GUYSOL

March 2023

Guyana Utility Scale Solar Photovoltaic Program (GUYSOL)

Project Summary – Dacoura

Linden

The Guyana Power and Light
103 Carmichael Street,
North Cummingsburg,
Georgetown.

Norway's International Climate and Forest Initiative

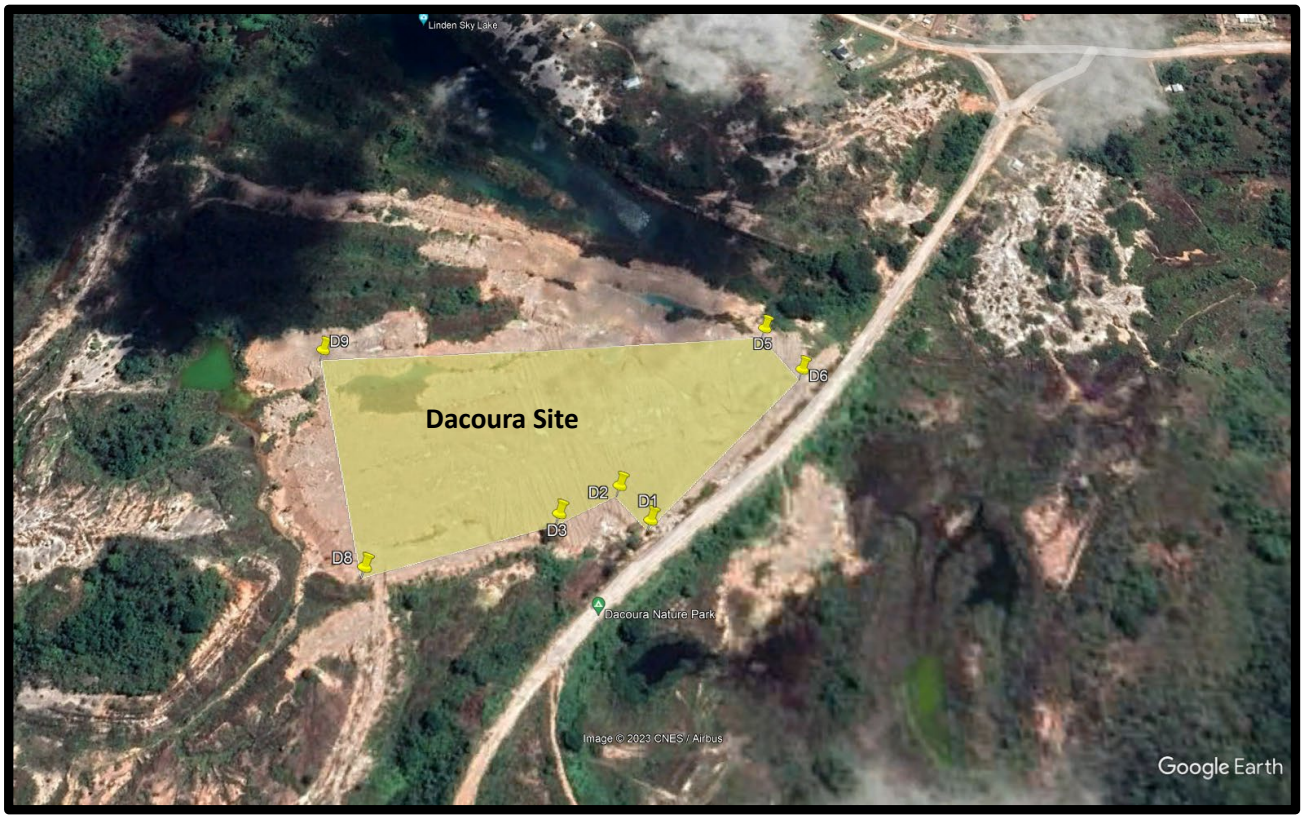
PROJECT SUMMARY – DACOURA

- ***A detailed description of the proposed project, including:***
    - ***i. Physical location and its characteristics along with GPS coordinate/s; where applicable distances from the closest town, settlement, indigenous community, and nearby waterways such as creeks, rivers, closest town, etc; general/predominant land use (residential, tourism, agricultural, commercial, industrial, etc.) of the area; sensitive receptors (daycare facilities, schools, hospitals, etc.) likely to be affected by the proposed project; the relative abundance of natural resources in the area; and the non-disputed nature of the land.***

Dacoura – Linden

The proposed solar PV farm for Dacoura, Linden otherwise known as "A portion of Lot No. 54" is situated on the left bank of the Demerara River in the county of Demerara. As it stands, the site is overburden indicative of mining as the previous land use. Southwest of the proposed solar PV site lies the Dacoura Creek which leads to a tailings pond. Directly south of the site, is characterised as overburden, whilst the north-eastern boundary indicates some secondary growth bushes, with the Guyana Water Incorporated (GWI) Reservoir beyond this point. The eastern boundary of the proposed site is also recognised as overburden. Access to the site is facilitated through the south-eastern boundary by an 'all-weather road.' South of the proposed site is also characterised as overburden with a gully present.

Wider surrounding land uses include the Dacoura Nature Park (0.06 km from the southern boundary) and the Linden Blue Sky Lake (0.34km from the northern boundary). The communities within proximity to the project site are Wisroc, Christianburg, New Silvercity and One Mile with key services including several schools (Wisburg Secondary School, New Silvercity Secondary School, Wismar Hill Nursery School), Wisroc Plant Reservoir, entertainment, small shops and food establishments. Other services include a printing shop, a sewing studio and a dumpsite. Dacoura can be found at Latitude 5.986945° and Longitude -58.322217°.



Map showing polygon of the Linden Dacoura Site.

ii. A description of all feasible and reasonable alternatives.

Several factors were used to determine the alternatives selected for the project. These included the availability of land, which constrained the identification of possible locations for the proposed locations of the project, proximity to existing infrastructure, specifically access roads and utility substations, and the solar resource potential; for an overview of Global Horizontal Irradiance (GHI) in Guyana. This refers to the total solar energy received on a unit area from above by a surface horizontal to the ground. The yearly sum of the GHI is of particular relevance for PV power. Additionally, the required area was determined based on an estimation of 5 acres per MWp of installed capacity, which would provide adequate space for the solar panels, battery storage, roads, switchgear, proper buffer areas and other required infrastructure. Furthermore, the consideration of the legal factors governing the sites and their selection were noted and played a vital role in the selection of the proposed sites. The solar resource potential at each site was estimated for crystalline silicon modules with a fixed system loss of 14 percent. This is based on the European Commission's Photovoltaic Geographical Information System (PVGIS) Tool, which utilizes satellite images to

calculate solar radiation data. The PVGIS-SARAH dataset was chosen since it has hourly time resolution, a spatial resolution of 3 arcminutes, and covers Guyana for a time series of 2005-2016.

Joint site visits were done on April 7, 2021, with NICIL. Initially, Block 37, Retrieve, and Wisroc were identified by NICIL as available for GPL acquisition. However, GPL and NICIL held additional site visits on April 24, 2021, in the Region. It was determined that the high number of informal occupants at the Wisroc Location would make surveying difficult and result in significant social implications. As such, an alternative site at Dacoura was identified.. NICIL began cadastral surveys on May 3, 2021, and completed the same on May 7, 2021. In the interim, NICIL has granted permission for GPL to commence de-risking work at the locations on April 30, 2021. NICIL is currently processing GPL's acquisition for Dacoura.

iii. Description of any existing baseline information on the physical (landscape, soil, water, air, the use of natural resources), ecological (flora and fauna), and social environment (economic and cultural aspects).

Based on the ESA carried out the following existing baseline information was gathered:

PHYSICAL ENVIRONMENT -

a) LANDSCAPE

Dacoura is located in the White Sand Plateau and Older Pedi plains physiographic region. This region, also known as the Hilly sand and clay Region, is found just inland of the Coastal zone. The region is gently undulating with altitudes varying from about 15m above sea level close to the coast to 150m in the south. The White Sands overlie brown sands, and the unit also contains deltaic sands and clays, laterite gravels and bauxite, and is deeply dissected in the centre north of the area. In the north-east, and corresponding to the greatest extent of white sand, the plain has a distinctive vegetation of Wallaba and Dakama forest, Muri scrub and Savannah grasslands. The white, sandy soil is permeable and low in nutrients, and forms the most vulnerable ecosystem in Guyana.

b) SOIL

The soils have been developed on old deltaic and continental deposits with some inclusions developed on crystalline rocks. The majority are red-yellow latosols and sandy regosols with steep, gravelly and truncated phases. The soils have been mapped as:

- **1c** - Regosols, white quartz phase (Quartzipsamments with Psammaquents, Endoaquepts)
- **2c –** Red-yellow latosols, light textured phase (Ustochrepts with Quartzipsamments, Kanhaplustults)
- **3c** – Red-yellow latosols, steep phase including red-yellow podzolic intergrades to red-yellow latosols (Kanhaplustults with Dystrochrepts, Kandiudults)
- **4c** - Regosols, laterite gravel phase, including red-yellow latosols, forest and savannah phases (Kanhaplustults with Kandiudults, Eutrochrepts)
- **5c** - Red-yellow latosols, groundwater laterites and lithosols (Kanhaplustults, Plinthudults, Kandiudults)
- **6c** - Groundwater laterites, truncated phase and red-yellow latosols (Plinthustults, Plinthaquults, Kanhaplustults)

1c - Regosols, white quartz phase (Quartzipsamments with Psammaquents, Endoaquepts)

This large unit is extensive on the interfluves between the Mazaruni, Essequibo, Demerara, Berbice and Corentyne rivers in the north centre of Guyana with patches west of the lower Essequibo in Region 2 and between the Berbice and Corentyne rivers in central Guyana and consists almost entirely of soils developed from quartz sand. The soils are excessively well drained sands of extremely low fertility with fertility and water-holding capacity limitations. The land cover is largely forest, often Wallaba and Dakama and Muri shrub.

2c – Red-yellow latosols, light textured phase (Ustochrepts with Quartzipsamments, Kanhaplustults)

This large unit is extensive inland of unit **1c** between the Demerara and Berbice and Corentyne rivers and extends to the eastern Rupununi savannas and east to the Essequibo River and the Kanuku Mountains. It is also extensive in the southern savannas to the Sierra Acarai. The soils are largely very deep, well drained sands over sandy clays with limitations of fertility and low water holding capacity, but which have favourable physical properties that could be ameliorated by land management and irrigation. The land cover is forest.

3c – Red-yellow latosols, steep phase including red-yellow podzolic intergrades to red-yellow latosols (Kanhaplustults with Dystrochrepts, Kandiudults)

This association occurs in north-central Guyana around the lower Cuyuni, Mazaruni and Essequibo rivers and between the Cuyuni and Barama rivers. The unit is characterised by the hilly terrain and steep slopes with deep, well drained sandy loams to sandy clays of low fertility. The main limitation is the terrain with a high erosion potential if the forest cover were to be removed.

4c - Regosols, laterite gravel phase, including red-yellow latosols, forest and savannah phases (Kanhaplustults with Kandiudults, Eutrochrepts)

This unit describes soils containing large amounts of laterite gravels. They occur east of the Pakaraima Mountains, north of the Siparuni River and in the Ebini hills between the Mazaruni and Potaro rivers. They are also extensive in the northern Rupununi savannas forming the higher ground between the alluvial plain and the Kanuku Mountains. The soils are generally very shallow (though occasionally deep), very gravelly (>70 percent gravels) and vary from darker coloured gravelly sandy clay loam under forest to lighter coloured gravelly clay loams on the savannas, both of very low fertility. The main limitations are the high gravel content resulting in low water holding capacity and low fertility.

5c - Red-yellow latosols, groundwater laterites and lithosols (Kanhaplustults, Plinthudults, Kandiudults)

This mapping unit describes soils formed from crystalline rocks in the southern Rupununi savannas between Dadanawa and Sawariwau in the north to Achiwuib, Aishalton and Shea in the south and east. The landform is an undulating plain with shallow lithosols and rock outcrops at the highest elevations, latosols on higher ground and laterites and gleys in depressions. Most latosols are deep, well drained sandy loams to sandy clays with shallow lithosols on crests and deep, poorly drained gleys in depressions. The soils all have very low fertility and are prone to erosion which are the main limitations.

6c - Groundwater laterites, truncated phase and red-yellow latosols (Plinthustults,

Plinthaquults, Kanhaplustults)

This unit also occurs in the southern Rupununi savannas, southeast of the Kanuku Mountains and extends eastwards towards the upper Essequibo River. The dominant soils are gravelly over plinthic clays with highly variable depths from shallow to very deep, often topography dependent when the gravelly layer may be absent. The soils have low fertility and can be shallow and gravelly in places which are the main limitations. The land cover is savanna in the west, forest in the east.

c) WATER QUALITY

Dacoura falls in the Upper Demerara – Berbice Region (Region 10). The township of Linden is within this region. It is 15,050 km2 or 7 percent of the country. This is the interior of the country, with the Essequibo River flowing through the westernmost area. This region lies in the interior plains. About 25 percent of the region along the Essequibo, Demerara, and Berbice Rivers possess enormous quantities of fresh water are available yearround. Several water quality and gauging stations are in this region. About 60 percent of the region have enormous quantities of fresh water are available from April through August and November through January with large to very large quantities available the rest of the year.

Ground water exploration during military exercises is not recommended in most of this region because fresh water is lacking or scarce, or access is difficult or impossible due to steep GYG 1007 - Guyana Utility Scale Solar PV Project | 79 vegetated terrain and lack of roads. The areas where ground water exploration is recommended, occupy about 5 percent of the region in the northeast where the coastal aquifer system is located north and east of the population centre of Takama. The White Sands Formation is centred around the town of Linden in the north. Accessibility may be difficult, prohibiting ground water exploration.

d) AIR QUALITY

The concentration of PM2.5 at the proposed Dacoura solar farm site ranged from 5.3 to 10.8 g/m3, which does not exceed its 24-hour average by the National Ambient Air Quality Standards. Additionally, PM10 values did not exceed the stipulated levels, with the highest value recorded at 30.3 g/m3. Overall, the current baseline air quality within the area is good. Total volatile organic

compounds were not detected at the site.

e) ECOLOGICAL ENVIRONMENT –

i. FLORA

The vegetation in Linden can be classified as low evergreen swamp forest. Some of the characteristic species that are naturally occurring in Linden are Symphonia globulifera, Tabebuia insignis/fluviatilis, Pterocarpus officinalis and Euterpe oleracea. Secondary species of shrubs black and sweet sage (*Cordia spp.*) spread out in fragments along the area while species such as manicaria saccifera commonly found as a narrow belt along rivers also occurred. Vegetation in this region is grouped as:

A. Non-flooded lowland forests:
    1. Tall, evergreen, non-flooded forest (rainforest)
        Lowland 10-400m, macro thermic, ombrophilous
        Floristic composition unknown
    2. Tall evergreen, seasonal forest:
        Lowland 10-400m, macro thermic, ombrophilous, 27-40m tall
        Goupia, Swartzia, Aspidosperma, (SE districts)

B. Non-flooded lowland forest on white sand:
        Tall, evergreen, sclerophyllous forest (Wallaba forest)
        Lowland 10-400m, macro thermic, ombrophilous, 25-35m tall
        Eperua - Eperua

C. Riparian forests:
        Tall, evergreen, flooded riparian forest (include. Mora forest) Lowland, 0-400m, macro thermic, omborphilous, 30-45m tall
            Mora Exceisa, Carapa, Simaruba

D. Non-flooded lowland and montane shrublands:
            Scieromorphic scrub (white sand plains, Pakaraima region)
        Lowland/upland 100-1500m, macro-sub mesothermic, ombro-to tropophilous, 2-6, tall, evergreen
            Humiria, Terminalia/Bonnetia, Chalepophyllum

A. Non-flooded interior savannas and meadows
    Lowland savanna on white sand (intermediate savannas)

Lowland 30-100m, macro thermic, 0.2-1m tall, perennial

Panicum, Lagenocarpus, Aboiboda, Xyris

The area designated for the solar PV site for Dacoura in Linden can be regarded as muri shrub/white sand savannah.

Species occurring at the proposed solar PV site for Dacoura include:

SPECIES NAME	COMMON NAME
Andropogon bicornis	Cow tail
Vismia macrophylla	Largeleaf bloodwood
Chrysobalanus icaco	Fat Pork

ii. FAUNA

Overall, no ecologically significant or critical habitat was found at the proposed sites, so there is no risk of disturbance to any critical habitats. No endemic species were found inhabiting the proposed sites, a few species were CITES listed and most were LC Least concern.

f) ***SOCIAL ENVIRONMENT*** -

a) ECONOMIC ASPECT

Dacoura, the community proposed for the solar PV farm is within proximity the Wisroc Housing Scheme in Linden. Since no current census is available for Dacoura, an estimate was taken based on Wisroc which is 3932. For the survey, a total of 100 households in Dacoura were interviewed. It was found that residents attained varying levels of education, ranging from none to tertiary qualifications. Assessment of employment status revealed 31% of respondents were unemployed. This consisted of 19% females, and 12% males. Furthermore, 10% of residents were found to be employed, consisting 6% of females, and 4% males and 9% of the surveyed population were retired. The average monthly income of each household in Dacoura ranged from $55,000 – $175,000. The largest, 80% of respondents have a household income between $55,000- $94,000. At the same time,

14% indicated a household income between $95,000 to $134,000, and 4% indicated between $135,000- $174,000, while 2% received an income between $135,000- $174,000.

In the community of Dacoura, 96% of respondents indicated that lack of employment was the main social issue. Meanwhile, the remaining 4% indicated the main issue as poverty. The respondents had no indication of any problem with discrimination or any other social issues. Concerning the level of social cohesion, 87% of the respondents indicated that the community had a good cohesion, whilst 7% indicated average levels, and 3% indicated poor levels of community cohesiveness. All residents stated that there was no opportunity for local employment.

g) CULTURAL ASPECT

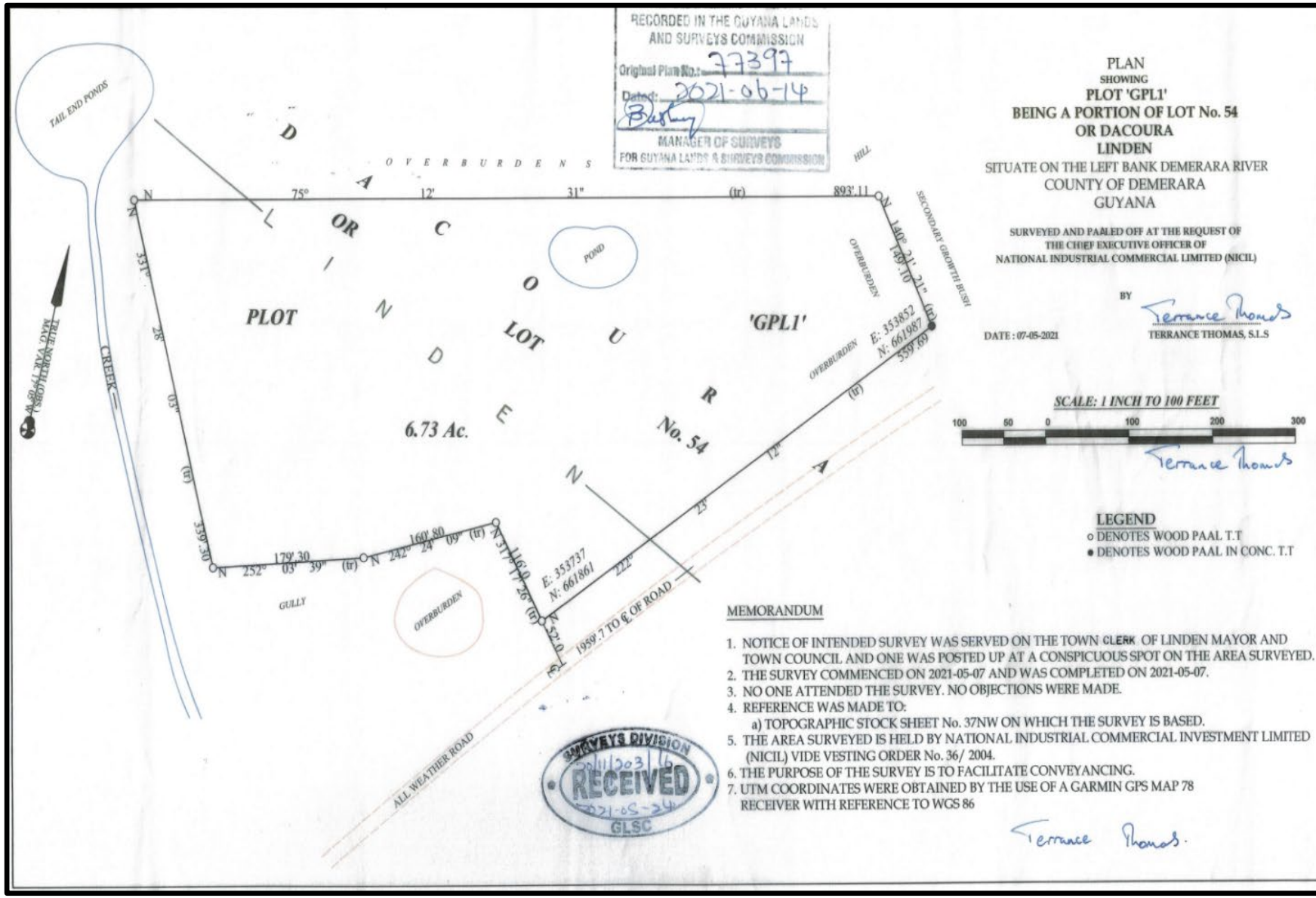
While there may be a temporary increase of construction workers in the area, the local customs, cultures, and social relations are not expected to be significantly impacted. There are no cultural sites or near to the project site. This impact is considered minor.

iv. Layout of the project, presented on a map with a scale relevant to the size of the development with the following details:

a) an accurate indication of the proposed site position, as well as, the positions of alternative site/s, if any;

b. The closest town is Linden, which is approximately 0.5 miles from the project site.

b) names of major and minor access road/s to the site;



RECORDED IN THE GUYANA LANDS AND SURVEYS COMMISSION
Original Plan No.: 77397
Dated: 2021-06-14
MANAGER OF SURVEYS
FOR GUYANA LANDS & SURVEYS COMMISSION

PLAN
SHOWING
PLOT 'GPL1'
BEING A PORTION OF LOT No. 54
OR DACOURA
LINDEN
SITUATE ON THE LEFT BANK DEMERARA RIVER
COUNTY OF DEMERARA
GUYANA

SURVEYED AND PAALED OFF AT THE REQUEST OF
THE CHIEF EXECUTIVE OFFICER OF
NATIONAL INDUSTRIAL COMMERCIAL LIMITED (NICIL)

BY Terrance Thomas
DATE : 07-05-2021 TERRANCE THOMAS, S.L.S

LEGEND
- o DENOTES WOOD PAAL T.T
- • DENOTES WOOD PAAL IN CONC. T.T

MEMORANDUM

1. NOTICE OF INTENDED SURVEY WAS SERVED ON THE TOWN CLERK OF LINDEN MAYOR AND TOWN COUNCIL AND ONE WAS POSTED UP AT A CONSPICUOUS SPOT ON THE AREA SURVEYED.
2. THE SURVEY COMMENCED ON 2021-05-07 AND WAS COMPLETED ON 2021-05-07.
3. NO ONE ATTENDED THE SURVEY. NO OBJECTIONS WERE MADE.
4. REFERENCE WAS MADE TO:
   a) TOPOGRAPHIC STOCK SHEET No. 37NW ON WHICH THE SURVEY IS BASED.
5. THE AREA SURVEYED IS HELD BY NATIONAL INDUSTRIAL COMMERCIAL INVESTMENT LIMITED (NICIL) VIDE VESTING ORDER No. 36/ 2004.
6. THE PURPOSE OF THE SURVEY IS TO FACILITATE CONVEYANCING.
7. UTM COORDINATES WERE OBTAINED BY THE USE OF A GARMIN GPS MAP 78 RECEIVER WITH REFERENCE TO WGS 86

Terrance Thomas.

SURVEYS DIVISION
RECEIVED
2021-05-24
GLSC

v. A description of the design of the proposed which shall include:

a) Design\construction drawings, specification of any structures, volume of expected pollutants, etc.

The construction drawings are currently being developed and as soon as they are accepted and approved, they will be submitted to the agency.

b) The project size, e.g. capital investment, number of employees projected for each stage of the project, rates of production, transportation route etc

The Capital investment for the entire GUYSOL project is 83.3 million united states dollars. The number of employees is yet to be determined. It is estimated that this project site will have an output of 3MWp.

c) Activities associated with all development stages from construction to closure:

a. operation and production processes and alternative design/s considered.

To be determined.

b. a guide for all stages of the project from raw material to the finished product.

To be determined

c. technical description of the proposed project's process/activity accompanied by a Process Flow Diagram/s;

To be determined

vi. Use of Natural Resources: approximate quantities of raw materials required at each stage of the project and their possible sources;

To be determined

vii. Source of utility services such as water supply and treatment options, energy/electricity and communication facilities;

Water will be suppled from GWI, while transmission lines will be established from the nearest transmission lines to the site to facilitate the flow of the power produced

from the solar farm back in to the grid.

viii. ***Waste production: types of waste, the monthly quantity/volume of waste managed (generated, stored, transported), the volume of effluent to be discharged along with a chemical analysis indicating the effluent's composition and methods of waste disposal/treatment. Potential locations for recovery/disposal sites shall be*** **identified** ***with justifications for the site selection;***

The waste produce will only be domestic waste. Which will be disposed of by a hired service provider.

ix. ***The duration of the project for each phase; and***
To be determined

x. ***Decommissioning plan (where applicable).***

Potential Impacts and their Significance

xi. **An assessment of the potential impacts of the proposed development and its significance in relation to:**

a. ***the extent of the impact or the area of influence: the geographical area that may be affected by the proposed activity and the manner in which the various aspects of the environment: physical (landscape, soil, water, air, the use of natural resources), ecological (flora and fauna), and social (economic and cultural aspects) may be impacted;***

Site	Construction Phase	Operation	Decommissioning
Dacoura	Dust generation		
	Dust generated during projects works is expected to be brief, frequent and localized. It will be attributable to site preparatory works mainly involving heavy machinery (clearing, levelling, excavation, grading). This impact is considered minor as it is site specific and short term.	This impact is not likely to occur during operation.	This is expected to be brief, frequent, and localized due to dismantling of the site and use of heavy machinery (clearing, levelling, excavation, grading). This impact is considered minor.
	Reduction of carbon emissions (+)		
Dacoura	This impact is not likely to occur during construction.	There is an expected long-term reduction of Greenhouse gas emissions. Given the current and projected loads at each site, the Linden component is expected to save a total of 17,259 tCO2 annually. The generation of energy through the PV system provides a source of green power generation and significantly reduces dependence on fossil fuels. The impact is considered major.	This impact is not likely to occur during decommission.

	Nitrogen and Carbon oxides emissions		
	This is expected to be brief and localized due to the operation of light and heavy vehicles, transportation trucks, generators, compressors and other construction equipment. This impact is considered minor.	The process of generating electricity from a solar power plant does not emit any harmful Greenhouse gases and/or waste products since substation only distributes power. The impact is considered insignificant.	This is expected to be brief and localized due to the operation of heavy machinery, transportation trucks, generators, compressors and other construction equipment. The impact is considered minor.

Site	Construction Phase	Operation	Decommissioning
	Noise level		
Dacoura	The presence of and operation of light and heavy vehicles, transportation trucks, generators, compressors and other construction equipment. Heavy machines will generate noise; however, this impact is considered low as it is expected to be brief, frequent and localized.	This phase will produce localized low levels of noise due to operation of electrical components of the PV plant, maintenance activities, and vehicular traffic. The impact is considered minor.	Brief, frequent and localized elevated noise levels due to dismantling of facilities, increased vehicular traffic, and movement of equipment. This impact is considered minor.

Site	Construction Phase	Operation	Decommissioning
	Loss of topsoil		
Dacoura	Since this land is heavily mined and considered overburden from these activities, the change on this land is considered insignificant.	This is considered positive as it will change the nature of the land from spoiled/waste to a positive development.	Removal of facilities and supporting structures will disturb topsoil once more. This is considered low as it is temporary and localised.
		Soil compaction	
	Brief and localized soil contamination due to oil spills or other hazardous substances. Effects can be avoided with adequate mitigation measures. The impact is considered minor.	With adequate mitigation measures in place, this impact will not be likely.	Brief and localized soil contamination due to oil spills during dismantling activities is expected. Effects can be avoided with adequate mitigation measures. This impact is considered minor.

		Soil contamination	
	Brief and localized soil contamination due to oil spills or other hazardous substances. Effects can be avoided with adequate mitigation measures. The impact is considered minor.	With adequate mitigation measures in place, this impact will not be likely.	Brief and localized soil contamination due to oil spills during dismantling activities is expected. Effects can be avoided with adequate mitigation measures. This impact is considered minor.
		Soil erosion	
	The impact of soil erosion is moderate at this site considering the type of soil present and the layout. The sloped nature of the land may increase run-off during periods of rainfall. Additionally, construction of related infrastructure may also impact the potential of erosion. With adequate mitigation measures like reducing gradient of land and use of established roads, this impact may be reduced to negligible.	Erosion of the soil may occur during this phase due to vehicle movement which will only happen during the occasional maintenance activities. Furthermore, water that falls on solar PV panels run down the panel to the dripline to the soil which may potentially cause localised erosion. This impact has the potential to be moderate however, with adequate mitigation measures like ground cover and proper drainage to manage runoff this is likely to be reduced to negligible/low risk.	During this phase, this impact is likely from the removal of infrastructure like mounting structures, however, if land cover is maintained throughout operation and soil is put back after removal, the potential for this impact is significantly reduced. This impact is expected to be low due to its occurrence at specific localised areas and existing erosion control measures from operation.

Site	Construction Phase	Operation	Decommissioning
		Land use	
Dacoura	This proposed site is 15 acres of State-owned land. Therefore, there are no foreseen conflicts with land use. The impact is considered minor. It is proposed that the solar PV farm be interconnected to the Wismar 13.8kV Load Feeder via a short 13.8kV Line along an existing road.	The site will be used for energy generation for the lifetime of the facility. There is no significant change in the land use of the site. The installation of the PV systems will not significantly impact the economic activities of the area. The impact is considered insignificant.	The farm will be dismantled, and the facilities removed. The future site use shall be in line with the land use of the area or be restored to its initial stage. The impact is considered minor.

	Current land use of the right of way (ROW) which are also road reserves commonly used for installation of infrastructure networks such as the one recommended for the Project. The new transmission lines for interconnection of PV Farm to the grid and substations will be done within the existing right of ROW. Therefore, there is no expected modification of the current land use of the proposed transmission lines. It is proposed that the Dacoura Solar Farm be interconnected to the Wismar 13.8kV feeder via a short (under 1km) along an existing road. The impact is considered insignificant.		

Site	Construction Phase	Operation	Decommissioning
	Visual landscape		
Dacoura	The installation of the PV system will alter the visual landscape of the project site. The components of the PV system will become a dominant feature of the environment. The impact is considered moderate, however, in consideration of the existing land zone (overburden), it is reduced to minor.	The PV systems will reflect sunlight and may become a distraction for motorists and aircrafts. The effects can be minimized with adequate mitigation measures. The impact is considered moderate. Conversely, solar PV farms are seen as tourist attractions and often open for school visits and opportunities for training, which reduces this impact to minor.	The decommissioning of the system will reverse the visual impacts at the proposed site. The impact is considered minor.

Site	Construction Phase	Operation	Decommissioning
	Solid waste generation		
Dacoura	Waste generation will be significant during the construction phase. Minimal to no green waste is expected at this site considering that the land is bare. Construction and domestic waste generation is expected to be temporary and localized but significant in volume. As an indirect impact, it likely that temporal food supply businesses will increase nearby the project site. These businesses will also be a source of increased generation of solid waste that must be considered. Poor solid waste management on site may lead to improper disposal, burning, and pollution of water resources. The effects can be minimized with adequate mitigation measures. The impact is considered moderate.	Domestic waste generation may be expected during operation from permanent maintenance staff. Although the generation will be long-term and localized, the volume generated can be considered low. The effects can be minimized with adequate mitigation measures. The impact is considered minor.	Solid waste generated is expected to increase in the decommissioning stage. Solid waste generated is expected to be localized, temporary and significant volume of domestic, scrap metal, construction waste, and hazardous waste. The effects can be minimized with adequate mitigation measures. The impact is considered moderate.

Site	Construction Phase	Operation	Decommissioning
	Surface water pollution		
Dacoura	Construction activities may result in pollution of nearby surface water due to runoff (increased turbidity, organic load). This is expected to be temporary and controlled with adequate drainage and wastewater management at the site.	During operation, wastewater will be generated from security/maintenance staff offices and cleaning of the PV cells. The effect is expected to be long term and can be mitigated with adequate collection and management practices.	Surface water pollution: Activities may result in pollution of public irrigation canal due to runoff (increased turbidity, organic load). This is expected to be temporary and controlled with adequate drainage at the site.

	Potential spills of oil could cause contamination of the nearby surface water through run-off. This aspect is temporary and avoidable. Wastewater generation from construction staff living quarters may also cause increased organic load to nearby water bodies, if not adequately managed. The impact is considered moderate.	The removal of soil cover might generate minor impacts due to erosions during operation also. Potential spills of oil and any other hazardous substances could cause contamination of the nearby public irrigation canals. This aspect is very localized, temporary and easily avoidable. The impact is considered minor.	Potential spills of oil could cause contamination of the nearby public irrigation canals. This aspect is very localized, temporary and easily avoidable. The impact is considered moderate.

Site	Construction Phase	Operation	Decommissioning
	Groundwater contamination		
Dacoura	Groundwater resources may be impacted during the construction stage from oil spills and leaks or due to improper storage and handling. Improper solid and wastewater management can also impact the groundwater resources. The effects are considered temporary and moderate. Adequate measures can avoid potential effects. The impact is considered minor.	Improper solid and wastewater have the potential to negatively impact ground water resources. Adequate measures can avoid potential effects. The impact is considered insignificant.	Groundwater resources may be impacted during the decommissioning stage from oil spills and leaks or due to improper storage and handling. Improper solid and wastewater management can also impact the groundwater resources. The effects are considered short term and minor. Adequate measures can avoid potential effects. The impact is considered insignificant.

Site	Construction Phase	Operation	Decommissioning
	Creation/loss of natural habitat		
Dacoura	This project site is considered disturbed since it is predominantly overburden from previous land uses. Also, there is little faunal biodiversity and no	The increase in ground shade and humidity may promote growth of vegetation which can open	The impact of this stage may be determined by the activities designated during operational aspects of the farm.

	indication of the presence of threatened or protected flora or fauna species at the proposed site for construction. The impact is localized, long term, with low intensity due to the disturbed conditions and zone in which the site is located.	opportunities for agrivoltaic farming (Corbley, 2022). This impact is positive and long-term. Another potential impact may be the reflection of solar panels may have on birds as the main wildlife in the surroundings, and transmission lines may affect bird mortality. The effects will be long term and localized. Solar PV farms can impact bird communities through habitat loss and the risk of avian collision mortality. An extrapolated mortality study based on a bird density of 38 to 50 species per ha (15 to 20 species per acre) may occur 4.5 bird fatalities per MW per year (Visser, Elke et. al 2019). A PV plant with 50 acres area or 10 MW is expected to impact 45 bird fatalities per 10 MW per year in a modest projection. Future data is needed to have a better accuracy in bird density and to understand the risk of PV solar energy developments on birds.	

		The impact can be considered moderate.	
	Noise levels		
	Noise generated by construction workers and machinery is more likely to impact wildlife in the surrounding areas of the site. The effects are limited to the project site and immediate surroundings. Due to the low faunal biodiversity at this site and industrial development, this impact is considered minor.	Due to the isolated location of the site and barriers (to be established), this impact will be localised and mitigable. It is considered minor.	Noise generated by construction workers and machinery is most likely to add to existing noises in this phase. These noises are not likely to impact wildlife as there may have been migration from this area after a prolonged presence. Any potential impacts will be temporary and localised. This impact is considered minor.
	Aesthetics		
	The increased traffic and machines during construction may affect faunal biodiversity within areas of influence causing migration to undisturbed areas of the forest. This impact is considered temporary and moderate.	The presence of the solar farm within a vegetated area may be distinguishable when compared to its surroundings but considering its delineated boundaries (with fencing), it is therefore confined and limited to a specific area. Furthermore, adequate mitigation measures can reduce this impart to negligible. This impact can be regarded as long term, direct and minor.	The impact of this stage may be determined by the activities designated during operational aspects of the farm.

Site	Construction Phase	Operation	Decommissioning
	Demography		

Dacoura	Demography		
	During the construction phase, an increase in population is expected in the area. While residents are expected to take part in some construction activities, there may be an influx of workers with specific skills. The effects are considered temporary, and localized. In general, this will bring a positive socio-economic impact to the area. However, demographics are not expected to be significantly impacted during this stage. The impact can be considered as minor.	Operation of the PV systems requires little staff. Additionally, maintenance and operational activities are expected to be carried out by GPL staff residing the areas of influence. The effects will be long term, localized but insignificant as it is not expected to change the demography of these areas. The impact is considered minor.	Decommissioning activities will need to ensure the quality of the GPL service is not affected negatively. In such case, the removal of the system is more likely to have an impact in the socio-economic activities of the area and its demography. To this assessment, it is assumed that GPL service after decommissioning will be maintained, therefore, decommissioning of the system is not considered to have a significant impact.
	Socioeconomics		
	Increased activities due to construction will temporarily increase the economic activities within proximity to the construction sites to accommodate the current needs of the workers. This impact is considered positive and minor.	An expected indirect impact of the operation of the PV systems is the increase of population in the area. The increase of energy production with the current reliable service from GPL, will naturally promote an expansion of socio-economic activities in the area thus also impacting the demography. This effect is considered high spread, long term and significant for the community. The impact is considered major.	An influx of construction workers will increase economic activities within the area temporarily. This impact is considered positive and minor.

Site	Construction Phase	Operation	Decommissioning
	Employment		

Dacoura	Employment		
	During the construction phase, employment opportunities will be generated for skilled and unskilled labour. There will also be a demand for local goods and services which will have an impact on the earning capacity of local businesses. These impacts while positive are expected to be only temporary and localized. The impact is considered minor.	The operation of the PV systems will be managed by GPL staff, however permanent roles like security services and scheduled upkeep. Therefore, a direct impact on employment generation is expected during this phase. This impact is considered minor.	During this phase, there may be temporary employment opportunities during the dismantling of the plant. However, this is expected to be in a much lesser extent than in the construction phase. The impact is considered minor.
	Socioeconomic activities		
	This impact is insignificant at this phase.	An indirect impact of the operation of the PV systems is the increase of employment in the district. The expected improvement on the reliability of the GPL service, will naturally promote an expansion of socio-economic activities in the area thus impacting employment opportunities. This impact is considered major. Additionally, the Programme intends to finance training and apprenticeships in solar PV installation and energy management projects which will be designed for diversity and inclusion, targeting women and persons with disabilities, adding to specific job skills and thereby employment within the sector. This effect is considered high spread, long term and significant for the community.	This impact is negligible at this phase considering the Government of Guyana's long-term plans for low-cost energy generation.

Site	Construction	Operation	Decommission
	Displacement		

Dacoura	This site is state owned land. Therefore, there are no foreseen conflicts with land use.	This impact is not likely to occur during this phase.	This impact is not likely to occur during this phase.

Site	Construction Phase	Operation	Decommissioning
	Livelihood		
Dacoura	This impact is not likely to occur during this phase.	The construction and operation of the PV system will increase energy security and access in the area and will support the development of a greener economy. It is highly likely the project economic activities will expand and diversify economies with employment opportunities and improving the quality of life in the community. The effects will spread at the community level and can be considered long term. There is also an anticipated positive effect on income generation opportunities for women. The savings or opportunity cost to solar energy to produce electricity will then contribute to funding for system upgrades, including digitization, improving overall system reliability and the resilience of LECI's Transmission and Distribution network. Renewed access to revenues originally dedicated to fuel and subsidies would also aid in the repayment of debts. This will allow LECI to provide increased value to its	It is assumed that GPL service after decommissioning, will be maintained, therefore, decommissioning of the system is not considered to have an impact, insignificant and minor.

		customers through more reliable and affordable electricity service in Guyana. This impact is considered major. This impact is considered major.	

Site	Construction Phase	Operation	Decommissioning
	Social/cultural		
Dacoura	While there may be a temporary increase of construction workers in the area, the local customs, cultures, and social relations are not expected to be significantly impacted. There are no cultural sites or near to the project site. This impact is considered minor.	This phase of the PV systems will be managed by local GPL staff. There are no expected impacts on local customs, culture, and social relations directly related to the operation of the PV systems. This impact is considered insignificant.	There are no expected impacts on local customs, culture, and social relations directly related to the decommissioning of the PV systems. This impact is considered insignificant.

Site	Construction Phase	Operation	Decommissioning
	Infrastructure		
Dacoura	Upgrading of the access road to this site is not likely to create traffic disturbances due to its remote location from nearby communities. The use of any current trail should be considered and relevant stakeholders contacted to ensure no significant disruption of activities to users. The impact is considered moderate.	During the operation of the PV system, the energy service is expected to be reliable. Modular PV systems are resilient to disruptive events. If a module is damaged, the system remains operational. This will benefit the customers and will minimize power outage in the area. Water supply service is expected to be impacted positively, since power disruptions to the distribution system will also be minimized. Effects will be long term and at the community level. The impact is considered major.	For this assessment, it is assumed that GPL service after decommissioning will be maintained, therefore, decommissioning of the system is not considered to have a significant impact.

Site	Construction Phase	Operation	Decommissioning
	Health and safety		
Dacoura	During construction, there will be health and safety hazards on site and in surrounding area due to increase vehicular traffic, heavy machinery operation, excavation, and other construction activities. The effects will be localized and temporary. However, the effects can be minimized by strict adherence of the approved safety procedures mandatory under the Laws of Guyana. Influx of construction workers may lead to increase in the prevalence of sexually transmitted diseases among the local population, as well as sexual violence. Considering that labour is expected to be filled locally, this concern can be regarded as low. However, health and awareness campaigns as well as a code of conduct indicating clear repercussions can minimize any potential effects. The impact is considered moderate.	During operations, workers will be exposed to occupational hazards especially during maintenance. The probability of occurrence can be minimized by strict adherence to occupational safety procedures. The impact is considered indirect and minor.	Increased exposure to hazards is expected in the decommissioning activities. Strict adherence to health and safety procedures will minimize these effects. The impact is considered direct and moderate.

Site	Construction Phase	Operation	Decommissioning
	Supply Chain Risk		
Dacoura	The solar PV supply chain is vulnerable to impacts like natural disasters, wars, pandemics, technical incapacities, individual company decisions, etc.	This impact is not likely to occur during this phase.	This impact is not likely to occur during this phase.

	which can impact project costs and management. This impact is considered medium as it is unpredictable and direct, however, it can only be expected during this phase. This impact can be reduced by greater understanding of price mechanisms and competition by the PEU to inform decisions about capital costs before hiring a Contractor.		

a. ***the trans frontier nature of the impacts i.e. does it cross country borders or boundaries;***

Response: Not applicable

b. ***the magnitude and complexity of the impacts;***

Response: Not applicable

c. ***the probability of the impacts;***

Response: Not applicable

d. ***the duration, frequency and reversibility of the impacts; and***

Response: Not applicable

e. ***Cumulative impacts with other projects: additional surveys and assessment may be required to determine whether existing projects in combination with the proposed project will have a significant cumulative effect on the receiving environment.***

Response: Not applicable

xii. Description of proposed environmental management and mitigation measures for all environmental, ecological and social impacts.

Table 10-1: Environmental and Social Management Plan – Construction of the Dacoura Solar PV Farm

	Issue/ Impact	Mitigation Measures	Monitoring Indicators	Responsibility for Implementation	Responsibility for Monitoring	Estimated Cost (US$)
Air Quality	Dust generation	▪ Cover stockpiles to minimize dust generation. ▪ Suppress dust from construction, stockpiles and increased vehicular traffic by sprinkling water. ▪ Consider wind direction when stockpiling construction materials. Orientation will avoid downwind residences or sensitive locations. ▪ Implement vehicle speed control though signage and speed bumps, whenever necessary.	▪ PM monitoring ▪ Dust generation observation ▪ Complaints register	All contractors on site	Site Supervisor	5,000
	NO_x and CO_x emissions	▪ Maintain vehicles and on-site construction equipment regularly.	▪ Equipment maintenance records according to schedule	All contractors on site	Site Supervisor	10,000

			▪ Vehicle fitness certificates			
	Noise	▪ Use padding/noise isolators for construction equipment and machinery. ▪ Carry out fixed noise sources or activities away from site boundaries, particularly boundaries close to sensitive environments. ▪ Maintain construction vehicles and machinery adequately. ▪ Use ear plugs or earmuffs for specific activities by workers, visitors and any individuals working in proximity to the works. ▪ Consult stakeholders (immediate surroundings of site) to plan activities accordingly.	▪ Monitoring of dB ▪ Complaints register ▪ Equipment maintenance records according to schedule ▪ Workers' compliance to H&S procedures ▪ Consultation records ▪ Environmental Annual Reports	All contractors on site	Site Supervisor	5,000
Soil	Topsoil loss	▪ Limit the removal of vegetation to the site footprint. ▪ Whenever possible, removed topsoil should be conserved and used for remediation of	▪ ESMP Compliance records ▪ Environmental Annual Report	All contractors on site	Site Supervisor	15,000

		affected areas. Since this site is predominantly overburden, this impact is insignificant.				
	Soil compaction and erosion	▪ Develop suitable drainage in consideration of the physical characteristics of the site. ▪ Plant grass or use of rocks under the solar panels is also recommended to reduce erosion at the drip line.	▪ ESMP Compliance records ▪ Environmental Annual Report	All contractors on site	Site Supervisor	
	Soil contamination	▪ Adequately dispose of waste materials. ▪ Provide bunded areas or secondary containment for storage of oil/fuel and/or any other hazardous materials or substances like batteries with 110% capacity of the stored material. ▪ Provide spill kits at strategic locations. ▪ Service construction vehicles and machinery regularly. ▪ Ensure that any vehicle maintenance is handled on impervious surfaces to avoid soil contamination.	▪ Complaints register ▪ ESMP Compliance records ▪ Environmental Annual Report	All contractors on site.	Site Supervisor	

		▪ Treat or dispose contaminated soil with a commercial oil-absorbing product, if possible.				
Land Use (ROW)		▪ Current land use of the right-of-way (ROW) is considered road reserved commonly used for infrastructural works like installation of networks of the solar PV farm. ▪ The proposed transmission lines for interconnection of PV Farm to the grid and substations will be done within the existing ROW. ▪ It is proposed that the Dacoura Solar Farm be interconnected to the Wismar 13.8kV Load Feeder via a short 13.8kV Line (under 1km). ▪ Therefore, there is no expected modification of the land use of the proposed transmission lines at no site. The impact is considered insignificant.	▪ Complaints register ▪ ESMP Compliance records	All contractors on site.	Site Supervisor	
	Landscape and visual impact	▪ The site proposed for the proposed solar PV farm is considered derelict land. However, grass is present and	▪ ESMP Compliance records	All contractors on site.	Site Supervisor	5,000

		should be maintained, where possible. ▪ Consult with aeronautical authorities with regards positioning and direction of solar panels to avoid conflicts with flying airplanes.	▪ Consultation meeting records			
	Solid waste generation	▪ Dispose of waste in the authorized landfill as regulated by the local authority. ▪ Plan and coordinate with the local NDC/RDC to manage the increased volume expected to be generated from the site. ▪ Provide the site with adequate number of bins for the disposal of domestic waste. ▪ Burning of waste on-site is strictly prohibited. ▪ Ensure adequate arrangements are made for the frequent collection of domestic, construction and hazardous materials. ▪ Provide bins to facilitate waste from food supply	▪ ESMP Compliance records ▪ Consultation records with solid waste management authorities ▪ Complaints records ▪ Valid contract with solid waste collection contractor ▪ Existence of at least one container bin outside the project site where food services providers are located (if necessary)	All contractors on site.	Site Supervisor	50,000

		entrepreneurs within the proximity to the site. ▪ Clean and maintain site and immediate surroundings.				
	Hazardous waste	▪ This phase is expected to produce much hazardous waste due to ongoing construction process which requires regular maintenance and servicing of machines and vehicles. ▪ A hazardous waste management plan must be developed by the contractor for spent oil, oily rags, grease, filters, etc. that will be used on site. ▪ Hazardous all hazardous materials on site and dispose according to stipulations outlined Environmental Protection (Hazardous Waste Management) Regulations 2000 and Environmental Permit. ▪ Any oil from machines serviced should be collected and stored in a bunded area or secondary containment for	▪ Compliance with hazardous waste management plan and Environmental Permit ▪ Environmental Annual Report where quantities generated are recorded and intended method of disposal	All contractors on site.	Site Supervisor.	5,000

		storage of any hazardous materials or substances like batteries with 110% capacity of the stored material. ▪ Machines and parts should not be serviced or cleaned near to or in any standing water body.				
	Surface water pollution	▪ Design drainage for the site to minimize run-off and in consideration of any nearby water bodies. ▪ Monitor and maintain drainage system regularly. ▪ Provide adequate temporary sanitary facilities for workers on-site while permanent facilities are constructed. ▪ Ensure frequent collection of waste generated by sanitary facilities by an EPA approved contractor. ▪ Provide bunded areas or secondary containment for storage of oil/fuel with 115% capacity of the stored material.	▪ ESMP compliance records ▪ Existence of temporary sanitary facilities ▪ Valid contract with waste collection contractor	All contractors on site	Site Supervisor	30,000

	Groundwater pollution	▪ Clean oil spills, fuel spill and other site contaminants rapidly and immediately. ▪ Frequent collection of waste generated by sanitary facilities will be done by an EPA approved contractor. ▪ Provide bunded areas or secondary containment for storage of oil/fuel with 115% capacity of the stored material.	▪ ESMP compliance records ▪ Existence of temporary sanitary facilities ▪ Valid contract with waste collection contractor	All contractors on site	Site Supervisor	
	Loss of natural habitat	▪ At the site proposed for the Dacoura solar PV farm, the natural habitat was previously disturbed by the extractive industry. ▪ Monitor and maintain noise levels as recommended by the EPA Noise Regulations to minimize potential effects to fauna in the surrounding areas i.e., Construction ▪ 90dB daytime limits (06:00 – 18:00h)	▪ dB monitoring	All contractors on site	Site Supervisor	500

		▪ 75dB night-time limits (18:00 – 06:00h) ▪ Ensure the Fauna Rescue Plan is consulted if any animal is encountered.				
	Demography and Employment	▪ Maximise the local labour market. ▪ Ensure the recruitment process is transparent.	▪ Employment records ▪ Number of local labours employed at the site	All contractors on site	Site Supervisor	1,000
	Socio-cultural	▪ Regularly consult with the community through meaningful stakeholder consultation.	▪ Monthly community consultation records	All contractors on site	Site Supervisor.	5,000
	Infrastructure	▪ Ensure timely and adequate public announcements with regards to any service interruption because of the project, including road closures if necessary.	▪ Service interruption records ▪ Duration of service interruption	All contractors on site.	Site Supervisor.	5,000
	Health and Safety	▪ A health and safety plan should be implemented by the contractor on site. ▪ Workers' awareness sessions on health and safety issues should be carried regularly.	▪ H&S Plan compliance records. ▪ H&S awareness sessions attendance records. ▪ Site emergency response and Fire	All contractors on site.	Site Supervisor.	20,000

		▪ Provide awareness campaigns to the population and training to workers on the mitigation of any potential community health and safety impacts. ▪ All personnel on site must be provided with PPE. ▪ Site emergency response plans should be developed including a fire safety plan. ▪ Provide adequate fire-fighting equipment on site. ▪ Ensure clear, visible signage throughout the site and surrounding areas always. ▪ Traffic control and speed limits must be observed. ▪ Limit work hours to daytime limits (06:00-18:00h), unless otherwise agreed with relevant stakeholders. ▪ If work needs to be completed during the evening, night-time limits are (18:00 -6:00h). ▪ Occupational hazards should be marked on site and staff trained on hazard recognition.	Safety plans developed and implemented. ▪ ESMP compliance records. ▪ Visible traffic and speed signage.			

		▪ Cleanliness of the site must be always maintained.				
	Health: HIV/AIDS	▪ Use code of ethics, conduct, and good practices based on existing GPL standards and guidelines. ▪ Training on awareness, and education on safe practises in the workplace during the period of construction must be done. ▪ Equip staff with appropriate equipment and materials to protect colleagues from the risk of exposure to STIs. ▪ Disseminate information on safe practises including occupational health and first aid training.	▪ Compliance with the code of ethics ▪ Behaviours which facilitate unintentional injuries and violence, ▪ Tobacco use, ▪ Alcohol and drug use, ▪ Sexual behaviours related to pregnancy and sexually transmitted diseases, ▪ Unhealthy dietary behaviours, and ▪ Physical inactivity and being overweight.	Health and Safety Officer. Program should be adapted to comply with local laws.	Health and safety officer	3,500
	Supply chain	• Ensure that there is greater understanding of price mechanisms and competition by the PEU to inform decisions about capital costs before hiring a Contractor. ▪ Research suppliers and products for adequate quotations.	▪ International price comparisons ▪ Reputation of suppliers and products	PEU-GPL	GPL	0

xiii. A summary of minutes of any public consultations/ meetings held by the Project proponent with key stakeholders expressing their views and opinions.

SUMMARY OF MINUTES

The consultation meeting related to the above-mentioned project was conducted with the community members, as it was seen that they are the most crucial part of the implementation of the project; whilst taking into consideration the social and environmental impacts of such a project, as well as issues surrounding land ownership. All other relevant stakeholders were invited, and the meeting was held on Friday, 1st July 2022 in Bay Roc Training Centre, Linden, Demerara. The meeting was called to order at 5:30 PM with 12 signed attendees.

MATTERS ARISING FROM THE MEETING:

Battery life concerns: Mr. Dillawar explained that the system is hybrid. Any shortfall in the solar power or generators, they would be able to support each other. He further explained that power will go where there is a demand. In a case of excess power, the batteries will charge which would give more power in the evenings.

Reduction of power outages: Mr. Dillawar highlighted that the batteries would help to sustain the load for some time to help with reliability. This all depends on the load capacity.

Different costs in Linden: Mr. Dillawar indicated that the project will not affect the cost consumers pay at no time. It is intended to assist with fuel costs for the energy company, reducing the amount that the central government has to pay for subsidies.

Employment of community labourer: A resident suggested that contractors advised on a certain percentage or conditions to employ local labourer. Mr. Dillawar explained that it is a situation that involves several risks. He suggested that the community submits a list of skilled or semi-skilled workers. The resident also further explained that bringing outside workers can affect the community socially, especially within indigenous communities. Mr. Dillawar indicated that discussions would have to be made with IDB concerning local content.

Employment of unskilled workers: Persons to stop traffic and clear lands can be considered for employment. Another resident indicated that the training centre has a record of workers within the

community who are skilled in construction services. Mr. Dillawar explained that mandating contractors to take local workers can result in other concerns. However, in the contract, a certain percentage can be considered as it could work out more economically for contractors to higher from the community.

Public awareness: A resident advised that the awareness of the project should be advertised on "What ya know". Mr. Dillawar explained that they are planning to ramp up advertising for the project.

Capacity building: Mr. Dillawar explained that the training for women in the community is still to be finalized, it would be modelled based on a similarly done project.

ANY OTHER BUSINESS: The Consultant highlighted that in addition to the consultation process of the project, there must continuous engagement with the community. Persons would have to come into the area at least every quarter, to provide updates. So, if persons would have missed the meeting, they can attend another. Mr. Dillawar indicated that the contractor has to be present to interact with the residents. A list of skilled workers in Dacoura was collected from the training centre.

CLOSING REMARKS: Mr. Dillawar thanked the attendees for attending the consultation. Residents were encouraged to collect the number for Grievances and contact via call or message if they have any questions.

xiv. A description of any assumptions, uncertainties and gaps in knowledge.

NA

xv. A non-technical summary of the project (a summary of what the project is about in layman's language that clearly describes your project).

Funds from the Guyana-Norway Partnership will be utilized to execute a National Solar PV Project aligned with its plans to increase renewable energy penetration and grid stability in the power system. The project will be administered through the Inter-American Development Bank (IDB), with GPL

as the Executing Agency. The execution of the projects that are a part of this program will support Guyana's transition to renewable energy and the diversification of the energy matrix via the use of cleaner and renewable energy sources in the electricity generation mix. Eight projects are currently proposed under Component 1: three sites (Prospect, Hampshire and Trafalgar) are vacant agricultural fields owned by the Government, to avoid land conflicts; two sites are former mining sites, those are Dacoura and Retrieve) in Linden; two sites are located on vegetated areas (Block 37 and Onderneeming) being the only feasible technical option for the respective areas, and one site in Charity.

The project will consist of 33MWp solar PV in three different grids as follows:

- ✓ 15MWp of Solar PV with a minimum of 22MWh (11MW, 2h) of battery storage for the Linden Isolated System.
- ✓ 8MWp of Solar PV with a minimum of 12MWh (6MW, 2h) of battery storage for the Essequibo Coast Isolated System.
- ✓ 10MWp of Solar PV for the Demerara-Berbice Interconnected System, specifically in Berbice.

Benefits

The development of a National Utility Scale Solar PV Program will generate benefits including:

- **Economic**

a) Diversification of the local economies within each proposed project area and overall, nationally due to a more reliable, stable form of electricity

b) Increase resilience to the volatility of the global fuel market:
    - ✓ The diversification of the energy generation matrix of these grids will result in operational and maintenance cost savings for GPL.
    - ✓ Significant reduction in Government subsidies which can be used for:
    - ✓ System upgrades, including digitisation, improving overall system reliability and the resilience of GPL's and LECI's Transmission and Distribution networks.

Thereby, allowing GPL and LECI to provide increased value to their customers through more reliable and affordable electricity services in Guyana.

- **Social and Gender**

  a) Improved efficiency in the health, education, water, and public safety sectors

  b) Employment during construction and operation

  c) Local training and institutional capacity

- **Environment**

  a) Contribution to the mitigation of global climate change by reduced emissions of Greenhouse Gases.

  b) The reduction and avoidance of CO2 emissions in electricity generation via the diversification of the energy supply matrix with the introduction of renewable energy-based sources of energy specifically,

     - Linden is purposed to conserve 17,259 tCO2 (valued = US$1.04M).
     - Essequibo will conserve 9,390 tCO2 (valued = US$1.04M).
     - Berbice will save 10,671 tCO2 (valued = US$0.64M).

  c) Reduction in the consumption of and dependence on fossil fuel for electricity generation.