alternative 3 utilises the Abengoa road up to the southern border of the Abengoa development from where the proposed Alternative 3 route traverse to the west across Rooipunt and onto the Dyason's Klip property from where it joins Route alterative 2 (between the Eastern border of RE Capital 3 development and the farm boundary).

Alterative 4 utilises the same access route and existing Abengoa road as Alternative 3, but extends this usage further north to the North-western corner of the existing Abengoa development. The proposed alternative 4 crosses the Abengoa border, the Rooipunt farm onto Dyason's Klip in this area due to the fact that less environmental impact is expected on crossing of washers.

There is a possibility however that the existing Abengoa access route and traversing of their land could not be used due to servitude negotiations and the financers of the REIPPP projects requirement that projects are ring-fenced. This option is however added to the impact report due to the possibility of utilising this option.

3.2.3 Alternative 5

The 5th alternative access road runs in a northern direction on the Eastern boundary of Dyason's Klip up to the district road D3276 north of the farm Dyason's Klip 454. This point is indicated by Point 3 on Figure 10.

Figure 10 illustrates the different road access alternatives for the Preferred Layout.

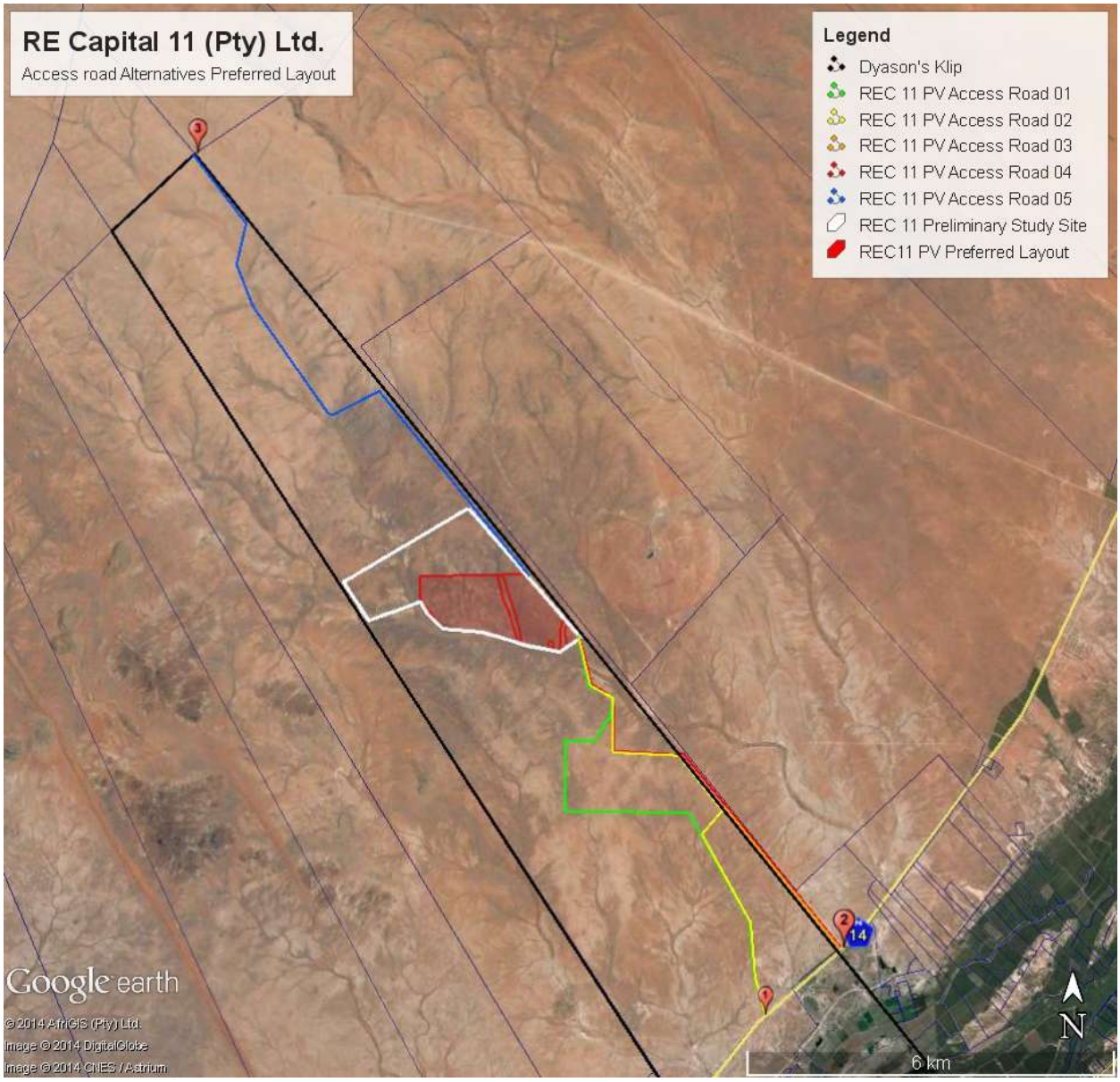

Figure 10: Access road alternatives to the Preferred Layout

3.3 Preferred Access Road

As per outcome of the transportation and traffic management plan, the preferred access road entrance to the site is entrance 1 which lead to two routes “REC 11 PV Access road_01” and “REC 11 PV Access road_02” which provide access from the N14.

The entrance 2 “REC 11 PV Access road 03” and “REC 11 PV Access road 04”, which also provides access from the N14 will be seen as second preferred access road entrance utilizing the newly constructed surfaced road for the McTaggarts Camp CSP plant.

Upgrading of the existing farm access and access route 1 is the preferred option as is not dependent on the developments of owners consent. The road should be upgraded to at least 5m width (preferable 6m with sufficient shoulders) and gravel wearing course layer.

The preferred access routes from entrance 1 and entrance 2 are illustrated in Figure 11.

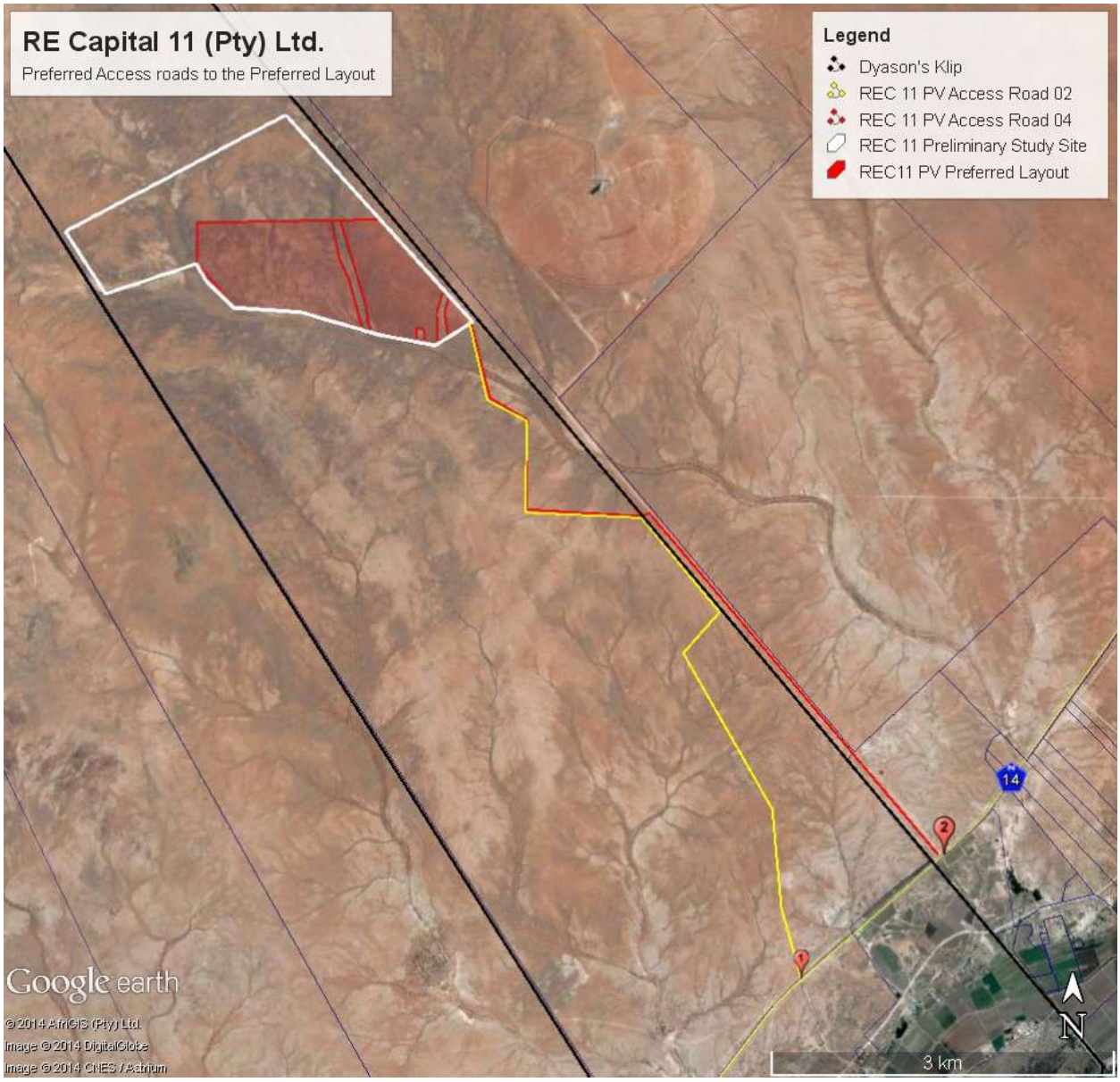

Figure 11: Preferred Access roads

In the case of the district road, the provincial road department will be part of discussions and road access approvals.

As part of the planning of the access routes, access to the northern farm portion by the farmer has been taken into account. The route will follow the eastern side of the preliminary study site to the north farm portion and will also function as fire break. Mitigation measures applicable to the crossing of possible drainage lines and seasonal washes will be implemented as per regulations and as described in the Transportation and Traffic Management report.

4 Grid Connection and Power Line Routes

NOTE: The grid connection is being assessed in a separate environmental process, but is described high level below in order to provide context.

In the Scoping Phase six power line route alternatives were investigated, including the loop-in loop – out route option. Because of possible complications with neighbouring projects, it was decided to include alternative option 3 to the South boundary of Tungsten Lodge.

The alternative grid connection routes are also described within the Engineering Report.

4.1 Preferred Loop-in Loop-out option

The option to loop into the existing 132 kV line is investigated as one of the primary connection alternatives. This option is indicated as "REC 11 PV PLine Loop in Loop out 01" in Figure 12 below.

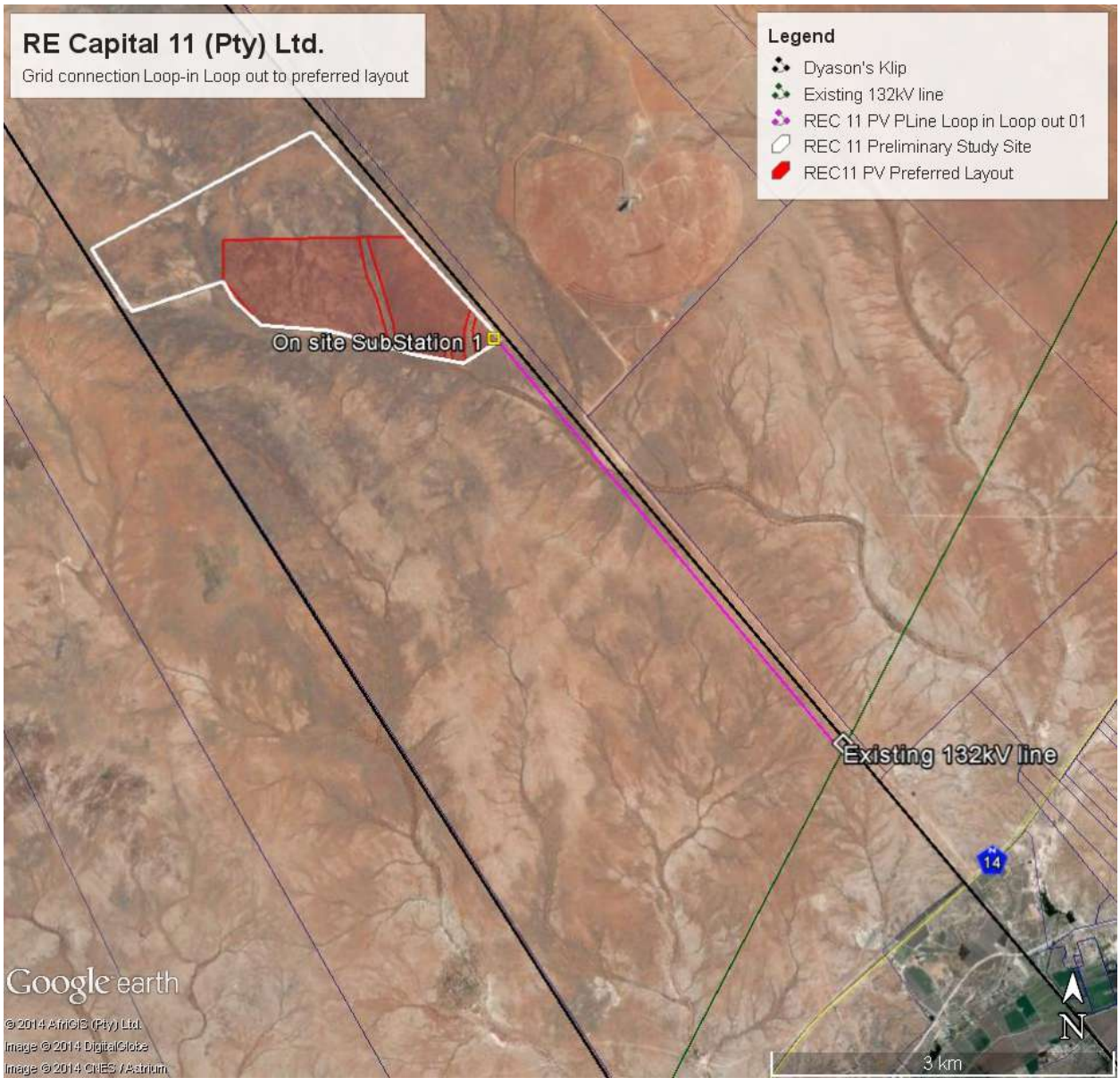

Figure 12: Preferred Loop-in Loop-out Grid Connection.

4.2 Preferred Self-build Grid Connection

The self-build alternative routes will all lead from the individual on-site substations to the authorised Eskom Upington MTS. The ESKOM MTS substation EIR was authorised on the 14th of February 2014 by the National Department of Environmental Affairs

The Self-build Options 1 is the preferred option, being the shortest distance to the authorised Eskom MTS substation. However, the feasibility of most of these options will depend on the neighbouring project's servitude consent. That is also the reason for the large number of alternative options. Negotiations are in progress for all the servitudes.

The routes were all chosen along existing fences or power lines, in order to minimise the additional environmental impact. The environmental impact of these alternatives should all be more or less the same.

The preferred self-build grid connection is illustrated in Figure 13.

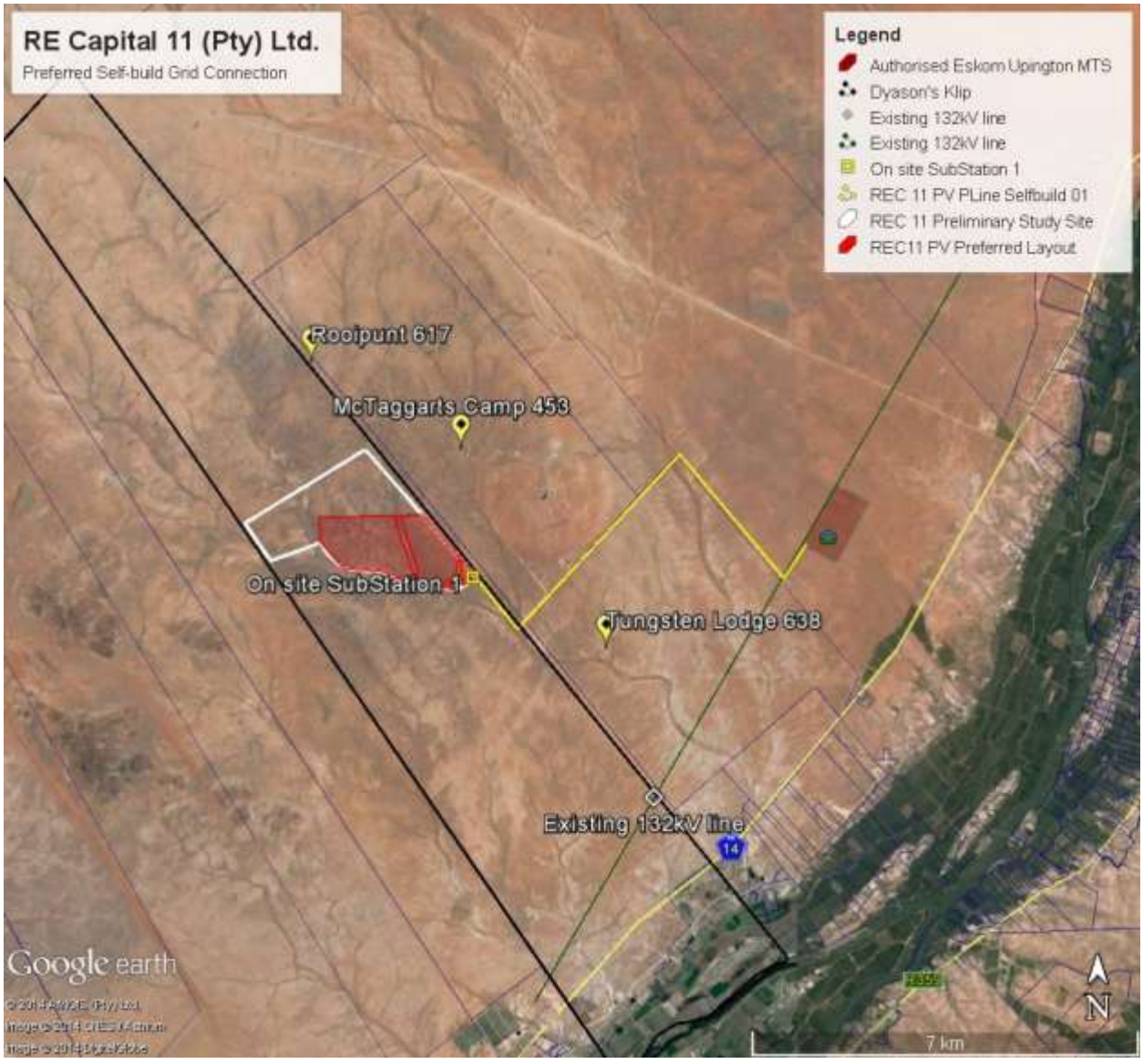

Figure 13: Preferred Self Build Grid connection to the Preferred Layout.

The summarised grid connection alternatives and their distances from the onsite substation to the Upington Authorised MTS substations or existing 132kV line are illustrated in Table 2. The preferred grid connection options are marked in yellow (Loop in Loop out) and in blue (Self-build) in the table below.

Table 2: Grid connection alternatives and distances

Alternative grid connection	Distance (km)
REC 11 PV PLine Loop in Loop out 01	7
REC 11 PV PLine Selfbuild 01	9.5
REC 11 PV PLine Selfbuild 02	10.5
REC 11 PV PLine Selfbuild 03	11.7
REC 11 PV PLine Selfbuild 04	9.5
REC 11 PV PLine Selfbuild 05	20

As noted within the comparative table above, the preferred routes have the shortest grid connections. Due to the fact that the distance has a significant impact on the grid connection cost, the shortest distance alternatives are preferred.

5 Other Projects in the Area

When considering South Africa's irradiation distribution, the Northern Cape Province, and Upington in particular, is known to be one of the most preferred areas for the generation of solar energy in South Africa and even in the world. This can be ascribed to the advantageous sun radiation specifications and the flat planes which are not intensively used except for grazing. The global irradiation in the specific area is between 2400 and 2600 kWh/m^2.

The DEA is in the process of identifying Renewable Energy Development zones (REDz) across South Africa, which is typically best, suited for renewable energy generation. Upington and its surrounding area is one of the areas identified to be a Renewable Energy Development Zone.

Other solar projects that are already being developed or proposed in close vicinity to the Dyason's Klip project (RE Capital 11 (Pty) Ltd.) are illustrated in Figure 14. Some of these projects have already been awarded preferred bidder status in the previous REIPPP rounds, while others are still in the planning phase.

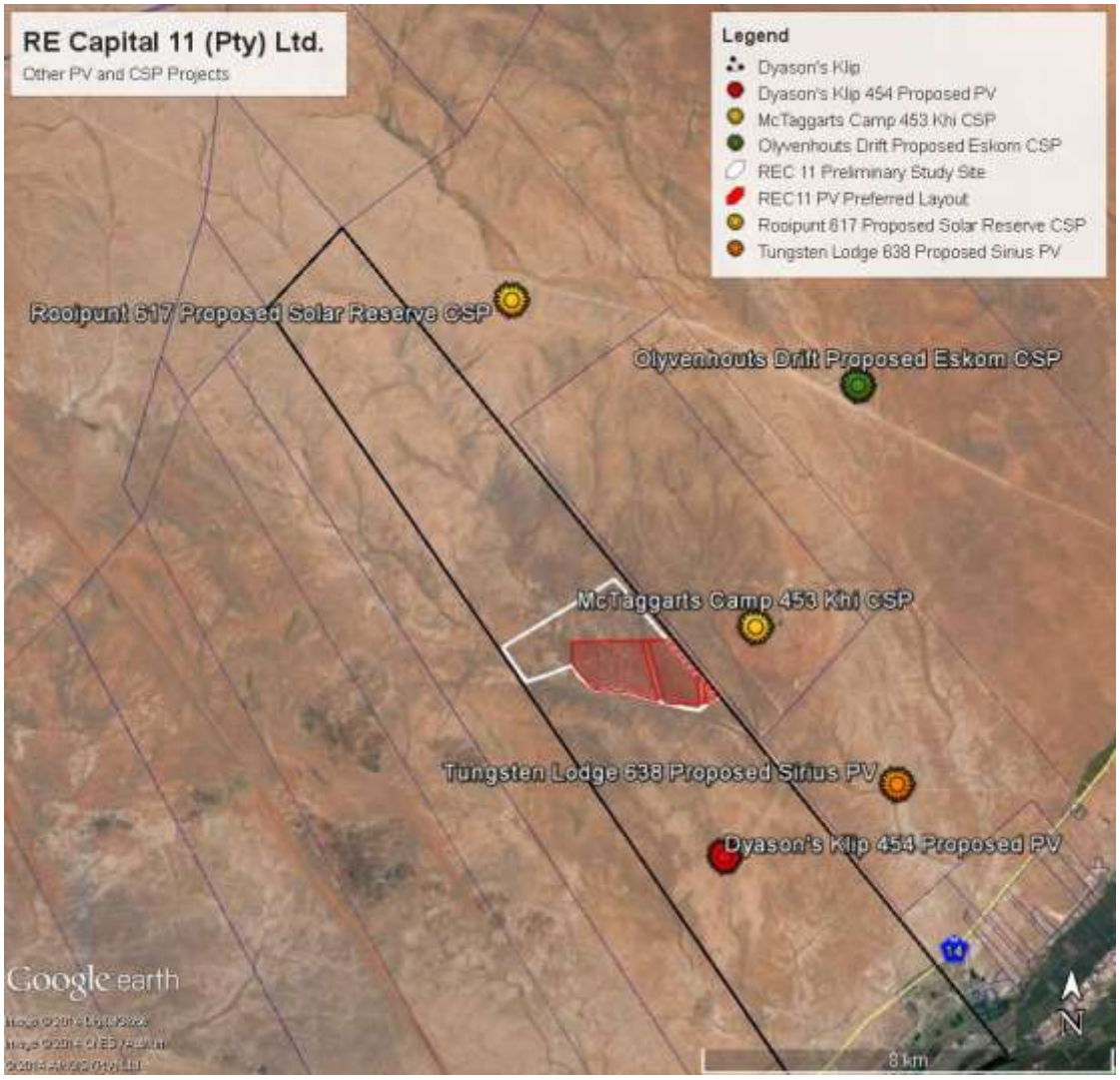

Figure 14: Other PV and CSP Projects in the Area

6 Conclusion

The Preferred site within the Preliminary Study site has been selected based on its level surface, road access alternatives, and distance to the new authorised Eskom Upington MTS as well as medium to low risk sensitive areas to minimize ecological, visual and archaeological impact and to optimise project viability.

Specialists have been appointed and completed assessments in the required areas of expertise. These reports have in included in main Environmental Impact Assessment report.

Feedback and confirmation regarding sensitive areas from the specialist studies on the Preliminary study Site has been incorporated into the preferred layout. The multiple power line alternatives and access route alternatives have been assessed and based on the results of the specialist studies and reports, the preferred access road options as well as preferred grid connection options have been selected. As part of the route selection for preferred grid connection options, it should be noted that they have more or less the same environmental impact. The impacts for the grid connection are being assessed in a separate EIA process as requested by DEA.