Table 1: Scarborough Project Nearshore Component – Summarised table of public submissions

Issue	Public submission 1	Response to comment
More information	That more information is recommended on the pipelay/dredging activities, indication of duration of the pipelay/dredging project, the size of the dredging plume; when this activity is proposed to take place, potential impacts on commercial fishing activities and potential impacts on the commercial fishing resource. What are the environmental risks of the dredging and the spoil grounds bespoke to commercial fishing activities and the commercial fishing resource? It is our understanding that more information will be available during the environment plan consultation process.	Section 4 of the DSDMP describes the activity, including the dredging volume, indicative schedule, work method and rationale. Once determined, the detailed information about the timing and extent of the activity will be made available to relevant stakeholders. Potential impacts to commercial fishing activities associated with the activity are addressed in Section 9.1.2.2 of the DSDMP. This has been supported by sediment transport modelling, which provides a conservative prediction of the sediment plume associated with the activity (with the results provided in Section 7 of the DSDMP) and an assessment of empirical evidence from similar dredging campaigns in Mermaid Sound. It should be noted that the modelling figures present outcomes over the entire scenario and do not represent an instantaneous plume footprint at any time.
Issue	**Public submission 2**	**Response to comment**
Maps	Clarification as to whether the DSDMP maps are correct, the DSDMP includes numerous figures (maps) which incorrectly identify Spoil Ground A/B and Spoil Ground 2B within the Port of Dampier (Spoil Ground A/B is labelled 2B and vice-versa). Pilbara Ports Authority (PPA) requests that proponent reviewed all maps within the DSDMP and update these accordingly to correct this issue.	All figures within the DSDMP have been updated to ensure correct reference.
Consultation	It is proposed to use Port of Dampier Spoil Ground A/B, Spoil Ground 2B and Spoil Ground 5A for the disposal of dredged material from trenching operations. The DSDMP states that the volumes of dredged material to be placed at each spoil ground will	Woodside confirms that PPA and the Port of Dampier Technical Advisory Consultative Committee (TACC) will be consulted when finalising the spoil ground allocation for the activity and reference has been included in Section 4.3.3.1 of the DSDMP.

	be determined in consultation with stakeholders. PPA requests that proponent consult's specifically with both PPA and the Port of Dampier Technical Advisory Consultative Committee (TACC) on the proposed allocation of dredged volumes in each spoil ground within the Port of Dampier, as part of this process. PPA requests that proponent liaise directly with PPA to obtain the required Port related approvals and permits for those works defined within the DSDMP which are within the Port Waters.	Woodside also confirm that they will liaise directly with PPA to obtain the required Port related approvals and permits for those works defined within the DSDMP, which are within the Port Waters.
Issue	**Public submission 3**	**Response to comment**
Dredge plumes	Dredge plumes can drift onto nearby benthic habitats. Elevated suspended sediment concentrations can affect filter and suspension feeders by interfering with food collection and the turbid plumes can reduce submarine irradiance, affecting benthic primary producers such as corals, seagrasses and macroalgae. There is no comment on the cumulative effects of the different activities that are taking place in the Dampier Archipelago. This approach cannot lead to a successful and safe outcome. According to MacDonald (2000), the cumulative effect can be generated by sequential activities on the same site. Cumulative effects can be additive or synergic. The increase in sediments is an additive effects that, for example, could disproportionately reduce fish spawning success. This nonlinear biological response to an additive change in sediments loads might be considered as a synergic cumulative effect.	The dredging activity described in the DSDMP is a one-off activity estimated to last for around 10 months. The water quality will only be affected during the construction period (as identified in Table 4-2 of the DSDMP) and not for the operational life of the pipeline. Further for clarity the figure of 2,781,700 refers to a volume (m^3) estimate for the total volume of material trenched and is not an estimate of the project footprint. The DSDMP acknowledges an impact pathway exists between the generation of suspended sediment as a result of dredging, spoil disposal and backfill activities, and the receiving benthic communities and habitat. However, when the DSDMP is implemented no impacts to benthic communities and habitat are expected, as the tiered monitoring and management framework will manage dredging operations such that water quality changes as a result of dredging remain within acceptable levels that are not predicted to impact benthic communities and habitats. Dredge modelling specific to the activity has been completed for the project, which outlines the predicted extent of the dredge plume and associated predicted zones of influence and impact. The DSDMP has been revised (section 9.1 of DSDMP) to include an assessment of Marine Environmental Quality as per the EPAs

		Technical Guidance for Protecting the Quality of Western Australia's Marine Environment, which demonstrates the objectives of the existing EQP for Mermaid Sound will be maintained. Dampier is a naturally turbid environment and increases in suspended sediments in the water column resulting from the Scarborough dredging, spoil disposal and backfill operations are expected to be spatially and temporally confined with no lasting impact to marine environmental quality. Increases in suspended sediments from past or future dredging programs in Mermaid Sound are also expected to be temporally confined such that cumulative effects on marine environmental quality are not expected for this project. The recent coral health monitoring survey completed by Woodside demonstrated that coral cover was similar to historic coverage estimates and levels of bleaching were relatively low. Overall, the changes observed in the coral health survey (Appendix E of the DSDMP) are less than those reported elsewhere in the coastal Pilbara (Depczynski et al. 2013; Moore et al. 2012; Moustaka et al. 2019; Ridgway et al. 2016), suggesting that the coral communities within Mermaid Sound have avoided some of the depredations of thermal bleaching events and cyclones over the last decade. This is particularly notable given ongoing capital and maintenance dredging programs during this period. Suspended sediments during high energy metocean events (including cyclones) naturally elevate the regional turbidity within Mermaid Sound often in excess of the levels of suspended sediments generated from dredging, spoil disposal and backfill activities. As such additive cumulative impacts from this project are not predicted.
Turtles	Suggested that additional research be conducted to understand the ecology, biology and habitat of marine turtles. Additional	The ecology, biology and habitat of marine turtles in the Dampier Archipelago is considered to be well known.

	research examining dredging-related behavioural changes in marine turtles in the northwest of Western Australia is needed.	The Pluto LNG Project Sea Turtle Management Plan details sea turtle ecology in the Dampier Archipelago for all six sea turtle species that occur within Australian waters. The plan is publicly available at https://files.woodside/docs/default-source/our-business---documents-and-files/pluto---documents-and-files/pluto-lng-environmental-compliance-documents/pluto-lng-project---sea-turtle-management-plan.pdf?sfvrsn=3c29ac91_4. Section 2.1.1 of the Pluto LNG Project Sea Turtle Management Plan describes the significant nesting and internesting aggregation areas for sea turtles in the Dampier Archipelago and Section 2.1.2 describes the migratory and foraging patterns. Table 2 of the plan summarises the sea turtle ecology in the Dampier Archipelago which discusses habitat, diet and nesting (including biologically important areas) for all six species. Further Sector 9: Devil Creek to Cape Lambert of Pilbara Region Oiled Wildlife Response Plan summarises the environmental sensitivity of the coastline which includes the Dampier Archipelago Islands. This plan describes turtle nesting density, location of nesting and where they inhabit for islands within the Dampier Archipelago. Impacts to internesting turtles associated with disposing of dredged sediment at the spoil grounds are not predicted. Satellite tracking of turtles within the Port of Dampier showed no use of the disposal sites by internesting turtles. The spoil grounds consist of soft substrate with no benthic communities and habitats and subsequently they have limited food sources that may attract turtles and are not considered suitable internesting habitat (PPA 2019). Monitoring of previous larger scale capital dredging programs have also shown that there have been no effects of project activities on turtle abundance (Inpex 2015). Important habitat for turtle foraging will be protected through the implementation of the DSDMP which aims to protect benthic communities and habitats from impact.

Coastal fish	That *in situ* studies examining accumulative and/or interactive impacts of multiple dredging-related stressors on coastal fish (across life-cycle) and juvenile sawfish. The accumulation of representative baseline data is particularly critical for the development of evidence-based management strategies for the protection of these threatened species. Recommends maintaining suspended sediment concentrations below 44mg/L (15-121 bootstrapped CI) and for less than 24 hours [which] would protect 95% of fishes from dredging-induced mortality. Seasonal restrictions on dredging during peak periods of reproduction and recruitment are also recommended to protect species from dredging impacts. Additionally, the implementation of a systematic monitoring program that enables a thorough evaluation of the effectiveness of different management strategies at mitigating impacts to fish is recommended.	The EQMF under section 9.1.2.2 of the revised DSDMP includes an assessment of impacts to fishes from the dredging operations. The assessment draws on the information from the WAMSI Dredging Science Node (Harvey et al 2017). The trenching and backfill operations are expected to rapidly progress along the pipeline route ensuring any elevated suspended sediment levels are spatially and temporally confined. Sampling of the sediments along the proposed pipeline route has demonstrated that sediments are suitable for unconfined ocean disposal with all levels of potential contaminants of concern below the National Assessment Guideline for Dredging (NAGD, 2009) screening levels, thus no toxicological impacts from the resuspension of contaminants are predicted. Modelling completed as part of the approval and presented in Appendix B of the DSDMP shows that dredging is not predicted to contribute more than 25 mg/l of suspended sediment to the water column except in isolated circumstances. The trenching and backfill operations are expected to rapidly progress along the pipeline route ensuring increased suspended sediment levels are spatially and temporally confined. This is supported by monitoring of the dredge vessel and MODIS imagery collected during the Pluto Foundation Project (MScience 2018b) which demonstrated turbidity levels fell below those observed at reference sites within proximity of the dredging activity. Suspended sediment concentrations during high energy metocean events including cyclones have been observed to naturally exceed 44 mg/l. The 99th percentiles for five of the eight water quality sites monitored between August and May prior to the Pluto foundation project dredging campaign naturally exceeded 44 mg/l (MScience 2007). Due to the factors outlined below, impacts to commercial or recreational fisheries are not expected as a result of increased suspended sediment levels:

		• Suspended sediment levels are naturally higher than those expected to be generated from dredging operations during high energy metocean events • Dredging activities are only predicted to raise suspended sediment levels in spatially confined areas that will vary with the location of the dredge, which will rapidly progress along the pipeline route Additional detail is provided on the assessment of potential impacts to aquaculture leases in Flying Foam Passage in Section 9.1.2.2 of the updated DSDMP.
Humpback Whale	Proponent contend the risk of vessel strike is highly unlikely. However, the risk of a dredging vessel colliding with whale species is dependent on several variables. Humpback whales are considered more prone to collision than other mammals, with calves and juveniles struck most often. Feeding and resting whales are also more at risk, possibly because they are distracted and not attending to vessels. Conversely, when dredging vessels move at speeds of between 1-3 kn, and avoids calf resting and feeding habitats, then the risk of collision is reduced	The DSDMP has been updated to include additional Management Actions to mitigate the potential risks to marine fauna during dredging operations. Updates include alignment to the particular manners for which the activity must be undertaken as stated in the referral decision on the Scarborough Development - nearshore component (EPBC 2018/8362). This includes the implementation of the marine fauna management procedure described in Section 9.3 of the DSDMP, including the implementation of observation and exclusion zones around dredging activities. Therefore, the likelihood of vessel interactions remains highly unlikely.
Dolphins	That the proponent avoid habitats comprising high calf concentrations and feeding/resting during the migration period for whales and dolphins. *In situ* studies examining accumulative and/or interactive impacts of multiple dredging-related stressors on whales and dolphins. Additionally, recommend the proponent limit dredging during breeding and spawning periods.	The project is not expected to impact areas comprising high calf concentrations and feeding/resting areas during the migration period for whales. Mermaid Sound is not an aggregation or calving area for humpback whales, although there is some recent suggestion that Nickol Bay (between Dampier and Karratha, outside the Port of Dampier and away from the proposed activity) may constitute some form of milling area during the southern migration (Jenner and Jenner 2009; Jenner and Jenner 2011). In addition, more recent surveys indicate that Nickol Bay is used as a single day staging post, mainly by pods with calves using the areas close to shore during the southern migration. Due to the

		location of the dredging activities impacts to Whales in Nickol Bay are not expected. Whales may be present in low numbers in the outer Mermaid Sound and around Spoil Ground 2B and 5A during the known migrations but are unlikely to be present in the proposed dredging areas and areas in closer proximity to the Dampier Port. These conclusions are based on the Humpback Whale Aerial Survey data which was collected for the region between 2012 and 2016 to support the Cape Lambert Port B Development. It is also supported by similar observations which were made during the Pluto Foundation Project Dredge Monitoring program. To further mitigate against any risks to marine fauna during the peak migration periods, additional controls have been added to the DSDMP (Table 9-13 of the updated DSDMP). No impacts are predicted to the local dolphin populations. Localised elevated turbidity is not expected to impact the dolphin population. Impacts to coastal fish (the primary food source) has been assessed in Section 9.1.2.2 of the DSDMP and no impacts are predicted.
Dugong	That the percentage of seagrass cover within/near the development envelope be determined. If seagrass cover reaches ecologically significant percentages, recommend mapping seagrass habitats to support the development of evidence-based modelling of dredging-related impacts on dugong (and marine turtles).	Seagrass found in and around the Dampier Port limits is typically found interspersed with other benthic communities and habitats in sparse and isolated patches (Bertolino 2006, CALM 2005, Wells and Walker 2003). Geographically seagrass is limited to the large bays and sheltered flats located in the inner harbour (CALM 2005). Surveys conducted by Bertlino (2006) reported seagrass in Conzinc and Whithnell Bays and the Southern side of East Lewis Island and between the causeways connecting East Intercourse Island and Mistaken/East Mid Intercourse Islands. During the Pluto Foundation Project monitoring sites for seagrasses were difficult to locate due to the very low coverage of seagrasses. Monitoring showed that there were no detectable impacts to seagrasses. Abiotic was the dominant substrate

		recorded (over 90% of community composition) at all monitoring sites with very low coverage of seagrasses (<10% coverage pre-dredging and <15% cover post dredging). Seagrasses were dominated by *Halophila Ovalis* and *Halophila Decipiens* which are both ephemeral increasing in biomass over the summer months. Impacts to seagrass are considered in the development of the thresholds used to support the modelling as described in Section 7.3.2 of the DSMDP. The significant habitat types are shown in Figure 5-5 of the DSDMP, with no seagrass recorded within the development envelope. Given that seagrasses are more tolerant to elevated suspended sediment levels than corals the thresholds used are considered to be protective of the seagrasses that are interspersed with other benthic communities and habitat (Section 7.3.2.2 of the DSDMP). No impacts were predicted to the seagrasses mapped in Figure 5-5 of the DSDMP.
Issue	**Public comment 4**	**Response to comment**
Marine Environmental Quality	Justification is sought as to why the Environmental Values (EV's) highlighted above are absent from the proposal's Environmental Quality Management Plan (EQMP) and DSDMP. Murujuga Aboriginal Corporation (MAC) requests that the final DSDMP include a comprehensive EQMF, that is consistent with EPA Guidelines, and has been informed by appropriate consultation with MAC (as committed to in Table 9-12 and required by the EPA) and take into consideration the Corporation's environmental, commercial and tourism interests in the region. Furthermore, the EVs, EQOs and EQC are informed by adequate underwater benthic mapping that accounts for, and adequately protects, submerged rock art and archaeological sites, and provides protection of the Corporations' Edible Oyster Project in the Flying Foam Passage adjacent to Dolphin Island.	The DSDMP has been updated to clearly demonstrate how the EPAs *Technical Guidance – Protecting the Quality of Western Australia's Marine Environment* (EPA 2016) has been used to inform the document. Section 9.1 of the updated DSDMP includes an assessment of the environmental values listed in the EPAs technical guidance document. The Marine Environmental Quality section has been separated from the benthic communities and habitats (BCH) section in the DSDMP and an EQMF is included in Section 9.1 of the updated DSDMP. Geotechnical sampling along the proposed pipeline route has shown that sediments are predominantly comprised of soft silty sands. A literature review and ethnographic survey relating to the potential for submerged aboriginal heritage was commissioned by Woodside (Section 5.5.6 of the DSDMP). This review determined that the types of archaeological sites most likely to survive inundation, as identified by the recent research, are logically the

	The final DSDMP include appropriately scaled spatially delineated zones of ecological protection, developed in consultation with MAC, to ensure MAC's (as well as the wider communities) environmental sensitive areas are identified and afforded the adequate level of protection. The zones of ecological protection should include appropriate buffer zones surrounding culturally significant submerged rock art (and other cultural sites) and aquaculture zones. It would be expected that these sites are provided with a High Level of Ecological Protection as per EPA Technical Guidelines. Noting the extent, severity and duration of dredging and associated impacts, as well as high biodiversity and cultural values of the marine environment, including consideration for World Heritage listing (see below section 3), it is not unreasonable to request the DSDMP include a discrete EQMP. The EQMP can address the key issues highlighted in this section and should include appropriate EQCs that are supported by protocols and procedures associated with monitoring, management and reporting to demonstrate that EQOs for the EVs are met. <u>Note:</u> It seems that the environmental values (and sensitive receptors) important to MAC are absent from the DSDMP, including the aquaculture areas of the Flying Foam Passage Oyster Project. A monitoring program specific to MAC's aquaculture operation in the Burrup Peninsula, to manage potential impacts during construction, should be developed and implemented. If carried out in accordance with EPA Technical Guidance, the DSDMP's EQMF could accommodate and address these issues, and provide for an appropriate monitoring program.	more robust forms which are highly unlikely to be present along the pipeline alignment including: • midden and artefacts within cemented dunes, relict water holes, and beach rock deposits; • quarry outcrops, extraction pits, and associated reduction debris in fine-grained volcanic outcrops; • curvilinear stone structures and standing stones sitting on volcanic pavements and jammed into volcanic rock piles; • lag deposits of artefacts and possibly midden on hardpan in suitable landscape contexts with good preservation conditions (e.g., shallow declination shorelines in sheltered passages of the inner archipelago or on the leeward side of hard-rock/fringing reef cause-ways adjacent to the outer islands); and • small overhangs and shelters with preserved deposits, facing away from the dominant wave and wind action (Veth et al 2019) MACs edible rock oyster project is considered in the EQMF (Section 9.1 of the updated DSDMP). The existing Mermaid Sound Environmental Quality Plan (EQP) is considered appropriate for this project. Using this EQP affords Flying Foam Passage a maximum level of ecological protection. Where a maximum level of ecological protection has been assigned to a part of the marine environment, this identifies the target environmental condition for this area as essentially pristine, with no detectable change from natural background conditions. The Environmental Quality Guidelines (which form part of the EQMF) are considered conservative in the protection of MAC's edible Oyster Project as outlined in Section 9.1.2.2 of the DSDMP. Intolerance thresholds for Oyster eggs are cited at 188 mg/l, no effect concentrations are cited to about 200 mg/l and sublethal effects to 4000 mg/l (Schönberg 2016). Field observations in a separate study showed that rock oysters thrived under highly

	Furthermore, independent peer review by technical experts from WAMSI would be essential in developing a DSDMP that can adequately demonstrate that the EPA's Environmental Objectives are met, and protection of the Burrup Peninsula and Dampier Archipelago is ensured	turbid conditions (<700 mg/l) if other environmental variables were optimal (Chowdhury et al 2019). The tiered monitoring and management framework requires that management actions are implemented to reduce suspended sediment levels when the relevant trigger levels are exceeded as a result of dredging and spoil disposal activities. The water quality monitoring program (Section 9.1.5 of the DSDMP) includes a number of sites surrounding the entrance to Flying Foam Passage (WQIMPANG2, WQIMPCONI and WQIMPCOBN), it also includes a site at the southern end of Flying Foam Passage (WQIMPFFP1). The trigger thresholds set for the maintenance of ecosystem integrity are an order of magnitude below the thresholds at which impacts to oyster communities are predicted and as such are considered to adequately protect the Maxima Pearling aquaculture lease. The water quality thresholds for the most sensitive receptor (i.e. corals) used for both the modelling and monitoring have been derived from the WAMSI Dredging Science Node (DSN) papers. Further details on the derivation of these triggers can be found in Section 7.3 of the DSDMP.
More information	MAC expects the proponent to provide a detailed SWOT analysis that provides additional justification for selection of the preferred (a) site location, (b) the proposed dredging equipment and engineering methods, (c) the use of additional engineered environmental controls to reduce the sediment dispersion potential (e.g. heavy-duty marine silt curtains) and (d) alternative methods for pile driving (e.g. vibration hammers) that would significantly reduce the potential to harm marine fauna (including cetaceans and marine reptiles).	a) Site location considerations as relevant to the offshore Borrow Ground is referenced in Section 4.3.4 of the DSDMP and were detailed in Section 4.5.4.7 of the Scarborough Offshore Project Proposal. b) Section 4.3 of the DSDMP provides a description of the work method and associated rational in context of environmental and economic considerations and technical feasibility and safety. c) Section 4.3. also considers additional mitigative physical controls such as silt curtains, however given the tiered monitoring and management framework, impacts to BCH are not expected to eventuate.

		d) Section 4.3.5 of the DSDMP provides a statement that piling activities for anchoring the pipelay barge has been considered in the DSDMP and risk assessed as the worse-case contingency option, noting that anchoring is the reference case however the final selection is subject to further detailed engineering.
More information	In consideration of step 3 of the EPA guidelines, MAC suggests the proponent adjust their management practice frameworks to industry standards. To assist with the drafting of the framework, MAC has outlined the points that should be included (appendix 1). It is expected that the marine fauna observer be an independent person of suitable knowledge and experience to distinguish animal distressed behaviour from normal animal behaviour.	The definitions for Marine Fauna Observers have been updated to reflect the particular manners for which the activity must be undertaken as stated in the referral decision on the Scarborough Development - nearshore component (EPBC 2018/8362). Additional Management Actions have also been added to Section 9.3 of the updated DSDMP to manage the piling operations, including the use of a soft start procedure, controls for periods of low visibility and Management Actions to mitigate potential impacts during the peak whale migration period between 1 August and 31 October (inclusive).
More information	MAC considers the current benthic habitat map to be inadequate and therefore not fit for the purpose of an EIA or unsuitable for informing accurate predictions of environmental impacts. An updated BCH map should be created that addresses all the considerations as outlined in Section 3.1.1 of the EPA guidelines.	The habitat map presented in Figure 5-5 of the DSDMP only presents the significant habitats. These are the most sensitive benthic communities and habitats and have been derived from a number of recent habitat maps developed post the Pluto Foundation Project approvals as described in further detail below. The habitat map looks to provide additional certainty on the distribution and extent of habitats and as such it is expected that there will be inconsistencies with the original Pluto habitat map, which was heavily reliant on the interpretation of multi-beam echo sounder and hyperspectral data. Historically each project within Dampier Port assessed impacts to benthic communities and habitats using differing spatial areas for impact assessment (previously referred to as management zones and more recently referred to as Local Assessment Units (LAUs)). Additionally, each project sought to determine the coverage of benthic communities relative to each project. In 2012 Dampier Port Authority (Now the Pilbara Port Authority)

		sought to align the way impacts to BCH were assessed within the port boundaries. The assessment included the definition of a common set of LAU's; the identification of the communities that are represented by Benthic Primary Producers and Habitats (BPPH) and the assessment of their historic and present distributions. The habitat map used to determine the historic loss of BCH for each LAU was subsequently updated in 2017 (MScience 2017) and has been used to support the impact assessment presented within the DSDMP. The habitat map is an amalgamation of a number of previous studies and maps. Habitat layers were split into individual habitat types and evaluated for congruence in the extent and placement of habitat features. Based on the data source and agreement of data layers, a confidence value for each feature was assigned (ranging from 1 – data should be rejected to 5 - data is highly reliable and the extent of the feature is justified based on the survey methods used to describe it and the feature is corroborated by two data sources) (MScience 2018). The final habitat file was produced by grouping individual habitat layers into one spatial file. The final shape file was assessed for conflicts in habitat classification between grouped layers and the feature confidence values were modified accordingly. Once all layer conflicts had been resolved, randomly selected features were checked against high-resolution satellite imagery to confirm their validity. In some cases, the boundaries of features were modified based on the available satellite imagery to increase confidence in their validity. A final assessment of the combined spatial data was performed by incorporating advice from an expert in the benthic primary producing habitats within the Dampier Archipelago and surrounding Cape Lambert. The expert advice was generally used to modify the confidence classification of data layers but, in some cases, the spatial extent of features were modified based on expert assessment of the feature (MScience 2018).

		The dominant habitat in Mermaid Sound is soft sediment largely composed of sand and silt. The Sampling and Analysis Plan (SAP) Implementation Survey showed that the sediments along the trunkline route were generally silty sands with varying proportions of clay. This is supported by the Woodside Maintenance Dredging SAP Implementation Report (MScience 2016) which recorded silty sands at the reference sites and a higher proportion of silts further inshore and the Scarborough Trunkline Geotechnical Survey (Fugro 2019). The areas where no classification is presented in Figure 5-5 are considered to consist of bare silty sands with no or low abundance areas of benthic communities and habitat. This is supported by previous work completed as part of the Pluto Baseline Marine Habitat Survey (SKM 2008) and further refined by MScience (2017) to produce the habitat map presented in the DSDMP. The benthic habitat map has been used to determine the predicted loss from the modelling. Refining this map to specific species would act to dilute the percentage loss calculations. Noting, the heterogeneity and species composition of monitoring locations has been considered to ensure that impact and reference sites are representative in the monitoring program. With regard to the offshore Commonwealth Waters Marine Benthic Habitat Survey, the purpose of the survey was to determine whether there were significant benthic communities at the proposed Borrow Ground and adjacent marine park. The survey objectives are considered to be achieved with appropriate spatial coverage of the borrow ground and adjacent marine park. It should be noted that although the zone of influence intersects the marine park the ZoMI and ZoHI (the zones at which impact to benthic communities is predicted) do not intersect the marine park. Additionally, the survey notes that no significant BCH exist either at the borrow ground location or in the area of the marine park adjacent to the borrow ground.

		For further context, survey locations for the water quality monitoring and coral health monitoring have been selected based on the predictive modelling. The water quality and coral monitoring locations are located adjacent to one another to allow an assessment of the cause and effect of any impacts that may be observed at the coral monitoring locations. No impacts are predicted based on an assessment of empirical data and the modelling is considered conservative in its prediction of impacts. However, the monitoring programs have been retained as a precautionary management measure. Additionally, the dredging program will be managed through the tiered monitoring and management framework. The tiered framework will be informed by water quality monitoring which aims to manage the dredging operations and associated water quality to levels at which no impacts are predicted to benthic communities and habitats. No coral monitoring locations were selected along the proposed trunkline route as the habitat map shows that no coral is present along the trunkline route.
More information	The proponent engages an appropriate peer review to provide certainty on the DSDMP's impact predictions, assumptions and modelling, including: - Providing review of the dredge plume modelling and extent of Zones of Impacts; - Provide certainty on the proponent's conclusion (as stated Pg. 69) that the Zone of Influence will not intersect with any known aquaculture leases (Figure 5-11), including the Flying Foam Passage lease, that is approximately five kilometres east of the development envelope. - Review the trigger and thresholds to ensure they are appropriate. The proponent provides further analysis of model outputs to determine the effect of varying impact thresholds (intensity and duration) on the predicted area of impact are undertaken to	The approach to modelling dredging operations in full and in three dimensions is in line with the best practice for sediment dispersion modelling in Western Australia as outlined in the WAMSI Dredging Science Node (DSN) guidance (Sun et al 2016). The hydrodynamic model was validated through a comparison of predicted (modelled) currents and waves against measured data from an acoustic wave and current profiler. Good correlations with field measurements and independent model predictions were achieved and the accuracy of the hydrodynamic model is considered suitable for the prediction of impacts. The suspended sediment fate model computes the advection, dispersion, differential sinking settlement and resuspension of sediment particles. Further, the modelling when assessed against empirical evidence from the monitoring completed as part of the Pluto

	account for the high variability within the marine environment and extreme weather conditions (i.e. cyclonic events).	Foundation Project is shown to be conservative in its prediction of sediment dispersion and impacts. The trigger thresholds developed for the project have been based on the latest contemporary scientific information from the WAMSI Dredging Science Node project. Woodside engaged with experts from the WAMSI DSN early in the development of the thresholds. Conservatism has also been built into the triggers with respect to the duration component, with the level two trigger threshold providing a two day warning prior to the level 3 threshold (which is aligned with the ZoMI) being exceeded. The tiered monitoring and management framework requires that management actions are implemented to reduce suspended sediment levels when the relevant trigger levels are exceeded as a result of dredging and spoil disposal activities. The water quality monitoring program (Section 9.1.5 of the DSDMP) includes a number of sites surrounding the entrance to Flying Foam Passage (WQIMPANG2, WQIMPCONI and WQIMPCOBN), it also includes a site at the southern end of Flying Foam Passage (WQIMPFFP1). The trigger thresholds set for the maintenance of ecosystem integrity are an order of magnitude below the thresholds at which impacts to oyster communities are predicted and as such are considered to adequately protect the Maxima Pearling aquaculture lease. Additional detail is provided on the assessment of potential impacts to aquaculture leases in Flying Foam Passage in Section 9.1.2.2 of the updated DSDMP.
More information	MAC is concerned regarding the adequate characterisation of the sediment physio-chemical characteristics. It is therefore recommended that characterisation be undertaken in consideration of the most recent industry standard documentation using the Commonwealth's National Assessment Guidelines for Dredging (2009).	Section 5.2.2 provides results from past studies with reference to the guidelines that were current at the time of the assessments, more recent data is related to the National Assessment Guidelines for Dredging (2009), which is the current standard that is required to be utilised in developing a Sampling and Analysis Plan (SAP).

		A SAP implementation survey was completed to support Woodside's Sea Dumping Permit application with sediments screened against the National Assessment Guideline for Dredging (2009). No contaminants of concern were observed above the NAGD screening levels. The results of this survey are summarised in the updated DSDMP under Section 5.2.2 and 9.1.
Social Surroundings	MAC requests that Woodside amend Section 5.5 of the DSDMP to account for a full acknowledgement of the Dampier Archipelago's (including the Burrup Peninsula) heritage values, particularly its international recognition for outstanding universal values. MAC requests that an appropriate environmental study for submerged rock art and an impact assessment is undertaken that considers all direct and indirect impacts associated with implementing the proposal, prior to the EPA reporting to the Minister for Environment. MAC would expect Woodside clearly demonstrate that the EPA's Environmental Objectives for Social Surroundings can be met, prior to deliberation by the EPA. In addition to this work, MAC are of the view that it would be reasonable to request a risk assessment be undertaken that takes into consideration the World Heritage Listing criteria, and informs adequate management measures that demonstrate the values are protected and not diminished during implementation of the proposal.	Further information regarding the heritage values of the Burrup Peninsula and it's proposed World Heritage Listing have been included in the Section 5.5.6.1 of the revised DSDMP. Further, Woodside have considered the Cultural and Spiritual Values in the EQMF in Section 9.1 of the DSDMP. The Integrated Heritage Services report summarised in Section 5.5.6.1 of the DSDMP represents the best available information regarding possible submerged archaeological sites of the Dampier Archipelago (Murujuga). Woodside has established and is continuing engagement with researchers in this field, including those involved in the Deep History of Sea Country project, and is working to identify opportunities to support increased understanding of submerged archaeology. Woodside will discuss its assessment of submerged heritage in a meeting with MAC on 15 October 2019. Woodside supports World Heritage Listing of Murujuga and will continue to reinforce its ongoing support for World Heritage Listing; noting the recent Woodside/MAC joint media release announcing AUD $ 4 M contribution to the Murujuga Living Knowledge Centre.
Offsets	Through consultation with MAC, an appropriate offsets strategy should be developed, which aims to reduce the direct and indirect impact of the proposal and counterbalance significant residual impacts on the Burrup Peninsula and Dampier Archipelago. MAC recommends that the offsets strategy be developed to include for the following:	The EPAs offsets policy recommends offsets are considered where there are significant residual environmental impacts and should not be applied to minor environmental impacts. The impacts associated with the project were considered during the referral and no impacts were considered significant. Additionally, an assessment of potential impacts to Matters of National Environmental Significance was considered as part of the

	1. Local environmental restoration activities that counterbalance the direct and indirect impacts to Benthic Communities and Habitats, i.e. mangrove restoration activities in the Burrup Peninsula and Damper Archipelago; 2. Reduction strategies for offshore dredge spoil disposal through localised land reclamation activities, effectively reducing the proposal's Zone of Influence and potential environmental impacts; and 3. Employing local traditional owners in marine fauna observation roles and scientific research projects.	referral document (Section 5.4 of the supplementary report) with an assessment of significance considered as per Section 5.2 of the referral supplementary report. Given that no residual impacts are considered significant in the assessment, no offsets have been proposed. Woodside would also like to note it is the principal funder for the Murujuga Rangers and funds the MAC Governance Project and the Murujuga Tourism initiative. In total we support a minimum of eight roles within the organisation.
Issue	**Public comment 5**	**Response to comment**
Burrup Hub	That the proposal consider the overall and cumulative impacts of the proposal and the broader Burrup Hub and does not adequately address its long term environmental impacts and therefore does not take into account the principle intergenerational equity in section 1A of the EP Act.	Burrup Hub is Woodside's vision to develop an integrated regional LNG production centre on the Burrup Peninsula. The Burrup Hub is not a proposal for a single activity for impact assessment; it describes Woodside's vision of several separate but related activities that, subject to respective joint venture approvals and relevant regulatory approvals, may be undertaken. The current allocation of approval processes between jurisdictions has been agreed with all relevant regulatory bodies. Direct greenhouse emissions associated with the Scarborough development are considered in the Scarborough Offshore Project Proposal, which is currently under assessment by NOPSEMA. Raw product from the Scarborough Project is proposed to be processed at the onshore Pluto LNG facility. Existing environmental approvals for the Pluto LNG facility already include processing emissions for a second train and scope 3 emissions associated with sold product. Pluto is required to have in place management plans including a Greenhouse Gas Abatement Program developed to address the requirements of Ministerial Statement 757, which ensures ongoing regulatory oversight. These approvals processes are out of scope for the DSDMP.

		This DSDMP covers the scope of the dredging and construction works associated with the proposed Scarborough development.
Location of borrow grounds	The DSDMP does not discuss in detail the effects on the marine park of the dredging in the borrow grounds. It is recommended that modelling data for turbidity caused by dredging near the marine park need to be closely examined.	Potential impacts to the Dampier Marine Park were considered during the development of the DSDMP. The following provides a summary of the reasoning as to why no impacts are predicted: • A survey of the Dampier Marine Park immediately adjacent to the Borrow Ground demonstrated that the seabed was dominated by bare sandy sediments with little to no biota (Appendix A of the DSDMP). • The modelling shows that suspended sediment levels are expected to remain below those at which impacts to filter feeder communities are predicted (Section 7 of the DSDMP). • The monitoring program will ensure that suspended sediment levels are maintained at a level below thresholds at which impacts to filter feeder communities are predicted in the Dampier Marine Park (Section 9.1 of the DSDMP). • Additionally, a 250m buffer is proposed between the borrow ground and the Dampier Marine Park to ensure that there is no seabed disturbance within the Dampier Marine Park.
Sediment contamination	That the DSDMP should include more comprehensive water quality testing.	A Sampling and Analysis Plan was submitted and approved by the DOEE in accordance with the National Assessment Guidelines for Dredging (2009). A sediment sampling survey was completed in accordance with the approved SAP that demonstrated that all potential contaminants of concern were below the NAGD screening levels, as described in Section 5.2.2 of the DSDMP. Given that no contaminants were recorded within the sediments that will be dredged as part of this project, additional water quality monitoring requirements over and above the program described in Section 9.1.5 of the DSDMP is not considered warranted.

Dugongs	The DSDMP should account for behavioural differences between dugongs and cetaceans in terms of mobility and security of food sources e.g. seagrass beds during dredging.	Seagrass is a primary food source for dugongs, with significant communities shown in Figure 5-5 of the DSDMP. Bertolino (2006) reported the presence of seagrasses in Conzinc and Whithnell Bays and the Southern side of East Lewis Island and between the causeways connecting East Intercourse Island and Mistaken/East Mid Intercourse Islands. Monitoring of seagrass during the Pluto Foundation Project dredging campaign showed that there were no detectable impacts to seagrasses. Abiotic was the dominant substrate recorded (over 90% of community composition) at all monitoring sites with very low coverage of seagrasses (<10% coverage pre dredging and <15% cover post dredging). Seagrasses were dominated by Halophila Ovalis and Halophila Decipiens which are both ephemeral increasing in biomass over the summer months. Given the distance between the significant seagrass communities and the dredging operations, as well as the proposed marine fauna management procedure described in Section 9.3 of the DSDMP including the implementation of observation and exclusion zones around dredging activities, the risks of vessel interactions with Dugongs is considered low. Further, impacts to seagrass have been considered in the development of the thresholds used to support the modelling. The thresholds were developed for the most sensitive benthic community (i.e. coral) to suspended sediment and are lower than the thresholds for seagrasses (Section 7.3.2.1 of the DSDMP). In context of the conservative coral thresholds, no impacts were predicted to the seagrasses mapped in Figure 5-5 of the DSDMP.
Table 6-1	It is not clear how the qualitative parameters in Table 6-1 in the DSDMP are derived, or how claims of 'no impact' are determined. In our client's view, the DSDMP needs to set out the basis for these qualitative parameters and findings are determined.	Table 6-1 provides a summary of the risks and further work proposed in the Scarborough Nearshore Component – Referral Supplementary Report (SA0006RH0000001) relevant to this DSDMP. It is not the intention to assess the impacts quantitively

		in this section, however all impacts are assessed as part of the referral documentation or the DSDMP.
Cyclones	The DSDMP does not set out adequate criteria for cessation of operations during cyclone season.	The DSDMP has risk assessed activities to be undertaken throughout the year (all seasons) to provide operational flexibility for requirements and schedule changes, with no planned cessation during the cyclone season as per the schedule in Section 4 of the DSDMP.
Wildlife observation	The proposal in the DSDMP to watch for turtles and marine mammals and halt operations if one is seen, is fanciful and inadequate to manage the risk of impacts to these marine fauna. In our client's view, the DSDMP should include more detailed information as to how this approach is intended to work.	The DSDMP has been updated to include additional Management Actions to mitigate the potential risks to marine fauna during piling and dredging operations. Updates include alignment to the particular manners for which the activity must be undertaken as stated in the referral decision on the Scarborough Development - nearshore component (EPBC 2018/8362). Further, for context, piling to support pipelay activities has been considered in the DSDMP and risk assessed as the worst-case contingency option. Anchoring is the reference case, however final selection is subject to further detailed engineering.
Dust	On-shore dust suppression measures during trunk line construction activities set out in the DSDMP are generally of limited effectiveness, and that additional dust suppression measures should be included in the DSDMP.	The dust suppression measures proposed are consistent with those used during the Pluto Foundation Project, and the effectiveness was monitored by traditional owners. These dust suppression measures are considered appropriate for the protection of known sites adjacent to the projects landfall area, particularly noting that the activities covered under the DSDMP are expected to generate markedly less dust impacts than those generated during the Pluto Foundation Project program, given the scope of the activity (e.g. no drill and blast).

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