

20. At Page 4-366, Section 4.3.4 – Biological Assessment: Terrestrial, it was noted that no night time surveys were conducted. As a result, nocturnal animals, such as bats and many other species would not have been observed. In this regard, please revise the sampling plan to include night time surveys.

CHAPTER 5 ASSESSMENT OF IMPACTS

1. At Page 5-11, subsection Modelling of Construction Phase Emission, air dispersion modelling was conducted to assess the impacts from construction phase sources. The modelled results were tabulated on Page 5-15 and compared to the Air Pollution Rules (APR), 2014. However, under the section on Control/Mitigation Measures, there was no mention of ambient air quality monitoring during the construction phase to validate the modelled results and ensure compliance with the First Schedule of the APR, 2014. Additionally, the Final ToR required that contingency plans be included for cases where monitoring indicates that mitigation measures are not meeting their objectives. A contingency was only provided in cases where complaints are made. However, contingency plans should also be included for scenarios where concentrations are exceeding the maximum permissible limits as outlined in Schedule 1 of the APR. Please provide.
2. At Pages 5-14-15 during the construction phase, it states that the NO₂ emissions exceeds the 1 hour standard (200 ug/m³) but the range of exceeding values are actually 3 to 6 times the concentration limit for tested areas surrounding the work areas (794 – 1356 ug/m³), which included schools. The mitigation strategy of “*addressing the emissions*” by regular monitoring and maintenance of engines is not sufficient and should include additional strategies to reduce emission concentrations. The option of rotating work and vehicular activities should be explored, including the institution of some limit of maximum emissions per day and measures taken to cap activities that contribute to these emissions (number of vehicles or time of vehicular use). Further, please clarify whether the model has been run with an assumption that the engines are not well-maintained. If not, please include the above-mentioned assumption.
3. At Page 5-16 Section 5.3.1.3, Evaluation of Impacts, sub-section Modelling of Normal Port Operation Emissions, the impact of port operations both before and after mitigation is provided as minor. The magnitude and sensitivity/importance or vulnerability remains unchanged even with mitigation measures. Based on the definitions of the grades provided, additional mitigation should be considered to decrease this significance of impact to negligible. Though operations at the port considered the ferry, coast guard vessels, it was not stated whether the potential impact to air quality due to the increase in vehicles/vehicular traffic and other land based operational aspects (e.g. bunkering and service station, wastewater treatment plant) were considered. These should also be considered in determining the operational impacts. Please provide.



4. Further to the above, under sub-section Modelling of Normal Port Operations Emissions, the Control/Mitigation Measures and Residual Impacts section, it states that during construction, "to address the increase in particulate matter, dust management and suppression plans will be developed and implemented to control fugitive emissions from unpaved haul roads and construction material piles." In order to assess the adequacy of the dust management and suppression plans they must be provided and should have been included in Section 6. As such, please provide details of both plans.

5. Section 5.3.2.1 – Potential Sources of Impact at Page 5-20 of the EIA Report makes mention of potential sources of impact during the operational phase of the project. Cruise ships are listed as one of the noise generating components during project operation. At no point in the CEC application, project description or EIA Report, was it mentioned that cruise ships will be docking at the proposed port facility. If this is the case, the presence of the cruise ships will also impact the water and air quality, as well as contribute considerably to waste management considerations at the port and must be taken into consideration when assessing the impacts of the project.

Please confirm whether cruise ships will be docking at the proposed port. If so, please amend the report to include a description of the nature and anticipated number of cruise ship vessels expected, as well as an assessment of the potential impacts from these vessels during the operation of the port.

6. Page 5-20, Section 5.3.2 Above-Water Noise, only addressed marine sources of noise and does not include vehicular traffic, machinery (e.g. cranes), human or other anthropogenic noises during the operational phase. This can be misleading as the port will attract additional activity to the area via the associated roads and buildings surrounding the area, which will be a change to the area. Additionally, the impacts were rated individually. It should be noted that noise levels during any phase will be cumulative as individual activities will not occur in isolation. As such, please revise the impact of noise on the surrounding community taking into consideration marine and land based activities cumulatively.

7. At Page 5-28, Section 5.3.3 Water Quality, the assessment of water quality impacts presented in this section focused mainly on construction activities including dredging, break water construction and stormwater runoff from landside construction. Effluent discharges, such as but not limited to, fish waste, sewage and discharge from the WWTP, associated leaks, overflows, accidental spills, bypass during maintenance, releases from vessels and dry dock/boat repair activities were not included in the assessment. It is also noted that Page 5-9 mentions cargo and oil vessels, however, the potential impacts related to oil and other spills, or loss of containment during bunkering, are not included in the assessment. These have the potential to significantly affect water quality over a long term period and the impacts should be categorised in detail. Please revise the assessment to consider the overall impact of the proposed project on the receiving water quality, for all phases of the project (i.e. site preparation, construction, post-construction/operation and maintenance).

8. At Page 5-29, Section 5.3.3.1 Dredging of the Project Site, it states "...impacts to the water quality from the dredging of the Project site are likely to be of *Medium* magnitude". Within this section it also states that the activity is anticipated to be conducted over a period of 17 months and that the Total Suspended Solids (TSS) concentration in the water column would exceed the regulatory threshold for that parameter. Given the duration of the activity and the potential to exceed the local regulatory limit on a continuous basis, a *large* impact magnitude appears to be more appropriate. In comparison, it was also noted that the reclamation activity was given the same impact rating but was expected to be conducted over a much short period of a six (6) weeks. Additionally it is unclear how the magnitude can be reduced to *Small* after mitigation when the duration and potential to exceed the local regulatory limit is expected on a continuous basis and will potentially impact the marine ecology.

Impacts of dredging on water quality, the sustained dredging on the daily and monthly schedule (17 months in the first instance) may result in sedimentation that will smother and kill reef communities, as well as prevent regrowth if the dredging activities are sustained in the long term. If maintenance dredging were to take place every 5-7 years (according to Chapter 6), the recovery of hard bottom communities will be unlikely as settled sediment will prevent reattachment of recruited benthic organisms in the future (Responses of coral reefs and reef organisms to sedimentation, Rogers 1990; Lethal and sub-lethal effects of dredging on reef corals, Bak 1978). Dredging reduces water quality by lowering the sunlight needed for photosynthesis by coral and algae species. Reduced light conditions can be sustained for over a week following dredging activities.

The statement that fish can move to escape impact of dredging is erroneous as fish depend on the habitat for food, refuge and survival, and the loss of the habitat is likely to result in mortality of the resident fish communities. Omitted from the EIA Report are the impacts (lethal and sublethal) on resident fish communities in the area. According to Wenger et al 2016, dredging impacts have severely impaired the survival of larvae and juvenile phases more than adults. This should be considered in the assessment as hard bottom habitats and nearshore environments serve as nurseries for fish. Dredging directly causes fish mortality as a result of clogging of gills and prolong exposure, but all affects the behaviour of certain fish species (*A critical analysis of the direct effects of dredging on fish, Wenger et al 2016*). Fish that survive direct impacts of dredging often display physiological and behavioural distress. Based on this discussion, dredging would have a major impact on water quality considering the effect on the marine community.

Further, it is noted that the proposed mitigation/control measures include use of silt curtains. Given the characterisation of the project area as a high energy environment, additional details are required on the efficacy of this measure in this environment and its ability to reduce the potential impacts to an acceptable level.



Please re-evaluate or provide justification of the impact rating assessment for this aspect of the proposed project.

9. Page 5-29 Section 5.3.3 entitled *Water Quality* states, "No information was available on the seawater turbidity or chemical composition of the sediments/seawater at the project site. It is also unknown whether or not there are already chemicals of concern in the seawater at the project site."

Similarly, Page 5-30 states that, "it is not expected that chemical contaminants (e.g., metals, hydrocarbons, pesticides) are present in the sediment which may become fluidized by the placement of dredge/fill material or installation of the breakwater and pilings. It is also not expected that there are chemicals of concern in the seawater at the Project site."

Additionally, Page 5-39 states, "Because of the current turbidity of the seawater in the area of the Project and to be conservative to include all receptors, the resource sensitivity is therefore considered to be Medium."

In this regard, please provide the following:

- a) Baseline data for seawater turbidity and the chemical composition of sediments and seawater at the project site,
 - b) A justification for the assumptions related to seawater turbidity and the chemical composition of sediments and seawater at the project site, as well as the corresponding impact assessment,
 - c) Reassess the parameters (seawater turbidity and chemical composition of sediments and seawater) based on the findings of the baseline data.
10. At Pages 5-29 to 5-30, it states "*Management of dredging activities around wave and weather action.*" Please provide more detail on how this is feasible for a 17-month period, where the wave action of Toco Beach can be challenging during certain times of the year. As the natural wave conditions of the bay will more likely exacerbate the dredging impact rather than abate it, the impact after mitigation cannot be considered as minor.
11. Pages 5-31 to 5-32 states "*Based on the results of the model, the Project is expected to increase the residence time of seawater in the bay, however the formation of eddies near the Project entrance will help mix and disperse any seawater constituents from stormwater runoff.*" While eddies mix and disperse in some areas, they don't necessarily assist in the flushing of the bay. The development of the port will increase the residence time of water in some areas up to 40-68 hours (Appendix D Coastal Dynamics Modelling Report Section 4.2 Water Quality modelling). Such long residence times combined with a potentially significant accumulation of daily storm discharge, pollutants waste and garbage may significantly reduce water quality, and increase deoxygenation and plankton or bacteria blooms that can kill marine life.



Further, given the deficiencies identified with regard to the modelling assessments, a revised impact assessment is required. The following should be considered in the revised assessment:

- The impact of the breakwater on the flow circulation and water quality of the site should be examined and presented, including the flushing afforded to the water body and the impact associated with the redirection of the river discharges. One of the new river discharges will be located near the marina which is likely to be afforded least mixing.
12. Page 5-33 sets out the key project activities that could result in an impact on seabed habitat and species. In addition to "*change in the local currents due to the project*", there is a need to consider potential changes in sedimentation patterns (erosion and accretion). Changes in sediment deposition and erosion as a result of the project are in fact assessed on Pages 5-39 and 5-44. The assessment, however, does not confirm if the predicted increase in potential sedimentation within Grande L'Anse Bay, could result in a change in the nature of the sediment (e.g. from sand to mud habitat) and therefore have an impact on the existing benthic communities. Please address.
 13. The definitions of receptor/resources sensitivity in Table 5.3.4.2-2 on Page 5-34 and Table 5.3.5.2-2 on Page 5-41 should consider the sensitivity of a particular seabed habitat and benthic community to a change (i.e. its recoverability and tolerance) and also its importance in terms of level of environmental protection. The low sensitivity category comprises "*existing sediment or substrate quality that is good*". However, such a seabed habitat and associated benthic community may be more susceptible and vulnerable to changes than a habitat that is already impoverished and under stress. Please address.
 14. At Page 5-34, Section 5.3.4.3 Evaluation of Impacts, it states "It is unlikely that there are sensitive soft bottom benthic receptors within the Project area. Desktop reviews and baseline marine biology studies performed by ERM in April and September 2019 have not identified any soft bottom benthic receptors of concern in Grande L'Anse Bay (IBAT 2018, ERM Marine Baseline 2019). However, this contradicts the information provided at Page 4-251, Section 4.3.3.1, sub-section Drop Camera where it states "Of note is that the benthic conditions corroborate the results found from the seismic survey where hard bottom and soft bottom sediments were observed". No analysis of the soft bottom sediment was conducted to validate the statement that there were no "soft bottom benthic receptors of concern". Please clarify the discrepancy presented.
 15. At Pages 5-34 to 5-35 there are discrepancies in the information provided. As such please clarify the following:



- a) It states "*Hard-bottom benthic communities, especially those comprised of corals such as in Grande L'Anse Bay, take a longer time to recover from disturbances than soft bottom communities. Hard bottom benthic communities such as those in Grande L'Anse Bay will likely take between 10-20 years to recover from the project activities.*" Recovery is based on the environment becoming conducive to support the survival of newly recruited organisms, as well as the presence of hard substrate which will have been removed during the dredging process.

If there is periodic dredging during operations every 5 -7 years (Section 6), which is less than the suggested recovery time of the hard bottom communities (10 -20 years) along with declines in water quality as the port functions, the recovery of the same hard bottom communities is not likely. Please address.

- b) Further to the above, it states that the "overall unmitigated impact to hard-bottom benthic organisms from dredging is therefore assessed to be of "Moderate-Major significance". However, based on Figure 5.2.2.2-1 Evaluation of Significance of Planned Events at Page 5-4, the significance value is Major. Please clarify the significance value, giving consideration to the aforementioned.

16. At Page 5-35, Section 5.3.4.3 Dredging of the Project Site, the following were noted:

- A statement was made that the sea turtle which utilise the area "are highly mobile and are predicted to utilise other bays";
- A low sensitivity value was assigned to the impacts of dredging on the sea turtle community;
- A moderate significance value was assigned to the impacts of dredging on the sea turtle community.

However, no scientific evidence or literature was provided to support the prediction. As such, the sensitivity and significance values cannot be validated. Please provide information to support the prediction and subsequent sensitivity and significance values. Furthermore, please provide an impact assessment of the establishment of the Toco port on the North Atlantic leatherback turtle population.

17. At Page 5-35, Section 5.3.4.3 Dredging of the Project Site, the third paragraph states "the soft-bottom community is evaluated to have Low ecological sensitivity to dredging" as the "communities will quickly recolonize". However, the Low sensitivity is characterised by two (2) factors, good sediment quality and having ecological resources that are not sensitive to changes in sediment quality. It should be noted that there is very little detail on how the placement of fill/dredge material and reclamation will be undertaken in the Project Description (Section 3). Furthermore, the three fill areas are not clearly defined on Figure 3.4.1-2. Therefore, the discussion does not provide a description of the sediment quality to validate the 'low' rating and the overall robustness of the assessment of this activity is therefore uncertain. Please re-assess.
18. At Pages 5-35 to 5-36, based on the deficiencies highlighted in the questions above, the Control/Mitigation Measures and Residual Impacts section should be revised, where applicable, based on the outcome of the above.
19. At Page 5-38, a recommendation was made for the installation of 42,800 m² of artificial reef to compensate for the loss of hard- bottom structure due to the project dredging activities that will not be replaced by the hard structure of the project (breakwater). However, please provide the following outstanding information:
 - (i) A detailed description of the proposed artificial reef design, inclusive, of location, size, material composition and scope of works;
 - (ii) A site location map of the proposed location for the artificial reef.
20. Further to the above, it is unclear how the proposed mitigation measures (i.e. the creation of new hard substrate by the project and installation of artificial reefs at other locations) will lower the residual impact of soft-bottom benthic receptors. This mitigation will not provide like-for-like replacement of the soft-bottom benthic community. The residual impact from dredging and placement of fill/dredging material and installation of breakwater/pilings should therefore remain moderate as there is no specific mitigation proposed for this receptor.
21. At Page 5-39, it states "Currently, the currents along Trinidad run from west to east". It is well known that the net current flow along Trinidad's north coast is from east to west. This is also described on Page 4-186 of the EIA Report.

Further, the discussion refers to the current and sediment transport modelling reported in Appendix D. Given the deficiencies identified in the modelling, the reliability of this section is affected. In addition, the studies in Appendix D do not appear to account for the regional flows at the site, the baseline suspended sediment concentration, the wave driven sediment transport regime, the distribution of bed types at the site and the presence and relocation of the streams that discharge into the bay. Please revise.



22. Page 5-40 suggests that because soft-bottom and hard-bottom subtidal species of Grande L'Anse Bay currently experience high turbidity throughout the year, they may have a low ecological sensitivity to the activities of the port development that encourage sedimentation and re-suspension of sediments. The basis for this statement is unclear, given the deficiencies highlighted in the description of the baseline environment. Please provide a justification for the conclusion made or revise based on scientific evidence.

Further, it is noted that no sediment contamination information is provided and therefore no assessment on the potential impact of changes in water quality on marine fauna (including bioaccumulation and bio-magnification along the food chain) other than suspended sediment concentrations has been undertaken. This is a key gap in the impact assessment. Please assess.

23. At Page 5-41, sub-section Dredging the Project Site, the potential of accidental overflow and spillage of material from dredging activities can occur and result in possible contamination and increased turbidity of the marine environment. As such, mitigation measures should be developed to prevent the risk of this impact. Please address.
24. The change to beach deposition rates at the project site is discussed on Page 5-44. This discussion refers to the wave driven transport modelled for extreme wave events as reported in Appendix D. Again, the reliability of the assessment is affected due to the deficiencies identified in the modelling assessment. In addition, there is no modelling/assessment included as to how the wave climate will change under more typical conditions and how this would affect the shoreline, beach and intertidal areas. Whilst it is identified that there could be some additional deposition of material to the beaches and intertidal areas, no attempt has been made to quantify this change. Furthermore, there is little discussion/consideration as to how the nature of the features may change. For example, with significantly reduced wave exposure the beaches that will be protected by the breakwater could change significantly in nature from being sandy to silty. Please address.
25. At Page 5-45: it states "*The mobile intertidal organisms, such as urchins, chiton and fishes will likely move to intertidal reef habitats without increased sedimentation.*" The basis for this statement is unclear given the extremely limited spatial ranges of these organisms. Please clarify.
26. Section 5.3.5.3, Page 5-45 states "*If sediment deposition during the operation phase of the Project increased the size of Mission Beach, sea turtles may no longer nest on that beach.*" The potential consequence of the loss or change in marine habitat on feeding, spawning, recruitment and nursery areas of other species, including marine mammals, seabirds and fish, has not been assessed. Please address.

27. Pages 5-46 to 5-47 Section 5.3.6.3 states "Based on a review of the potential impacts from the Project, no impacts to geology or hydrology are expected. This is largely due to the project being located offshore within a marine environment which removes applicability of terrestrial hazards such as landslides. Current Project development plans do not include any terrestrial workspaces, stockpile, or lay-down areas." However according to Section 3 Project Description, activities include the establishment of new roads and the construction of buildings, which will increase impervious areas and affect hydrology. In this regard, please provide a revised impact assessment for hydrology.
28. In the assessment of dredging impacts (Page 5-49), it is described that none of the sediment sampled included silt or clays, but this is not the case. Of the very limited samples taken, C_NFF was predominantly silt and clay, and 4 % of C_FF comprised silt and clay (Table 4.2.1.4-2). The assessment of impacts refers to the modelling undertaken in Appendix D. However, given the deficiencies identified for the modelling assessments, the impact of dredging works is therefore not adequately addressed. Similarly, the assessment related to the placement of fill material states that no fines and clays are present at the site which is not the case. It is likely that fines would be released from placement activities and this has not been adequately examined or modelled. Please address.
29. At Page 5-50 it Section 5.3.7.2 states, "Impacts on artificial lighting will only affect a small group of localized individuals over a short period of time, there the magnitude is evaluated at *Small (sic)*." Similarly, Page 5-51 states, "Impacts on artificial lighting will only affect a small group of localized individuals over a short period of time, therefore the magnitude is evaluated at *Small (sic)*." However, there are inconsistencies in these statements above, as follows:
- It states, "Impacts on artificial lighting..." It should read the impacts of artificial lighting. Please address.
 - During operation of the Port, vessels with artificial lighting would traverse the sea to and from the Port, as well as there would be permanent artificial lighting installed at the Port. Please provide a revised assessment of the magnitude of the ecological impact for seabirds, including Environmentally Sensitive Species, such as the Pawi.



30. At Page 5–51, various mitigation measures are proposed for management of artificial lighting on the port. It seems unlikely that these measures will result in sufficient control of artificial lighting to mitigate the potential impacts to sea turtles and birds. It is simply not feasible to run a port and associated operations without lighting when there is activity in the evenings. Due consideration must be given to the multiple sources of light including vehicles, restaurants, etc. Legal Notices 88, 90, and 91 (2014) designating the leatherback, green and hawksbill turtles respectively as ESSs prohibit activities which result in the disturbance of the ESS at any time. Mitigation measures outlining how the compliance with these requirements would be ensured considering the proposed artificial lighting, should be described. Please address.
31. At Page 5-52 states that any sea turtles present may be at risk of vessel strikes, with greens and leatherbacks the most likely to be impacted due to their known presence in the area. However, there are deficiencies in the assessment as follows:
- Greater emphasis should be placed on this aspect, given the high numbers of reproductively active leatherback turtles around northeast Trinidad inclusive of Grande L'Anse Bay during the breeding and nesting season (Eckert, 2006), and therefore the potential magnitude of these impacts;
 - The risk of vessel strikes and mortality, and a potential change to behaviour and local distribution, including links to breeding and nesting, as a result should be discussed in greater detail;
 - The increased mortality of the breeding turtles from vessel strikes is significant. Adult sea turtles appear to be at increased risk of vessel strikes during breeding and nesting season;
 - The proposed mitigation of a Marine Wildlife Observer (MWO) on board is inadequate to reduce this impact. Sea turtles spend the majority of their time underwater, and, due to their size and typical sea surface conditions, will not be easily detected, unless they surface in close proximity to the vessel. An effective response of the vessel captain at this time is unlikely to be possible. It is also impractical to enforce an MWO onboard every ferry once the port is operating. Finally, as vessels will also be operating at night, visibility will not allow for detection.
 - Further, the EIA does not consider the impact of the activities on the movement of the ESS, its sensory abilities, its habitat, its sensitivity to noise during breeding and nesting periods, and the impact to surrounding ecosystems or to the disturbance to plants or animal communities upon which the ESS depends. It therefore does not propose any mitigation measures that respond to these impacts. In this regard, please provide a revised impact assessment of sea turtles.

In light of the above-mentioned omissions, please revise the impact assessment for this component. Furthermore, based on the reassessment, please revise the proposals in Section 6.2.7.1 Marine Wildlife Observer Programme (Page 6-54) of the EIA Report.



32. Section 5.3.7.2 at Page 5-53 states "the expected increase in vessels utilizing the nearshore waters around Grande L'Anse Bay during the Project operation are expected to increase the number of sea turtles struck by vessels. The magnitude of the increased vessel traffic impact on sea turtle communities is evaluated as *Medium*. The resource sensitivity is considered to be *High* and the pre-mitigation significance of increased marine vessel traffic due to the project operation on sea turtle communities is evaluated as Moderate-Major. This assessment of the magnitude of the impact appears to be superficial given that it was stated that sea turtles traverse the study area especially during nesting season where there are increased number of turtles. In this regard, please re-assess the impact on this receptor.
33. At Page 5-55 under sub-section Vessel Releases, during the operational phase, introduction of invasive species from recreational vessels should also be considered. Please address.
34. The following deficiencies were identified from review of the section on Vessel Releases (at Page 5-55 of the EIA Report):
- This assessment does not capture a potential spill or loss of containment during bunkering. Please revise the impact to include the above-mentioned potential impact;
 - With regards to Marine Vessel Collision, one mitigation measure proposed is that all vessels are equipped to meet international standards. It should be noted however, the majority of the fishing vessels in north east Trinidad, do not have communications equipment or radar reflectors. Fishing vessels are known to cause most marine vessel collisions. As such, it is unclear how this proposed mitigation measure will be implemented among the fishing vessels;
 - At Page 5-56 it states that "*Marine receptors with the potential to be impacted, such as sea turtles, are evaluated as Medium sensitivity due to their local importance and protected status*". This contrasts with the previous evaluations for sea turtles as 'High sensitivity'. Similarly, on Page 5-141 it states that "*Marine receptors with the potential to be impacted, such as sea turtles, are evaluated as Medium sensitivity due to their local importance and protected status*". Perhaps the reason for this is because sea turtles are not evaluated independently in these cases, but as part of a larger group of marine fauna. Please re-assess the magnitude of impact to sea turtles as a distinct sensitive group of interest.
35. At Page 5-57, in the absence of the maximum volume of fuel stored on the project site and spill modelling, the rationale for the reduction in the significance of vessel releases from Moderate to Minor is unclear. Please explain or re-assess.

The underwater noise model that has been used in Section 5.3.7.3 is based on a simplified attenuation formula for shallow and near-shore waters (NMFS 2018), with an attenuation rate of 5 dB/10 m. This formula is not referred to in the NMFS (2018) and is not considered appropriate given that underwater noise attenuates logarithmically. In accordance with good practice (NPL, 2014), a practical spreading model with an attenuation coefficient (N=15) would be a more appropriate simple model to apply in shallow water environments for first order calculations of underwater noise propagation.

There is evidence that benthic invertebrates are sensitive to particle motion (vibration) and the potential effects of the project on these receptors should therefore also be considered. Key references include the following:

- Hawkins A. D., and Popper, A. N., 2017. A sound approach to assessing the impact of underwater noise on marine fishes and invertebrates. ICES Journal of Marine Science, Volume 74, Issue 3, 1 March 2017, Pages 635–651. Available from: <https://doi.org/10.1093/icesjms/fsw205>;
- Roberts, L., Hardig, H.R., Voellmy, I., Bruintjes, R., Simpson, S.D., Radford, A.N., Breithaupt, T., and Elliott M., 2016. Exposure of benthic invertebrates to sediment vibration: From laboratory experiments to outdoor simulated pile-driving. Proc. Mtgs. Acoust. 27. Available from: <https://doi.org/10.1121/2.0000324>; and
- Tidau, S., and M. Briffa, 2016. Review on behavioural impacts of aquatic noise on crustaceans. Proc. Mtgs. Acoust. 27. Available at: <http://dx.doi.org/10.1121/2.0000302>.

As such, please reassess the underwater noise assessment.

41. The increased fishing pressure on the local marine fishing communities was described at Pages 5-79 to 5-82. It was noted that the operation of the proposed port will create a permanent change in the fishing pressure resulting in lower abundance of commercially valuable fish species. As control measures, it was proposed to limit the number of fisherfolk registered and operating in the northeast coast of Trinidad at any given time and the phasing out of the use of gillnets. The mitigation measures suggested in this section reflect a lack of understanding of the dynamics of the local fisheries sector, Trinidad and Tobago's fisheries legislation, and the general principles of fisheries management regarding small scale fisheries. Area and gear restrictions that could have significant socioeconomic impacts on an increasingly marginalised artisanal fisheries sector have been suggested. Please clarify whether a feasibility study of implementing the suggested measures was explored or discussed with the local authorities and whether there is a commitment in writing that can be referenced. Further, please provide the mechanisms by which these proposed measures will be achieved prior to the operation of the proposed port. In the absence of such, a reduction of the impact significance of increased fishing pressure cannot be justified by the proposed measures. Please re-consider.



42. At Page 5-81, the magnitude of the increased fishing pressure on sea turtle communities is evaluated as *Medium*. Because sea turtles are valued locally and are protected, the resource sensitivity is considered to be *Medium*. Therefore, the pre-mitigation significance of increased fishing pressure due to the project operation on sea turtle communities is evaluated as Moderate.

Similarly, the marine mammal species likely to be entangled, based on previous occurrences near Toco, include the Sei Whale, Blue Whale, and West Indian manatee, all of which are endangered or vulnerable. Therefore, the resource sensitivity for marine mammals is considered to be *Medium*. The pre-mitigation significance of increased fishing pressure due to the project operation on marine mammal communities is considered Minor.

Further, the assessment fails to mention the primary immediate impact of increased mortality and potential population decrease to this globally threatened species (leatherback turtles). Therefore the resource sensitivity is underestimated. Please reassess the resource sensitivity for fishing pressure and entanglement.

43. At Page 5-84 it states "No endemic, endangered or threatened lizard species were observed. Some anoles were observed occurring in Mission Beach that remain unidentified, which should be identified by a specialist prior to Project construction." If some anoles were not identified, it is hypothetical to state that there a no endemic, endangered or threatened lizards. As such, this impact assessment is incomplete and should be re-assessed based on identification of the anoles observed.
44. At Page 5-89 it states "Impacts during operations due to light are long-term and will occur during the operations and construction phase. Receptor sensitivity is *Low* and magnitude to terrestrial flora and fauna (excluding insects) is *Small* and with insects is *Medium*. Therefore, impacts for the construction and operations phases of the Project to terrestrial fauna are considered Negligible to Minor." This assessment appears to be not conservative based on the evidence provided for the potential impacts in the preceding paragraph. Please re-assess.
45. At Page 5-90, it states that construction of the Port would require relocation of the existing Toco fishing facility to a temporary facility at Salybia Beach for the duration of the construction phase (about 3.5 years). However, an impact assessment of the relocation on Salybia Beach was not provided. Salybia Beach is known for turtle nesting as stated in this EIA Report at Page 4-260 under sub-section Sea Turtle Nesting Activity. This chapter needs to include in its assessment, the impacts of the construction and operation of a temporary fishing facility at Salybia Beach, inclusive of the impact on the turtles that utilise this area for nesting. Additionally, mitigation measures regarding how these turtles will be protected must be provided. Please address.



46. At Page 5-90, reference is made to crabs, lobster and sea moss as primary income-generating activities. However, these were not included in the description of the receiving biological environment. Please include in the relevant chapter of the report.
47. At Page 5-91, it was noted that the third bullet predicts the dredging and construction of the proposed port to have the potential for fish, crab, chiton and other marine provisioning resources to leave the area, and less mobile species such as sea moss to die. The mitigation measures provided does not address the loss of the livelihoods, a socioeconomic impact, which will be faced by persons other than fisherfolk such as the crab catchers, sea moss vendors, roadside vendors or provide any compensation during the construction period. Additionally there was no mention of measures to restore the marine resources (flora and fauna) that will be lost post construction of the port. Please address.
48. Page 5-93, Section 5.3.9.3 states "Dredging and marine works activities will disrupt the seabed and result in short-term increases in TSS in the water column. Small spills and leaks of fuel, lubricants and other substances from vessels and machinery operating in Grande L'Anse Bay during construction will also result in water quality impacts. Given the short duration of this impact, the mobile nature of fish and the large offshore area that local fisherfolk use for fishing, this is not expected to have a direct effect on fishing. However the impact of both water quality deterioration and the loss of the soft- and hard-bottom habitats for various benthic species, including corals, could potentially have an indirect impact on fish populations that use such habitats as feeding or nursery areas." With consideration of these factors, the impact magnitude is considered to be Medium during construction. Similarly, during operation it states "The magnitude of impact during operations will be overall Small, considering that while some adverse impacts to fishing could potentially occur due to changes in water quality and vessel traffic associated with the operation of the Port facility, fisherfolk will also have the benefit of a new, larger and improved fishing complex". These impact assessments are underestimated. Please provide a revised impact assessment.
49. At Page 5-95 it states, "Coastal Dynamics modelling results show that the presence of the breakwater will result in increased sedimentation of the coastline directly to the west of the Project site, which could cause some smothering of benthic organisms including sea moss. Water quality impacts from stormwater runoff and presence of vessels could also have an adverse impact on marine provisioning resource species. The pre-mitigation significance of the impact on marine provisioning resources is therefore considered to be Moderate during the construction phase and Moderate during the operations phase." The livelihood impact is therefore underestimated. Furthermore, the permanent loss of habitat, and significant and permanent changes to the marine environment with no guarantee of natural recovery, in addition to the question of the suitability of harvesting from the vicinity of the operational port, constitutes a major impact to marine provisioning resources that cannot be mitigated



As such, please provide a revised impact assessment.

50. At Page 5-96 the impact of the Port on the Tourism and Service Industry was assessed. However, there are deficiencies in the information provided as follows:
- Different types of tourists were not incorporated such as surfers. Please provide a revised impact assessment to capture surfers.
 - It states "*In some respects it is also likely that the project could encourage increased tourism activity, given the improved connection with Tobago and the provision of facilities that could be of interest to tourists and visitors...*". This conclusion appears to be the opinion of ERM but has not been demonstrated through appropriate data gathering. Please provide evidence to support this position.
 - Other potential negative impacts to tourism in the region include chronic water pollution and the impact to the aesthetics and character of the community. Please provide a thorough evaluation of the potential impacts.
51. Page 5-97 states, "Changes in shoreline erosion or sedimentation as a result of the Port's presence have the potential to affect beaches that are important for sea turtle nesting, which is one of the most significant attractors of tourism to the area. Results of Coastal Dynamics modelling indicate that sedimentation may increase on some beaches immediately to the west of the Project site, including Mission Beach, which could in turn deter sea turtles from nesting at this location." However, the pre-mitigation impact on eco-tourism is ranked as Moderate. This impact is underestimated. Please provide a revised impact assessment.
52. It is noted that the potential consequences of habitat fragmentation from the landside improvements associated with Phase 2 of the project (e.g. roads and bridges, buildings, parking areas, and landscaping) have not been assessed in accordance with Section 7.14 3(i) of the Final ToR. Please address.
53. At Page 5-91 (under Section 5.9.1 Livelihood activities), the physical changes related to oceanography, coastal process and shoreline morphology, including beaches, due to the port and the associated construction activities, are identified as Potential Sources of Impact to Livelihoods. Within the remainder of this section references are made to the likely effect on the development on these physical processes, so they can be used to explore the impact on Livelihoods. No new analysis and assessments are included in this section to describe how the physical environment may change, and this information is drawn from previous sections and the modelling work included in Appendix D. Based on the highlighted deficiencies with these assessments on the physical environment, this section will need to be revisited once the impacts to the physical environment have been re-examined.

54. At Page 5-97 a brief discussion is provided on the potential for changes to tourism in the region due to operation of the port. It is concluded that these impacts are challenging to predict due to the dependence on policy, planning, management, etc. Such impacts have the potential to be significant negative impacts and as such require further analysis, including in-depth interviews of local persons involved in the tourism sector and visitors to the area. Furthermore, alternative scenarios should be explored to address the influence of policy and planning. Please address.
55. Section 7.14.2 of the Final ToR required an assessment of the potential impacts of the project to human receptors. The following deficiencies require re-assessment:
- (i) Section 7.14.2(iv) required an assessment as it relates to disruption of access to and use of the foreshore as a result of changes to coastal processes and/or physical infrastructure. However, the loss of use of foreshore is not considered in relation to Section 5.3.10 - Community Health, Safety and Wellbeing;
 - (ii) Section 7.14.2(vi) required that the availability of employment during the different phases of the project (site preparation, construction, operation) be quantified and defined in terms of temporary vs. permanent, skilled versus unskilled and availability during the different phases of the project. In addition, an assessment of the capability of the local population to participate in any employment opportunities afforded by the project was required. Subsection 5.3.10.1 Potential Sources of Impact identifies potential estimated local employment opportunities during the construction phase, but local employment opportunities are not quantified for the operational phase. Thus, no breakdown is provided in terms of temporary vs. permanent, skilled versus unskilled and availability during the different phases of the project. No assessment of the capability of the local population to participate in any employment opportunities afforded by the project has been provided;
 - (iii) Subsection 5.3.9.1 Potential Sources of Impact, (Page 5-91) omits a potentially significant source of impact relating to the potential for an increased number of fishing vessels to be based in the port, leading to increased pressure on local fish stocks with a subsequent impact on the livelihoods of local fishers. The risk of increased local fishing pressure and its consequences should be assessed in Section 5.3.9.3 and consideration given to how any significant impacts can be mitigated;
 - (iv) At Page 5-99, reference is made to alternative views from Toco residents about expected changes to the community, but no quantification is given to understand what proportion of the community may have these views. As such, please provide a quantification of these perceptions to understand and assess the potential impact.

- (v) Subsection 5.3.10.1 Potential Sources of Impact (Page 5-99) does not identify construction or operational noise as a potential issue for local residents and this is not assessed within this section. While a separate airborne noise assessment has been prepared for the project - Appendix B Noise Modelling Report – and the impact of airborne noise is assessed in section 5.3.2 (Page 5-20) the assessment methodology does not appear to take a conservative approach to the assessment. For construction activity the source noise level used does not appear to be conservative (source noise level for percussive piling may be up to 110 dBA) and does not consider the worst case location for piling noise. For operational noise, the assessment does not consider noise associated with arriving or departing vehicles. These omissions are a significant gap in the noise assessment and thus the assessment of impacts to socio-cultural receptors under the category 'Environmental Health' at Page 5-116;
- (vi) Subsection 5.3.10.1 - Potential Sources of Impact (Page 5-99) does not identify the loss of the beach and thus loss of local recreational space as a potential impact to the local community (e.g. the area is utilised as a surfing location, which was not considered in the assessment);
- (vii) Navigation risk is assessed in Section 5.3.10 Community Health, Safety and Wellbeing under the subtopic Marine Traffic and Navigation (Page 5-100). The methodology and basis for the assessment that navigational risks during operation being categorised as low, is unclear given that no structured navigational risk assessment has been undertaken. The port will be used by relatively large ferries operating alongside recreational and commercial fishing vessels. Management of navigational safety for vessels entering or leaving the port will be important for ensuring safe access to the port. The statement at Page 5-104 which states 'No mitigations are proposed for the operations phase' is not acceptable. Further, as it relates to the construction phase, there should be a clear vessel safety management plan;
- (viii) Vehicle traffic during construction is assessed under the subtopic Vehicle Traffic (Page 5-105). The assessment of construction traffic does not include an assessment of construction traffic on Tobago associated with the supply of rock for breakwater construction.
- (ix) Page 5-109 states 'The proposed port would have 150 parking spaces. The proposed overflow parking areas are not identified'. Given that the ferries will have capacity for up to 400 cars, it is unclear where vehicles will park before embarkation. This needs to be addressed as part of the project design. Without such clarity the significance of the impact should be re-assessed for the operational phase;



- (x) Safety and wellbeing is assessed in Section 5.3.10 Community Health, Safety and Wellbeing under the subtopic Safety and Wellbeing (Page 5-112). On Page 5-113 in relation to pre-mitigation significance, the assessment notes 'With a magnitude of Medium and a sensitivity level of Medium, the significance of impact during construction and operations is considered to be Moderate.' However, the table on Page 5-114 records operational magnitude as 'small' and significance as 'minor'. Also, in the table, the residual magnitude should be 'small' and the residual significance 'minor'. These appear to be typographical errors. Please clarify or amend accordingly;
- (xi) Water supply is assessed in Section 5.3.11 Services and Infrastructure under the topic water supply (Page 5-121). It is concluded that impacts on water supply will be small during construction (Page 5-121). There will be a significant increase in the resident population during construction as well as construction activity demands while the existing supply is described as 'insufficient and unreliable'. Control and mitigation for water supply during construction and operation are described on Page 5-122. Mitigation measures are uncertain and do not demonstrably address issues of water supply. For example, it is suggested to "*liaise with WASA to conduct a study of water availability and potential alternate sources*". This is not a mitigation measure. Results of this study could potentially conclude e.g. that there is no water available and there are no alternate sources. Please re-consider.
- (xii) At Page 5-127, subsection Road Network, states "...ESIA assumes that the Valencia to Toco Road would be complete prior to the construction of the Toco Port, so that construction traffic would not need to travel on the Toco Main Road and Paria Main Road except for employees who live near those roads". In the scenario where the Valencia to Toco Roadway is not completed prior to the start of construction, an assessment of the anticipated traffic flow on the existing Paria Main Road should be conducted. Based on the outcome, additional mitigation measures may be required. Please address.
- (xiii) Visual impact is assessed in Section 5.3.12 Land Use and Aesthetics (Page 5-128). For a project of this type a more detailed Landscape and Visual Impact Assessment including photomontages and more detailed mitigation measures relating to building size/height/density and design is required. This may include considerations relating to aspects such as building size/height/density and design as they are important in ameliorating the effects of the project to some extent, although the impact on landscape is likely to remain as high even with these mitigations in place.
- (xiv) Local economic impacts are qualitatively assessed in Section 5.3.13 Economy and Development (Page 5-133). While the assessment considers positive local effects, it does not consider the potential negative effect on the Port of Spain to Tobago ferry service.



(xv) At Page 5-133 to 5-135 it is suggested that the proposed project will boost the local economy through job creation, but it is not clear whether the local community has the requisite training and experience to avail themselves of any new jobs created. The proposed measures to enhance these positive benefits rely on implementation by external parties such as the local Regional Corporation and the Ministries of Labour and Community Development. Please clarify whether these parties committed to undertaking these tasks. If not, consultation with the above-mentioned agencies should be conducted.

56. At Page 5-140, Section 5.3.15 Unplanned Events, the evaluation of significance presented only planned events for impact to air quality. Unplanned events (e.g. emergency events - increased frequency of coast guard vessels, marine vessel collision) as indicated in Section 5.2.2.2 Evaluation of Significance at Page 5-3, were not considered. Any unplanned air quality related events must be identified, considered and mitigated in the assessment.

Further, the only unplanned events identified and addressed are diesel spills and marine vessel collisions. Please revise this list to include other unplanned events such as fire, natural disaster, financial loss or economic downturn and the impacts on port maintenance and function, or water shortage.

57. At Page 5-142 it states "*Ensure that all vessels are equipped to meet international maritime standards (i.e. navigation lights, area lighting, communication equipment and radar reflectors.*" However, the existing standard for safety equipment on the Toco fishing vessels (artisanal or industrial) (Section 4) was not stated. Further, it is unclear how fishermen would be incentivised to obtain, carry, maintain and use the necessary safety equipment. Please clarify the measures to be used such as, training of the fishing community on standards of navigating around larger vessels in a confined area, and the use of light channel markers to direct vessel movement in and out of the port as a mitigation strategy, or markers to indicate areas where anchoring may be permitted e.g., high voltage areas.

58. Sub-section 7.15 – Cumulative Impact Assessment (CIA), Pages 46 to 47 of the Final ToR required the Applicant to identify potential cumulative impacts associated with other existing or proposed activities within the defined study area (i.e. immediate and wider study area).

Page 5-144, Section 5. 4.1 states that the objective and the scope of the Cumulative Impacts Analysis (CIA) includes a "high level assessment of cumulative impacts on receptors. Further, at Page 5-146 it states "only one major development project capable of influencing the Toco Port project was identified. This is the Valencia to Toco Road Project." Other ongoing projects such as, but not limited to ongoing coastal protection projects along the north coast were not considered in the assessment. Further, other infrastructural works that may be required to facilitate the project (e.g. upgrades to electricity and water services) were not considered in the assessment. Similarly, the only external drivers identified were natural hazards and climate change.



Given the nature, scale and location of this project however, cumulative impacts are expected given the multiple facilities proposed and the large area covering both marine and terrestrial habitats that stand to be affected. Consideration should have been given to the impact of declining water quality over time in the area near the marina, as well as near the docks for the ferries, where there is likely to be an accumulation of heavy metals, polyaromatic hydrocarbons (PAHs) from boat fuel, and other contaminants. The extent of pollution over time should be considered to determine whether it will adversely impact commercial and subsistence species or make them unsafe for human consumption. In addition the potential impacts of sea level rise and climate change to the design and maintenance of the proposed port facility and associated structures were not discussed as stipulated in the Final ToR. This is considered to be a serious deficiency of the EIA.

In this regard, please amend this section to consider the following, as was previously outlined in the Final ToR:

- i. Relate potential impacts from the proposed activity with existing impacts from other activities within the wider municipal area and particularly among communities within/between the Matura to Matelot area, in terms of effects to the social climate and civil amenities/infrastructure;
 - ii. Relate impacts, through the quantitative assessment, from the proposed activity with existing impacts from other activities on the coastal zone and marine environment, such as water quality. An account must be given of the quantitative assessment methods used for all the impacts identified and the level of uncertainty of any predictions. Numerical modelling should also be considered in situations to understand the spatial distribution and relationships of risks. The results of the assessment should characterise the severity or magnitude of the cumulative effect;
 - iii. Relate impacts, through the qualitative assessment, from the proposed activity with existing impacts from other activities on the coastal zone and marine environment, such as biodiversity, ecosystem function and health;
 - iv. Relate potential impacts of sea level rise and climate change to the design and maintenance of the proposed port facility and associated structures.
59. At Page 5-147, Section 5.4.5.1, Other Projects, even though it is stated that the Valencia to Toco road would be completed prior to the Toco port project, the cumulative impacts to air quality of the increased traffic flow to Toco due to the Valencia to Toco road must be considered in the cumulative assessment. Please address.



60. Section 7.14.10 of the Final ToR required an assessment of impacts of the port's activities on air quality, including climate change. The EIA in the executive summary states "Cumulative impacts from the Valencia to Toco Road project as well as natural hazards and climate change can affect the overall impact level of the Project; however, because the Road is expected to be completed prior to the start of the Toco Port, those cumulative impacts will be minimal". However, the document does not present an assessment of the port's impact on climate change, recommendations to mitigate the impacts, nor any climate change adaption practice that is part of the project to reduce climate change impacts.

The issue of impacts of climate change on the project and vice versa is briefly mentioned in Section 5.4.5.2: "External Drivers- Natural Hazards and Climate Change" Page 5-148, while climate change fails to make it into the summary of impacts table presented in Section 7 of the report.

It should be noted that the port will be exposed to the risk of climate change-related impacts, particularly in view of its exposure on north coast at the base of elevated terrain as part of the wettest area of the country and an area where the strongest winds and storm surges from westward traversing tropical storms and hurricanes usually impact.

The use of modelling with inadequate data cannot negate the prognosis and accepted knowledge based on robust research (IPCC 2013), that increases in mean and extreme sea levels are likely to cause recurring coastal inundations at the Toco port, in circumstances where already occurring extreme hazardous seas often overwhelm the area causing loss and damage in most instances in recent times. Coastal flooding events in the area from extreme events in the past have rendered the beach area unusable at times and can do the same to port and related transportation systems for the duration of an event, and even disrupt operations and damages to port infrastructure, if these impacts are not appropriately considered in the EIA. Given the observed trends and projections of sea levels and hazardous seas, one of the key considerations for this port must be with regard to climate adaptation and resilience-building.

The EIA Report failed to provide recommendations in the context of the project to manage potential cumulative impacts that can worsen global warming and climate change. The issue of how emissions from the project might affect global climate change has not been assessed in terms of impacts. A significant portion of greenhouse gas emissions will result from the proposed port project due the combustion of fossil fuel. However, the EIA does not assess greenhouse gas emissions as an impact factor neither has it advanced mitigation actions in line with this. Please address.



61. Page 5-148 Section 5.4.5.2 states "The Toco region of Trinidad has a moderate risk of earthquakes, while flooding is not considered a risk due to the general geographic elevation of most of the region". However, this conclusion is inconsistent with information presented in other sections of the EIA Report. For example, at the stakeholder engagement sessions, flooding was highlighted as an issue where a stakeholder indicated on Page 10 Appendix C that "after 27 years living in this area, he has witnessed the flooding phenomena which have been increasing over time". Another indicated on Page 11 Appendix C, that the "EIA should consider the impact of the project on coastal erosion and landslides". Furthermore, at the stakeholder engagement with the Ministry of Rural Development and Local Government, the point was made that "in 2018 there was serious damage from flooding and landslides in the area" (Page C5-2); while flood risk data from the Sangre Grande Regional Corporation showed that the area is at risk to flooding (appendix D Page D-49). Flooding and landslides associated with extreme weather events also stand out as significant risks to the project (see maps on Pages 4-41 and 4-43) but were not adequately evaluated in the impact assessment. Please re-assess.
62. Section 7.11 of the Final ToR states "*areas of impact/hazards shall be illustrated in map form and those that are unavoidable or irreversible must be specifically identified*". These impacts and hazards have not been mapped. Please address.
63. Section 7.14.10 of the Final ToR requested that an analysis of impacts as a result of emissions from port activities, including but not limited to, the estimates of the port's Greenhouse Gases (GHG) emissions (i.e. brown, black, green and blue carbon emission estimates) during reclamation, construction and annual emissions during operation, in relation to carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O). Substantive emission sources shall be identified and quantified. In response, only CO₂ emissions were provided for the diesel non road combustion equipment and truck tailpipe as shown in Tables A1-4 and A1-5 of Appendix A, during port construction. Carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O) must be provided for all phases of the port project (reclamation, construction and annual emissions during operation). Please provide.
64. Section 7.14.15 of the Final ToR required a Quantitative Risk Assessment to address the risk to the health and safety of the public, and this has not been addressed. Please provide.
65. Section 7.15.1 of the Final ToR requested "*effects to the social climate and civil amenities/infrastructure*" which was not addressed. Please provide.



CHAPTER 6 ENVIRONMENTAL MONITORING PLAN

1. Chapter 6 does not clearly identify the personnel responsible for the mitigation measures outlined. In this regard, please provide a thorough layout of the team members, the number of people needed for the designated tasks, the methodology and frequency for completion of all tasks to accomplish the proposed mitigation measures.
2. At Page 6-2, Table 6.1-1: Project Mitigation and Monitoring for Planned and Unplanned Activities, no monitoring programme is identified. In accordance with Section 9.2 of the Final ToR, a detailed monitoring plan must be provided for the different aspects of the project to ensure that mitigation measures are achieving their objectives. As such, please provide.
3. The Coastal Zone Management Plan (CZMP) only considers monitoring of beaches and does not address other physical features (e.g. coastal cliffs/headlands, rocky shoreline) and impacts on turbidity as required in the Final ToR. While some of the features are considered in the Water Quality Management Plan, the CZMP should be revised to consider monitoring of other areas that may be affected and to provide more details on the proposal for monitoring of the receiving coastal environment.
4. At Page 6-21 Section 6.2.1.3 Coastal Zone Management Plan Control Measures states that if there is a change in grain size or erosion and deposition, sand would be added or removed to bring beach to pre-Project state. This may be impractical if the change occurs as a result of a change in the coastal dynamics. Please provide evidence of the feasibility of the proposed measure.
5. Page 6-23, Section 6.2.2.2, it states "Any sediments found to be contaminated will be properly disposed off-site". Additional details on the storage, handling, treatment and final disposal of such sediment is required. Please address.
6. Page 6-23 Section 6.2.2.3 Storm Pollution Prevention and Monitoring subsection Storm Water Sampling, provides a monitoring regime which states "within two hours of the discharge of stormwater from the site, a trained Project worker will collect a water sample to determine if the stormwater from the Project site is affected by spilled or released materials. This sampling will occur through the life of the Project". It is uncertain how this sampling regime is meant to be conducted. For example, how will a stormwater sample be collected within two hours of discharge? Please provide more details on the methodology of the sampling regime. Further, the practicality and the implications of the proposed measures should also be investigated further.
7. At Page 6-26, Section 6.2.2.4 Waste Water Monitoring, it simply states that sampling and testing will be conducted monthly. Please provide a more detailed plan inclusive of proposed sampling location(s), parameters to be tested, number of samples to be taken, etc.



8. Page 6-26, Section 6.2.2.5 proposes Water Quality Management Plan Control Measures. However, given the potential impact of the proposed project on circulation and mixing that is afforded to the body of water enclosed by the breakwater, monitoring and control measures should have been identified in the event that the project itself negatively affects the water quality at the site. Similarly, no consideration has been given to the relocated river discharges and how they may affect water quality.
9. Page 19 of the Final ToR, Section 1.4, subsection Operations and Maintenance required the provision of a project specific Waste Management Plan (WMP). The submitted plan was generic and failed to address the requirements of the Final ToR. Please provide a revised, project specific plan, in accordance with Section 8 (vi) of the Final ToR. The submitted plan should consider, but not be limited to the following:
 - (i) State the estimated quantity of each type of waste that will be generated during construction and operation;
 - (ii) Describe any port reception facility;
 - (iii) The list of wastes provided in Table 6.2.3.2-1 at Page 6-28 did not consider all construction and operational solid and liquid wastes listed in Pages 6-23 to 24, nor other commonly-generated wastes which may be generated at the site during operations such as electronic waste, spent filters or spent absorbents;
 - (iv) Describe, in detail, how wastes will be managed. Table 6.2.3.2-2, at Page 6-29, summarized the preferred waste management options. However, the EIA Report did not indicate where wastes will be stored nor described the "final waste management facility" (as stated on Page 5-55), "waste treatment center" (at Page 6-32) and "fish waste treatment plant" (Page 5-121) which are expected to support waste management at the site;
 - (v) Identify the activities in all phases of the project that may produce hazardous and non-hazardous solid waste and the impacts of the type of waste produced. A list of "construction solid and liquid wastes" and "operation solid and liquid wastes" was provided on Pages 6-23 and 6-24 respectively. However the activities (sources) in the construction and operation phases which will generate the wastes listed were not provided;
 - (vi) Describe the impacts of wastes generated. Special consideration must be given to mitigating the impact of wastes on endangered marine life, such as sea turtles.

Each of the bullets highlighted above [(i) to (vi)] must be addressed within the WMP in order to satisfy the requirements of the Final ToR.

10. Section 8.3 (vii) of the Final ToR required the provision of an Operation and Maintenance Plan, which includes arrangements for the management of marine and vehicular traffic. Page 6-32 included one statement in Section 6.2.4.3. This does not address the requirement for a description of the arrangements for management of traffic during the operational phase of the project. Please address.
11. Page 6-32 Section 6.2.5 Emergency Response Plan (ERP) addresses oil spill events. However, Section 8.3 (viii) of the Final ToR requested plans to respond to emergencies incidents and accidents. Therefore, unforeseen events such as fire, earthquakes and adverse weather should also be considered. It must be designed with climate resilience and business continuity in mind, given the vulnerability of the area to extreme climate events and the potential for disruption to business operations. The Plan needs to describe the organizing, coordinating and directing of available resources in order to respond to various natural and man-made disasters and situations, and should consider the findings of the Risk Assessment. As such, please revise the ERP, in accordance with Section 8.3(viii) of the Final ToR, to include all potential sources of spills related to the project. A scoping exercise should be conducted to identify all relevant scenarios that should be included in the revised plan. At a minimum, the revised plan should include the following:
 - Plans to respond to emergencies, incidents and accidents, other than hydrocarbon spills (e.g. hurricanes, earthquakes, flooding, landslides, fires, fuel and other hazardous material spill, bomb threats and other acts of sabotage, medical and technological emergencies and occupational safety and health issues).
 - An outline of the components and structure of the emergency response team, defining their qualifications and roles as emergency response team members;
 - A description of how local residents/users will be contacted during an emergency and what type of information will be communicated to them;
 - A description of proposed emergency reporting procedures;
 - The plan to have proposed agreements with regional corporations, fire services, co-operatives, emergency response associations to help deal with emergencies or adverse situations.
12. Page 6-40 Section 6.2.5.4 Spill Scenarios; please provide the metocean data (wind, current, waves) that were used in the oil spill modelling. This is important to verify the validity of the results, especially given statements in other areas of the EIA Report that state that currents along Trinidad run from west to east.
13. The exclusion zones around the different noise activities for the protection of smaller marine mammals or sea turtles described in Section 6.2.7.1, Pages 6-55 to 6-57 and set out in Table 6.2.7.1-1, are not considered appropriate given the identified deficiencies in the underwater noise modelling. Once, the underwater noise assessment has been rectified it will be possible to confirm the most appropriate exclusion zone for marine fauna.



Further, the practicability of some of the proposed mitigation measures is questionable, such as the use of silt curtains during dredging given the already highly dynamic environment of the Bay; and a fish exclusion zone for pile driving impacts given that unlike marine mammals, fish are not possible to easily identify from a vessel, particularly in the turbid conditions of the project site. These measures require some further investigation to confirm that they can be applied at this project site.

Please re-assess the proposed mitigation and monitoring measures, further to the amendment of the underwater noise assessment. It is recommended that a exclusion zones to be applied for all marine mammals and sea turtles for impact piling are proposed in accordance with existing international good practice protocols [e.g. the JNCC (2010) piling protocol].

14. Section 6.2.1.3 of the EMP states "*If it is observed that there is a change in the deposition or erosion of local beaches during construction or operation of the Project, sand will be removed from the beaches that have experienced deposition and sand will be added to the beaches that have experienced erosion*". It is agreed that any erosion of sand from the beaches should be replaced to ensure adequate beach levels are maintained to support nesting turtles. However, the need to remove any increased deposition of sand is questionable as this could increase the area of the beach and potentially enhance nesting habitat for turtles. The validity of this proposed mitigation measure needs to be further evaluated and only implemented if the evidence indicates that this measure could support turtles nesting at this site.
15. Page 6-54 to 6-61 provides the Marine Monitoring Plan. Please indicate who is responsible for the implementation of the said Plan.
16. At Pages 6-60 to 6-61 Hard Structure and Artificial Reef Monitoring proposals were presented. However, it was stated "it is recommended that the monitoring for key species be performed by the University of Trinidad and Tobago, the University of the West Indies, or the University of the Southern Caribbean. This will be a long-term monitoring program which could be established by a professor or department and performed by students". The 'recommendation' does not constitute a plan for monitoring this component. Please re-consider.
17. At Page 6-61, with respect to Section 6.2.8 Ambient air quality monitoring, please amend the monitoring regime to reflect the recommendations noted below:
 - (i) The parameters to be monitored during construction and operation must not only be CO, NO₂, SO₂, and particulate matter. Parameters to be monitored include Total Suspended Particulates (TSP), Particulate Matter of diameter $\leq 10 \mu\text{m}$ and $\leq 2.5 \mu\text{m}$ (PM₁₀ and PM_{2.5}), Carbon Monoxide (CO), Nitrogen Dioxide (NO₂), Sulphur Dioxide (SO₂) and Ozone (O₃).

- (ii) The number and distribution of ambient air quality monitoring stations shall take into consideration the area to be covered, the spatial variability of the pollutants being measured, and the location of sensitive receptors around the facility. At a minimum, monitoring shall be conducted upwind and downwind of the facility at the fenceline, in the vicinity of the nearest sensitive receptor. Meteorological data (wind speed, wind direction, temperature and atmospheric pressure) and the details of facility operations for the monitoring period, is to be provided.
- (iii) A map illustrating the sampling points and a justification for the number and locations of the sampling points must be provided.
- (iv) Recommended methods of sampling and analysis include those developed by the United States Environmental Protection Agency, the New South Wales Approved Methods for the Sampling and Analysis of Air Pollutants or any other internationally accepted or comparable methods (e.g. ISO and Environment Canada).
- (v) Copies of quality data records in support of the monitoring data should be included. Documents include, but are not limited to, sample records, chain of custody, identification of sampling and analysis equipment, analytical methods, calibration records and the competency of the personnel and/or service provider conducting the analysis (e.g. laboratory certification).
- (vi) Source Emitter Registration of the Port is also required. The port activities fall under several designated activities outlined in Schedule 3 and releases air pollutants outlined in Schedules 1 and 2, and as such is an emitter facility. Based on Rule 4(2) of the APR 2014, the Port is required to register. Designated Activities include, Category 2 Stationary fuel combustion - consumption of fossil fuel in equipment at fixed facilities - iii Transport Terminals (seaports, airports, bus and rail terminals) and Activity 4 Petroleum and Related Industries (c) vehicle service stations - dispensing of fuel, Activity 14 Waste Handling. Please amend the monitoring plan to consider this aspect of the process.

CHAPTER 7 IMPACT SUMMARY

1. Given the deficiencies highlighted in the previous section, the impact summary should be revised to ensure that potential impacts for all phases of the proposed project are included.
2. The assessments undertaken in relation to oceanography and coastal processes, including effects on water quality and the sedimentation regime are very limited and do not provide a suitable basis for assessing how the port and associated construction activities will affect these physical processes and features, nor, the effectiveness of the identified mitigation. Of particular:



- (i) With a relatively high background suspended sedimentation concentration, once sediment rich water enters the protected harbour this is likely to settle and will not be re-mobilised and redistributed by wave action. Therefore, the seabed protected by the breakwater could be significantly affected;
- (ii) The re-direction and discharge of the river into the most protected part of the harbour could result in additional siltation in the sheltered water of the harbour;
- (iii) The wave climate in the lee of the breakwater will be significantly affected and this is likely to significantly change the nature of the beaches in its lee, including Mission Beach;
- (iv) The breakwater will significantly affect current circulation and mixing afforded to the water body protected by it. The effect on water quality could be significant, especially if pollutants, including nutrients and faecal matter are discharged into this body of water. Potential sources include the re-directed river, wastewater discharge, and stormwater discharge.

It is further identified that the impacts to these physical processes and features are a 'Source of Impact' in relation to other Resources (receptors) such as the biodiversity and Livelihood Activities. Therefore, other impacts examined in relation to these physical processes and features need to be re-examined accordingly, once the physical processes have been re-assessed.

APPENDIX A AIR DISPERSION MODELLING REPORT

1. At Page A-9, Section 2.2.2 Operation Phase, it was stated "Although there are 30 berths available for pleasure craft to be moored at the port at the same time, for modelling purposes, five pleasure crafts were assumed to be operational at a given time". The modelling must take into account the maximum pleasure crafts being operational. The maximum/worst case must be modelled based on the port maximum operating capacity of all vessels and equipment being operational. Please provide a justification for the use of only five (5) pleasure crafts.
2. At Page A-13, Section 3.1 Meteorological Data Development reports that the Weather Research and Forecasting (WRF) modelling "was conducted for calendar years 2015 to 2017 to simulate wind conditions across the modelling domains". Further to this Section 3.3 Initialization Datasets states, "WRF meteorological datasets were developed for the years 2015 through 2017 using both National Centers for Environmental Prediction (NCEP) FNL (Final) operational model global tropospheric analyses data and NCEP/NCAR Reanalysis Project7 (NNRP) data as the initial guess and boundary fields". Based on these statements provided, please clarify if the meteorological datasets were verified or validated against local real-time data sets for the project area, such as the meteorological data collected during the ambient air quality monitoring during June-October 2019 or any other data collection events or studies.



3. Section 5 Modelling Results and Discussion of Appendix A presents the results of the modelling exercise for the air pollutants NO₂, SO₂, CO, PM₁₀ and PM_{2.5}. Please note O₃ is also an air pollutant that will be emitted during both construction and operation of the port. As such O₃ concentrations must also be modelled, similarly to the aforementioned air pollutants. Please assess.
4. As it pertains to Attachment A1, Table A1-2 please note the following deficiencies:
 - (i) The horsepower (HP) equivalent to Kilowatts (KW) is incorrect as this should be corrected to 1KW=1.34HP. Please amend.
 - (ii) The source of the average load factor must be provided.
 - (iii) Emission factors were presented in g/KWh and g/s. Please clarify whether the values provided in g/s are emission factors, emission rates or the emission estimates that were derived from the modelling as Section 2.2.1 Table 2.2-1 at Page A-7 provides a complete listing of the modelled emission rates in g/s whereas Table A1-1 presents the same information as emissions.
 - (iv) Emission rates were provided, however it is unclear as to whether the estimates were derived via modelling or via calculations. Please clarify whether the emission rates provided in g/s are derived from modelling or estimated based on calculations. Table 2.2-1 of Section 2.2.1 states that modelled emission rates are provided, however Section 2.2.1 also states that "Emissions were calculated from the operational data for each activity (e.g., fuel use, annual hours of operation, vehicle kilometres travelled) and the corresponding emission factors. Where necessary, additional approximations were made based on best available information. For modelling purposes, the construction activities were modelled as a series of area sources and the equipment and vessels were assumed to be active only between the hours of 8 a.m.-5 p.m. Figure 2.2-1 displays the locations of the area sources representing construction activities. Table 2.2-1 provides a complete listing of the modelled emission rates in grams/second (g/s)." If emissions were estimated based on calculations, the equations used, all inputs and assumptions must be provided, along with a worked example for one of the air pollutants.
5. As it pertains to Attachment A1, Table A1-3 please note the following deficiencies:
 - (i) If W_{LOADED} is 93.2 tons and W_{EMPTY} is 44.7 tons, the truck load should equal weight of loaded truck minus empty truck which gives a load of 48.5 tons and not 53.4 tons as stated in the table. Please correct.



- (ii) If Vehicles Kilometers Travelled (VKT) is utilised as the activity data, then VKT equals the number of trips made multiplied by the distance travelled. However, the equation provided for VKT is $(TM/LOAD) \times L$ where TM is the total material handled, LOAD is the average truck load in tonnes and L presents distance in kilometers. Please provide an explanation for the equation used for VKT.
- (iii) Provide a worked example of the calculation of emissions in tons/yr, utilizing Total Suspended Solids (TSP) as an example.

6. With respect to Table A1-4 and Table A1-5, please provide the following:

- (i) The source of the maximum rated capacity (hp) utilised for the various equipment.
- (ii) The equation provided to calculate emission rate in tonnes per year is given as:

$$E = EF_{adj} \times P \times OP \times (1 \text{ tonne}/1,000,000 \text{ g}), \text{ where:}$$

E - Annual emission rate; tons per year (tons/yr);

EF_{adj} - final emission factor used in model, after adjustments to account for transient operation and deterioration (g/hphr);

P - Diesel engine input; horsepower (hp); and

OP - annual operating hours; hours per year (hr/yr)

The emission estimates presented in the tables for the various equipment differs to the emission values obtained when utilising the equation above. The emission estimates presented in the table are only derived when multiplied by the load factor. Please verify the equation used and rectify where applicable.

- (iii) The softcopy worksheets (MS Excel format) used to derive the in-use emission factors utilised and the emission estimates calculated for the various equipment must be provided. The worksheets must include all input values used to derive the in-use emission factors, including but not limited to, in-use adjusted brake-specific fuel consumption, transient adjustment factor, deterioration factor, zero-hour steady-state emission factor, grams PM sulfur/grams fuel sulfur consumed, in-use adjusted hydrocarbon emissions, episodic weight percent of sulfur in non-road diesel fuel, relative deterioration factor (% increase / % useful life), constant for a given pollutant/technology type, fraction of median life expended and default certification fuel sulfur weight percent.

7. Please address the following deficiencies identified within Attachment A2: Emissions Documentation of Appendix A:



- (i) Table A2-2: Vessel Emissions During Operational Phase, Note 'b' provided below the table, states Table 11 shows Category 1 harbor craft emission factors. However, this is incorrect as it is shown in Table 14. Please amend.
- (ii) Table A2-2 - The source/reference for the engine power (kW/hp) must be provided.
- (iii) Section 2.2.2 Operational Phase at Page A-9, lists the typical marine vessels at the port during operation, as provided by NIDCO, as 2 ferries, 3 small cargo/oil/workboat vessels, 2 coast guard vessels, 30 pleasure crafts and 50 fishing boats. However, the emissions in Table A2-2 are provided for 5 ferries, 2 boats and 5 pleasure crafts, as a conservative approach. The emissions should represent maximum operational capacity of the port, worst case scenario. As such the emissions for the maximum number of vessels operating at the port must be provided i.e. 2 ferries, 3 small cargo/oil/workboat vessels, 2 coast guard vessels, 30 pleasure crafts, 50 boats. Please address.
- (iv) For Table A2-2, the emission rates are provided, however, it is unclear as to whether the estimates were derived via modelling or via calculations. Please clarify if the emission rates provided in g/s are derived from modelling or estimated based on calculations. At Page A-10, Table 2.2-2, the title "Modelled Emission Rates for the Operation Phase, indicates that modelled emission rates are provided. However, Section 2.2.2 also states that "Emissions from port operations were estimated based on a number of factors, including activity levels, fuel types, equipment capacities, and standard emission factors that are published by the U.S. Environmental Protection Agency in the publication Current Methodologies and Best Practices for Preparing Port Emission Inventories (USEPA, 2006)". If based on calculations, the equation used, all inputs and assumptions should be provided, along with a worked example for one of the air pollutants. Please provide.

Other Deficiencies which require addressing are as follows:

1. Air Quality

The robustness of the assessment and baselining of the air quality impacts at all stages of the project is lacking. The EIA needs to better consider a holistic approach to the modelling of future air pollution emissions and the cumulative impacts that can accrue. The port and the planned improved road works will provide access to a largely undeveloped section of Trinidad, which has unique resources that can attract tourism, agriculture and other commercial business. These resources will become easier accessed as a result of the port and improved transportation infrastructure which will incentivise development. The development will result in increased traffic volumes, which will drive up the air pollution emission volumes. Therefore, it is misleading for the EIA Report to conclude minor impacts will accrue to air quality, when it has not assessed or made any assumptions as it relates to global climate change which has far reaching negative consequences at the local to global scales.



The modelling of air quality did not cover all the required air-quality emissions contained in the Final ToR, while the monitoring of some elements fell short of the expected standards. In particular, the EIA fails to consider model prediction of tropospheric ozone. As a consequence, confidence is very low on whether the air quality monitoring data and model simulated output presented in the EIA Report, adequately captured air pollution data that represent the Toco port project area. This is due to the following:

- (i) The EIA did not completely assess predictions for all the important air-quality emission parameter that can occur during the project operation phase. In particular the EIA did not assess the prediction of tropospheric Ozone;
- (ii) The short time-slice (5 months) during which air-quality monitoring data was captured and used for baselining the project area is inadequate as a base reference against which the changes due to project can be measured;
- (iii) The baseline did not consider seasonality which is a major factor, as baseline data only represented the wet season ;
- (iv) The period used to baseline ozone and ozone precursors missed out on two particular high vehicular traffic periods in the area, namely Carnival and Easter;
- (v) The assessment of the baseline and non-modelling of ozone within the vicinity of the port location, given the narrow view adopted with regard to the treatment of meteorological processes as it relates to accounting for the presence or change in air quality at the site.

The EIA is correct in that meteorological elements directly determine whether ozone and ozone precursors are contained locally or are transported downwind. This is a narrow view to adopt. Apart from the weather elements (temperature, relative humidity, wind direction & speed) which were assessed in the EIA in relation to their impact on the level of ozone recorded at the monitoring site, the MSD takes note of a critical gap, in that specific seasons and weather patterns which play a major role in establishing conditions conducive for accumulation of high ozone concentrations and terminating of such episodes were not assessed. In particular, the presence of high pressure/ridge systems is well known as a significant determinant and a conducive environment for high ozone accumulation episodes; yet, neither atmospheric pressure nor synoptic weather pattern during the monitoring period were considered as factors that could possibly impact ozone accumulation in the area. These are major concerns which reduce the confidence in the EIA finding that the impacts on air quality are minor, which affects the mitigation actions proposed or not proposed.

Recommendation

1. It is very important that the baselining of ozone across all seasons be done and factored into the air quality impact assessment,
2. Baseline and assess the impact of atmospheric pressure and the presence of high pressure/ridge systems on ozone either within the study area;
3. The air quality baseline and assessment for impact must consider the dry season as an integral season for assessing air quality.



Rationale

- a) Ground ozone represents a very dangerous health hazard; therefore there is a strong rationale for the need to appropriately assess the impact of ground ozone which can emanate from air quality issues related to the project;
- b) The dry season is the season when the background air quality is likely to naturally deteriorate the most, given it is the season which generates the most dust, has the most bush/forest fires, and high volumes of dust hazes;
- c) The dry season is also the season during which the project area is likely to see additional volumes of vehicular traffic due to Carnival and Easter which can produce additional volumes of ozone precursors and conducive environmental and weather conditions for trapping of air pollutants closer to the ground;
- d) The dry season could substantially influence the results for air quality impact results in general;
- e) High-pressure/ ridge patterns play an important role in the vertical redistribution of ozone and ozone precursors. In fact, it may be due to this gap that the EIA Report results appeared confusing, when the author states on Page F-39 "Thus, these results did not generally conform to expected results, in which ozone was expected to increase with temperature, where highest temperatures would facilitate the conversion on nitrous oxides generated during the morning period to ozone... and so it is possible that the differences could be a natural occurrence."
- f) To be clear, high pressure/ridge systems are characterised by widespread sinking of air through most of the troposphere. The subsidence or sinking of air associated with these high-pressure systems creates a pronounced inversion in the temperature profile which serves as a strong lid to contain pollutants such as ozone in a shallow layer in the troposphere, thus causing high ozone concentration to accumulate. At the same time, the local physical geography can exaggerate the problem; since, if the prevailing low level flows of the local wind was east-south-easterly or south-easterly, such a flow will enhance the sinking motion of air on the leeward of the Northern range, where the port is to be located. Therefore, on a day when there is a high pressure-ridge system within Trinidad and Tobago's area with subsiding air from the upper atmosphere causing a strong trade wind inversion, along with long hours of sunlight (not necessarily high temperatures) and relatively few clouds, it is likely to have high concentrations of ozone in the vicinity of the project. In such conditions, it may not be surprising to find the ozone levels are much higher than that observed, including during the night, since these conditions are ideal for the photochemical production of ozone and stagnation of ozone plumes. In such conditions ozone plumes can maintain their integrity for 12 hours and may have been contributing factors on days with high ozone levels during the monitoring period;
- g) It is critical to note that high pressure / ridge systems are most prevalent and pronounced in Trinidad and Tobago during the dry season, while the baselining of ozone occurred during the wet season when the weather patterns that are most conducive for accumulation of high concentrations of ozone are not as prevalent in Trinidad and Tobago.

