

# **Darwin Pipeline Duplication Project**

## **EPBC Act - Preliminary Documentation Report – Response to Comments**

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**January 2024**

**Table 1 Response Table**

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<b>I. SUMMARY</b>	
<p>1. The Environment Centre NT (ECNT) provides this submission on the Preliminary Documentation Report (PDR) for the Darwin Pipeline Duplication (DPD) Project (EPBC 2022/09372), published on 12 November 2023 by the proponent, Santos NA Barossa Pty Ltd (Santos).<sup>1</sup> The Commonwealth Minister for the Environment and Water (Minister) has determined that the DPD is a controlled action under s 75 of the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act), and is therefore subject to federal review for its potential impacts on identified Matters of National Environmental Significance (MNES).</p>	<p>Noted as background, contextual information and statements. No comments that require a response by Santos.</p>
<p>2. The DPD is a key component of Santos's proposed offshore Barossa Gas Project.<sup>2</sup> The project requires the construction, operation, and decommissioning of a subsea gas export pipeline to transport hydrocarbons between the offshore Barossa gas field and the existing Darwin Liquefied Natural Gas facility (DLNG) at Wickham Point in Darwin. The DPD consists of a section of this pipeline connecting the DLNG with the offshore Barossa Gas Export Pipeline. The pipeline would be approximately 123 km long, including 23 km of pipeline in Commonwealth waters and 100 km of pipeline in Northern Territory (NT) waters including Darwin Harbour.</p>	<p>Noted as background, contextual information and statements. No comments that require a response by Santos.</p>
<p>3. Santos's DPD proposal includes, in summary, a construction phase including seabed preparation, trenching, offshore spoil disposal, and installation of the pipeline and associated infrastructure including an onshore section at the DLNG. Pre-commissioning activities will include flooding, cleaning, gauging, and testing of the pipeline, pipeline dewatering, preconditioning, and nitrogen packing. Operational activities will include transport of hydrocarbons through the pipeline, and vessel-based inspection, maintenance, and repair activities along the pipeline. Santos states that decommissioning activities will be conducted as per regulatory requirements. A range of vessels will support project activities, including surveys, anchor handling, environmental monitoring, and crew changes.<sup>3</sup></p>	<p>Noted as background, contextual information and statements. No comments that require a response by Santos.</p>
<p>4. The DPD will duplicate part of the existing Bayu-Undan pipeline, which is currently used to transport gas from the Bayu-Undan field in Timor Leste to the DLNG for processing. Santos's justification for duplicating part of the existing Bayu-Undan pipeline is that the DPD will be used to transport gas from the Barossa field to the DLNG for</p>	<p>Noted as background, contextual information and statements. No comments that require a response by Santos.</p>

<sup>1</sup> Santos, Notification of Publication of Preliminary Documentation: Darwin Pipeline Duplication Project (EPBC 2022/09372) (12 November 2023), <https://www.santos.com/barossa/dpd-preliminary-report/>; Santos, Darwin Pipeline Duplication Project: Preliminary Documentation Report (October 2023), <https://www.santos.com/wp-content/uploads/2023/11/DPD-Project-Preliminary-Documentation-Report.pdf> (PDR).

<sup>2</sup> See Santos, Barossa Gas Project (2023), <https://www.santos.com/barossa/>.

<sup>3</sup> Santos, Barossa Gas Project (2023), <https://www.santos.com/barossa/>. See also PDR, Chapter 2.

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<p>processing, allowing the Bayu-Undan pipeline to be repurposed at some future unspecified time for carbon capture and storage (CCS) activities, namely the transport of extracted carbon dioxide (CO<sub>2</sub>) from the DLNG to Bayu-Undan.<sup>4</sup></p>	
<p>5. In summary, based on our review of Santos’s self-assessment in the PDR of the impacts of the DPD on the relevant MNES:</p> <ul style="list-style-type: none"> <li>a. Santos has failed to provide sufficient information about the direct and indirect impacts of GHG emissions from the DPD on the relevant MNES. The DPD is a necessary and indispensable component of the larger offshore Barossa Gas Project, which will make a major contribution to climate change, consuming a substantial part of Australia’s remaining fair-share carbon budget up to 2050. Any assessment of the DPD requires an assessment of the lifetime GHG contribution and resulting climate impacts of the Barossa Gas Project, particularly considering that Santos’s justification for the DPD is that it will reduce Barossa’s total emissions by enabling the use of the existing Bayu-Undan pipeline for carbon capture and storage.</li> <li>b. As a substantial cause of direct and indirect lifecycle emissions, the DPD and Barossa Gas Project will have unacceptable climate change-related impacts on MNES, including threatened species and communities, migratory species, Commonwealth marine areas, and the environment in general.</li> <li>c. Approval of the DPD would be inconsistent with the principles of ecologically sustainable development, including the principle of inter-generational equity, the precautionary principle, and the principle of conserving biodiversity and ecological integrity.</li> <li>d. In relation to listed threatened species and ecological communities, Santos has failed to provide sufficient information about the impacts from seabed disturbance, vessel collisions, underwater noise, and light pollution.</li> <li>e. In relation to listed migratory species, Santos has failed to provide sufficient information on similar issues, including noise impacts on dolphin species and artificial light impacts on bird species.</li> <li>f. In relation to impacts on the marine environment, Santos has conducted a narrow review of impacts in Commonwealth marine areas only, and failed to provide sufficient information about the impacts from seabed disturbance and pipeline failures on the marine environment.</li> </ul>	<p>a. The DPD Project does not involve extractive activities and is therefore not a substantial cause of emissions from the consumption of gas extracted as a result of the Barossa Gas Project within the meaning of s527E of the EPBC Act. In their Statement of Reasons for their decision under s87 (Appendix 1B in the PDR), the Minister’s delegate accepted this position, noting at para. 29:</p> <p><i>‘The delegate considered the following regarding GHG emissions associated with the proposed action:</i></p> <p><i>a) This action is part of a larger project to enable natural gas from offshore reservoirs of the Barossa Area Development to be exported to the existing Darwin LNG facility via a new pipeline. The proposed action does not include extractive activities. As noted in paragraph 8, other elements of this larger action will be regulated by NOPSEMA. ECNT’s submission is premised on the department considering the emissions associated with the larger action. The delegate understands that an Environment Plan for the extractive activities, which form part of the larger action, will be submitted to NOPSEMA for assessment and approval.</i></p>

<sup>4</sup> PDR, 38, 241.

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	<p><i>b) Having accepted the referral of the proposed action pursuant to s 74A, the delegate considered the GHG emissions associated with the proposed action. The delegate considered that the proposed action, given its place in the supply chain, would not be a substantial cause of scope 3 GHG emissions associated with the end-use of gas from the larger action.</i></p> <p><i>c) Taking into account the nature and size of the proposed action, the delegate considered that the scope 1 and 2 GHGs emissions associated with the proposed action will not be a substantial cause of any adverse climate change-related effects on matters of national environmental significance.'</i></p> <p>As such, direct/indirect impacts of GHG emissions were not part of the information required to be included in the PDR, relevant to the impacts of the DPD. Notwithstanding this, such information was included in the PDR at Appendix 29 (the Supplementary Environmental Report prepared under the <i>Environment Protection Act 2019 (NT)</i>), which addresses GHG emissions from both the DPD Project and Barossa Project, including scope 3 emissions.</p> <p>The Barossa Production Operations Environment Plan (under development) to be assessed by NOPSEMA, is the relevant assessment for extractive activities and will provide a comprehensive description of direct/indirect GHG emissions impacts from the broader Barossa Project.</p> <p>b. As noted above, the DPD Project is not a substantial cause of the lifecycle emissions from the Barossa Project. Further, even if scope 3</p>

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	<p>emissions of the Barossa Project were relevant impacts of DPD, the currently observed global warming and associated anthropogenic climate changes cannot be directly attributed to any one development or activity, as they are the result of net global GHG emissions and GHG sinks that have accumulated in the atmosphere since the industrial revolution began. It is therefore not possible to directly attribute climate change impacts globally or upon any particular MNES to any one project or activity, such as the Barossa Project, due to the spatial (global) and temporal (since the industrial revolution) extent of GHG emissions. It is also not possible to conclude that any one project will result in a <u>net</u> increase in global GHG emissions and global temperatures, given the large number of variables involved.</p> <p>The Barossa Gas Project will be a designated large facility under the NGER Act and as such will be subject to the Safeguard Mechanism. This means that Santos, among other things, will have an obligation to ensure that the net covered emissions of GHGs from the operation of the Barossa Gas Project do not exceed the applicable baseline, as set by the Australian Government in line with Australia's 2030 and 2050 emissions reduction targets.</p> <p>See responses below for 5,.c.(in III.D), d. (in IV), e. (in V), f. (in VI).</p>
<p>6. We recommend that:</p> <ol style="list-style-type: none"> <li>a. Considering the flaws and gaps in Santos's self-assessment of the impacts of the DPD on the relevant MNES, the Minister should refuse to grant approval of the controlled action because the DPD will have unacceptable impacts on the relevant MNES.</li> <li>b. In the alternative, the Minister does not have sufficient information to make an informed decision under Part 9, and should request further information under s 132 of the EPBC Act.</li> </ol>	<p>Santos does not agree that there are any flaws or gaps in its assessment and considers that the PDR provides a comprehensive assessment of the impacts of the DPD on relevant MNES.</p> <p>The PDR demonstrates that the impacts of the DPD Project on MNES can be appropriately</p>

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	<p>managed and mitigated such that the DPD will not have unacceptable impacts on MNES.</p> <p>Santos considers the Minister does have sufficient information based on the PDR, which also attaches the referral information and the comprehensive Supplementary Environmental Report, to make an informed decision.</p>
<p><b>II. LEGISLATIVE FRAMEWORK AND PROCEDURAL HISTORY</b></p>	
<p>A. Assessment of a controlled action under the EPBC Act</p>	
<p>7. This submission concerns the assessment of the DPD under Australia’s main environmental law, the EPBC Act. The objects of the Act include but are not limited to:</p> <ul style="list-style-type: none"> <li>a. Providing for the protection of the environment,<sup>5</sup> especially MNES;</li> <li>b. Promoting ecologically sustainable development through the conservation and ecologically sustainable use of natural resources;</li> <li>c. Promoting the conservation of biodiversity; and</li> <li>d. Assisting in the co-operative implementation of Australia’s international environmental responsibilities.<sup>6</sup></li> </ul>	<p>Noted as background, contextual information and statements. No comments that require a response by Santos.</p>
<p>8. The EPBC Act prohibits a person from taking a “controlled action” without approval.<sup>7</sup> A “controlled action” is one which has, will have, or is likely to have a significant impact on an MNES identified in Part 3 of the Act.<sup>8</sup> The relevant MNES in Part 3 is a “controlling provision” for the action.<sup>9</sup></p>	<p>Noted as background, contextual information and statements. No comments that require a response by Santos.</p>

<sup>5</sup> The Act defines “environment” as broadly encapsulating “ecosystems and their constituent parts” and “natural and physical resources,” among other things: EPBC Act, s 528.

<sup>6</sup> EPBC Act, s 3.

<sup>7</sup> EPBC Act, s 67A.

<sup>8</sup> EPBC Act, s 67.

<sup>9</sup> EPBC Act, s 67 and Part 3.

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<p>9. A person proposing to take an action that they think may be or is a controlled action must refer the proposal to the Minister.<sup>10</sup> The Minister must then decide whether the action is a controlled action and which MNES provisions of Part 3 are “controlling provisions.”<sup>11</sup></p>	<p>Noted as background, contextual information and statements. No comments that require a response by Santos.</p>
<p>10. On 8 November 2022, Santos referred the DPD to the Minister under s 68 of the EPBC Act.<sup>12</sup></p>	<p>Noted as background, contextual information and statements. No comments that require a response by Santos.</p>
<p>11. On 6 December 2022, a delegate of the Minister determined that the DPD is a controlled action under s 75 of the EPBC Act. The delegate identified the controlling provisions as:</p> <ul style="list-style-type: none"> <li>a. Listed threatened species and ecological communities (ss 18 &amp; 18A);</li> <li>b. Listed migratory species (ss 20 &amp; 20A); and</li> <li>c. The marine environment (ss 23 &amp; 24A).</li> </ul>	<p>Noted as background, contextual information and statements. No comments that require a response by Santos.</p>
<p>12. The delegate also determined that, pursuant to s 87(1)(b) of the EPBC Act, the DPD requires assessment on preliminary documentation under Part 8, Division 4 of the Act, and published reasons for this decision on 25 January 2023.<sup>13</sup></p>	<p>Noted as background, contextual information and statements. No comments that require a response by Santos.</p>
<p><b>B. Assessment on preliminary documentation</b></p>	
<p>13. Since the delegate’s decision that the action will be assessed on preliminary documentation, the proponent was required to publish the referral information and further specified information, and invite written comments in accordance with the Act.<sup>14</sup></p>	<p>Noted as background, contextual information and statements. No comments that require a response by Santos.</p>

<sup>10</sup> EPBC Act, s 68.

<sup>11</sup> EPBC Act, s 75.

<sup>12</sup> See PDR, Appendix 1A.

<sup>13</sup> PDR, Appendix 1B.

<sup>14</sup> EPBC Act, s 95A

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14. Santos published its PDR in November 2023 for public comment.	Noted as background, contextual information and statements. No comments that require a response by Santos.
15. Once the public comment period is closed, the proponent must prepare, as soon as practicable after the end of that period, a document to be given to the Minister that sets out the information previously given to the Minister in relation to the action with any changes or additions needed to take account of the comments and contains a summary of the comments received and how those comments have been addressed. <sup>15</sup> The Secretary of the Department must then prepare and give to the Minister a recommendation report that addresses whether the action be approved and, if so, any conditions that should be attached. <sup>16</sup>	Noted as background, contextual information and statements. No comments that require a response by Santos.
16. Assessment based on preliminary documentation is less rigorous than certain other forms of assessment under the EPBC Act; for example, it evades the need for a comprehensive environmental impact statement. <sup>17</sup>	Assessment by preliminary documentation was considered to be the appropriate form of assessment by the Minister's delegate based on the Referral information and potential impacts of the DPD Project.
17. In the Statement of Reasons, the Minister's delegate indicates that this assessment approach is "appropriate ... and will allow the Minister to make an informed decision" under Part 9, on the grounds that (among other things) "[t]he number and complexity of relevant impacts is low and locally confined" and "good quality information has been provided in the referral" and further specified information. <sup>18</sup>	Noted as background, contextual information and statements. No comments that require a response by Santos.
18. The delegate's decision does not address Santos's failure to assess the potential climate-related impacts of the project, which are high in number and complexity. The decision also belies the need for a more comprehensive environmental impact statement for a project of this size and scale, considering that it underpins one of the largest and most carbon-intensive offshore gas projects in Australia's history.	See response for 5a. Otherwise, these comments relate to the delegate's decision on the EPBC Referral. Therefore this is a matter that does not require a response from Santos.
C. Decision on approval of a controlled action	

<sup>15</sup> EPBC Act, s 95B

<sup>16</sup> EPBC Act, s 95C

<sup>17</sup> See, for example, EPBC Act, Part 8, Division 6.

<sup>18</sup> 18 PDR, Appendix 1B, [33].



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19. The Minister must now decide whether or not to approve, for the purposes of each controlling provision, the taking of the action, and if so, on what conditions. <sup>19</sup>	Noted as background, contextual information and statements. No comments that require a response by Santos.
20. In making the decision under Part 9, the Minister must consider matters relevant to any matter protected by a controlling provision for the action, and economic and social matters. <sup>20</sup> For example, in relation to threatened species and migratory species, the Minister must not act inconsistently with Australia's obligations under certain international treaties. <sup>21</sup>	Noted as background, contextual information and statements. No comments that require a response by Santos.
21. In considering the above matters, the Minister must take into account, among other things, the principles of ecologically sustainable development, <sup>22</sup> including the precautionary principle, principle of inter-generational equity, and the principle of conserving biodiversity and ecological integrity. <sup>23</sup>	Noted as background, contextual information and statements. No comments that require a response by Santos.
22. If the Minister "believes on reasonable grounds" that they do not have enough information to make an informed decision on whether to approve a controlled action, the Minister may request "specified information relevant to making the decision," including from Santos as the project proponent, before making the decision. <sup>24</sup>	Noted as background, contextual information and statements. No comments that require a response by Santos.
23. This submission demonstrates that Santos's referral information and preliminary documentation is tainted by inaccuracies and deficiencies, which means the Minister lacks sufficient information to make an informed decision under Part 9. Further, this submission highlights evidence that the DPD will cause unacceptable risks to MNES. For these reasons, the Minister should not approve the taking of this controlled action.	Santos does not accept that there are any inaccuracies and deficiencies in the PDR and considers the ECNT submission fails to establish any such inaccuracies or deficiencies. Santos considers the PDR, which also attached the Referral information and comprehensive SER, provides the Minister with sufficient information to make an informed decision.  The PDR demonstrates that the impacts of the DPD Project on MNES can be appropriately

<sup>19</sup> EPBC Act, ss 130(1), 133, 134.

<sup>20</sup> EPBC Act, s 136(1).

<sup>21</sup> EPBC Act, ss 139, 140.

<sup>22</sup> EPBC Act, s 136(2)(a). The Minister is required to take into account the precautionary principle when determining whether to approve the taking of an action under s 133: EPBC Act, s 391.

<sup>23</sup> See EPBC Act, s 3A.

<sup>24</sup> EPBC Act, s 132.

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	managed and mitigated such that the DPD will not have an unacceptable impact on MNES.
<b>III. THE CLIMATE IMPACTS OF THE DPD</b>	
A. Santos must provide sufficient information about the impact on relevant MNES of the indirect GHG emissions from the DPD	
24. For the reasons that follow, Santos should have provided sufficient information about the impact on the relevant MNES of the indirect impacts of GHG emissions from the DPD. As Santos did not undertake this assessment, the Minister does not have sufficient information to make an informed decision under Part 9 for the purposes of the relevant controlling provisions, and Santos has also failed to demonstrate that the GHG emissions from the DPD will have no unacceptable impacts on the relevant MNES.	See response for 5.a. and 5.b.
25. First, the DPD is a necessary and indispensable component of the larger offshore Barossa Gas Project. The Minister's delegate acknowledges that the action "is part of a larger action to enable natural gas from offshore reservoirs of the Barossa Area Development to be exported..." <sup>25</sup> The purpose of the DPD, if approved, is to transport gas from the Barossa gas field to the DLNG for processing into liquefied natural gas (LNG). <sup>26</sup> Without the pipeline, Santos cannot transport gas from the field to the processing facility. Santos also states that it intends the DPD to enable the repurposing of the Bayu-Undan pipeline for CCS activities at some future unspecified time. <sup>27</sup>	See response for 5.a. and 5.b.
26. As such, the DPD does not stand alone and is fully integrated with the Barossa Gas Project. It is neither accurate nor relevant to state that the specific DPD proposal "does not include extractive activities," <sup>28</sup> when its sole purpose is to enable extractive activities as part of the Barossa development.	See response for 5.a. and 5.b. It is factually correct that the DPD proposal does not involve extractive activities and is limited to activities involved in constructing, operating and decommissioning the DPD pipeline.
27. Second, the EPBC Act provides that the indirect impacts of an action include an event or circumstance that is an indirect consequence of the action, where the action is a "substantial cause" of that event or circumstance. <sup>29</sup> An impact that evidence strongly suggests might manifest itself many years later, or occurs at a substantial geographic	See response for 5.a. and 5.b.

<sup>25</sup> PDR, Appendix 1B, [8].

<sup>26</sup> PDR, 35. LNG is a fossil fuel primarily used for combustion to create energy.

<sup>27</sup> PDR, 38, 241.

<sup>28</sup> PDR, Appendix 1B, [29(a)].

<sup>29</sup> EPBC Act, s 527E.

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<p>distance from the location of the original action, may still be an indirect consequence that is substantial enough to cause an impact.<sup>30</sup></p>	
<p>28. Here, the scope 1, 2, and 3 GHG emissions from the Barossa Gas Project – such as those from the extraction, transport, processing, and use of gas – and the resulting climate change driven by those emissions are indirect impacts of the DPD. Without the DPD, the emissions from the Barossa Gas Project would not occur, because there would be no way of transporting the gas from the field to the processing facility. The DPD, as the proposed action, is therefore a substantial cause of the indirect emissions.</p>	<p>See response for 5.a. and 5.b.</p>
<p>29. As for whether the DPD, and the Barossa Gas Project as a whole, is a substantial cause of climate change-related harms to MNES, Santos has not provided this information (as discussed further below). A full assessment of the indirect impacts of the DPD is needed to achieve the objects of the EPBC Act, including to ensure the protection of MNES, promote ecologically sustainable development, and promote the conservation of biodiversity.</p>	<p>See response for 5.a. and 5.b.</p>
<p><b>B. The direct and indirect GHG emissions from the DPD</b></p>	
<p>30. The DPD and Barossa Gas Project would be a significant source of the GHG emissions that are driving climate change. The gas to be extracted from the Barossa field contains 18% CO<sub>2</sub> per volume – a higher level of CO<sub>2</sub> by volume than any other gas resource currently made into LNG.<sup>31</sup> Total emissions from the project (including scope 3 emissions) would be approximately 15.2 million tonnes (Mt) of carbon dioxide equivalent (CO<sub>2</sub>-e) per year,<sup>32</sup> or a total of 380 Mt for the estimated project life of 25 years. The total lifetime emissions of the project are equivalent to more than 80% of Australia's current annual emissions.<sup>33</sup></p>	<p>See response for 5.a. and 5.b.</p>
<p>31. By way of comparison, the scope 1, 2, and 3 emissions from the project would consume the equivalent of approximately 6.9% of Australia's total remaining carbon budget from 2024 to 2050 for limiting global temperatures</p>	<p>See response for 5.a. and 5.b.</p>

<sup>30</sup> Australian Government, Environment Protection and Biodiversity Conservation Act 1999 (Cth) – Policy Statement – ‘Indirect consequences’ of an action: Section 527E of the EPBC Act, 2.

<sup>31</sup> John Robert, Institute for Energy Economics and Financial Analysis, Should Santos’ Proposed Barossa Gas “Backfill” for the Darwin LNG Facility Proceed to Development? (March 2021), 2.

<sup>32</sup> Santos, Darwin Pipeline Duplication Project: Supplementary Environmental Report (May 2023), 297.

<sup>33</sup> According to the Australian Government, national GHG emissions for the year to December 2022 were estimated to be 463.9 Mt CO<sub>2</sub>e: Department of Climate Change, Energy, the Environment and Water, Australian Government, Quarterly Update of Australia’s National Greenhouse Gas Inventory: December 2022 (March 2023), <https://www.dcceew.gov.au/sites/default/files/documents/nggi-quarterly-update-dec-2022.pdf>, 8.

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<p>to 1.5°C.<sup>34</sup> This means that approving the DPD and the Barossa Gas Project would significantly narrow Australian and global options for achieving the internationally agreed temperature goal and avoiding the most catastrophic climate harms.</p>	
<p>32. Furthermore, Santos has no credible plan to avoid, mitigate, or offset the emissions from the Barossa Gas Project and, consequently, the significant indirect impacts of the DPD.</p>	<p>See response for 5.a. and 5.b.</p> <p>Santos further notes that the Barossa Gas Project will be a designated large facility under the Safeguard Mechanism and required to comply with an emissions baseline, as set by the Australian Government in line with its 2030 and 2050 emissions reduction targets. It is a matter for Santos to determine how it will meet its baseline and it will have a legal obligation to procure offsets if it cannot meet its baseline, with significant penalties applying if it does not do so. While there is no requirement for Santos to provide details of how it intends to meet its broader emissions reduction targets in the PDR, and this information is not relevant to the impacts of the DPD Project for the reasons set out at 5.a. and 5.b. above, Appendix 29 of the PDR notes that Santos has a goal of reducing customer emissions (Santos scope 3 emissions) by 1.5 MT CO<sub>2</sub>-e per annum (Santos Climate Change Report 2023, <a href="https://www.santos.com/wp-content/uploads/2023/02/Climate-Change-Report-2023.pdf">https://www.santos.com/wp-content/uploads/2023/02/Climate-Change-Report-2023.pdf</a>), which will be achieved through generation of carbon offsets for customers along with the supply of clean fuels, and a commitment to only sell products to customers from countries</p>

<sup>34</sup> Based on Australia’s upper-end trajectory towards 1.5°C under the fair share methodology, the total national carbon budget from 2024 to 2050 (excluding Land Use, Land Use Change and Forestry) is 5,543.6 Mt of CO<sub>2</sub>e: Climate Action Tracker, Australia: Data Download (28 March 2022), <https://climateactiontracker.org/countries/australia/>.

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	that have a net-zero commitment or that are signatories to the Paris Agreement.
<p>33. The Barossa Gas Project is subject to the Commonwealth Safeguard Mechanism, which requires Santos to fully offset or mitigate all reservoir carbon emissions, along with reducing net scope 1 emissions year on year. Safeguard Mechanism emissions can only be offset using ACCUs or Safeguard Mechanism credits. In the first five years of operations, ECNT understands that Santos is proposing to rely on offsets, moving to CCS from 2030.</p>	See response for 5.a. and 5.b.
<p>34. ECNT submits that Santos has provided insufficient evidence that it will be able to meet the requirements of the Safeguard Mechanism. Indeed, the evidence suggests that Santos will be unable to meet these requirements. To approve the DPD in the face of this uncertainty could amount to authorising a contravention of other Commonwealth legislation, namely the National Greenhouse and Energy Reporting Act 2007, and the National Greenhouse and Energy Reporting (Safeguard Mechanism) Rule 2015 .</p>	See response for 5.a., 5.b and 32.
<p>35. Firstly, Santos is unlikely to be able to secure the ACCUs required to offset emissions from the Barossa Project.</p>	See response for 5.a., 5.b and 32.
<p>36. Rob Cawthorne’s report, at Annexure A, sets out the following hurdles for Santos meeting its obligations under the Safeguard Mechanism and in limiting the global warming effect of the Barossa Development emissions:</p> <ul style="list-style-type: none"> <li>a. Due to the Barossa Development’s high reservoir and scope 1 emissions it is “highly plausible” there will not be enough ACCUs available for Santos to meet its obligations under the Safeguard Mechanism;</li> <li>b. Increased demand for ACCUs as a result of the Barossa Development creates a “high potential” to see ACCU prices rise to \$75, representing an approximate rise in residential electricity supply rates of 20%; and</li> <li>c. Santos could not rely solely on ACCUs to offset all non-Safeguard Mechanism emissions (Scope 2 and 3) of the Barossa Development, and would need to use international offsets if it wished to meet its own corporate targets, which may be more difficult to ensure are real and permanent sources of abatement.</li> </ul>	See response for 5.a., 5.b and 32.
<p>37. Mr Cawthorne’s evidence is supported by a letter written by the CEO of Santos, Mr Kevin Gallagher, to Climate Change Minister Chris Bowen, on 6 June 2023 (attached at Annexure B). This letter relevantly states in relation to the availability of ACCUs:</p> <p>“... my concerns about overall increased demand and the consequential impact on supply remain. In your letter you refer to supply that is anticipated to be developed in response to demand. This is not sufficient to assure Santos and our joint venture partners that we can commence gas production from Barossa with the certainty that we will be able to access sufficient ACCUs to meet our obligation...</p>	See response for 5.a., 5.b and 32.

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<p>Given baselines will remain production-adjusted, the Barossa Gas Project does not have sufficient access to abatement or offsets, the project’s only option to remain compliant would be to crease production, as far as we are aware.”</p>	
<p>38. Secondly, from 2030, Santos is relying on the speculative Bayu-Undan CCS project and other unidentified “zero emissions clean fuels projects.”<sup>35</sup> However, the underperformance of CCS worldwide casts doubt on the proposal; the viability, technical feasibility, and certainty of the Bayu-Undan CCS project is far from clear.<sup>36</sup> Santos has failed to date to demonstrate that the Bayu-Undan pipeline is technically capable of transporting pressurised CO2 without a high risk of rupture. Indeed, there are very few examples worldwide of gas pipelines that have been successfully repurposed to transmit pressured CO2, and none approaching the distance anticipated for CCS at Bayu-Undan. Santos has also failed to demonstrate that permanent storage of CO2 at Bayu-Undan field is feasible. Long-term storage of CO2 beneath the sea is not proven at scale, and there is a real risk leakage or that targeted formations will not in fact store as much CO2 as expected.</p>	<p>See response for 5.a., 5.b and 32.</p>
<p>39. In addition, as the Institute for Energy Economics and Financial Analysis (IEEFA) has noted, any CCS project involving separating CO2 from the hydrocarbon product and transporting it under pressure 500km to Bayu-Undan is likely to be energy-intensive and thus associated with significant emissions.<sup>37</sup></p>	<p>See response for 5.a., 5.b and 32.</p>
<p>40. In sum, it is clear that Santos has provided insufficient information to satisfy the Minister that the Barossa Gas Project will be able to comply with the Safeguard Mechanism.</p>	<p>See response for 5.a., 5.b and 32.</p>
<p>C. Santos has failed to provide sufficient information for the Minister to make an informed decision about the direct and indirect impacts of GHG emissions from the DPD on the relevant MNES</p>	

<sup>35</sup> PDR, 241.

<sup>36</sup> Factors that influence the feasibility and risks of transporting CO2 via pipeline include the chemical composition of impurities expected in the CO2 stream that can cause corrosion, the pressures and weights of the gas, the impacts of severe weather on the pipeline, challenges related to changing the flow direction, and technical specifications of the pipeline design. See Environment Centre Northern Territory, Submission on the Darwin Pipeline Duplication Project: Supplementary Environmental Report (May 2023), [https://ntepa.nt.gov.au/\\_\\_data/assets/pdf\\_file/0003/1256763/santos-dpd-ecnt-submission.pdf](https://ntepa.nt.gov.au/__data/assets/pdf_file/0003/1256763/santos-dpd-ecnt-submission.pdf). See also Center for International Environmental Law, The Risks of Offshore Carbon Capture and Storage and the Middle Arm Industrial Precinct (submission to the Senate Standing Committees on Environment and Communications – Middle Arm Industrial Precinct Inquiry) (10 November 2023).

<sup>37</sup> IEEFA, Darwin Pipeline Duplication Project Submission to the Northern Territory Environmental Protection Authority (June 2023), [https://ntepa.nt.gov.au/\\_\\_data/assets/pdf\\_file/0003/1256772/santos-dpd-ieefa-submission.pdf](https://ntepa.nt.gov.au/__data/assets/pdf_file/0003/1256772/santos-dpd-ieefa-submission.pdf), 5.

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<p>41. In the PDR, Santos fails to identify all direct and indirect emissions from the DPD, analyse any adverse impacts on the relevant MNES, or assess whether those emissions are a substantial cause of any such impacts. Instead, Santos states that the “impact (i.e., climate change) of GHG emissions from DPD Project sources is considered to be negligible and is not discussed further” in the PDR.<sup>38</sup> Santos identifies “short term combustion emissions” of GHGs from the use of “marine vessels, helicopters and vehicles/equipment (onshore construction) and associated combustion of hydrocarbons (fuel oil – marine diesel oil)” as “unavoidable” for the DPD, but considers these to be an insignificant contribution to the total current Australian GHG emissions.<sup>39</sup></p>	<p>See response for 5.a. and 5.b.</p>
<p>42. Santos cannot disregard the significant environmental impact of the direct and indirect emissions from the DPD. It must assess whether the proposed action – which is an indispensable component of the larger Barossa Gas Project – is a substantial cause of the adverse impacts of climate change on the relevant MNES, including by assessing whether the proposed action will or will not cause any net increase in global GHG emissions and considering the consequences of any contributions to global GHG emissions in the context of clear scientific evidence about the need for drastic and urgent emissions reductions to limit warming to the Paris Agreement goals.</p>	<p>See response for 5.a. and 5.b.</p>
<p>43. Accordingly, unless and until Santos provides this information, the Minister cannot make an informed decision under Part 9 about the direct and indirect impacts of GHG emissions from the DPD on the relevant MNES</p>	<p>See response for 5.a. and 5.b.</p>
<p><b>D. The DPD is inconsistent with the principles of ecologically sustainable development</b></p>	
<p>44. When deciding whether or not to approve to the DPD for the purposes of each controlling provision and, if so, on what conditions, the Minister must take into account the principles of ecologically sustainable development.<sup>40</sup></p>	<p>Noted as background, contextual information and statements. No comments that require a response by Santos.</p>
<p>45. One of these principles is inter-generational equity, which provides that “present generations should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.”<sup>41</sup> Chief Justice Preston of the NSW Land and Environment Court has articulated three principles that form the basis of intergenerational equity:</p>	<p>Noted as background, contextual information and statements. No comments that require a response by Santos.</p>

<sup>38</sup> PDR, 133.

<sup>39</sup> PDR, 132-133.

<sup>40</sup> EPBC Act, ss 136(2)(a).

<sup>41</sup> EPBC Act, s 3A(c).

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<p>a. The conservation of options principle, which requires the current generation to conserve the health, diversity, and productivity of the environment to ensure future generations have options to solve their problems and satisfy their needs;</p> <p>b. The conservation of quality principle, which requires each generation to maintain the health, diversity, and productivity of the environment to ensure they are passed on in no worse condition than they were received; and</p> <p>c. The conservation of access principle, which means conserving the legacy of past generations, so that future generations have equitable access to that legacy.<sup>42</sup></p>	
<p>46. Approving the DPD would be inconsistent with the principle of inter-generational equity. Children of today and children born in the future will bear the legacy of decisions taken today and experience the worst impacts of climate change. In relation to the first principle identified above, the direct and indirect emissions from the DPD could well constrain development options for future generations as the remaining carbon budget for the Paris Agreement temperature goal is rapidly exhausted.<sup>43</sup> In relation to the second principle, there is no dispute that GHG emissions are harming the earth system,<sup>44</sup> as well as MNES. The DPD would contribute to that harm.</p>	<p>See response for 5.a. and 5.b.</p>
<p>47. Second, approving the DPD would be inconsistent with the principle of conserving biodiversity and ecological integrity, which should be a “fundamental consideration in decision-making.”<sup>45</sup> As described in this submission, the direct and indirect impacts of the DPD will harm species of national environmental significance and exacerbate the climate change which is threatening biodiversity and ecological integrity in Australia and across the world.</p>	<p>The PDR demonstrates that the impacts of the DPD Project will be appropriately managed and mitigated and that the DPD Project will not have a significant residual impact on species of national environmental significance, once all relevant control measures are implemented. See response for 5.a. and 5.b in relation to climate change issues.</p>
<p>48. Finally, approving the DPD would be inconsistent with the precautionary principle. This principle provides that, if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used</p>	<p>Santos does not accept that approval of the DPD Project would be inconsistent with the precautionary principle. The basis on which the</p>

<sup>42</sup> Brian Preston, The Judicial Development of Ecologically Sustainable Development (‘Environment in Court’ IUCNAEL Colloquium (Conference Paper) (22 June 2016), <https://lec.nsw.gov.au/documents/speeches-and-papers/PrestonCJ%20The%20Judicial%20Development%20of%20Ecologically%20Sustainable%20Development.pdf>, 26-27.

<sup>43</sup> See *Waratah Coal Pty Ltd v Youth Verdict Ltd & Ors* (No 6) [2022] QLC 21, [1843].

<sup>44</sup> *Waratah Coal v Youth Verdict* (No 6), [1844].

<sup>45</sup> EPBC Act, s 3A(d).



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<p>as a reason for postponing measures to prevent environmental degradation.<sup>46</sup> There are two preconditions to the application of the principle, namely, a threat of serious or irreversible environmental damage, and scientific uncertainty as to the damage.<sup>47</sup></p>	<p>ECNT asserts that approval of the DPD Project would be inconsistent with the precautionary principle is the threat of climate change, to which it says the DPD will contribute. In this regard, see response for 5.a. and 5.b.</p>
<p>49.As to the first precondition, a “threat” is critical, but it does not need to have occurred.<sup>48</sup> The threat must be foreseeable, and may be direct, indirect, long-term, secondary, incremental, cumulative, and/or interrelated.<sup>49</sup> Once a threat is identified, it must be shown to be serious or irreversible. In assessing whether a threat meets that threshold, courts will consider:</p> <ol style="list-style-type: none"> <li>a. The geographical reach of the threat (local, territory, national, global);</li> <li>b. The magnitude of the impact on the environment;</li> <li>c. Whether the threat is intermittent or would persevere;</li> <li>d. The value of the environment under threat;</li> <li>e. The complexity and connectivity of the possible impacts;</li> <li>f. Whether the possible impacts are manageable;</li> <li>g. The level of public concern, and whether there is rational or scientific evidence for that concern; and</li> <li>h. Whether the possible impacts are reversible, and a timeframe for reversing impacts along with the difficulty or cost of reversing.<sup>50</sup></li> </ol>	<p>Noted as background, contextual information and statements. No comments that require a response by Santos.</p>
<p>50.The second precondition – scientific uncertainty as to the damage – requires understanding the nature and scope of the damage. This means considering:</p> <ol style="list-style-type: none"> <li>a. The sufficiency of the evidence that there could be serious or irreversible environmental harm caused by the project;</li> <li>b. The level of uncertainty, and kind of uncertainty; and</li> </ol>	<p>Noted as background, contextual information and statements. No comments that require a response by Santos.</p>

<sup>46</sup> EPBC Act, s 3A(b).

<sup>47</sup> See *Waratah Coal Pty Ltd v Youth Verdict (No 6)*, [111].

<sup>48</sup> *Telstra Corporation v Hornsby Shire Council* (2006) 67 NSWLR 256, [129]

<sup>49</sup> *Telstra v Hornsby Shire Council*, [130].

<sup>50</sup> *Telstra v Hornsby Shire Council*, [131]

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<p>c. The potential to reduce uncertainty given what is possible in principle, economically and within a reasonable time frame.<sup>51</sup></p>	
<p>51. The threat of climate change, to which the DPD will contribute, is a serious and irreversible threat, for a number of reasons. The magnitude of impact on the environment, including ecosystems and people, is great. Many of the climate threats are likely to persevere and become worse as warming increases (e.g., sea level rise), and the complexity and connectivity of the impacts is significant due to the interdependence and connection of the climate systems. The threats are unlikely to be reversible given some level of continue warming is already locked in by virtue of emissions already released.</p>	<p>See response for 5.a. and 5.b.</p>
<p>52. While there is significant scientific consensus around the effects of climate change (such as temperature and sea level rises) and some of the damage it is likely to cause (such as increasing heat-related deaths and inundation of low-lying areas), the exact nature of the damage is less certain due to the complexity of the climate systems.</p>	<p>See response for 5.a. and 5.b.</p>
<p>53. Given this, the nature and scope of the threat and the uncertainty of damage engages the precautionary principle, and all possible measures – including refusing to approve the DPD – should be used to prevent the environmental degradation resulted from this proposal.</p>	<p>See response for 48.</p>
<p>54. In conclusion, considering both the direct and indirect GHG emissions from the DPD, the Minister should require Santos to provide sufficient information about the climate-related impacts of the project on all relevant controlling provisions.</p>	<p>See response for 5.a. and 5.b.</p>
<p>55. Setting aside the need for this broader climate impacts assessment, the sections below consider the other potential impacts of the DPD proposal on the identified controlling provisions.</p>	<p>Noted as background, contextual information and statements. No comments that require a response by Santos.</p>
<p><b>IV. SANTOS HAS FAILED TO PROVIDE SUFFICIENT INFORMATION FOR THE MINISTER TO MAKEAN INFORMED DECISION ABOUT THE DPD’S IMPACTS ON LISTED THREATENED SPECIES AND ECOLOGICAL COMMUNITIES</b></p>	
<p>56. The Minister identified listed threatened species and ecological communities as a controlling provision for the DPD.<sup>52</sup> However, we submit that the Minister does not have sufficient information to make an informed decision under Part 9 for the purposes of the controlling provision and therefore should not approve the action.</p>	<p>Santos considers that the Minister does have sufficient information, as contained within the referral and PDR, to make an informed decision</p>

<sup>51</sup> Telstra v Hornsby Shire Council, [141].

<sup>52</sup> EPBC Act, ss 18, 18A.

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	on the Project’s impacts to listed threatened species and communities, as outlined within Santos’ response to comments below.
<p>57. Overall, Santos’s assessment does not consider all listed threatened species in the environment that may be affected. Santos acknowledges that the EPBC Act Protected Matters Report identifies 41 listed threatened species occurring or potentially occurring within or nearby the Project Area, and no listed threatened ecological communities in the Project Area.<sup>53</sup> However, instead of assessing impacts on all 41 species, Santos narrowed the scope of its assessment to only six marine turtle species,<sup>54</sup> which it identified as the only listed threatened species “having the potential or likely to occur within or nearby the Project Area”<sup>55</sup> based on a desktop study using “publicly available information and previous studies of the area.”<sup>56</sup></p>	<p>The likelihood of occurrence assessment undertaken for the Referral (Table 2-2) and the PDR (Table 3-2) identified that it was unlikely for many of the species (or their habitats) identified in the Protected Matters Report to occur in the Project area. Santos has undertaken a comprehensive assessment of impacts on those species which have a reasonable likelihood of occurring in the Project area and being impacted by the DPD Project. The turtle species assessed in the PDR are consistent with (and go beyond) DCCEEW’s request for further information, the scope for the PDR, which identified four (4) turtle species as being likely to utilise the proposed action area.</p>
<p>58. This narrow analysis based on a desktop study ignores impacts on multiple species that are “known to occur” or “likely to occur” in the area according to the Protected Matters Report, including on species under significant threat, such as three critically endangered bird species, the Eastern Curlew, Great Knot, and Curlew Sandpiper, as well as endangered mammals like the Black-footed Tree-rat.<sup>57</sup></p>	<p>These species occupy terrestrial/shoreline habitats. The terrestrial/shoreline area of the Project area is within the existing DLNG facility disturbance area.</p> <p>The likelihood of occurrence assessment undertaken for the Referral (Table 2-2) and the</p>

<sup>53</sup> PDR, 92. The “Project Area” includes “[o]ffshore waters including NT waters outside Darwin Harbour, where the proposed spoil disposal area is located, and the 23 km of pipeline in Commonwealth waters,” Darwin Harbour (waters within the Darwin Harbour Management Area),” and “[s]hore crossing and onshore location where the Project pipeline crosses the shoreline within the exiting DLNG disturbance footprint”: PDR, 38.

<sup>54</sup> Those six species are Flatback, Olive Ridley, Green, Hawksbill, Leatherback, and Loggerhead Turtles: see PDR, 92.

<sup>55</sup> PDR, 92.

<sup>56</sup> PDR, 79.

<sup>57</sup> PDR, Appendix 16.

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	<p>PDR (Table 3-2) identified that it was unlikely that these species or their habitats would occur in the Project area e.g., the curlew sandpiper habitat is described as fresh and brackish water that can include ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand and neither this species nor the preferred habitat occur within the Project area.</p>
<p>59. Particularly for critically endangered and endangered species, any possible impacts should be assessed. For example, all three critically endangered bird species identified in the Protected Matters Report are shorebirds that are at higher risk of strandings and other impacts from industrial light pollution.<sup>58</sup> These species are listed as “critically endangered” because they face “an extremely high risk of extinction in the wild in the immediate future.”<sup>59</sup> Even if they occur in relatively low numbers in the Project Area, it is unacceptable for Santos not to consider any risks of possible impacts at an individual or population level.</p>	<p>Refer to response to comment 58.</p>
<p>60. Santos’s failure to complete a full assessment means that the Minister does not have sufficient information to make an informed decision under Part 9 for the purposes of the controlling provision.</p>	<p>As noted in responses to comments 57 and 58, Santos considers that it has undertaken a thorough assessment of those threatened species that have a reasonable likelihood of occurring in the Project area and being impacted by the DPD Project. Santos therefore considers that the Minister does have sufficient information to make an informed decision under Part 9 for the purposes of the controlling provision.</p>

<sup>58</sup> Industrial light sources can pose the “greatest risk to migrating landbirds, and some seabirds, particularly during periods of inclement weather”: see Robert A. Ronconi et al., ‘Bird Interactions with Offshore Oil and Gas Platforms: Review of Impacts and Monitoring Techniques’ (2015) 147 Journal of Environmental Management 34, <https://www.sciencedirect.com/science/article/abs/pii/S0301479714003806>, 42. Bird strandings are more common around coastal and offshore industrial sites than at other locations: see Carina Gjerdrum, ‘Bird Strandings and Bright Lights at Coastal and Offshore Industrial Sites in Atlantic Canada’ (2021) 16(1) Avian Conservation and Ecology 22, <https://pdfs.semanticscholar.org/9683/2b6b39eed81c46e5f6b324e3119a882549a8.pdf>, 42.

<sup>59</sup> EPBC Act, s 179(3).

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<p>61. Further, as set out below, for the six turtle species which Santos does cover in its self-assessment, the PDR’s analysis is flawed and incomplete as it fails to properly assess impacts from interference with key biological behaviours, habitat loss, and vessel collisions, among other things.</p>	<p>Impacts to marine turtles from habitat loss and vessel collisions are assessed within the PDR. The residual impact of habitat loss on marine turtles is assessed in Section 6.2.2.2.1 and 6.2.2.3 and the residual risk of vessel collision is assessed in Section 6.2.2.5. The assessments consider key marine turtle behaviours of foraging and nesting. Residual impacts from project lighting, underwater noise and marine discharges are also assessed in Section 6.2.2. Santos considers these assessments robust and supported by scientific evidence.</p>
<p>A. Significant impact guidelines for listed threatened species and ecological communities</p>	
<p>62. The federal government has issued “Significant Impact Guidelines” to “provide overarching guidance on determining whether an action is likely to have a significant impact on a matter protected under national environment law.”<sup>60</sup></p>	<p>Noted as background, contextual information and statements. No comments that require a response by Santos.</p>
<p>63. The Significant Impact Guidelines provide that an action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will lead to a long-term decrease in the size of, reduce the area of occupancy of, or disrupt the breeding cycle of an important population of a species, or adversely affect habitat critical to the survival of a species.<sup>61</sup></p>	<p>Noted as background, contextual information and statements. No comments that require a response by Santos.</p>
<p>64. A “habitat critical to the survival of a species” includes areas that are necessary for “foraging, breeding, roosting, or dispersal.”<sup>62</sup></p>	<p>Noted as background, contextual information and statements. No comments that require a response by Santos.</p>

<sup>60</sup> Australian Government, Department of the Environment, Significant Impact Guidelines 1.1 – Matters of National Environmental Significance (2013), <https://www.dcceew.gov.au/environment/epbc/publications/significant-impact-guidelines-11-matters-national-environmental-significance>.

<sup>61</sup> Commonwealth of Australia, Matters of National Environmental Significance – Significant Impact Guidelines 1.1 – Environment Protection and Biodiversity Conservation Act 1999 (2013), [https://www.dcceew.gov.au/sites/default/files/documents/nes-guidelines\\_1.pdf](https://www.dcceew.gov.au/sites/default/files/documents/nes-guidelines_1.pdf) (Significant Impact Guidelines), 10. See also Significant Impact Guidelines, 9, which describe when an action is likely to have a significant impact on a critically endangered or endangered species.

<sup>62</sup> Significant Impact Guidelines, 10.

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<p>65. The Minister's delegate has already determined that the DPD, as a controlled action, is likely to have significant impacts on MNES, including listed threatened species and communities. Santos must now provide adequate information for the Minister to make an informed decision under Part 9 for the purposes of the controlling provision.</p>	<p>Noted as background, contextual information and statements. No comments that require a response by Santos.</p>
<p>B. Santos failed to provide sufficient information about the impacts of seabed disturbance on listed threatened species</p>	
<p>66. Seabed disturbance within Darwin Harbour from DPD activities such as dredging could damage foraging and nesting habitats critical to the survival of listed threatened species. However, these impacts are not properly addressed in the PDR.</p>	<p>The area of seabed affected by the DPD Project has been detailed in terms of direct and indirect impacts (Sections 4.2.1.1 and 4.2.1.2, respectively). Seabed disturbance and the potential for impact to turtle foraging habitat is assessed in Section 6.2.2.3 and Section 6.2.2.2.1. The assessment considers the type and area of habitat either directly or indirectly disturbed by the Project within the context of the broader region, and the potential significance of these habitat types to foraging turtles, including flatback turtles. The assessment concludes that residual impact to turtle foraging habitat from the Project will not be significant. Furthermore, significant impact criteria relevant to threatened turtle species were not triggered (refer Table 6-1 to 6-6).</p> <p>There is no seabed disturbance from the DPD Project on any turtle nesting habitat.</p>
<p>67. A number of listed threatened species, including Flatback, Hawksbill, Green, and Olive Ridley Turtles, use Darwin Harbour for foraging. Darwin Harbour houses a reef with a high density of epibiota.<sup>63</sup> The density of corals and seagrass increases towards the inner Darwin Harbour, with the densest area surveyed occurring in rocky reefs in</p>	<p>Olive ridley foraging is not considered a common occurrence in Darwin Harbour (refer Section 3.2.2.1).</p> <p>The DPD Project area (which predominantly represents a nominal 2 km buffer either side of</p>

<sup>63</sup> PDR, Appendix 7, Benthic Survey Report, 31.

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<p>the shallow protected areas of the inner harbour.<sup>64</sup> The DPD area overlaps with seagrasses, macroalgae, and hard-corals,<sup>65</sup> and a small amount of mangrove trees.<sup>66</sup></p>	<p>the proposed pipeline route) overlaps with mapped hard coral and seagrass habitat at the outer edges of the Project area in Darwin Harbour, where this corresponds with shallow waters near shorelines. There are no seagrass or hard coral areas under the proposed pipeline route (Figure 4-1 of the PDR). Overlap of the Project area with mangrove trees occurs only at the pipeline shore-crossing within the DLNG facility footprint and these mangrove trees represent regrowth from disturbance associated with the previous Bayu-Undan to Darwin pipeline installation.</p>
<p>68. Each of these marine species are important. Seagrasses and mangroves protect against coastal erosion and storm surge, macroalgae are important for ecosystem health for their role in fighting parasites<sup>67</sup> and sequestering carbon,<sup>68</sup> and corals support marine biodiversity. In this area, Santos is planning on trenching over 300,000 m<sup>3</sup> of sediment that will create sediment plumes and increase turbidity.<sup>69</sup></p>	<p>Santos has not proposed trenching in seagrass meadows. Trenching through the shoreline will occur within the pre-disturbed DLNG footprint. Santos has conducted peer-reviewed modelling of sediment dispersion from its trenching and spoil disposal activities and there is no predicted impact to mangroves or seagrass meadows from turbidity or sedimentation (see PDR Section 4.2.1.2 Indirect Impacts).</p>

<sup>64</sup> PDR, Appendix 7, Benthic Survey Report, 33.

<sup>65</sup> See PDR, Figure 6-2 (225); Appendix 2, Figure 9-10 (248).

<sup>66</sup> PDR, 223.

<sup>67</sup> Seham M Hamed et al., 'Role of Marine Macroalgae in Plant Protection & Improvement for Sustainable Agriculture Technology' (2018) 7(1) Beni-Suef University Journal of Basic and Applied Sciences 104, <https://www.sciencedirect.com/science/article/pii/S2314853517301294>.

<sup>68</sup> Dorte Krause-Jensen and Carlon M. Duarte 'Substantial role of macroalgae in marine carbon sequestration' (2016) 9 Nature Geoscience 737, <https://www.nature.com/articles/ngeo2790>.

<sup>69</sup> PDR, Appendix 8, Table 5.7.

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<p>69. The PDR acknowledges that the vulnerable Flatback Turtle has “habitat critical to survival” that overlaps with the entire Project Area, including areas necessary for foraging, breeding, interesting and “long-term maintenance of the species.”<sup>70</sup> Given Flatback Turtles prefer to forage in subtidal, soft-bottomed habitats, the PDR finds that its surveys show “potential foraging habitat (soft corals) within the Project [A]rea.”<sup>71</sup> Similarly, with respect to the Hawksbill Turtle, the PDR notes that “[s]oft coral and sandy habitats are widely present throughout the DPD area within Darwin Harbour” and thus there is “likely to be” “suitable foraging habitat for the hawksbill turtle.”<sup>72</sup> Green Turtles were the most frequently observed turtle species in Darwin Harbour during surveys and “eat mainly seagrass and algae.”<sup>73</sup> With respect to the endangered Olive Ridley Turtle, the PDR points out that “[a] substantial proportion of the immature and adult population forages over shallow water benthic habitats,” and Figure 3-5 shows an overlap between Darwin Harbour and Olive Ridley Turtle distribution.<sup>74</sup></p>	<p>Noted as background, contextual information and statements. No comments that require a response by Santos.</p>
<p>70. However, despite identifying that several threatened turtle species have important habitat in the affected area, Santos fails to provide sufficient information about the risks to these species from activities causing seabed disturbance. Santos’s conclusion regarding impacts to marine ecosystems from seabed disturbance is that the DPD “is unlikely to result in changes to the composition of benthic habitats across Darwin Harbour, nor have wider impacts on the marine fauna that rely on those habitats.”<sup>75</sup></p>	<p>Refer to response to comment 66.</p>
<p>71. The primary assumption for this conclusion comes in the immediately preceding sentence, which states that “[t]renching and infrastructure footprints combined will impact less than 1% of the benthic habitats across Darwin Harbour.”<sup>76</sup></p>	<p>Noted as background, contextual information and statements. No comments that require a response by Santos.</p>
<p>72. This assumption presents several issues. First, Santos identifies the primary criterion for determining impacts to marine ecosystems from seabed disturbance as percentage of “habitats” impacted.<sup>77</sup> The areas of habitat impacted are listed in Table 4-1 of the PDR. However, Santos provides insufficient information to determine whether there will be significant harm to benthic communities; for example, it does not specify how many hectares will be affected,</p>	<p>The area (Ha) affected is presented in Table 4-1. Detail on benthic habitat to species level is shown in the benthic habitat survey report (Appendix 7) however the description by broader biota categories is sufficient for relating impact to turtle</p>

<sup>70</sup> PDR, 92-95.

<sup>71</sup> PDR, 97.

<sup>72</sup> PDR, 111.

<sup>73</sup> PDR, 110-111

<sup>74</sup> PDR, 98.

<sup>75</sup> PDR, 15.

<sup>76</sup> PDR, 15.

<sup>77</sup> PDR, 134.



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<p>which benthic species will be affected, the degree of risk to impacted species, or the cumulative impacts from activities in Darwin Harbour.</p>	<p>foraging habitat. Significant impact is determined from both direct habitat loss and potential loss through water quality impacts using footprint/habitat loss calculations and modelling, including interpretation of modelling using established methods for assessing risk from dredging operations (e.g. Zone of Impact and Zones of Influence). Cumulative impacts, while not specifically requested in the PDR information scope, have been included in the SER at Appendix 29 to the PDR.</p>
<p>73. Second, Santos does not evaluate the associated impacts of seabed disturbance on listed threatened fauna. Santos only describes some macroalgae communities impacted by seabed disturbance,<sup>78</sup> and specifies the size of habitats impacted.<sup>79</sup> Given that listed threatened species such as marine turtles rely on benthic resources (including as a primary food source), this is a flaw in the PDR. Without providing any further analysis or evidence, the PDR cursorily concludes that the DPD will result in no “wider impacts on the marine fauna that rely on those habitats.”<sup>80</sup></p>	<p>Refer to response to comment 66.</p>
<p>74. Finally, Santos makes a faulty assumption that a small loss of habitat is insignificant. The loss of even one hectare of habitat could be considered significant for species that are listed as threatened (and therefore MNES) or have limited range.<sup>81</sup> The Australian Department of the Environment and Energy’s Recovery Plan for Marine Turtles lists three of the turtles that have foraging habitat in Darwin Harbour, namely, Hawksbill, Green, and Olive Ridley Turtles, as “stocks at highest risk” which should be a “priority for management action”.<sup>82</sup> It specifically notes that the Northern Territory is habitat for “one of only two stocks of olive ridley turtles nesting in Australia.”<sup>83</sup> Disturbances to potential foraging areas could potentially impact the survival rates of these threatened species.</p>	<p>Refer to response to comment 66. Furthermore, olive ridley foraging is not considered a common occurrence in Darwin Harbour (refer Section 3.2.2.1).</p>

<sup>78</sup> PDR, 229.

<sup>79</sup> PDR, Table 4-1

<sup>80</sup> PDR, 134.

<sup>81</sup> Michelle S. Ward et al., ‘Lots of loss with little scrutiny: The attrition of habitat critical for threatened species in Australia’ (2019) 1(11) Journal for the Society of Conservation Biology, <https://conbio.onlinelibrary.wiley.com/doi/epdf/10.1111/csp2.117>.

<sup>82</sup> Australian Government, Department of the Environment and Energy, Recovery Plan for Marine Turtles in Australia (2017), <https://www.dcceew.gov.au/sites/default/files/documents/recovery-plan-marine-turtles-2017.pdf> (Recovery Plan for Marine Turtles), 101.

<sup>83</sup> Recovery Plan for Marine Turtles, 96, 101.

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<p>75. Under the EPBC Act, the Minister is legally bound not to act inconsistently with the Recovery Plan for Marine Turtles in deciding whether to approve this controlling provision.<sup>84</sup> It is not clear from the PDR whether the projected loss of habitat would undermine the national priority to protect the threatened turtle species that have critical foraging habitat in Darwin Harbour.</p>	<p>Refer to response to comment 66. The PDR assessment concludes that residual impact to turtle foraging habitat from the Project will not be significant and therefore Santos does not consider that the Project will undermine the national priority to protect threatened turtle species.</p>
<p>76. Habitat loss and ecosystem disturbance may also be problematic for small populations of cetaceans and marine megafauna that show high site fidelity to areas used for foraging, mating, resting, or calf rearing, particularly where multiple industrial projects overlap.<sup>85</sup> A 2006 photo-identification study of the Indo-Pacific humpback dolphin in Cleveland Bay, Queensland found that the population's recurrent use of the bay combined with their low numbers (approximately 34 in 2001 and 54 in 2002) posed concerns for long-term survival if habitat quality did not improve.<sup>86</sup> The PDR includes similarly low estimates of population size of humpback dolphins in Darwin Harbour (as low as 30 in 2017).<sup>87</sup> The PDR also notes that "the size of Australian snubfin dolphin population is small in the Darwin region" with "a significant negative trend in abundance," which may be due to "anthropogenic factors," among other things.<sup>88</sup> Yet, the PDR does not properly assess the risk to these species.</p>	<p>The PDR assesses the impact of Project habitat loss and disturbance (noise and collision risk) to migratory cetaceans (Australian humpback dolphin, Australian snubfin dolphin and spotted bottlenose dolphin) including an assessment of dolphin breeding, calving and foraging habitats (refer Sections 6.3.2.2, 6.3.2.3 and 6.3.2.4). The assessment concludes that residual impacts to these migratory dolphin species from the Project will not be significant. Furthermore, the Project does not trigger significant impact criteria relevant to migratory species (Table 6-7), including the significant impact criteria to substantially modify</p>

<sup>84</sup> EPBC Act, s 139(1)(b).

<sup>85</sup> Bernd Würsig, 'Cetaceans,' (1989) 244(4912) *Science* 1550, <https://www.science.org/doi/10.1126/science.2662403>; Lars Bejder et al., 'Impact assessment research: use and misuse of habituation, sensitisation and tolerance in describing wildlife responses to anthropogenic stimuli' (2009) 395 *Marine Ecology Progress Series* 177, <https://www.int-res.com/articles/theme/m395p177.pdf>.

<sup>86</sup> Guido J. Parra et al., 'Population sizes, site fidelity and residence patterns of Australian snubfin and Indo-Pacific humpback dolphins: Implications for conservation' (2006) 129 *Biological Conservation* 167, [https://www.researchgate.net/publication/222297236\\_Population\\_sizes\\_site\\_fidelity\\_and\\_residence\\_patterns\\_of\\_Australian\\_snubfin\\_and\\_Indo-Pacific\\_humpback\\_dolphins\\_Implications\\_for\\_conservation](https://www.researchgate.net/publication/222297236_Population_sizes_site_fidelity_and_residence_patterns_of_Australian_snubfin_and_Indo-Pacific_humpback_dolphins_Implications_for_conservation).

<sup>87</sup> PDR, 123.

<sup>88</sup> PDR, 118.

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	(including by fragmenting, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for the three dolphin species.
77. By concluding that there will be no harm mainly because only one percent of habitat in Darwin Harbour will be impacted, Santos has failed to provide sufficient information about whether habitat loss will result in harm to threatened fauna that depend on those habitats.	Refer response to comment 66.
C. Santos failed to provide sufficient information about risks of vessel collision for listed threatened species	
78. The DPD activities pose a risk of vessel collision with listed threatened species leading to injury or mortality. Vessel strikes can also “reduce the area of occupancy” and “adversely affect habitat critical to the survival” of listed species by interfering with foraging behaviours and disrupting the breeding cycle.	Noted as background, contextual information and statements. No comments that require a response by Santos.
79. Santos fails to adequately assess these risks to listed threatened species. For example, the PDR discounts risks of injury, mortality or harmful behavioural impacts on the endangered Olive Ridley Turtle from vessel collision by arguing that the “Project vessel numbers and movements will be insignificant compared to the total number of vessel movements within the Darwin Harbour.” <sup>89</sup> As such, “the increase in vessel traffic from the Project is considered unlikely to result in a greater risk of vessel collision with this species than the current environment.” <sup>90</sup> A similar logic is applied to migratory dolphin species, which are also protected as MNES (discussed further below). <sup>91</sup>	The assessment of residual risk to threatened and migratory species from Project vessel collisions (Sections 6.2.2.5 and 6.3.2.4) considers the management measures that will be implemented to reduce risk as well as the existing vessel movements that occur within Darwin Harbour. These management measures include trained marine fauna observers, vessel speed controls as well as marine fauna avoidance protocols aligned with Part 8 of the <i>EPBC Regulations 2000</i> (refer Table 5-1). Most vessels involved in Project activities will be stationary or slow moving, as required to conduct construction

<sup>89</sup> PDR, 194.

<sup>90</sup> PDR, 194.

<sup>91</sup> See, for example, PDR, 206.

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	activities, and therefore operating at speeds lower than Port of Darwin speed limits.
80. This conclusion is based on the incorrect assumption that because these species already face risks of vessel collision due to high usage of Darwin Harbour, any additional vessel traffic will not increase collision risks. Logically, increasing the number of vessels in the area may make it even more difficult for turtles, dolphins and other fauna to avoid collisions and lead to greater numbers of injury or mortality. Santos has failed to account for the cumulative impacts of multiple activities and pressures on the survival of these species.	Refer to response to comment 79.
81. Moreover, the proposed mitigation measures for avoiding vessel collisions will not adequately protect threatened species. The PDR asserts that “speed limit restrictions within Darwin Harbour” will “reduce the potential for vessel strikes on marine turtles.” <sup>92</sup> However, it also notes that vessels operating outside the Darwin port do not have to abide by the same speed limit restrictions as those within Darwin Harbour. <sup>93</sup> For these vessels, “the onus is on the deck officers to be vigilant,” <sup>94</sup> yet vigilance does not make turtles or other vulnerable species more easily observable. As the National Strategy for Reducing Vessel Strike on Cetaceans and Other Marine Megafauna explains:  The relatively small size of turtles and the significant time spent below the surface makes their observation by vessel operators extremely difficult or impossible. Green turtles observed by Hazel (2009) generally only exposed the dorsal-anterior part of the head above the surface of the water and never for longer than two seconds. <sup>95</sup>	Refer to response to comment 79.
82. Given that it can be difficult to spot marine fauna (especially small fauna such as turtles), Santos is relying on its own personnel rather than professional marine fauna observers, and observers will not be present after dark <sup>96</sup> when it is more difficult to spot fauna, the PDR’s mitigation measures are deficient.	Refer to response to comment 79.
D. Santos did not provide sufficient information about impacts from underwater noise on listed threatened species	
83. Santos fails to show that there are no unacceptable impacts on marine turtles from noise pollution. The PDR relies on limited studies (one from over 20 years ago) to derive a single 166 dB impulsive behavioural threshold for all sea	The potential for impacts to listed and migratory marine fauna, including marine turtles, from

<sup>92</sup> PDR, 218.

<sup>93</sup> PDR, 218.

<sup>94</sup> PDR, 218.

<sup>95</sup> Australian Government, Department of the Environment and Energy, National Strategy for Reducing Vessel Strike on Cetaceans and other Marine Megafauna (December 2017), <https://www.dcceew.gov.au/sites/default/files/documents/vessel-strike-strategy.pdf> (National Strategy for Reducing Vessel Strike), 19.

<sup>96</sup> PDR, 218.

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<p>turtles.<sup>97</sup> The PDR acknowledges that underwater noise pollution can result in loss of hearing, behavioural changes such as a reduction in foraging, and interference with biological signals.<sup>98</sup> Hearing loss may be in the form of a temporary threshold shift (TTS) from which an animal recovers within minutes or hours, or a permanent threshold shift (PTS) from which the animal does not recover.<sup>99</sup> Such impacts can undermine the survival of listed threatened species, including the endangered Olive Ridley Turtle, which rely on sound to communicate, forage, breed, and navigate.</p>	<p>Project underwater noise is assessed in Sections 4.2.3, 6.2.2.2.3 and 6.3.2.3. The assessment considers contemporary noise modelling studies (Appendices 20 and 22 of the PDR) and use of established and accepted noise thresholds for marine fauna including behavioural thresholds and thresholds for PTS and TTS.</p> <p>Through the residual impact assessment of Project noise on threatened and migratory species, including marine turtles and dolphins, Santos concludes there will be no residual significant impacts on these species.</p> <p>Furthermore, significant impact criteria relevant to threatened turtle species and migratory dolphin species were not triggered (refer Tables 6-1 to 6-7).</p>
<p>84. In reaching its conclusion that the project's added noise from vessels and dredging will have "minimal" impacts on affected species, the PDR depends on species avoiding a sound source.<sup>100</sup> For example, in concluding that the Project will not "lead to a long-term decrease in the size of a population" of Olive Ridley Turtles, the PDR notes that "mobile animals such as turtles will be able to move away freely before any physical or behavioural changes occur."<sup>101</sup> However, the PDR fails to recognise that this avoidance movement is, in fact, a behavioural change that costs individuals' energy and could have significant impacts. Avoidance of habitat is especially significant given that important turtle nesting sites are near the dredging locations, as are locations for foraging for other species.<sup>102</sup> Movement to avoid physiological harm from the project's noise pollution must be assessed as an impact, not as a mitigating factor.</p>	<p>The PDR recognises that avoidance is a behavioural response (refer Section 4.2.3) but that due to the wide distribution of foraging habitat, the short duration of dredging and the location of dredging along shipping fairways (i.e. within an existing noisy environment) these responses are not likely to have a significant impact on turtles.</p> <p>Santos does not agree that there are important turtle nesting sites near the trenching locations.</p>

<sup>97</sup> PDR, 158.

<sup>98</sup> PDR, 153.

<sup>99</sup> PDR, 153.

<sup>100</sup> PDR, 165.

<sup>101</sup> PDR, 194.

<sup>102</sup> See PDR, 109-112, 222-223.

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	This is supported by a subject matter expert technical memo provided with the PDR (Appendix 19). The nearest significant turtle nesting beaches to trenching locations are at Quail Island and Bare Sand Island, which are approximately 28km and 29km, respectively, from the Project area. .
85. In light of the limited research on sea turtles, <sup>103</sup> the PDR should have taken a precautionary approach and conducted studies to assess at what levels sea turtles and other listed threatened species may experience behavioural impacts. Without those studies, the Minister cannot make an informed decision taking into account the risks to sea turtles and other listed threatened species of underwater noise associated with the DPD. <sup>104</sup>	Refer to response to comment 83.
<i>Incomplete analysis of physiological harm</i>	
86. Santos forms an overall conclusion that there is no significant impact from noise emissions to any MNES species (not only marine turtles, but all threatened and migratory species). Its assessment generally fails to analyse key noise impacts related to acoustic masking and physiological impacts. The PDR's analysis of physiological harm is limited to hearing loss, however, many other impacts are relevant. Established science demonstrates that physiological impacts of underwater noise go far beyond hearing loss. For example, anthropogenic-generated noise can cause physiological stress, alter metabolic rates, induce embolisms, and alter life history traits. <sup>105</sup> This is a key flaw in Santos' analysis of noise impacts.	Santos' assessment of noise impacts to MNES species goes beyond just hearing loss. Refer to response to comment 83.  Additional information on acoustic masking is provided in response to comment 90.

<sup>103</sup> See Arthur Popper and Richard Fay, 'Rethinking sound detection by fishes' (2011) 273(1-2) Hearing Research 25, <https://www.sciencedirect.com/science/article/pii/S037859550900313X>.

<sup>104</sup> PDR, Appendix 16.

<sup>105</sup> C.R. Kight and J.P. Swaddle, 'How and why environmental noise impacts animals: An integrative, mechanistic review' (2011) 14 Ecology Letters 1052, <https://onlinelibrary.wiley.com/doi/10.1111/j.1461-0248.2011.01664.x>; R.M. Rolland et al., 'Evidence that ship noise increases stress in right whales' (2012) 279(1737) Proceedings of the Royal Society B: Biological Sciences 2363, <https://royalsocietypublishing.org/doi/10.1098/rspb.2011.2429>; E.P. Fakan and M.I. McCormick, 'Boat noise affects the early life history of two damselfishes' (2019) 141 Marine Pollution Bulletin 493 <https://www.sciencedirect.com/science/article/abs/pii/S0025326X19301547>; K. de Jong et al., 'Predicting the effects of anthropogenic noise on fish reproduction' (2020) 30 Reviews in Fish Biology and Fisheries 245, <https://link.springer.com/article/10.1007/s11160-020-09598-9>; Stephen D. Simpson et al., 'Anthropogenic noise compromises antipredator behaviour in European eels' (2015) 21(2) Global Change Biology 586, <https://onlinelibrary.wiley.com/doi/full/10.1111/gcb.12685>; N.J. Kleist et al., 'Chronic anthropogenic noise disrupts glucocorticoid

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<i>Failure to assess impacts specific to acoustic masking</i>	
87. The PDR acknowledges that one of the main harms to marine fauna from underwater noise is “acoustic masking” which occurs when anthropogenic noises “interfere with, or mask, biological signals, therefore reducing the communication and perceptual space of an individual.” <sup>106</sup>	Noted as background, contextual information and statements. No comments that require a response by Santos.
88. It is important to assess acoustic masking because it can result in detrimental effects to marine species. The masking of breeding sounds of fish species can reduce breeding success. <sup>107</sup> Acoustic masking of habitat sounds may also prevent important structure-building organisms (i.e., corals in shallow coastal areas) from locating suitable habitat. <sup>108</sup> Studies also show that anthropogenic noise sources mask whale communication and induce chronic stress.	Noted as background, contextual information and statements. No comments that require a response by Santos.
89. The PDR fails to study harms related to acoustic masking. The specialist report on noise from rock breaking acknowledges that acoustic masking impacts “are not addressed in this report” and that only some general information on masking is provided “for completeness only.” <sup>109</sup> The specialist report on modelling underwater noise does not mention masking at all. <sup>110</sup> Although Santos acknowledges that acoustic masking can “disrupt ... underwater acoustic cues” and mask “vocalisations and signals from predators and prey,” <sup>111</sup> both the PDR and the specialist report on marine fauna noise management assess the concept of “masking” only in relation to how commercial vehicle traffic in Darwin Harbour may mask the noise of Santos’s vehicle traffic. <sup>112</sup>	Acoustic masking is included as an impact of underwater noise in section 4.2.3 of the PDR. The severity and extent of auditory masking depends on the spectral and temporal characteristics of both the signal and the noise. To date, a direct assessment and quantification of masking effects in wild marine mammals has

signaling and has multiple effects on fitness in an avian community’ (2018) 115(4) Proceedings of the National Academy of Sciences of the United States of America E648, 115(4) Proceedings of the National Academy of Sciences of the United States of America E648,

<sup>106</sup> PDR, 153.

<sup>107</sup> Arthur Pipper and Mardi Hastings, ‘The effects of human-generated sound on fish’ (2009) 4 Integrative Zoology 43, <https://www.nrc.gov/docs/ML1434/ML1434A581.pdf>; E.P. Fakan and M.I. McCormick, ‘Boat noise affects the early life history of two damselfishes’ (2019) 141 Marine Pollution Bulletin 493, <https://www.sciencedirect.com/science/article/abs/pii/S0025326X19301547>; I. K. Voellmy et al., ‘Acoustic noise reduces foraging success in two sympatric fish species via different mechanisms’ (2014) 89 Animal Behaviour 191

<sup>108</sup> Dr. Michelle Fournet, ‘Judicial Review – Environmental Authorisation for Exploration of Oil and Gas Granted to Sasol / Eni – Marine Ecology Expert Input,’ filed in South Durban Community Environmental Alliance v. Minister of Environment (2021 High Court, Gauteng Division South Africa) (undated) <https://naturaljustice.org/wp-content/uploads/2021/06/DDS31-Fournet-Report.pdf>, 5

<sup>109</sup> PDR, Appendix 22, 14.

<sup>110</sup> See PDR, Appendix 20 (references for “mask” or “masking” not present in the document)

<sup>111</sup> PDR, Appendix 23, 74.

<sup>112</sup> PDR, 166; PDR, Appendix 23, 63.



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	<p>proven impossible (Tougaard, J., A.J. Wright, and P.T. Madsen. 2015. Cetacean noise criteria revisited in the light of proposed exposure limits for harbour porpoises. Marine Pollution Bulletin 90(1-2): 196-208. <a href="https://doi.org/10.1016/j.marpolbul.2014.10.051">https://doi.org/10.1016/j.marpolbul.2014.10.051</a>); masking effects depend on the positions of the signalling and the receiving animal relative to the sound source and to each other. Furthermore, the use of compensatory mechanisms by animals to avoid or overcome masking effects are highly complex and basic audiometric information for most species is lacking. Currently, there are no thresholds or exposure criteria for masking effects in marine mammals.</p> <p>There is also a lack of detailed empirical information on the production of underwater sound by marine reptiles, including turtles, or its functional relevance, therefore no thresholds or criteria have been proposed for this group in current literature.</p> <p>Ambient noise levels in Darwin harbour, in the vicinity of the planned activities, have been measured historically within Salgado-Kent et al. (2015) (as referenced in Section 4.2.3.4 of the PDR). The report characterises Darwin Harbour as highly anthropogenically and biologically influenced. The report quantifies periods when anthropogenic construction and dredging operations were occurring, and found that during periods when dredging and pile driving were not occurring, the ambient soundscape in the area was dominated by vessel and machinery noise in</p>



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	<p>East Arm, and by biological sources in Middle Arm.</p> <p>As noted in Section 4.2.3.4 of the PDR, it is expected that fauna which already utilise Darwin Harbour would be habituated to an environment with increased noise levels (e.g. vessel noise) and using mechanisms to compensate. Most animals have evolved mechanisms to compensate for this natural variation in noise. Listeners (marine and terrestrial) employ various methods to compensate for masking sounds to a limited degree. They may increase the amplitude of their calls (referred to as the Lombard effect, refer Luo, J., S.R. Hage, and C.F. Moss. 2018. The Lombard Effect: From Acoustics to Neural Mechanisms. Trends in Neurosciences 41(12): 938-949. <a href="https://doi.org/10.1016/j.tins.2018.07.011">https://doi.org/10.1016/j.tins.2018.07.011</a>), change the spectral and temporal properties of vocalisations such as frequency content (refer Parks, S.E., M. Johnson, D.P. Nowacek, and P.L. Tyack. 2011. Individual right whales call louder in increased environmental noise. Biology Letters 7: 33-35. <a href="https://doi.org/10.1098/rsbl.2010.0451">https://doi.org/10.1098/rsbl.2010.0451</a>), Hotchkin, C.F. and S.E. Parks. 2013. The Lombard effect and other noise-induced vocal modifications: Insight from mammalian communication systems. Biological Reviews 88(4): 809-824. <a href="https://doi.org/10.1111/brv.12026">https://doi.org/10.1111/brv.12026</a>.) or benefit from a phenomenon known as co-modulation masking release (refer Trickey, J.S., B.K. Branstetter, and J.J. Finneran. 2010. Auditory masking of a 10 kHz tone with environmental, comodulated, and Gaussian noise in bottlenose dolphins (Tursiops truncatus).</p>

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	<p>Journal of the Acoustical Society of America 128(6): 3799-3804.  <a href="https://doi.org/10.1121/1.3506367">https://doi.org/10.1121/1.3506367</a>.)</p> <p>DPD operations will be additive to the Darwin Harbour soundscape, with trenching expected to be the most noticeable contributor when it is occurring. Given the relatively short duration of trenching activities in any one area and the likelihood that MNES species are habituated to the anthropogenically influenced soundscape of Darwin Harbour, Santos considers there will be no residual significant impacts on MNES species from underwater masking effects of noise generated by the Project.</p>
<p>90.As a result of these gaps in analysis, the PDR has failed to address how boat and dredging noise will mask sounds important for species' communication and perception of space. Failure to address acoustic masking is a significant gap in the analysis, not only of impacts on threatened marine turtles, but all affected threatened species and migratory species.</p>	<p>Refer to response to comment 89.</p>
<p><i>Cumulative impacts of noise emissions</i></p>	
<p>91.Santos fails to properly consider the cumulative, longer term impacts of noise from the DPD. The operation of trenching vessels, including the use of rock-breaking tools, is expected to generate the highest underwater noise emissions, according to the PDR.<sup>113</sup> A primary reason that the PDR concludes that the impacts of underwater noise will be minor is that these intense noises from trenching will last only 2-3 months.<sup>114</sup> However, this assertion is not supported by the record. There is no scientific citation or analysis in the PDR showing that 2-3 months of noise at the levels expected to occur from trenching activities will have only minor impacts.</p>	<p>In addition to the short duration of trenching activities, other factors considered are the existing background noise levels, the existing behaviour of the threatened and migratory marine fauna, which are known to move within and out of Darwin Harbour, and the presence of similar habitat adjacent to trenching areas within the broader region.</p>

<sup>113</sup> PDR, 165.

<sup>114</sup> PDR, 166.

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<p>92. Scientific literature suggests that longer term exposure to noise can result in fatal harm even if there are no apparent shorter term behavioural impacts from that noise. For example, initial studies of noise impacts on feeding Humpback Whales in Newfoundland, Canada, initially detected no behavioural changes.<sup>115</sup> However, after a subsequent increase in entrapment rates in the area, scientists conducted dissections of the auditory systems of two stranded whales and found damaged ear structures that were likely due to anthropogenic noise pollution.<sup>116</sup></p>	<p>Noted as background, contextual information and statements. No comments that require a response by Santos.</p>
<p>93. The PDR fails to assess whether noise generated over the project activity period could result in cumulative harms at the individual and population level for affected species (including threatened and migratory species). Santos's failure to provide sufficient information about the cumulative impacts on the marine environment, unless remedied, must be fatal to the approvals sought.<sup>117</sup> Without sufficient information, the Minister cannot make an informed decision under Part 9.<sup>118</sup></p>	<p>The cumulative effect of noise is considered at the individual level in terms of 24 h cumulative exposure PTS/TTS thresholds (refer Section 4.2.3.1.1). Behavioural impact assessment at the local population level considers the effect of the existing anthropogenic noise in Darwin Harbour (Sections 4.2.3.3 and 4.2.3.4).</p>
<p>E. Santos failed to provide sufficient information about impacts from light pollution on listed threatened species</p>	
<p>94. It is well established that artificial lighting can disturb coastal species such as marine turtles and some migratory birds, and accordingly on ecosystem health as a whole.<sup>119</sup> There is substantial evidence that industrial light pollution affects turtles and reduces their chance of successful nesting and survival.<sup>120</sup></p>	<p>Noted as background, contextual information and statements. No comments that require a response by Santos.</p>
<p>95. The PDR notes that “[t]he worst-case potential impact from light spill in the Commonwealth marine area is behavioural disruption to marine turtles during the critical life-cycle phases of nesting and hatching,” but dismisses</p>	<p>Noted as background, contextual information and statements. No comments that require a response by Santos.</p>

<sup>115</sup> Catalina Gomez et al., ‘A Systematic Review on the Behavioural Responses of Wild Marine Mammals to The Disparity Between Science and Policy’ (2016) 94 Canadian Journal of Zoology 801, <https://cdnsiencepub.com/doi/abs/10.1139/cjz-2016-0098>, 812

<sup>116</sup> Gomez et al., ‘A Systematic Review on the Behavioural Responses of Wild Marine Mammals to Noise,’ 812.

<sup>117</sup> Gray v Minister for Planning (2006) 152 LGERA 258, [122].

<sup>118</sup> Gray v Minister for Planning, [122].

<sup>119</sup> See, for example, Thomas W. Davies et al., ‘The Nature, Extent, and Ecological Implications of Marine Light Pollution’ (2014) 12(6) Frontiers in Ecology and the Environment 347, <https://ore.exeter.ac.uk/repository/bitstream/handle/10871/31366/fee2014126347.pdf>.

<sup>120</sup> See, for example, Ruth Kamrowski et al., ‘Influence of industrial light pollution on the sea-finding behaviour of flatback turtle hatchlings’ (2015) 41(5) Wildlife Research 421, [https://www.researchgate.net/publication/272746907\\_Influence\\_of\\_industrial\\_light\\_pollution\\_on\\_the\\_sea-finding\\_behaviour\\_of\\_flatback\\_turtle\\_hatchlings](https://www.researchgate.net/publication/272746907_Influence_of_industrial_light_pollution_on_the_sea-finding_behaviour_of_flatback_turtle_hatchlings).

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<p>this potential impact as “behaviourally insignificant” given “[t]he Project area is well offshore (approximately 25 km) from the closest significant flatback turtle nesting beaches at Cape Fourcroy.”<sup>121</sup></p>	
<p>96. The PDR underestimates light impacts on nesting flatback turtles and hatchlings. The Barossa Pipelay Light Modelling notes that “light emissions are expected to be visible” at Cape Fourcroy, but “behavioural impacts to olive ridley and flatback hatchling turtles on the beach are unlikely.”<sup>122</sup> This conclusion appears to completely ignore the danger that “[o]ffshore lights can attract in-water dispersing hatchlings, causing them to linger around the light source at sea,”<sup>123</sup> including within the radius where the modelling found behavioural impacts become possible.<sup>124</sup> A 2018 study on neonate flatback turtles in Western Australia concluded that “[a]rtificial light was a strong predictor of the in-water movement behaviour of flatback turtle hatchlings, largely overriding the influence of oceanographic cues and likely incurring energetic costs and increasing predation risk.”<sup>125</sup> Santos should have assessed potential impacts from light pollution on hatchling turtles after they have entered the ocean.</p>	<p>The PDR considers impacts to nesting turtles and turtle hatchlings, including attraction of turtle hatchlings at sea (refer Section 4.2.2). A light modelling study included with the PDR (Appendix 19A and Section 4.2.2.2) was conducted to determine the distance away from Project vessels where light could possibly cause behavioural disturbance to turtle hatchlings. This was determined as within 3.3 km of the pipelay vessel, 2.5 km of the offshore construction vessel, and 4.5 km when these vessels are operating side by side.</p> <p>The distance of the Project area away from Cape Fourcroy is approximately 25 km. The risk of Project vessel lighting to turtle hatchlings that disperse from this location is not considered significant, given the modelled potential behavioural effect radius being over 20 km away from where turtle hatchlings could be entering the water and the limited time these vessels will be at this location.</p>

<sup>121</sup> PDR, 152-53.

<sup>122</sup> PDR, Appendix 19A, 12.

<sup>123</sup> Phillipa Wilson et al., ‘Artificial Light Disrupts the Nearshore Dispersal of Neonate Flatback Turtles *Natator depressus*’ (2018) 600 Marine Ecology Progress Series 179, [https://www.int-res.com/articles/meps\\_oa/m600p179.pdf](https://www.int-res.com/articles/meps_oa/m600p179.pdf), 180.

<sup>124</sup> PDR, Appendix 19A, 7.

<sup>125</sup> Wilson et al., ‘Artificial Light Disrupts the Nearshore Dispersal of Neonate Flatback Turtles *Natator depressus*,’ 188.

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<p>97. As above, the Minister must not act inconsistently with the Recovery Plan for Marine Turtles in deciding whether to approve the controlling provision.<sup>126</sup> One of the priority actions under the Recovery Plan is to “minimise light pollution” particularly within or adjacent to habitat critical to the survival of marine turtles, and to identify cumulative impacts of multiple sources of light pollution.<sup>127</sup> Based on the absence of sufficient information, the Minister cannot make an informed decision about the likely impacts from light pollution on threatened species, nor the adequacy of Santos’s proposed mitigation measures.</p>	<p>Santos considers that sufficient information has been provided to allow the Minister to make an informed decision about the likely impacts from light pollution on threatened species.</p> <p>A subject matter expert evaluation of DPD Project lighting on turtle nesting beaches has been provided with the PDR (Appendix 19) and discussed within Section 4.2.2.1 of the PDR. This considers the impact of Project lighting with consideration of existing light sources visible from turtle nesting beaches.</p> <p>Light spill modelling and potential effects of turtle hatchlings is also provided (refer to response to comment 96 above).</p> <p>Project light pollution will be minimised through control measures outlined in PDR Table 5-1. These measures are considered adequate in the context of the low level of impact that Project lighting could have on marine turtles.</p>
<p><b>V. SANTOS HAS FAILED TO PROVIDE SUFFICIENT INFORMATION FOR THE MINISTER TO MAKE AN INFORMED DECISION ABOUT THE DPD’S IMPACTS ON MIGRATORY SPECIES</b></p>	
<p>98. The Minister identified listed migratory species as a controlling provision for the DPD.<sup>128</sup> The EPBC Act Protected Matters Report identifies 71 listed migratory species within the Project Area.<sup>129</sup> As with listed threatened species, Santos does not assess impacts on all 71 species and limits the list of migratory species likely or potentially occurring within the Project Area to six species—the saltwater crocodile, Australian snubfin dolphin, Australian</p>	<p>Species identified from the EPBC Act Protected Matters Report were further assessed for likelihood of occurrence within the Project area (PDR 3.1 Likelihood of Occurrence, Table 3-2 Likelihood of occurrence assessment). This</p>

<sup>126</sup> EPBC Act, s 139(1)(b).

<sup>127</sup> Recovery Plan for Marine Turtles, 56.

<sup>128</sup> EPBC Act, ss 20, 20A.

<sup>129</sup> PDR, Appendix 16.

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<p>humpback dolphin, spotted bottlenose dolphin, dugong, and osprey.<sup>130</sup> In doing so, the PDR ignores impacts on dozens of other migratory species, including the endangered Lesser Sand Plover which is known to forage or feed within the Project Area and nine other migratory terrestrial species that similarly rely on the area.<sup>131</sup></p>	<p>process that was assessed by DCCEEW in the Referral stage.</p> <p>Santos has undertaken a comprehensive assessment of impacts on those migratory species which have a reasonable likelihood of occurring in the Project area and being impacted by the DPD Project. The migratory species assessed in the PDR are consistent with DCCEEW's request for further information (PDR Appendix 3), which identified that the proposed action intersects biologically important areas for three migratory dolphin species.</p>
<p>99. With regards to the listed migratory species for which the PDR does assess impacts, the PDR does not adequately analyse several impacts, such as interference with foraging and breeding behaviours.</p>	<p>Refer to response to comment 76.</p>
<p>100. For the reasons that follow, Santos has failed to provide sufficient information about the impacts of the DPD on listed migratory species. As such, the Minister cannot make an informed decision on this controlling provision, and the Minister should therefore not approve the action.</p>	<p>As further explained in Santos Responses 101 to 124, Santos has provided sufficient information about the impacts of the DPD on listed migratory species to enable the Minister to make an informed decision.</p>
<p>A. Significant impact guidelines for listed migratory species</p>	
<p>101. The Significant Impact Guidelines state that “[a]n action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will,” among other things, “substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species.”<sup>132</sup></p>	<p>Noted as background, contextual information and statements. No comments that require a response by Santos.</p>

<sup>130</sup> PDR, 192.

<sup>131</sup> PDR, Appendix 16.

<sup>132</sup> Significant Impact Guidelines, 12.

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102. An “important habitat” area for a migratory species includes “habitat that is of critical importance to the species at particular life-cycle stages” and “habitat utilised by a migratory species which is at the limit of the species range.” <sup>133</sup>	Noted as background, contextual information and statements. No comments that require a response by Santos.
B. Santos has failed to provide sufficient information about impacts on migratory dolphin species	
103. The Project Area intersects with Biologically Important Areas (BIAs) for three listed migratory dolphin species: <ul style="list-style-type: none"> <li>a. The Australian Snubfin Dolphin (breeding and calving);</li> <li>b. The Australian Humpback Dolphin (breeding, calving, foraging); and</li> <li>c. The Spotted Bottlenose Dolphin (breeding and calving).<sup>134</sup></li> </ul>	Noted as background, contextual information and statements. No comments that require a response by Santos.
104. BIAs are “spatially and temporally defined areas of the marine environment used by protected marine species for carrying out critical life functions,” <sup>135</sup> including reproduction, feeding, migration, and resting. <sup>136</sup> They are used to identify habitat critical to the survival of a species under the Significant Impact Guidelines. <sup>137</sup>	Noted as background, contextual information and statements. No comments that require a response by Santos.
105. The Australian Snubfin and Australian Humpback Dolphins are in fact endemic to northern Australia and rely on Darwin Harbour for critical habitat. <sup>138</sup> The DPD, as a major development in Darwin Harbour, could compromise their international conservation status, noting that both species are already listed in the IUCN Red List as vulnerable. <sup>139</sup> Under the EPBC Act, the Minister has an obligation to act consistently with approved international agreements such as the Bonn Convention, <sup>140</sup> including “the need to take action to avoid any migratory species	Noted as background, contextual information and statements. No comments that require a response by Santos.  Santos does not agree that the DPD Project will compromise the international convention status of these species. Santos notes that the following

<sup>133</sup> Significant Impact Guidelines, 12.

<sup>134</sup> PDR, 222-223.

<sup>135</sup> Australian Government, Department of Climate Change, Energy, and the Environment and Water, The Protocol for the Designation of Biologically Important Areas for Protected Marine Species (The BIA Protocol) (2023), <https://www.dcceew.gov.au/sites/default/files/documents/protocol-designation-bia-marine-species.pdf>, 6.

<sup>136</sup> The BIA Protocol, 9-10.

<sup>137</sup> The BIA Protocol, 7.

<sup>138</sup> See Carol Palmer, Department of Natural Resources, Environment, the Arts and Sport (NRETAS), Darwin Harbour Coastal Dolphin Project – Interim Report (March 2010), [https://denr.nt.gov.au/\\_\\_data/assets/pdf\\_file/0007/255157/InterimReport\\_DarwinHarbourDolphins\\_2008-to-2010\\_PALMER.pdf](https://denr.nt.gov.au/__data/assets/pdf_file/0007/255157/InterimReport_DarwinHarbourDolphins_2008-to-2010_PALMER.pdf); Flinders University, ‘Help to save rare humpback dolphins,’ (13 February 2017) Phys Org, <https://phys.org/news/2017-02-rare-humpback-dolphins.html>.

<sup>139</sup> IUCN Red List, ‘Australian Snubfin Dolphin’ <https://www.iucnredlist.org/species/136315/123793740>; IUCN Red List, ‘Australian Humpback Dolphin’ <https://www.iucnredlist.org/species/82031667/82031671>.

<sup>140</sup> EPBC Act, s 140(a).

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<p>becoming endangered.”<sup>141</sup> The Minister is required to take these international obligations into account when considering the potential risks to protected dolphin species from DPD activities such as vessel traffic, dredging, marine fauna interactions, and noise emissions, as discussed further below.</p>	<p>study Palmer, C., Brooks, L., Fegan, M. and Griffiths, A.D. (2017). <i>Conservation Status of Coastal Dolphins in the Northern Territory: Final Report</i>. Marine Ecosystems Group, Flora and Fauna Division, Department of Environment and Natural Resources, Northern Territory Government, Darwin, as referenced in Table 3-7 of the PDR found that the three migratory dolphin species are widespread across NT coastal waters and did not meet IUCN Red List criteria B for threatened species.</p>
<p><i>Impacts on foraging</i></p>	
<p>106. The PDR downplays the project’s impacts on foraging for all three dolphin species on the basis that “there are no specific habitats that are considered unique or key ... given [their] generalist feeding behaviour and wide use of shallow coastal habitats for foraging.”<sup>142</sup></p>	<p>Refer to response to comment 76.</p>
<p>107. At the same time, the PDR acknowledges elsewhere that the Australian Snubfin Dolphin has foraging habitats “closer to shore”,<sup>143</sup> and that it specifically has foraging BIAs that overlap with the Project Area.<sup>144</sup> BIAs for foraging are “[a]reas (and times) known or likely to be regularly or repeatedly used by individuals or aggregations of a species for feeding, foraging (searching for food including for provisioning of young) or otherwise obtaining nutrition.”<sup>145</sup> Santos should not dismiss the fact that protected dolphin species, particularly the Snubfin, rely on their foraging BIAs in and around the Project Area and will therefore be vulnerable to project impacts.</p>	<p>The BIA for the Australian snubfin dolphin that overlaps with Darwin Harbour is designated as breeding and calving and does not include foraging. Also, refer to response to comment 76.</p>
<p><i>Impacts on breeding</i></p>	

<sup>141</sup> Convention on the Conservation of Migratory Species of Wild Animals (1651 UNTS 333) (entered into force 1 November 1983), <https://www.cms.int/en/convention-text> (Bonn Convention), Article II(2).

<sup>142</sup> PDR, 226-227.

<sup>143</sup> PDR, 226.

<sup>144</sup> PDR, 222-223.

<sup>145</sup> The BIA Protocol, 9.



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<p>108. The PDR explains that the “exact locations of breeding habitats within the BIA (breeding and calving) in Darwin Harbour are not known,” but concludes that “calving probably occurs in shallow water habitats” despite the absence of “supporting studies/reports of calving behaviour of the three dolphin species in the Darwin Harbour regions.”<sup>146</sup> The PDR accordingly reasons that “[t]he dolphin species are therefore most unlikely to calve in the deeper waters of the Project’s alignment” and “Project interception of dolphin breeding or shallow water calving areas within the BIAs is unlikely.”<sup>147</sup> The PDR further relies on the fact that “the Project pipeline is adjacent to and closely follows the main shipping lane to and from Darwin Harbour,” and “it is most unlikely that any of the three dolphin species would breed [or calve] within or close to this shipping channel.”<sup>148</sup></p>	<p>Noted as background, contextual information and statements. No comments that require a response by Santos.</p>
<p>109. Santos’s lack of information about the breeding habits of migratory dolphin species does not support a conclusion that the DPD will have no significant impact on those species. In taking account of the precautionary principle,<sup>149</sup> the Minister should not allow Santos to use the absence of full scientific certainty on impacts on dolphin calving to avoid taking mitigating action.</p>	<p>Santos refutes the claim of an absence of scientific certainty and for example provides the following evidence that dolphin calving probably occurs in shallow water habitats.</p> <p>A study in Bunbury, Western Australia of dolphin sociality, distribution and calving to identify important behavioural and ecological patterns to inform management (Smith et al, 2016. H. Smith, C. Frere, H. Kobryn and L. Bejder, Dolphin Sociality, Distribution and Calving as Important Behavioural Patterns Informing Management, Zoological Science London – Animal Conservation, <a href="https://zslpublications.onlinelibrary.wiley.com/doi/abs/10.1111/acv.12263">https://zslpublications.onlinelibrary.wiley.com/doi/abs/10.1111/acv.12263</a>) had three main findings. First, it was shown that dolphin density and distribution changed seasonally with adult female dolphins aggregating in the inner waters of Koombana Bay in summer and autumn. Second, adult female dolphins formed bonds with other adult females, seasonally, during this same time</p>

<sup>146</sup> PDR, 223.

<sup>147</sup> PDR, 223-224.

<sup>148</sup> PDR, 223.

<sup>149</sup> EPBC Act, s 391(1), (3).

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	<p>period. Lastly, the timing of peak female sociality and use of the inner waters coincided with the majority of calving. Calving is known to be linked to warmer water temperatures in bottlenose dolphins (Mann et al., 2000) and seasonality in calving is a common trait amongst mammals with a polygynous mating system (Clutton-Brock &amp; Harvey, 1978). Santos concludes that in light of these findings no additional mitigation is required.</p>
<p>110. In any case, Santos should not assume that proximity to a shipping channel automatically disqualifies an area as unsuitable grounds for dolphin breeding and calving. A 2023 study on bottlenose dolphin behaviour in the active Port of Corpus Christi, Texas found that “[b]ottlenose dolphins foraged, travelled, socialized, and milled across all seasons and times of day..., despite high vessel traffic, dredging, and marine construction.”<sup>150</sup></p>	<p>Santos notes the study referenced which indicates bottlenose dolphins exhibited multiple behaviours, including foraging, within an active port with high vessel traffic, dredging and marine construction. However, the study did not observe dolphin breeding or calving.</p>
<p><i>Noise emissions</i></p>	
<p>111. Noise pollution from the project could have unacceptable impacts on dolphin populations which have critical habitat in and around the Project Area, and Santos’s mitigation approach is inadequate. As with threatened marine turtle species, Santos concludes that “all MNES migratory dolphin species are expected to demonstrate avoidance behaviour if noise levels approach those that could cause pathological effects.”<sup>151</sup> However, Santos fails to consider that avoidance of noise pollution sources among cetaceans can impact survival and reproduction rates due to stress and reduced foraging success.<sup>152</sup> This omission is particularly concerning within BIAs specifically designated for breeding, calving, and foraging.</p>	<p>Refer to response to comment 76. Santos acknowledges that avoidance can have these effects (refer Section 6.3.3.2) within the broader impact of all vessel traffic in Darwin Harbour. The incremental impact from Project vessels is assessed as not significant.</p>

<sup>150</sup> Eliza M. M. Mills and Sarah Piwetz, ‘Vessels Disturb Bottlenose Dolphin Behavior and Movement in an Active Ship Channel’ (2023) 13(22) *Animals (Basel)* 3441, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10668690/>.

<sup>151</sup> PDR, 232.

<sup>152</sup> Karin A. Forney et al., ‘Nowhere to Go: Noise Impact Assessments for Marine Mammal Populations with High Site Fidelity’ (2017) 32 *Endangered Species Research* 391, <https://doi.org/10.3354/esr00820>.

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<p>112. The PDR’s methodology for assessing noise impacts is also flawed. The PDR uses a single impulsive acoustic threshold of 160 dB to assess whether harm will occur to dolphins.<sup>153</sup> This is not an appropriate method for determining behavioural impacts for different marine species or in line with best available science. In 2013, the US National Marine Fisheries Service characterised this 160 dB threshold as “generic criteria” pending updated threshold information.<sup>154</sup> Similarly, in 2018, the US government concluded that “[s]tudies of marine mammals in the wild and in experimental settings do not support” use of a single 160 dB threshold considering a recognised “potential for ... harassment at exposures to received levels below 160 [dB].”<sup>155</sup></p>	<p>Refer to response to comment 83.</p>
<p>113. Furthermore, scientific studies have found that harm may occur to marine mammals below the 160 dB for impulsive sound. For example, researchers from the Canadian Bedford Institute of Oceanography surveyed hundreds of studies on behavioural changes in marine mammals in response to anthropogenic noise and found that “behavioural responses were observed starting at approximately 110 dB re 1 µ Pa.”<sup>156</sup> This “suggests that a relatively low RL [received level of sound] might result in biologically significant impacts (by affecting foraging, socialising, reproduction, or overall survival).”<sup>157</sup> The study concluded that a large range of factors can influence the threshold of harm.<sup>158</sup></p>	<p>Refer to response to comment 83.</p>
<p>114. A better approach to determining the behavioural impacts of noise on marine mammals, in line with “best available science,” is a probabilistic assessment of risk that considers multiple criteria, including behavioural context and sensitivities particular to each species, in addition to distance and decibel levels.<sup>159</sup></p>	<p>Refer to response to comment 83.</p>

<sup>153</sup> PDR, Table 4-3, 157.

<sup>154</sup> Klaus Lucke et al., Peer Review Report: National Oceanic and Atmospheric Administration Draft Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammals: Acoustic Threshold Levels for Onset of Permanent and Temporary Threshold Shifts (2013), [https://www.noaa.gov/sites/default/files/2021-09/ID43\\_FINAL\\_Peer\\_Review\\_Report.pdf](https://www.noaa.gov/sites/default/files/2021-09/ID43_FINAL_Peer_Review_Report.pdf), 10.

<sup>155</sup> National Marine Fisheries Service, National Oceanic and Atmospheric Administration, ‘Taking and Importing Marine Mammals; Taking Marine Mammals Incidental to Geophysical Surveys Related to Oil and Gas Activities in the Gulf of Mexico’ 83 Federal Register 29212 (22 June 2018), <https://www.federalregister.gov/documents/2018/06/22/2018-12906/taking-and-importing-marine-mammals-taking-marine-mammals-incident-to-geophysical-surveys-related> NMFS Marine Mammals Register)

<sup>156</sup> Gomez et al., ‘A Systematic Review on the Behavioural Responses of Wild Marine Mammals to Noise’, 811.

<sup>157</sup> Gomez et al., ‘A Systematic Review on the Behavioural Responses of Wild Marine Mammals to Noise’, 811.

<sup>158</sup> For example, the proximity, movement and depth of the sound source, the ratio of signal to background noise, the sound level above hearing threshold, and the receivers’ species, sex, age, motivation, and behavioural state: Gomez et al., ‘A Systematic Review on the Behavioural Responses of Wild Marine Mammals to Noise’, 811.

<sup>159</sup> NMFS Marine Mammals Register.

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115. Accordingly, the use of a single generic 160 dB threshold across all dolphin species in the area, without comprehensive consideration of other contextual factors, is inadequate and does not provide an accurate or a comprehensive assessment of the true behavioural impacts to these species. Without this information, the Minister cannot properly assess the risk to these species from the DPD.	Refer to response to comment 83.
116. Further, the comments in Section IV on Santos’s failure to provide sufficient information about the cumulative impacts of noise emissions on threatened species apply equally in relation to migratory species.	Refer to response to comment 93.
117. More generally, cumulative impacts are a notable gap in Santos’s assessment of impacts on threatened and migratory species. It is recognised that the effects of persistent marine construction and associated vessels on species such as dolphins are compounded when multiple industrial activities co-occur with varying methods and intensity. <sup>160</sup> A 2021 study found that “dolphin populations with small ranges and high site fidelity may be particularly vulnerable to cumulative stressors associated with pollution and other point sources of disturbance.” <sup>161</sup> For all migratory dolphins, Santos should have considered the cumulative impacts of project activities as well as external activities, such as reduced or degraded freshwater outflow to estuaries, habitat loss, fisheries interactions, contamination from industrial and other discharges, and increasing development pressures. <sup>162</sup>	Santos has undertaken a cumulative impact assessment which considers other construction projects and potential cumulative impacts from other aspects of the DPD activity. It includes such aspects as habitat loss, existing vessel traffic and marine discharges (PDR Section 4.3).
C. Santos has failed to provide sufficient information about impacts on migratory bird species	
118. The PDR identifies the osprey among the six migratory species “likely to, or have potential to, occur within the Project Area.” <sup>163</sup> Table 3-2 elaborates that “[t]he Project Area and surrounds contain suitable foraging habitat for the species,” and “[n]ests are usually located near a suitable area of foraging habitat.” <sup>164</sup> In fact, “there is an osprey nest on the DLNG site.” <sup>165</sup>	Noted as background, contextual information and statements. No comments that require a response by Santos.

<sup>160</sup> Victoria L. G. Todd et al., ‘A Review of Impacts of Marine Dredging Activities on Marine Mammals’ (2015) 72(2) ICES Journal of Marine Science 328, <https://doi.org/10.1093/icesjms/fsu187>.

<sup>161</sup> Cecilia Passadore et al., ‘High Site Fidelity and Restricted Ranging Patterns in Southern Australian Bottlenose Dolphins’ (2018) 8(1) Ecology and Evolution 242, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5756869/>.

<sup>162</sup> Lyndon Brooks et al., ‘Monitoring Variation in Small Coastal Dolphin Populations: An Example from Darwin, Northern Territory, Australia’ (2017) 4 Frontiers in Marine Science (2017), <http://doi.org/10.3389/fmars.2017.00094>.

<sup>163</sup> PDR, 192.

<sup>164</sup> PDR, 87.

<sup>165</sup> PDR, 87.

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<p>119. Despite noting the possible use of the Project Area for foraging and nesting, the PDR does little to assess impacts on the osprey beyond including a single row in Table 3-2 on the species. The PDR should have analysed whether and the extent to which the DPD’s impacts, particularly through light emissions, could disorient or misorient ospreys and interfere with foraging and nesting behaviours.</p>	<p>The DCCEEW request for further information, the scope for the PDR, does not include the osprey or other migratory (terrestrial/wetland birds). Further detail on habitat use by ospreys in the Project area is included in the Referral (Table 37). Further information was not requested by DCCEEW to be provided in the PDR. Given there is no natural osprey nesting habitat within the Project area or any alteration to anthropogenic nesting habitat, impacts to osprey nesting habitat are not expected. Osprey foraging habitat is typically expansive and covers a wide array of coastal habitats (PDR Table 3-2). Given the localised and temporary activity associated with DPD Project in coastal waters, and the lack of impacts to any unique habitats, there are not expected to be significant impacts to osprey foraging from Project activities.</p>
<p>120. In addition, the PDR acknowledges that several other migratory bird species may be present in the Project Area. For example, there is suitable foraging habitat on either side of the Project Area for the common sandpiper and grey plover “which may result in [these] species traversing the Project Area.”<sup>166</sup> However, the PDR dismisses the need to assess impacts on migratory birds because they would “likely” only be transiting through the Project Area:</p> <p>As described in Table 3-2, a number of additional migratory birds were assessed as having the potential to occur in the Project area. However, most of these birds would likely be transiting to suitable habitat located on either side of the Project area (i.e. shoreline crossing is within a disturbed area) and have therefore not been further considered.<sup>167</sup></p>	<p>Noted as background, contextual information and statements. No comments that require a response by Santos.</p>

<sup>166</sup> PDR, 87.

<sup>167</sup> PDR, 192.

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<p>121. The mere fact that the birds do not remain in the Project Area for long periods of time does not necessarily mean that the DPD would have no significant impact. The project vessels will operate 24 hours a day and “require external lighting”; “behavioural disturbance such as attraction, disorientation and misorientation”<sup>168</sup> can occur as the birds are flying through, even if they do not land. Light emissions can thus substantially modify important habitat for ospreys by interfering with foraging and keeping them from traveling safely to their nests adjacent to or within the Project Area. The Minister does not have sufficient information to make an informed decision about impacts on listed migratory birds transiting through the Project Area.</p>	<p>The DCCEEW request for further information, the scope for the PDR, does not include the osprey or other migratory terrestrial/wetland birds.</p>
<p>D. Other examples of Santos's failures to provide sufficient information about impacts on migratory species</p>	
<p>122. Without explanation, the PDR expressly excludes Saltwater Crocodiles, Dugongs, and certain other migratory species from further consideration in Section 3.3 on Listed Migratory Species.</p>	<p>An assessment of saltwater crocodiles, dugongs and other migratory species was included in the Project referral. The Project area does not overlap with key habitat of the saltwater crocodile (Table 37 of the referral) and significant impact criteria were not triggered (Table 63 of the referral).</p> <p>Evaluation of Project impacts to dugongs against significant impact criteria was included in Table 63 of the referral and outlines that impacts will not be significant. Dugong foraging habitats (shallow water seagrass meadows and shallow coastal reef flat habitat, refer Table 37 of the referral) are not directly (through Project infrastructure) or indirectly (through turbidity/sedimentation) impacted by Project activities (refer Section 4.2.1 of the PDR).</p> <p>On the basis of the referral information, further information on saltwater crocodiles, dugongs and other migratory species (with the exception of migratory dolphin species) was not requested by DCCEEW to be addressed within the PDR.</p>

<sup>168</sup> PDR, 149.

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<p>123. Acoustic impacts on Saltwater Crocodiles are discussed briefly in Section 6 on Residual Impact Assessment. However, adding to the layers of uncertainty and assumptions, the PDR applies the marine turtle’s 166 dB behavioural threshold to crocodiles merely because “there are no known studies that have investigated the effects of noise on crocodiles.”<sup>169</sup> However, the precautionary principle applies and, further, gaps in scientific knowledge do not warrant the use of arbitrary numbers for impact assessments. A study to establish the threshold at which crocodiles are likely to experience disturbance or harm from the project’s underwater noise should be completed to fully assess impacts on this protected species.</p>	<p>Refer to response to comment 122.</p> <p>Both turtles and crocodiles have relatively similar hearing systems (more similar than between reptiles and mammals) and this is the reason the same thresholds are used in absence of a crocodile-specific threshold.</p>
<p>124. Santos’s assessment of impacts on Dugongs is also not comprehensive. For example, the PDR does not refer to the risk of vessel collisions on dugongs at all. The evidence set out in the National Strategy for Reducing Vessel Strikes suggests that Dugongs in Darwin Harbour would be vulnerable to DPD vessel activities, since they spend a large part of their time at the ocean’s surface; they tend to “fail to flee or evade the approach of fast approaching vessels until an impact is unavoidable”; and there is a higher probability of vessel interactions in “shallow water with large intertidal areas” especially during low tide.<sup>170</sup> None of these risk factors are mentioned, let alone assessed.</p>	<p>Refer to response to comment 122.</p> <p>In addition, Section 4.2.5.2 of the referral considers vessel collision risk to dugongs. As outlined in the referral, the risk of collisions is not considered significant given dugong foraging habitats are in shallow waters away from the pipeline route, Project vessel speeds during construction activities are inherently slow, and management measures, including Part 8 of the EPBC Regulations 2000 and Darwin Port speed restrictions will be followed.</p>
<p><b>VI. SANTOS FAILED TO PROVIDE SUFFICIENT INFORMATION FOR THE MINISTER TO MAKE AN INFORMED DECISION ABOUT THE DPD’S IMPACTS ON THE ENVIRONMENT</b></p>	
<p>125. The final controlling provision for the DPD concerns activities involving the marine environment.<sup>171</sup> Section 23(1) of the EPBC Act prohibits any action taken without approval in a Commonwealth marine area that “has, will have or is likely to have a significant impact on the environment.”<sup>172</sup> Under s 23(2) of the Act, actions taken “outside a Commonwealth marine area but in the Australian jurisdiction” that have, will have or are likely to have a significant impact on the environment in a Commonwealth marine area are likewise prohibited without</p>	<p>Noted as background, contextual information and statements. No comments that require a response by Santos.</p>

<sup>169</sup> PDR, 157.

<sup>170</sup> National Strategy for Reducing Vessel Strike, 18.

<sup>171</sup> EPBC Act, ss 23, 24A.

<sup>172</sup> EPBC Act, s 23(1).



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<p>approval.<sup>173</sup> The EPBC Act defines “environment” as broadly encapsulating “ecosystems and their constituent parts” and “natural and physical resources,” among other things.<sup>174</sup></p>	
<p>126. The DPD pipeline extends 23 km into the Commonwealth marine area.<sup>175</sup> Although a relatively small proportion of the pipeline lies in the Commonwealth marine area, Santos’s pipeline proposal must be taken as a whole. Although the PDR attempts to isolate activities within and impacts on the Commonwealth marine area,<sup>176</sup> this separation is not practical nor needed. The DPD itself, as the controlled action, constitutes an action in a Commonwealth marine area for the purposes of s 23(1) of the EPBC Act, as well as an action outside the Commonwealth marine area for the purposes of s 23(2) of the Act. The wider provision is most relevant: the Minister is required to consider whether the DPD activities are likely to have a significant impact on the environment, defined broadly.</p>	<p>Subsections 23(1) and (2) of the EPBC Act do not require the Minister to consider whether DPD activities undertaken <i>outside</i> the Commonwealth marine area will have a significant impact on the environment generally. Section 23(1) requires consideration of the impacts of activities <i>within</i> the Commonwealth marine area on the environment generally. In contrast, section 23(2), which relates to activities taken <i>outside</i> a Commonwealth marine area, is confined to impacts on the environment <i>in the Commonwealth marine area</i>. It is therefore not correct to say that the Minister is required to consider whether all DPD activities, including those outside the Commonwealth marine area, will have a significant impact on the environment generally.</p>
<p>127. Following the above reasoning, in addition to assessing impacts of the DPD action on threatened and migratory species (see Sections IV and V), Santos should have provided sufficient information about impacts on the environment generally. The Environment Centre NT’s (ECNT) submission to the NT Environment Protection Authority in relation to the DPD Supplementary Environmental Report (SER) identifies several flaws in Santos’s</p>	<p>Refer to response to comment 126. Further, Santos does not accept that there are flaws in the PDR’s methodology for assessing impacts on the environment associated with the portion of the action within the Commonwealth marine area, or impacts on the environment</p>

<sup>173</sup> EPBC Act, s 23(2).

<sup>174</sup> EPBC Act, s 528.

<sup>175</sup> PDR, 77.

<sup>176</sup> For example, the PDR identifies sediment disturbance from pre-commissioning and construction activities and chemical discharges as potential impacts on Commonwealth marine areas, before concluding that there are no significant residual impacts on these areas: see PDR, 237. Separately, the PDR dismisses impacts on MNES species in the Commonwealth marine area on the basis that there are “no key habitats nor areas supporting key-lifecycle activities [for MNES species] within the Commonwealth waters Project area” and that any listed species present “would be expected to be transient only within the Project area”: PDR, 208.



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<p>methodology for assessing impacts on the environment.<sup>177</sup> Because the DPD remains flawed in the ways identified in that submission, those arguments on the wider environmental impacts from the SER submission equally apply here. Some key examples are provided below.</p>	<p>within the Commonwealth marine area resulting from actions outside that area, for the reasons set out in response to paragraphs 128 – 134 below.</p>
<p>A. Santos failed to provide sufficient information about impacts of pipeline failures and toxic discharges on the marine environment</p>	
<p>128. Santos failed to adequately assess the risk that pipeline failures could cause significant impacts on the environment. If any part of the pipeline were to experience a failure (whether within or outside the Commonwealth marine area), there is a major risk of toxic chemical discharges into the marine environment.</p>	<p>The PDR does consider the potential impacts from a contingency discharge following an unplanned wet-buckle, both within the Commonwealth marine area and impacts on the Commonwealth marine area of an event outside the Commonwealth marine area (refer Section 4.2.4.1). Santos does not agree that a contingency discharge represents a major risk. The assessment of contingency marine discharges, which consider ecotoxicology information and hydrodynamic modelling, concludes that the residual impact will not be significant (Sections 4.2.4.3 and 4.2.4.4).</p>
<p>129. In the event of a ‘wet buckle’ event (that is, “when there is a failure in the pipeline during installation which results in the ingress of raw/untreated seawater into the pipeline”<sup>178</sup>), the PDR indicates that seawater treated with 550 mg/L of the Hydrosure chemical mixture will be injected into the pipeline.<sup>179</sup> Hydrosure contains biocides that kill marine organisms within the pipeline<sup>180</sup> and then disperse into the marine environment.<sup>181</sup></p>	<p>Noted as background, contextual information and statements. No comments that require a response by Santos.</p>

<sup>177</sup> See ECNT, Submission in Response to Santos’s Darwin Pipeline Duplication Project: Supplementary Environmental Report (June 2023), [https://ntepa.nt.gov.au/\\_\\_data/assets/pdf\\_file/0003/1256763/santos-dpd-ecnt-submission.pdf](https://ntepa.nt.gov.au/__data/assets/pdf_file/0003/1256763/santos-dpd-ecnt-submission.pdf), (ECNT Submission on NT SER) [165]-[171].

<sup>178</sup> PDR, 64.

<sup>179</sup> PDR, Appendix 18, 1.

<sup>180</sup> PDR, 167.

<sup>181</sup> PDR, 168-169.

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<p>130. Hydrosure’s biocide is Alkyl dimethyl benzyl ammonium chloride (ADBAC),<sup>182</sup> which the United States EPA has categorised as “highly toxic to fish” and “very highly toxic to aquatic invertebrates... on an acute exposure basis.”<sup>183</sup> Even relatively low levels of the biocide ADBAC in treated seawater can be lethal at very short time periods. Studies have found that ADBAC is lethal to aquatic invertebrates over 48 hours with a No Observable Effect Concentration level as low as 0.006 mg/L.<sup>184</sup></p>	<p>The Hydrosure chemical is designed to contain a biocide which impacts marine organisms at concentrations within the pipe, and rapidly disperses to levels that are not harmful and does not persist in the environment.</p> <p>For chemicals discharged to the environment, Santos preferentially selects for use those chemicals which are rated as Gold/Silver through the Offshore Chemical Notification Scheme (OCNS) Chemical Hazard and Risk Management (CHARM) or OCNS group rating of D/E (if not CHARM rated) (see PDR Section 2.6.1 Assessment of Fuels and Chemicals). A preservation chemical such as Hydrosure (OCNS Gold rating) dosed at a rate of 550 mg/L will be used to treat the seawater to be pumped into the pipeline. These chemicals are biodegradable with low potential for bioaccumulation.</p>
<p>131. At a minimum, Santos should have defined the levels (mg/L) at which all organisms, including corals and the microorganisms important for coral health, may be harmed over time periods ranging from immediate exposure to 12, 24, and 48 hours.<sup>185</sup> Santos should have also assessed the potential cumulative impacts of the toxic discharges on environmental health. Overall, Santos has failed to provide sufficient information to the Minister to make an informed decision about the impacts of pipeline failures and toxic discharges on the marine environment.</p>	<p>The PDR does consider impacts to all organisms by calculating 99% species protection levels which considers ecosystem wide protection, not just selected species. The 99% species protection levels are based on Hydrosure whole effluent testing (WET) ecotoxicology results conducted on a number of different species</p>

<sup>182</sup> PDR, Appendix 2, Table 8-3 (170).

<sup>183</sup> United States Environment Protection Agency, Reregistration Eligibility Decision for Alkyl Dimethyl Benzyl Ammonium Chloride (ADBAC) (3 August 2006), [https://www3.epa.gov/pesticides/chem\\_search/reg\\_actions/reregistration/red\\_G-2\\_3-Aug-06.pdf](https://www3.epa.gov/pesticides/chem_search/reg_actions/reregistration/red_G-2_3-Aug-06.pdf), 45.

<sup>184</sup> See Toxicology Regulatory Services, Inc., Alkyldimethylbenzylammonium Chloride (ADBAC) Category High Production Volume (HPV) Chemicals Challenge Final Test Status and Data Review (1 March 2011), <https://19january2017snapshot.epa.gov/sites/production/files/2015-06/documents/c16856tp.pdf>, 22.

<sup>185</sup> Appendix 2 of the PDR defines toxicity limits for five species, claiming this is representative of impacts for all species in the area: PDR, Appendix 2, Table 8-4, 171-172

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	following established protocols and exposure periods (refer Section 4.2.4.1).
B. Santos has failed to provide sufficient information about impacts on seabed habitat in the marine environment	
<p>132. The previous ECNT submission on the SER considered the disturbance of seabed habitats in Darwin Harbour from trenching activities, highlighting the failure to assess how modelled exposure levels might harm hard and soft corals, through accretion and on top of climate-change related stress and other industrial activities.<sup>186</sup></p>	<p>DPD activities within Darwin Harbour (i.e. outside the Commonwealth marine area) are only relevant to the assessment under the EPBC Act to the extent they will have impacts on listed threatened species or listed migratory species. Hard corals are not predicted to be impacted by the DPD Project (refer PDR Section 4.2.1). The impacts of trenching activities on listed threatened species and listed migratory species are addressed in the PDR. The disturbance of seabed habitats within Darwin Harbour from trenching activities will not have any impacts on the environment within the Commonwealth marine environment.</p> <p>For completeness, Santos notes that the trenching and spoil disposal impact assessment has been supported by peer-reviewed modelling studies (Appendix 8 of PDR) and considers established methodologies for determining exposure to marine habitats, including sensitive light dependent habitats such as hard corals (Section 4.2.1.2). The modelling considers both accretion (sedimentation) and turbidity effects to benthic habitats, including soft corals, from both trenching and spoil disposal activities.</p>

<sup>186</sup> ECNT Submission on NT SER ECNT, [165]-[171].

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<p>133. Santos also failed to properly assess impacts to benthic habitats near the proposed spoil ground disposal area. The PDR explains that Santos will transport material removed from trenching to the proposed spoil ground disposal area.<sup>187</sup> The PDR notes that “temporarily increased suspended sediment ... may result in a visible plume that could impact visual amenity and dissuade the use of the area in the harbour and at the spoil disposal ground.”<sup>188</sup> Sediment levels at the disposal site approach or exceed dry season tolerance levels of 17.9 mg/L several times over the course of trenching operations,<sup>189</sup> which are expected to take place over “a six-week period, but potentially up to 12 weeks.”<sup>190</sup></p>	<p>Impacts to benthic habitats near the proposed spoil ground disposal area are only relevant to the assessment under the EPBC Act to the extent they will have impacts on listed threatened species or listed migratory species. Spoil disposal activities outside the Commonwealth marine area will not have any impact on the environment within the Commonwealth marine area.</p>
<p>134. However, as with the previous comments on Darwin Harbour, Santos’s sediment modelling fails to assess seabed disturbance impacts from plumes generated near this disposal site, including on the soft corals it notes are present.<sup>191</sup></p>	<p>Refer to response to comments 132 and 133. PDR Section 4.2.1.1 states that the habitat mapped in the spoil disposal ground is predicted to be 91.8% low density sponge, filter feeder and octocoral habitat and 8.2% bare ground. There are no unique, or sensitive habitats and the habitats present are well represented regionally.</p>
<p>C. Alternatively, Santos has failed to provide sufficient information about impacts on the Commonwealth marine area</p>	
<p>135. As noted above, we disagree with Santos’s interpretation of s 23 of the EPBC Act, as it divides the DPD action (established as a “controlled action”) into activities that occur within and outside Commonwealth marine areas. However, even if Santos were correct in taking this approach, the PDR’s analysis of s 23 impacts is incomplete.</p>	<p>Refer to response to comment 126. Further, Santos does not accept that the PDR’s analysis of s 23 impacts is incomplete. The deficiencies in the s 23 assessment alleged in paragraphs 137 – 139 of the ECNT submission are not deficiencies for the reasons set out below.</p>

<sup>187</sup> PDR, 52; Appendix 8, 27.

<sup>188</sup> PDR, 249.

<sup>189</sup> PDR, Appendix 8, Table 7.2 (76).

<sup>190</sup> PDR, 52.

<sup>191</sup> PDR, Appendix 8, 89.

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<p>136. The PDR acknowledges that: Activities with the potential to reduce water quality within the Commonwealth marine environment will be undertaken in the pre-commissioning and construction phases of the Project. Sediment disturbance is one likely result of these activities, with associated impacts capable of influencing water quality in Commonwealth waters, where approximately 23 km of the Project pipeline is being installed.<sup>192</sup></p>	<p>Noted as background, contextual information and statements. No comments that require a response by Santos.</p>
<p>137. Santos’s use of mass flow excavation, which “accelerat[es] a mass flow of water to blow away sediments within a localised area,”<sup>193</sup> is expected to occur over 7-14 days,<sup>194</sup> and pipelay activities are “conservatively estimated” to take 100 days.<sup>195</sup> Although these timelines are calculated for the entire DPD, they suggest prolonged exposure to sedimentation in Commonwealth waters that should have been assessed.</p>	<p>It should be noted however that MFE is not planned to be undertaken in the Commonwealth marine area. Sedimentation/turbidity effects will not be prolonged in the Commonwealth marine area. The 23 km of pipelay in Commonwealth waters is expected to take approximately 14 days to complete. With respect to mass flow excavation (MFE), there are nominally 8 sites where Santos may use MFE, and each site is expected to take nominally 6 hours to rectify (refer Section 2.4.2.3).</p>
<p>138. Despite noting that activities with potential impacts on the seabed in the Commonwealth marine area will take place over several weeks, Santos’s sediment dispersion modelling only assesses impacts from “[t]renching of sediment and rock along the pipeline route” and “[d]isposal of trenched sediment and rock at the nominated spoil ground,”<sup>196</sup> neither of which occurs in Commonwealth waters. As such, there does not appear to be any detailed assessment of seabed disturbance in Commonwealth waters in the PDR or its appendices.</p>	<p>Santos details direct disturbance from pipeline and structures, including the Commonwealth marine area in the PDR in Section 4.2.1. The effects on turbidity are considered extremely localised/short term in the Commonwealth marine area and not at the same scale as trenching and spoil disposal activities, which will not occur within the Commonwealth marine area, hence</p>

<sup>192</sup> PDR, 237.

<sup>193</sup> PDR, 55.

<sup>194</sup> PDR, 56.

<sup>195</sup> PDR, 58.

<sup>196</sup> PDR, Appendix 8, 25.

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	modelling has not been conducted and is not necessary to properly assess the impacts on the Commonwealth marine area.
<p>139. Even if Santos was correct to isolate activities that fall within s 23(2) of the EPBC Act, Santos failed to model the extent of sediment dispersion from the activities occurring in Commonwealth waters, which accounts for accretion of sediments over time and potential impacts on corals and other biota. Without this information, the Minister lacks sufficient information to make an informed decision about the impacts of seabed disturbance for the purposes of this controlling provision.</p>	Refer response to comment 138.