NEWMONT® SURINAME

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Sabajo Project

Draft Environmental and Social Impact Assessment

EXECUTIVE SUMMARY

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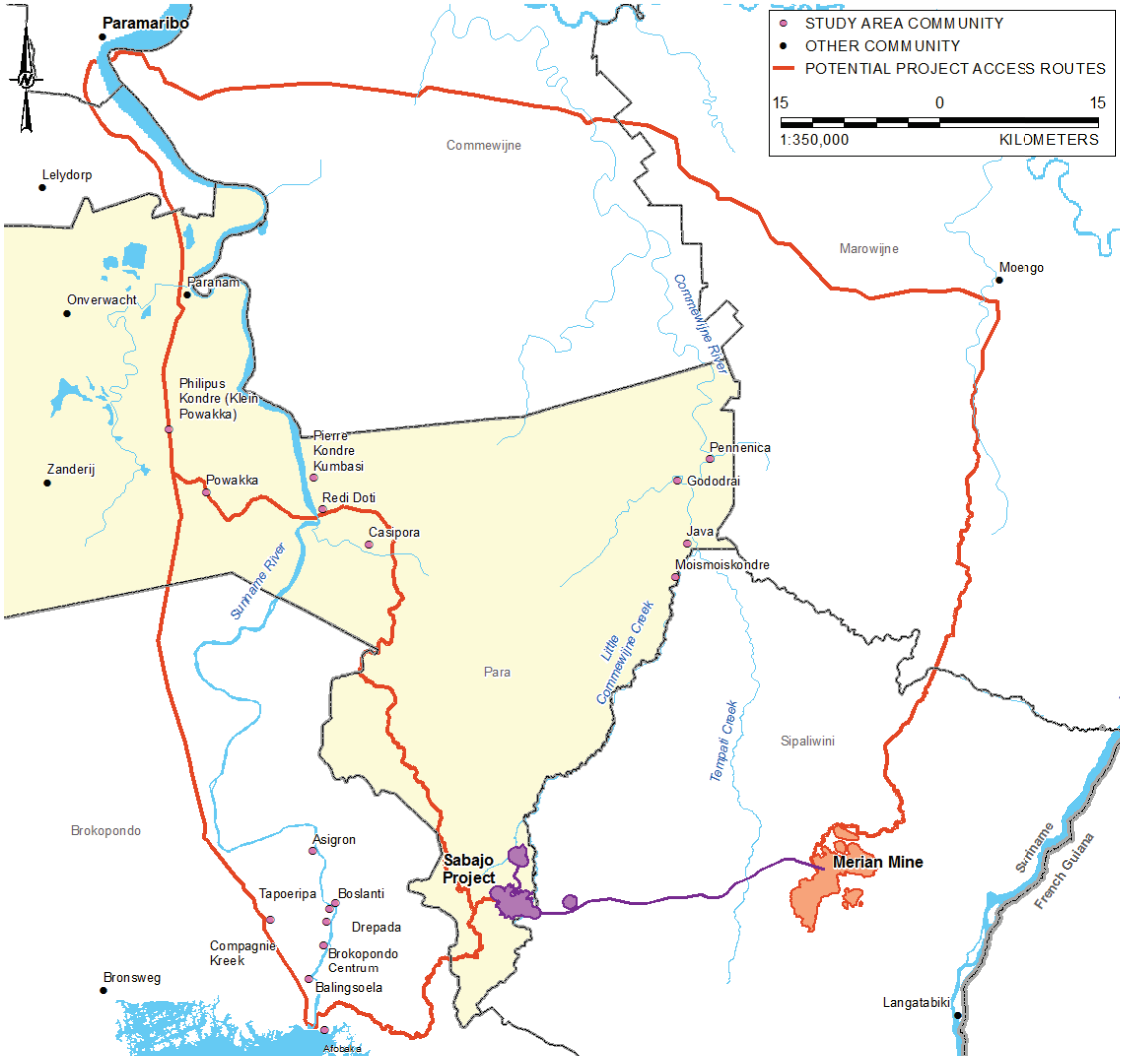
INTRODUCTION

This executive summary provides an overview of the Environmental and Social Impact Assessment (ESIA) for the Newmont Suriname, LLC (Newmont) Sabajo Project (the Project). It summarizes the Project description, results of baseline social and environmental studies that were completed, impact and cumulative effects assessments, and Environmental and Social Monitoring and Management Plans (ESMMP) for the Project.

Project Introduction

Newmont presently operates the Merian gold mine in eastern Suriname. Newmont is now considering the development of Sabajo, approximately 30 kilometers (km) to the west of Merian and 100 km south of Paramaribo, as an extension to the Merian operation (Figure ES-1). Newmont holds a Right of Exploration where the Project is located.

Figure ES-1 Project Location



Introduction to the ESIA Process

Newmont engaged a consulting team led by Golder Associates Inc. (Golder) to complete this ESIA. The team includes specialist local Surinamese consultants who completed the majority of baseline studies.

The Project is being proposed within a legal and institutional framework that has been established in part through agreements reached for the Merian mine. The Merian Mining Act granted permission to the government of Suriname to enter into a Mineral Agreement. The Project and this ESIA are mandated to comply with this Mineral Agreement, as well as the National Institute of Environment and Development in Suriname (NIMOS) process. This ESIA process meets these requirements and also meets Newmont's internal standards. The Process has included:

Step 1: Screening of the proposed project by NIMOS to determine if an ESIA is required. This occurred in November of 2016, resulting in a definition of the project as a 'Category A' Project requiring an ESIA.

Step 2: Scoping of the proposed project to determine the types of impacts that might occur, to whom they would occur and in which areas. This determined the Area of Influence (AOI) and which baseline studies would be required. A detailed Terms of Reference (ToR) was developed, discussed, presented publicly and reviewed, then finalized to meet the needs of NIMOS and project stakeholders. The ToR was issued as final in August, 2017.

Step 3: Impact Assessment consists of three phases; a) characterizing the baseline environment by conducting field studies and describing conditions before the start of the Project with data; b) considering the project and assessing the significance of potential impacts, including cumulative effects between the Project and other projects, and; c) developing measures to prevent or reduce impacts. This has resulted in the completion of this draft ESIA in March, 2018.

The next step in the process is the formal disclosure of results, as the ESIA is presented to NIMOS and other stakeholders in a set of public meetings for public comments and input. Lastly, the ESIA will be edited based on the comments received, and re-issued as a final version.

Within the baseline studies and the assessment of effects, the following disciplines are considered:

- Physical disciplines:
  - Geochemistry;
  - Existing Disturbance and Impacts;
  - Climate;

- Terrain and soils;
- Groundwater;
- Surface Water;
- Water Quality;
- Noise and Vibration; and
- Air Quality.

- Biological disciplines:
  - Habitats;
  - Aquatic ecosystems;
  - Flora;
  - Terrestrial Fauna (Mammals, birds and herptiles); and
  - Ecosystem Services.

- Social disciplines:
  - Socio-economics;
  - Land Use;
  - Artisanal and Small Scale Mining;
  - Cultural resources (intangible);
  - Health;
  - Historical and Archaeological Resources;
  - Traffic;
  - Visual resources;
  - Hazards; and
  - Human Rights.

Public and Regulatory Engagement

Participation in engagement activities is an integral part of the ESIA process to ensure that the views, knowledge, and concerns of Project stakeholders are considered in the assessment of the potential impacts as well as in Project decisions. Stakeholder engagement activities occurred throughout the course of the ESIA with strong focus on local communities. Newmont supports an engagement approach that is tailored to each community and stakeholder group, which includes ongoing communications and distribution of project-related information.

The Sabajo stakeholder engagement program is based on Newmont's Social Responsibility Standards and International Council on Mining & Metals - Position

Statement on Indigenous Peoples and Mining, and meets NIMOS requirements and best practice standards for ESIA engagement processes. The process therefore included the following:

- identification of potentially impacted stakeholders and others with an interest in the Project;
- developing, with affected stakeholders, consultation activities that are culturally appropriate to each group;
- information disclosure, specifically the provision of timely and meaningful information that is accessible to all stakeholders;
- continuous review of the approach and mechanisms for obtaining stakeholder feedback on the information disclosed; and
- receiving and documenting feedback for inclusion in the ESIA.

The following six rounds of engagement were planned and executed to meet or exceed stakeholder engagement requirements of both NIMOS and Newmont.

- **Pre-scoping engagement activities** aimed primarily to identify Project stakeholders, initiate communication with communities, present preliminary information on the Project, find out from communities how they wish to be consulted, and collect requirements related to the development of the Project (November 2016 to May 2017).
- **Scoping engagement** including a series of formal meetings introducing the Project and the overall ESIA process, and gathering information from communities and regulatory agencies (e.g., NIMOS). Four public meetings were held in four different languages to make information as easily accessible as possible. The information received from all Project stakeholders was captured in the Project Terms of Reference (March to August 2017)
- **Baseline method validation** aimed to present, discuss and gain community approval for the methods that were proposed for social baseline information collection for the Project. The objective was to ensure the ESIA team collected the information that is most important to community stakeholders in an acceptable manner, as well as to explain data requirements to build an effective ESIA, consistent with NIMOS requirements, international best practice, and Newmont's social and environmental standards (August to September 2017).
- **Baseline results validation** included community presentations on the preliminary results of the baseline studies. The aim of these engagement activities was to allow communities where data had been collected to have the opportunity to review and comment on the results, to enable verification of the factual accuracy of findings, and also to allow

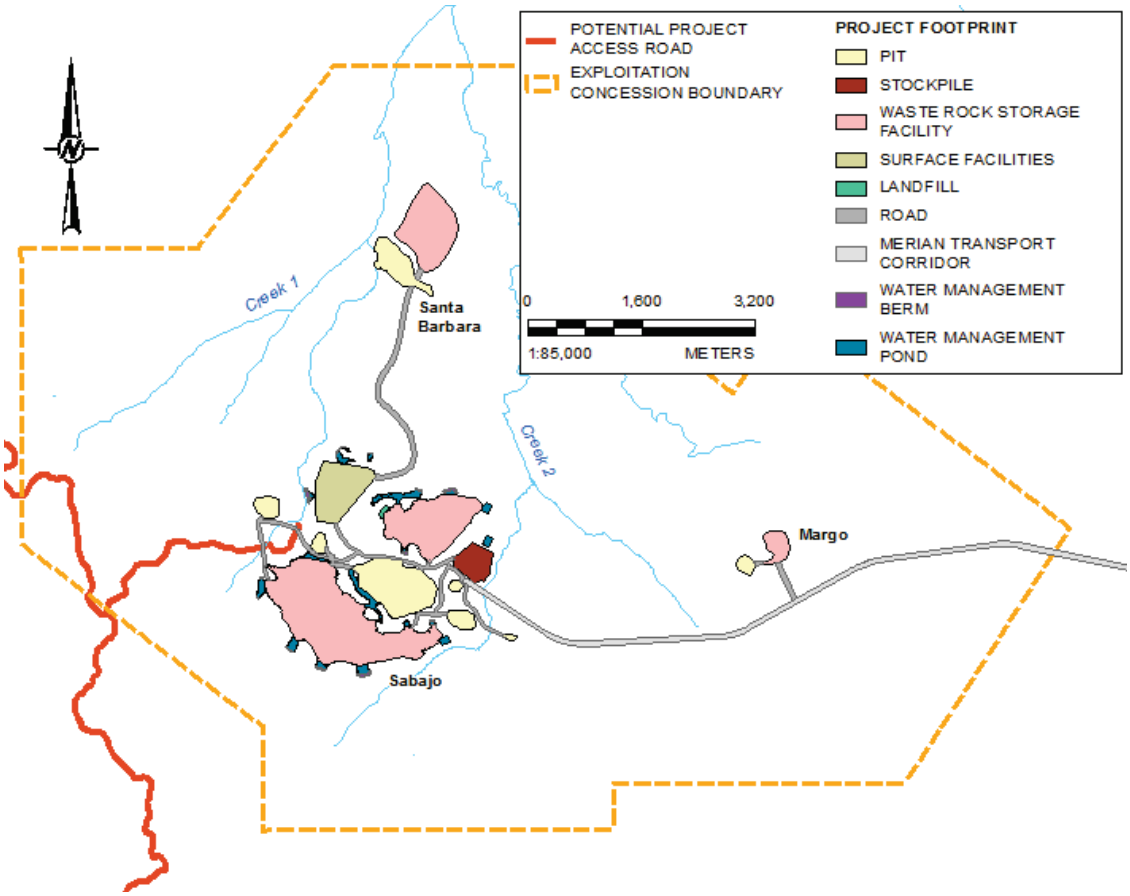
stakeholders to absorb information in an easily digestible format and well ahead of the formal validation meetings (October to November 2017).

- **Assessment results presentation and validation** – In parallel with completion of this draft ESIA, engagement has been, and will continue to be held to discuss the results and the proposed mitigation measures, and obtain input from stakeholders. Engagement meetings will be held with communities and regulatory agencies to disclose impact assessment results for the project. The aim of these consultation meetings is to achieve both understanding of the impacts and agreement of mitigations. (March to May 2018)

PROJECT DESCRIPTION

The proposed Project consists of the development of a gold mine with planned production of approximately 613,000 ounces (oz) of gold and 140 million tons of waste rock. Mining will take place over 10 years and all ore will be processed at the Merian Facility. The construction and operation of the Project requires the development of supporting infrastructure, and an approximately 30 km long, 14 meter (m) wide haul road connecting the Project with the Merian mine. The Sabajo site is shown in Figure ES-2.

Figure ES-2 Sabajo Mine Area



The site includes:

- six open pits (named Cassador (or "Pit 1") and Pits 2-6) in the Sabajo Area;
- one open pit in the Margo Area;
- one open pit in the Santa Barbara Area;
- one ore stockpile in the Sabajo Area;
- two waste rock disposal facilities (WRFs) in the Sabajo Area;
- one WRF each for Margo and Santa Barbara;
- an accommodation camp with capacity for 300 people;
- maintenance shops;

- a diesel power generating station (1 megawatt [MWe]) and diesel storage tanks;
- temporary fuel storage and fuelling area for vehicles;
- an Effluent Water Treatment Plant (ETP) to manage seepage from the WRFs, if required;
- sewage treatment plant;
- potable water treatment plant;
- haul roads and other access roads;
- landfill and waste management facilities; and
- a borrow area.

The direct disturbance area due to project development is estimated at 886 hectares (ha), of which about 170 ha is already disturbed by past artisanal and small scale mining (ASM) activity at Sabajo, Santa Barbara and Margo.

The schedule for mining includes:

- Early works (up to 1 year): construction and improvements to access roads.
- Construction (about 2 years): camp completion, landfill completion, water management structure completion, construction of the Sabajo-Merian Haul Road, stripping of Cassador Pit and stockpiling saprolitic ore, and installation of other supporting infrastructure.
- Operations (about 10 years):
  - sequential mining of the Cassador Pit and Pit 3, then Pit 5, Pit 6, the Santa Barbara Pit, Pits 2 and 4, and the Margo Pit;
  - operation of North WRF, South WRF, Santa Barbara WRF and the Margo WRF; and

- concurrent reclamation of WRFs.

- Closure (about 4 years): Capping of North, South, Margo and Santa Barbara WRFs; re-grading of benches on WRFs if necessary; re-vegetation of WRFs and other disturbed areas; decommissioning of buildings (and to be following by further years of monitoring).

All mining will be open-pit mining performed using a truck and shovel operation. The Sabajo site is generally composed of a thick layer of saprolite underlain by a transition layer of saprock overlying more competent bedrock. The differences in the rock properties affect the mining methods and rates. The saprolite is generally soft and can be mined without blasting. Blasting will be required for fresh rock and some of the harder saprolite. The hardness of the rock and ore increases through the saprock transition zone.

Waste Rock Facility locations have been selected to minimize truck travel distances from the pits. The heights of WRFs have been restricted so as to not exceed the surrounding regional topography and to be geotechnically stable. Waste material will be deposited at all WRFs in 10 to 20 m benches.

Water management at the mine site includes active management and contingencies for sediment control, pit dewatering water, waste rock runoff water and domestic waste water. Control measures will include diversion channels, ponds, and treatment plants as required so that releases from the mine perimeter achieve water quality criteria at downstream compliance points.

Estimated fresh water demand will be proportional to the workforce present, peaking at approximately 100 cubic meters per day (m^3/day) during construction and levelling out to 50 m^3/day during operation. Fresh water supply for the project will be met by collection of rainwater, withdrawal of surface water and groundwater wells.

Most of the Project's supplies will be imported to the Nieuwe Haven Port at Paramaribo or the port in Paranam or sourced from suppliers in Paramaribo. Supplies will be trucked to the mine site. It is estimated that 15 to 20 trucks per day will be required to keep the mine supplied in fuel, diesel, reagents, perishables, and other supplies. During construction, truck traffic is expected to reach approximately 30 trucks/day. People and supplies travelling to Merian may also use the Sabajo access routes to reach the Merian mine. The fuel and diesel trucking will be conducted in caravans while the other supplies will not be organized as they will come from a variety of suppliers. Generally, supplies will leave Paramaribo in the morning and make the return trip in the afternoon to maximize travel during daylight hours and minimize safety risks. The one-way trip between Paramaribo and the Sabajo mine site is estimated at 3-4 hours depending on road conditions.

Two access routes are being investigated as the main access for the Sabajo Project (and potentially the Merian mine):

- The **Carolina Access Route** starts in Paramaribo, passes the town of Powakka, and then crosses the Carolina Bridge before reaching the existing private 62 km spur road from the Carolina Bridge to the Project site.
- The **Afobaka Access Route** starts in Paramaribo and continues on the paved highway approximately 103 km to the Afobaka Dam and then continues 37 km on the unpaved Musa Road from Afobaka to the Project site.

Construction is anticipated to start with an estimated workforce of approximately 100 employees. The total construction workforce will increase as construction progresses to reach a maximum of 300 people (including mine operations and exploration groups). Once the mine begins operations, it will employ approximately 140-170 employees (with approximately half on site at any given time) and will operate 24-hours/day.

Some direct benefits of the project to Suriname are expected to include royalties, workforce earnings, local procurement, and corporate income tax.

ANALYSIS OF ALTERNATIVES

Three analyses of alternatives were conducted in order to ensure the project design is considering appropriate social, environmental, and health and safety criteria in addition to technical and economic considerations.

The first analysis of alternatives evaluated the project against a “no Project” alternative. This analysis concluded that the Project’s social benefits are expected to exceed its negative effects and its negative environmental effects are expected to be overcome by biodiversity offsets and concurrent reclamation efforts. Pending a final analysis of feasibility, if the project also provides sufficient economic benefits to Newmont to justify the expenditures, then the Project Alternative will be considered preferable to the No Project Alternative.

The second analysis of alternatives compared the options for the access routes to reach the Project site. This showed that both the Carolina and Afobaka roads are possible viable options for the Project. The two routes are similarly rated and therefore neither has yet been chosen. The option for both is included in the project description, and they have both been assessed as part of the project.

The third analysis of alternatives compared four options for the routing of the Sabajo-Merian Haul Road. The routes were rated similarly for health and safety, social considerations, and stream crossings. The preferred route was found to most effectively avoid sensitive wildlife habitat, and minimized total disturbance compared to the other options.

ASSESSMENT DISCIPLINES

Baseline data, assessment results, and mitigation and benefit enhancement measures are presented below for each discipline and issue assessed. The first two disciplines, geochemistry and existing disturbance, provide context and are not the subject of impact assessments. The approach for this assessment is to define current conditions; identify key issues raised by stakeholders; assess those issues using a set of criteria for the effects the project will have (magnitude, geographic extent, duration and likelihood); evaluate the opportunities for mitigation; and assess the significance of each impact based on all of these criteria. The ESIA evaluates residual impacts that remain after various mitigation measures are implemented.

Key mitigation measures to protect and enhance the physical, biological and social resources of the project area, as well as residual impacts, are described below. Results of the assessment of the potential cumulative effects of the expanded project are provided later in this summary.

Geology, Geochemistry and Existing Conditions

Geology and Geochemistry

The ore body at Sabajo is located along a shear zone known as the Cassador shear zone. The footwall consists of dacite and the hanging wall is composed of graphitic and variably brecciated mudstones, siltstones, sandstones and greywackes. The entire sequence is overlain by a greenstone package consisting of mafic to felsic volcanics intermixed with volcaniclastic units and sedimentary sequences including marls.

The regolith (the layer of unconsolidated rocky material covering the bedrock) consists of Saprolite underlain by a transition layer of Saprock overlying more competent material, which is referred to as “Fresh Rock”. Saprolites form in high-rainfall environments where extensive chemical weathering results in decomposition of the parent rock.

Based on the results of the static leach geochemical tests, the following constituents are identified as constituents of possible concern based on their potential to exceed project water quality standards:

- **Arsenic**: Leach testing indicates a potential for mobilization of arsenic from both fresh rock and saprolite/saprock under acidic, neutral and alkaline conditions. Because leachate concentrations generally increase with increasing solid phase arsenic concentration, total arsenic concentration may be considered as a criterion for material segregation.
- **Aluminum, Cobalt, Copper, Iron, Manganese, Nickel and Zinc**: Leach testing indicates a potential for mobilization of these metals from both fresh rock and saprolite/saprock under acidic conditions. Cobalt and nickel may also be mobilized under circum-neutral pH conditions, particularly from the saprolite and saprock.

- **Cadmium, Chromium, Lead and Thallium**: Leach testing indicates a potential for mobilization of these metals under acidic conditions, and possibly circum-neutral, from the saprolite and saprock.

Arsenic is, therefore, the primary element of concern due to its potential to leach from all rock types under all pH conditions. If acidic conditions are established, several additional metals have the potential to exceed water quality criteria in mine waters. Kinetic testing is ongoing and kinetic test results are required to verify acid rock drainage potential and evaluate long-term metal leaching potential.

The ESIA baseline samples for geochemical analysis were all collected from Sabajo drill core. Although the geochemical behavior of waste and ore from the Santa Barbara and Margo deposits is expected to be similar, geochemical investigation of these deposits is required to verify this assumption.

Existing Disturbance and Impacts

The Sabajo concession is already subject to considerable ASM activity, both current and historical, which has disturbed and contaminated the environment.

Based on an analysis of satellite imagery, the area disturbed to date by ASM activities at Sabajo, Santa Barbara and Margo is calculated to be 423 ha as of August 2017 (Table ES-1). The disturbed area has been increasing steadily since 2012.

Table ES-1 Summary of Land Disturbance Trends, 2012-2017

Location	Area of Disturbance in 2012 (ha)	Area of Disturbance in 2014 (ha)	Area of Disturbance in 2017 (ha)
Sabajo	43	65	66
Santa Barbara	90	114	348
Margo	0	0	9
Total	**113**	**179**	**423**

ha = hectare.

Studies on ASM areas conducted in 2014 and 2017 have indicated that impacts to the environment beyond landscape alteration and vegetation loss have included deposition of industrial and domestic waste and hydrocarbon and mercury releases to the environment.

Hydrocarbon impacts were associated with diesel fuel and petroleum oil products. Mercury impacts were found to be greatest around ASM sluice boxes and in particular around Cassador Pit. Presence of heavy metal resulting from ASM disturbance include elevated total arsenic in a few locations, including Cassador pit water and elevated cadmium and chromium in many soil samples at

ASM sites. Contamination occurs in soil, sediment and water while mercury is found in fish downstream of ASM areas.

The following potential impacts to area water quality in association with ASM activities were identified:

- **Total Suspended Solids (TSS):** ASM activities involve land disturbance in the vicinity of stream channels. These activities have the potential to increase TSS. An increase in TSS results in an increase in total metal concentrations.
- **Mercury:** ASM activities may involve the use of mercury. Mercury was detected at low levels in water samples collected in 2017 from a tailings pond and sluice box associated with ASM. Mercury concentrations are generally below detection in site streams.
- **Organics:** When analyzed, organics were below detection at all routine surface water monitoring locations. However, qualitative field observations during sampling rounds when organics samples were not collected suggest the potential periodic presence of organics in surface water below ASM activities. Specifically, oil sheens were visible at a monitoring site during a period when there was active ASM upstream.
- **Arsenic:** Total arsenic was present in water samples collected in association with ASM activities at the Margo site in 2017. Soils data for this area indicate the presence of elevated arsenic concentrations. ASM activities may affect arsenic concentrations in area streams.

Climate

Baseline

In general, Suriname has a tropical climate influenced by year-round trade winds from the northeast with four distinct seasons:

- short rainy season: mid-December to mid-February;
- short dry season: mid-February to mid-April;
- long wet season: mid-April to mid-August; and
- long dry season: mid-August to mid-December.

Average monthly temperature at Sabajo ranges from 27.7 degrees Celsius (ºC) in October to 24.8ºC in January. Maximum temperatures ranged from 31.3 ºC to 36.1ºC in the dry months from August through October. Low temperatures ranged from 19.6ºC to 22.3ºC usually in the dry months although low nighttime temperatures were recorded in the wet seasons also. The relative humidity is high to very high (80 to 90 percent [%]). The occurrence of hurricanes in Suriname is very rare.

Average annual precipitation at Sabajo ranges from a minimum of 2,209 millimeters (mm) in 2015 to a maximum of 2,740 mm in 2013. Wind data was

characterized by approximately 94% of winds blowing from the east and northeast. This pattern may be due to the orientation of the immediate topography at the site, in conjunction with coastal-influenced weather patterns. The wind data show that this site is typically exposed to incremental mild winds, almost entirely out of the east and northeast.

Effects and Mitigation

The Project will release greenhouse gases, contributing to climate change, but at a negligible level compared with other sources. Table ES-2 shows maximum annual project emissions (inclusive of both combustion emissions and releases due to removal of vegetation at the Project site) compared with other sources.

Table ES-2 Greenhouse Gas Emissions

Emission Source Location	Total Emissions [Mt CO_2e]
Global (2012)	25,764
Suriname (2008)	6.366
Merian Mine (Maximum Annual)	0.368
Sabajo Project (Maximum Annual)	0.076

Mt CO_2e = million tons carbon dioxide equivalent.

Mitigation to minimize greenhouse gases will include training drivers to minimize idling, limiting truck speed, and reclaiming mine stockpiles and disturbed areas as they become available. Newmont will quantify greenhouse gas emissions as part of standard monitoring and reporting carried out for all mine sites.

The Project's effect on climate is considered negligible.

Soils and Topography

Baseline

The Project Site elevation ranges from approximately 30 to 80 m above sea level at a latitude of approximately 5 degrees north and a longitude of approximately 55 degrees west. The forest canopy, in upland areas in particular, is dense and the ground surface is covered with dense vegetation, although soils are thin and water is not retained. Hillslopes are moderately steep with typical slopes of approximately 30% to 50%. Valley bottoms are generally wide and flat.

Based on available soil maps, the majority of the Sabajo Project footprint is located in the Donderbari landscape unit. Most soil profiles show an increase in clay percentage with depth, usually followed by a gradual decrease. Most soils contain iron gravel and occasionally also quartz gravel. The textural class of the Donderbari landscape unit sample sites are clay, sometimes with a very high clay content.

Soils were subject to chemical analyses. There is little variation between samples for many of the soil chemical parameters. All soils are acid, have a very high aluminum saturation, a very low base saturation, and all contain low to fair quantities of organic matter. All soils are very low in primary weatherable minerals, and thus have low nutrient capacity reserves. Virtually all nutrient reserves are found in the upper portion of the soil profiles.

Effects and Mitigation

The Project will affect soil quantity and quality through soil removal, compaction and erosion. The Project will also result in changes to existing topographic features such as hilltops and hillside slopes. New topographic features such as waste rock facilities and pit lakes will be created.

A sediment and erosion control plan will be implemented to manage erosion and a concurrent reclamation program will be implemented to progressively revegetate disturbed areas as they become available. Topsoil/subsoil/saprolite layers will be stored and this material will be used as growth media during reclamation. A spill prevention and control plan will be implemented to minimize soil contamination and hard-packed soils resulting from Project activities will be ripped to encourage revegetation. In addition, an offset program will aim to restore riparian areas previously destroyed by ASM activities. As a long term result, the soil quality and capability will be largely restored.

Residual effects are considered to be low for soils, and negligible for topography. Both kinds of effects are not expected to change the capability of the land for other uses.

Groundwater

Baseline

Shallow groundwater flow at Sabajo generally mimics the surface topography. Groundwater generally flows away from recharge areas on hilltops and ridges to converge and discharge in the valley bottoms to surface water. Based on measured groundwater elevations, groundwater levels at the site range from approximately 19 to 36 m above mean sea level. Lower groundwater elevations are found in valley bottoms and the higher groundwater elevations are found in upland areas such as the proposed Sabajo Pit area. Groundwater levels at individual wells over the period of record have fluctuated from less than 20 centimeters to more than 2 m.

Groundwater at Sabajo occurs within the alluvium, saprolite/saprolite quartz veins, saprock, and fractured bedrock. The dominant groundwater flow paths are expected to be within the quartz vein system, saprock, and (to a lesser degree) the fractured bedrock, which have relatively higher hydraulic pathways compared with the unfractured bedrock and saprolite. Although saprolite was not tested during the Sabajo hydrogeological investigation, testing at Merian has shown that groundwater flow through saprolite is minor because of its low

permeability. Groundwater flow in unfractured bedrock is also relatively minor because of the very low permeability.

Effects and Mitigation

The potential impacts to groundwater quantity are related to the dewatering of the pits during mining, and the time to fill the pit after mine closure. Lowering of the water table will potentially reduce the yield of baseflow to surface water streams within the radius-of-influence of the pit. A radius of influence ranging from 1,700 m to 3,300 m around the largest planned Pit, Sabajo Pit 1, was estimated. No groundwater users or sensitive habitat areas that rely on groundwater were identified within the effects area. The assessment of potential impacts included the changes in groundwater levels from pit dewatering and groundwater inflow to the mine during post-closure which may have impacts to surface water flows. The water balance modeling predicts that it will take approximately 28 years for Pit 1 to fill with water to the post-mining equilibrium condition (a water elevation of 30 m above mean sea level). As the pit fills with water, groundwater levels outside the pit (inside the radius-of-influence) will gradually rise to new post-mining equilibrium conditions. As the pit lake level rises, baseflow impacts to streams will reduce. Effects from other pits will be similar or lower, and added data collection will be carried out as needed to assess those effects prior to development.

Given there are no direct groundwater users, the classification of effects relating to groundwater was carried out in the surface water section.

Surface Water Hydrology

Baseline

Surface water flows within two drainages on the mine site (Figure ES-2). One flows predominantly west and the other flows predominantly east within the project area. Downstream, both drainages trend north and merge approximately 5 km north of the Project exploitation concession boundary and eventually flow into the Commewijne River near the village of Java, which is approximately 35 km north of Sabajo. There are a series of small tributary streams that flow into the creeks in the vicinity or down-gradient of the Project site. The surface water hydrology and drainage network on and immediately down-gradient of the Sabajo Site is strongly influenced by past and present ASM activity.

The measured flows vary widely between the monitoring sites ranging from less than 0.001 cubic meters per second (m^3/sec) to over 10 m^3/sec. An automated stream gauge was installed on one creek at Sabajo in June 2017 and near continuous flow data are available at this station from June 2017 to September 2017. From data at this station, flow is showed to have short-term peaks during wet season storm events and then quick recession to baseflow or near baseflow levels. The largest storm events occurred between mid-July and early August. There are only a few smaller storm events after early August, indicative of dry

season conditions, and the flows generally remained low from mid-August to the end of the period of record (September 26, 2017). During the dry season, outside of the small storm events, the total streamflow rates were essentially equal to baseflow, indicating that all of the flow is generated from groundwater discharge during the dry season.

Effects and Mitigation

The surface water quantity impact assessment has two components: (1) increased runoff related to clearing vegetation in areas as part of operations, and (2) reduced baseflows to streams from pit dewatering.

Overall, very little change in flow is predicted because the Project disturbance area is relatively small and much of the area that will be disturbed is in areas that have already been disturbed by small-scale mining. During mine closure, dewatering activities will stop and the pit will fill as groundwater levels re-balance.

Engineering controls will serve to mitigate the small impacts to surface water quantity. Sediment control structures down-gradient of the waste rock and stockpile facilities will collect runoff during storm events and act to detain peak flows during storm events; and water collected from the pits and dewatering wells will be discharged to streams. Typically, water will be collected and stored temporarily (and potentially treated) before being discharged back into streams down-gradient of the site. The discharge locations have not been determined, but could be targeted to stream reaches that are either most affected by Project operations or to areas where increased flow would be ecologically beneficial.

Residual effects on surface water flow are considered to be negligible for construction and operation phases as they will be almost fully mitigated, and low for the closure phase as mitigation will stop but effects will remain small and local.

Water Quality

Baseline

Site surface water quality results included:

- **Total Dissolved Solids (TDS):** Surface water TDS concentrations are consistently below 170 milligrams per liter (mg/L) at all monitoring locations.
- **pH and Alkalinity**: Surface water pH values range from acidic to circum-neutral. At many sites, field pH values have exhibited a high degree of variability.
- **Major Ions**: Surface waters in the Project area are characterized by low sulfate and calcium concentrations. Sodium and bicarbonate are the dominant cation and anion in most surface water samples.

- **Metals**: Dissolved metal concentrations are generally low in surface water samples and often below detection. Dissolved manganese and iron are consistently measured in surface water. Dissolved arsenic is typically below detection; however, on occasion it has been detected at some monitoring locations at low levels.
- **Nutrients**: Nitrogen species (i.e., ammonia and nitrate) concentrations are consistently low at most monitoring locations (i.e., <0.5 mg/L as nitrogen).

Groundwater water results included the following. All of the exceedances of water quality standards (arsenic and manganese) were measured in wells completed in the Cassador Fault (i.e., bedrock wells), as summarized below:

- **pH**: Groundwater field measured pH values range from acidic (4.6 standard units [s.u.]) to circum-neutral (6.9 s.u.).
- **TDS:** Groundwater TDS concentrations range from approximately 40 to 380 mg/L.
- **Alkalinity**: Alkalinity concentrations are variable ranging from approximately 10 to 340 mg/L as calcium carbonate.
- **Sulfate:** Groundwater sulfate concentrations range from 2 to 44 mg/L.
- **Arsenic:** Dissolved and total recoverable arsenic concentrations exceeded the drinking water standard in all Cassador Fault wells. Dissolved arsenic results for groundwater samples filtered with a 0.45 micrometer (µm) and 0.10 µm filter were similar, indicating that the arsenic is present in the dissolved fraction. Maximum arsenic concentrations (i.e., milligram per liter levels) are orders of magnitude higher than the drinking water standard of 0.010 mg/L.
- **Manganese**: Dissolved and total recoverable manganese exceeded the drinking water standard in one of the Cassador Fault wells. Maximum manganese concentrations (i.e., approximately 1 mg/L) were only slightly higher than the drinking water standard of 0.88 mg/L.

No exceedances of drinking water standards were measured in the saprolite quartz vein or saprock wells.

Effects and Mitigation

Water quality in local watercourses could be affected by site clearing and disruption of natural drainage patterns, disposal and stockpiling of waste rock and ore, sewage treatment effluent, accidental releases and spills and site reclamation and closure activities.

To prevent these adverse impacts to surface water and groundwater, it is assumed that treatment of WRF runoff and seepage will be required. This

assessment assumes WRF runoff and seepage is collected and treated for arsenic, and possibly other metals, prior to discharge to the environment.

Management of waste rock may include segregation and encapsulation of rock with elevated arsenic concentrations to limit exposure to oxygen and water.

Pit lake water quality modeling has indicated a potential for elevated metal and sulfate concentrations. To improve pit lake water quality, rapid filling of the pit by the diversion of surface water into the pit may be considered. Rapid filling is intended to decrease the exposure time of reactive sulfides present in the pit wall faces. Inundation prevents exposure to atmospheric oxygen and is, therefore, an effective way to reduce metal and sulfate loading from sulfide oxidation.

The residual effects for waste rock facility runoff on surface water, and on the quality of pit lake water, are considered medium. These runoff waters will include arsenic and potentially other metals prior to treatment. Residual effects due to ore stockpile runoff, erosion and accidental spills are all considered low. Effects on groundwater are also considered low, as they will be very localized. No people or fauna downstream are expected to be adversely affected, as water quality leaving the site will be protective of human health and the environment and in some aspects will be improved due to cessation of ASM and rehabilitation of selected ASM areas. Brokopondo Villages are in a separate watershed and streams in that area will not be affected.

Human Rights Risks and Benefits

The short-term impacts from accidental spills from hazardous material transport along the Project access routes to surface and groundwater quality have the potential to negatively impact water resources, potentially causing harm to the communities that use these water resources; such impacts would be addressed within the mitigation plans and remediated but may have residual impacts in the case of a significant incident. The risks would be to the right to water and the right to health; the right to an adequate standard of living could be impacted in that case.

Restrictions to ASM activities within the Project boundaries would improve water quality of the streams throughout the life of the Project including during closure; the effect would be to the right to water and the right to health. Post closure, the likelihood for ASM activity to resume is small but is present and could affect water quality.

Pits and WRF facilities will generate acid, with the potential to mobilize heavy metals. Post-closure seepage and runoff from the waste rock facilities of acidic water carrying heavy metals will be monitored and treated as necessary in order to manage it at permissible levels at the Project boundaries. The magnitude of the potential risk to the right to water remains uncertain and further testing is necessary to fully characterize the geochemistry of the waste rock. The risks would be to the right to water and the right to health.

Noise and Vibration

Baseline

Noise monitoring focused on daytime conditions. Noise monitoring along the Carolina Road have shown typical roadside noise levels in the range of 37.6 to 68.1 A-weighted decibels. Noise monitoring along the Afobaka Road have shown typical roadside noise levels in the range of 47.3 to 68.7 A-weighted decibels (dBA). Noise comes from natural forest noises as well as traffic, but tends to increase along road routes where traffic is higher. At Sabajo, noise presently comes mainly from natural sources and has shown quiet conditions with noise ranging from 31.3 to 59.0 dBA in the day and from 42.3 to 50.2 dBA at night.

Under baseline conditions there is no ground vibration at the mine site.

Effects and Mitigation

The Project will affect noise along the Carolina and Afobaka roads. However, Project noise levels are predicted to fall below the applicable International Finance Corporation (IFC) guideline for all modeled cases (no increase of greater than 3 dBA from project sources) for both the Carolina Road and Afobaka Road. Project traffic will not result in any substantial vibration off of the road, as long as roads are well-maintained.

The Project will affect noise levels at the mine site and the newly built Sabajo-Merian Haul Road, and all noise levels will be well within the industrial IFC guideline of 70 dBA.

The Project will cause vibration in the vicinity of the mine, due to blasting. Blasting effects are compared against an international standard, the Australia and New Zealand Environmental Conservation Council (ANZECC) guidelines. The modelling predicts that ground vibration will decay below the ANZECC maximum guideline of 10.0 mm/s within 700 m of the blast site and will decay below the ANZECC recommended guideline of 5.0 mm/s within about 1 km of the blast site. The modelling predicts that airblast overpressure will decay below the ANZECC maximum guideline of 120 linear decibels (dBL) within about 1.6 km of the blast site and will decay below the ANZECC recommended guideline of 115 dBL within about 2.3 km of the blast site. Given that the nearest occupied areas are 15 km away, blasting is not expected to affect any populated location.

As mitigation, in order to limit night time disturbance effects, the Project will limit offsite traffic and blasting to the daytime period (7:00 to 22:00) whenever possible.

The residual impact classification for noise on the Carolina and Afobaka roads is medium, as noise will increase in populated areas, but will be within IFC guideline levels. The residual impact classification for the noise increase at the mine site is low, given that noise will increase but at a long distance from any populated areas. The residual impact classification for ground vibration is low, as effects will be only in close proximity to the mine. The residual impact classification for air vibration (airblast overpressure) is considered medium, as effects extend farther, but still not into any populated areas.

Air Quality

Baseline

Air quality monitoring along the Carolina Road has indicated good air quality, with low but higher than background levels of dust (total suspended particulates, particulate matter less than 10 microns aerodynamic diameter (PM_{10}) and particulate matter less than 2.5 microns aerodynamic diameter ($PM_{2.5}$]) observed close to the road. Air quality monitoring at Sabajo has shown good air quality with minimal nitrogen dioxide (NO_2), sulfur dioxide (SO_2), or dust.

Effects and Mitigation

Project activities that will affect air quality include dust (particulates) caused by traffic and site clearing and tailpipe emissions (exhaust) from vehicles and from the on-site diesel generator. Based on the engagement with roadside communities, dust and air emissions along the Carolina Road was recognized as an issue of interest.

Effects on air quality will be mitigated by using Ultra-Low Sulfur Diesel for project equipment; watering of project roads and stockpile as necessary; reclaiming mine stockpiles and disturbed areas as they become available; training of drivers to minimize idling and limiting the speeds of trucks for Newmont and contractor vehicles.

Residual effects both along the access road and at the mine were modelled. As a result, it was confirmed that applicable standards will be met both outside the mine site and along the road, and that air quality will continue to be good in these areas. The PM_{10} levels modelled for the gravel road section of the Carolina Road, as an example; the PM_{10} dust levels increase along the roads but remain below the World Health Organization (WHO) Ambient Air Quality Guideline (AAQG) and levels decline quickly with distance from the road.

Air quality impacts along the project access roads are predicted to be negligible for NO_2, carbon monoxide (CO) and SO_2 concentrations for all sections of the Project access route, since Project traffic will emit negligible amounts of these compounds; along unpaved roads, there will be a small local increase in dust but this is also considered a negligible effect.

Air quality impacts at the mine site are considered medium. While SO_2, CO and NO_2 levels will be very low, 24-hour $PM_{2.5}$ concentrations are between 50% and 100% of the AAQG and annual $PM_{2.5}$ concentrations are below 25% of the AAQG at the boundary, meaning that a receptor at the edge of the mine site could experience elevated dust levels. Having said this, no effects to study area communities will occur.

Biodiversity

Baseline

Biodiversity surveys were carried out for habitat types, fish and aquatic habitats, flora, birds, mammals and herpetofauna. A review of ecosystem services for people was also conducted.

Habitat

Habitat types in the study area were mapped and are listed in table ES-3. Features of note include wet savanna forest habitat on sandy soil, which had a large population of the palm *Elaeis oleifera*, a species of conservation interest (see Flora results below); in high dryland forest on tall hills with shallow soil, at least in the central part of the study area, the endemic palm *Oenocarpus* sp. was present, also a species of conservation interest.

Aquatics

Many of the watercourses in the immediate area of the Project are either disturbed, or have water quality affected by ASM activity.

No International Union for Conservation of Nature (IUCN) Red List threatened macroinvertebrates or fish species were documented in the baseline.

Although it is known to occur in the Upper Tempati catchment, a rare, enigmatic cetopsid catfish (*Cetopsis* sp), was not collected during the present survey. This species is previously known in Suriname from only two specimens collected during baseline studies for the Merian ESIA in a tributary of Tempati Creek.

Table ES-3 Extent of Different Habitat/Vegetation Types in the Project Study Area

Habitat/ vegetation type	Description	Species	Area (ha)	% of Total
High dryland forest	Tall forest on low hills and slopes of taller hills; soil deep, but gravely / rocky (probably no duricrust in the soil)	Large tree families Lecythidaceae, Mimosaceae and Caesalpiniaceae are co-dominant; many other families are also represented.	10,758	57.3%
Marsh Forest in Floodplain (Kleine Commewijne)	Tall forest in wide valleys – terraces of major creeks; deep soil that seasonally floods (at least large part of soil seasonally waterlogged)	Hydrophytic palms *Euterpe oleracea* and *Socratea exorrhiza* present; Lecythis corrugata very abundant (many large individuals) in marshy parts. drier parts with typical high dryland tree species.	1,643	8.7%
Marsh Forest in Floodplain (Tempati)			1,218	6.5%
Marsh Forest on Loamy Soil	wide depression with creeks; deep, loamy soil (large part flooded / water-logged in rainy season)	Hydrophytic palm *Euterpe oleracea* present; *Lecythis corrugata* abundant. Some typical high dryland forest trees also present (at drier spots). Understory very rich in palms and Marantaceae.	1,622	8.6%
Creek Forest	Tall forest in narrow creek valleys, encased by lateritic hills; deep sandy / loamy soil that is mostly flooded / waterlogged perennially	*Euterpe oleracea* very abundant, as well as many other hydrophytic trees, such as *Tabebuia insignis* and *Pterocarpus officinalis*. Understory with abundant *Monotagma spicatum* and *Geonoma baculifera*, rich in epiphytes	1,498	8.0%
Secondary Forest / Disturbance	ASM areas, roads and other disturbances	N/A	1,175	6.3%
Wet Savannah Forest on Sandy Soil	Tall forest in wide depressions with creeks; deep, flooded / water-logged white / bleached sand soil	Tall hydrophytic palm *Euterpe oleracea* abundant, and locally also the understory palm *Elaeis oleifera*. Typical white sand savanna forest trees present such as *Licania divaricata*.	5278	2.8%
No data	N/A	N/A	297	1.6%
Dry Mountain Savannah Forest on Duricrust	Dolerite ridges with shallow soil over (possibly intact) duricrust	Fairly small-medium sized trees of families Myrtaceae and Euphorbiacae should be present / abundant alongside other xerophytes.	44	0.2%
Total			18,782	100%

ha = hectare; % = percent; N/A = not applicable.

The Commewijne River contains three endemic fish species. Two species (*Peckoltia* sp and *Panaqolus* sp) are only known from a single specimen each collected during studies, unrelated to this ESIA, in the blackwater Mapane Creek that is outside the study area. The third endemic is a *Corydoras* species (aff.

oxyrhynchus) that was collected at the junction of the Kleine Commewijne River and Tempati Creek for this study.

In July, a slender plar'plari species (*Ageneiosus ucayalensis*) was collected in the middle Tempati; this species was previously known in Suriname only from the Corantijn River; it has never been caught by the authors and is not known from the Commewijne River. A second interesting species is *Piabucus dentatus*; this elongated characin is seldom caught in Suriname but proved relatively abundant in the upper Commewijne River.

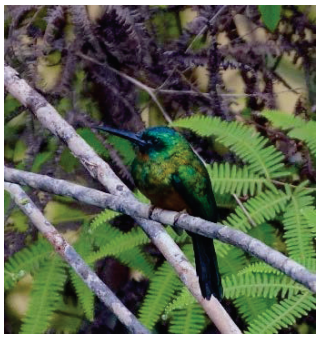
Flora

The floristic survey identified 370 vascular plant species belonging to 105 plant families: 72 Dicotyledon families, 17 Monocotyledons, 17 Fern and related families (pteridophytes). Trees represented nearly a third of species documented in the study area, while herbs, shrubs and treelets together accounted for 46.3% of species. In the course of floristic surveys the following four species potentially new to science were documented:

- *Anathallis* aff. *ciliolate* (Orchidaceae), a herbaceous epiphyte, found in High Dryland Forest
- *Lundia* sp. nov (Bignoniaceae), a liana, found in High Dryland Forest
- *Oenocarpus* sp. nov (Arecaceae), a tree palm, found in High Dryland Forest
- *Clidemia* sp. *nov. ? (affine Hirta ?)* (Melastomataceae), a shrub found in High Dryland Forest

The floristic survey also documented some plant species of economic importance. Of particular note was the American oil palm *Elaeis* aff. *oleifera* (Kunth) Cortés (Arecaceae), a stand of which was located in Wet Savannah Forest on Sandy Soil.

According to a Guianas palm specialist, the Suriname and French Guiana populations belong to a different sub-species than those from central Amazon basin and Central America. When this taxonomic group is revised, the Guianan populations may be classified as *Elaeis oleifera subsp. guianensis*, a distinct Guianese strain of the American Oil Palm. This sub-species represents a genetic resource of potential economic importance for oil palm, which is planted extensively in plantations in tropical regions around the world. In addition to the oil palm, a number of economically important timber species were documented in the study area, two of which are classified as globally endangered by IUCN (*Virola surinamensis* IUCN Endangered; *Vouacapoua americana* IUCN Critically Endangered). Two species of trees are protected by Suriname forestry law: *Dipteryx odorata* and *Copaifera guyanensis.*



Birds

Field surveys documented 249 species of birds on the 13 sites visited in the Project study area. Estimates of species richness were higher for forest plots (193 observed species) than for those in secondary habitats (155 observed species), while species richness estimates were similar for dryland forest (191 observed species) and seasonally inundated forest (189 observed species). Despite the widespread degradation of habitat in Sabajo, a few notable bird species were observed. Of particular significance was an observation of Harpy Eagle (*Harpia harpyja*; IUCN Near Threatened) during the October survey. Of the 249 species observed, 34 are endemic to the Guiana Shield. The majority of these, such as the Guianan Warbling-Antbird (*Hypocnemis cantator*) are forest species that persist in Sabajo. The proportion of endemics in the study area (~13.7%) was roughly equal to that found in less disturbed lowland forest areas of the Guiana Shield (O'Shea *in press*), suggesting that forested habitats in Sabajo retain value for regional endemic birds. Most of the endemic species encountered are readily found in lowland forests of the Guiana Shield and have broad geographic ranges within this area.

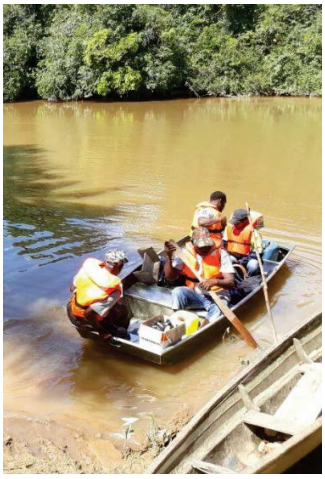
Mammals

Mammal groups surveyed included bats (29 found), terrestrial small mammals (2 found, a low level of diversity typical in the Guiana shield) and large mammals (25 directly observed or detected with camera traps). The mammal surveys did not document any species considered as Endangered or Critically Endangered by the IUCN Red List, although several species assessed at lower threat levels were documented (IUCN has assessed the giant anteater, lowland tapir, and the Guiana spider monkey as Vulnerable, and the jaguar as Near Threatened). Other mammals of conservation interest include the relatively rare, large carnivorous greater false vampire bat (*Vampyrum spectrum*), which was caught in a net set in a highly disturbed area. Four of the 8 species of primates that occur in Suriname were observed during the field survey, indicating that some species of large mammals sensitive to hunting pressure are still resident in the Sabajo area.

Reptiles and Amphibians

Forty-three species of amphibians (all Anura – frogs or toads) and 17 species of reptiles (12 lizards, 2 snakes, 1 turtle and 2 caimans) were found in surveys at Sabajo. The disturbance caused by ASM has reduced the area of potential habitat for many amphibians, in particular. All amphibian and reptile species were either assessed by IUCN as Least Concern or have not had IUCN conservation assessments published yet. The frog *Osteocephalus cabrerai* is a rare species over most of its distribution range including Suriname. The specimen from Sabajo is only the second found in Suriname. In a swampy forest area near basecamp, a species of *Anomaloglossus* (a small terrestrial frog) was heard with a call different from known *Anomaloglossus* species. This could indicate the occurrence of an *Anomaloglossus* species new to science. Although the call was recorded it was not possible to catch any individuals. In another location a *Scinax* species (a tree

frog) was collected that could not be identified. It may be a species new for Suriname.



Ecosystem Services

Ecosystem services are the benefits that people derive from ecosystems, and are generally considered in four categories: *provisioning*, *regulating*, *cultural*, and *supporting*. Ecosystem service benefits to local communities and users of the Sabajo area were evaluated as part of the Cultural Resources Survey and ASM Survey. In general, the surveys did not identify significant ecosystem services meriting treatment as Key Biodiversity Values.

Effects and Mitigation

***Habitat loss*:** the project footprint (886 ha) will be cleared of terrestrial natural habitats (716 ha). A portion of the project footprint (170 ha) will be on areas already cleared of natural habitat by ASM. In addition, 6 km of streams and drainages will be directly impacted within the footprint, all of which have either been directly intervened previously by ASM or are upstream of ASM impacts and therefore have degraded ecological function from impaired connectivity. Notably, no protected areas will be directly affected by the project. The nearest protected area is more than 30 kilometers away.

***Habitat degradation*:** removal of terrestrial habitat increases fragmentation at the scale of the landscape, reducing the movements of living organisms across the landscape. Fragmentation can also occur through the loss of sections of stream habitat which hinder aquatic species' movement. Terrestrial habitats not removed in the footprint, but within a buffer of 100 m of roads and mining operations may experience some degree of edge effects and disturbance from light and noise. Riparian vegetation communities may be impacted by changes to surface water flow or quality. Aquatic habitats also have the risk of being degraded by changes in flow, sedimentation and contamination.

***Species mortality and population loss*:** In addition to habitat loss, fragmentation, and degradation, other impacts may selectively result in flora and fauna mortality. Potential risks of this Project include mortality during site clearing, vehicular collisions with wildlife, introduction and spread of invasive species, introduction and spread of animal or plant disease.

The project will seek to minimize effects on biodiversity through:

- Avoiding areas of high biodiversity value, both through the choice of routing for the Sabajo-Merian Haul Road, and through avoidance actions for savanna forest on sandy soil at the Sabajo site, if needed.
- Reducing clearing widths at several locations along the Sabajo-Merian Haul Road route, where wildlife crossing can be best accommodated.

- Constructing bridges over three river crossings used by the Sabajo-Merian Haul Road with spans sufficient to allow normal hydrologic function of the rivers, ensure connectivity for migrating fish, and to allow free movement of terrestrial wildlife under the bridges through riparian corridors.
- Using traffic controls to minimize wildlife collisions, including driver awareness through education, signage, and speed limits of 30 to 40 km/h on the Sabajo-Merian Haul Road.
- Ongoing vigilance during road and mine construction and operation to ensure that unnecessary habitat damage is not caused.
- Proper disposal of organic wastes generated at the site daily and restricting wildlife access to disposal area.
- Prohibition of hunting and fishing including by its own staff and contractors within the Right of Exploitation.
- Prevention, detection, control and reporting of invasive exotic species.
- Implementation of progressive rehabilitation.

A biodiversity offset will be implemented to compensate for residual impacts not mitigated by avoidance, minimization, and rehabilitation. The offset will seek to restore natural habitats outside of the project footprint, both aquatic and terrestrial, impacted by ASM prior to Sabajo's construction. The goal of the offset will be to restore up to 750 ha of impacted terrestrial habitat outside of the project footprint, and directly improve the average quality of up to 36 km of streams. Stream improvements may also indirectly benefit up to 184 km of upstream habitat by improving ecological connectivity.

After mitigation, all significant impacts to key biodiversity values are eliminated. It is expected that Newmont's goal of no net loss for biodiversity will be achieved. A follow up study will be conducted to evaluate effects on one species, *Elaeis aff. oleifera,* a plant which is associated with wet savanna forest on sandy soil.

Social Approach

Several social and community studies were undertaken to describe socio-economic, health, and cultural baseline features in the Project's Area of Influence (AOI). Studies focused on stakeholder groups and communities that have the potential to be affected by the Sabajo Project, including its proposed access routes. Table ES-4 displays AOI communities and stakeholder groups that were involved in the various studies.

Table ES-4 AOI Communities and Stakeholder Groups

Kawina Communities	Brokopondo Communities	Carolina Communities	Small-Scale Mining Areas
Gododrai	Afobaka Centrum	Redi Doti	Santa Barbara
Java	Asigron	Casipora	Margo
Moismoiskondre	Balingsoela	Powakka	Km 34
Pennenica	Brokopondo Centrum	Philipus Kondre (Klein Powakka)	Polaco
Kawina residents in Paramaribo	Boslanti	Pierre Kondre Kumbasi	
	Compagnie Kreek		
	Drepada		
	Tapoeripa		

Note: The four traditional Kawina communities (Gododrai, Java, Moismoiskondre, and Pennenica) are intermittently occupied.

The social issues assessed are divided into the following categories: socio economics; historical narrative and land use; health; artisanal and small scale mining; cultural practices and intangible values; and historical and archaeological resources.

Socio-Economics

Baseline

National Context

The economy of Suriname is dominated by mineral development and exportation, and government investment. In the past, the mineral sector contributed roughly a third of total national GDP. With recent shifts in commodity prices and reduced production of aluminum, the mineral sector's GDP contribution has fallen to about 18% (in 2016). The sector is dominated by petroleum production at a state-owned (Staatsolie) oil refinery, and gold mining at the Merian and Rosebel mines. With recent declines in mineral revenues, the economy has been shrinking and the Government has been operating at a deficit.

The population of Suriname is 541,000, of which almost 50% live in Paramaribo, a further 40% live in other towns along the coast, and 10% live in the interior.

Local Context

The proposed Sabajo mine is located in Para District in northeast Suriname (Figure ES-1). The closest communities (about 15 km from the Project in a straight line) are located in Brokopondo District. Communities with the possibility of being influenced by the Project are listed in Table ES-4.

The Kawina people are a subset of the Ndjuka Maroons and have inhabited and used the Commewijne River area for more than 200 years. After escaping from slavery, most of the Kawina settled in the area near Java and remained there for decades. Before the Interior War (1986-1992), the four Kawina villages

(Pennenica, Java, Moismoiskondre, Gododrai) were fully populated. The Interior War caused the destruction of the villages and the inhabitants were forced to flee to Paramaribo. Today the population of Kawina people is estimated at 500 and they still mostly reside in Paramaribo.

The 'Brokopondo communities' are select communities in the District of Brokopondo that are located along the southern part of the Afobaka Road. The majority of people living in this area are Maroon (African descendants of escaped slaves). They are further self-identified as being of Saramaka or Saakiiki tribes. Collectively, the six Brokopondo communities under study have a population of about 2,536. Agriculture and ASM are main economic activities. About 50% of the population aged 15 and over are formally employed. Levels of education are typical of interior populations in Suriname; approximately 20% of the population does not have any formal schooling. Nearly half (43%) have completed or partially completed primary school as their highest level of education, while another quarter of the population has either completed or partially completed secondary schooling.

The Carolina Communities are descendants of the Lokono and Kaliña Indigenous Peoples, who moved into the present-day east Para region in the early 17th century to keep at a distance from the coastal area plantations. Casipora and Pierre Kondre Kumbasi are the oldest indigenous communities in this area. Pierre Kondre Kumbasi and Redi Doti are Kaliña communities while Powakka, Philipusdorp and Casipora are Lokono communities. Many people in the communities along the Carolina Road live and work in Paramaribo during the week, and return to their villages for the weekend. For most communities, agriculture remains the most important economic activity. Tourism is another important source of income for some in Carolina communities. Tourism-related work is often largely associated with Jodensavanne and the Blaka Watra recreational resort. Just under 50% of the population aged 15 and over are formally employed. Nearly a third of adults in the Carolina communities have not completed an elementary education. Of the remaining two thirds that have completed an elementary education, 3% possess high school-level education.

Macroeconomics Effects and Benefit Enhancement

Assuming that the Sabajo Project enters operation while the Rosebel and Merian mines are still producing gold[1], its addition of approximately 61,300 oz. of gold production per annum over 10 years would represent a 9% increase on total annual national production. Should the Project enter operations following the closure of the Rosebel Mine, and assuming constant production volumes at the Merian mine, the Project's share of total national gold production would grow to

[1] As of 2015, the Rosebel Mine was predicted to have a 6.6 year lifespan of attributable gold production, potentially overlapping with Project operation.

around 17%. In either scenario, the Project would represent a significant increase to national gold production and exportation, and an important contributor to the economy of Suriname.

Once operational, the Sabajo Project will also pay a royalty to the Government of Suriname equivalent to 6% of the total export value of gold produced each year. In the first three quarters of operation, the Merian mine generated $34 million in resource royalties. It is estimated that total resource royalties for 2017 will amount to $38 million. Assuming annual gold production of between 350,000 and 390,000 oz. at the Merian Mine, the Sabajo Project could result in about $5 million in annual royalties to the Government of Suriname for approximately 10 years.

Project construction is expected to require approximately 100 Surinamese workers during ramp up. As construction progresses, the workforce will grow to around 300 Surinamese jobs. Sabajo Project operations are expected to require approximately 140 to, at peak, 170 direct personnel, in addition to the existing management and planning workforce present at the Merian Mine.

Overall, The Project's macroeconomic impacts are expected to be positive and of low to moderate magnitude relative to the baseline conditions against which they are measured. While the Project represents substantial benefits in terms of gold exportation and government revenues, its national-level employment impact is modest. National economic effects will be most pronounced during operations.

Human Rights Risks and Benefits

Macroeconomic improvement and increased revenue to the government have the capacity to positively impact rights to health care and education and other initiatives. The scale of the impacts are limited due to the relatively limited contribution to overall economic stability and the uncertainty as to whether the additional government revenues will be directed towards shortfalls that address human rights. The positive impact to rights is possible, but low scale, and is a low priority for further management attention.

Local Economic Effects and Benefit Enhancement

The project will generate direct employment opportunities. During operations, it is expected that around half[2] of highly skilled positions (i.e., only around six positions) would be filled by expatriates, while the other half would be filled by Surinamese candidates. The Project's management requirements would be met largely by the existing management workforce at the Merian mine. The majority of Project direct operational employment that would be taken up by the

[2] Based on local hiring performance of professional positions at the Merian mine in 2016.

Surinamese labor force would, therefore, be in the areas of equipment operation and mining supervision.

The Project will also generate business opportunities through the procurement of goods and services. As with employment, procuring goods and services is likely to be modest.

The Project's employment impact, while positive, would be of low magnitude given the small number of jobs available. Members of the Kawina tribe may be well-positioned to participate in the project through employment but new positions are still limited. This impact would exist during construction and operations and would be of medium-term duration. Given these factors, the Project's impact on local employment and incomes is assessed as positive and low.

The Project's positive local business development impact would result in local purchase of goods and services, and in turn generate earnings for local vendors. Given these factors, the Project's impact via local procurement is assessed as low.

Enhancements for potential economic benefits will include:

- Undertake efforts to identify suitable Surinamese candidates for as many positions as possible during both the construction and operations with Project operations requiring a more skilled workforce than construction.
- Stay in contact with the Kawina Traditional Authorities and continue ongoing engagement with them regarding Project opportunities.
- Undertake a formal recruitment process that maximises opportunities for employment of key stakeholder groups, where possible, including accessible and timely job postings.
- Post positions internally to encourage the advancement of the workforce into other categories of employment, thus creating entry level job openings.
- Implement a process to identify potential suppliers of goods and services and analyse barriers to the ability of key stakeholder groups to supply goods and services relative to Project procurement requirements.
- Give priority to suppliers from key stakeholder groups when sourcing raw materials, finished goods, and services.
- Identify opportunities for 'adhoc' or occasional income generation opportunities (filling sand bags, collecting seeds for reclamation, etc).
- Establish achievable targets for local procurement (as a percent of total procurement) from key stakeholder groups that grow over time.
- Provide businesses with timely information on procurement.

Human Rights Risks and Benefits

Both the local procurement and local employment program have the potential to contribute positively to the right to work and the right to an adequate standard of living. The potential impacts are evaluated as positive but of limited scale given the limitations to local hiring and procurement identified in the ESIA; the impacts to the right to work are considered certain. Although assessed as a positive impact the actual results should be monitored and reported on.

Land Use and Historical Narrative

Historical Narrative of Traditional Lands around the Project

A preliminary desktop study and mapping validation exercises were carried out, yielding the following outcomes:

- Indigenous peoples of upper Para region, as well as Paamaka and Ndyuka, including Kawina, recognize that Indigenous peoples are the first inhabitants of the territory surrounding the Sabajo Hills;
- Indigenous peoples of upper Para region (Kaliña and the Lokono in the Carolina Bridge area) do not claim land in Newmont's Project Area and their traditional territory does not overlap the project area;
- According to Kawina people, the Peace Treaty of 1760 (1761) is still valid and they recognize the territory upon which the Sabajo Project is located as their traditional territory;
- The watershed of the Commewijne River and the watershed of the upper Suriname River are the natural borders for the Kawina and Saamaka, respectively; and,
- The Commewijne River is still inhabited and the Tempati and Little Commewijne creeks are still traditionally used by the Kawina people.

Further data collection found evidence of traditional collective habitation and use of land by the Kawina people within the Commewijne River area including the Tempati, Little Commewijne and Mapane Creeks.

Effects and Mitigation

The project's efforts to achieve Free, Prior and Informed Consent (FPIC) would affirm the customary land tenure of the Kawina. Newmont acknowledges that the Sabajo Project is located within the Kawina's traditional territory and the Kawina may potentially benefit from this acknowledgement in several ways. As noted in the Culture and Wellbeing section, the acknowledgement of Kawina traditional territory may be a driver for their cultural revival, including the sustained use of land around historic villages for traditional activities. A final

pathway by which the Kawina may benefit from the Project's acknowledgement of their land rights is that this affirmation was attained through methodologically sound research and shared with the Kawina.

The Project could impact recreation and tourism activities in the vicinity of resorts and recreational areas along the potential Carolina access route due to greater traffic.

The Project could impact commercial and community forestry activities through direct land take and increased access. The development of access roads associated with the Project will increase access for other users. This could result in increased illegal harvesting of wood and also access to the area for ASM. Newmont will engage land users to agree on locations of crossings and will not allow facilities, shops or settlements along the Sabajo-Merian Haul Road. Given the remote location and the fact that the Sabajo-Merian Haul Road will have controlled access at both ends, illegal wood harvesting will likely be limited and is expected to be minimal.

The Project could impact hunting and fishing activities through direct land take or change in the availability or quality of resource species. However, there are presently few users in the area and for those who do use it (some ASM miners), this is not a primary food source.

In acknowledging the collective rights and traditional lands of the Kawina in the area of Sabajo, the Project has the potential to represent a high, positive impact on Kawina land tenure.

The Project's disruptive effect on recreation and tourism in the region is assessed as negligible.

The Project's potential effect on forestry will be largely mitigated through:

- Consulting and then implementation of agreed on plans with those holding rights to forest areas removed by the mine concession and the Sabajo-Merian Haul Road; and
- Limiting the area of disturbance relative to the overall land availability for the timber concessions.

Assuming effective mitigation, the Project's effect on commercial forestry activities is assessed as negligible.

The Project's potential effect on hunting and fishing activities is, as with agriculture, limited to the small-scale miners near the Project who practice these activities sporadically. The Project's effect on hunting and fishing is assessed as negligible.

Human Rights Risks and Benefits

The assessment identifies an enhancement to Kawina property rights and self-determination from Newmont sharing the research with the Kawina that led to the company's acknowledgement of their traditional land rights. This is a positive impact on the enjoyment of these rights, the status is actual and the scale of the impact is high given the contribution it makes to the Kawina's knowledge base for their land rights. As it is already occurring, the likelihood is certain; further attention by the Project is not required so the prioritization is low.

Artisanal and Small Scale Mining

Baseline

The history of ASM in the Project area dates back to the 1880-1910 gold rush. Some of the present-day Kawina small scale miners began ASM activities in the Sabajo area in 1993. They left the area in 1995 due to the high costs of bringing in fuel and supplies but returned in 2009 with improved access associated with newly developed logging roads and higher gold prices.

Newmont Suriname first obtained exploration rights in the Sabajo Area in 2009, and in 2010 it became unsafe for Newmont to continue its exploration activities due to the number of ASM operators and the company asked the government of Suriname for assistance in evicting the gold miners. Most miners left in 2011 and the last group left in 2014. While Newmont regained exploration rights over the Santa Barbara area in 2017, the company currently works alongside the ASM operators during drilling campaigns and regularly engages with them as part of the ongoing community relations program.

Artisanal and small scale mining in the Sabajo concession area is carried out by an estimated 198 individuals. This also includes about 21 people who are Kawina. Almost all those directly involved in ASM (93%) reside in Paramaribo when not actively mining, while the remainder stay either in the bush around the mining area, or with family members in other communities. About 71% (140 individuals) of small scale miners studied operate in the Santa Barbara area.

ASM mining is generally overseen by 'land bosses'. Though not legal under Surinamese law, the system of land bosses is a commonly accepted practice in Suriname. Land bosses are typically people who claim informal (ancestral/tribal) rights to the land where ASM is taking place and require a percentage of the profit produced from their land.

For the local ASM camps, food for the camps is primarily obtained from Paramaribo. Some individuals hunt and fish and in many camps people plant some basic food crops to supplement the diet. The majority of ASM operations

obtained drinking water from a well, and others relied on rain and/or creek water. Most camps created some sort of sanitary facility in the forest (typically, a large hole with wooden beams across) and others relied on the forest floor. Garbage is disposed of by digging holes in the ground that is then sometimes burned or covered with sand. For medical services, ASM workers would travel to Paramaribo or French Guiana. For protection against theft and violent assault, some ASM operations have hired armed security services, either continuously or only on high risk days when gold is collected or transported. The ASM have virtually no relation or contact with the surrounding Afobaka communities. As most small-scale miners live outside the project area and supplies are mostly sourced from Paramaribo, few economic benefits stay in the project area.

Effects and Mitigation

The project will displace small scale mining operations around Santa Barbara and Margo. The mitigation for the economic displacement of small scale miners is the implementation of an ASM Strategy with support for livelihood restoration where possible. Newmont will:

- Provide adequate advance notice to miners ahead of commencing project construction;
- Provide assistance with moving equipment out of the area; and
- raise awareness of labor, environmental and safety considerations.

Even with effective mitigation, some small scale miners are likely to feel inconvenienced by, and resistant to the process. The effect will be localized to those operators displaced by the Sabajo Project and would extend beyond Project operations into closure. Given these factors, the Project's impact of economic displacement of small scale miners is assessed as medium.

Human Rights Risks

By displacing ASM from the Project footprint, the Project is at risk of indirectly causing a negative impact to the right to an adequate standard of living for those displaced. The potential impact has a high severity.

The use of excessive force or harassment during encounters with the population, or use of force during the removal of ASM from the property boundaries could result in injuries or fatalities depending upon the circumstances and the security forces involved. The potential for serious injury or a fatality is greatly reduced by mitigation in place including the prohibition on arms. Implementation of the Voluntary Principles on Security and Human Rights and a significantly different engagement strategy with ASM have reduced the likelihood of a conflict. The risk of excessive use of force in managing ASM issues is negative and potential (not occurring now); it is of high severity with a low likelihood.

Cultural Practices and Intangible Values

Baseline

Brokopondo and the Kawina

The different Maroon groups have a comparable traditional authority structure, with the Granman (Paramount Chief) as head of the tribal group, and Kapiteins (clan heads/village leader) as main authorities in the villages. The Granman and Kapiteins are assisted by Basjas (administrative assistants).

Politics and religion are interwoven in most Maroon groups, with the Granman and Kapiteins being central persons in communicating with the ancestors and the outside world. In recent years, many villages have chosen to elect their leadership instead of appointing them for life as has been historically done which may increase their legitimacy, especially among younger people.

Suriname's Maroon societies have a largely matrilineal descent structure, with heritage and family relations being traced to the organizational units of *Oso, Mamapikin, Bee, Lo* en *Nási.* For Maroon individuals, these kinship lineages are very important in determining who is to be trusted, who will assist in times of need, who one associates with, and who are suitable marriage candidates. In order to understand the various communities, it is important to be aware of these lineages.

Religion is central to Ndyuka and Saramaka daily life. Among the target Brokopondo area communities, villages can be roughly categorized as Christian (missionized) villages and non-Christian villages, where the traditional winti religion is dominant. In reality, the divide is less distinct; inhabitants of Christianized communities take part in Winti rituals, and in Non-Christianized communities one finds Christened people who may not obey certain traditional cultural codes.

The two ancestral shrines of most significance are the mortuary and the ancestor pole. Without these two structures, a settlement is not considered a real ancestral "village" but a kampu (camp), regardless of the number of inhabitants and layout. In addition, the majority of villages have one or more shrines and ritual places. Such ritual places are also found in the old Kawina villages and are still used.

Maroons have rites of passage during the most important transitions in their lives. These include rites of passage around important life events such as celebrations around the transition to adulthood for girls and boys, and rituals during marriage, pregnancy, childbirth and death. The size of the event depends on the character of the community (incl. the dominant religion), on the position of the individual, the preference of the family and of the financial situation. Maroons living outside their traditional village still attach value to these rituals and celebrations.

In times of illness, community members rely on a combination of Medical Mission Primary PHC clinics, traditional *dresiman* or *obiaman* healers, traditional herbal remedies prepared in a special bowl (*patu*), and home remedies. In all consulted communities there was at least one dresiman, and often also obiaman, traditional midwives, and other specialized healers.

Carolina Communities

Since pre-Columbian times, the Lokono co-existed with the Kaliña Indigenous groups in the same areas. In recent years, however, cultural change has occurred - loss of traditional knowledge and culture was reported in all five Indigenous villages. The causes include missionary activity, (temporary) migration during the Interior War, improved accessibility and resulting influx from outsiders, labor migration, and the influence of television. The presence of Suralco, SEMC NV., and other firms has brought outside laborers to the area. Meanwhile the relatively limited local employment opportunities cause many Indigenous individuals to leave in search of employment. Community inhabitants reported that the increasingly mixed composition of the villages from the influx of other Indigenous and non-Indigenous cultures has contributed to cultural change. Specific cultural expressions such as traditional dancing and music have deteriorated and are seldom practiced.

The authority structure of *Kapiteins* and *Basjas* was implemented in Indigenous communities and modelled after the Maroons. However, in contrast to most Maroon tribal groups, the Lokono and Kaliña Indigenous groups do not have a *Granman* or Paramount Chief.

While the practice of rituals may be on the decline, people continue to harvest non-timber forest products, including medicinal plants, construction materials, plants and plant parts to fabricate crafts and utensils, plants for hunting and fishing purposes, and edible fruits and plants (e.g., palm fruits). Medicinal plants are used for a wide variety of illnesses, injuries and conditions. Some individuals who rely on medicinal plants attribute healing powers to these plants by themselves, while other people combine plant use with rituals.

Effects and Mitigation

The project could result in changes in culture associated with out-migration from AOI communities to Paramaribo once people secure a job with the Project. This could occur for Carolina Road or Brokopondo area employees.

The Project could also influence intra-community and inter-community social conflict, if it is felt that the Project advantages one group over another unfairly. The project will have a grievance mechanism to identify if Project-related processes are creating conflict.

The Project could influence gender relations by providing Women opportunities that they do not presently have.

Mitigation and benefit enhancement measures to minimize Project-related effects to culture and wellbeing are outlined below and include:

- The Project will widely circulate its employment and procurement policy to limit the number of people who come to the region to search for direct and indirect employment opportunities;
- The Project will consult with small-scale mining and logging operations about policies to secure the Project's boundary to prevent encroachment onto the potential mining concession;
- The Project will consistently show respect to traditional authorities and their decisions in order to prevent and manage conflict or aggression;
- The Project will implement cultural sensitivity training programs to help out-of-area Project workforce understand local cultural context; and will complete prior to full time arrival on site;
- Project employees from AOI communities should be given the option to receive money management training, including support for opening up joint bank accounts for employees and their spouses, if requested;
- Project employees should be given the option of suggesting and attending "life skills" presentations on topics of interest. These may include topics such as effective communication and teamwork;
- Project employees receive training on the responsible use of alcohol, and facilitate access to programs for addictions and mental health issues;
- The Project will establish workplace conditions that are sensitive to local cultures and values;
- The Project will develop community development strategies that target women's participation to reduce the potential for gender inequalities.
- The Social Responsibility Team should continue to engage with communities in the Project's Area of Influence where possible; and
- Project employees should adhere to cultural norms. This may include participating in rituals if there are Project disturbances to land, resources or areas of cultural values. It may also include respecting Taboos.

Considering the mitigation proposed, any negative effects associates with in-migration, out-migration, cultural change due to wages, or social conflict between communities are expected to be low. Positive impacts could occur to the social identity of the Kawina, and on gender equality/relations.

Human Rights Risks and Benefits

Prior to Newmont's presence, processes of cultural loss were underway in the interior and the ESIA identifies a number of additional pressures that might stem from the Project. While the extent or severity of any given social change may be low, the cumulative effect might be higher over time, although the specificity of impact is unknown. Given that these are Indigenous and tribal communities, cultural loss is of concern. The direction of impact is negative, of low severity and potential. The Project contributes to this risk to the right to culture and should be taking steps to reduce its contributions.

For the Kawina, there is a potential positive impact to the right to culture and self-determination from Newmont's acknowledgement of the Kawina as traditional land owners and the associated benefit sharing that can come with that.

Quality of Life

Effects and Mitigation

Possible quality of life impacts on communities include effects for a change in water quality at Kawina communities and effects due to traffic, noise and air emissions along the road near Brokopondo and Carolina Road communities.

Mitigation in relation to these possible effects are described in the water quality, traffic, air and noise discipline sections.

Water quality effects are not predicted in downstream communities, as described in the water quality section, so there is no effect on quality of life effect on Kawina communities.

While the overall traffic volume increase is small, changes in traffic composition and flow have been identified as an area of concern by Brokopondo community stakeholders. Even a relatively small contribution such as that brought about by the Project can have an adverse effect where baseline conditions have high volumes of traffic, including large trucks and logging vehicles. This is the case on the Afobaka Road near the Brokopondo communities. This effect is, however, expected to be manageable with mitigation. Given these factors, the Project's adverse effect on quality of life for residents of the Brokopondo communities is assessed as low.

The Project represents a substantial addition of heavy truck traffic on the Carolina Road during operations. It is expected that this effect could be managed through the implementation of mitigation as noted below. Given these factors, the Project's adverse effect on the quality of life of residents of the off-road Carolina communities is assessed as low to medium.

The Project's heavy truck traffic will interact with high volumes of local traffic on the portion of the Carolina Road that runs through Powakka, including numerous

pedestrians, some of which are young children. Given these factors, the consequence of the Project's adverse effect on the quality of life of residents of Powakka is assessed as medium.

Mitigation for potential quality of life effects will include measures to reduce the risk of traffic, as presented in the Traffic Section; manage noise, as presented in the noise section; and manage air and dust emissions, as presented in the air section.

Health

Baseline

The Ministry of Health coordinates the national health system in Suriname around three main geographic areas that include Paramaribo and the urban coastal area (served through Regional Health Services) and the interior region of the country (served through the Medical Mission).

According to the 2015 data, cerebrovascular disease ranks first and is the most common cause of deaths, followed by heart disease and diabetes. According to the 2009 data, the percentage of cardiovascular disease (CVD) mortality in Brokopondo is lower than the other districts in Suriname. Diseases reported in the Brokopondo and Carolina communities include Chikungunya, Zika, Leishmaniasis, Malaria, Influenza, HIV/AIDS, Sanitation related sicknesses, hypertension and diabetes.

Primary healthcare near the Carolina communities and the six Brokopondo communities is provided by the Medical Mission through five health centers. Brokopondo has three health centers: Brokopondo, Asigron, and Balingsoela. The Carolina region includes two health centers in Powakka and Redi Doti.

The number of visits to the health clinics in the Brokopondo region was higher than in the Carolina region in 2015 due to chronic diseases. In the Brokopondo region, the clinics are visited most for hypertension. In the Carolina region, the clinics are visited most due to diabetes and hypertension.

Road traffic accidents most common on the paved Afobaka road in the Brokopondo region. From 2015 to mid-2017, a total of 40 road traffic accidents were recorded in the Brokopondo region, while two were recorded in the Carolina area. About 70% of road accidents involved males with an average age of 35 years. Females involved in road accidents have an average age of 29 years. Accidents are mainly due to erratic driving and high speeding.

Effects and Mitigation

The Project could impact vector-borne diseases like malaria, zika and yellow fever by facilitating the growth and interaction of these vectors with people at the mine site. Through mitigation, these effects can be reversed.

At the mine site, workers can be affected by non-communicable illnesses or injuries if exposed to unsafe working conditions, but the project will use good occupational health and safety practices and will improve the access of many workers to medical facilities. Benefits may increase further if community or family members are given access to better health care through employee benefits and insurance programs.

There is the possibility of an increase of sexually transmitted infections as a result of the project because this is a known problem for the industry and it has been encountered at mining sites on all continents.

The addition of project vehicles including heavy trucks could potentially increase accident rates.

Mitigation for potential health effects will include:

- Ensure project designs reduce the potential for sources of vector breeding. This could include a review of some engineering drawings to assess the design of project components such as environmental containment dams to minimize mosquito breeding and mosquito–human contact. In addition, the positioning of potential mine accommodation should be assessed in terms of its proximity to breeding sites.
- Ensure that the site Implements the Newmont Global Health Management Guideline for Pandemic Events and a Health Incident Response Plan (HIRP).
- Ensure Newmont-utilized medical facilities can test for and treat malaria, leishmaniasis and other vector-borne diseases.
- Provide health information on vector-borne disease to workers through posters and awareness sessions.
- A sexually transmitted infection and human immunodeficiency virus (STI and HIV) policy for Newmont will be implemented. This should include issues stemming from accommodation camps and extended time away from families, voluntary testing, counselling and access to treatment.
- Health education on STI and HIV should be included during inductions.
- Supply free condoms on site for all employees and contractors.
- A traffic and transportation safety management plan will be developed (adopted from the plan in place at Merian) to improve overall traffic safety and reduce risks within the transportation corridor. The plan will include contractors and subcontractors.
- Support an educational program in schools along Project access routes regarding road safety among children and teenagers, as well as for the school bus drivers.

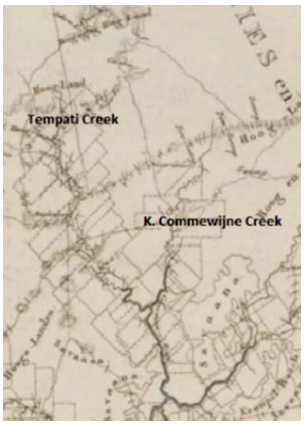
- Initiate screening programs for the early recognition of chronic diseases and appropriate treatment practices. Ensure medical facilities utilized by Newmont can manage these conditions.
- Ensure the living areas are equipped with facilities for physical activities.
- Consider a system that controls the consumption of alcohol on-site.
- Consider utilizing a rating system on canteen food choices and encourage healthy eating.

Project effects on vector related diseases and on non-communicable diseases are both found to be positive, after mitigation. Effects on sexually transmitted diseases are found to be negative and low. Effects on accidents and injuries are found to be negative and medium.

Historical and Archaeological Study

Baseline

The tangible heritage (historical and archaeological) baseline study for the Project sought to identify, describe and determine the significance of tangible cultural heritage near the Project. Tangible heritage was defined as moveable or immovable objects, property, sites, structures, or groups of structures having archaeological (prehistoric) or historical value in the proposed Project footprint.



Pre-Columbian sites have been extensively researched and inventoried in the coastal region but not in the interior, where registered archaeological sites are sparse. All registered archaeological sites within 50 km of the Project area are characterized as pre-Columbian. None of these are close to the Project. Suriname's archaeological record is biased toward pre-Columbian sites, with Maroon archaeological sites reported, identified and excavated, but not placed on the national register of heritage sites.

Based on the results of the desktop research, it was determined that there are no previously recorded archaeological sites in the proposed Project footprint. Community consultation identified one previously unrecorded pre-Columbian archaeological site in the vicinity of the Santa Barbara Pit (an area now fully altered by ASM) and an unrecorded slave route in the proposed Sabajo Project footprint. No tangible heritage resources were found in the 182 ha area that was subject to archaeological survey.

Effects and Mitigation

There are no previously recorded archaeological sites in the proposed Project footprint. No tangible heritage resources were found in the 182 ha area that was subject to archaeological survey. Given that baseline work completed to date has not identified cultural heritage resources which may be subject to potential Project effects, there are no measurable impacts to assess and cultural heritage is not carried through to the effects assessment. Given access constraints and

uncertainty around the location of some of the proposed Project components, the field component of the baseline heritage assessment to date has focused on accessible areas considered to have the highest potential for tangible cultural resources to be found. Prior to site clearing or construction, Newmont will engage a qualified archaeologist to complete additional baseline surveys at: (1) the Sabajo North WRF; (2) Sabajo Pits 4 and 6; (3) the area to be disturbed by the Margo pit and WRF; and (4) all medium or high potential areas for cultural resources along the Sabajo-Merian Haul Road.

Traffic

Baseline

Traffic counts were conducted along the Afobaka and Carolina roads. Average vehicle counts at typical locations ranged from 407 to 2,084 on the Afobaka Road and 83 to 738 on the Carolina Road (total vehicles per day).

Some of the key results from traffic counts were:

- The location with most pedestrians observed was at the Multicultureel Centrum Powakka, where a considerable number of children are included in the pedestrian numbers.

- Peak traffic typically occurred between 16:00 (4 pm) and 18:00 (6pm) in most locations; peak pedestrian times were more varied and occurred in the morning or around 15:30 after school let out.
- On both the Afobaka and Carolina roads, traffic gradually decreases moving north to south; very little traffic exists toward the southern end of these roads.
- At most locations and on most dates, the most common type of vehicle was the car, with light trucks the second most common.
- Weekend traffic is substantially higher than weekday traffic at the majority of the sampling sites.

Sensitive receptors mapped along the Afobaka and Carolina roads include:

- The primary school at Powakka, where most children are bussed from nearby towns; 4 school busses were counted traveling through Powakka and Redi Doti during baseline studies, and pedestrians, mainly children, are active at bus stop locations and at the school itself both in the morning (7:00-7:30) and afternoon (13:00-16:00).
- The pedestrians in Powakka; for example, on non-school days, 40 children were counted passing along the Carolina Road on a weekend and 46 children were counted passing along the Carolina Road on a weekday. The average total pedestrian traffic observed in Powakka was 173 people per day. One popular location along the road is the Paratjima Swim Area.

- School bus stops along the Carolina and Afobaka roads: for example, on a single day in one location on this road, 16 school busses were observed passing between 7:00 and 16:00. Between the Philippus Kondre turnoff and Afobaka Dam, 14 formal bus stops were counted.
- Other locations where people congregate close to the Afobaka and Carolina roads include fruit stands, muster points, churches and recreational sites.

Effects and Mitigation

Issues identified for potential project effects included changes to traffic volume that could cause road congestion or increase accident risk, harm to road infrastructure, increases to air or dust emissions along the road, and effects on vibration along the road. Stakeholders along the Carolina Road and specifically in Powakka voiced concern with these possible effects. Traffic volume and harm to infrastructure are addressed within the traffic assessment, while the others are addressed in the air, noise and vibration assessment.

The Project is expected to require approximately 30 vehicles per day for transport from Paramaribo during construction, and approximately 90 vehicles per day during operation, and less than 10 vehicles per day during the active closure phase. This includes consideration that traffic destined for the Merian mine may use the Project access routes in addition to Sabajo traffic. During the heaviest impact period, this means that total traffic could increase by as much as 7% on the Afobaka Road or 12% on the Carolina Road at Powakka. The percentage increase in heavy trucks is of most concern, representing an increase of as much as 29% on the Afobaka Road or 162% on the Carolina Road at Powakka during operations.

A traffic and transportation safety management plan is being developed for the Project based on the experience at Merian. Measures that are to be built into the project design include the maintenance of unpaved roadways and upgrading existing roads if required for safety. Several safety measures will also be implemented in parallel to these physical measures, including speed limits, drivers' education, and vehicle scheduling (with almost all traffic moving in the daytime). These measures will reduce the potential for accidents along roadways.

Effects for the Afobaka Road route, if all traffic to the project is routed there, would be negligible for traffic congestion, as the road has sufficient capacity (assuming the Musa road segment is upgraded); medium for road safety; and low for effects on infrastructure. Effects for the Carolina road route, if all traffic to the project is routed there, would be low for traffic congestion, medium for road safety and low for effects on infrastructure. Effects on road safety are of greatest concern, given the presence of sensitive receptors like bus stops along both

routes, a school at Powakka, and pedestrians congregating along the road at Powakka and other locations.

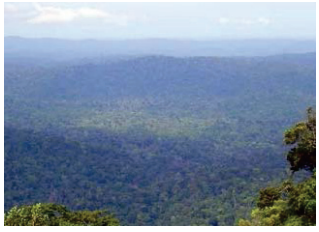
Human Rights Risks

The risk to human rights from traffic is present during all stages of the Project and is potentially present for both the Afobaka and Carolina roads. Due to the potential to affect the right to life, the impact is negative, severity is high, and probability is possible. More probable are the risks to the right to health (injury from vehicle-pedestrian interaction), which has a severity of medium and is considered potential. While both road options receive the same level of prioritization, the level of exposure of children is higher on the Carolina Road option.

This impact to the human right to health as a result of dust and air effects from traffic in Powakka is negative, of medium scale to specific individuals and of low scope, in that only those individuals within 15 m of the main road in Powakka are exposed. The health assessment did not identify respiratory health as a health risk.

The extent of impacts due to spills from transport vehicles is direct. This impact to the human right to health is rated as high intensity to specific individuals within 15 m of the roads. The impact is remediable and the probability is low.

Visual Aesthetics



Baseline

In the vicinity of the Project, there are no visually outstanding features such as notable hills, mountains, wide rivers, lakes, or waterfalls. There are no features that have historically attracted tourism to the area, or features identified as culturally important due to their appearance. The closest notable attractions and the closest areas with long term populations are near the Suriname River to the west and the Afobaka Reservoir to the southwest. The rolling topography and dense vegetation tends to restrict views from the roads in the vicinity of the Project at present.

Effects and Mitigation

Visual changes due to the Project will include physical changes at the mine site, dust along the access road, and light at the mine site.

The physical changes caused by the Project will include excavation of pits, development of waste rock facilities, and clearing of other lands for roads, camps and other infrastructure. This will occur in an area that is predominantly forested, but with many of the lowlands disturbed by existing ASM. From close-up, all of these types of disturbances are visible. From a further distance, the only highly visible disturbances are the built-up waste rock facilities, due to their height.

Dust will be released along the road corridor of the Carolina Road, if this road is used as the transport corridor to the Project.

Substantial light effects are expected to be limited to the mine site, which will be active (at least in part) and lit at night, and the Sabajo-Merian Haul Road, which will also be used at night. The use of public roads by the Project will be minimal at night.

The effects due to physical changes and due to light are considered low and negligible, respectively. Very few viewers will see these changes. The effects due to dust along roads will affect more viewers and extend a farther distance, and is considered medium in magnitude. Specific mitigation is not proposed.

Major Hazards

Effects and Mitigation

Major hazards include natural and man-made hazards. A natural hazard is a naturally occurring event that could lead to potential failure of project facilities that would impact the public or the environment. Hazards were evaluated in relation to possible flooding; high wind events; earthquakes; slope failures; spills of hazardous or non-hazardous materials; and traffic accidents with effects on people and on property.

Key mitigation to reduce potential risks includes:

- to extent possible engineer for high rain events; allow for possibility of disruption of ore transport from Sabajo to Merian in wet seasons;
- engineering design with gradual side slopes; revegetation where possible to reduce erosion; plan to manage slope failures if they occur;
- extensive controls associated with prevention of spills, including cyanide, oil, and other substances; vehicle safety; emergency / spill control planning; and
- a traffic and transport management plan to promote driver safety, as discussed om the traffic and health sections, above.

After the above mitigation, levels will be within international standards for mining operations to minimize risk to the public and to environmental resources.

The highest total risk scores are for cyanide spills, flooding events and slope failures. Cyanide spills are considered ‘unlikely’, but carry a risk of a ‘major’ consequence. Floods and slope failures are both considered possible and may both have moderate consequences, even after the mitigation described above. In the unlikely event of a cyanide spill, it could affect some people, but would be subject to an immediate spill response plan to protect human health and mitigate environmental effects. The flooding and slope failures are most likely to affect

the Project but not any other people, because they would occur at the mine site or along the Sabajo-Merian Haul Road, far from populated locations. The other risk scores that are higher than 'low' are for a significant spill of fuel at the mine or along a public road. These kinds of events present lower overall risks (rated at medium) than the high-risk events describe above, due to their lower consequences, but still must be managed carefully.

CUMULATIVE EFFECTS ASSESSMENT

A cumulative effects assessment was conducted for each physical, biological and social discipline. Cumulative effects are the impact on the environment which results from the incremental impact of the Project in addition to other past, present, and reasonably foreseeable future actions regardless of what company or person undertakes such other actions. In addition to the Project, the other activities considered in assessing cumulative effects (where their effects overlap in space or time with the Project) are:

- the Merian mine, and transport to and from the mine;
- the Rosebel mine and its potential extension, referred to as Saramacca;
- artisanal and small scale mining (ASM);
- forestry, and transport of trees on the Carolina Road; and
- hunting and fishing occurring near the Project.

These were all qualitatively considered in the cumulative assessment. The first part of the assessment evaluates if there are overlapping effects for the Project and any of these other projects that extend into the future. If there are overlapping effects, the second part of the assessment determines the effect of the Project in addition to other projects, using the same impact classification approach as in the Project Case.

Physical Effects

In general, for physical disciplines collecting baseline data, such as air quality, noise, traffic levels, water conditions, the existing baseline data already incorporate the effects of other existing projects, because all of the cumulative effects developments in the area already exist, with the exception of the Saramacca mine. Qualitative analyses indicate the Saramacca mine will not overlap substantially with the physical effects of the Project. Because the baseline conditions incorporate the existing cumulative development, the effect of the project in addition to baseline conditions is effectively a cumulative assessment.

Biological Effects

In addition to the Sabajo mine, other anthropogenic activities that potentially impact biodiversity and contribute to cumulative effects in the Klein-Commewijne and Tempati watersheds include logging, informal mining, hunting and fishing, and collection of animals for the pet trade. The Project is not expected to contribute to cumulative effects because the Project will adopt

higher environmental controls than the small scale artisanal mining that it will replace in the Right of Exploitation. These controls include: water quality management; a rehabilitation and offset program to restore forests and creeks on lands disturbed by the mine, as well as outside the project footprint, ensuring a net gain in natural habitats; and, restricting public access in the Right of Exploitation which will reduce pressure on wildlife and fisheries. Cumulative effects in the region are expected to decrease due to the environmental controls adopted by the Sabajo mine.

Social and Cultural Effects

Social

The macroeconomic assessment conducted for Sabajo is inherently cumulative in nature, as it measures the Project's effects against a future scenario that includes the operation of the Merian mine and, potentially depending on schedule, the expansion of the Rosebel mine. No other new projects that would substantially change macroeconomic conditions in Suriname are foreseeable at this time.

The Sabajo Project and the existing Merian mine are expected to have different local communities targeted for employment and procurement, and so are not expected to result in enhanced local benefits to the same groups. There is no potential for the Project and the Merian mine to increase inflation in the event that consumer goods are sourced from and concentrated in the same communities.

The Rosebel mine is not expected to interact cumulatively with the Sabajo Project to enhance local economic benefits, or exacerbate adverse local economic effects as the two mines do not overlap in terms of targeted local communities. Though there has been some involvement between the Carolina Road and Brokopondo communities and the Rosebel mine in the past (e.g., sale of produce, limited employment), baseline studies suggest that this is no longer the case.

Cultural

The Sabajo Project, the Rosebel mine, and the existing Merian mine are expected to have different local AOI communities and so are not expected to interact cumulatively with regard to community level impacts. That being said, cultural change is the result of cumulative pressures on local culture from outside forces. Therefore, all development activities in the region interact with the local culture and the more development that there is, the greater the pace of cultural change.

As the Merian mine and Sabajo Project are both operated by Newmont, the company through its existing operations at Merian has gained capacity about how to work with communities in a culturally appropriate way. It is expected that

this experiential knowledge will be transferred to the Sabajo Project from the outset with respect to it engagement with AOI communities.

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLANS

An environmental and social management and monitoring plan (ESMMP) has been designed to implement the measures required to mitigate and manage the environmental and social impacts of the proposed project.

In accordance with best international practice, Newmont will put in place specific actions to appropriately prevent, mitigate, manage and monitor the environmental and social impacts of the project from construction until post-closure.

The ESMMP considers the important design aspects that are necessary to prevent the occurrence of environmental and social impacts as well as specific actions required to mitigate impacts that cannot be prevented. Furthermore, the ESMMP considers preventive measures to address potential environmental risks associated with the project as well as responsive measures that would need to be implemented under the occurrence of an emergency.

The implementation of the ESMMP will fall under the responsibility of the Merian environmental and social responsibility departments, supported by specific staff at Sabajo. The managers of the Environmental and Social Responsibility departments will interact with government institutions and with third-party organizations throughout the implementation of the different action plans that constitute these departments.

Three main action plans or sets of plans will be managed by the Environmental Department and Social Responsibility Department Managers:

- Environmental Management Plans (EMPs);
- a Social Management Plan (SMP) and Heritage Environmental Protection Plan; and
- Closure and Reclamation Plan.

An occupational health and safety plan will be managed by the Occupational Health and Safety Department.

The EMPs include:

- Traffic Management Plan;
- Biodiversity Management Plan;
- Erosion and Sediment Control Plan;

- Waste Management Plan; and
- Emergency Response Plan and Spill Prevention, Control and Countermeasures Plan.

The SMP includes:

- Approach to Socio-Economic Management;
- Mitigation and Benefit Enhancement Measures for employment and recruiting, contracting and procurement, training, culture and wellbeing, ASM, land use and tenure, quality of life and community heath;
- Human Rights Management Plan; and
- Social Monitoring Plan.

A Cultural Heritage Management Plan indicating how to address the possibility of archaeological finds on the Project site has also been developed.

The reclamation and closure plan describes the actions that will be taken for the closure of project facilities. The main objectives of the reclamation and closure plan are to ensure the long-term physical and chemical stability of the project, wherever possible restore the project site conditions that would allow post-closure beneficial use, and to protect people and wildlife from any hazards. This plan will also present necessary post-closure treatment, maintenance and monitoring measures that would be required following completion of closure measures.

The occupational health and safety plan describes the actions that will be taken to protect the health and safety of the employees involved in the construction and operation of the project.

The emergency response plan and spill control plan describe the actions that will be taken to respond to situations out of the scope of normal operations such as medical emergencies, fires, non-schedule explosions, vehicle accidents, hazardous materials spills/releases and natural disasters.

CONCLUSIONS AND ACKNOWLEDGMENTS

In conclusion, the following table outlines the main issues, mitigation and residual impacts for the Sabajo project (Table ES-5). A more complete table of residual impacts is provided in the main conclusions section of the assessment.

This ESIA could not have been completed without the involvement and contributions of stakeholders in Paramaribo and in the project study areas, including:

- the Kawina peoples who participated in our engagement and baseline study sessions;
- the peoples of the Carolina Road communities, as listed in Section 1.3;
- the residents of communities in the Brokopondo area, including all of those noted in the engagement summary in Section 1.3;
- the Project team at NIMOS;
- the small-scale miners in the area of the Project; and
- numerous employees of Newmont Suriname.

The ESIA owes a debt of gratitude to all of these contributors.

This ESIA has been completed by a consulting team external to Newmont. The ESIA contains input from companies including Triple R Alliance, On Common Ground, International SOS, Hardner Gullison Associates, the Anton De Kom University Institute for Graduate Studies and Research, Social Solutions, ILACO, and ESS (Environmental Services and Support), in addition to Golder Associates.

Table ES-5 Summary of Potential Impacts for the Sabajo Project

Discipline Category	Discipline	Residual Impacts
Physical	Climate	• Negligible effects due to very small levels of greenhouse gas emissions.
	Topography and Soils	• Low effect on soil quantity and quality in operations and closure due to disturbance, erosion and compaction. Growth medium will be re-established at reclamation. • Negligible effect on topography; landforms altered at mine.
	Groundwater and Surface Water	• Negligible effect of increased runoff due to clearing of land. • Negligible effect of decreased baseflows from groundwater, lowing surface water flows from local creeks (mitigated in operation with discharge of collected water). • Low effect of decreased baseflows from groundwater, lowing surface water flows from local creeks at closure (not mitigated).
	Water Quality	• Medium effect of waste rock facility runoff on surface water quality • Low effect of waste rock facility runoff on groundwater quality • Low effect of ore stockpile seepage on surface water quality • Low effect of ore stockpile seepage on groundwater quality. • Low effect of erosion on suspended solids in surface water. • Low effect of accidental spills on surface water quality. • Medium effect at closure due to poor water quality in pit lake. • Positive effect due to lowered effect of ASM on all water quality (and associated potential positive effect on right to water). • Potential negative risks in relation to right to water if there are spills contaminating water used by people along the access route. • Potential negative risks to right to water and health if long term effects on water quality occur due to the mine.
	Air	• Negligible effect due to air emissions along access route (Carolina or Afobaka roads), most notably dust along unpaved road segments. • Medium effect due to mine site air emissions and dust during operations; effect will extend beyond mining right of exploration area.
	Noise and Vibration	• Medium effect due to noise emissions that is within guidelines (less than 3 decibels), but may be noticeable along access route (Carolina or Afobaka Roads). • Low effect due to noise on mine site and Sabajo-Merian Haul Road (well within industrial guideline levels). • Low effect of blasting on ground vibration at mine site (no effects expected at distance of villages). • Medium effect of blasting on air overpressure/vibration from blasting (no effects expected at distance of villages).
Biological	Habitats, Flora, Fauna and Fish	• Unknown effects on vegetation species *Elaeis add. Oleifera*, rare species, to be mitigated with avoidance if needed (further study required). • Negligible effects on vegetation species *Virola surinamensis*, red list species, to be included in rehabilitation program. • Negligible effects on vegetation species *Vouacampoua amerianca*, red list species, to be included in rehabilitation program. • Negligible habitat level effects due to offsetting program and commitment to achieve no net loss.

Table ES-5 Potential Impacts and Mitigation for the Sabajo Project (continued)

Discipline Category	Discipline	Residual Impacts
Social	Socio-Economics	Economy • Low, positive effect on overall economy of Suriname. • Low, positive effect providing fiscal benefits to Government of Suriname (with potential benefits to rights to health and education). • Low, positive effect providing direct employment and incomes (with potential benefits to rights to work and standard of living). • Low, positive effect generating business opportunities through procurement. Transportation • Low, positive effect on transportation infrastructure through road improvement and maintenance. Culture • Low, negative effect on culture due to in- or out- migration. • Possible low, negative effect on culture (right to take part in cultural life) due to gradual cultural loss. • High, positive impact on recognition of cultural identity for Kawina (with related positive influence on right to take part in Cultural Life and Right to Self Determination). • Low, negative effect on possible social conflict due to unequal benefits (with possible benefit to right to non-discrimination). • Low, positive effect on gender relations. Artisanal and Small Scale Mining • Moderate, negative effect due to local displacement of ASM operations. • Associated potential negative effect on right to adequate standard of living and potential indirect risk of right to security of the person, in the unlikely event excessive force is used to remove ASM from Project areas. Land Use and Tenure • High, positive effect affirming customary land tenure of Kawina. • Negligible effect impacting tourism and recreation. • Negligible effect on forestry activities through land take and access change. • Negligible effect on hunting and fishing. • Potential negligible effect on right to property for community forest concession holders. Quality of Life • Low effect on quality of life in Brokopondo communities, with added traffic on Afobaka Road. • Low to moderate effect on quality of life in off-road Carolina communities, with added traffic on Carolina Road. • Moderate effect on quality of life in Powakka, with added traffic on Carolina Road.

Table ES-5 Potential Impacts and Mitigation for the Sabajo Project (continued)

Discipline Category	Discipline	Residual Impacts
Social (continued)	Health	• Low effect due to potential increase in sexually transmitted infections • Medium effect due to potential accidents and injuries in relation to added road traffic near communities. • Positive effect for vector related diseases, given added medical services to employees. • Positive effect for non-communicable diseases, given added medical services to employees.
	Historical and Archaeological Resources	• No expected effects, pending additional surveys pre-construction, and implementation of cultural Heritage Resources Management Plan.
	Traffic	• Negligible effect of traffic congestion on Afobaka Road. • Low effect of traffic congestion on Carolina Road. • Medium effect on safety on Afobaka and Carolina Roads; risk of traffic accidents; mitigated by traffic management plan. • Low effect on road infrastructure on Afobaka and Carolina Roads; effects will be mitigated with maintenance. • Potential negative effects on human rights (right to health and life) due to accidents, spills and air quality effects.
	Visual Aesthetics	• Medium effect due to added dust along unpaved roads. • Low effect due to clearing of forest and landform changes in construction and operations. • Negligible effects due to light at mine.
Hazards	Hazards (Possible risks of unlikely events)	• High risk of flooding disrupting project activities (this is possible to happen, consequence would be moderate). • Low risk of wind storm disrupting project activities (unlikely) • Low risk of earthquake disrupting project activities (unlikely). • High risk of slope failure adding sediment to streams or affecting project activities (this is possible to happen, consequence would be moderate). • High risk due to possible cyanide spill (unlikely to happen, but effect would be major). • Moderate risk due to possible oil spill (possible to happen, minor consequence). • Low risk due to non-hazardous material spill (possible to happen, insignificant consequence).

ASM = artisanal and small scale mining.