For submission to:

Noranda Jamaica Bauxite Partners II (NJBP II)

Port Rhoades
Discovery Bay P.O.
St. Ann
Jamaica, W.I.

Environmental Impact Assessment

for the

Proposed Mining of Bauxite

in the

Special Mining Lease 173 (SML 173) Area

in the parishes of

St. Ann and Trelawny

Responses to Additional Comments Received from the Public by the National Environment & Planning Agency

on

February 5, 2021

following

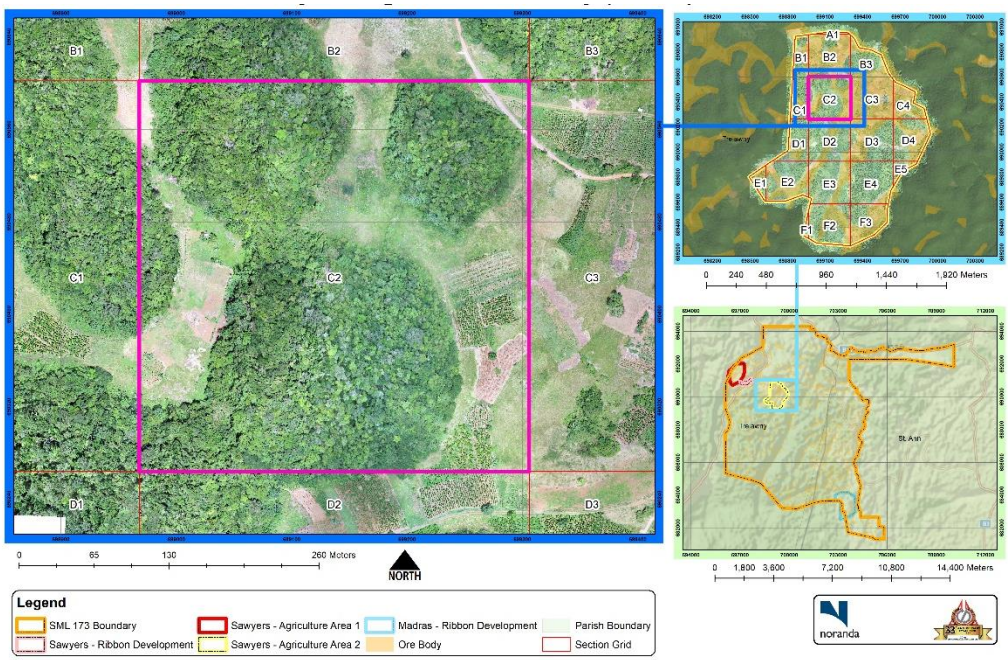
(1) The Mandatory Public Meeting held on December 8, 2020

(2) Responses to Comments Received from the Public by the National Environment & Planning Agency on January 5, 2021

and

(3) Responses to Comments from The Forestry Department (FD) and The Water Resources Authority (WRA) received from the National Environment & Planning Agency on January 20, 2021

March 10, 2021



CONRAD DOUGLAS & ASSOCIATES LIMITED

14 Carvalho Drive, Kingston 10, Jamaica W.I.

(876)929-0023/0025/8824

info@cdaestech.com; cdaestech@hotmail.com; conraddouglasnassociatesltd@gmail.com

www.cdaestech.com

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Prepared for:

Noranda Jamaica Bauxite Partners II (NJBP II)
Port Rhoades
Discovery Bay P.O.
St. Ann
Jamaica, W.I.

Prepared by:

Conrad Douglas & Associates Limited
14 Carvalho Drive • Kingston 10 • Jamaica
Tel: (876) 929-0023 • (876) 929-0025 • (876) 929-8824
Fax: (876) 960-2014
Email: info@cdaestech.com
Website: www.cdaestech.com

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COVER CREDITS

From Aerial Surveys conducted by Conrad Douglas & Associates Limited in SML 173 area.

This shows mode of occurrence of bauxite deposit within SML 173 area. Elevated limestone hillocks with high biodiversity and low-lying deposits of bauxite supporting sparse grassland/shrub vegetation and agricultural activities.

PROPRIETARY RESTRICTION NOTICE

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1.0. Introduction

Following on submission of Volume I: Environmental Impact Assessment (EIA) Report and the following companion documents for the proposed mining of bauxite in Special Mining Lease 173 Area (SML 173) by Noranda Jamaica Bauxite Partners II (NJBP II), a mixed-virtual meeting of the Mandatory Public Meeting was convened on December 8, 2020 after receiving the necessary approvals from the National Environment & Planning Agency (NEPA) on November 6, 2020:

- ✓ Volume I: Environmental Impact Assessment (EIA) Report
- ✓ Volume II: Reports on Voluntary Stakeholder Consultations
- ✓ Volume III: Archaeological Impact Assessment
- ✓ Volume IV: Air Dispersion Modelling Report

Several comments and questions were sent to NEPA by members of the public after the mixed-virtual Mandatory Public Meeting and transmitted to Conrad Douglas & Associates Limited (CD&A) on January 5, 2021. CD&A provided responses to these comments and questions on January 20, 2021.

On January 20, 2021, NEPA also transmitted additional comments from the Forestry Department dated January 5, 2021 and the Water Resources Authority dated December 15, 2020 to Conrad Douglas & Associates Limited. CD&A provided responses to these comments and questions on February 5, 2021.

On February 5, 2021, NEPA transmitted additional comments from members of the public after the mixed-virtual Mandatory Public Meeting to Conrad Douglas & Associates Limited (See Appendix I). These were transmitted by NEPA to CD&A 36 days after the final date for the public to submit comments to NEPA (December 31, 2020) and well beyond the due date for the CD&A to receive comments from the public.

Our responses to these additional comments of February 5, 2021 are provided in section 3.0 below.

2.0. General Remarks

It is standard, for the purpose of transparency, that during the course of these forms of proceedings, discourses, discussions or dialogues for persons who are making comments or asking questions to state their name and the organisation (if any) to which they belong. These comments were received without the names of the persons or the institutions to which they belong. Neither were the attachments to the comments provided. Some of the attachments were identified or located through independent searches by members of the EIA team.

It was stated in the cover letter of our previous response that: "*It was our belief that all parties were operating within NEPA's established and published framework for the review and approval of the EIA Reports. This is not to assert that we considered that the framework was being slavishly followed but we, reasonably, anticipated that it was serving as the roadmap to accomplish the equitable, timely and practical completion of the process*". The comments were received five (5) weeks after the due date for comments from the Public as per NEPA's review framework.

Further, there are a number of errors or omissions in the comments made by the reviewers, among them are the following:

1. The comments continue to ignore the designated Cockpit Country Protected Area (CCPA), which was announced by the Most Honourable Andrew Holness, Prime Minister, in Parliament on November 21, 2017 (See Appendix IV of the EIA Report).
2. Several of the comments made reference to the Cockpit Country, in general, rather than the subject area of the EIA, which is SML 173.
3. A number of the comments are highly subjective, biased, unprofessional and disparage Jamaica's institutions, agencies and several of Jamaica's internationally renowned experts. This includes the University of the West Indies.
4. The comments introduce various baseless and spurious matters which falls outside the agreed Terms of Reference. For example:
    a. The matter of climate change, which was restricted to vulnerability only

b. Cattle farming on bauxite bearing lands and on rehabilitated lands, for which Jamaica has been a world leader for many years to the extent that it has been recognized as having the largest red poll cattle in the world. In addition, it was the bauxite companies led by ALCAN, which supported and engaged in the genetic research and animal breeding, which led to the tropicalization of Jamaica cattle such as the Jamaica Braham, Jamaica Hope and the Jamaica Red Poll. Bauxite-alumina companies in Jamaica were involved to varying extent in Jamaica cattle rearing for a number of years. These include ALCAN, Reynolds, Kaiser and ALPART. A sperm bank of outstanding breed of tropical cattle is maintained at Bodles Agricultural Research Station. There has been 17 World Congress of Cattle Breeders to which Jamaica has always been invited. The last one being convened in 2020 in Africa. Jamaica has also been a host of the World Congress of Cattle Breeders (Source: *Dr. Karl Wellington, private communications, Bodles Agricultural Research Station, Ministry of Agriculture*).

The review contains a number of conjectures and speculative statements without providing any supporting evidence.

CD&A provided accurate scientific information and explanations related to the hydrology and hydrogeology of SML 173 in the previous responses submitted to NEPA. It is noted, however, that the latest comments attempt to discredit the hydrology and hydrogeology of SML 173 presented in the EIA Report.

The review continues to make illogical comments about the location of the Giant Swallowtail Butterfly *Pterourus Homerus*, an important endangered species, which has not been found in the area of SML 173 after exhaustive review of the literature and several visits to the field. Among the comments is essentially the assertion that mining should not take place in SML 173 as this species of butterfly could turn up in the area at some future date.

CD&A stands by our findings, which are scientific and accurate, concerning all aspects of the study: biological, physical, socio-cultural & economic, historical heritage. These investigations were carried out exhaustively in compliance with the requirements of the

agreed ToR and subsequent approval by NEPA of the draft Final EIA Report for presentation to the public.

In the circumstances, CD&A remains confident about the conclusions arrived at in the EIA Report and the corresponding recommendations made.

3.0. Responses to Additional Comments Received from the Public

Table 1: Responses to Additional Comments Received from the Public

No	Comment	Section of ToR within which this topic would be discussed	CD&A/NJBP II Response
1.	**No assessment was included in the EIA of the negative short-term/immediate impact on the farming communities.** There is no evidence of what livelihood activities will occur over the intervening period between mining and rehabilitation to substitute or compensate for livelihood losses. Response to this issue in correspondence dated 20 January 2021 is noted however it does not adequately address the issue as further highlighted.	***8.5. Human/Social/Cultural*** *Effects of mining on the socio-economic status such as changes to public access and recreational use; impacts of the proposed mining activities on existing and potential economic activities; contribution of the development to the national economy and development of surrounding communities should be examined. Socio-economic and cultural impacts to include land use/resource effects, health and safety of the potential workers as well as the residents of the surrounding environs should be described. Public perception as it relates to loss of property value, loss of aesthetic enjoyment, loss of livelihoods among other things should be explored.*	CD&A again reiterates that this statement is incorrect. The data required for the socio-cultural and economic survey was captured by a survey instrument (questionnaire), which was administered to an appropriate sample size (See Section 5.5.1. Introduction, page 5-275 of the EIA Report). The socio-cultural and economic survey instrument (See Appendix III of the EIA Report) was approved by NEPA (See Appendix II below). The study complies with the agreed ToR (See Appendix I of the EIA Report). CD&A also consulted relevant literature including data from the Social Development Commission (SDC) and the Statistical Institute of Jamaica (STATIN), among others. Further, the EIA Report addresses the following: 1. **<u>The offer of compensation</u>**, in certain circumstances, to farmers and land owners whose activities may be temporarily dislocated due to the mining process. **<u>This compensation occurs over the intervening period between mining and rehabilitation.</u>** After mining, the rehabilitated lands are returned to the land owners or previous occupiers. 2. Slide 6 of the Mandatory Public Meeting presentation made on December 8, 2020 stated that: "*The SML 173 area comprises private and government holdings of which, approximately, 70% is titled. Untitled lands are privately owned. Noranda holds 55% of the total land areas (for and behalf of the Commissioner of Lands) and the remainder is privately held (See EIA Report Volume 1: Appendix V). If mining rights is required for any privately owned land, Noranda is obliged to pay fair and reasonable compensation to the owner or occupier for disturbance of surface rights, any damage to the land, affected crops and buildings. Upon completion of mining, the land will be rehabilitated in accordance with applicable laws and returned to the landowner or occupier.*" In the case of private lands, the rehabilitated lands are returned to the farmer (as one option) for their continued use. 3. The recommendation that, where practicable, displaced farmers should be accommodated for continuation of farming in the 'clawed back area'. **<u>This again stresses the proposed mitigation to the disruption during the intervening period between the mining and rehabilitation period.</u>** In "*Section 10: Alternative Analysis*" (pages 10-6 to 10-7 of the EIA Report), the third (3rd) alternative referred to the '*clawed back area'*, within which there is intensive agricultural production. This alternative proposes that there will

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			be no mining in the '*clawed back area*', which hosts intensive agricultural production and the declared Forest Reserves. **Hence, the livelihoods of the farmers would not be negatively impacted.** In "Section 10: Alternative Analysis" (pages 10-6 to 10-7), the modified proposal which is the third (3rd) and **preferred alternative** referred to the 'clawed back area', within which there is intensive agricultural production. The map showing the 'clawed back area' is shown in Figure 1 below. The potential impacts and proposed mitigation for the exclusions as a result of the proposed '*Clawed Back Area*' were also outlined in: "*Section 7: Impact Identification & Assessment and Analysis of Potential Impacts*" (See page 7-14 of the EIA Report).

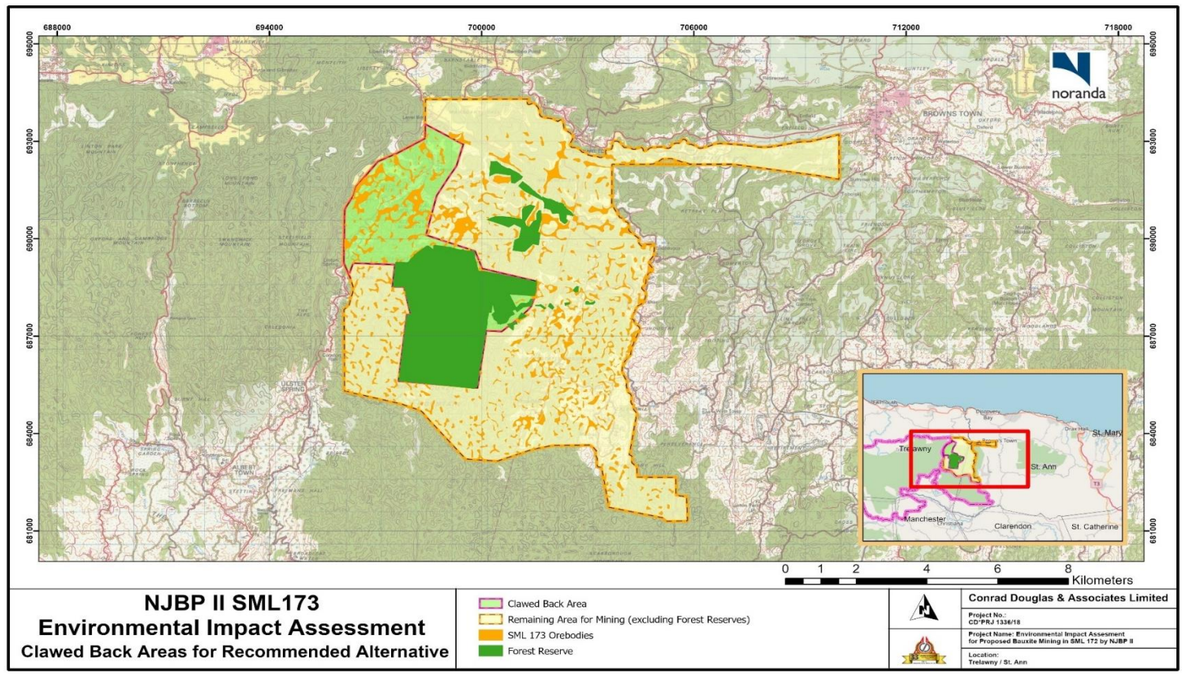

Figure 1: Boundaries of Entire SML 173 area and Modified '*clawed back*' SML 173 (Source: *EIA Report - Figure 2, page 10-7*)

4. It was also elaborated in the Mandatory Public Meeting and stated in the EIA Report on page 4-1 that mining progresses in consecutive series of five (5) year Mining Plans, and that mining is projected to take place for an overall period of 25 years in SML 173. Every four (4) years a Mining Plan must be developed and submitted to the

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			Commissioner of Mines (Mines & Geology Division) for their review and approval. In each instance, before mining commences, **the communities are advised far in advance and are provided with alternative lands (and other resources, as the case may require) to continue their farming activities.** 5. Our investigations have shown that it is the practice of NJBP II to mitigate or avoid disruption of the livelihoods of the residents in and around its mining locations. NJBP II has consistently demonstrated its commitment to work with farmers through partnerships with stakeholders such as the Jamaica Social Investment Fund (JSIF), the Jamaica Bauxite Institute (JBI) and Community Councils to establish greenhouses and cultivate crops or engage in other forms of farming on rehabilitated lands (see Figure 1 below and pages 4-15 to 4-17 of the EIA Report). As an example, NJBP II has also supported the farming of peanuts and the establishment of a peanut processing factory.






Figure 3: From right to left - Watt Town Greenhouse cluster on rehabilitated lands | Cabbage Growing on rehabilitated lands at Higgins Land Greenhouses | Pond established on Rehabilitated land | Aerial showing rows of corn thriving on

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			rehabilitated land | Land being prepared for planting on rehabilitated lands | Sweet Potato being planted on rehabilitated lands In addition, it must be highlighted that: 1. NJBP II owns 55% of the mining rights in SML 173. 2. The basis of capturing data is the survey instrument and this was reviewed and approved by NEPA (See Appendix I of the EIA Report and Appendix II below). 3. The AIA (See Volume III of the EIA Report) addresses the cultural and historical heritage resources in SML 173. 4. The inclusion of the '*clawed back area'* option in the Alternative Analysis section (See Section 10.4 of the EIA Report) also takes into consideration the short term impact of the mining activities on the livelihoods of the farmers.
2.	The EIA reflected a significant disconnect between the overwhelming evidence of the impacts of mining on the social and economic wellbeing and views of the communities in SML173, by ignoring those factors and concluding that: "Jamaica's immediate to medium social, economic and sustainable development future is highly dependent on providing NJBP II with the permits to mine these bauxite resources. **There are no other feasible immediate or short-term economic alternatives that have been identified that can be considered as a substitute to bring equal or greater macro and micro-**	***8.5. Human/Social/Cultural*** *Effects of mining on the socio-economic status such as changes to public access and recreational use; impacts of the proposed mining activities on existing and potential economic activities; contribution of the development to the national economy and development of surrounding communities should be examined. Socio-economic and cultural impacts to include land use/resource effects, health and safety of the potential workers as well as the residents of the surrounding environs should be described. Public perception as it relates to loss of property value, loss of aesthetic enjoyment, loss of livelihoods among other things should be explored.* ***11.0. Analysis of Alternatives*** *Alternatives to the proposed project including the no-action alternative will be examined.*	**CD&A does not agree with these statements. The EIA Report complied with the agreed ToR (See Appendix I of the EIA Report).** The Economic Profile (See Page 4-27 of the EIA Report) in the EIA Report gives the importance of bauxite mining and the mining sector, in general to the Jamaican economy. It has been illustrated in the EIA Report that the bauxite industry is a major contributor to Jamaica's economy. The sector contributes substantially to foreign exchange income, Jamaica's GDP growth and employment. "*There is a strong correlation between Jamaica's economic performance and bauxite mining. Historically, whenever there is serious decline in bauxite production, the International Monetary Fund becomes deeply involved in the country's economy"* (See page 4-26 of the EIA Report). **NJBP II accounted for 6% of Jamaica's Total Domestic Export for 2019 and 7.6% for the period January to July 2020. *(Source: STATIN)*** NJBP II earns a gross annual income in the range of US$80 – US$150 million. It was stated in the Mandatory Public Meeting presentation made on December 8, 2020 that: "*NJBP II's operations **provide** about **400 direct jobs, 400 indirect contractor jobs (mining)** and **2,500 indirect opportunities** through contractor services and temporary jobs, for a **total of 3,300 jobs."*** NJBP II's payroll taxes is a major contributor to the GoJ's revenues.

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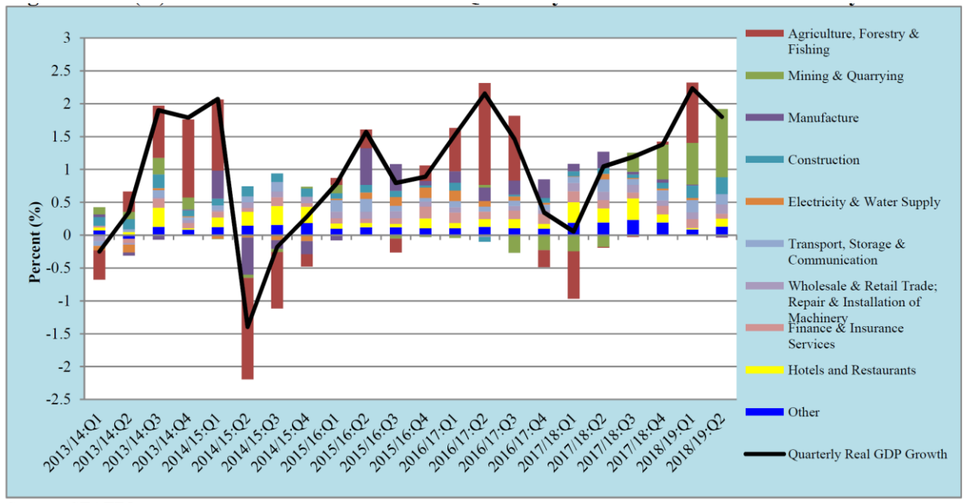
	economic benefits to Jamaica, at this time"(1-13). [My emphasis.] The EIA did not evaluate or include reference to any of the alternative options that do in fact exist, some of which were raised by community members in the Zoom meeting of December 8, 2020 (typescript is unavailable) and by the JHTA. Response to this issue in correspondence dated 20 January 2021 is noted however it does not adequately address the issue as further highlighted.	*These will be assessed according to the physical, ecological, climatic variability and socio-economic parameters of the site. This examination of alternatives will incorporate the use of the history of the overall area in which the site is located and previous uses of the site itself. Alternatives will also address specific aspects of the project such as methods, locations, layouts, [costs] and technologies proposed in the execution of the project (works) that have been identified as being causes of major impacts. The scoping exercise for the analysis of alternatives will also include a description of each alternative, summary of adverse impacts of each alternative as well as a rationale for the selected project alternative.* *All alternatives will be included in the document.*	*"The Jamaican economy is still at a very sensitive juncture and could be subject to exogenous and endogenous shocks. The former could take the form of natural hazards such as hurricanes and earthquakes or a pandemic. The latter refers to the potential collapse of major economic sectors including bauxite production. Changes in the global economy also have the potential to cause shocks to Jamaica's economy. At the same time imports are still outperforming exports and there is a persistent trade deficit*" (Page 4-24 of the EIA Report). <u>This statement was written from the first Draft EIA submitted to NEPA in July 2019, before the COVID-19 pandemic.</u>  Source: STATIN **Figure 4: Contribution to Quarterly GDP Growth by Industry (See section 4.7 of the EIA Report)** The coronavirus pandemic (December 2019) has further diminished the economic growth of the Jamaican economy and the Planning Institute of Jamaica (PIOJ) has reported that there will be about 12% decline in GDP in 2020. The PIOJ further projected the same level of decline in 2021 and have stated that recovery to 2018 performance is projected to take place in 2025. The assessment of the economy (locally, nationally and internationally) is universally recognized as a necessary part of the EIA process as well as the rationale, importance and justification for the proposed project. It is a critical component of any EIA that

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			the economic considerations are integrated into the process. This includes the biological, physical, social, economic, cultural, historical and archaeological which are all potential receptors of negative and positive impacts. **These statements are to be found in statistics published by the PIOJ and STATIN. The review should provide any alternative that could contribute to Jamaica's economy to a similar extent in the immediate or short term. For these reasons, our conclusion regarding the importance of NJBP II to the Jamaican economy remains unchanged.** Please revisit the alternative analysis section (See Section 10.0) of the EIA Report. The alternatives as stated in the EIA Report are: 1. *No Action' or 'Do Nothing' alternative* 2. *The Proposed Mining Activity* 3. *Modified Project Proposal (SML 173 inclusive of the 'Clawed Back Area' as well as any other areas within SML 173, which is consonant with and practicable as mining progresses)* o *No mining in the Forest Reserves* o *In general, recommendation for farmers who may temporarily be displaced to be accommodated in the 'Clawed Back Area'* 4. *Location* 5. *Conveyance Technology* It was also elaborated in the Mandatory Public Meeting and stated in the EIA Report on page 4-1 that mining progresses in a consecutive series of five (5) year Mining Plans, and that mining is projected to take place for an overall period of 25 years in SML 173. Every four (4) years a Mining Plan must be developed and submitted to the Commissioner of Mines for their review and approval. In each instance, before mining commences, the communities are advised far in advance and are provided with alternative lands (and other resources, as the case may require) to continue their farming activities.
3.	A more detailed assessment of the impact on agricultural communities and national food security of replacing deep agricultural soils that can retain moisture (suitable for tree crops and timber and a wide variety of other crops) with shallow soils on running rock.	***8.5. Human/Social/Cultural*** *Effects of mining on the socio-economic status such as changes to public access and recreational use; impacts of the proposed mining activities on existing and potential economic activities; contribution of the development to the national economy and development of surrounding communities should be examined. Socio-economic and cultural*	The area to be impacted represents approximately 15% of the entire SML 173 inclusive of the haul roads. Prior to any mining activity, all sensitive species of flora is removed and relocated to nearby hillocks or for temporary storage in a greenhouse. Upon completion of rehabilitation, the floral species which are stored in greenhouses are relocated to the area. The bauxite ore bodies in SML 173 do not support the growth of forest cover or large timber trees as asserted in the comment. The process does not involve deforestation of the hillocks. To the extent that trees on the periphery are marginally impacted during the grading process, this will be regenerated in the due course of time through natural recolonization.

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		impacts to include land use/resource effects, health and safety of the potential workers as well as the residents of the surrounding environs should be described. Public perception as it relates to loss of property value, loss of aesthetic enjoyment, loss of livelihoods among other things should be explored.	Further, please note that, most of the bauxite orebodies in SML 173 have already been impacted on by anthropogenic activities. With specific reference to the topsoil, the rehabilitation process involves the replacement of the 18" – 24" of topsoil that was removed and placed in storage as the final cover. **It should be noted that rehabilitation is done in accordance with the standards stipulated by the Commissioner of Mines (Mines & Geology Division) for rehabilitation of mined lands.** The optimal use will be made of the lands which have been rehabilitated. In some instances rehabilitated lands may also be used for social and economic activities as may be agreed with the relevant authorities, Community Councils and residents. CD&A's review has shown that seventy years of bauxite mining has significantly improved food security in Jamaica with the implementation of agricultural projects such as dairy farming, the rearing of beef cattle and greenhouse developments, among others. Dairy farming and beef cattle rearing is specially indebted to the substantial investment in special animal genetic research made by ALCAN for the development of the following breed of cattle: Jamaica Brahman, **Jamaica Red Poll, Jamaican Hope and Jamaica Black.** Jamaica enjoys highly respected international recognition for these breeds of cattle. These cattle are reared on bauxite rehabilitated lands. It is recognized through the seventeen (17) internationally held congresses on cattle breeding that Jamaica still has the largest and best breed of Red Poll throughout the world. The Bodles Agricultural Research Station maintains a sperm bank of cattle to this day and often sells this on the international market. CD&A's review has shown that NJBP II also places great emphasis on diverse agricultural and farming activities such as growing of cash crops, aquaponics technology, water harvesting and storage which all utilize rehabilitated lands.
4.	A realistic assessment of the impacts of noise and dust from mining and transportation of ore on forest biodiversity, human health and standards of living is needed. More discussion of the impacts on existing activities such as rainwater harvest; as well as the way that dust contributes to altered pH of rain and run off would be relevant.	***8.1. Physical*** *In general, for this proposed development, the physical impacts may include the effect on soil and geology (site clearance, storm water runoff, loss of topsoil, potential erosion, change in drainage patterns, flooding risks (as it pertains to the site and the surrounding environs and communities), air, particularly in the context of the potential impact that the proposed development may have on communities such as the potential generation of dust from*	Bauxite mining does not contribute to or change the pH of rain or the runoff water from the exposed surfaces. The impacts on these physical activities referenced in the comment were investigated and reported on in the EIA Report, as agreed in the TOR. Please see section 7.1. Impacts to Physical Resources of the EIA Report. Mitigation measures are also detailed in the EIA Report (See section 8.0. Impact Mitigation of the EIA Report). Be reminded that bauxite mining will be confined to the grasslands in the depressions and will not be in the Forest Reserves or limestone hillocks, which hosts the highest level of biodiversity in SML 173. Caves and sinkholes will also be protected. **Our investigations have shown that, in carrying out its routine mining activities, NJBP II conducts** environmental **monitoring of these activities and reports to the regulatory agencies on a monthly and annual basis in compliance with the regulatory framework. The regulator also carries out its own independent assessment**s, audits and reviews **and ensures compliance** with the implementation of prescribed **mitigation measures.**

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		processing, drilling, transportation, material storage and handling and fly rock from surface workings. Possible contamination of surface and subsurface resources from improper waste disposal or storm water runoff. Loss of character of the area, impact of excavation; material assets and effects of vibration on surface structures as it pertains to the site and the surrounding environs and communities, damage to roads during transportation. The physical impacts will be explored, but not be limited to the following: *Effects of project design and engineering;* *Impacts of construction activities such as site clearance, earthworks, access routes development on the physical features of the natural environment* *The impact of transportation networks and overburden storage for reuse, spoil disposal on major geological formation, such as sinkholes and caves.* *Impacts of accidental oil and chemical spills* *Impacts on Air Quality* *• Impacts on Water Quality (pollution of potable, coastal, surface and ground waters)* *Impact of the loss of forest cover on the area*	As stated on page 7-12 of the EIA Report bauxite mining may lead to: "*Better quality amenities, facilities, physical infrastructure and utilities are provided to improve the standard of living and quality of life*". The Jamaica National Heritage Trust (JNHT) in the AIA (see AIA Report page 120) recognizes that: *"Defaulting on the proposed development may result in:* • *Loss of potential employment opportunity for community members.* • *Lost potential opportunity for infrastructural development and improved housing stocks.* • *Lost opportunity for poverty alleviation."* CD&A's review has shown that NJBP II has adopted rainwater harvesting and storage projects for the benefit of its operations and proximate communities. A point to note is that orebodies proposed for mining in SML 173 are generally in remote locations and away from existing residential areas.

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		Impact of pilferage of forest cover from non-mining areas due to the increased access *Impacts/demands/requirements of the following must be quantified* ✓ *Water Supply* ✓ *Drainage* ✓ *Sewage Treatment and Disposal* ✓ *Wastewater Disposal* ✓ *Solid Waste Disposal* ✓ *Communications and other utility requirements* ✓ *Transport Systems, traffic management and supporting infrastructure required* ✓ *Operation and maintenance – waste disposal, site drainage, sewage treatment and disposal solution, and air quality;* *Impacts on visual aesthetics and landscape* *Noise* *Dust* *Vibration* *Change in drainage pattern* *Carrying capacity of the proposed site*	
5.	A more detailed analysis of the short and long-term impacts of haul roads and extraction on fragmentation of ecosystems and wildlife, the impacts	***8.3. Biological*** *Direct and indirect impact and associated risks on ecology of the terrestrial habitats, where relevant. Emphasis will be placed on any rare, endemic, protected*	**This was fully addressed in the EIA Report in accordance with the requirements of the agreed TOR.** In relation to the configuration of haul roads, the EIA Report (See page 5-8) stated that: "*As far as practical, existing pathways (bridle paths/roadways/footpaths) will be mainly converted to haul roads*." It is also documented in the AIA (Volume III of the EIA

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	of increased human access to the remaining forest fragments (which could include increased illegal harvest of wildlife and native plants, increased squatting and fires) is required. The impact of roads is much more pervasive than their total area and short-term direct impacts. Have the impacts of increased traffic on surrounding roads been fully assessed?	*or endangered species loss of biodiversity, loss of ecosystem functions, habitat loss and fragmentation, loss of* ***niches and natural features due to construction and operation. The impact of noise, dust and vibration on floral and faunal species will also be explored.*** ***8.1. Physical*** *In general, for this proposed development, the physical impacts may include the effect on soil and geology (site clearance, storm water runoff, loss of topsoil, potential erosion, change in drainage patterns, flooding risks (as it pertains to the site and the surrounding environs and communities), air, particularly in the context of the potential impact that the proposed development may have on communities such as the potential generation of dust from processing, drilling, transportation, material storage and handling and fly rock from surface workings. Possible contamination of surface and subsurface resources from improper waste disposal or storm water runoff. Loss of character of the area, impact of excavation; material assets and effects of vibration on surface structures as it pertains to the site and the surrounding environs and communities, damage to roads during transportation. The physical impacts will be explored,*	Report) that the haul roads developed for accessing and transporting bauxite may be beneficial to the communities and community development. Among NJBP II's best practice is to actively patrol the areas in which mining is taking place. With the exception of the haul roads that are authorized to remain open (agreement with the Municipal Corporations and JNHT) for the benefit of the community, at the end of the mining process haul roads are eliminated and enables natural recolonization to take place. This was stated on page 5-63 of the EIA Report: "***At the end of use, access and use of the haul roads are eliminated by making the road redundant.***" It was stated on page 8-5 of the EIA Report that: "*NJBP II will not be engaged in any substantial fragmentation. The area is already naturally fragmented by the nature of the topography and activities in the area. NJBP II operations will temporarily impact on less than 15% of the total area inclusive of construction of haul roads. Haul roads constructed will be at a maximum width of 35 feet. This will be the distance of separation for those specific areas for which the haul roads traverse. This does not prevent any plant species that reproduces itself by any method of sexual reproduction to constrain propagation through pollen and seed dispersal."* Further, the mobility of animals will not be constrained. It was also stated in Section 7.2. Impacts to Biological Resources, on page 7-11 that the mitigation proposed for potential impact to the biological resources included: "*Vegetation should only be removed within the design and operating footprints. Existing roadways and degraded areas will be utilized for use as haul roads. Sensitive species of plants identified will be removed and relocated to areas that will not be affected by the operations or at NJBP II's greenhouses."* Potential impacts on traffic were analyzed in Section 8.1.12. of the EIA Report. It was stated that "*Impact on traffic will be negligible. The project does not propose to add significantly to the existing traffic volumes to the public roads. Intersections will be actively monitored and signs installed, where necessary*."

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		but not be limited to the following: *Effects of project design and engineering;* *Impacts of construction activities such as site clearance, earthworks, access routes development on the physical features of the natural environment* *The impact of transportation networks and overburden storage for reuse, spoil disposal on major geological formation, such as sinkholes and caves.* *Impacts of accidental oil and chemical spills* *Impacts on Air Quality* • *Impacts on Water Quality (pollution of potable, coastal, surface and ground waters)* *Impact of the loss of forest cover on the area* *Impact of pilferage of forest cover from non-mining areas due to the increased access* *Impacts/demands/requirements of the following must be quantified* ✓ *Water Supply* ✓ *Drainage*	

No	Comment	Section of ToR within which this topic would be discussed	CD&A/NJBP II Response
		✓ *Sewage Treatment and Disposal* ✓ *Wastewater Disposal* ✓ *Solid Waste Disposal* ✓ *Communications and other utility requirements* ✓ *Transport Systems, traffic management and supporting infrastructure required* ✓ *Operation and maintenance – waste disposal, site drainage, sewage treatment and disposal solution, and air quality;* □ *Impacts on visual aesthetics and landscape* □ *Noise* □ *Dust* □ *Vibration* □ *Change in drainage pattern* □ *Carrying capacity of the proposed site*	
6.	The impacts of mining practices on soil fertility and biodiversity in relation to restoration of forest cover on mined-out lands need more attention. The importance of the immense biodiversity that is found in undisturbed soils and the effects of mining on it have not been	***8.1. Physical*** *In general, for this proposed development, the physical impacts may include the effect on soil and geology (site clearance, storm water runoff, loss of topsoil, potential erosion, change in*	With specific reference to the topsoil, the 18" – 24" of topsoil contains the highest level of soil biodiversity and is removed and stored for use in the rehabilitation process as the final cover. The rehabilitation is done at the end of the phased mining process and in accordance with the standards stipulated by the Commissioner of Mines (Mines & Geology Division) for rehabilitation of mined lands. Please be reminded that 15% of the total area of SML 173 will be mined, inclusive of construction of haul roads. **There will be no mining in the Forest Reserves as required by the law, or the hillocks which contains the highest levels of biodiversity.**

No	Comment	Section of ToR within which this topic would be discussed	CD&A/NJBP II Response
	considered in this report. Are there any measures that could be implemented to minimise the loss of soil biodiversity?	*drainage patterns, flooding risks (as it pertains to the site and the surrounding environs and communities), air, particularly in the context of the potential impact that the proposed development may have on communities such as the potential generation of dust from processing, drilling, transportation, material storage and handling and fly rock from surface workings.* ***6.1. Physical Environment*** ***6.1.1. Land*** ***Topography -*** *Baseline data to be given on description of existing features of the land at the proposed project area including description of slopes, inland topography and drainage features.* ***Soils*** *– Baseline soil data including type, classification, characteristics, soil properties etc. Results of investigations carried out are to be provided for the project area.*	The bauxite deposits identified in SML 173 do not have forest cover and is preponderantly grassland. The bio-geo-stratigraphy in the region and the subject SML 173 area is naturally defined. It shows mainly grasslands on the depressions and the high biodiversity on the hillocks. See Figure 5 to Figure 7 below.  **Figure 5: Illustration showing the low lying bauxite deposits (highlighted in purple) in between the hillocks in SML 173 (See page 5-128 of the EIA Report)**

			 **Figure 6: Illustration showing the low lying bauxite deposits (foreground) in between the hillocks (background) in SML 173 (See page 5-128 of the EIA Report)**

No	Comment	Section of ToR within which this topic would be discussed	CD&A/NJBP II Response
			 **Figure 7: Illustration showing the low lying bauxite deposits (midground) in between the hillocks (background) in SML 173 (See Slide 10 of the presentation made at the Mandatory Public Meeting)** **The requirements for soil investigation in the agreed TOR is as follows: "***Soils – Baseline soil data including type, classification, characteristics, soil properties etc. Results of investigations carried out are to be provided for the project area."* **These requirements have been met in the EIA report.**
7.	Creating drivable access roads facilitates poaching / illegal harvesting of protected flora and fauna, incl. parrots, butterflies, and orchids. Why did the EIA fail to address this with regards to species in the Risk Assessment as a permanent threat associated with the network of haul roads which remain usable after mining ceases? One of the consequences of their failure to detect Black---billed Parrots is that they failed to refer to the relevant Population Viability Assessment (PVA; Koenig 2008) which address this issue of mining roads and poaching.	***8.7. Risk Analysis and Risk Assessment*** *The objective of the Risk Analysis Study is to identify potential credible hazards arising from the operations* *CD&A will analyze the risks to the safety of the workers and persons within the sphere of influence related to the projected impacts identified during the studies. This will include: 1) Identifying the hazards 2) and assessing the potential consequences.*	It is not correct to say that the network of haul roads will remain usable after mining ceases thereby creating a permanent threat With the exception of the haul roads that are authorized to remain open (agreement with the Municipal Corporation and JNHT) for the benefit of the community, at the end of the mining process haul roads are eliminated and enables natural recolonization to take place. This was stated on page 5-63 of the EIA Report: "*At the end of use, access and use of the haul roads are eliminated by making the road redundant.*" Further, during the mining operations, among NJBP II best practice is for its security personnel to actively patrol the areas in which mining is taking place to prevent trespassing and other encroachments. In relation to the configuration of haul roads, the EIA Report (See page 5-8) stated that: "*As far as practical, existing pathways (bridle paths/roadways/footpaths) will be mainly converted to haul roads.*" It is also documented in the AIA (Volume III of the EIA Report) that the haul roads developed for accessing and transporting bauxite may be beneficial to the communities and community development. It was stated on page 8-5 of the EIA Report that: "*NJBP II will not be engaged in any substantial fragmentation. The area is already naturally fragmented by the nature of the topography and activities in the area. NJBP II operations will temporarily impact on less*

No	Comment	Section of ToR within which this topic would be discussed	CD&A/NJBP II Response
			than 15% of the total area inclusive of construction of haul roads. Haul roads constructed will be at a maximum width of 35 feet. This will be the distance of separation for those specific areas for which the haul roads traverse. This does not prevent any plant species that reproduces itself by any method of sexual reproduction to constrain propagation through pollen and seed dispersal." Further, the mobility of animals will not be constrained. It was also stated in Section 7.2. Impacts to Biological Resources, on page 7-11 that the mitigation proposed for potential impact to the biological resources included: "*Vegetation should only be removed within the design and operating footprints. Existing roadways and degraded areas will be utilized for use as haul roads. Sensitive species of plants identified will be removed and relocated to areas that will not be affected by the operations or at NJBP II's greenhouses."* The various extensive bird counts conducted did not identify the endangered Black Bill Parrot (*Amazona agilis*).
8.	The description of the proposed planning approach includes "planning for relocation of any sensitive plants, such as epiphytes, to areas that will not be disturbed and concomitantly placing any excess species in greenhouses for future planting." Relocation of species is a very technically demanding and expensive long-term process. Previous attempts such as the Orchid Sanctuary at Martin's Hill, Manchester were unsuccessful and have been abandoned. My recommendation is that areas that have sensitive species should be permanently excluded from the mining process and protected from any adjacent mining by a buffer zone. Whether or not mining is allowed, resources should be dedicated to	***5.0. Project Description*** *The description will detail the elements of the project, highlighting the activities which will be involved in all the major aspects of the project. Therefore, activities which will be involved in the construction, operation, decommissioning and rehabilitation phases will be addressed. These may include, but are not limited to the following:* ***Pre-operation**: exploration drilling and trenching; location of stockpiles, general access to site and access to extraction or dig sites, plant and accommodation and administrative office during initial development phase, duration, timing and working hours of the initial phase, drainage assessment and design, method of sewage treatment and disposal, road construction plan and methods to be employed, source(s) of potable water, electricity, solid waste disposal for site operations. Also, the identification of rescue centres/nurseries/centres for*	Our investigation shows that the approach and methodologies used in removing and relocating sensitive species of flora have been successfully implemented by NJBP II for a number of years. These activities were approved and are audited by NEPA. This EIA Report does not address an orchid sanctuary. The mentioned orchid sanctuary at Martin's Hill, Manchester bears little or no relevance to NJBP II's mining practices, inclusive of land rehabilitation. Mining will only be carried out on 15% of the total SML 173 area on which economic bauxite deposits occur. This 15% also includes haul roads. Be reminded that the bauxite orebodies in SML 173 are located on the low lying grassland areas and do not support the growth of forest cover. The rehabilitation process and obligations are well established, actively and efficiently regulated, monitored and enforced by the Mines & Geology Division, NEPA and the Portfolio Ministry. The Mines & Geology Division certifies the rehabilitation of mined-out pits. NJBP II is required to comply with the requirements of all Mining laws. NJBP II reports that it is current with its land rehabilitation programme. Rehabilitation is to be undertaken within three (3) years of completion of mining.

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	developing cost effective approaches to support reforestation of mined out lands, and decommissioned roads. These techniques could be very important for the large areas of mined out lands from other operations that are currently barren.		
9.	As a mitigation the EIA proposes that: Pre-•operation activities will also include the removal and relocation of sensitive species such as epiphytes to NJBP II's existing greenhouses. (pg 4-4). In Table 7.2 Impacts to Biological Resources, the EIA also notes: During the EIA, epiphytes, Wild Pine, Bromeliad and God Okra were identified. (pg 7---11). Given that "wild pine" is the local name for bromeliads (Bromeliaceae), which are epiphytes, I can't but wonder why the EIA presented the list in this fashion. Beyond that, what evidence is there that survival and growth rates are not impacted for each species of epiphyte which will be translocated, both to greenhouses and to their return to the wild? For	***5.0. Project Description*** *The description will detail the elements of the project, highlighting the activities which will be involved in all the major aspects of the project. Therefore, activities which will be involved in the construction, operation, decommissioning and rehabilitation phases will be addressed. These may include, but are not limited to the following:* ***Pre-operation**: exploration drilling and trenching; location of stockpiles, general access to site and access to extraction or dig sites, plant and accommodation and administrative office during initial development phase, duration, timing and working hours of the initial phase, drainage assessment and design, method of sewage treatment and disposal, road construction plan and methods to be employed, source(s) of potable water, electricity, solid waste disposal for site operations. Also, the identification of rescue centres/nurseries/centres for relocation of species. Noranda has an established*	**Our investigation shows that the approach and methodologies used in removing and relocating sensitive species of flora have been successfully implemented by NJBP II for a number of years. These activities were approved and are audited by NEPA.** All of the relevant approaches, methodologies and techniques have been developed and have been successfully applied for the collection and temporary storage in greenhouses or immediate transfer to other areas in the field in which mining will not take place. All the appropriate measurements and monitoring have and are being successfully carried out by NJBP II and with the knowledge, approval and monitoring of the regulatory agencies. Prior to clear cutting activities, assessment of the conditions in the alignment of the haul roads is carried out followed by relocation to nearby undisturbed areas or relocation to NJBP II's greenhouses. Before removal of the epiphytes from the field, the greenhouse team undertakes an assessment of the bio-physical parameters such as light intensity, relative humidity etc. in order to simulate similar conditions in the greenhouse. Continuous assessment and evaluation are undertaken by the greenhouse staff with the purpose of ensuring that the proper bio-physical parameters are maintained within the greenhouses. The bio-physical conditions in the field are also measured after replacement in the field.

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	this mitigation to be valid, the EIA needs to present data on sunlight requirements (i.e, light---tolerance ranges), moisture requirements, and nutrient requirements for the stage classes of each epiphyte species. There also needs to be pre--- defined Measures---of---Success for growth and survival rates in the nurseries and following return to the wild.	*greenhouse/nursery dedicated to the management of relocated sensitive species.*	
10.	The EIA states that the planting of grass "plus the planting of several trees in the vicinity and a major tree planting programme of 200,000 trees" for land rehabilitation after mining will increase the size of grasslands and increase carbon sequestration. The EIA does not, however, present calculations to support this. From 2006 – 2012, bauxite mining and limestone quarrying across Jamaica emitted a total of 17,694 Gigagrams (Gg) of carbon dioxide (CO2) into the atmosphere (Ministry of Economic Growth and Job Creation, GoJ, undated biennial update report). That's 17,694,000 tonnes of CO2 or 4,825,636 tonnes of carbon which Jamaica must capture and store for this reported 6 year period. There's also the entire 70+ year history of bauxite mining in Jamaica and the 25---30 years of this proposed lease which must be accounted for. Is this mitigation for carbon emissions genuinely feasible and valid?	***6.3. Natural Hazards*** *Vulnerability assessment of the development in relation to the following will be undertaken:* *Hurricanes,* *Earthquakes* *Natural hazard vulnerability assessment will take in account climate change projections.* *Considerations will be given to the creation/effect on microclimate within the proposed SML.*	The proposed rehabilitation measures which would assist in carbon sequestration are considered feasible and valid and in some instances are already under implementation. Even so, given that only 15% of the SML 173 area will be impacted by mining inclusive of the construction of haul roads and that there will be no mining in the Forest Reserves or the limestone hillocks, the carbon footprint of the area will be extremely limited. The level of greenhouse gas emissions quoted for all of Jamaica and the entire mining sector, cannot be used to assess or compare NJBP II mining operations, a predominantly brown site operation. Mining operations, if permitted in SML 173, will be the only greenfield (new location) component of NJBP II's operation. This will involve the relocation of mobile mining equipment only. The mining of bauxite in SML 173 by NJBP II would therefore not result in a net increase in greenhouse gas emissions from what has been involved in the past. The mining in SML 173 is aimed at maintaining NJBP II's existing operations. **It is important to note that the total emission of greenhouse gas by the entire Caribbean region is less than 2% of the total greenhouse gases emitted throughout the entire world.** The agreed TOR required the following analysis as it pertains to Climate Change: "*Natural hazard vulnerability assessment will take in account climate change projections.*" This requirement has been met as reported in the EIA report (See Section 8.1.5. Climate Change of the EIA Report). The measures for rehabilitation and revegetation of the mined out orebodies are expected to be superior in terms of carbon sequestration to what existed before mining. As stated in the EIA Report (See page 1-1) the area to be impacted represents approximately 15% of the area of SML 173 inclusive of the haul roads. The impact of the project on carbon sequestration is therefore minimal and temporary. Upon rehabilitation, for example, the planting of Napier grass or crops on rehabilitated lands, will provide greater carbon sequestration and climate change mitigation, which is superior to the existing grass cover in the depressions. The Napier grass will also provide a greater air cleansing function.

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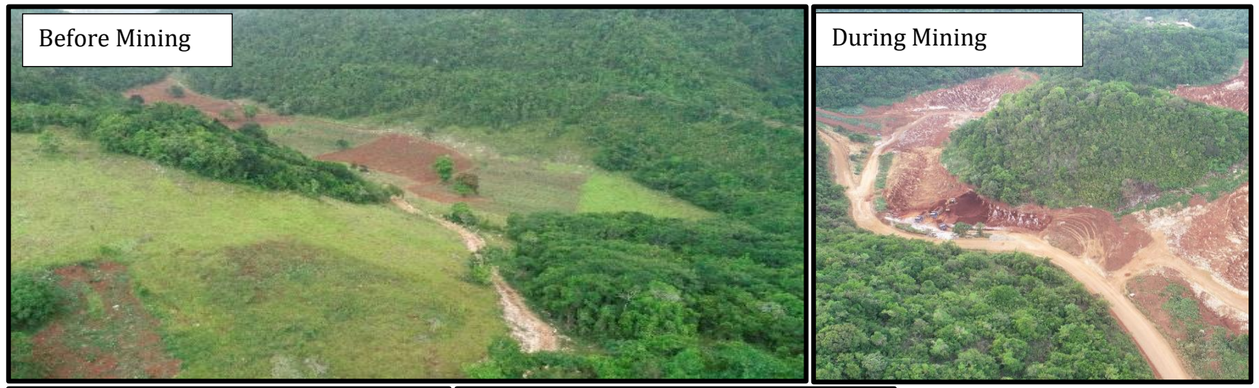
			Figure 8 below illustrate examples of the following in NJBP II's current mining lease: A. grassland vegetation that existed before mining, B. mining in progress, C. rehabilitated lands planted with Napier grass  **Figure 8: Images illustrating the various stages of mining – Pre-Mining, Mining and Rehabilitation**
11.	Where are the 200,000 trees (ref above, #47) going to be planted? The EIA needs to include a map and notation as to whether this will occur	***9.0. Impact Mitigation*** *The mitigation measures will endeavour to avoid, reduce and*	**NJBP II has committed to plant 200,000 trees as part of the GOJ National Tree Planting Programme. This is separate from its land rehabilitation and reclamation activities for mined out lands, which are to be undertaken in accordance with the established regulatory protocols and procedures for land rehabilitation.**

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	on rehabilitated mined---out ore bodies or will planting occur in unmined soils? If they won't be planted in rehabilitated pits, why not? What is the minimum depth---of---reconstructed soil required for trees? What are the pre---defined metrics for seedling survival and growth rates which Noranda will use to monitor the short--- , medium---, and long---term success of this activity?	*remedy the potential negative effects while at the same time enhancing the positive impacts projected. Mitigation and abatement measures should be developed for each potential negative impact identified. This will include recommendations for the enhancement of beneficial impacts and quantify and assign financial and economic values to mitigating methods. Green technology should be examined. A statement is to be made on strategies that will be used to conserve energy and water in relation to this project.*	The tree planting, which is a separate activity will be developed using best approaches and practices in consultation with relevant stakeholders including the GOJ and community groups and is not earmarked for mined out lands. This project is currently ongoing.
12.	Tropical forests growing on deep soils are at least 10 times more effective at storing carbon than Napier Grass. Did the EIA consultants examine alternative scenarios to mining and planting of grass for climate change mitigation? Alternatives such as keeping the bauxitic soils in the ground and promoting restoration of native forest cover in the area, particularly on those lands entrusted to the Commissioner of Lands to be looked after on behalf of the public. If alternative scenarios for climate change mitigation were evaluated, why were results not presented in the EIA?	***11.0. Analysis of Alternatives*** *Alternatives to the proposed project including the no-action alternative will be examined. These will be assessed according to the physical, ecological, climatic variability and socio-economic parameters of the site. This examination of alternatives will incorporate the use of the history of the overall area in which the site is located and previous uses of the site* ***itself. Alternatives will also address specific aspects of the project such as methods, locations, layouts, [costs] and technologies proposed in the execution of the project (works) that have been identified as being causes of major impacts. The scoping exercise for the analysis of alternatives will also include a description of each alternative, summary of***	The orebodies within SML 173 are located within the low-lying grasslands and not on the limestone hillocks, which supports forest cover. As shown in Figure 5 to Figure 7 above, the low-lying grasslands of SML 173 do not support the growth of large trees or forest cover. Any activity to convert these grasslands to a tropical forest will likely be biologically impracticable and prohibitive in cost. In any event this would be outside the scope of NJBP II operations. NJBP II is responsible for the impacts of its bauxite mining operations and is obliged under Mining laws and established best practices to rehabilitate mined out areas in compliance with the applicable regulations and standards. The MGD conducts inspections before, during and after mining and rehabilitation and certifies these operations. Additionally, our investigations have shown that NJBP II is contributing to Jamaica's reforestation programme and has committed to the planting of 200,000 trees in any suitable location within its mining operations. The TORs indicated specific alternatives to be analysed. Please revisit the alternative analysis (See Section 10 of the EIA Report). Please also see "*pages 10-1 to 10-4, Section 10.2. No Action Alternative*" or '*Do Nothing*' scenario, which outlines what could occur if NJBP II is not issued with an environmental permit and there is no mining in the SML 173 area.

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		adverse impacts of each alternative as well as a rationale for the selected project alternative.	
13.	On page 8---35, the EIA states that: "Currently 2,889 hectares of the total 3,123 hectares (91%) disturbed by Kaiser/Noranda/NJBP II has been certified rehabilitated." This was reiterated during the December 8th, 2020 public meeting by Mr. Delroy Dell, who confirmed that 92% of land disturbed since 1967 have been rehabilitated. Presented as such, this information will be highly---misleading to anyone who is not familiar with the concept of "percentage--- swell", the increase in surface area which occurs during the stage of reclamation. One hundred percent (100%), that is, where hectares disturbed equals hectares reclaimed, does not mean that every single mined--- out ore body has been reclaimed and rehabilitated. Based on data obtained from Mines and Geology Division using an Access To Information request, Noranda's average swell is about 43---53% (with a range of 1% to over 200%). Thus, the reclamation and rehabilitation goal is towards upwards of 150%, not 100% To ensure that the public and decision---makers are not confused or misled, the numbers of ore bodies mined---out and the numbers of mined---out pits reclaimed need to be included	***8.3. Biological*** *Direct and indirect impact and associated risks on ecology of the terrestrial habitats, where relevant. Emphasis will be placed on any rare, endemic, protected or endangered species loss of biodiversity, loss of ecosystem functions, habitat loss and fragmentation, loss of* ***niches and natural features due to construction and operation. The impact of noise, dust and vibration on floral and faunal species will also be explored.***	**It is critically important that we distinguish between bauxite mining and rehabilitation of mined orebodies.** NJBP II is responsible for the impacts of its bauxite mining operations. NJBP II is obliged by way of the Mining Act and established best practices to rehabilitate mined out areas in compliance with the regulations and standards of the Mining Act and Regulations. The MGD conducts inspections before, during and after mining and rehabilitation and certifies these operations. The process of rehabilitation is guided by the Inspectorate of the MGD which prescribes and specifies the processes and procedures which must be involved for every specific mined out orebody. On satisfactory rehabilitation of mined out orebodies the Inspectorate issues a certificate of rehabilitation.

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	with the above--- quoted sentence from the EIA, not just the numbers of hectares.		
14.	As mitigation, the AIA proposes delineation of boundaries around communities and "compensation for damages on private property including archaeological sites." Under what law would compensation be calculated? Will compensation go solely to the current title---holder? What about families whose ancestors created the artifacts? What about future land owners who will be denied the experience associated with having history and heritage left in situ?	***9.0. Impact Mitigation*** *The mitigation measures will endeavour to avoid, reduce and remedy the potential negative effects while at the same time enhancing the positive impacts projected. Mitigation and abatement measures should be developed for each potential negative impact identified. This will include recommendations for the enhancement of beneficial impacts and quantify and assign financial and economic values to mitigating methods. Green technology should be examined. A statement is to be made on strategies that will be used to conserve energy and water in relation to this project.*	This is outside the scope of the Agreed ToR.
15.	**Measurements of micro-climatic conditions** • It was stated that micro-climatic conditions were measured, but absolutely no results have been presented. ○ A. What micro-climatic parameters were measured? ○ B. Where are the data on these the micro-climatic parameters. These data should be reported. The impacts of the removal of forest cover on the microclimate from mining are acknowledged but not quantified. Is there	***6.3. Natural Hazards*** *Vulnerability assessment of the development in relation to the following will be undertaken:* *Hurricanes,* *Earthquakes* *Natural hazard vulnerability assessment will take in account climate change projections.* *Considerations will be given to the creation/effect on*	**The requirements of the TOR regarding micro-climate is as follows: "*Considerations will be given to the creation/effect on microclimate within the proposed SML.*"** CD&A measured a number of parameters at several locations with SML 173. These are reported in the EIA Report. Please see "*section 5.3.3.5.7. Abiotic Findings – Measurement of Physical Parameters*". The evidence of resilience is provided in the EIA Report. The area has recovered from burnings of the hillsides and farming activities. See section 5.3.3.2.1. Spatial Extent – Block 1 -9 of the EIA Report. Please note that the EIA Report in no way suggested that the destruction of haul roads will address the potential microclimate impacts. The EIA Report stated that: "*It should be noted that areas where the winning of bauxite will be carried out are already under significant anthropogenic stress from agricultural activities such as yam planting and the creation of paths for accessing these areas. Therefore, any changes that may occur from the winning of bauxite and the creation of haul roads will not introduce any significant irreversible impacts on microclimates. Further, any changes that may occur are deemed substantially reversible, and will be mitigated during the rehabilitation process.*"

No	Comment	Section of ToR within which this topic would be discussed	CD&A/NJBP II Response
	any scientific basis for the statement that "Based on existing activities within SML 173 that have disrupted microclimates, the overall ecology of the area demonstrates resilience"? The report suggests that these impacts will be mitigated by destroying the roads. How feasible and effective is this likely to be? • Misleading analyses (such as the inference that historically cockpit bottoms did not support trees). 196/711 – Towards the end of this page, the EIA discusses the low-lying areas of this region. It basically states that the low-lying areas' biodiversity would not be impacted since most of the biodiversity is on the "hillocks", but that is not how ecosystems work. The low-lying areas connect the karst limestone hills, so any disruption in the flow between low-lying areas to areas of higher elevation would be affected. Additionally, the use of "hillock" is inaccurate that it dismisses how integral the karst limestone is to the area in terms of the biodiversity they support. The theory of island biogeography focuses on islands, but it is also discussed in reference to places like the Cockpit Country and adjacent areas that have similar geomorphology and species composition (MacArthur and Wilson 1967). Hills and mountains are connected by their low-lying areas and if these areas are disrupted, then the flora and fauna of the areas may experience lower genetic diversity since the connectivity between habitats and populations of species	*microclimate within the proposed SML.* ***6.2. Ecological Services*** *Baseline data of terrestrial flora and fauna at the project area must be collected and analyzed and will include a ranking of flora and fauna present along with their ecological importance. A statement clearly specifying whether the study area forms a part of an ecologically sensitive area or migratory corridor of any endangered fauna as well as an indication of whether or not any of the ecological services currently being offered by the site will remain or be recovered subsequent to mining must be provided. The data provided will include but not be limited to the following:* *Detailed description of the flora and fauna (terrestrial) present at the mining, reclamation, storage and disposal sites with special emphasis on rare, threatened, endangered, endemic, protected, invasive and economically important species* *Identification and description of the different ecosystem types and structure including species dominance, dependence and diversity, habitat specificity and community structure*	The destruction of roads will end the access they provide. One of the mitigation for microclimate impacts is to use existing pathways for the development of haul roads, where practicable. In section 5.2. Natural Hazards, sub section *5.2.8. Considerations on Micro-Climate*, it was stated that during closure: "*At the end of use, access and use of the haul roads are eliminated by making the road redundant. Based on existing activities within SML 173 that have disrupted microclimates, the overall ecology of the area demonstrates resilience. It is therefore anticipated that efforts made to restore and allow for recolonization will result in the re-establishment of the minimally impacted microclimate in the due course of time*." Please note that 15% of the SML 173 will be altered during the phased mining operations and of this 15%, approximately 20% will be due to haul roads. NJBP II is obliged by way of the Mining Act and established best practices to rehabilitate mined out areas in compliance with the regulations and standards of the Mining Act and Regulations. The destruction of roads by mining companies on completion of mining activities have been practiced for several decades. This has been successfully implemented. The observation that '*bauxite deposits do not support the growth of forests*' has been made for several decades and is a definitive characteristic of the mode of occurrence of Jamaican bauxite to the extent that it has been used as an indicator in exploration aimed at identifying bauxite deposits. It should be further noted that the infertility of bauxitic soil and the fact that it does not support the growth of forest was among the reasons which piqued the curiosity of Sir. Alfred DaCosta and led to the discovery of bauxite soils in Jamaica in the first place (please see page 2-4 of the EIA Report). Mr. James Lee was among the distinguished geologists who pioneered the use of this method of remote sensing for bauxite exploration in Jamaica. Please see *Lee, J.W., Exploration & Development Drilling for Bauxite in Jamaica, The Journal of the Geological Society of Jamaica Bauxite/Alumina Symposium, 1971*, referenced in the EIA Report on page 5-18. The mode of occurrence of Jamaican bauxite and the fact that bauxite deposits do not support the growth of forests has also been proven by several national and international experts through a number of independent surveys carried out in Jamaica. Included among the institutions that have been involved in these surveys are: the Jamaica Bauxite Institute (JBI), Mines & Geology Division, ALCAN, Alumina Partners of Jamaica (ALPART), Kaiser Bauxite, Alcoa and the US Geological Survey Department. The bio-geo-stratigraphy in the region and the subject SML 173 area is naturally defined. It shows mainly grasslands on the depressions and the high biodiversity on the hillocks (several of which have been disturbed by human activities). See Figure 9 to Figure 11 below.

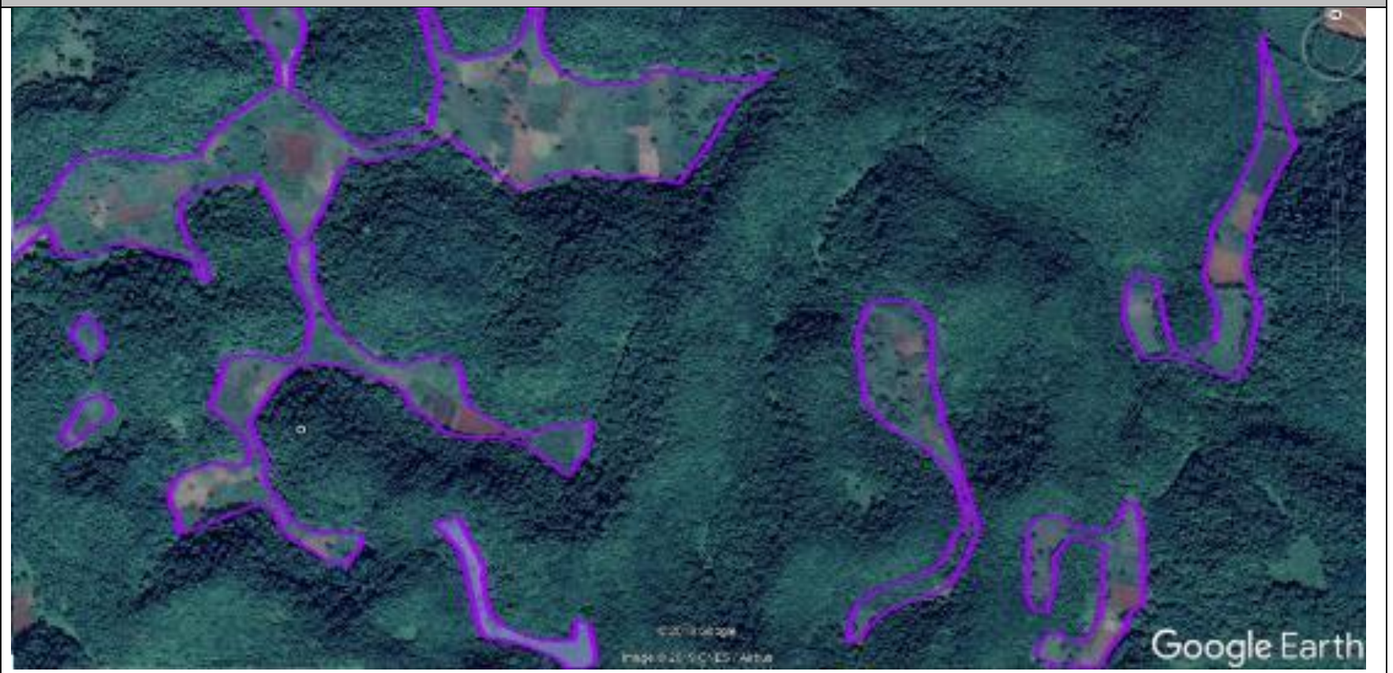
No	Comment	Section of ToR within which this topic would be discussed	CD&A/NJBP II Response
	was disrupted (MacArthur and Wilson 1967).	⍰ *Possible biological loss or habitat fragmentation* ⍰ *The Forestry Department's data will be used to identify the Forest Reserves within the SML as well as identifying closed broadleaf and disturbed broadleaf forests within the SML.*	 **Figure 9: Aerial image showing the low lying bauxite deposits (highlighted in purple) in between the hillocks in SML 173 (See page 5-128 of the EIA Report)**

			 **Figure 10: Photograph showing the low lying bauxite deposits (foreground) in between the hillocks (background) in SML 173 (See *page 5-128 of the EIA Report*)**

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			 **Figure 11: Photograph showing the low lying bauxite deposits (midground) in between the hillocks (background) in SML 173 (See Slide 10 of the presentation made at the Mandatory Public Meeting)** It was never posited that there was no biological connection between the low-lying grasslands and the hillocks.
16.	**Methodology** It is well established that seasons play a significant role in the ecology of animals. Consequently the fauna of any area is likely to change with the seasons. This study was conducted in August 2019 only and is thus not likely to provide a true picture of the biodiversity of the area.	***6.4. Biological Environment*** *CD&A will present a detailed description of the flora and fauna (terrestrial) of the area, with special emphasis on rare, endemic, protected or endangered species. In this section the emphasis is on a description of habitats, flora and*	It is incorrect to state that the study was undertaken only in August 2019. The field investigations covered both the wet and dry seasons and nocturnal studies. Field visits were conducted within SML 173 and its environs covering a period of 20 months over the period February 2018 to December 2019: i. February 2018, ii. August 2018, iii. August to September 2019, and

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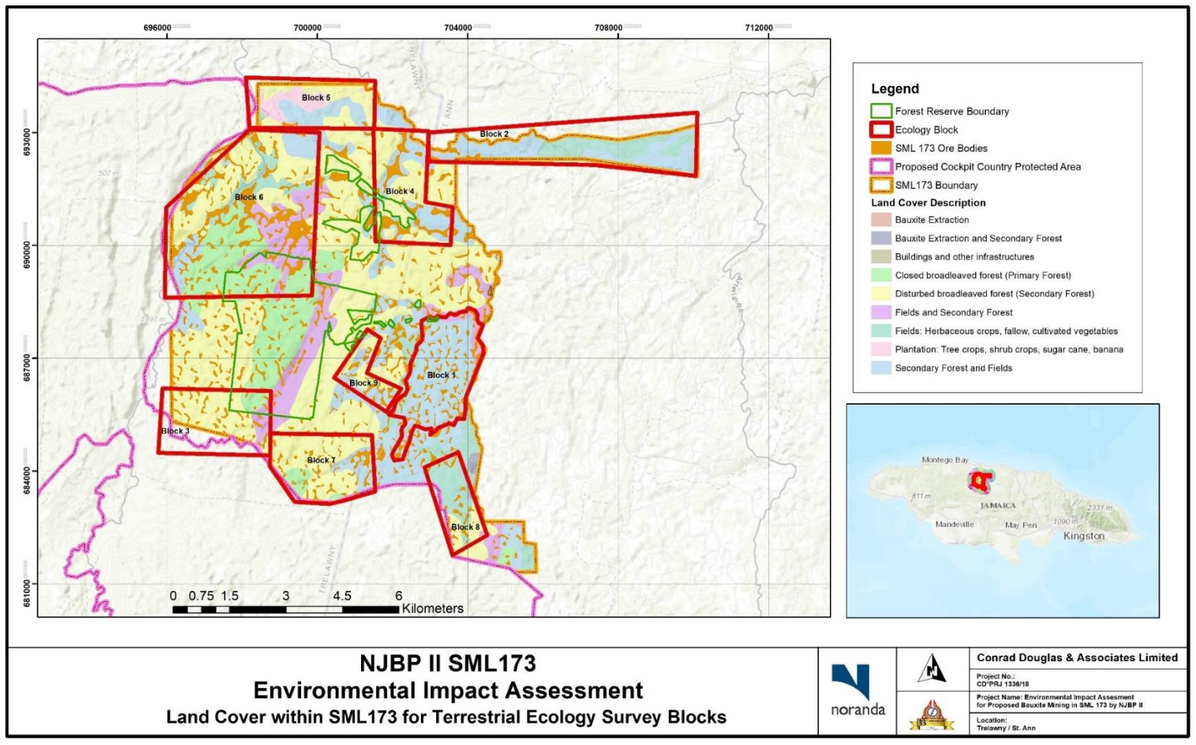
	⍰ On page 5-82, the EIA states that faunal assessments were undertaken during Phase 2 of field surveys, during the period of August 17-19, August 24-26, 2019 and September 14-16, 2019. "December 2019" also was included on pg 5-66, but it remains unnoted what was surveyed during that period. What ecologically-relevant criteria were used to determine the timing of faunal surveys so as to ensure that all fauna present in the area were detectable, especially in relation to the survey methods utilized? The timing of mid-to-late August and mid-September suggests that the consultants are not aware of the abiotic factors to which breeding seasons, insect emergence patterns, and seasonal intra-island and international migration patterns are linked i.e., those conditions which influence species' presence and detectability. Why were surveys not conducted in association with the cyclic bimodal rainfall pattern (e.g. pg 5-34), which drives faunal ecologies and detectability? ⍰ Overall the consultant needed a longer timeline to carry out the fauna and flora study in such a sensitive area. It would have accounted for seasonal variation in the species encountered such as dry vs wet season. ⍰ There should be more sample points over the study site to account for the variation in the habitat. ⍰ The extent of sampling of the forest ecosystems is inadequate and the number of plant and animal species, especially of the number of endemic species, appears low. Apart from	*fauna surveys inclusive of a species list; commentary on the ecological health, function and value in the project area, threats and conservation significance.* *This will include:* ⍰ *A detailed qualitative and quantitative assessment of terrestrial habitats in and around the proposed project sites and the areas of impact. This will also include flora and fauna surveys and will include species lists.* ⍰ *Special emphasis will be placed on rare, endemic, protected or endangered species. Migratory species will also be considered. As well as economically important species and nocturnal species.* ⍰ *Species dependence, niche specificity, community structure, population dynamics, species richness and evenness (a measure of diversity) ought to be evaluated.* *The field data collected will include, but not be limited to:* ⍰ *Vegetation profile* ⍰ *Species lists will be provided for each community* ⍰ *A habitat map of the area*	iv. December 2019. Further, the nine blocks covered more that 50% of the 8,335 hectares SML 173 area, or 2.5 times of what best practice requires. It included all land uses within the area. Nine sampling blocks were used (Please see Figure 12 below and pages 5-71 to 5-84 of the EIA Report). The study was carried out comprehensively using universally acceptable scientific methods. The sampling methods used are described in "*Section 5.3.2. Approach & Methodology*" on pages 5-70 to 5-127 of the EIA Report.  **Figure 12: Terrestrial Ecology Study Area Blocks within SML 173 (numbered 1-9) (Source: EIA Report)** The study went beyond the requirements of the Terms of Reference (See Appendix I of the EIA Report) and conducted flora and fauna assessments within control sites outside of the SML 173. We found that the biomass was significantly increased, as well

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	Hernandia, are there other possible species of interest (e.g. because of their endemism, rarity or globally threatened status) that require special searches to assess their status in the area? A detailed literature review should be carried to account for the species known from the area but was not observed during the study. Overall, the quality of the report is uneven, with gaps in methodology and inconsistent presentation of evidence and poor referencing. There is little quantitative material collected or presented. Some sections quote peer-reviewed studies, but there are many examples of important statements unsupported by references; for example section 5.3.2 makes the statement that "*literature indicates that the vegetation in the area is generally homogenous*" but gives no reference for this statement. Since the EIA does not carry out a detailed floral survey, it's difficult to evaluate this statement especially given that the Cockpit Country is known for *heterogeneity* (Binney et a. 1991, Eyre 1995). 183/711 – The EIA discusses how they randomly divided the 8335 ha into 9 random blocks, but then goes on to say that the 9 blocks covered more than 50% of the 83335 ha – which is it? The EIA report then goes on to say that they analyzed 7 out of the 9 blocks and that's more than the 20% that they say they are required to analyze. The report does not mention where the requirement comes from; why only 20% is adequate; and if there is a citation for the reasoning of	*Geo-referencing of all rare species identified in the course of the analysis of the proposed SML.* ***6.2. Ecological Services*** *Baseline data of terrestrial flora and fauna at the project area must be collected and analyzed and will include a ranking of flora and fauna present along with their ecological importance. A statement clearly specifying whether the study area forms a part of an ecologically sensitive area or migratory corridor of any endangered fauna as well as an indication of whether or not any of the ecological services currently being offered by the site will remain or be recovered subsequent to mining must be provided. The data provided will include but not be limited to the following:* *Detailed description of the flora and fauna (terrestrial) present at the mining, reclamation, storage and disposal sites with special emphasis on rare, threatened, endangered, endemic, protected, invasive and economically important species* *Identification and description of the different ecosystem types*	as the biodiversity of other invertebrates and population of fauna, which becomes a part of the food chain and allow insectivores birds and other predatory insectivores to thrive. **The consultant is fully aware of all the physical, chemical and biological factors including seasonality, which influences biological and ecological systems and these were taken into account when doing these studies, even though they may have been limitations.** The study was comprehensive and detailed as possible, to meet the requirements of the agreed Terms of Reference in ensuring that there is comprehensive investigation of the subject under investigation for the purpose of the specific project. It is guided by a considered and agreed ToR, which utilizes universally accepted, best practices, approaches and methodologies. Overall the study captured the seasons over a 12 month period. The dates of the study are highlighted above and presented again for easy reference. • February 2018, • August 2018, • August to September 2019, and • December 2019. The period of study in SML 173 adequately collected the baseline information for the level of detail required for an EIA. As shown in the EIA sampling points were spread throughout SML 173. As stipulated by the TORs the Forest Reserves were excluded from the study as no mining will be permitted in the Forest Reserves. Detailed descriptions were given supported by habitat maps and full species list provided. These were accompanied with DAFOR scales. These were also supported by photographs taken in the field. All species reported in the EIA Report were those observed during the study. Furthermore, species lists from various secondary data sources were also cited in the EIA Report.

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	only 20% of the total area. These percentages are confusing, no citations are provided, and the divisions seem arbitrary. If the area was randomly divided, they should be citing what method they used to divide the land randomly. Quantitative methods were not used to assess the number of species in the site, the species composition nor the species diversity of the areas under consideration. 201/711 – On Table 5-9, the waypoints were listed for the transects completed for the survey. The length of the transects were not mentioned, the GPS locations of the quadrats that were supposedly surveyed were not listed; and the EIA report does not discuss how plant samples were collected or if they took photos or samples of unidentified species. Again, as discussed in the previous comment, it is unclear how the data are being collected and analyzed. Multiple methodologies are discussed but not necessarily outlined in detail as to how the surveys were done. How far apart were the quadrats? How long were the transects? Were all plants in the quadrat surveyed? Was canopy accounted for? Were non-vascular-plant life accounted for like lichen, moss, and terrestrial algae? These items need to be addressed in a floral survey. The land-use data referred to in the EIA is from 1999-2000, but there is updated land-use data available through Forestry Department and NEPA that the authors	*and structure including species dominance, dependence and diversity, habitat specificity and community structure* *Possible biological loss or habitat fragmentation* *The Forestry Department's data will be used to identify the Forest Reserves within the SML as well as identifying closed broadleaf and disturbed broadleaf forests within the SML.*	As far as possible the literature was reviewed in detail. It was stated from the presentation of an earlier draft EIA that the literature indicated that the Giant Swallowtail butterfly was not resident in the area but resident in the Blue and John Crow Mountains, the Dolphin Head Mountains and in the designated Cockpit Country Protected Area (CCPA). In spite of this, intensive and exhaustive search were made to identify the hernandiaceae family within the study area. This family of plant which is critical for the sustenance of the endangered butterfly was not observed in SML 173. Also in depth searches of the literature proved futile in locating the hernandiaceae family in SML 173. A detailed floral survey was carried out in SML 173 based on the level of sampling required for an EIA over the following period: • February 23 - 26, 2018, • September 20-22, 2018, • August 17-19, 2019, • August 24-26, 2019, and • September 14 – 16, 2019. Quantitative methods were used in the study (See section "5.3.2.1 *Floral Assessments –Ground Truthing Phase 1*" of the EIA Report). The statement that "*Quantitative methods were not used to assess the number of species in the site"* is false. These assertions are demonstrably unfounded and false. For instance, "*Each transect was divided into six 5m x 5m quadrats. For each quadrat the species of flora were identified, enumerated and recorded. Samples of flora species that were not able to be identified in the field were collected and taken to the University of the West Indies Herbarium for identification".* This statement is located on page 5-89 of the EIA Report. The floral survey covered all species of plants. All plants observed were recorded and the canopy were taken into account. See section "*5.3.3.3. Vegetation Characterizations: Plot-Based Assessment"* of the EIA Report. The comment is noted. However, primary data was collected using various remote sensing techniques and ground truthing as recently as 2018 and 2019.

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	of this report should have referred to when discussing land use.		In addition, please see "*Section 5.5.7.Land-Use Analysis, 5.5.7.1. Approach and Methodology*" of the EIA Report -An accurate and thorough account of past and current land uses in the study area demanded a multi-faceted approach for collating land use information for the area. This included: 1. Aerial Photographs (from surveys conducted in 2018) 2. Satellite Imagery of the area dating 1986, 1996 and 2016 (Google Earth) 3. Spatial analysis using Geographic Information System (GIS) and Remote Sensing 4. The use of field surveys to incorporate regional observations and documentation of existing land use, while providing verification of land use patterns depicted on the maps. Land use was examined from regional perspective with analysis of the area within the proposed SML 173 area and communities which are adjacent to the proposed mining project area. As indicated on Figure 13 below, some of these communities include, but are not limited to: 1. Brown's Town 2. Stewart Town 3. Gibraltar 4. Alexandria 5. Madras 6. Linton Spring 7. Ulster Spring

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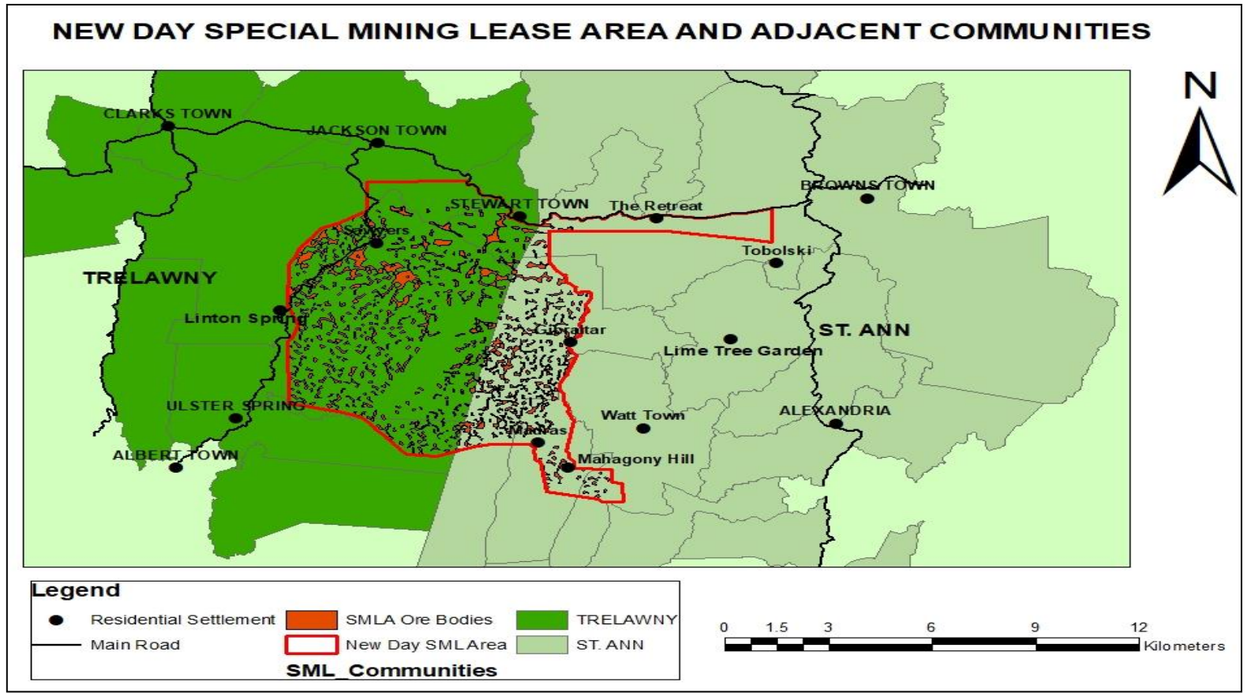
			8. Watt Town  **Figure 13: Special Mining Lease 173 Area and Adjacent Communities (See Figure 5-221 of the EIA Report)**
17.	Bird survey - The CITES species listed on Appendix 11: Yellow-billed Parrot *Amazona collaria* and Black Billed Parrot *Amazona agilis*. There are over 326 species of birds recorded in Jamaica. Only 46 species of birds have been reported in the study; This seems a bit low for such a large and diverse area. ○ The survey was carried out at approximately 11 transects (page 5-90). The study site is quite large, and the sample point was very limited to cover the study area adequately.	**6.4. Biological Environment** CD&A will present a detailed description of the flora and fauna (terrestrial) of the area, with special emphasis on rare, endemic, protected or endangered species. In this section the emphasis is on a description of habitats, flora and fauna surveys inclusive of a species list; commentary on the ecological health, function and value in the project area, threats and conservation significance. This will include:	**The consultants complied with the requirement of the agreed TOR.** **Field observations are reported in the EIA Report and the species observed are accurately and faithfully reported in the results sections.** Not only was the individual species identified but as far as possible the numbers observed were recorded. In many cases only one individual was seen. In the various bird counts carried out in SML 173 only the yellow billed parrot was observed. On no occasion did we observe the black billed parrot.

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	○ The consultant needs to be clear on how many days the bird surveys were carried out and if it accounted for seasonal changes in the bird distribution. Only a few migrants were observed in the study. The consultant did not mention if the parrots were nesting in the study area. □ Table 5-26 refers to the number of bird species observed in the sample blocks but does not indicate the number of individuals observed. A quantitative study should include not only the number of species observed but also the number of individuals of each species. Without this, species diversity cannot be calculated. Similar gap exists in table 5-28. □ With regards to the failure to detect Black-billed Parrots, a statement about an arboreal termitary mound raises questions as to how familiar the consultants are with wild Black-billed and Yellow-billed parrots in particular, and to wild birds in general. It was concluded that the nest most likely belonged to a Parakeet, as the Amazon Parrots are known to be non-excavating cavity nesters (Koenig 2001) (ref pp 5-207 & 208). Can the EIA consultants explain how to distinguish Yellow-billed Parrots and Black-billed Parrots, both by their vocalizations and when they are in-flight without vocalizing? That is, how confident can we be that Black-billed Parrots weren't mis-identified during the surveys, esp. given all of the reports of this species on eBird? □ The EIA asserts that during pre-operations, operations and	• A detailed qualitative and quantitative assessment of terrestrial habitats in and around the proposed project sites and the areas of impact. This will also include flora and fauna surveys and will include species lists. □ Special emphasis will be placed on rare, endemic, protected or endangered species. Migratory species will also be considered. As well as economically important species and nocturnal species. □ Species dependence, niche specificity, community structure, population dynamics, species richness and evenness (a measure of diversity) ought to be evaluated. The field data collected will include, but not be limited to: □ Vegetation profile □ Species lists will be provided for each community □ A habitat map of the area □ Geo-referencing of all rare species identified in the course of the analysis of the proposed SML. **6.2. Ecological Services** Baseline data of terrestrial flora and fauna at the project area must be collected and analyzed and will include a ranking of flora and fauna present along with	We are aware of the differences in vocalizations of the various species of birds, in general, and that bird sounds are critical for the identification of species of birds. Neither did we see nor hear any sounds characteristic of the black billed parrot. With the Forest Reserves excluded from mining by law and not required to be studied by the agreed TOR, it was not required to do the detail surveys in these areas. Ms. Wendy Lee has indicated that the black billed parrot was observed in the Forest Reserves around Stewart Town. These Forest Reserves were not a part of the detailed studies carried out by the consultant. eBird (www.ebird.org) is an unverifiable, unaudited source which cannot supersede primary data collected in the field. The online portal referenced, eBird, is not a scientific or audited tool, and cannot and should not be used as a reference in a scientific document such as an EIA. The website was accessed and assessed by CD&A and found to be easily manipulated wherein additions or modifications of species and their populations and sightings can be made by any individual, with or without the necessary ornithological expertise. Note that mining progresses in five year tranches based on approved plans. An approval of each five (5) year Mining Plan must be given by the regulatory entities such as the National Environment & Planning Agency (NEPA) and Mines & Geology Division (MGD).

No	Comment	Section of ToR within which this topic would be discussed	CD&A/NJBP II Response
	rehabilitation, wildlife such as birds will not be impacted because of their mobility (ref Table 7.2 and pg 8-4). The "mitigation" that animals will just move is both simplistic and misses substantial bodies of literature on habitat carrying capacity (incl. density as a misleading indicator of habitat quality), disturbance-mediated changes in activity budgets (e.g., changes in territorial defense, predator vigilance, and foraging time budgets), and how disturbance affects an individual's fitness, reproductive performance, and lifespan. What evidence is there to support the assertion that mining does not affect avifauna? Have any mark-recapture / resighting studies been conducted for birds (or, indeed, for any faunal species) in areas currently being mined and rehabilitated in Jamaica? There is, of course, an extensive body of literature on banded Neotropical migrants over-wintering in Jamaica which addresses these questions on how habitat quality affects home range size requirements, individual fitness, and species demography. The EIA reports on two floral and faunal transects, one undertaken in a mined-out ore body which was reclaimed and rehabilitated 17 years ago in Tobolski, St Ann and one which is actively being mined in Gibraltar, St. Ann. Only 4 bird species were detected in the rehabilitated site, and a set of 4 different bird species was detected in the active-mining site (Table 8-3). Given these results and in comparison to the un-mined areas surveyed in SML-173, how does the EIA defend its assertion that birds are not impacted by mining, both by short-term impacts and long-term	their ecological importance. A statement clearly specifying whether the study area forms a part of an ecologically sensitive area or migratory corridor of any endangered fauna as well as an indication of whether or not any of the ecological services currently being offered by the site will remain or be recovered subsequent to mining must be provided. The data provided will include but not be limited to the following: • Detailed description of the flora and fauna (terrestrial) present at the mining, reclamation, storage and disposal sites with special emphasis on rare, threatened, endangered, endemic, protected, invasive and economically important species Identification and description of the different ecosystem types and structure including species dominance, dependence and diversity, habitat specificity and community structure Possible biological loss or habitat fragmentation The Forestry Department's data will be used to identify the Forest Reserves within the SML as well as identifying closed	The EIA Report stated that all orebodies **<u>will not be mined simultaneously</u>**. This would be impracticable. Mining will be carried out on the basis of approved five (5) year Mining Plans for specific blocks of bauxite deposits. In the event that an environmental permit is granted for SML 173, the entire mining programme will last for a period of 20 – 25 years. Hence, there will be several unmined orebodies of similar biophysical characteristics in SML 173 which will continue to form undisturbed habitats for birds or other species which may temporarily migrate from the area that is undergoing active mining. Neighbouring orebodies may be left unmined as well as those further away from the location at which active mining is occurring. The temporary migration of species is not expected to be at distances to the order of several kilometers away from the point of active mining. There is no restriction on the mobility of the avi-fauna species. Universally accepted approaches and methodologies were used throughout the course of the investigation. See section "*5.3.2.2.1. Avi-Fauna*" of the EIA Report. The findings from these investigations were accurately recorded. These investigations took into account any potential for risk or errors and due care was carried out to ensure that errors of these kinds (neither human nor systematic) were introduced. The methodology used are provided in Sections "*5.3.2.1.2. Detailed Characterization Methods (Plot-based) – Flora - Depressions and Hillock Areas*" and "*5.3.2.2.1. Avi-Fauna of the EIA Report*".

No	Comment	Section of ToR within which this topic would be discussed	CD&A/NJBP II Response
	effects? That is, why was the Risk Assessment not driven by the field data? ▯ Figures 5-61 through 5-67 give visuals of transects as a point when they should be lines as the word "transect" indicates. It is still unclear what the lengths of the transects were. If bird point counts were included along these transects, they may not have been done properly given that if the points were not at least 200 meters apart, there would be overlap of species and therefore double counting of birds would have occurred. Again, these factors were not addressed so the lack of information is inadequate for the assessment.	broadleaf and disturbed broadleaf forests within the SML.	
18.	Herpetofaunal survey ▯ Several endemic frogs have been reported in the Cockpit Country. None of the endemics was reported in the study area. The method employed did not capture the species. ▯ The consultant did not report several endemics such as the Bromeliad Galliwasp *Celestus fowleri*, Cockpit Eyespotted Geckolet *Sphaerodactylus semasiops* Thomas 1975 and several frogs. A literature review of the species present in the area should be carried out. ▯ The EIA is still not specific about localities or methods, and this section is generally confusing and vague. The quadrat method is mentioned and that they were done along a transects but specific GPS points were not provided. Locality data should be reported for amphibian and reptile data collection. Additionally, the researchers spent only 90 minutes doing this survey which is insufficient time to do a proper	**6.4. Biological Environment** CD&A will present a detailed description of the flora and fauna (terrestrial) of the area, with special emphasis on rare, endemic, protected or endangered species. In this section the emphasis is on a description of habitats, flora and fauna surveys inclusive of a species list; commentary on the ecological health, function and value in the project area, threats and conservation significance. This will include: • A detailed qualitative and quantitative assessment of terrestrial habitats in and around the proposed project sites and the areas of impact. This will also include flora and	We are aware of and have contributed substantially to the literature on the endemic frogs that may exist in the CCPA. Please see information in "*A system of Natural Protected Areas for Jamaica*". This is listed as Reference no. 4. Conrad Douglas & Associates Limited, Ann Haynes-Sutton, Susan Anderson, George Proctor, Jeremy Woodley, Karl Aiken, Robert Sutton, Peter Vogel, Barbara Chow and Gerald Alleng 1992; A System of Natural Protected Areas for Jamaica Volume V Part A: Ecology Reports, an unpublished report done on behalf of the United States Agency for International Development (USAID), Jamaica Conservation Development Trust (JCDT) and submitted to the Natural Resources Conservation Authority (NRCA). The subject area of our investigation was SML 173 which comprises an area of 8,835 hectares to the east of the CCPA. The species of frogs reported are those that were identified during the course of our investigations over the following periods: • February 23 - 26, 2018, • September 20-22, 2018, • August 17-19, 2019, • August 24-26, 2019, and • September 14 – 16, 2019. It is incorrect and misleading to state that *"The method employed did not capture the species"*. The investigation better supports a statement that most of these species would not reside in the grassland covered orebodies in SML 173. The tank bromeliads mainly

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	herpetological survey. Many herpetological researchers will spend several hours over a series of days in a small area to make sure that all species were documented due to the difficulty of detecting amphibians and reptiles, however it should be noted that field methods will vary dependent upon the taxon being studied (Rice et al. 2004; Mazerolle et al. 2007).	fauna surveys and will include species lists. □ Special emphasis will be placed on rare, endemic, protected or endangered species. Migratory species will also be considered. As well as economically important species and nocturnal species. □ Species dependence, niche specificity, community structure, population dynamics, species richness and evenness (a measure of diversity) ought to be evaluated. The field data collected will include, but not be limited to: □ Vegetation profile □ Species lists will be provided for each community □ A habitat map of the area □ Geo-referencing of all rare species identified in the course of the analysis of the proposed SML. **6.2. Ecological Services** Baseline data of terrestrial flora and fauna at the project area must be collected and analyzed and will include a ranking of flora and fauna present along with their ecological importance. A statement clearly specifying whether the study area forms a	form the habitat for several of these species of frogs. We remind that mining will only be carried out in the grassland orebodies and not the limestone hillocks. It is unscientific to speculate on the species of frogs that are in the area of SML 173. We can only report on the findings of our objective and scientific investigation and observations. Please see Section "*5.3.3.5.2. Reptiles and Amphibians*" which shows herpetofauna and amphibians observed during our investigations. It is incorrect to state that GPS coordinates were not provided. Please see Figure 5 139 to Figure 5 143, Figure 5 145, Figure 5 147 which provide GPS coordinates for areas surveyed. Furthermore, the TORs required GPS for only rare and endemic species. The investigation met the requirements of the TORs.

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		part of an ecologically sensitive area or migratory corridor of any endangered fauna as well as an indication of whether or not any of the ecological services currently being offered by the site will remain or be recovered subsequent to mining must be provided. The data provided will include but not be limited to the following: • Detailed description of the flora and fauna (terrestrial) present at the mining, reclamation, storage and disposal sites with special emphasis on rare, threatened, endangered, endemic, protected, invasive and economically important species ▯ Identification and description of the different ecosystem types and structure including species dominance, dependence and diversity, habitat specificity and community structure ▯ Possible biological loss or habitat fragmentation ▯ The Forestry Department's data will be used to identify the Forest Reserves within the SML as well as identifying closed broadleaf and disturbed broadleaf forests within the SML.	
19.	Bat survey ▯ The details of Jamaican bats provided in the report are cursory, missing important	**6.4. Biological Environment** CD&A will present a detailed description of the flora and fauna	**The Bat study was carried out to meet the requirements of the agreed ToRs and the information provided superseded the requirements of the agreed ToRs.**

No	Comment	Section of ToR within which this topic would be discussed	CD&A/NJBP II Response
	details about each species, from habitat to life history to echolocation behaviour. I found no indication of the extent of sampling on which the bat part of the report is based. The report also lacks the details about identifying bats by their echolocation calls. Most professionals who use this approach do not rely on one call identification system. It is customary to provide details of equipment and sampling as well as protocols for analyzing and reporting data. Statistical analyses are also very useful because they provide some objectivity for interpreting the data. The report also fails to provide any information about the qualifications of the individual(s) who collected, compiled and analyzed the data about bats' echolocation calls. Basic questions about the importance of foraging habitats are not addressed and there is no information about populations of any of the species that might occur in the area that will be affected by the mining operations. The report does make it clear that the mining operations will have dramatic and drastic impact on the habitats. But there are no details about the amelioration steps that might be taken to minimize the impact of the operations on bats (and other wildlife). A statement about the potential role bats may play in spreading diseases to humans is presented without any important details. This statement is completely unjustified, leaving one to wonder why it was included in the report.	(terrestrial) of the area, with special emphasis on rare, endemic, protected or endangered species. In this section the emphasis is on a description of habitats, flora and fauna surveys inclusive of a species list; commentary on the ecological health, function and value in the project area, threats and conservation significance. This will include: • A detailed qualitative and quantitative assessment of terrestrial habitats in and around the proposed project sites and the areas of impact. This will also include flora and fauna surveys and will include species lists. Special emphasis will be placed on rare, endemic, protected or endangered species. Migratory species will also be considered. As well as economically important species and nocturnal species. Species dependence, niche specificity, community structure, population dynamics, species richness and evenness (a measure of diversity) ought to be evaluated. The field data collected will include, but not be limited to: Vegetation profile Species lists will be provided for each community A habitat map of the area	The TOR requirements as it relates to bats are inferred from the following excerpt: *"Special emphasis will be placed on rare, endemic, protected or endangered species. Migratory species will also be considered. As well as economically important species and* ***nocturnal species****".* This was the reason for conducting the investigations on bats in the area. An echolocation methodology was used to determine the species of bats that may be present in SML 173. See *section 5.3.2.2.5. Mammals.* The exhaustive and comprehensive statements referenced in the comments would exceed the requirements of the ToR. The statement *"the mining operations will have dramatic and drastic impact on the habitats."* is a misrepresentation of the EIA Report. The EIA report indicates that mining operations will not directly impact on cave habitats. The caves are elevated above the orebodies and NJBP II will be obliged to protect all caves in SML 173 in accordance with the regulations. In addition, mining will only be carried out on 15% of the total SML 173 area on which economic bauxite deposits occur. This 15% also includes haul roads. Please be reminded that the bauxite orebodies in SML 173 are located on the low lying grassland areas and not the limestone hillocks on which the caves are located. The study was not concerned with zoonosis. This is not a part of the agreed ToR. However, it is well known that bats can be transmitter of rabies and other diseases. The basis for cave selection is presented in section "*5.1.5. Geomorphology*" of the EIA Report. The Audiomoths were exposed for periods of up to 72 hours. The execution of the bat identification study was carried out to provide information for consideration of nocturnal species. As stated above, the EIA report indicates that mining operations will not directly impact on cave habitats. The caves are elevated above the orebodies and NJBP II will be obliged to protect all caves in SML 173 in accordance with the regulations. The findings of the EIA is consistent with the findings of previously reported human activities, which has also been documented in the AIA. These human activities along with the morphological differences between the designated CCPA and the area comprising SML 173 may be responsible for the stark difference in ecology between the areas.

No	Comment	Section of ToR within which this topic would be discussed	CD&A/NJBP II Response
	⍰ Only 3 of the nine Caves reported in the study area were surveyed. o How did the consultant select the 3 of the 9 cave to survey for the bat? o Why didn't the consultant carried out the bat survey in the different vegetation type with the study area? o How long was the bat surveys carried out in the caves? o The Kladescope software only has 11 of 21 species of bats found in Jamaica. The consultant stated that he could identify 17 of the 21 species of bat founds in Jamaica. Is it possible for the consultant to provide the sonogram of species identified? ⍰ The photograph in Figure 5-83 showing the positioning of the AudioMoth (and its associated microphone), along with several statements (e.g. pg 5-199 "Bats emit sound waves within unique and narrow frequency bands . . .") leads me to question how many hours, if any, of supervised professional training the consultants have had using ultrasonic detection equipment and of practical experience with Jamaican bats (whose acoustic calls, far from being within "narrow" frequency bands, span from an audible range of 18 kHz to ultrasonic exceeding 170 kHz). For example, on page 5-124 with regards to configuring the recording equipment, the EIA notes: "The sound frequency sampling range was set between 0 and 256 kHz." The consultants have confused two concepts: sampling rate and frequency range. Sonograms shown in the EIA confirm that they programmed the	⍰ Geo-referencing of all rare species identified in the course of the analysis of the proposed SML. **6.2. Ecological Services** Baseline data of terrestrial flora and fauna at the project area must be collected and analyzed and will include a ranking of flora and fauna present along with their ecological importance. A statement clearly specifying whether the study area forms a part of an ecologically sensitive area or migratory corridor of any endangered fauna as well as an indication of whether or not any of the ecological services currently being offered by the site will remain or be recovered subsequent to mining must be provided. The data provided will include but not be limited to the following: • Detailed description of the flora and fauna (terrestrial) present at the mining, reclamation, storage and disposal sites with special emphasis on rare, threatened, endangered,	The Outline Environmental Monitoring Plan as stated, is a **framework**. The EIA Report on page 11-1 has stated that: "*The Monitoring Plan to be developed for the project should be implemented during site clearance and all operational aspects of the project. Monitoring involves the observation, review and assessment of onsite activities to ensure adherence to regulatory standards and the recommendations made to reduce negative impacts. The Plan must be comprehensive and address relevant issues, with a reporting component that will be made available to the regulatory agencies based on a mutually agreed frequency*." In the event that an environmental permit is granted, it falls within the remit of the regulatory agency to state the parameters which it seeks to have the applicant monitor.

No	Comment	Section of ToR within which this topic would be discussed	CD&A/NJBP II Response
	devices to a sampling rate of 256 kHz, with a consequent maximum frequency range up-to 128 kHz. (NB, on pg 5-125, the EIA stated that "Kaleidoscope automatically sets the analysis range to a maximum of 120 kHz". The software shows the range as defined by a device's recording parameters i.e., the detector, not Kaleidoscope software "sets" the range.) This sampling rate and consequent frequency range, however, are not appropriate for Jamaica's bat fauna as it results in the truncation of calls of Phyllostomidae and Natalidae. Why did the consultants not program the devices to record at a sampling rate of 384 kHz, the maximum which is available as per manufacturer specifications? Especially as I had already reported on the potential for Glossophaga soricina and / or Chilonatalus micropus to be present in the Belmont area (Koenig 2019)? In Table 5-30, the EIA reports that Noctilio leporinus (common name Bulldog or Fish-eating Bat) was auto-identified by Kaleidoscope Pro software in all three caves. If this identification is correct, why was the ecological and hydrological significance of this species' presence not discussed and analyzed for the Risk Assessment? On the other hand, one also has to question the validity of this identification. How complete is the Kaleidoscope Pro library of calls? For all of the species of Molossidae presented in Table 5-30, are there adequate	endemic, protected, invasive and economically important species Identification and description of the different ecosystem types and structure including species dominance, dependence and diversity, habitat specificity and community structure Possible biological loss or habitat fragmentation The Forestry Department's data will be used to identify the Forest Reserves within the SML as well as identifying closed broadleaf and disturbed broadleaf forests within the SML.	

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	reference-examples of these species flying in small enclosed spaces and / or in densely cluttered air space, where there will be functional convergence of acoustic characteristics amongst them and to Noctilio leporinus? The absence of any species of Phyllostomidae (aka “whispering” bats) on Table 5-30 make salient the MAJOR well-documented problems associated with using auto-classification and identification for this family of bats, in general, and the specific problems known for Wildlife Acoustics’ software, namely the mis-classification of files as “NOISE” when they do, indeed, have valid bat calls. Did the consultants review any of the files classified as “NOISE” (ref pg 5-125) to extract any-and-all false negatives and manually identify any of these files? If not, why not? For Figure 5-183, I must ask the consultants to report what species’ identifications were assigned by Kaleidoscope Pro for the two species shown in the sonogram and what identities did the consultants manually assign to each of them. Neither Table 5-30 nor Table 5-31 have both species included on the listings (i.e., one table excludes one of the species and the other table excludes the second species which appear in this sonogram). Additionally, the consultants’ reported ability to manually distinguish Glossophaga soricina from Chilonatalus micropus is not reliable given that recordings were		

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	truncated at 128 kHz. Based on this sonogram and the question about Noctilio vs. the Molossidae discrimination, the Kaleidoscope Pro identifications are not reliable nor should the manual identification be trusted for anything other than one species, Pteronotus parnellii. □ On page 5-124, the EIA notes that: "The extensive ecological survey of SML 173 did not identify any evidence of tree roosting bats. Therefore, no deliberate setup was done to assess the presence of this type of bat." Given the highly cryptic behaviour of tree-roosting bats, which evolved to reduce being detected by diurnal predators and for the need to protect themselves from inclement weather, what evidence was actually looked for? The identification in acoustic recordings of Ariteus flavescens (ref Table 5-31), a tree-roosting species which also roosts opportunistically in caves, demanded nocturnal acoustic terrestrial surveys for tree-roosting bats. □ The EIA asserts that, not only are NJBP II's operations diurnal, not nocturnal, but also because of their mobility, flying animals like bats will not be impacted (ref pg 8-4). The EIA also asserts that haul roads constructed to a maximum width of 11 m (35 feet) will not result in any "substantial" fragmentation (pg 8-5), even though the proposed haul roads for the first 5-year period, alone, could destroy 50 – 60 corridors which connect hillsides (ref Figure 4-2). In light of the fact that: (a) no bat surveys were conducted above-ground, at night, so as to identify bats' travelling and feeding		

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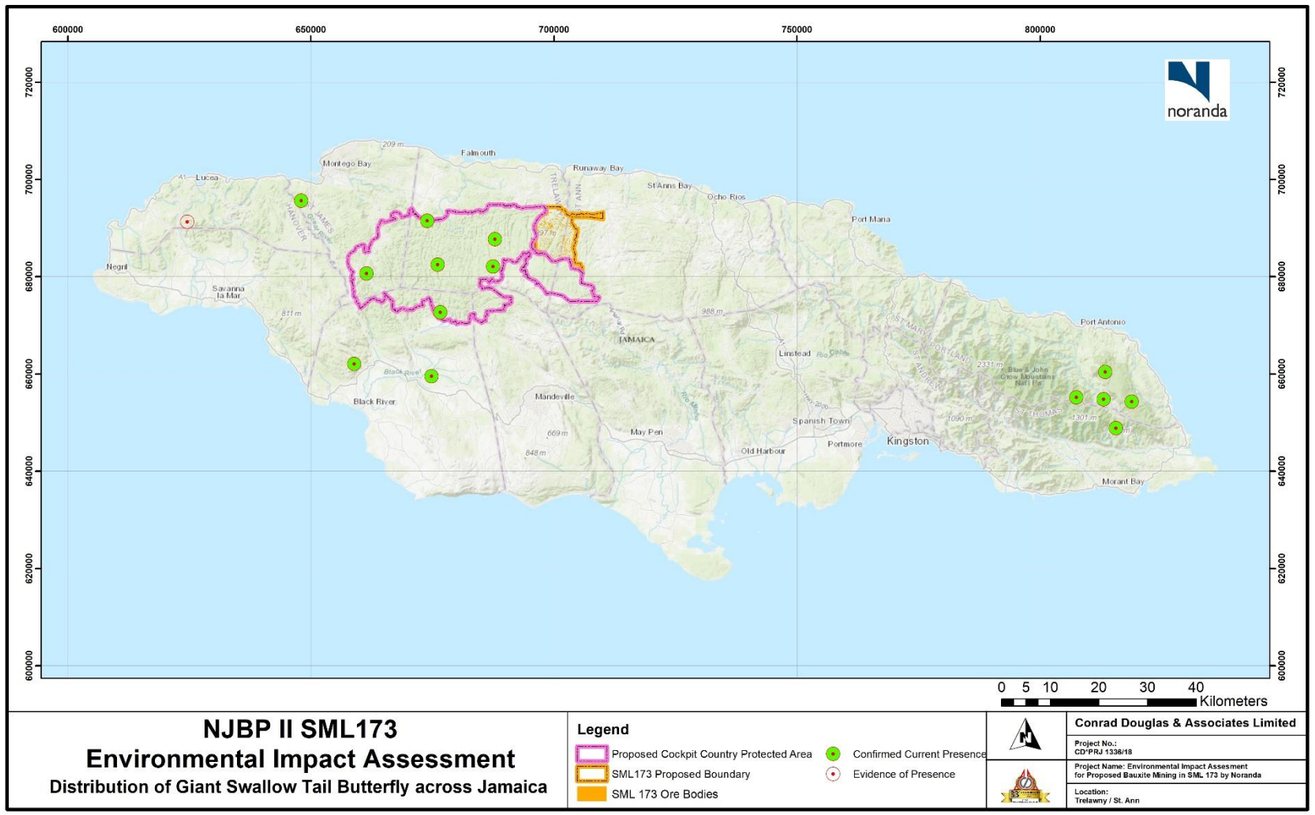
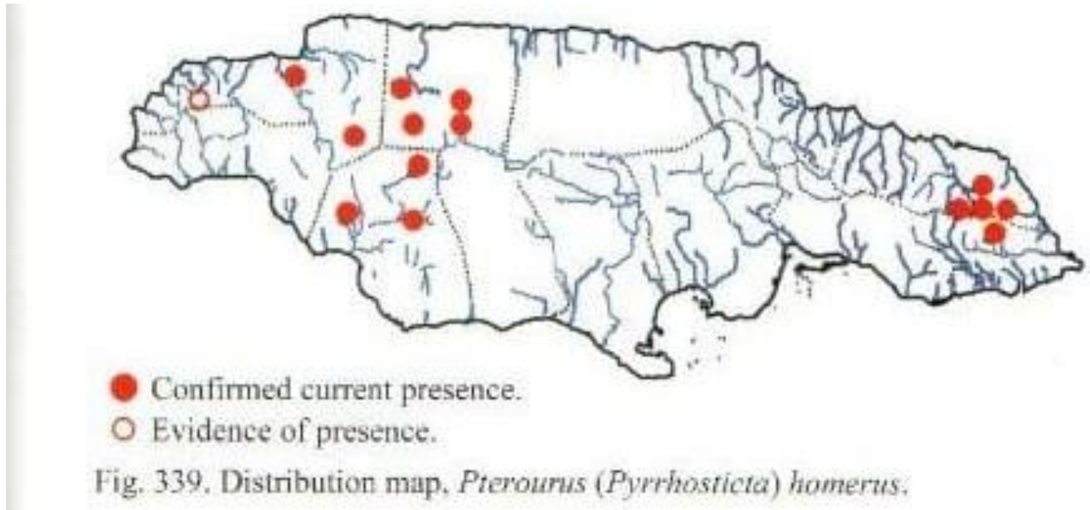
	areas across the land-cover gradient; and (b) no terrestrial, nocturnal bat surveys were conducted at the rehabilitated site at Tobolski nor at the currently-mined site at Gibraltar, what evidence did the consultants use to draw the conclusion that mining and haul roads will not impact bats? Particularly, what evidence did they use to draw their conclusions for the only species which they can reliably identify, Pteronotus parnellii? The consultants clearly are not aware of the published literature from Jamaica (and Cuba), which identifies the strong acoustic dependence of this species on densely-cluttered forest for both travel and hunting. Had they conducted proper terrestrial acoustic surveys, they would have confirmed that 11 meters creates an "acoustic barrier" gap for the highly-forest-dependent Pteronotus parnellii. This species is, in fact, also a biological indicator for the quality of forest connectivity in any area where it occurs. Further, give SML-173's proximity to the important bat colony in Thatchfield Great Cave, proper attention should have been given to the "soundscape" of forest-connectivity for bats (particularly in relation to the published literature on feeding home range sizes and travel distances for the species definitively confirmed for the area). Why did the EIA omit details about the habitat "soundscape" requirements of each of the species they believed were identified correctly in Tables 5-30 and 5-31? □ On page 5-237, the EIA noted: "At dusk, bats were observed flying around in both populated areas, as well as, in the vicinity of low-lying		

No	Comment	Section of ToR within which this topic would be discussed	CD&A/NJBP II Response
	depressions. The identity of these bats could not be ascertained. “ Did it not occur to the consultants that they should deploy their AudioMoths to identify bats flying around at dusk? That is, did it not occur to them to fulfill the Terms of Reference? Figure 5-200 and its associated text on pg 5-263 demonstrate a complete ignorance of the foraging and acoustic ecologies which are published for Jamaican bats and for foraging and home range sizes of these species where they occur and have been studied outside of Jamaica. Let’s start with a simple question: of the insectivorous species supposedly identified by Kaleidoscope and manually by CD&A, which species are restricted to cluttered forest, which would utilize forest edges, and which use open space? Do the consultants know what the acoustic signatures are when insectivores are hunting (instead of just guessing that observed bats were “possibly feeding”)? Why did the consultants not evaluate the status of Retreat Gully Cave and Croyden Mountain Cave, both of which are reported by Fincham (1997) to have guano deposits? Proximity to the boundary makes it highly likely that bats roosting in these caves will make use of the area of SML-173. For Retreat Gully Cave, its position within SML-172 demands that it be assessed and protected. It’s also important to		

No	Comment	Section of ToR within which this topic would be discussed	CD&A/NJBP II Response
	remember that, while historic disturbance by guano collectors can easily cause the death of an entire bat colony, the cave can be re-inhabited over time (i.e. absence of a bat colony at present would not justify destroying a cave). □ The environmental monitoring plan framework (Table 11-1) does not address biological diversity.		
20.	Giant Swallowtail Butterfly ***PTEROURUS HOMERUS*** This refers to Section **5.3.3.4.2.4. Arthropods** □ If *Hernandia catalpifolia* was recorded during this study it would represent a very significant discovery. According to Adams (1972) and George Proctor (pers. comm.; former Head, Natural History Division, Institute of Jamaica) *H. catalpifolia* does not occur in the Cockpit Country. This species occurs in Portland and St. Thomas. Yet its absence was reported in this EIA as a major finding! with the implication that the absence of the plant signifies absence of the butterfly! □ *Heranandia catalpifolia* is not the larval food plant of *P. homeus* in the Cockpit Country. *Hernandia jamaicensis* is the known larval food plant in the Cockpit Country. Lehnert et.al (2017) which was referenced by this EIA reported as follows: "…. the sole known host plant for the western population, *Hernandia*	**6.4. Biological Environment** CD&A will present a detailed description of the flora and fauna (terrestrial) of the area, with special emphasis on rare, endemic, protected or endangered species. In this section the emphasis is on a description of habitats, flora and fauna surveys inclusive of a species list; commentary on the ecological health, function and value in the project area, threats and conservation significance. This will include: • A detailed qualitative and quantitative assessment of terrestrial habitats in and around the proposed project sites and the areas of impact. This will also include flora and fauna surveys and will include species lists. □ Special emphasis will be placed on rare, endemic, protected or endangered species. Migratory species will also be considered. As well as	Noted. In compiling the document, CD&A erred by reporting only one member of the Hernandia genus. In the final EIA report, the statement will be adjusted to read, "No member of the Hernandia genus was observed during the field surveys". Adams, C. D. Flowering Plants of Jamaica, 1972. University of the West Indies was extensively used as reference throughout the survey. In addition, there was consensus with where the Giant Swallowtail Butterfly may be found in Jamaica in the book: Thomas, Turner and Vaughan, Turland, 2017; Discovering Jamaican Butterflies and Their Relationships Around the Caribbean. Caribbean Wildlife Publications. See **Figure 14** and **Figure 15** below and figure 5-127 of the EIA Report. **We accurately recorded the locations on the map. The original data set does not supply the precise longitude or latitude for the locations of the species of butterflies. The original map was georeferenced using ESRI ArcMap software and the confirmed locations determined and showed in relation to the CCPA and SML 173 boundaries.** During our field investigations in SML 173, specimens of plant shoot system (including leaves) were collected in the field and taken to the Life Sciences Herbarium at the University of the West Indies (UWI) for identifying the species of plant. In addition, the Director of the Herbarium, Mr. Patrick Lewis (Taxonomist employed to the Herbarium) was a member of the team, which carry out the field investigations. Further, there were no sightings of the endangered and protected Giant Swallowtail Butterfly (Pterourus homerus, formerly called Papilio homerus) or any member of the Hernandia genus. We recognize that Hernandia genus is crucial for supporting the existence of the Giant Swallowtail Butterfly at all phases of its life cycle. This reply was previously given for responses to queries supplied by NEPA on the January 5, 2021 as a part of the submission of public comments from the Mandatory Public Meeting. The first responses provided to NEPA's initial queries regarding the Giant Swallowtail Butterfly stated that the literature does not support the presence of this endangered butterfly being present in SML 173. The comment is requiring the investigators to report on a species that was not observed in the study area. Neither the species, its habitat nor the plant associated with its sustenance was observed after several intensive and exhaustive visits to SML 173 in search of this species. The visits to SML 173 in search of this species was carried out over the period:

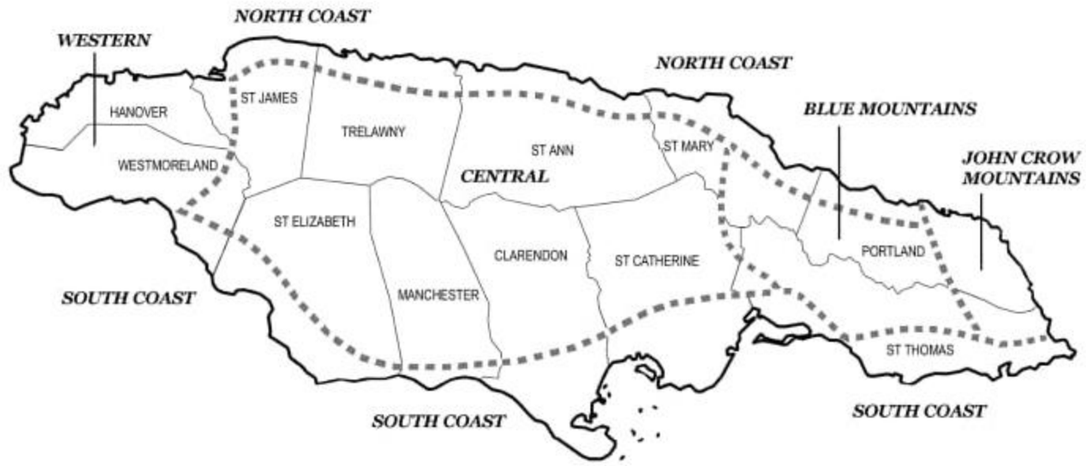
No	Comment	Section of ToR within which this topic would be discussed	CD&A/NJBP II Response
	jamaicensis Britton and Harris (Hernandiaceae).... " Several other research publications over the decades also support this finding; some such publications are given in the References below. ▯ Jamaican Giant Swallowtail Butterfly (Pterourus homerus -formerly called Papilio homerus) is on Appendix I of CITES. The food plant for the Giant Swallowtail is Hernandia jamaicensis Britton and Harris (Hernandiaceae) (locally known as water mahoe and water wood) in the western population and H. catalpaefolia Britton and Harris (pumpkin wood and suck axe) in the eastern population Portland and St. Thomas. o The consultant reported Hernandia catalpaefolia in the Cockpit Country, which is only found in eastern Jamaica. o The consultant never explained the methodology that was used to search for the food plant and the butterfly. There was no map of the sites visited, and also the time of year the survey was carried out. ▯ On page 5-195, the EIA makes reference to the Giant Swallowtail's (Pterourus homerus) food plant, the Water Mahoe (Hernandia catalpifolia), and on page 5-196, the EIA reports that "No Water Mahoe was observed." This observation is no surprise given that H. catalpifolia is restricted to the parishes of Portland and St. Thomas. They should have been looking for Hernandia jamaicensis, which is known by the common names of Pumpkin Wood or Suck Axe. A critical point which the EIA	economically important species and nocturnal species. ▯ Species dependence, niche specificity, community structure, population dynamics, species richness and evenness (a measure of diversity) ought to be evaluated. The field data collected will include, but not be limited to: ▯ Vegetation profile ▯ Species lists will be provided for each community ▯ A habitat map of the area ▯ Geo-referencing of all rare species identified in the course of the analysis of the proposed SML. **6.2. Ecological Services** Baseline data of terrestrial flora and fauna at the project area must be collected and analyzed and will include a ranking of flora and fauna present along with their ecological importance. A statement clearly specifying whether the study area forms a part of an ecologically sensitive area or migratory corridor of any endangered fauna as well as an indication of whether or not any of the ecological services currently being offered by the	• February 23 - 26, 2018, • September 20-22, 2018, • August 17-19, 2019, • August 24-26, 2019, and • September 14 – 16, 2019. *The comments of the review include: "A critical point which the EIA failed to address: as long as mining is prohibited and the deep bauxitic soils are left in situ, the area retains the potential for forest habitat restoration for this Endangered swallowtail. If the bauxitic soils are removed, rehabilitation of forest and the microclimate required by the Giant Swallowtail will be impossible."* This comment is not rationale. Whether or not bauxitic soils are removed, it must be stated that bauxitic soil do not support forest cover in SML 173. The comment would suggest that bauxite soils, as they appear throughout Jamaica, should be left unmined so that the Giant Swallow Butterfly may turn up at those sites at anytime in the future. All species of flora and fauna observed in SML 173 were diligently recorded and reported in the EIA Report. All species of flora and fauna, inclusive of the arthropods and class insecta observed in SML 173 were diligently recorded and reported in the EIA Report.

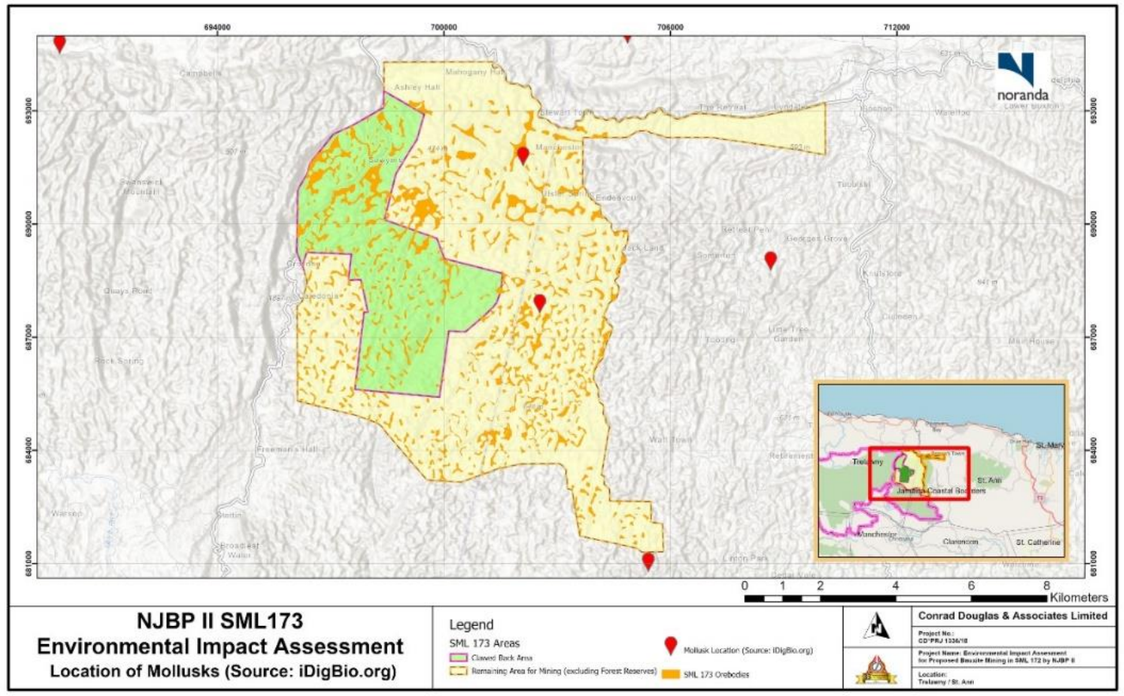
No	Comment	Section of ToR within which this topic would be discussed	CD&A/NJBP II Response
	failed to address: as long as mining is prohibited and the deep bauxitic soils are left in situ, the area retains the potential for forest habitat restoration for this Endangered swallowtail. If the bauxitic soils are removed, rehabilitation of forest and the microclimate required by the Giant Swallowtail will be impossible. ▯ Re: Figure 5-134 -Distribution Map for Giant Swallowtail. Recognizing the need to not publish precise location data for this species, there are several points on this map which clearly place this species in unoccupiable habitat locations. EIAs have a responsibility not to disseminate inaccurate or false information. Why was this map of clearly-incorrect information included? ▯ An examination of the new publication on Jamaican butterflies by Turner and Turland (2017) show that no less than 32 endemic species and subspecies of butterflies are found in central Cockpit Country near the Lease are #173, which includes the very rare Perkins' skipper butterfly which is endemic. A further 42 species of butterflies are found in the central Cockpit Country but these are not endemic. **References** Adams C.D. 1972. Flowering plants of Jamaica. University of the West Indies. Page 287. Turner T. and V. Turland. 2017. Discovering Jamaican Butterflies and their relationships around the Caribbean. Page 163. Lehnert M.S, Thomas C. Emmel , and E Garraway. 2013. Male-Male Interactions in the Endangered Homerus Swallowtail,	site will remain or be recovered subsequent to mining must be provided. The data provided will include but not be limited to the following: • Detailed description of the flora and fauna (terrestrial) present at the mining, reclamation, storage and disposal sites with special emphasis on rare, threatened, endangered, endemic, protected, invasive and economically important species ▯ Identification and description of the different ecosystem types and structure including species dominance, dependence and diversity, habitat specificity and community structure ▯ Possible biological loss or habitat fragmentation ▯ The Forestry Department's data will be used to identify the Forest Reserves within the SML as well as identifying closed broadleaf and disturbed broadleaf forests within the SML.	 **Figure 14: Distribution Map for Giant Swallowtail (*Source: Turner and Turland, 2017*) (See figure 5-127 of the EIA Report) – Data overlaid from source.**

No	Comment	Section of ToR within which this topic would be discussed	CD&A/NJBP II Response
	Papilio homerus (Lepidoptera: Papilionidae), in Jamaica. Caribbean Journal of Science47, 57-66. Garraway E., A.J.A Bailey., B.E. Freeman, J.R. Parnell, T.C. Emmel. (2008) Population studies and conservation of Jamaica's endangered swallowtail butterfly *Papilio* (*Pterourus*) *homerus*. In: New T.R. (eds) Insect Conservation and Islands. Springer, Dordrecht. https://doi.org/10.1007/978-1-4020-8782-0_16 Garraway E, AJA Bailey, T.C. Emmel. 1993. Contribution to the ecology and conservation biology of the endangered Papilio homerus (Lepidoptera: Papilionidae). Tropical Lepidoptera, 4: 83-91 Emmel T.C. And E. 1990. Garraway ecology and conservation biology of the *homerus* swallowtail in JAMAICA (Lepidoptera: Papilionidae). Tropical Lepidoptera, 1: 63-76		 Confirmed current presence. Evidence of presence. Fig. 339. Distribution map, *Pterourus* (*Pyrrhosticta*) *homerus*. **Figure 15: Distribution Map for Giant Swallowtail (*Source: Turner and Turland, 2017*) (See figure 5-127 of the EIA Report) – Original Map from the source.**
21.	**GASTROPODA** In reference to sections 5.3.2.2.4. and 5.3.3.5.5. • The classification used here: arboreal snail and ground snail, is not one in used in Malacology. These should be clearly defined to avoid confusion with established malacological terminologies. • It is well established that over 560 species of terrestrial gastropods have been identified in Jamaica. Moreover, this area of the island with its limestone geology and moist habitats is a prime area for diversity and density of terrestrial gastropods. The results presented here are beyond comprehension. In my experience even the most casual naturalist-walk through such habitats will produce significantly	**6.4. Biological Environment** CD&A will present a detailed description of the flora and fauna (terrestrial) of the area, with special emphasis on rare, endemic, protected or endangered species. In this section the emphasis is on a description of habitats, flora and fauna surveys inclusive of a species list; commentary on the ecological health, function and value in the project area, threats and conservation significance. This will include: • A detailed qualitative and quantitative assessment of terrestrial habitats in and around the proposed project	As stated variously in the EIA Report: "*SML 173 has an area of 8,335 hectares, of which 15% are orebodies proposed for bauxite mining, inclusive of the haul roads to gain access to and transport the bauxite*." The proposed project area **is not 800,000 hectares** (almost the size of Jamaica -1.099 million hectares) as indicated by the review. SML 173 represents about 1% of the area of 800,000 hectares mentioned in the review. All species of fauna and flora observed were diligently recorded and reported. A comprehensive literature review was carried out and included in the EIA Report (See section 5.3.3.4.2.5. Gastropods).

No	Comment	Section of ToR within which this topic would be discussed	CD&A/NJBP II Response
	more than two species of land snails. Yet with "Emphasis was placed on the detection and listing" of Gastropods, in an area over 800,000 hectares, only two types were found. **If this result is accepted as a representation of the state of the Gastropod fauna then the big question is: "Where have all the snails gone?" This result will be an indicator of a massive environmental disaster, requiring major and rapid investigation by NEPA.** The molluscan results as reported are either inaccurate or misleading. The photos provided in the report are insufficient for confirming identification. Photos of the aperture, dorsal view, ventral view, and a view which includes all the whorls are the minimum needed to identify the shell. Additionally, like other taxa, specimens should have been collected and deposited to the Natural History Museum in Kingston for their natural history collection. It is claimed that Thelidomus congata (not cognate as it is misspelled) was found while doing surveys, however this species does not occur in Cockpit Country. This species (Thelidomus cognata) only occurs in the western part of Jamaica, specifically Westmoreland and Hanover Parishes. The species that the surveyors likely saw was instead Thelidomus aspera. However, if the surveyors had done a sufficient literature and data search, they would have found publicly available terrestrial molluscan species range data available through iDigBio. Among other things, iDigBio takes museum collection data and makes	sites and the areas of impact. This will also include flora and fauna surveys and will include species lists. Special emphasis will be placed on rare, endemic, protected or endangered species. Migratory species will also be considered. As well as economically important species and nocturnal species. Species dependence, niche specificity, community structure, population dynamics, species richness and evenness (a measure of diversity) ought to be evaluated. The field data collected will include, but not be limited to: Vegetation profile Species lists will be provided for each community A habitat map of the area Geo-referencing of all rare species identified in the course of the analysis of the proposed SML. **6.2. Ecological Services** Baseline data of terrestrial flora and fauna at the project area must be collected and analyzed and will include a ranking of flora and fauna present along with their ecological importance. A statement clearly specifying whether the study area forms a	The comments are highly subjective. Several of these comments are not supported by facts. As stated in the EIA Report on page 1-6: "*The SML 173 area is not pristine and has been subjected to various anthropogenic stresses, both historically and ongoing. These stresses include establishment of plantations in the early 1700s, hunting, human settlements and agricultural practices.*" The Forest Reserves, which have been protected for the last 50 years would have more biodiversity, in comparison to the relatively dry bauxite deposit with grass as the vegetative cover and vulnerable to drought. All species of fauna and flora observed were diligently recorded and reported. Please note that this is an EIA and not a study for biodiversity management. The collection of species were not a part of the agreed TORs. These databases were exhaustively consulted. As well as that of the Institute of Jamaica.

No	Comment	Section of ToR within which this topic would be discussed	CD&A/NJBP II Response
	it publicly available so that they data may be accessed, studied, and analyzed. The data referenced in Figures 1 through 5 are available through iDigBio (2020), and the majority of it was collected during the Jamaican Biotic Surveys conducted by Gary Rosenberg and associated researchers from 1999-2002 (Rosenberg & Muratov 2006). Despite the EIA (on PDF page 311/711, Section 5.3.3.4.2.5. Gastropods) stating that there is no available checklist, the publication by Rosenberg and Muratov (2006) does include a checklist of species for the island on pages 141 through 161 (Rosenberg and Muratov 2006), and a copy of the open-source publication is attached to the email containing this commentary submission. Figure 2 shows the geographical range of Thelidomus aspera, which is likely the species that the surveyors saw in their surveys. The only place these two species consistently overlap is in the western side of the island (Figure 3). It is reported that Pleurodonte peracutissima was found while conducting the surveys. Figure 4 shows that this is certainly possible given that this species, now called Dentellaria peracutissima (Uit de Weerd et al. 2016), occurs in and around the SML-173 area. However, it is not the only species in this family (Pleurodontidae) or genus. Figure 5 shows the range of all pleurodontid snails within the SML-173 and adjacent areas. There are several pleurodontid species within SML-173 and some of which are more common than the supposed documented species. Again, this identification of Dentellaria peracutissima can only be confirmed with the proper techniques as	part of an ecologically sensitive area or migratory corridor of any endangered fauna as well as an indication of whether or not any of the ecological services currently being offered by the site will remain or be recovered subsequent to mining must be provided. The data provided will include but not be limited to the following: • Detailed description of the flora and fauna (terrestrial) present at the mining, reclamation, storage and disposal sites with special emphasis on rare, threatened, endangered, endemic, protected, invasive and economically important species Identification and description of the different ecosystem types and structure including species dominance, dependence and diversity, habitat specificity and community structure Possible biological loss or habitat fragmentation The Forestry Department's data will be used to identify the Forest Reserves within the SML as well as identifying closed broadleaf and disturbed broadleaf forests within the SML.	A visit to the recommended website with the extensive database on mollusk: https://www.discoverlife.org/mp/20q?guide=Molluscs&flags=not_no: does not provide clear evidence of the error being postulated by this review. The map in Figure 13 shows the division of the country into regions. The range of the *Thelidomus aspera* is not presented. The data "*Figures 1 through 5 are available through iDigBio (2020)*" have not been provided. We are therefore not able to evaluate and respond to this comment. It does not change our scientific observations in the field. Furthermore the data on the website (iDigBio.org) used to contradict CD&A's findings and observation is misleading and in some instances covers the period from the 1800s, which is over 200 years ago. Several changes have taken place in the natural environment during that period. The map in Figure 14 shows only those locations for which GPS coordinates were available from the iDigBio.org website. The accuracy of locations indicated as sightings is questionable. In some instances, sightings placed in SML 173 from the database (iDigBio.org) are actually located in other parts of Jamaica such as in the Parish of Manchester. Objectivity and strict empiricism require that we can only report on what we observed.

No	Comment	Section of ToR within which this topic would be discussed	CD&A/NJBP II Response
	summarized above. Additionally, if the reporters had done sufficient research, they would have been more familiar with the updated taxonomic literature of the species' name. Additionally, there are many species that occur within the cockpit karst of this region, including SML-173. Specifically, there are at least 103 species within SML-173 alone which includes 8 undescribed and unnamed species which require further surveying and study to describe and name (Jamaican Biotic Survey Dataset 2019; Google LLC 2020). When looking at the border of SML-173 and the species found within one kilometer of the border, another 28 species can be found which brings the count up to 131 (Jamaican Biotic Survey Dataset 2019; Google LLC 2020). There are more species of molluscs that can be found within five kilometers of SML-173 (Jamaican Biotic Survey Dataset 2019; Google LLC 2020). Although I accessed the discussed data through an internal digital portal of the Academy of Natural Sciences of Philadelphia (ANSP), this species range data is publicly available through iDigBio and can be shown using basic GIS techniques using software such as Google Earth (Google LLC 2020) or open-source QGIS (QGIS.org 2020). Had the surveyors done sufficient research and field methodologies, they would have found more than three species of land snails and slugs. Jamaica has over 500 species of endemic land snails (Rosenberg & Muratov 2006), and it is very easy to find them throughout the island without much effort. Basic techniques such as turning over leaf litter and rocks will yield several mollusc species (Sturm et al. 2006).		 **Figure 2.** Map of Jamaica showing parishes and informal biogeographic regions. Regions are Western, Central, North Coast, South Coast, Blue Mountains and John Crow Mountains. Boundaries are approximate. **Figure 16: Map of Jamaica showing parishes and informal biogeographic regions. Regions are Western, Central, North Coast, South Coast, Blue Mountains and John Crow Mountains (Source: Proceedings of the Academy of Natural Sciences of Philadelphia, *Status Report on the Terrestrial Mollusca of Jamaica*, Rosenberg, Gary, Muratov, Igor, 2006/03/31)**

No	Comment	Section of ToR within which this topic would be discussed	CD&A/NJBP II Response
	▯ Jamaica's molluscan diversity is highly localized and when one area is disrupted for mining, quarrying, or damming, it can have a devastating effect on the local endemic species and contribute to their extinction.		 **Figure 17: Location of Mollusks (Source: iDigBio.org)** After review of the information and data referenced in this section we are unable to verify the claim of 103 species and any work being done specific to SML 173. Neither the Jamaican Biotic Survey Dataset 2019; Google LLC 2020 nor the iDigBio (2020) support the abundance that is being suggested by the review. Please see section 5.3.3.4.2.5. Gastropods on page 5-198 of the EIA Report, which states that: *Rosenberg and Muratov (2006) have identified a total of 562 Snails and Slugs in Jamaica, of which 505, or over 90% are endemic. No lists were found, however, Eurycratera jamaicensis and Poteria sp are two examples of endemic snails identified within wet limestone environments such as the study area. With such a high percentage of endemism, it is likely that any typical snail found within an area could be an endemic species.*

No	Comment	Section of ToR within which this topic would be discussed	CD&A/NJBP II Response
22.	**ARTHROPODA** In reference to section 5.3.2.2.3.1. and 5.3.2.2.3.2. • This method is suitable for survey of large species of insects such as butterflies. It is absolutely ineffective for almost all insect groups. Yet the report here implies that all groups were sampled this way. This is in effect a false representation. □ Very few insect can be classified to family in the field. Classification to family generally requires the use of taxonomic keys and/or museum collection. The morphological features used in such classification include structure of antennae, structure of legs including tarsal segments, wing structure and venation, and many other structures, all these features generally require the use of a stereomicroscope. Moreover, in many cases the researcher only has a fleeting glance of the insect and key features cannot be seen. **Yet during this study "no specimens were collected, but were classified to the level of family" in the field.** Very experienced entomologists, (who have worked extensively on a specific group of insects), are able to classify some insects to family in the field, but generally still take back specimens for verification. They know that it is not possible to carry all that vast taxonomic information in one's head, or to see the features with the standard human eye. I have had the privilege to work with a number of distinguished entomologists including Dr Thomas Farr, former Head of the Natural History Division, Institute of Jamaica, Dr John Parnell, former Senior	**6.4. Biological Environment** CD&A will present a detailed description of the flora and fauna (terrestrial) of the area, with special emphasis on rare, endemic, protected or endangered species. In this section the emphasis is on a description of habitats, flora and fauna surveys inclusive of a species list; commentary on the ecological health, function and value in the project area, threats and conservation significance. This will include: • A detailed qualitative and quantitative assessment of terrestrial habitats in and around the proposed project sites and the areas of impact. This will also include flora and fauna surveys and will include species lists. □ Special emphasis will be placed on rare, endemic, protected or endangered species. Migratory species will also be considered. As well as economically important species and nocturnal species. □ Species dependence, niche specificity, community structure, population dynamics, species richness and evenness (a measure of diversity) ought to be evaluated. The field data collected will include, but not be limited to: □ Vegetation profile	**As outlined earlier there are limitations to executing any scientific study. However due to the experience of the scientists working in the field classification of the specimen were possible.**

No	Comment	Section of ToR within this topic would be discussed	CD&A/NJBP II Response
	Lecture, University of the West Indies, Professor George Ball, formerly of University of Alberta, and a Past President of the Entomological Society of Canada. While they classified some material in the field they invariably took back material to be identified in the laboratory. **Against this background, the identification of the material presented in this EIA is highly questionable. The team needs to justify the use of this method, including capability/expertise to identify insects in the field beyond that of world renowned entomologist.**	- Species lists will be provided for each community - A habitat map of the area - Geo-referencing of all rare species identified in the course of the analysis of the proposed SML. **6.2. Ecological Services** Baseline data of terrestrial flora and fauna at the project area must be collected and analyzed and will include a ranking of flora and fauna present along with their ecological importance. A statement clearly specifying whether the study area forms a part of an ecologically sensitive area or migratory corridor of any endangered fauna as well as an indication of whether or not any of the ecological services currently being offered by the site will remain or be recovered subsequent to mining must be provided. The data provided will include but not be limited to the following: • Detailed description of the flora and fauna (terrestrial) present at the mining,	The Consultant takes offence to this statement which is also most disparaging to the expert training and education and research that is provided and takes place at the UWI Jamaica by some of the most brilliant and intelligent scientific minds in the world for several decades (since the inception of the University of the West Indies since 1948). In conducting our investigations, we relied on the knowledge, experience and expertise of the Natural History Division of the Institute of Jamaica (IOJ). The comments of the review are unwarranted and is an unmerited attack on the prestigious Natural History Division of the Institute of Jamaica (IOJ) and the distinguished work that it has done and for which it is internationally recognized, in providing education and information on the natural history of Jamaica. The information provided by the IOJ has been used for example for museum development throughout the British Commonwealth.

No	Comment	Section of ToR within which this topic would be discussed	CD&A/NJBP II Response
		reclamation, storage and disposal sites with special emphasis on rare, threatened, endangered, endemic, protected, invasive and economically important species Identification and description of the different ecosystem types and structure including species dominance, dependence and diversity, habitat specificity and community structure Possible biological loss or habitat fragmentation The Forestry Department's data will be used to identify the Forest Reserves within the SML as well as identifying closed broadleaf and disturbed broadleaf forests within the SML.	
23.	**Examples of mis-identification** Figure 5-This specimen shows key features of the suborder Zygoptera but not of the Suborder Anisoptera. It is therefore a Damselfly and not a Dragonfly. This is most elementary entomology and is not expected at this level where proficiency is important. Figure 8-22: Diptera A. This photograph is so poor that there is very little useful information. However, from what little can be discerned from the photograph, this insect appears to have a waist; hence, I am at a total loss as to how the researcher decided this was a Diptera, and not a Hymenoptera. **Figure 5-165: Glossy Flower Beetle (Endemic)** No scientific name was	**6.4. Biological Environment** CD&A will present a detailed description of the flora and fauna (terrestrial) of the area, with special emphasis on rare, endemic, protected or endangered species. In this section the emphasis is on a description of habitats, flora and fauna surveys inclusive of a species list; commentary on the ecological health, function and value in the project area, threats and conservation significance. This will include: • A detailed qualitative and quantitative assessment of terrestrial habitats in and around the proposed project sites and the areas of impact.	**Noted the distance between the eyes does suggest that it could be a damsel fly as opposed to a dragon fly.** However, as the reviewer has admitted, there are other anatomical features that are needed to conclusively say whether this is a dragonfly or damsel fly. **The assertion does not alter the conclusions of the EIA.** **The conclusion drawn by the review however, is unmerited as such occasional errors (occasional misspellings, grammatical etc) will take place occasionally in any document of this magnitude and complexity. The reviewers themselves have made such similar errors in their comments. This is the reason for adding a list of errata or corrigendum with documents.** There are errors in internationally published books which are considered authoritative in their respective subject.

No	Comment	Section of ToR within which this topic would be discussed	CD&A/NJBP II Response
	provided for this beetle. Flower beetles belong to the Family Phalacridae. The beetle in this photograph was identified by this author as *Macraspis tetradactyla,* family Scarabaeidae. This identification was confirmed by the Natural History Museum of Jamaica. **Figure 5-161: Cicad.** This insect is repeatedly referred to as Cicad. Presumably this is mixed up with 'Cicada.' The examples above clearly indicate problems with identification of the material. The accuracy of identification will definitely be lower in the field when the insects are active. Use of sonograms might assist on collecting data on nocturnal species of amphibia and crickets.	This will also include flora and fauna surveys and will include species lists. Special emphasis will be placed on rare, endemic, protected or endangered species. Migratory species will also be considered. As well as economically important species and nocturnal species. Species dependence, niche specificity, community structure, population dynamics, species richness and evenness (a measure of diversity) ought to be evaluated. The field data collected will include, but not be limited to: Vegetation profile Species lists will be provided for each community A habitat map of the area Geo-referencing of all rare species identified in the course of the analysis of the proposed SML. **6.2. Ecological Services** Baseline data of terrestrial flora and fauna at the project area must be collected and analyzed and will include a ranking of flora and fauna present along with their ecological importance. A statement clearly specifying whether the study area forms a part of an ecologically sensitive	This typographical error identified by this review is noted. This is inconsequential in respect of the biodiversity in particular and the conclusions of the EIA in general. **As outlined in the above section, the minor error identified does not alter the findings and conclusion of relatively low biodiversity in SML 173 especially in the low lying grasslands.**

No	Comment	Section of ToR within which this topic would be discussed	CD&A/NJBP II Response
		area or migratory corridor of any endangered fauna as well as an indication of whether or not any of the ecological services currently being offered by the site will remain or be recovered subsequent to mining must be provided. The data provided will include but not be limited to the following: • Detailed description of the flora and fauna (terrestrial) present at the mining, reclamation, storage and disposal sites with special emphasis on rare, threatened, endangered, endemic, protected, invasive and economically important species □ Identification and description of the different ecosystem types and structure including species dominance, dependence and diversity, habitat specificity and community structure □ Possible biological loss or habitat fragmentation □ The Forestry Department's data will be used to identify the Forest Reserves within the SML as well as identifying closed broadleaf and disturbed broadleaf forests within the SML.	

No	Comment	Section of ToR within which this topic would be discussed	CD&A/NJBP II Response
24.	**Light Trapping** This refers to section 5.3.2.2.3.3. and Figure 5-72: Light Trap Setup. ⍰ It is well established that different groups of nocturnal insects are active at different times of the night; i.e. there is temporal separation in the use of the habitat; e.g. some groups are active at dusk, while another may be active later in the night. Consequently, a " 90 minute" trapping period is not likely to be representative. ⍰ A white sheet collection method is suitable for selective collection, as the collector selectively collects specimens from the sheet. It is not suitable for general fauna survey. ⍰ Moreover, the material was identified in the field; the limitations of this method have been discussed above, and are even less effective at nights. ⍰ Figure 5-72 shows the light trap, an LED headlamp shining on a sheet 1.5 m on each side. The total area fully illuminated by the light was calculated as follows: **o Area of sheet = 1.5 x1.5 = 2.25 m2** **o Fraction of sheet illuminated: approximately 1/6 (0.17)** o Total Area fully illuminated by head lamp = 2.25 x 0.17 = **0.4 m2** This is simply inadequate for effective collection, especially since the light is highly focused/directional. There is a vast amount of research which has shown that the spread of the light is a significant factor in attracting insects to the trap. ⍰ The quality of light is also a problem. LED lights are known to emit very white light, with very little contribution of	***6.4. Biological Environment*** *CD&A will present a detailed description of the flora and fauna (terrestrial) of the area, with special emphasis on rare, endemic, protected or endangered species. In this section the emphasis is on a description of habitats, flora and fauna surveys inclusive of a species list; commentary on the ecological health, function and value in the project area, threats and conservation significance.* *This will include:* *• A detailed qualitative and quantitative assessment of terrestrial habitats in and around the proposed project sites and the areas of impact. This will also include flora and fauna surveys and will include species lists.* ⍰ *Special emphasis will be placed on rare, endemic, protected or endangered species. Migratory species will also be considered. As well as economically important species and nocturnal species.* ⍰ *Species dependence, niche specificity, community structure, population dynamics, species richness and evenness (a measure of diversity) ought to be evaluated.* *The field data collected will include, but not be limited to:* ⍰ *Vegetation profile* ⍰ *Species lists will be provided for each community* ⍰ *A habitat map of the area*	**Contrary to the assertion made, a light trapping technique was deployed for a minimum of 60 minutes and in several instances in excess of 240 minutes. The light trapping techniques were carried out on different dates at different locations during the investigations.** The following is an excerpt from the EIA Report: ***"5.3.2.2.3.3. Light Trapping (Nocturnal Assessments)*** *A light trap was established at WPT 650 for 1-hour in the alpha period (August 17, 2019 to August 19, 2019) (refer to Figure 5-73 below). Night survey was attempted at WPT 649.* ***In the beta period, light trapping was conducted between the hours of 2200 hrs to 0200 hrs on August 23, 2019 and August 26, 2019****. A white sheet of cloth, measuring at least 1.5 m on each side was strung up amidst shrubs and trees at the ecotone of the valleys and hillocks. A light trap was constituted by shining light on a white sheet for a minimum of 90 minutes (see Figure 5-72 below)."* As indicated on Figure 5-73 below, random nocturnal surveys were carried out at three locations (675, 676 and 677) within SML 173. After an elapsed time of 90 minutes, the light trap was assessed for a period of 10 minutes both on and around the sheet. The species present and number of individuals were recorded. **We have reported faithfully on the results of the nocturnal studies carried out for both the number of species identified and the number of individuals from accurate measurements.** **The EIA repeatedly indicates that the area is not in the "Cockpit Country". The SML 173 is to the east of the designated CCPA and has been the subject of intensive and extensive agricultural activities for more than three centuries. Despite the fact that The Most Honourable Prime Minister has laid a paper in parliament, which describes the proposed CCPA (See Appendix VII of the EIA Report), the review continues to describe the entire area as 'Cockpit Country' in contradiction of the statement of The Most Honourable Prime Minister.** As stated in the comments: "***Given that Windsor Research Centre has never conducted any systematic surveys for reptiles or amphibians for SML 173, why is WRC referenced in Appendix XX".*** By its own admission the Windsor Research Center has not carried out research in the area of SML 173, yet it continues to speak 'authoritatively' to suggest that it has carried out extensive research in SML 173. Therefore, this statement made by the review specious and unfounded. The methods used for sample collection are recognized best practices and the data collected were accurately reported. The EIA may have overlooked the need to put a caveat in the document to indicate that some of the literature cited invariably includes information from studies carried out in the core Cockpit Country (proposed CCPA), including studies by Conrad Douglas & Associates Limited (A system of Natural Protected Areas for Jamaica. This is listed as Reference no. 4. Conrad Douglas &

No	Comment	Section of ToR within which this topic would be discussed	CD&A/NJBP II Response
	wavelengths from the ultraviolet end of the spectrum. However, ultra- violet light is essential for insect collections; proper light-trapping bulbs always emit significant amount of uv light; in some cases, insect collection lamps are classified as 'black bulbs'. **The light trapping method used in this study does not comply with standard entomological practices and thus could not yield a proper assessment of the nocturnal insect fauna**. • Page 5-222 indicates that light trapping was only able to identify 16 insect species. This is a very low number. However, its not clear from the passage how may samples this relates to or how many different areas where included in the survey or what this number represents. The Fauna species list (Appendix XX) also has extremely low numbers of species observed, particularly of gastropods and insects. The numbers are so low that they indicate the survey was not done properly, rather than the diversity of the fauna was low (e.g. see table of insects on page CXXVII). These numbers would be low even for Kingston and contradict earlier studies of the area (see the IoJ lists in the report and https://www.cockpitcountry.com/). • The EIA does not discuss specific localities of arthropods surveyed, and species were not always identified to the species level. The light trap that is demonstrated in the photo is not the appropriate way to attract insects to a light trap. In order to maximize the attraction of insects to the sheet, the	*Geo-referencing of all rare species identified in the course of the analysis of the proposed SML.* ***6.2. Ecological Services*** *Baseline data of terrestrial flora and fauna at the project area must be collected and analyzed and will include a ranking of flora and fauna present along with their ecological importance. A statement clearly specifying whether the study area forms a part of an ecologically sensitive area or migratory corridor of any endangered fauna as well as an indication of whether or not any of the ecological services currently being offered by the site will remain or be recovered subsequent to mining must be provided. The data provided will include but not be limited to the following:* *• Detailed description of the flora and fauna (terrestrial) present at the mining, reclamation, storage and disposal sites with special emphasis on rare, threatened, endangered, endemic, protected, invasive and economically important species*	Associates Limited, Ann Haynes-Sutton, Susan Anderson, George Proctor, Jeremy Woodley, Karl Aiken, Robert Sutton, Peter Vogel, Barbara Chow and Gerald Alleng 1992). It must be stressed that this should not be generally applied to an area such as SML 173, which has been impacted by intense human activity for more than 300 hundred years. We note the comments. However, there are various methods of setting up light traps for studying nocturnal insects. CD&A stands by the findings of our investigations.

No	Comment	Section of ToR within which this topic would be discussed	CD&A/NJBP II Response
	lighting should be under the sheet, not facing it on a small area. By placing the light under the sheet, it allows the light to illuminate the entire sheet and create a larger area in which to attract nocturnal insects to the light trap. **References** Southwood, T.R.E. 2009. Ecological Methods. PA Henderson. Murihead-Thompson, R.C. 1991. Trap responses of flying insects. Academic Press.	*Identification and description of the different ecosystem types and structure including species dominance, dependence and diversity, habitat specificity and community structure* *Possible biological loss or habitat fragmentation* *The Forestry Department's data will be used to identify the Forest Reserves within the SML as well as identifying closed broadleaf and disturbed broadleaf forests within the SML.*	
25.	**Nocturnal Assessment — Results** This refers to Section 5.3.3.5.4.1. 274 individuals counted and identified to family from the sheet and surrounding ground and vegetation in 10 minutes, at night. This is amazing efficiency. I have done hundreds of hours light trapping, including working with Watson (20020), Murphy (2004) and Hamilton (2005) and many other projects; we have never achieve such rates. To count and classify 274 insect on a sheet and surrounding ground and vegetation in 10 minutes, in the night when light is poor, is highly questionable. **References** Watson, A. 2002. Taxonomy of the Jamaican Ouwlet Moths (Lepidoptera: Nocutidae) M.Phil. Thesis. University of the West Indies. Murphy. C.P. 2004. The taxonomy and Biodiversity of Jamaica's Arctiid moths. Lepidoptera (Arctiidae). Ph.D. Thesis. University of the West Indies	***6.4. Biological Environment*** *CD&A will present a detailed description of the flora and fauna (terrestrial) of the area, with special emphasis on rare, endemic, protected or endangered species. In this section the emphasis is on a description of habitats, flora and fauna surveys inclusive of a species list; commentary on the ecological health, function and value in the project area, threats and conservation significance.* *This will include:* • *A detailed qualitative and quantitative assessment of terrestrial habitats in and around the proposed project sites and the areas of impact. This will also include flora and fauna surveys and will include species lists.* *Special emphasis will be placed on rare, endemic, protected or endangered species. Migratory*	The identification on the light traps were done for a minimum of ten minutes. Photographs were also taken for further analysis. The total of 274 individuals was not all counted in the 10 minutes but was done over the survey periods. The compliment on our efficiency is noted.

No	Comment	Section of ToR within which this topic would be discussed	CD&A/NJBP II Response
	Hamilton, A.A. 2005. A taxonomic and zoogeographical study of Jamaican Carabidae (Insecta: Coleoptera). M.Phil. Thesis. University of the West Indies.	*species will also be considered. As well as economically important species and nocturnal species.* *Species dependence, niche specificity, community structure, population dynamics, species richness and evenness (a measure of diversity) ought to be evaluated.* *The field data collected will include, but not be limited to:* *Vegetation profile* *Species lists will be provided for each community* *A habitat map of the area* *Geo-referencing of all rare species identified in the course of the analysis of the proposed SML.* ***6.2. Ecological Services*** *Baseline data of terrestrial flora and fauna at the project area must be collected and analyzed and will include a ranking of flora and fauna present along with their ecological importance. A statement clearly specifying whether the study area forms a part of an ecologically sensitive area or migratory corridor of any endangered fauna as well as an indication of whether or not any of the ecological services currently being offered by the site will*	

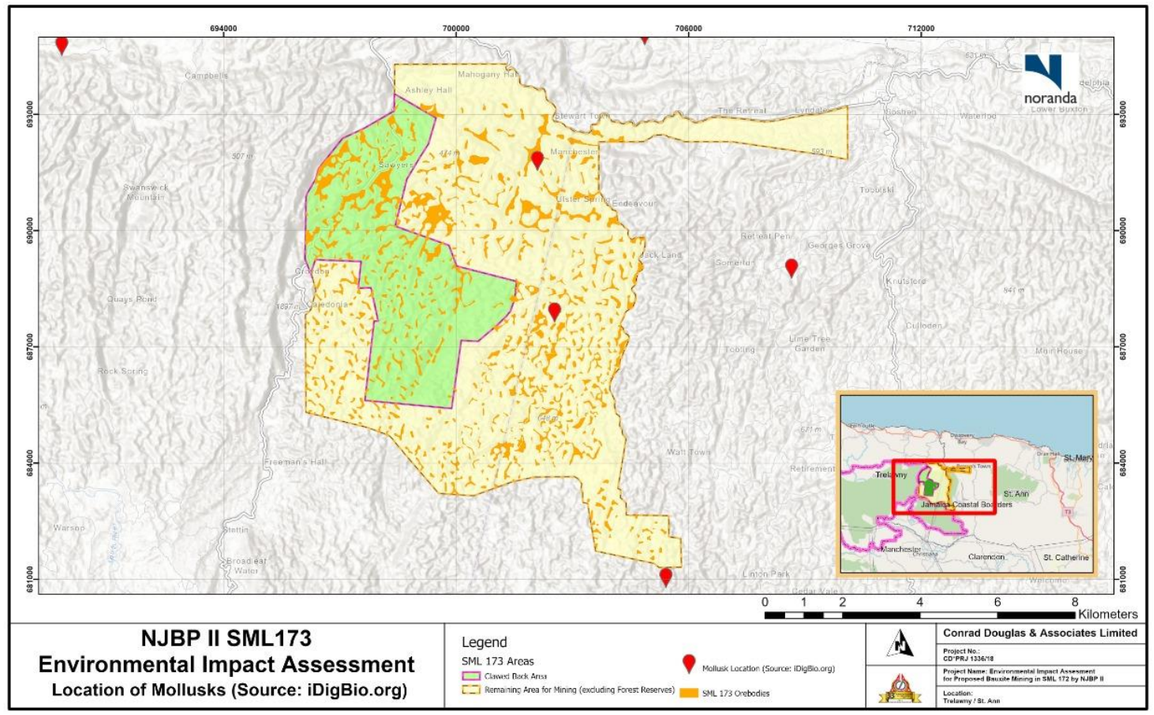
No	Comment	Section of ToR within which this topic would be discussed	CD&A/NJBP II Response
		remain or be recovered subsequent to mining must be provided. The data provided will include but not be limited to the following: • *Detailed description of the flora and fauna (terrestrial) present at the mining, reclamation, storage and disposal sites with special emphasis on rare, threatened, endangered, endemic, protected, invasive and economically important species* *Identification and description of the different ecosystem types and structure including species dominance, dependence and diversity, habitat specificity and community structure* *Possible biological loss or habitat fragmentation* *The Forestry Department's data will be used to identify the Forest Reserves within the SML as well as identifying closed broadleaf and disturbed broadleaf forests within the SML.*	
26.	***PROTOGRAPHUM MARCELLINUS* (JAMAICAN KITE SWALLOWTAIL)** *Protographum marcellinus* is listed by the IUCN as vulnerable and it is protected under the Third Schedule of the Wild Life Protection Act, 1945. Yet the only mention of it was as follows: " Of the 125 species of butterflies found locally, at least 94 are found within the general area. Eighteen species of Jamaican butterflies have been identified	**6.4. Biological Environment** CD&A will present a detailed description of the flora and fauna (terrestrial) of the area, with special emphasis on rare, endemic, protected or endangered species. In this section the emphasis is on a description of habitats, flora and fauna surveys inclusive of a species list; commentary on the	**Contrary to the assertion made in the comment, the study was not conducted on one occasion in August only, but during the following periods:** i. February 2018, ii. August 2018, iii. August to September 2019, and iv. December 2019 **The agreed TOR required that: "*Special emphasis will be placed on rare, endemic, protected or endangered species. Migratory species will also be considered. As well as economically important species and nocturnal species.*"**

No	Comment	Section of ToR within which this topic would be discussed	CD&A/NJBP II Response
	as being endemic. These are listed in Appendix XVII. All have been reported to be found in the general area." The species also listed in: Table 13-10: Fauna –Windsor. □ No attention was given to the species in the field. This species hibernates for several months and adults are seen at specific times of the year. There are no records of this species flying in August, the month when this survey was conducted. **A proper assessment clearly needs to be undertaken**. □ The endemic Blue Swallowtail or Jamaican Kite Swallowtail (*Protographium (Eurytides) marcellinus)* is present in the Cockpit Country and was not mentioned in the EIA. □ Because of their failure to survey in April and May, the EIA consultants failed to document the occupancy of the area by the Jamaican (Blue) Kite Swallowtail. Consequently, the EIA provides no baseline information to identify all areas which must be excluded from mining in order to conserve the habitat (incl. forest corridors to connect to other known locations beyond SML-173) of this protected species. **References** Turner T. and V. Turland. 2017. Discovering Jamaican Butterflies and their relationships around the Caribbean. Garraway E. , A. J. A. Bailey, T. Farr And J. Woodley. 1993. Studies on the Jamaican kite swallowtail, *Eurytides (protesilaus) marcellinus* (Lepidoptera:	ecological health, function and value in the project area, threats and conservation significance. This will include: • A detailed qualitative and quantitative assessment of terrestrial habitats in and around the proposed project sites and the areas of impact. This will also include flora and fauna surveys and will include species lists. □ Special emphasis will be placed on rare, endemic, protected or endangered species. Migratory species will also be considered. As well as economically important species and nocturnal species. □ Species dependence, niche specificity, community structure, population dynamics, species richness and evenness (a measure of diversity) ought to be evaluated. The field data collected will include, but not be limited to: □ Vegetation profile □ Species lists will be provided for each community □ A habitat map of the area □ Geo-referencing of all rare species identified in the course of the analysis of the proposed SML. **6.2. Ecological Services**	While the investigation was carried out over four (4) different periods, it was not identified during the course of our investigations. Nevertheless, it was listed as being endemic and protected (See Appendix XVII: Jamaican Endemic Butterflies and Appendix VI: The Wild Life Protection (Amendment of the Second and Third Schedules) Regulations, 2016). The statement that the Jamaican Kite Swallowtail is not mentioned in the EIA Report is false. Please note that the Jamaican Kite Swallowtail is referenced in Appendix XVII: Jamaican Endemic Butterflies as an endemic butterfly. Please see page CXXII. As indicated before, the study was not conducted in the designated Cockpit Country Protected Area. The non-sighting of the specified butterfly is therefore not necessarily surprising as the morphology, vegetative cover, bio-physical conditions and level of human activities (past and present), in general of SML 173 varies from that which is within the designated CCPA. The endemic Blue Swallowtail or Jamaican Kite Swallowtail (*Protographium (Eurytides) marcellinus)* was not detected in our extensive field survey.

No	Comment	Section of ToR within which this topic would be discussed	CD&A/NJBP II Response
	Papilionidae. Tropical Lepidoptera, 4: 151-154	Baseline data of terrestrial flora and fauna at the project area must be collected and analyzed and will include a ranking of flora and fauna present along with their ecological importance. A statement clearly specifying whether the study area forms a part of an ecologically sensitive area or migratory corridor of any endangered fauna as well as an indication of whether or not any of the ecological services currently being offered by the site will remain or be recovered subsequent to mining must be provided. The data provided will include but not be limited to the following: • Detailed description of the flora and fauna (terrestrial) present at the mining, reclamation, storage and disposal sites with special emphasis on rare, threatened, endangered, endemic, protected, invasive and economically important species □ Identification and description of the different ecosystem types and structure including species dominance, dependence and	

No	Comment	Section of ToR within which this topic would be discussed	CD&A/NJBP II Response
		diversity, habitat specificity and community structure Possible biological loss or habitat fragmentation The Forestry Department's data will be used to identify the Forest Reserves within the SML as well as identifying closed broadleaf and disturbed broadleaf forests within the SML.	
27.	**DATA MANAGEMENT** There are significant problems with the data management. One example will be used to demonstrate these deficiencies. Figure 5-159: Species Richness by Quadrats Surveyed in Blocks 1 and 4. While Block 1 is at the bottom of the hillock and Block 4 is at the top, these are discrete quadrats. **The data is thus discontinuous. These data should not be presented as line graphs. Line graphs are used for continuous data sets. This is most elementary; "statistics 101."**	*6.2. Ecological Services* ***6.4. Biological Environment***	**This review has obviously mis-read and misunderstood the data presented.** SML 173 was divided into nine (9) discontinuous blocks. All blocks contain hillocks – both the top and bottom of a specified hillock would be in the same block. A transect would traverse from the low land (cockpit) area up the slope of the hillock. These transects were divided in 6 quadrats. The line graph shows the trend in species richness as one moves from the lowland area up the slope of the hillock in each block.
28.	**POOR PHOTOS** Some photographs are badly out of focus and hence of very little or no value. o Figure 8-21: Hemiptera C o Figure 8-22: Diptera A o Figure 5-160: Adaptive Cricket (Pseudophyllidae) Camouflage	*6.2. Ecological Services* ***6.4. Biological Environment***	**The photographs presented accurately capture the subject and provides the information that was intended to be displayed. The subject of the photograph is in focus in all cases, meeting the objective of capturing the fauna in the image.** **Camouflage is a special characteristic of several animals in nature. Among the purpose of camouflaging is to minimize or avoid detection usually by predators. It is well-known and established that camouflaging is a special adaptive characteristic of organisms.** Please note that it was a result of the knowledge and expertise of the survey team that this adaptive cricket was photographed for identification.

No	Comment	Section of ToR within which this topic would be discussed	CD&A/NJBP II Response
29.	The term "Adaptive insect" which is used in the caption above is unknown in Entomological Science. It should be clearly defined to avoid confusion	*6.2. Ecological Services* ***6.4. Biological Environment***	Please note that this document is for public consumption, in general and as far as possible and without losing meaning we have used language that could be readily understood by the public-at-large. The term adaptive was meant as a simple adjective and not as an adjectival noun.
30.	It is not always possible to document all groups of fauna. Secondly, it is not possible for all the specimens encountered to be identified to genus and species level, and in some cases not even to family. The necessary resources on Jamaican fauna: literature, access to museum, and expertise are simply not available, or in some cases non-existent. The limitations of the study must be clearly established. A. It is essential, that any aims/objectives set out in the document should be met. B. It is essential that the methods meet internationally established standards, and are appropriate to the aims and objectives. C. It is essential that the all data are properly managed. D. It is essential that all data are presented in an appropriate manner. E. This document fall short of these expectations as far as the Gastropod and the Arthropoda are concerned. This cannot to be considered a proper representation of state of the Gastropod and Arthropod fauna of SML 173. In most cases it can only be remedied by redesign and return to the field.	*6.2. Ecological Services* ***6.4. Biological Environment***	**The objectives of the project as stated in the agreed ToR have been met. The ToR was agreed through a multi-stakeholder process involving all the regulators.** The study was conducted using internationally recognized approaches, methodologies and best practices and the findings are diligently reported. The "*pristine areas*" (Forest Reserves) within SML 173 were excluded as agreed in the TORs. There is no indication or evidence that that the review has carried out research work in SML 173. Furthermore the data on the website (iDigBio.org) used to contradict CD&A's findings and observation is misleading and in some instances covers the period from the 1800s, which is over 200 years ago. Several changes have taken place in the natural environment during that period. The map in Figure 18 below shows only those locations for which GPS coordinates were available from the iDigBio.org website. The accuracy of locations indicated as sightings is questionable. In some instances, sightings placed in SML 173 from the database (iDigBio.org) are actually located in other parts of Jamaica such as in the Parish of Manchester. Objectivity and strict empiricism require that we can only report on what we observed. (See Figure 18 below).

No	Comment	Section of ToR within which this topic would be discussed	CD&A/NJBP II Response
			 **Figure 18: Location of Mollusks (Source: iDigBio.org)**
31.	In-depth assessments of invertebrate and herptile surveys and results are beyond the scope of this review. The absence of commentary should not be interpreted as acceptance of these survey efforts nor of conclusions. Indeed, a superficial reading indicates that all have the same flaws of inadequate spatial and temporal sampling, inadequate sampling methods, and incorrect species identifications (e.g. they identified a snail as Thelidomus cognate (sic). Not only is the species name spelled incorrectly throughout the EIA – it is cognata—but their	*6.2. Ecological Services* ***6.4. Biological Environment***	The investigations were carried out in the SML 173 area. As indicated in our response above all species of fauna and flora observed were diligently recorded and reported. These conjectures appear to be speculative. We are therefore being requested to accept as reality the expectations of a "community of researchers" who do not have the research data to support their assertions and who might have indicated by their statements that they have not done investigations in SML 173. We have accessed the website referred to and it does not support the species abundance that is being purported for SML 173. The mining of bauxite deposit is proposed to take place in the low lying grassland areas with the lowest level of biodiversity in SML 173. As stated in the EIA Report: "*SML 173 has an area of 8,335 hectares, of which 15% are orebodies proposed for bauxite*

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	identification is wrong. T. cognata occurs outside of this area; the correct identification is Thelidomus aspera. Similarly, the snail in Figure 5-177 belongs to the genus Lucerna, not Pleurodonte). Thus, of the two shelled gastropod species they managed to find alive, they mis-identified both. Further, they identified empty shells as Sagda foremaniana (ref Appendix XX), but SML-173 is not within the known range of this species. Based on previous surveys by Dr. Gary Rosenberg (Academy of Natural Sciences, USA) across the Litchfeld Mountain – Matheson's Run Key Biodiversity Area in which SML-173 is included, there could be up-to 70 species of snails present.		*mining, inclusive of the haul roads to gain access to and transport the bauxite.* It has been stated that there will be no mining in the Forest Reserves which contain the forest cover and would contain the highest levels of biodiversity in SML 173. The Forestry Department was consulted during the EIA and permitting process and provided the consultants with the Jamaica Gazettes for the estates in the SML 173, which illustrate the boundaries of the Forest Reserves (See Appendix III, page XCIII of the EIA Report). **By law, the Forest Reserves are excluded from mining activities**.
32.	The consultants need to explain why the reptile and amphibian lists in Appendix XX don't correspond to the species listed in Table 5-27. As printed in the EIA: Appendix XX: Fauna Species List for SML 173 Area So why does Table 13-3 in the Appendix show 20 species of reptiles for SML 173 Area while Table 5-27 shows that only 8 reptile species were observed during the survey? And why are there 16 species under the heading of Amphibians in the Appendix when Table 5-27 shows only 3 species were detected during the survey?	*6.2. Ecological Services* ***6.4. Biological Environment***	Appendix XX provides the Literature review supported species list. This data is collected from reports of studies done within the designated Cockpit Country Protected area and other Forest Reserves in the vicinity of the CCPA. The list provided a guide as to what species may be expected in the Cockpit Country and its surrounding (adjacent) areas. SML 173 is adjacent to the eastern boundary of the CCPA. This provided the study team with guidance as to the potential techniques to be employed in carrying out the study of the SML 173 area. For this reason, the comprehensive species list of the literature was included in the EIA. However, our study has shown that the literature data available from studies in the designated CCPA and other forest reserve areas (core of the cockpit country) is not necessarily the same as in the SML 173 area. Table 5-27 provides the actual species list that were observed during the field investigations. The labels of the appendix and tables will be corrected as necessary. Reference to Appendix XX will be updated in the EIA Report.
33.	Given that Windsor Research Centre has never conducted any systematic surveys for reptiles or amphibians for SML 173, why is WRC referenced in Appendix XX?	6.2. Ecological Services **6.4. Biological Environment**	
34.	The term "Species Richness" is used throughout the document but is not	*6.2. Ecological Services*	There are no errors in presenting the counts of species in the graph or the methodology used in the investigation.

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	defined. a. If the term is supposed to indicate the number of species observed, then this has little bearing on ecosystem function or value. What would be required is to measure species diversity, however, this would need both the number of species and the number of individuals in each species to be recorded. The EIA does not indicate such data for most sites, nor does it indicate how such data could be collected. In places where such data were collected errors were made. For example in Figure 5-175 the number of individuals The numbers of faunal species (in several categories) identified is low, even compared to urban areas. Specifically, the low number of arthropod and gastropod species reflects on the sampling methods used. There is no mention of the use of flight nets or sweep nets. As a result its unlikely that the sample represents the arthropod diversity in the areas investigated. Indeed, the very low numbers of species encountered indicates that the surveys were not properly done, the numbers being more representative of a suburban garden than a rural site. a. Jamaica has one of the highest ratios of gastropod species to area of any country in the world and over 500 species have been described, many from the Cockpit Country.	***6.4. Biological Environment***	Further, please note that, most of the bauxite orebodies in SML 173 have already been impacted on by anthropogenic activities. The assessment of the research data can only be compared to data from studies in an intense farming area and its environs. Again, we reiterate that the study was not conducted in the designated CCPA.
35.	In its current form the EIA lacks the quantitative data to inform a decision on whether mining should take place. For example while the EIA indicates (without a source) the potential value of the ore that could be mined each year, it does not indicate the values of the water resources, nor of the living biological	*6.2. Ecological Services* ***6.4. Biological Environment*** ***Hydrology –*** *The hydrological regime of the proposed project area will be analysed. This will include investigations of storm*	**The EIA has met the requirements of the agreed TOR.** The EIA recognizes all the natural resources in SML 173. It was stated in the EIA Report that:

No	Comment	Section of ToR within which this topic would be discussed	CD&A/NJBP II Response
	resources nor the ecosystem services provided by the area. As such only a theoretical gross value is given without sufficient data to calculate a net value. As a result, it would be impossible to derive net economic costs or benefits from the EIA, estimate the size of bonds or compensation required. There are no data indicating the effect of removing soil and ore on ground or surface water flow. If the depth of topsoil is reduced what is the effect on flow? Is there an effect on surface runoff due to changes in contours? How might this affect the flood hazard. Will there be a change in flow regimes that could affect users of the Rio Bueno and other sources in the area? The report addresses water quality but not quantity.	*water run-off, drainage patterns, potential impact on groundwater. Well data will be assessed (if available). The data will be analyzed for wet and dry periods. Available water quality and quantity of any existing rivers, ponds, or streams in the proposed SML will be analyzed for both wet and dry seasons.* *Where data exists on percolation tests within the proposed SML, these will be analysed. If data exists, a test will be done in a representative site to validate the analysis.*	• Mining of bauxite and the construction of haul roads will be limited to 15% of the entire 8,335 hectares comprising the SML 173 area. • The areas proposed for mining are already subjected to anthropogenic activities such as farming, charcoal burning, and housing developments, among others. • The section on hydrology states that there will be a temporary increase in turbidity. However, the system will return to stability. In response to the comment on surface water flow, it should be noted that there are no surface streams in SML 173. This was stated in the EIA Report (Please see section 1.4.2.2. Hydrology of the EIA Report). The statement that "*The report addresses water quality but not quantity*" is incorrect. The information on water quantity is provided in section *5.1.6.3.3. Groundwater* of the EIA Report. Issues relating directly to Rio Bueno have also been addressed. Section *8.1.3. Water Quality, Surface Water Hydrology and Groundwater* of the EIA Report provide the mitigation measures for the potential impacts.
36.	The EIA report on the survey conducted by CDA clearly sets out in Table 5-33, p 5-293, the 44% positive rating given by the 325 survey population and the 50% negative. But then on p 5-296 it refers only to the positive 44% rating and on p 5-297 cites only the 40% part (very not important) (sic) of the negative rating, ignoring 10% (10%), (which on the positive side is a significant 14% part of the 44% total). This amounts a sleight of hand, an a subtle hiding of the negative majority outcome of the survey.	***6.6. Socio-economic Environment*** *Demography, regional setting, location assessment and current and potential land-use patterns (of neighbouring properties); description of existing infrastructure such as roadways, utilities (electricity, water and telecommunications), and public health safety; cultural peculiarities, aspirations and attitudes will be explored; and other material assets of the area will also be examined. A socio-economic survey to determine public perception of the project will also be completed and this will include but not be limited to potential impacts on social, aesthetic and historical/cultural*	The EIA presented all the findings of the NEPA approved survey instrument for capturing the relevant information, as well as information from four (4) Voluntary Public Stakeholder Consultations conducted in and around SML 173 during the preparation of the EIA study. Furthermore, it has carried out a critical review of the Development Orders, which is documented in the EIA Report. The review states the following: "*This amounts a sleight of hand, an a subtle hiding of the negative majority outcome of the survey.*" This most unfortunate and unprofessional statement is completely rejected. The entire discussions, issues and concerns raised were recorded *ad verbatim* and reported in Volume II of the EIA Report. The comment is an indication of the less than objective intent of the review. Please also note the typographical errors in the comments. For example "*This amounts (**to)** a sleight of hand, **an** a subtle hiding of the negative majority outcome of the survey*"

No	Comment	Section of ToR within which this topic would be discussed	CD&A/NJBP II Response
		values. This assessment will include but not be limited to: present employment and livelihood of these populations, awareness of the population about the proposed activity, information on major economic activities and sources of employment and their income. *Existing economic land use and land tenure will be analysed and discussed in relation to existing legislation, policies and development orders using a combination of secondary and primary data sources.* *The historical importance of the area will also be examined including identification of culturally significant features e.g. archaeological finds. While this analysis is being conducted, an assessment of public perception of the proposed development will be conducted and the use, benefit or value of the existing site will be explored and explained. This assessment may vary with community structure and will take various forms such as public meetings or questionnaires.* ***7.0. Public Participation*** *Describe the public participation methods, timing, type of information provided and collected from public and stakeholder target groups meetings. The instrument used to*	

No	Comment	Section of ToR within which this topic would be discussed	CD&A/NJBP II Response
		collect the information must be included in the appendix. Survey instruments to be utilized in the study will be approved by the NEPA prior to use. It may be useful and necessary to hold stakeholder meetings to inform the public of the proposed development and thepossible impacts. This will also gauge the feelings or response of the public toward the development. *The issues identified during the public participation process should be summarized and public input that has been incorporated or addressed in the EIA should be outlined.* *Public Meetings should be held in accordance with the Guidelines for Conducting Public Presentation at a time and location signed off by the National Environment and Planning Agency (NEPA). A public meeting will be held to present the findings of the EIA once the EIA is completed and submitted for consideration in keeping with NEPA's guidelines. All relevant documents are required to be made available to the public. In addition, any material change to the design of the project will require a further public meeting to be undertaken by the developer and all changes made to the document will be clearly outlined to the public.*	

No	Comment	Section of ToR within which this topic would be discussed	CD&A/NJBP II Response
37.	According to the same Report, p 5-288-289, "some residents (22% of survey population) felt that the proposed SML 173 area would negatively affect the economic value of the community. These were predominantly residents of communities in and around existing or previous bauxite mining operations such as Gibraltor, Lime Tree Garden, Watt Town and Linton Park. Yet on page 1-9, the opposite is stated (though more comprehensively): "The communities which were aware of bauxite mining were found to be more receptive to bauxite mining (56%), while those that were not familiar with bauxite mining displayed some degree of reservation."	*6.6. Socio-economic Environment* ***7.0. Public Participation***	The findings of the socio-economic survey were determined through administration of the NEPA approved survey instrument (See Appendix III: Survey Instrument). The analysis of the data was carefully processed using internationally approved methodologies. It is important to note the following from the comments made in the review: i. One statement is specific to economic value of the community, ii. while another statement concerns an analysis of general perception.
38.	See attachment labelled 'Stakeholder Comment for SML 173' (92 pages).		A response could not be provided as this attachment was not provided to the Consultants. The issue intended cannot be discerned.
39.	In relation to SML-165, on pg 5-28, the EIA describes the flow of the Rio Bueno, including: The trend line indicates a slight increase in flow despite the diversion of the Cave River and the mining of bauxite within the Rio Bueno Sub Basin by Kaiser Bauxite, and successive companies over the past 50 years. During the public meeting on 8th December 2020, Dr. Conrad Douglas stated that he was confident that there is "no risk to the flow rates and water quality" of the Rio Bueno if mining were to occur under SML-173. Why did he contradict the information in the EIA, namely that changes in flow have, indeed, been detected within the Rio Bueno Sub Basin over decades of mining?	***Hydrology –*** *The hydrological regime of the proposed project area will be analysed. This will include investigations of storm water run-off, drainage patterns, potential impact on groundwater. Well data will be assessed (if available). The data will be analyzed for wet and dry periods. Available water quality and quantity of any existing rivers, ponds, or streams in the proposed SML will be analyzed for both wet and dry seasons.* *Where data exists on percolation tests within the proposed SML, these will be analysed. If data exists, a test will be done in a representative site to validate the analysis.*	It is important to note that Dr. Douglas accurately indicated in the virtual Public Meeting of December 8, 2020, that there is no evidence of risk to flow (volume and direction of flow and quality of groundwater) and **not the flow rate**. This is supported by measurements carried out in areas of karstic limestone geology, in which bauxite mining has taken place in the parishes of Manchester, Clarendon, St. Catherine, St. Elizabeth and St. Ann for more than 60 years. It is stated on page 5-28 of the EIA Report that: "*The trend line indicates a slight increase in flow despite the diversion of the Cave River and the mining of bauxite within the Rio Bueno Sub Basin by Kaiser Bauxite, and successive companies over the past 50 years.*" We stand by this comment in the EIA, which was contributed by the world renown expert in Jamaica's hydrogeology, Mr. Basil Fernandez, CD.

No	Comment	Section of ToR within which this topic would be discussed	CD&A/NJBP II Response
40.	With regards to proven underground drainage, why did the EIA refer only to WRA's 2018 dye tracing effort (pg 5-24 and associated Figure 5-15) and not also the literature which documented in 1966 a hydrologic connection between Cave River Sink and Dornock (Dornoch) Head Rising, where the Rio Bueno surfaces? That is why was the third proven underground flow omitted from Figure 5-15? Or, more correctly, why was the injection site and detection site (with a straight line drawn between them but the actual wet season and dry season conduit routes remaining unknown) of this dye tracing omitted from Figure 5-15?	***Hydrology –*** *The hydrological regime of the proposed project area will be analysed. This will include investigations of storm water run-off, drainage patterns, potential impact on groundwater. Well data will be assessed (if available). The data will be analyzed for wet and dry periods. Available water quality and quantity of any existing rivers, ponds, or streams in the proposed SML will be analyzed for both wet and dry seasons.* *Where data exists on percolation tests within the proposed SML, these will be analysed. If data exists, a test will be done in a representative site to validate the analysis.*	The WRA is the authority mandated to manage Jamaica's water resources and its dye tracing studies were relied upon. As outlined in the excerpt from the EIA Report below, mention is made of the flow from the Cave River to the Rio Bueno. This matter was discussed at length during consultations with the WRA in the process of preparing the EIA Report. It was agreed with the WRA to indicate the direction of flow on the map. It was stated in section *5.1.6.3.2. Surface Water* of the EIA Report that: *"Rainwater is the basis for surface water draining from the basement aquiclude of the southwestern corner of the basin and provides flow to the Cave, Quashies and Lowe Rivers. These are outside the area of the SML 173. The Quashies and Lowe Rivers lose all their flow to the limestone aquifer atop of which SML 173 is located. Dye tracing studies done by the University of Bristol in the 1970s have proven the linkage between the flows from the Quashies and Cave to the Limestone aquifer and unto the Rio Bueno River. (See Figure 5-15 below). Dye tracing by the WRA in 2018 proved the Lowe River connection. No linkage with the Martha Brae River or any other surface system in either the Martha Brae River or Dry Harbour Mountain Hydrologic Basins has been proven.* *South of the SML 173 area is the Hectors River that originates on the Basement Aquiclude and flows westward sinking into the limestone of the Upper Black River hydrologic basin; supporting flows in the Black River.* ***There is also the Yankee River, which is a tributary to the Cave River, which flows towards the Rio Bueno*** *(Source: WRA)*."
41.	The EIA asserts that "it is very easy to identity sinkholes prior to mining and ensure buffer zones are created to prevent any infiltration of material" (pg 7-24) and further states that "Depressions that are sinkholes will not contain bauxite. Hence, no mining activities will be carried out in these areas." (pg 7-7). The EIA's assertion that mining doesn't breach sinkholes is demonstrably false.	***Hydrology –*** *The hydrological regime of the proposed project area will be analysed. This will include investigations of storm water run-off, drainage patterns, potential impact on groundwater. Well data will be assessed (if available). The data will be analyzed for wet and dry periods. Available water quality and quantity of any existing rivers, ponds, or streams in the proposed SML will be analyzed for both wet and dry seasons.* *Where data exists on percolation tests within the proposed SML, these will be analysed. If data exists, a test will be done in a representative site to validate the analysis.*	We disagree with this most highly subjective and misleading statement for which no evidence or justification has been provided. The statement continues in the consistent vein of disparaging the distinguished and internationally recognized work of leading institutions and professionals in this discipline. In the 70 years of bauxite mining in Jamaica there has never been documented reports of a collapsed sinkhole in any bauxite mine. See List of References no. 26 in the EIA Report**: Porter, Anthony R.D. 2017** ***Jamaican Bauxite, A Retrospective*****. iMagiNation Books.**
42.	Is NJBP II required to report to regulatory agencies when sinkholes are encountered? If so, how many encounters have been reported for SML-	***9.0. Impact Mitigation*** *The mitigation measures will endeavour to avoid, reduce and remedy the potential negative*	In accordance with applicable regulations and practices, NJBP II is obliged to protect caves, sinkholes and sensitive features. Consequently, during the development of the Mining Plan, any sensitive features, including sinkholes will be identified and the regulatory protocols for protection of same enacted.

No	Comment	Section of ToR within which this topic would be discussed	CD&A/NJBP II Response
	165 and SML-172? If sinkhole reporting is not required, why not?	*effects while at the same time enhancing the positive impacts projected. Mitigation and abatement measures should be developed for each potential negative impact identified. This will include recommendations for the enhancement of beneficial impacts and quantify and assign financial and economic values to mitigating methods. Green technology should be examined. A statement is to be made on strategies that will be used to conserve energy and water in relation to this project.* ***9.1.1. Establishment of Buffer Zones*** *CD&A will use international and local best practices, which have been accepted for the protection of sinkholes and caves in the past, and existing legislations, including recommendations for a 100m setback, to develop and delineate buffer zones for the protection of sensitive features such as caves, sinkholes and heritage sites as applicable.*	As stated variously in the EIA Report, the subject of this EIA Report is SML 173 and not SML 165 or 172. See page 1-1 of the EIA Report, which states that: "*It is proposed to conduct bauxite mining operations in SML 173 for a period of about twenty-five (25) years. The area granted under SML 173 includes both the areas depicted as SML 173 and SML 172. All references to 'the SML 173 area' in this report pertain to only that area shown as SML 173 in Figure 1 1. SML 173 has an area of 8,335 hectares, of which 15% are orebodies proposed for bauxite mining, inclusive of the haul roads to gain access to and transport the bauxite*." Regardless, CD&A is not aware of any assertion or contention that sinkholes or caves have been damaged in either SML 165 or 172 or by NJBP II.
43.	The AIA describes the eco-hydrological associations of Giant Bamboo (Bambusa vulgaris), namely that "where water tables appear close to the surface, bamboo plants thrive." (pg 32 of the AIA). Given that In Table 5-14, Bambusa vulgaris is classifed as "Abundant" why did the EIA omit discussion of this species in relation to the assessments of hydrology? Have any test bores been drilled for ore bodies with Giant Bamboo land cover? If yes, when were they drilled, and on what date and at what depth was the water table reached? If test borings have not been undertaken in	***6.5. Historical Heritage*** *An assessment of the archaeological and historical heritage resources in the development area will be conducted in collaboration with the JNHT, taking into account the requirement of the JNHT Act. CD&A will work collaboratively with the JNHT for this assessment and will conduct joint site visits, share data on geomorphology, topography and the biological environment as well as land use survey data inclusive of aerial*	**This is not a requirement of the agreed TOR for the EIA.** While *bambusa vulgaris* thrives in an area with a high water table, it also thrives and grows in other areas with a low water table. The presence of *bambusa vulgaris* is not an indicator species for the presence of a high water table. It is clearly stated in the AIA that: "*In the bauxite ore laiden depressions, the vegetation supported there is, for the most part, a variety of grass punctuated by isolated trees or small cluster of trees which are the remnants of ruinate pastures. Where water tables appear close to the surface, bamboo plants thrive. Traditionally, these grasslands are used for the cultivation of cash crops, mainly yam and corn.*" CD&A's investigations did not show any orebodies covered with *bambusa vulgaris* in SML 173.

No	Comment	Section of ToR within which this topic would be discussed	CD&A/NJBP II Response
	areas of Bambusa vulgaris, why not? Have hydrologic test drillings been undertaken at any time during the past 50 years, anywhere within the area of SML-173, that are not included in WRA's	*surveys, to facilitate efficient ground truthing.* *The historical heritage resource assessment section will be compiled by the JNHT and will be incorporated in the relevant sections of the Environmental Baseline and Setting, Potential Impact Identification, Mitigation and Monitoring of the EIA by JNHT and CD&A.* ***Hydrology –** The hydrological regime of the proposed project area will be analysed. This will include investigations of storm water run-off, drainage patterns, potential impact on groundwater. Well data will be assessed (if available). The data will be analyzed for wet and dry periods. Available water quality and quantity of any existing rivers, ponds, or streams in the proposed SML will be analyzed for both wet and dry seasons.* *Where data exists on percolation tests within the proposed SML, these will be analysed. If data exists, a test will be done in a representative site to validate the analysis.*	The hydrological conditions of areas that are substantially characterized by white karst limestone such as the SML 173 area has been extensively documented. There are no wells, ponds, rivers or streams in SML 173. The licensing and monitoring of wells in Jamaica fall within the mandate of the WRA.
44.	The EIA is riddled with its presentation of internal contradictory statements. For example, on pg 5-178 it states: This study area (Figure 5-121) was defined by its dense, closed canopy with relatively high humidity (75.2%). There was almost no evidence of human disturbance, placing this among the pristine areas. The most abundant species along the transect	**6.5. Historical Heritage** An assessment of the archaeological and historical heritage resources in the development area will be conducted in collaboration with the JNHT, taking into account the requirement of the JNHT Act. CD&A will work collaboratively with the JNHT for this assessment and will conduct	CD&A disagrees with the comments made. It is further evidence of the highly subjective nature of the review. A general description of the area as "*dense, closed canopy with relatively high humidity (75.2%)*", does not eliminate or exclude specific instances of disturbances as reported in the EIA Report. Further, disturbances are not limited to human activities. There are natural events such as fires, land slippage and floods, among others that disturb ecosystems. below shows dense closed canopy with an area of disturbance.

No	Comment	Section of ToR within which this topic would be discussed	CD&A/NJBP II Response
	was bracken fern, Pteridium sp. This presented as evidence of disturbance. However, it was also noted that a significant amount of plants observed were dried up and burnt between 20-30m of the transect. It is possible that a recent fire could have brought about this disturbance. So, which was it – no evidence of human disturbance or abundant evidence of disturbance? What baseline description would a monitoring program use to detect mining impacts?	joint site visits, share data on geomorphology, topography and the biological environment as well as land use survey data inclusive of aerial surveys, to facilitate efficient ground truthing. The historical heritage resource assessment section will be compiled by the JNHT and will be incorporated in the relevant sections of the Environmental Baseline and Setting, Potential Impact Identification, Mitigation and Monitoring of the EIA by JNHT and CD&A.	 **Figure 19: Photograph showing the low lying bauxite deposits (midground) in between the hillocks (background) in SML 173 (See Slide 10 of the presentation made at the Mandatory Public Meeting) -Circle in red showing disturbances on a hillock**

No	Comment	Section of ToR within which this topic would be discussed	CD&A/NJBP II Response
45.	The EIA has other sloppy misspellings. For example, the surname of the Senior Agricultural Chemist who first confirmed the high alumina concentrations in Jamaican soils was Innes, not "Ennis" (pg. 2-4). This makes me wonder whether the EIA consultants reviewed the original literature of the industry or whether they merely copied interpretations of summaries that have been handed down, unverified. Their false assertion that forests don't occur on bauxite certainly indicates a mis-reading of the original article published by Howard and Proctor (1957).	**Introduction and Background**	CD&A considers the comment 'sloppy misspellings' to be most unfortunate. The comment regarding the spelling of Innes is noted and the correction was made to this oversight. Please note that the review erred by mentioning alumina content in Jamaican soils. Alumina does not occur naturally in Jamaican soils. Alumina occurs naturally in some soils as corundum (Al_2O_3). Clearly, the review must have meant the metallic element aluminum (Al). CD&A is fully aware of the literature associated with the Jamaican bauxite and alumina industry and has contributed substantially to it via a number of peer reviewed articles and major international publications for the United Nations and other organizations (UNEP Industry and Environment Office, Paris, France.) See list of references. It should also be noted that the observation of bauxitic soils not supporting forest, has been made for several decades and is a definitive characteristic of the mode of occurrence of Jamaican bauxite to the extent that it has been used as an indicator in exploration aimed at identifying bauxite deposits. It should be further noted that the infertility of bauxitic soil and the fact that it does not support the growth of forest was among the reasons which piqued the curiosity of Sir. Alfred DaCosta and led to the discovery of bauxite soils in Jamaica in the first place (please see page 2-4 of the EIA Report). Mr. James Lee, a geologist employed to ALPART, was among the distinguished geologists who pioneered the use of this method of exploration for bauxite in Jamaica. Please see Lee, J.W., Exploration & Development Drilling for Bauxite in Jamaica, The Journal of the Geological Society of Jamaica Bauxite/Alumina Symposium, 1971, referenced in the EIA Report on page 5-18. The use of Howard and Proctor 1957 was not the basis for determination of the vegetative cover of bauxite. Asprey and Robbins was used to describe the vegetation in the general area. This is yet another example of an attempt to discredit without proper assessment of the information provided. We recommend that the review revisits the EIA Report. We continue to express the accurate observations made from numerous field visits that bauxite bearing soils in SML 173 does not support the growth of forests (Please see Figure 19 above). There are errors in internationally published books which are considered authoritative in their respective subjects. This is the reason for adding a list of **errata** or **corrigendum** with document, if necessary. While we do not wish to or have the time to engage in the splitting of hairs nor nitpicking, we must point out, in the same vein that the review contains some errors. Examples of these are provided below**:** 1. "classifed" 2. *"This amounts a sleight of hand, **an** a subtle hiding of the negative majority outcome of the survey"* 3. "*the **Litchfeld** Mountain – Matheson's Run Key Biodiversity Area in which SML-173*" 4. "Kladescope" 5. "Taxonomy of the Jamaican Ouwlet Moths (Lepidoptera: Nocutidae) M.Phil." 6. Several instances of the scientific names not following the convention

Appendix I: Additional Comments Received from the Public

Further specific comments received from the public on the Environmental Impact Assessment for the Proposed Mining of Bauxite in the Special Mining Lease 173 (SML 173) Area in the parishes of St. Ann and Trelawny

Comments
No assessment was included in the EIA of the negative short-term/immediate impact on the farming communities. *There is no evidence of what livelihood activities will occur over the intervening period between mining and rehabilitation to substitute or compensate for livelihood losses.* Response to this issue in correspondence dated 20 January 2021 is noted however it does not adequately address the issue as further highlighted.
Disconnect between the evidence and the EIA conclusions. *The EIA reflected a significant disconnect between the overwhelming evidence of the impacts of mining on the social and economic wellbeing and views of the communities in SML173, by ignoring those factors and concluding that:* *"Jamaica's immediate to medium social, economic and sustainable development future is highly dependent on providing NJBP II with the permits to mine these bauxite resources.* ***There are no other feasible immediate or short-term economic alternatives that have been identified that can be considered as a substitute to bring equal or greater macro and micro-economic benefits to Jamaica, at this time"****(1-13). [My emphasis.]* *The EIA did not evaluate or include reference to any of the alternative options that do in fact exist, some of which were raised by community members in the Zoom meeting of December 8, 2020 (typescript is unavailable) and by the JHTA.* Response to this issue in correspondence dated 20 January 2021 is noted however it does not adequately address the issue as further highlighted.
• A more detailed assessment of the impact on agricultural communities and national food security of replacing deep agricultural soils that can retain moisture (suitable for tree crops and timber and a wide variety of other crops) with shallow soils on running rock.

Comments
• A realistic assessment of the impacts of noise and dust from mining and transportation of ore on forest biodiversity, human health and standards of living is needed. More discussion of the impacts on existing activities such as rainwater harvest; as well as the way that dust contributes to altered pH of rain and run off would be relevant. • A more detailed analysis of the short and long-term impacts of haul roads and extraction on fragmentation of ecosystems and wildlife, the impacts of increased human access to the remaining forest fragments (which could include increased illegal harvest of wildlife and native plants, increased squatting and fires) is required. The impact of roads is much more pervasive than their total area and short-term direct impacts. Have the impacts of increased traffic on surrounding roads been fully assessed? • The impacts of mining practices on soil fertility and biodiversity in relation to restoration of forest cover on mined-out lands need more attention. The importance of the immense biodiversity that is found in undisturbed soils and the effects of mining on it have not been considered in this report. Are there any measures that could be implemented to minimise the loss of soil biodiversity? • Creating drivable access roads facilitates poaching / illegal harvesting of protected flora and fauna, incl. parrots, butterflies, and orchids. Why did the EIA fail to address this with regards to species in the Risk Assessment as a permanent threat associated with the network of haul roads which remain usable after mining ceases? One of the consequences of their failure to detect Black---billed Parrots is that they failed to refer to the relevant Population Viability Assessment (PVA; Koenig 2008) which address this issue of mining roads and poaching.
• The description of the proposed planning approach includes "planning for relocation of any sensitive plants, such as epiphytes, to areas that will not be disturbed and concomitantly placing any excess species in greenhouses for future planting." Relocation of species is a very technically demanding and expensive long-term process. Previous attempts such as the Orchid Sanctuary at Martin's Hill, Manchester were unsuccessful and have been abandoned. My recommendation is that areas that have sensitive species should be permanently excluded from the mining process and protected from any adjacent mining by a buffer zone. Whether or not mining is allowed, resources should be dedicated to developing cost effective approaches to support reforestation of mined out lands, and decommissioned roads. These techniques could be very important for the large areas of mined out lands from other operations that are currently barren. • As a mitigation the EIA proposes that: Pre--operation activities will also include the removal and relocation of sensitive species such as epiphytes to NJBP II's existing greenhouses. (pg 4---4). In Table 7.2 Impacts to Biological Resources, the EIA also notes:

Comments
During the EIA, epiphytes, Wild Pine, Bromeliad and God Okra were identified. (pg 7---11). Given that "wild pine" is the local name for bromeliads (Bromeliaceae), which are epiphytes, I can't but wonder why the EIA presented the list in this fashion. Beyond that, what evidence is there that survival and growth rates are not impacted for each species of epiphyte which will be translocated, both to greenhouses and to their return to the wild? For this mitigation to be valid, the EIA needs to present data on sunlight requirements (i.e, light---tolerance ranges), moisture requirements, and nutrient requirements for the stage classes of each epiphyte species. There also needs to be pre--- defined Measures---of---Success for growth and survival rates in the nurseries and following return to the wild.
• The EIA states that the planting of grass "plus the planting of several trees in the vicinity and a major tree planting programme of 200,000 trees" for land rehabilitation after mining will increase the size of grasslands and increase carbon sequestration. The EIA does not, however, present calculations to support this. From 2006 – 2012, bauxite mining and limestone quarrying across Jamaica emitted a total of 17,694 Gigagrams (Gg) of carbon dioxide (CO2) into the atmosphere (Ministry of Economic Growth and Job Creation, GoJ, undated biennial update report). That's 17,694,000 tonnes of CO2 or 4,825,636 tonnes of carbon which Jamaica must capture and store for this reported 6 year period. There's also the entire 70+ year history of bauxite mining in Jamaica and the 25---30 years of this proposed lease which must be accounted for. Is this mitigation for carbon emissions genuinely feasible and valid?
• Where are the 200,000 trees (ref above, #47) going to be planted? The EIA needs to include a map and notation as to whether this will occur on rehabilitated mined---out ore bodies or will planting occur in unmined soils? If they won't be planted in rehabilitated pits, why not? What is the minimum depth---of---reconstructed soil required for trees? What are the pre---defined metrics for seedling survival and growth rates which Noranda will use to monitor the short--- , medium---, and long---term success of this activity? Tropical forests growing on deep soils are at least 10 times more effective at storing carbon than Napier Grass. Did the EIA consultants examine alternative scenarios to mining and planting of grass for climate change mitigation? Alternatives such as keeping the bauxitic soils in the ground and promoting restoration of native forest cover in the area, particularly on those lands entrusted to the Commissioner of Lands to be looked after on behalf of the public. If alternative scenarios for climate change mitigation were evaluated, why were results not presented in the EIA?
• On page 8---35, the EIA states that:

Comments
"Currently 2,889 hectares of the total 3,123 hectares (91%) disturbed by Kaiser/Noranda/NJBP II has been certified rehabilitated." This was reiterated during the December 8th, 2020 public meeting by Mr. Delroy Dell, who confirmed that 92% of land disturbed since 1967 have been rehabilitated. Presented as such, this information will be highly---misleading to anyone who is not familiar with the concept of "percentage---swell", the increase in surface area which occurs during the stage of reclamation. One hundred percent (100%), that is, where hectares disturbed equals hectares reclaimed, does not mean that every single mined--- out ore body has been reclaimed and rehabilitated. Based on data obtained from Mines and Geology Division using an Access To Information request, Noranda's average swell is about 43---53% (with a range of 1% to over 200%). Thus, the reclamation and rehabilitation goal is towards upwards of 150%, not 100% To ensure that the public and decision---makers are not confused or misled, the numbers of ore bodies mined---out and the numbers of mined---out pits reclaimed need to be included with the above--- quoted sentence from the EIA, not just the numbers of hectares. • As mitigation, the AIA proposes delineation of boundaries around communities and "compensation for damages on private property including archaeological sites." Under what law would compensation be calculated? Will compensation go solely to the current title---holder? What about families whose ancestors created the artifacts? What about future land owners who will be denied the experience associated with having history and heritage left in situ?

Measurements of micro-climatic conditions
• It was stated that micro-climatic conditions were measured, but absolutely no results have been presented.
  ○ A. What micro-climatic paramaters were measured?
  ○ B. Where are the data on these the micro-climatic parameters. These data should be reported.
 	
• The impacts of the removal of forest cover on the microclimate from mining are acknowledged but not quantified. Is there any scientific basis for the statement that "Based on existing activities within SML 173 that have disrupted microclimates, the overall ecology of the area demonstrates resilience"? The report suggests that these impacts will be mitigated by destroying the roads. How feasible and effective is this likely to be?

Comments
• Misleading analyses (such as the inference that historically cockpit bottoms did not support trees). • 196/711 – Towards the end of this page, the EIA discusses the low-lying areas of this region. It basically states that the low-lying areas' biodiversity would not be impacted since most of the biodiversity is on the "hillocks", but that is not how ecosystems work. The low-lying areas connect the karst limestone hills, so any disruption in the flow between low-lying areas to areas of higher elevation would be affected. Additionally, the use of "hillock" is inaccurate that it dismisses how integral the karst limestone is to the area in terms of the biodiversity they support. The theory of island biogeography focuses on islands, but it is also discussed in reference to places like the Cockpit Country and adjacent areas that have similar geomorphology and species composition (MacArthur and Wilson 1967). Hills and mountains are connected by their low-lying areas and if these areas are disrupted, then the flora and fauna of the areas may experience lower genetic diversity since the connectivity between habitats and populations of species was disrupted (MacArthur and Wilson 1967).
Methodology
• It is well established that seasons play a significant role in the ecology of animals. Consequently the fauna of any area is likely to change with the seasons. This study was conducted in August 2019 only and is thus not likely to provide a true picture of the biodiversity of the area. • On page 5---82, the EIA states that faunal assessments were undertaken during Phase 2 of field surveys, during the period of August 17---19, August 24---26, 2019 and September 14--- 16, 2019. "December 2019" also was included on pg 5---66, but it remains unnoted what was surveyed during that period. What ecologically---relevant criteria were used to determine the timing of faunal surveys so as to ensure that all fauna present in the area were detectable, especially in relation to the survey methods utilized? The timing of mid---to---late August and mid---September suggests that the consultants are not aware of the abiotic factors to which breeding seasons, insect emergence patterns, and seasonal intra---island and international migration patterns are linked i.e., those conditions which influence species' presence and detectability. Why were surveys not conducted in association with the cyclic bimodal rainfall pattern (e.g. pg 5---34), which drives faunal ecologies and detectability? • Overall the consultant needed a longer timeline to carry out the fauna and flora study in such a sensitive area. It would have accounted for seasonal variation in the species encountered such as dry vs wet season. • There should be more sample points over the study site to account for the variation in the habitat.

Comments
• The extent of sampling of the forest ecosystems is inadequate and the number of plant and animal species, especially of the number of endemic species, appears low. Apart from Hernandia, are there other possible species of interest (e.g. because of their endemism, rarity or globally threatened status) that require special searches to assess their status in the area? • A detailed literature review should be carried to account for the species known from the area but was not observed during the study. • Overall, the quality of the report is uneven, with gaps in methodology and inconsistent presentation of evidence and poor referencing. There is little quantitative material collected or presented. Some sections quote peer-reviewed studies, but there are many examples of important statements unsupported by references; for example section 5.3.2 makes the statement that "*literature indicates that the vegetation in the area is generally homogenous*" but gives no reference for this statement. Since the EIA does not carry out a detailed floral survey, it's difficult to evaluate this statement especially given that the Cockpit Country is known for *heterogeneity* (Binney et a. 1991, Eyre 1995). • 183/711 – The EIA discusses how they randomly divided the 8335 ha into 9 random blocks, but then goes on to say that the 9 blocks covered more than 50% of the 83335 ha – which is it? The EIA report then goes on to say that they analyzed 7 out of the 9 blocks and that's more than the 20% that they say they are required to analyze. The report does not mention where the requirement comes from; why only 20% is adequate; and if there is a citation for the reasoning of only 20% of the total area. These percentages are confusing, no citations are provided, and the divisions seem arbitrary. If the area was randomly divided, they should be citing what method they used to divide the land randomly. • Quantitative methods were not used to assess the number of species in the site, the species composition nor the species diversity of the areas under consideration. • 201/711 – On Table 5-9, the waypoints were listed for the transects completed for the survey. The length of the transects were not mentioned, the GPS locations of the quadrats that were supposedly surveyed were not listed; and the EIA report does not discuss how plant samples were collected or if they took photos or samples of unidentified species. Again, as discussed in the previous comment, it is unclear how the data are being collected and analyzed. Multiple methodologies are discussed but not necessarily outlined in detail as to how the surveys were done. How far apart were the quadrats? How long were the transects?

Comments
Were all plants in the quadrat surveyed? Was canopy accounted for? Were non-vascular-plant life accounted for like lichen, moss, and terrestrial algae? These items need to be addressed in a floral survey. • The land-use data referred to in the EIA is from 1999-2000, but there is updated land-use data available through Forestry Department and NEPA that the authors of this report should have referred to when discussing land use.
<u>Bird survey</u> • The CITES species listed on Appendix 11: Yellow-billed Parrot *Amazona collaria* and Black Billed Parrot *Amazona agilis*. There are over 326 species of birds recorded in Jamaica. Only 46 species of birds have been reported in the study; This seems a bit low for such a large and diverse area. o The survey was carried out at approximately 11 transects (page 5-90). The study site is quite large, and the sample point was very limited to cover the study area adequately. o The consultant needs to be clear on how many days the bird surveys were carried out and if it accounted for seasonal changes in the bird distribution. Only a few migrants were observed in the study. The consultant did not mention if the parrots were nesting in the study area. • Table 5-26 refers to the number of bird species observed in the sample blocks but does not indicate the number of individuals observed. A quantitative study should include not only the number of species observed but also the number of individuals of each species. Without this, species diversity cannot be calculated. Similar gap exists in table 5-28. • With regards to the failure to detect Black---billed Parrots, a statement about an arboreal termitary mound raises questions as to how familiar the consultants are with wild Black--- billed and Yellow---billed parrots in particular, and to wild birds in general. It was concluded that the nest most likely belonged to a Parakeet, as the Amazon Parrots are known to be non--excavating cavity nesters (Koenig 2001) (ref pp 5---207 & 208). Can the EIA consultants explain how to distinguish Yellow---billed Parrots and Black---billed Parrots, both by their vocalizations and when they are in---flight without vocalizing? That is, how confident can we be that Black---billed Parrots weren't mis---identified during the surveys, esp. given all of the reports of this species on eBird? • The EIA asserts that during pre---operations, operations and rehabilitation, wildlife such as birds will not be impacted because

Comments
of their mobility (ref Table 7.2 and pg 8---4). The "mitigation" that animals will just move is both simplistic and misses substantial bodies of literature on habitat carrying capacity (incl. density as a misleading indicator of habitat quality), disturbance---mediated changes in activity budgets (e.g., changes in territorial defense, predator vigilance, and foraging time budgets), and how disturbance affects an individual's fitness, reproductive performance, and lifespan. What evidence is there to support the assertion that mining does not affect avifauna? Have any mark--- recapture / resighting studies been conducted for birds (or, indeed, for any faunal species) in areas currently being mined and rehabilitated in Jamaica? There is, of course, an extensive body of literature on banded Neotropical migrants over---wintering in Jamaica which addresses these questions on how habitat quality affects home range size requirements, individual fitness, and species demography. • The EIA reports on two floral and faunal transects, one undertaken in a mined---out ore body which was reclaimed and rehabilitated 17 years ago in Tobolski, St Ann and one which is actively being mined in Gibraltar, St. Ann. Only 4 bird species were detected in the rehabilitated site, and a set of 4 different bird species was detected in the active--- mining site (Table 8---3). Given these results and in comparison to the un---mined areas surveyed in SML---173, how does the EIA defend its assertion that birds are not impacted by mining, both by short---term impacts and long---term effects? That is, why was the Risk Assessment not driven by the field data? • Figures 5-61 through 5-67 give visuals of transects as a point when they should be lines as the word "transect" indicates. It is still unclear what the lengths of the transects were. If bird point counts were included along these transects, they may not have been done properly given that if the points were not at least 200 meters apart, there would be overlap of species and therefore double counting of birds would have occurred. Again, these factors were not addressed so the lack of information is inadequate for the assessment. <u>Herpetofaunal survey</u> • Several endemic frogs have been reported in the Cockpit Country. None of the endemics was reported in the study area. The method employed did not capture the species. • The consultant did not report several endemics such as the Bromeliad Galliwasp *Celestus fowleri*, Cockpit Eyespotted Geckolet *Sphaerodactylus semasiops* Thomas 1975 and several frogs. A literature review of the species present in the area should be carried out.

Comments

- The EIA is still not specific about localities or methods, and this section is generally confusing and vague. The quadrat method is mentioned and that they were done along a transects but specific GPS points were not provided. Locality data should be reported for amphibian and reptile data collection. Additionally, the researchers spent only 90 minutes doing this survey which is insufficient time to do a proper herpetological survey. Many herpetological researchers will spend several hours over a series of days in a small area to make sure that all species were documented due to the difficulty of detecting amphibians and reptiles, however it should be noted that field methods will vary dependent upon the taxon being studied (Rice et al. 2004; Mazerolle et al. 2007).

Bat survey

- The details of Jamaican bats provided in the report are cursory, missing important details about each species, from habitat to life history to echolocation behaviour. I found no indication of the extent of sampling on which the bat part of the report is based. The report also lacks the details about identifying bats by their echolocation calls. Most professionals who use this approach do not rely on one call identification system. It is customary to provide details of equipment and sampling as well as protocols for analyzing and reporting data. Statistical analyses are also very useful because they provide some objectivity for interpreting the data.

- The report also fails to provide any information about the qualifications of the individual(s) who collected, compiled and analyzed the data about bats' echolocation calls. Basic questions about the importance of foraging habitats are not addressed and there is no information about populations of any of the species that might occur in the area that will be affected by the mining operations.

- The report does make it clear that the mining operations will have dramatic and drastic impact on the habitats. But there are no details about the amelioration steps that might be taken to minimize the impact of the operations on bats (and other wildlife).

- A statement about the potential role bats may play in spreading diseases to humans is presented without any important details. This statement is completely unjustified, leaving one to wonder why it was included in the report.

- Only 3 of the nine Caves reported in the study area were surveyed.
  - How did the consultant select the 3 of the 9 cave to survey for the bat?
  - Why didn't the consultant carried out the bat survey in the different vegetation type with the study area?

Comments
○ How long was the bat surveys carried out in the caves? ○ The Kladescope software only has 11 of 21 species of bats found in Jamaica. The consultant stated that he could identify 17 of the 21 species of bat founds in Jamaica. Is it possible for the consultant to provide the sonogram of species identified? • The photograph in Figure 5---83 showing the positioning of the AudioMoth (and its associated microphone), along with several statements (e.g. pg 5---199 "Bats emit sound waves within unique and narrow frequency bands . . .") leads me to question how many hours, if any, of supervised professional training the consultants have had using ultrasonic detection equipment and of practical experience with Jamaican bats (whose acoustic calls, far from being within "narrow" frequency bands, span from an audible range of 18 kHz to ultrasonic exceeding 170 kHz). For example, on page 5---124 with regards to configuring the recording equipment, the EIA notes: "The sound frequency sampling range was set between 0 and 256 kHz." The consultants have confused two concepts: sampling rate and frequency range. Sonograms shown in the EIA confirm that they programmed the devices to a sampling rate of 256 kHz, with a consequent maximum frequency range up---to 128 kHz. (NB, on pg 5---125, the EIA stated that "Kaleidoscope automatically sets the analysis range to a maximum of 120 kHz". The software shows the range as defined by a device's recording parameters i.e., the detector, not Kaleidoscope software "sets" the range.) This sampling rate and consequent frequency range, however, are not appropriate for Jamaica's bat fauna as it results in the truncation of calls of Phyllostomidae and Natalidae. Why did the consultants not program the devices to record at a sampling rate of 384 kHz, the maximum which is available as per manufacturer specifications? Especially as I had already reported on the potential for Glossophaga soricina and / or Chilonatalus micropus to be present in the Belmont area (Koenig 2019)? • In Table 5---30, the EIA reports that Noctilio leporinus (common name Bulldog or Fish--- eating Bat) was auto---identified by Kaleidoscope Pro software in all three caves. If this identification is correct, why was the ecological and hydrological significance of this species' presence not discussed and analyzed for the Risk Assessment? On the other hand, one also has to question the validity of this identification. How complete is the Kaleidoscope Pro library of calls? For all of the species of Molossidae presented in Table 5---30, are there adequate reference---examples of these species flying in small enclosed spaces and / or in densely cluttered air space, where there will be functional convergence of acoustic characteristics amongst them and to Noctilio leporinus?

Comments

- The absence of any species of Phyllostomidae (aka "whispering" bats) on Table 5---30 make salient the MAJOR well---documented problems associated with using auto--- classification and identification for this family of bats, in general, and the specific problems known for Wildlife Acoustics' software, namely the mis---classification of files as "NOISE" when they do, indeed, have valid bat calls. Did the consultants review any of the files classified as "NOISE" (ref pg 5---125) to extract any---and---all false negatives and manually identify any of these files? If not, why not?

- For Figure 5---183, I must ask the consultants to report what species' identifications were assigned by Kaleidoscope Pro for the two species shown in the sonogram and what identities did the consultants manually assign to each of them. Neither Table 5---30 nor Table 5---31 have both species included on the listings (i.e., one table excludes one of the species and the other table excludes the second species which appear in this sonogram). Additionally, the consultants' reported ability to manually distinguish Glossophaga soricina from Chilonatalus micropus is not reliable given that recordings were truncated at 128 kHz. Based on this sonogram and the question about Noctilio vs. the Molossidae discrimination, the Kaleidoscope Pro identifications are not reliable nor should the manual identification be trusted for anything other than one species, Pteronotus parnellii.

- On page 5---124, the EIA notes that:
  "The extensive ecological survey of SML 173 did not identify any evidence of tree roosting bats. Therefore, no deliberate setup was done to assess the presence of this type of bat."

  Given the highly cryptic behaviour of tree---roosting bats, which evolved to reduce being detected by diurnal predators and for the need to protect themselves from inclement weather, what evidence was actually looked for? The identification in acoustic recordings of Ariteus flavescens (ref Table 5---31), a tree---roosting species which also roosts opportunistically in caves, demanded nocturnal acoustic terrestrial surveys for tree---roosting bats.

- The EIA asserts that, not only are NJBP II's operations diurnal, not nocturnal, but also because of their mobility, flying animals like bats will not be impacted (ref pg 8---4). The EIA also asserts that haul roads constructed to a maximum width of 11 m (35 feet) will not result in any "substantial" fragmentation (pg 8---5), even though the proposed haul roads for the first 5---year period, alone, could destroy 50 – 60 corridors which connect hillsides (ref Figure 4---2). In light of the fact that: (a) no bat surveys were conducted above---ground, at night, so as to identify bats' travelling and feeding areas across the land---cover gradient; and (b) no terrestrial, nocturnal bat surveys were conducted at the rehabilitated site at Tobolski nor at the currently---

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mined site at Gibraltar, what evidence did the consultants use to draw the conclusion that mining and haul roads will not impact bats? Particularly, what evidence did they use to draw their conclusions for the only species which they can reliably identify, Pteronotus parnellii? The consultants clearly are not aware of the published literature from Jamaica (and Cuba), which identifies the strong acoustic dependence of this species on densely---cluttered forest for both travel and hunting. Had they conducted proper terrestrial acoustic surveys, they would have confirmed that 11 meters creates an "acoustic barrier" gap for the highly--- forest---dependent Pteronotus parnellii. This species is, in fact, also a biological indicator for the quality of forest connectivity in any area where it occurs. Further, give SML--- 173's proximity to the important bat colony in Thatchfield Great Cave, proper attention should have been given to the "soundscape" of forest---connectivity for bats (particularly in relation to the published literature on feeding home range sizes and travel distances for the species definitively confirmed for the area). Why did the EIA omit details about the habitat "soundscape" requirements of each of the species they believed were identified correctly in Tables 5---30 and 5---31? • On page 5---237, the EIA noted: "At dusk, bats were observed flying around in both populated areas, as well as, in the vicinity of low--lying depressions. The identity of these bats could not be ascertained. " Did it not occur to the consultants that they should deploy their AudioMoths to identify bats flying around at dusk? That is, did it not occur to them to fulfill the Terms of Reference? • Figure 5---200 and its associated text on pg 5---263 demonstrate a complete ignorance of the foraging and acoustic ecologies which are published for Jamaican bats and for foraging and home range sizes of these species where they occur and have been studied outside of Jamaica. Let's start with a simple question: of the insectivorous species supposedly identified by Kaleidoscope and manually by CD&A, which species are restricted to cluttered forest, which would utilize forest edges, and which use open space? Do the consultants know what the acoustic signatures are when insectivores are hunting (instead of just guessing that observed bats were "possibly feeding")? Why did the consultants not evaluate the status of Retreat Gully Cave and Croyden Mountain Cave, both of which are reported by Fincham (1997) to have guano deposits? Proximity to the boundary makes it highly likely that bats roosting in these caves will make use of the area of SML---173. For Retreat Gully Cave, its position within SML---172 demands that it be assessed and protected. It's also important to remember that, while historic disturbance by guano collectors can easily cause the death of an entire bat colony, the cave can be re---inhabited over time (i.e. absence of a bat colony at present would not justify destroying a

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cave).
• The environmental monitoring plan framework (Table 11-1) does not address biological diversity.
Giant Swallowtail Butterfly *PTEROURUS HOMERUS* This refers to Section **5.3.3.4.2.4. Arthropods** • If *Hernandia catalpifolia* was recorded during this study it would represent a very significant discovery. According to Adams (1972) and George Proctor (pers. comm.; former Head, Natural History Division, Institute of Jamaica) *H. catalpifolia* does not occur in the Cockpit Country. This species occurs in Portland and St. Thomas. Yet its absence was reported in this EIA as a major finding! with the implication that the absence of the plant signifies absence of the butterfly! • *Heranandia catalpifolia* is not the larval food plant of *P. homeus* in the Cockpit Country. *Hernandia jamaicensis* is the known larval food plant in the Cockpit Country. Lehnert et.al (2017) which was referenced by this EIA reported as follows: "…. the sole known host plant for the western population, *Hernandia jamaicensis* Britton and Harris (Hernandiaceae)…. " Several other research publications over the decades also support this finding; some such publications are given in the References below. • Jamaican Giant Swallowtail Butterfly (Pterourus homerus -formerly called Papilio homerus) is on Appendix I of CITES. The food plant for the Giant Swallowtail is Hernandia jamaicensis Britton and Harris (Hernandiaceae) (locally known as water mahoe and water wood) in the western population and H. catalpaefolia Britton and Harris (pumpkin wood and suck axe) in the eastern population Portland and St. Thomas. ○ The consultant reported Hernandia catalpaefolia in the Cockpit Country, which is only found in eastern Jamaica. ○ The consultant never explained the methodology that was used to search for the food plant and the butterfly. There was no map of the sites visited, and also the time of year the survey was carried out. • On page 5---195, the EIA makes reference to the Giant Swallowtail's (Pterourus homerus) food plant, the Water Mahoe (Hernandia catalpifolia), and on page 5---196, the EIA reports that "No Water Mahoe was observed." This observation is no surprise given that H. catalpifolia is restricted to the parishes of Portland and St. Thomas. They should have been looking for Hernandia jamaicensis, which is known by the common names of Pumpkin Wood or Suck Axe. A critical point which the EIA

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failed to address: as long as mining is prohibited and the deep bauxitic soils are left in situ, the area retains the potential for forest habitat restoration for this Endangered swallowtail. If the bauxitic soils are removed, rehabilitation of forest and the microclimate required by the Giant Swallowtail will be impossible.

- Re: Figure 5---134 --- Distribution Map for Giant Swallowtail. Recognizing the need to not publish precise location data for this species, there are several points on this map which clearly place this species in unoccupiable habitat locations. EIAs have a responsibility not to disseminate inaccurate or false information. Why was this map of clearly--- incorrect information included?

- An examination of the new publication on Jamaican butterflies by Turner and Turland (2017) show that no less than 32 endemic species and subspecies of butterflies are found in central Cockpit Country near the Lease are #173, which includes the very rare Perkins' skipper butterfly which is endemic. A further 42 species of butterflies are found in the central Cockpit Country but these are not endemic.

References

Adams C.D. 1972. Flowering plants of Jamaica. University of the West Indies. Page 287.

Turner T. and V. Turland. 2017. Discovering Jamaican Butterflies and their relationships around the Caribbean. Page 163.

Lehnert M.S, Thomas C. Emmel , and E Garraway. 2013. Male-Male Interactions in the Endangered Homerus Swallowtail, Papilio homerus (Lepidoptera: Papilionidae), in Jamaica. Caribbean Journal of Science47, 57-66.

Garraway E., A.J.A Bailey., B.E. Freeman, J.R. Parnell, T.C. Emmel. (2008) Population studies and conservation of Jamaica's endangered swallowtail butterfly *Papilio* (*Pterourus*) *homerus*. In: New T.R. (eds) Insect Conservation and Islands. Springer, Dordrecht. https://doi.org/10.1007/978-1-4020-8782-0_16

Garraway E, AJA Bailey, T.C. Emmel. 1993. Contribution to the ecology and conservation biology of the endangered Papilio homerus (Lepidoptera: Papilionidae). Tropical Lepidoptera, 4: 83-91

Emmel T.C. And E. 1990. Garraway ecology and conservation biology of the *homerus* swallowtail in JAMAICA (Lepidoptera: Papilionidae). Tropical Lepidoptera, 1: 63-76

GASTROPODA

In reference to sections 5.3.2.2.4. and 5.3.3.5.5.

- The classification used here: arboreal snail and ground snail, is not one in used in Malacology. These should be clearly defined to

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avoid confusion with established malacological terminologies. • It is well established that over 560 species of terrestrial gastropods have been identified in Jamaica. Moreover, this area of the island with its limestone geology and moist habitats is a prime area for diversity and density of terrestrial gastropods. The results presented here are beyond comprehension. In my experience even the most casual naturalist-walk through such habitats will produce significantly more than two species of land snails. Yet with "Emphasis was placed on the detection and listing" of Gastropods, in an area over 800,000 hectares, only two types were found. **If this result is accepted as a representation of the state of the Gastropod fauna then the big question is: "Where have all the snails gone?" This result will be an indicator of a massive environmental disaster, requiring major and rapid investigation by NEPA.** • The molluscan results as reported are either inaccurate or misleading. The photos provided in the report are insufficient for confirming identification. Photos of the aperture, dorsal view, ventral view, and a view which includes all the whorls are the minimum needed to identify the shell. Additionally, like other taxa, specimens should have been collected and deposited to the Natural History Museum in Kingston for their natural history collection. It is claimed that Thelidomus congata (not cognate as it is misspelled) was found while doing surveys, however this species does not occur in Cockpit Country. This species (Thelidomus cognata) only occurs in the western part of Jamaica, specifically Westmoreland and Hanover Parishes. The species that the surveyors likely saw was instead Thelidomus aspera. However, if the surveyors had done a sufficient literature and data search, they would have found publicly available terrestrial molluscan species range data available through iDigBio. Among other things, iDigBio takes museum collection data and makes it publicly available so that they data may be accessed, studied, and analyzed. The data referenced in Figures 1 through 5 are available through iDigBio (2020), and the majority of it was collected during the Jamaican Biotic Surveys conducted by Gary Rosenberg and associated researchers from 1999-2002 (Rosenberg & Muratov 2006). Despite the EIA (on PDF page 311/711, Section 5.3.3.4.2.5. Gastropods) stating that there is no available checklist, the publication by Rosenberg and Muratov (2006) does include a checklist of species for the island on pages 141 through 161 (Rosenberg and Muratov 2006), and a copy of the open-source publication is attached to the email containing this commentary submission. Figure 2 shows the geographical range of Thelidomus aspera, which is likely the species that the surveyors saw in their surveys. The only place these two species consistently overlap is in the western side of the island (Figure 3).

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It is reported that Pleurodonte peracutissima was found while conducting the surveys. Figure 4 shows that this is certainly possible given that this species, now called Dentellaria peracutissima (Uit de Weerd et al. 2016), occurs in and around the SML-173 area. However, it is not the only species in this family (Pleurodontidae) or genus. Figure 5 shows the range of all pleurodontid snails within the SML-173 and adjacent areas. There are several pleurodontid species within SML-173 and some of which are more common than the supposed documented species. Again, this identification of Dentellaria peracutissima can only be confirmed with the proper techniques as summarized above. Additionally, if the reporters had done sufficient research, they would have been more familiar with the updated taxonomic literature of the species' name. Additionally, there are many species that occur within the cockpit karst of this region, including SML-173. Specifically, there are at least 103 species within SML-173 alone which includes 8 undescribed and unnamed species which require further surveying and study to describe and name (Jamaican Biotic Survey Dataset 2019; Google LLC 2020). When looking at the border of SML-173 and the species found within one kilometer of the border, another 28 species can be found which brings the count up to 131 (Jamaican Biotic Survey Dataset 2019; Google LLC 2020). There are more species of molluscs that can be found within five kilometers of SML-173 (Jamaican Biotic Survey Dataset 2019; Google LLC 2020). Although I accessed the discussed data through an internal digital portal of the Academy of Natural Sciences of Philadelphia (ANSP), this species range data is publicly available through iDigBio and can be shown using basic GIS techniques using software such as Google Earth (Google LLC 2020) or open-source QGIS (QGIS.org 2020). Had the surveyors done sufficient research and field methodologies, they would have found more than three species of land snails and slugs. Jamaica has over 500 species of endemic land snails (Rosenberg & Muratov 2006), and it is very easy to find them throughout the island without much effort. Basic techniques such as turning over leaf litter and rocks will yield several mollusc species (Sturm et al. 2006). • Jamaica's molluscan diversity is highly localized and when one area is disrupted for mining, quarrying, or damming, it can have a devastating effect on the local endemic species and contribute to their extinction. **ARTHROPODA** In reference to section 5.3.2.2.3.1. and 5.3.2.2.3.2. • This method is suitable for survey of large species of insects such as butterflies. It is absolutely ineffective for almost all insect groups. Yet the report here implies that all groups were sampled this way. This is in effect a false representation. • Very few insect can be classified to family in the field. Classification to family generally requires the use of taxonomic keys and/or museum collection. The morphological features used in such classification include structure of antennae, structure of

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legs including tarsal segments, wing structure and venation, and many other structures, all these features generally require the use of a stereomicroscope. Moreover, in many cases the researcher only has a fleeting glance of the insect and key features cannot be seen. **Yet during this study "no specimens were collected, but were classified to the level of family" in the field.** Very experienced entomologists, (who have worked extensively on a specific group of insects), are able to classify some insects to family in the field, but generally still take back specimens for verification. They know that it is not possible to carry all that vast taxonomic information in one's head, or to see the features with the standard human eye. I have had the privilege to work with a number of distinguished entomologists including Dr Thomas Farr, former Head of the Natural History Division, Institute of Jamaica, Dr John Parnell, former Senior Lecture, University of the West Indies, Professor George Ball, formerly of University of Alberta, and a Past President of the Entomological Society of Canada. While they classified some material in the field they invariably took back material to be identified in the laboratory. **Against this background, the identification of the material presented in this EIA is highly questionable. The team needs to justify the use of this method, including capability/expertise to identify insects in the field beyond that of world renowned entomologist.** Examples of mis-identification • Figure 5-This specimen shows key features of the suborder Zygoptera but not of the Suborder Anisoptera. It is therefore a Damselfly and not a Dragonfly. This is most elementary entomology and is not expected at this level where proficiency is important. • Figure 8-22: Diptera A. This photograph is so poor that there is very little useful information. However, from what little can be discerned from the photograph, this insect appears to have a waist; hence, I am at a total loss as to how the researcher decided this was a Diptera, and not a Hymenoptera. • **Figure 5-165: Glossy Flower Beetle (Endemic)** No scientific name was provided for this beetle. Flower beetles belong to the Family Phalacridae. The beetle in this photograph was identified by this author as *Macraspis tetradactyla,* family Scarabaeidae. This identification was confirmed by the Natural History Museum of Jamaica.

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- **Figure 5-161: Cicad.** This insect is repeatedly referred to as Cicad. Presumably this is mixed up with 'Cicada.'

The examples above clearly indicate problems with identification of the material. The accuracy of identification will definitely be lower in the field when the insects are active.

- Use of sonograms might assist on collecting data on nocturnal species of amphibia and crickets.

Light Trapping

This refers to section 5.3.2.2.3.3. and Figure 5-72: Light Trap Setup.

- It is well established that different groups of nocturnal insects are active at different times of the night; i.e. there is temporal separation in the use of the habitat; e.g. some groups are active at dusk, while another may be active later in the night. Consequently, a " 90 minute" trapping period is not likely to be representative.

- A white sheet collection method is suitable for selective collection, as the collector selectively collects specimens from the sheet. It is not suitable for general fauna survey.

- Moreover, the material was identified in the field; the limitations of this method have been discussed above, and are even less effective at nights.

- Figure 5-72 shows the light trap, an LED headlamp shining on a sheet 1.5 m on each side. The total area fully illuminated by the light was calculated as follows:
  - Area of sheet = 1.5 x1.5 = 2.25 m2
  - Fraction of sheet illuminated: approximately 1/6 (0.17)
  - Total Area fully illuminated by head lamp = 2.25 x 0.17 = **0.4 m^2**

  This is simply inadequate for effective collection, especially since the light is highly focused/directional. There is a vast amount of research which has shown that the spread of the light is a significant factor in attracting insects to the trap.

- The quality of light is also a problem. LED lights are known to emit very white light, with very little contribution of wavelengths from the ultraviolet end of the spectrum. However, ultra- violet light is essential for insect collections; proper light-trapping bulbs always emit significant amount of uv light; in some cases, insect collection lamps are classified as 'black bulbs'.

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- **The light trapping method used in this study does not comply with standard entomological practices and thus could not yield a proper assessment of the nocturnal insect fauna.**

- Page 5-222 indicates that light trapping was only able to identify 16 insect species. This is a very low number. However, its not clear from the passage how may samples this relates to or how many different areas where included in the survey or what this number represents. The Fauna species list (Appendix XX) also has extremely low numbers of species observed, particularly of gastropods and insects. The numbers are so low that they indicate the survey was not done properly, rather than the diversity of the fauna was low (e.g. see table of insects on page CXXVII). These numbers would be low even for Kingston and contradict earlier studies of the area (see the IoJ lists in the report and https://www.cockpitcountry.com/).

- The EIA does not discuss specific localities of arthropods surveyed, and species were not always identified to the species level. The light trap that is demonstrated in the photo is not the appropriate way to attract insects to a light trap. In order to maximize the attraction of insects to the sheet, the lighting should be under the sheet, not facing it on a small area. By placing the light under the sheet, it allows the light to illuminate the entire sheet and create a larger area in which to attract nocturnal insects to the light trap.

References

Southwood, T.R.E. 2009. Ecological Methods. PA Henderson.
Murihead-Thompson, R.C. 1991. Trap responses of flying insects. Academic Press.

Nocturnal Assessment — Results

This refers to Section 5.3.3.5.4.1.

- 274 individuals counted and identified to family from the sheet and surrounding ground and vegetation in 10 minutes, at night. This is amazing efficiency.

- I have done hundreds of hours light trapping, including working with Watson (20020), Murphy (2004) and Hamilton (2005) and many other projects; we have never achieve such rates. To count and classify 274 insect on a sheet and surrounding ground and vegetation in 10 minutes, in the night when light is poor, is highly questionable.

Comments
References Watson, A. 2002. Taxonomy of the Jamaican Ouwlet Moths (Lepidoptera: Nocutidae) M.Phil. Thesis. University of the West Indies. Murphy. C.P. 2004. The taxonomy and Biodiversity of Jamaica's Arctiid moths. Lepidoptera (Arctiidae). Ph.D. Thesis. University of the West Indies Hamilton, A.A. 2005. A taxonomic and zoogeographical study of Jamaican Carabidae (Insecta: Coleoptera). M.Phil. Thesis. University of the West Indies. ***PROTOGRAPHUM MARCELLINUS* (JAMAICAN KITE SWALLOWTAIL)** *Protographum marcellinus* is listed by the IUCN as vulnerable and it is protected under the Third Schedule of the Wild Life Protection Act, 1945. Yet the only mention of it was as follows: " Of the 125 species of butterflies found locally, at least 94 are found within the general area. Eighteen species of Jamaican butterflies have been identified as being endemic. These are listed in Appendix XVII. All have been reported to be found in the general area." The species also listed in: Table 13-10: Fauna –Windsor. • No attention was given to the species in the field. This species hibernates for several months and adults are seen at specific times of the year. There are no records of this species flying in August, the month when this survey was conducted. **A proper assessment clearly needs to be undertaken**. • The endemic Blue Swallowtail or Jamaican Kite Swallowtail (*Protographium (Eurytides) marcellinus)* is present in the Cockpit Country and was not mentioned in the EIA. • Because of their failure to survey in April and May, the EIA consultants failed to document the occupancy of the area by the Jamaican (Blue) Kite Swallowtail. Consequently, the EIA provides no baseline information to identify all areas which must be excluded from mining in order to conserve the habitat (incl. forest corridors to connect to other known locations beyond SML---173) of this protected species. **References** Turner T. and V. Turland. 2017. Discovering Jamaican Butterflies and their relationships around the Caribbean. Garraway E. , A. J. A. Bailey, T. Farr And J. Woodley. 1993. Studies on the Jamaican kite swallowtail, *Eurytides (protesilaus) marcellinus* (Lepidoptera: Papilionidae. Tropical Lepidoptera, 4: 151-154

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DATA MANAGEMENT

There are significant problems with the data management. One example will be used to demonstrate these deficiencies.

Figure 5-159: Species Richness by Quadrats Surveyed in Blocks 1 and 4.

- While Block 1 is at the bottom of the hillock and Block 4 is at the top, these are discrete quadrats. **The data is thus discontinuous. These data should not be presented as line graphs. Line graphs are used for continuous data sets. This is most elementary; "statistics 101."**

POOR PHOTOS

- **Some photographs are badly out of focus and hence of very little or no value.**
  - Figure 8-21: Hemiptera C
  - Figure 8-22: Diptera A
  - Figure 5-160: Adaptive Cricket (Pseudophyllidae) Camouflage

- The term "Adaptive insect" which is used in the caption above is unknown in Entomological Science. It should be clearly defined to avoid confusion.

- It is not always possible to document all groups of fauna. Secondly, it is not possible for all the specimens encountered to be identified to genus and species level, and in some cases not even to family. The necessary resources on Jamaican fauna: literature, access to museum, and expertise are simply not available, or in some cases non-existent. The limitations of the study must be clearly established.
  A. It is essential, that any aims/objectives set out in the document should be met.
  B. It is essential that the methods meet internationally established standards, and are appropriate to the aims and objectives.
  C. It is essential that the all data are properly managed.
  D. It is essential that all data are presented in an appropriate manner.
  E. This document fall short of these expectations as far as the Gastropod and the Arthropoda are concerned. This cannot to be considered a proper representation of state of the Gastropod and Arthropod fauna of SML 173. In most cases it can only be remedied by redesign and return to the field.

- In---depth assessments of invertebrate and herptile surveys and results are beyond the scope of this review. The absence of

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commentary should not be interpreted as acceptance of these survey efforts nor of conclusions. Indeed, a superficial reading indicates that all have the same flaws of inadequate spatial and temporal sampling, inadequate sampling methods, and incorrect species identifications (e.g. they identified a snail as Thelidomus cognate (sic). Not only is the species name spelled incorrectly throughout the EIA – it is cognata—but their identification is wrong. T. cognata occurs outside of this area; the correct identification is Thelidomus aspera. Similarly, the snail in Figure 5---177 belongs to the genus Lucerna, not Pleurodonte). Thus, of the two shelled gastropod species they managed to find alive, they mis---identified both. Further, they identified empty shells as Sagda foremaniana (ref Appendix XX), but SML---173 is not within the known range of this species. Based on previous surveys by Dr. Gary Rosenberg (Academy of Natural Sciences, USA) across the Litchfeld Mountain – Matheson's Run Key Biodiversity Area in which SML---173 is included, there could be up--- to 70 species of snails present. • The consultants need to explain why the reptile and amphibian lists in Appendix XX don't correspond to the species listed in Table 5---27. As printed in the EIA: Appendix XX: Fauna Species List for SML 173 Area So why does Table 13---3 in the Appendix show 20 species of reptiles for SML 173 Area while Table 5---27 shows that only 8 reptile species were observed during the survey? And why are there 16 species under the heading of Amphibians in the Appendix when Table 5---27 shows only 3 species were detected during the survey? • Given that Windsor Research Centre has never conducted any systematic surveys for reptiles or amphibians for SML 173, why is WRC referenced in Appendix XX?
• The term "Species Richness" is used throughout the document but is not defined. a. If the term is supposed to indicate the number of species observed, then this has little bearing on ecosystem function or value. What would be required is to measure species diversity, however, this would need both the number of species and the number of individuals in each species to be recorded. The EIA does not indicate such data for most sites, nor does it indicate how such data could be collected. In places where such data were collected errors were made. For example in Figure 5-175 the number of individuals • The numbers of faunal species (in several categories) identified is low, even compared to urban areas. Specifically, the low number of arthropod and gastropod species reflects on the sampling methods used. There is no mention of the use of flight nets or sweep nets. As a result its unlikely that the sample represents the arthropod diversity in the areas investigated. Indeed, the very low numbers of species encountered indicates that the surveys were not properly done, the numbers being more representative of a suburban garden than a rural site. a. Jamaica has one of the highest ratios of gastropod species to area of

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any country in the world and over 500 species have been described, many from the Cockpit Country.
• In its current form the EIA lacks the quantitative data to inform a decision on whether mining should take place. For example while the EIA indicates (without a source) the potential value of the ore that could be mined each year, it does not indicate the values of the water resources, nor of the living biological resources nor the ecosystem services provided by the area. As such only a theoretical gross value is given without sufficient data to calculate a net value. As a result, it would be impossible to derive net economic costs or benefits from the EIA, estimate the size of bonds or compensation required. There are no data indicating the effect of removing soil and ore on ground or surface water flow. If the depth of topsoil is reduced what is the effect on flow? Is there an effect on surface runoff due to changes in contours? How might this affect the flood hazard. Will there be a change in flow regimes that could affect users of the Rio Bueno and other sources in the area? The report addresses water quality but not quantity.
• The EIA report on the survey conducted by CDA clearly sets out in Table 5-33, p 5-293, the 44% positive rating given by the 325 survey population and the 50% negative. But then on p 5-296 it refers only to the positive 44% rating and on p 5-297 cites only the 40% part (very not important) (sic) of the negative rating, ignoring 10% (10%), (which on the positive side is a significant 14% part of the 44% total). This amounts a sleight of hand, an a subtle hiding of the negative majority outcome of the survey. • According to the same Report, p 5-288-289, "some residents (22% of survey population) felt that the proposed SML 173 area would negatively affect the economic value of the community. These were predominantly residents of communities in and around existing or previous bauxite mining operations such as Gibraltor, Lime Tree Garden, Watt Town and Linton Park. Yet on page 1-9, the opposite is stated (though more comprehensively): "The communities which were aware of bauxite mining were found to be more receptive to bauxite mining (56%), while those that were not familiar with bauxite mining displayed some degree of reservation."
• See attachment labelled 'Stakeholder Comment for SML 173' (92 pages).
• In relation to SML---165, on pg 5---28, the EIA describes the flow of the Rio Bueno, including: The trend line indicates a slight increase in flow despite the diversion of the Cave River and the mining of bauxite within the Rio Bueno Sub Basin by Kaiser Bauxite, and successive companies over the past 50 years.

Comments
During the public meeting on 8th December 2020, Dr. Conrad Douglas stated that he was confident that there is "no risk to the flow rates and water quality" of the Rio Bueno if mining were to occur under SML---173. Why did he contradict the information in the EIA, namely that changes in flow have, indeed, been detected within the Rio Bueno Sub Basin over decades of mining? • With regards to proven underground drainage, why did the EIA refer only to WRA's 2018 dye tracing effort (pg 5---24 and associated Figure 5---15) and not also the literature which documented in 1966 a hydrologic connection between Cave River Sink and Dornock (Dornoch) Head Rising, where the Rio Bueno surfaces? That is why was the third proven underground flow omitted from Figure 5---15? Or, more correctly, why was the injection site and detection site (with a straight line drawn between them but the actual wet season and dry season conduit routes remaining unknown) of this dye tracing omitted from Figure 5---15? • The EIA asserts that "it is very easy to identity sinkholes prior to mining and ensure buffer zones are created to prevent any infiltration of material" (pg 7---24) and further states that "Depressions that are sinkholes will not contain bauxite. Hence, no mining activities will be carried out in these areas." (pg 7---7). The EIA's assertion that mining doesn't breach sinkholes is demonstrably false. • Is NJBP II required to report to regulatory agencies when sinkholes are encountered? If so, how many encounters have been reported for SML---165 and SML---172? If sinkhole reporting is not required, why not? • The AIA describes the eco---hydrological associations of Giant Bamboo (Bambusa vulgaris), namely that "where water tables appear close to the surface, bamboo plants thrive." (pg 32 of the AIA). Given that In Table 5---14, Bambusa vulgaris is classifed as "Abundant" why did the EIA omit discussion of this species in relation to the assessments of hydrology? Have any test bores been drilled for ore bodies with Giant Bamboo land cover? If yes, when were they drilled, and on what date and at what depth was the water table reached? If test borings have not been undertaken in areas of Bambusa vulgaris, why not? Have hydrologic test drillings been undertaken at any time during the past 50 years, anywhere within the area of SML---173, that are not included in WRA's online Water Information System database and mapping service? If yes, why was such information omitted from the EIA? • The EIA is riddled with its presentation of internal contradictory statements. For example, on pg 5---178 it states:

Comments
This study area (Figure 5--121) was defined by its dense, closed canopy with relatively high humidity (75.2%). There was almost no evidence of human disturbance, placing this among the pristine areas. The most abundant species along the transect was bracken fern, Pteridium sp. This presented as evidence of disturbance. However, it was also noted that a significant amount of plants observed were dried up and burnt between 20--30m of the transect. It is possible that a recent fire could have brought about this disturbance. So, which was it – no evidence of human disturbance or abundant evidence of disturbance? What baseline description would a monitoring program use to detect mining impacts? • The EIA has other sloppy misspellings. For example, the surname of the Senior Agricultural Chemist who first confirmed the high alumina concentrations in Jamaican soils was Innes, not "Ennis" (pg. 2---4). This makes me wonder whether the EIA consultants reviewed the original literature of the industry or whether they merely copied interpretations of summaries that have been handed down, unverified. Their false assertion that forests don't occur on bauxite certainly indicates a mis---reading of the original article published by Howard and Proctor (1957).

Appendix II: Communications between CD&A & NEPA regarding the Approved Socio-Cultural and Economic Survey Instrument

RE: Socio-Cultural and Economic Survey Instrument for EIA regarding SML173

McKenzie, Anthony <AMcKenzie@nepa.gov.jm>
Wed 2/20/2019 2:56 PM

To: CDA ESTECH <cdaestech@hotmail.com>; Lacey-Sherrard, Ruth-Ann <rLacey-Sherrard@nepa.gov.jm>
Cc: Knight, Peter <Peter.Knight@nepa.gov.jm>; delroy.dell@norandabauxite.com <delroy.dell@norandabauxite.com>; Nelson, Sheridah (ST ANN) <Sheridah.Nelson@norandabauxite.com>; Allen, Locksley (ST ANN) <locksley.allen@norandabauxite.com>; Claudy-Ann Godson (ST ANN) <claudy-ann.godson@norandabauxite.com>

Dear Dr Douglas,
This is to confirm that the Agency offers no objections to the Socio-Cultural and Economic Survey Instrument as revised and submitted on Monday 18 February 2019.

Kind regards,

Anthony McKenzie
Director – Environmental Management and Conservation
National Environment and Planning Agency
10-11 Caledonia Avenue
Kingston 5
Ph: 7547540: 4787666

From: CDA ESTECH [mailto:cdaestech@hotmail.com]
Sent: Monday, 18 February 2019 5:50 PM
To: McKenzie, Anthony <AMcKenzie@nepa.gov.jm>; Lacey-Sherrard, Ruth-Ann <rLacey-Sherrard@nepa.gov.jm>
Cc: Knight, Peter <Peter.Knight@nepa.gov.jm>; delroy.dell@norandabauxite.com; Nelson, Sheridah (ST ANN) <Sheridah.Nelson@norandabauxite.com>; Allen, Locksley (ST ANN) <locksley.allen@norandabauxite.com>; Claudy-Ann Godson (ST ANN) <claudy-ann.godson@norandabauxite.com>; CDA ESTECH <cdaestech@hotmail.com>
Subject: Socio-Cultural and Economic Survey Instrument for EIA regarding SML173

Dear Mr. McKenzie,

Attached please find the Final Socio-Cultural and Economic Survey Instrument for EIA regarding SML 173 which incorporates the changes that you have requested.

Regards,
Conrad Douglas, CD, PhD
Executive Chairman & Principal Consultant

cc: Mark Richards, PhD., Technical Director, CD&A
Doran Beckford, B.Eng., Dip. Bus. Admin., MBA, Snr. Process & Environmental Engineer, CD&A
Vance Johnson, MSc., BSc., Snr. Environmental Engineer, CD&A

CONRAD DOUGLAS & ASSOCIATES LIMITED

14 CARVALHO DRIVE
KINGSTON 10, JAMAICA W.I.

TELEPHONE: (876) 929-8824
(876) 929-0023
(876) 929-0025
FAX: (876) 960-2014
Website: www.cdaestech.com
E-MAIL: info@cdaestech.com, conraddouglasnassociatesltd@gmail.com

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From: McKenzie, Anthony <AMcKenzie@nepa.gov.jm>
Sent: Monday, February 11, 2019 4:24 PM
To: CDA ESTECH; Lacey-Sherrard, Ruth-Ann
Cc: Knight, Peter; delroy.dell@norandabauxite.com; Nelson, Sheridah (ST ANN); Allen, Locksley (ST ANN); Claudy-Ann Godson (ST ANN)
Subject: RE: Socio-Cultural and Economic Survey Instrument for EIA regarding SML173

Dear Dr Douglas,

Based on a review of the survey instrument, the following is recommended:

There be a short preamble at the start of the questionnaire outlining:

- What is a SML
- What are the boundaries of SML 173 and probably the closest communities

For questions 13 and 15: insert *If your answer [to the previous question] is yes*, How did.....

If you require any clarifications, kindly contact us immediately.

Kind regards,

Anthony McKenzie
Director – Environmental Management and Conservation
National Environment and Planning Agency
10-11 Caledonia Avenue
Kingston 5
Ph: 7547540: 4787666

From: CDA ESTECH [mailto:cdaestech@hotmail.com]
Sent: Thursday, 7 February 2019 4:39 PM
To: Lacey-Sherrard, Ruth-Ann <rLacey-Sherrard@nepa.gov.jm>; McKenzie, Anthony <AMcKenzie@nepa.gov.jm>
Cc: Knight, Peter <Peter.Knight@nepa.gov.jm>; delroy.dell@norandabauxite.com; Nelson, Sheridah (ST ANN) <Sheridah.Nelson@norandabauxite.com>; Allen, Locksley (ST ANN) <locksley.allen@norandabauxite.com>;

Claudy-Ann Godson (ST ANN) <claudy-ann.godson@norandabauxite.com>; CDA ESTECH <cdaestech@hotmail.com>
Subject: Socio-Cultural and Economic Survey Instrument for EIA regarding SML173

Dear Mr. McKenzie and Mrs. Lacey- Sherrard,

Further to our meetings with Mr. Peter Knight and other members of NEPA's team, various Government Agencies and our various telephone conversations concerning the TORs and the development of the EIA regarding SML 173, we herewith submit the the Socio-Cultural and Economic Survey Instrument for your review and and approval.

We look forward to receiving your timely review and approval.

With kindest regards,
Conrad Douglas, CD, PhD
Executive Chairman & Principal Consultant

cc: Mark Richards, PhD., Technical Director, CD&A
Doran Beckford, B.Eng., Dip. Bus. Admin., MBA, Snr. Process & Environmental Engineer, CD&A
Vance Johnson, MSc., BSc., Snr. Environmental Engineer, CD&A

CONRAD DOUGLAS & ASSOCIATES LIMITED
14 CARVALHO DRIVE
KINGSTON 10, JAMAICA W.I.

TELEPHONE: (876) 929-8824
(876) 929-0023
(876) 929-0025
FAX: (876) 960-2014
Website: www.cdaestech.com
E-MAIL: info@cdaestech.com, conraddouglasnassociatesltd@gmail.com