

2022

# Loo Creek Solar Farm Environmental Authorization Project Summary



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## I. NON TECHNICAL SUMMARY

The goal of this project is to clear an estimated 40 acres of the existing forest adjacent to the Soesdyke Linden Highway, approximately 20 km north of Linden and build a 5.8 megawatt (MW) photo voltaic (PV) solar power generation facility. The solar farm will be comprised of solar panels, batteries (for energy storage), two diesel generators (for back up power), a power inverter, and a site control office. Once built, the facility will be able to provide a maximum of 5.8 MW of uninterrupted electrical power, 24 hours a day, to anyone within a 10 km radius and can eventually be connected to a power grid when one becomes available, in the area.

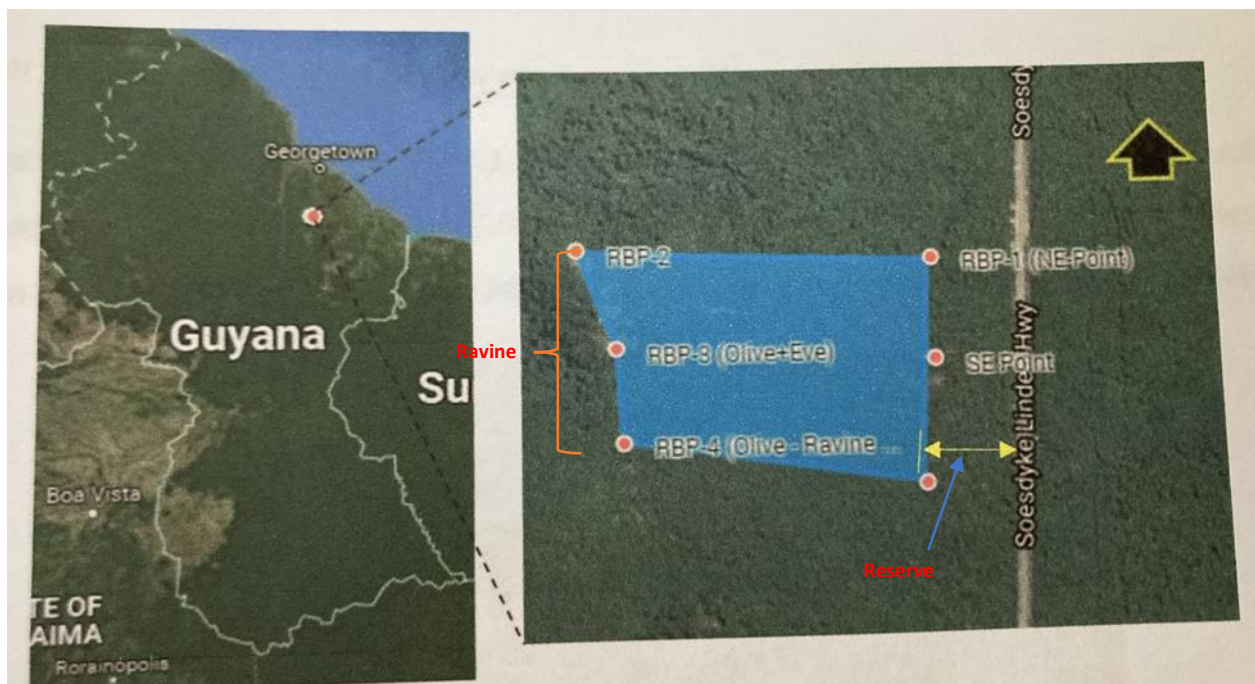
## II. PROJECT DESCRIPTION

The Loo Creek Solar Farm project site lies in Region 4, on the west side of the Soesdyke Linden Highway, approximately 23.3 km north of the 90 degree turn to Amelia’s Ward. The entrance is located adjacent a roadside shed structure, near GPS point 6.22489, -58.24554 and it is the only access point to the site, at this time.

The proposed site is on land that is privately leased / owned by two Board Members of Caiman Industries, Environmental (currently under incorporation). The project boundary points are below.

Point	Latitude	Longitude
RBP - 1	6.2258	-58.24655
RBP - 2	6.22594	-58.25052
RBP - 3	6.22483	-58.25008
RBP - 4	6.2238	-58.25002
RBP - 5	6.2233	-58.24669

**RBP: Real Boundary Point**



The project land surface is estimated at 10.1 ha (hectares) and is bordered on the west by a 15m – 20m deep ravine and on the east by the Soesdyke Linden Hwy. The ravine runs south to north with a ground water fed spring, at the bottom, running the same direction and there is a 115m reserve between the highway and project line.

Currently, the property is undeveloped. The terrain is level and consists of white sand regosols soil that is densely covered by vegetation, characteristic to the area, consisting of trees and shrubs that belong to the *Tall Evergreen Sclerophyllous Forest* classification. Animals and signs of animals seen in the area include, jaguars, monkeys, deer, and various birds. Fish have been observed in the stream at the bottom of the ravine.

The area around the project is populated by individual residences, small hamlets, and farms. Linden is the nearest town and with the town center (on the West Bank) approximately 25.5 km (as the crow flies) away. The Soesdyke Linden Highway is the only main road through the area with smaller roads diverging to access individual properties and the local villages.

There are no known local areas that are “sensitive” or with “abundant local resources” however the Demerara River lies approximately 5.3 km directly due west of the site and there is another smaller water way that is 1.13 km north of the site. This water way appears to run to the Demerara River and is crossed by a roadway bridge. Due to the lack of development in the project area, there are no known intake or emission structures at this time.



### **III. PROJECT DESIGN**

The estimated cost to build the solar power plant is just under \$10,000,000 USD. The daily operations, managerial and upkeep costs are still to be determined.

The main stages of the build are as follows:

- Land Preparation
- Civil Work
- Boundary and Road Building
- Foundations / Pilings
- Facility Structures Build
- Solar Panel Leg Mounts
- Cable Trench Excavation
- Cable Laying & Electrical Work
- Solar Panel Mounting
- Power Modules Installation
- Testing
- Line Charging and Distribution

#### **Land Preparation**

Excavators, bulldozers, graders, and other large equipment shall be used to remove the existing vegetation and grade the terrain to the requirements.

#### **Employee Operations & Duration**

An estimate of 8 – 10 employees will work standard shifts of 8 – 10 hours per days, five days a week, with weekends off. Their activities will consist of operating the heavy machinery, clearing and sorting the wood and plant debris, and grading the soil. This stage should last between one to three months.

#### **Utility / Power Use and Source(s)**

Onsite power at this time will consist of diesel-powered generators and electrical or hydrocarbon fuel powered hand tools (chainsaws etc.). The heavy equipment will be powered by either gas or diesel engines.

#### **Raw and Natural Material Use, Quantities, and Source(s)**

During the land preparation stage, there should be no need to consume any natural resources other than water. Water used will have to be brought on site as the on site spring water, in the ravine, may not be usable due to it's high mineral content. There is a plan to bring in a small demineralization and filtration system, in order to use the water from the spring, but this is still under evaluation. Tanks may

be used on site to collect rain water for use through out the construction and afterwards, during energy production.

#### Waste Discharges / Disposal, Treatment, Recycling & Reuse Plan

All hazardous wastes generated during this project phase shall be disposed of as per the Loo Creek Waste Management Process.

**Solid waste** will consist of household wastes generated by the workers food consumption and cleared trees and foliage. All usable wood shall be separated from the non usable and brush and either sold off site or used for onsite construction. Non usable wood and brush shall be reduced or mulched and returned to the surrounding land.

**Spill clean up wastes** may be generated should any process fluids or hazardous solids be accidentally released. The naturally existing onsite sand shall be used to absorb any spilled liquids or solids.

**Air emissions** consisting of hydrocarbons and ash will be generated by vehicle engines, generators, and power tool exhaust. In addition, fine dust will be thrown into the air from the movement of the machines and grading of the soil. There is no plan to capture these emissions although the dusts will most likely be trapped by the surrounding foliage and return to the ground as the site will be surrounded by the existing dense forest vegetation. The hydrocarbons and some of the ash however, will be released to the atmosphere.

**Waste fluids** will be made up of vehicle maintenance fluids, wash waters, used and unused cleaning chemicals, and any water contaminated with hazardous fluids that exhibit a hazardous characteristic.

**Sewage wastes** will be managed via the use of portable toilets which will be provided during the construction phase of this project and until a sewage leach field can be constructed with toilets.

**Uncontaminated rainwater and rain runoff** shall either fall or flow on to the surrounding land and streams or it shall be collected and used in on site construction or production processes.

#### Civil Work

This work will consist of conducting topographical and other land surveys for the purpose of generating the detailed construction plan, roadway design, and facility lay out.

#### Employee Operations & Duration

A crew of 1 – 4 surveyors should be on hand to conduct the necessary surveys. Work hours shall be 8 hours per day with weekends off and the surveying should take no longer than 1 month.

#### Utility / Power Use and Source(s)

The only power required should be that of the batteries in the surveying equipment.

#### Raw and Natural Material Use, Quantities, and Sources

No natural resources should be consumed during the civil work.

## Waste Discharges / Disposal, Treatment, Recycling & Reuse Plan

The survey crew should only generate household waste.

### **Boundary & Road Building**

A mesh wire fence will be built on the property perimeter along with high bay lighting installed. In addition, an asphalt access roadway will also be installed during this phase. Roadways will be built from the site entrance at the Soesdyke Linden Highway to access the main control building and other plant facilities including the generators, inverter station, and the battery energy storage system.

#### Employee Operations & Duration

There will most likely be two or three crews working: the road crew and the fence with or without a lighting installation crew. The road crew will consist of approximately 7 workers in addition to truck drivers delivering asphalt. The fence building crew will also have from 7 – 10 employees as will the light installation crew. The crews will work daily 8 - 10 hour shifts with weekends off. This phase should take from one to two months.

#### Utility / Power Use and Source(s)

There should be no utility power required for this phase of the job, only manual labor and hydrocarbon powered vehicles. If any hand tools require power, it will be provided by batteries or diesel powered, electrical generators, provided by the contractor.

#### Raw and Natural Material Use, Quantities, and Sources

There should be no raw or natural material usage during this project phase.

## Waste Discharges / Disposal, Treatment, Recycling & Reuse Plan

Waste products from this phase should only consist of unused raw materials (left over fencing, lighting equipment, etc.). Vehicle and tool maintenance will be performed by the contractors and they will be required to remove their own wastes other than household and any solid non hazardous wastes.

### **Foundations / Pilings**

The foundations to the onsite structures will be installed during this phase. The concrete will be mixed and casted, on site, at the individual structure and solar panel array locations.

#### Employee Operations & Duration

We estimate 10 – 20 employees will be working in 8 – 10 hour shifts every day except for weekends. Installing foundations for the site buildings and solar panels will take 2 – 4 months. There may be delays due to weather (rain) which will affect the concrete curing process.

#### Utility / Power Use and Source(s)

Power will be generated by diesel powered electrical generators and physical labor.

#### Raw and Natural Material Use, Quantities, and Sources

Several thousand gallons of water will be required to build the foundations. There are three (3) sources of water:

1. Onsite stream
2. Collected rain water
3. Water delivered to site

Tanks will be installed on site to collect rain water at the very beginning of the project. Should the collected rain water not be sufficient for the foundation operations then delivered water shall be used. At this time, it is unsure when the water treatment / softening technology will be available to utilize the on site stream water but stream water use will become a reality at some phase of the project.

#### Waste Discharges / Disposal, Treatment, Recycling & Reuse Plan

Waste water from concrete generation will very likely be discharged during this project phase. This water will be collected at the point of generation and stored for onsite treatment. Treatment will consist of:

1. Settling – to allow particulates to drop out. Particulates will be applied to the land.
2. pH neutralization with an appropriate acid and or base
3. Testing – to ensure water is pH greater than 2 and less than 11.5
4. Applied to land – there will be no dumping of process water, treated or otherwise, to streams.

Wash water from cleaning tools will be collected and treated as process waste.

Household wastes are expected to be generated as well.

#### **Facility Structures Build**

During this phase, all of the onsite structures including the Control Building, Guard Station, back up generator buildings, inverter shelter, and other facility structures to house the power modules shall be built. Some of these buildings will contain office spaces and restrooms and will have lighting, plumbing, and air temperature control units. Other standard indoor features may be added as seen necessary.

#### Employee Operations & Duration

We estimate that approximately 20 – 30 workers will be on site, working 8 – 10 hour shifts, 5 days per week. Building material are to be transported to site by truck and the total build time is estimated to take 4 – 6 months. In addition, a site Security company shall be contracted to provide services 24 hours / day, 7 days / week.

#### Utility / Power Use and Source(s)

Diesel powered electrical generators shall provide most of the power onsite during this phase in addition to the battery powered hand tools.

#### Raw and Natural Material Use, Quantities, and Sources

Water will be the main resource used as the building will most likely be constructed from concrete blocks, covered with cement. Thousands of gallons of water are expected to be used and shall be supplied by either being delivered or from rain water that is to be collected in onsite storage tanks. The use of the onsite stream water is still under evaluation as is the constructing of the water treatment system and housing facility.

#### Waste Discharges / Disposal, Treatment, Recycling & Reuse Plan

The main waste expected is the concrete generation process water waste. It will be collected and managed in the same manner as the Foundation & Pilings process (see above). Any unused or off specification chemicals shall be managed by the building contractor but any other remaining chemicals shall be collected, stored, categorized, and disposed of as per the Guyana Hazardous Waste Regulations.

Solid construction waste in the form of off specification, excess, and unused building material may be generated as well. These materials shall be characterized as either hazardous or non hazardous. All non hazardous wastes shall be disposed of at the nearest municipal landfill and the hazardous wastes will be collected and disposed of as per the Guyana Hazardous Waste Regulations.

No chemicals shall be applied to the land and no discharges of liquids are to be allowed except for uncontaminated rain and runoff waters.

It is expected that household waste will be generated by the construction crews and these shall be accumulated and disposed of at the nearest municipal landfill.

#### **Solar Panel Leg Mounts**

During this phase, the solar panel leg mounts are to be installed onto the foundations. All mounts are premade, metal structures, and the installation should only require hand tools and battery powered hand tools.

#### Employee Operations & Duration

An estimated 10 – 20 workers shall work 8 – 10 hour shifts Monday through Friday. Leg mount installation should take 4 to 6 weeks.

#### Utility / Power Use and Source(s)

No utility power will be required as installation should be conducted with battery powered hand tools and labor.

#### Raw and Natural Material Use, Quantities, and Sources

This phase requires no raw or natural materials.

## Waste Discharges / Disposal, Treatment, Recycling & Reuse Plan

Any waste generated will consist of household waste and or unused scrap parts from the leg mounts.

### **Cable Trench Excavation**

Activities conducted in this phase will consist of digging trenches for electrical cables possibly using trenching machines and hand tools. The use of trenching machines is not confirmed at this time.

#### Employee Operations & Duration

Depending on if a trenching machine is used, the trenching crew will consist of 8 – 10 personnel who will work 5 days each week in 8 – 10 hour shifts. Excavation of all trenches should take no more than 1 month.

#### Utility / Power Use and Source(s)

No utility power will be used during these work processes.

#### Raw and Natural Material Use, Quantities, and Sources

No raw or natural resources will be used during this phase.

## Waste Discharges / Disposal, Treatment, Recycling & Reuse Plan

Solid waste expected during this phase would be from waste maintenance fluids from the trenching machine (if used) and household wastes generated by the crew. Any machine waste fluids will be managed and disposed of by the trenching contractor.

### **Cable Laying & Electrical Work**

This phase includes the installation of all the electricity conducting cables and wires for the power transmission. It is most likely that plastic and metal conduits will be installed in addition to cables and transmission wires. This work should be completed with manual labor and will include above and below ground cable installation.

#### Employee Operations & Duration

The electrical crew should consist of 8 – 10 personnel, employed 5 days a week, for 8 – 10 hour shifts. This phase should be completed within 1 to 2 months.

#### Utility / Power Use and Source(s)

No utility power should be necessary during this project phase. Personnel will most likely use manual and battery powered hand tools.

#### Raw and Natural Material Use, Quantities, and Sources

No raw or natural materials should be consumed during this project phase.

#### Waste Discharges / Disposal, Treatment, Recycling & Reuse Plan

Waste discharges expected would be from left over lubricants or adhesives or other chemicals required for the installation of electrical cables. The management and disposal of these shall be the responsibility of the installation contractor. Should any chemicals remain on site, they shall be collected, stored, and characterized as either non hazardous or hazardous until a suitable means of disposal is determined as per the Guyana Hazardous Waste Regulations. The crews would also be expected to generate some household wastes as well.

#### **Solar Panel Mounting**

This phase involves the manual mounting of the solar panels, onto their leg mounts.

#### Employee Operations & Duration

Multiple crews totaling 20 – 30 employees will be involved in the mounting the solar panels. Working hours will be 8 – 10 hours per shift for 5 days a week. This phase should be completed within 2 months.

#### Utility / Power Use and Source(s)

Only battery powered and hand tools should be used during this installation.

#### Raw and Natural Material Use, Quantities, and Sources

No raw or natural materials are expected to be consumed during this phase.

#### Waste Discharges / Disposal, Treatment, Recycling & Reuse Plan

This work should only consist of mechanical type installation therefore the crews should only generate household wastes.

#### **Power Module Installation**

During this phase the inverter, batteries, back up generators, electrical panels, switches and other electrical power regulating components shall be installed. Because these components are of a modular design, they will only need to be attached to their foundations or installed in their already built structures and attached to the power transmission cables and wires.

#### Employee Operations & Duration

Approximately 10 – 20 workers working 8 – 10 hour shifts, 5 days per week will be responsible for installing the facility power modules. This phase should be completed within 4 – 6 weeks.

#### Utility / Power Use and Source(s)

The power modules will be delivered to the site by trucks and placed in position by cranes. There should be no use for utility power as all electrical attachments will be performed manually.

#### Raw and Natural Material Use, Quantities, and Sources

No raw or natural resource use is foreseen at this time.

#### Waste Discharges / Disposal, Treatment, Recycling & Reuse Plan

Only household wastes should be generated by the installation crews as this manual and mechanical process, only.

### **Testing**

Once all construction and installations are completed the equipment will need to undergo some basic, manufacturer tests to ensure they function as per design. The facility operators and engineer shall be responsible for the testing. Should any problems arise with the physical structures or components the responsible contractor will be required to return to the site and correct the problem unless it can be addressed by the site engineer or operators.

#### Employee Operations & Duration

One engineer and approximately 4 Operators will be on hand for the testing. At least 2 Operators will be on site 24 hours a day, 7 days a week. Testing should last no more than 1 week.

#### Utility / Power Use and Source(s)

Any power during this phase will be provided by the facility.

#### Raw and Natural Material Use, Quantities, and Sources

All process water used on site shall be provided by collected rainwater.

#### Waste Discharges / Disposal, Treatment, Recycling & Reuse Plan

Only household wastes should be generated during this phase.

### **Line Charging & Distribution**

Upon completion of the testing phase, the facility will start to produce electrical power for all onsite activities and local customers. There will be no decommissioning. At this time all construction will cease, and the facility will exist solely as a power production and transmission facility.

Diesel fuel will be stored on site for the back up power generators.

#### Employee Operations & Duration

To operate the plant there will be at least 2 Operators, one or more security contractor(s), and a maintenance employee, on site 24 hours a day, 7 days a week. A janitorial company will be contracted

to clean the facility structures on a regular basis. At times, during operation, cleaning crews will be contracted to conduct cleaning of the solar panels, themselves. The schedule for panel cleaning is yet to be determined.

#### Utility / Power Use and Source(s)

All utility power required will be generated by the facility.

#### Raw and Natural Material Use, Quantities, and Sources

Collected rain water will be used for all on site, process water needs with the exception of drinking water which will be transported to the facility. Use of the onsite creek water is still to be determined.

#### Waste Discharges / Disposal, Treatment, Recycling & Reuse Plan

Household wastes and sewage will be regularly generated by this facility during operation. The household wastes will be disposed of at the nearest municipal landfill and the sewage will drain to a leach field. Grey water will either be applied directly to land or discharged through the septic leach field.

Only household, non industrial cleaners (glass cleaner or Dawn) will be used to clean the solar panels.

All solar panel cleaning process water will fall directly to the ground as disposal.

There will be no waste water discharges to the onsite stream.

#### **Loo Creek Waste Management Process**

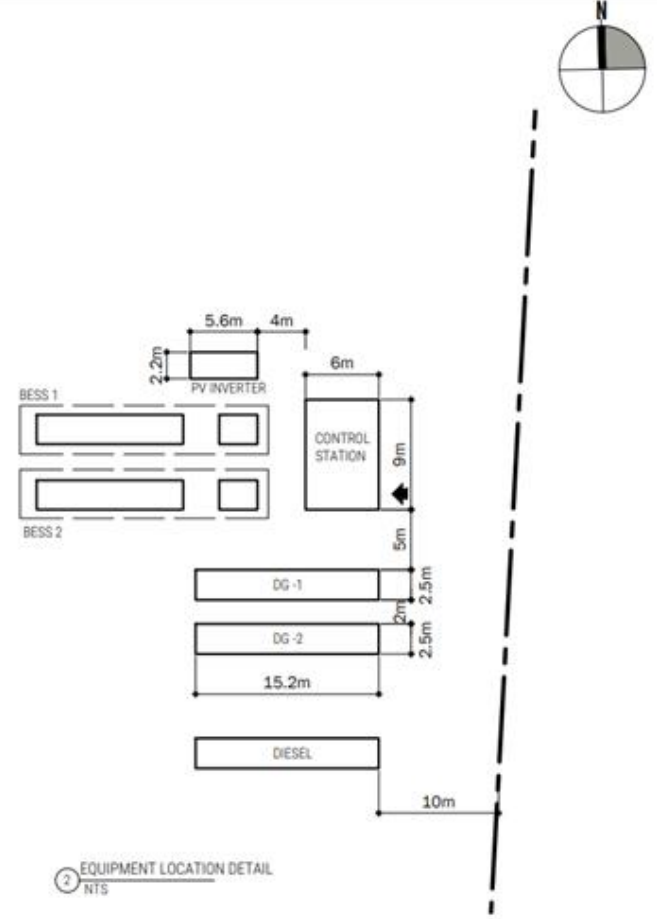
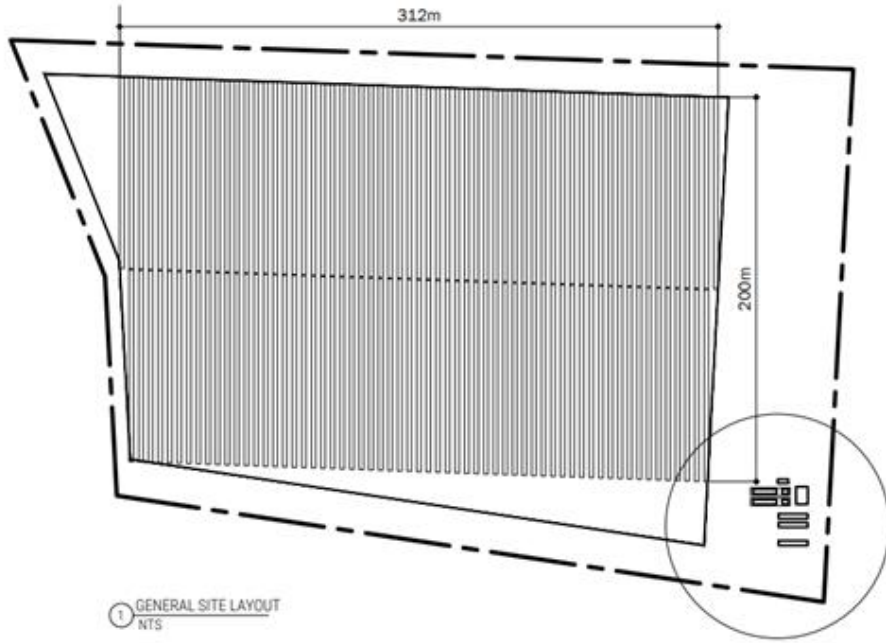
This process shall be followed for all wastes generated on site during the construction and production phases of this project.

Before any solid or liquid substance is disposed it shall first be designated as either a **“Hazardous”** or **“Non Hazardous”** waste. This determination shall be made in accordance with the Guyana Environmental Protection Agency’s (EPA) Hazardous Waste Regulations. Hazardous wastes shall be segregated, containerized, and accumulated separately from non hazardous wastes and the two shall not be mixed. Disposal methods shall be according to any approved and applicable international or United States Resource Conservation and Recovery Act (RCRA) hazardous waste disposal technologies and standards. Disposal methods will however be limited to the best available disposal technologies that are available in Guyana unless a more effective technology is available and at an equal or lower cost.

All hazardous wastes shall be collected in closed, 55gal drums or smaller containers and stored until transported to an approved hazardous waste disposal vendor such as Tiger Rentals.

**Household wastes (non hazardous)** shall be collected and shipped off site, for disposal, at the nearest municipal dump facility.

# PROPOSED SITE PLAN



INTEGRATED CONTROLS & POWER SOLUTIONS	LOO CREEK MICROGRID			
	SITE PLAN			
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#### **IV. POTENTIAL PROJECT IMPACTS AND SIGNIFICANCE**

The Loo Creek Solar Farm Project area is proposed to cover approximately 10.1 hectares in Region IV, Guyana. All construction and waste generation activities will be conducted on site therefore there will be no impact to nearby countries and only temporary environmental impacts to the surrounding geographic area beyond the project boundaries.

The majority of the negative environmental impacts will only occur during the build phase of the project and once the facility is built, all acute environmentally harmful activities shall cease. Furthermore, there will be no cumulative impacts as the energy production has very few by products that require disposal. The probability of any significant local or regional environmental impacts will be minimal due to the low quantities of wastes generated and by the limited number of natural resources required to build and sustain such a facility.

#### **Cumulative and Long Term Foreseen Impacts and Proposed Management and Mitigation Measures**

##### **Habitat Loss**

This is a major negative environmental impact as it is permanent. The existing forest must be completely cleared eliminating habitat to all but below ground and ground level dwelling creatures. Birds and other creatures that rely on the forest canopy and low scrub cover will no longer be able to dwell in the site area.

Grass will be planted on the cleared ground, under the panels to provide some cover and reduce surface soil erosion.

##### **Reduced Carbon Dioxide (CO<sub>2</sub>) Absorption Capacity**

The trees and other foliage that are cleared will no longer absorb atmospheric Carbon dioxide (CO<sub>2</sub>) reducing the regions ecological carbon sink capacity. On an ecological or global scale the amount of carbon absorption capacity will most likely be minimal however it still contributes to the cumulative effect when taken into account with all other man induced deforestation on the continent.

The grass that will be planted to prevent habitat loss and soil erosion will provide some CO<sub>2</sub> absorption for the site but still not at the levels of the previous vegetation.

##### **Thermal Emissions**

There will be some noticeable heat emissions, to the atmosphere, from the solar panels themselves when they reflect the sun's rays. This is not expected to significantly impact the surrounding environment however it is a permanent and unnatural change to the location. Not only would the panels have replaced the trees, but they will now be reflecting thermal radiation.

The grass planted will help diminish some of the heat projected but not significantly.

##### **Harmful Air Emissions**

The emissions from all motor vehicle exhaust and diesel powered generators will stop once the solar farm construction has been completed. After facility construction and for the process of electrical

energy generation there will be two 2.5 MW diesel powered generators serving as back up electrical power generation. These will emit exhaust, ash, and heat during operation.

Air pollution control devices will be installed on both generators to greatly reduce and possibly eliminate all hazardous air emissions. The air pollution control devices will also include a reverse refrigeration module that will generate ice that can be provided to the local farmers in the area. In addition, the generators will only be intermittently used in the event that there is not enough power stored in the batteries to provide to the grid.

#### Social, Economic & Cultural (positive)

It is the belief of Caiman Industries, Environmental that the positive impacts from building this facility will far outweigh any aforementioned negative environmental impacts.

When built, this facility will provide 5.8 MW of uninterrupted electrical power within a 10 km radius. The power will be almost without any waste byproducts generated, renewable, and long lasting (20-year estimate for plant components). The area surrounding this site currently has no power provided to it from any municipality and the area is slated for economic development in the future.

In addition, the facility can operate as a standalone power generation plant or can be attached to an electrical grid, should one be built in the future and it fits in with the micro grid concept as outlined in the Guyana Green Development Strategy.

Other added positive benefits include water conservation, as the facility will capture rain water for use or water from the on site stream. There will also be minimal process wastes generated during the production of electricity and all waste will be shipped off site for disposal.

### Project Ecological Impact Table

IMPACT & SOURCE	MAGNITUDE	DURATION	FREQUENCY	MITIGATION / OUTCOME
<p>Noise</p> <ul style="list-style-type: none"> <li>• Earth moving equipment</li> <li>• Generators</li> <li>• Power tools</li> <li>• Electrical equipment (humming)</li> <li>• Impact</li> <li>• Motor vehicles</li> </ul>	Negligible	The entire project with the exception of the Testing and Line Charging & Distribution Phases.	8 – 10 hours / day	There is no mitigation for the noise created except for hearing protection, that will be provided to workers. The remoteness of the area will limit negative impacts to the surrounding community as will the dense vegetation and tree cover that surround the work site. High noise should be confined to the project site only.
<p>Surface Vibration</p> <ul style="list-style-type: none"> <li>• Motor vehicles</li> <li>• Earth moving equipment</li> <li>• Generators</li> </ul>	Negligible	The entire project with the exception of the Testing and Line Charging & Distribution Phases.	8 – 10 hours / day	There is no mitigation for surface vibration however, once the project is in the Test and Distribution Phase, all further vibrations from earth moving and construction equipment shall cease. Any future vibration will only come from the generators and it will be negligible.
<p>Land Clearing</p> <ul style="list-style-type: none"> <li>• Habitat destruction</li> </ul>	Major	Permanent	24 hours / day	Grass shall be planted on in the area that was cleared, under the solar panels. Unfortunately, the removal of the trees and larger vegetation will be permanent during the existence of the completed facility.
<p>Air Emissions</p> <ul style="list-style-type: none"> <li>• Generators – during build</li> <li>• Back up Generators – post build, during operation</li> <li>• Motor vehicles</li> </ul>	Negligible	The entire project with the exception of the Testing and Line Charging & Distribution Phases.	8 – 10 hours / day	There will be no mitigation during the build phases however air pollution control devices shall be installed on the Back up Generators. These control devices shall include a reverse refrigeration module that will create ice from the heat generated by the generators. Furthermore, the generators are not for continual use but only to be used as a back up power supply in the event that the batteries cannot provide enough energy to the grid.
<p>Groundwater Contamination</p> <ul style="list-style-type: none"> <li>• Cleaning chemicals</li> <li>• Vehicle fluid discharges</li> <li>• Spills</li> <li>• Solid wastes</li> </ul>	Negligible	1 – 3 weeks / year	8 – 10 hours / day	Only common household glass cleaning products will be used to clean the panels. Process waters will be treated and tested before being applied to the ground.

<ul style="list-style-type: none"> <li>Process water discharge from solar panel cleaning</li> </ul>				
Solid Wastes (ground contamination) <ul style="list-style-type: none"> <li>Domestic trash</li> <li>Used / partially full containers</li> <li>Discarded chemicals</li> <li>Bulbs / lamps</li> <li>Used / unused / off spec materials</li> </ul>	Negligible	From the start of the project and for the total existence of the facility	24 hours / day	All wastes will be removed from the site for disposal except for sewage, which will be managed in a septic tank and leach field.
Thermal <ul style="list-style-type: none"> <li>Reflection from solar panels</li> </ul>	Negligible	Permanent	During sunlight hours only	None
Ecological <ul style="list-style-type: none"> <li>Lower CO<sub>2</sub> absorption from the site due to removal of forest cover</li> </ul>	Significant	Permanent	24 hours / day	Grass shall be planted on the cleared surface in the location of the solar panels and all other open areas.

**Negligible:** impact only lasts while an activity is being performed and ends once the activity has ceased. The activity effects are not noticed by employees during and after the activity. The local water, air, ground, and plant and animal life are unaffected, for any length of time, during and after the activity.

**Noticeable:** impacts are able to be noticed by employees, site visitors, passerbys, or local residents and discomfort or annoyance is expressed by the affected person. The surrounding air, water, or land is visibly affected by an activity. Although noticeable, there are no ill effects from these impacts once the activity creating the impact ceases.

**Minor:** impact negatively affects an employee, visitor, passerby, local resident, or the surrounding environment but only during the activity and the effects of the activity cease once the activity has stopped or there is no impact lasting more than one week.

**Significant:** impact suffered by an employee, visitor, passerby, local resident, or the surrounding environment, due to an onsite activity that affects the party for more than a week, after the activity has ceased.

**Major:** any activity that causes irreparable damage to an individual or the environment or damage that takes more than one (1) year to correct. Correcting damage means returning the affected individual, group, or environment to at least the condition it was before the activity occurred.

## **Public Consultations / Stakeholders Summary & Minutes**

To date, Caiman Industries, Environmental (CIE) has only contacted the Guyana Power and Light, Inc. (GPL) to notify them of the intention to build. GPL was favorable to the idea and shared that the project area does not currently support enough population for GPL, or any other municipality, to provide electrical energy even though there are village settlements and small farms all along the Soesdyke Linden Highway.

Within the next 2 months from the submission of this project summary, CIE will reach out the Office of the Prime Minister, Lands & Surveys, and the National and Municipal Democratic Councils for the Loo Creek area.

## **Knowledge Gaps & Unknowns**

Being as this is the first hybrid solar farm of its size to be proposed in Guyana there will be obstacles and gaps of knowledge for CIE to overcome. Those that are known at this time are listed below however there may be more that come to light as the project unfolds.

### **Power Transmission to Customers**

This is the largest concern and one that will be addressed during consequent meetings with the Office of the Prime Minister and the Democratic Councils. At this time there is only a limited idea of who this proposed facility will provide power to. The local inhabitants are scattered and must be contacted. Furthermore, there is the concern of who will pay for the transmission lines, where they will be placed, and who will install them. Although it is known that the area will be “developed” in the future and other industries are already looking to move to the area, it is not known how or where they are to be built, their power needs, or how the power will be transmitted.

### **Water Use & Waste Volumes**

The Engineering Detailed Design is still to be developed. As such, CIE cannot determine the total amounts of concrete and asphalt that will be required for structure and road building. This directly inhibits our ability to determine how much waste will be generated from these activities.

### **Timelines**

The timelines are currently an estimate as we know there will be potential delays of construction materials, shipments of supplies, and manpower. Although we do not expect this to be significant, it is still a factor for consideration.

### **Back up Power Generator Use and Emissions**

At this time we do not know how often, if at all, the back up generators will be used. The batteries will have a 5 MW storage capacity, matching the solar panel generation levels but the energy usage levels will determine how fast the power is used. If there are periods of limited sun and enough energy has not been generated to fill the batteries and or provide power during hours of darkness, then the back up generators will have to be used. How often that will be is unknown at this time.