

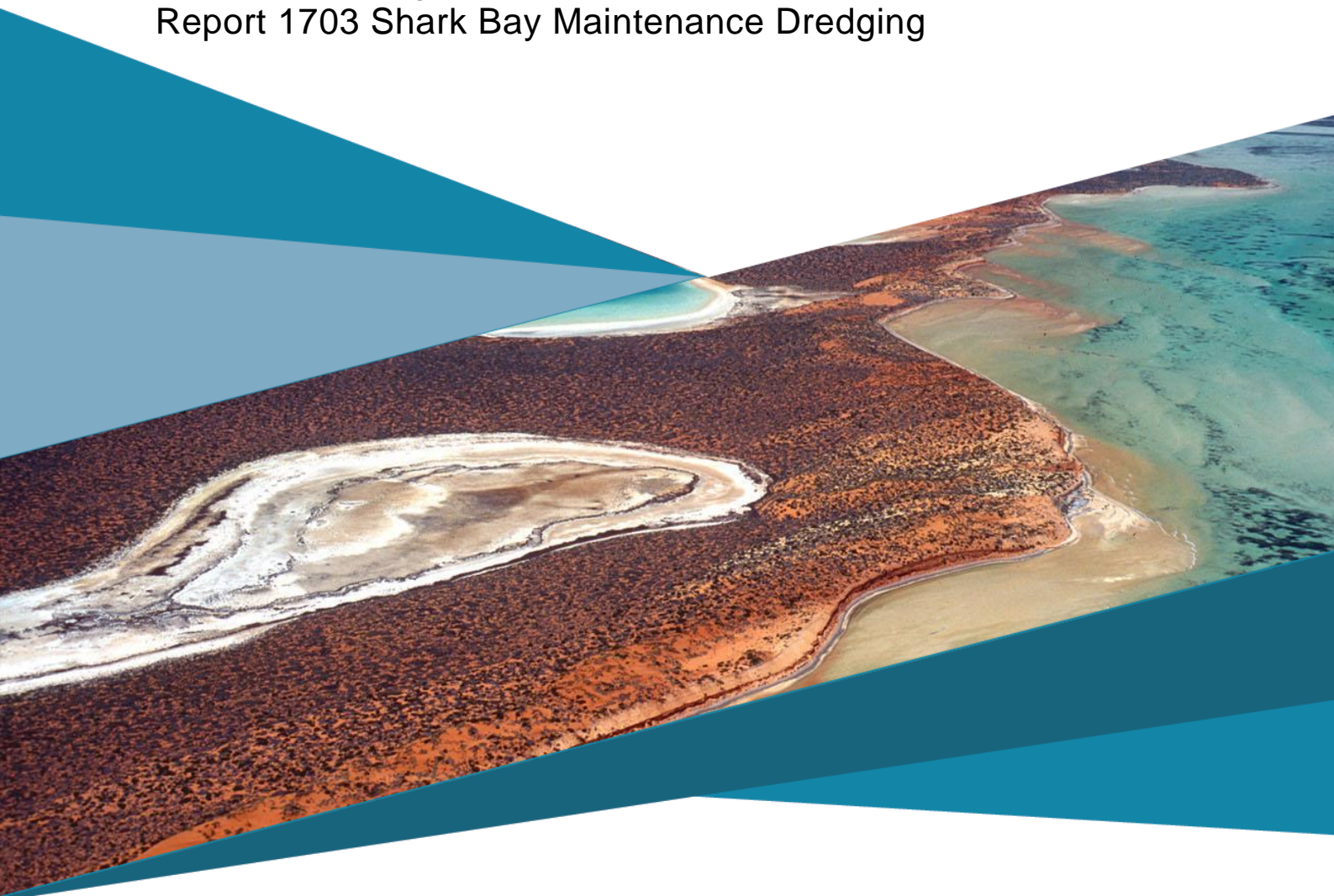


Government of **Western Australia**  
Office of the **Appeals Convenor**  
Environmental Protection Act 1986

# Appeals Convenor's Report to the Minister for Environment

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Appeal objecting to Report and Recommendations: EPA  
Report 1703 Shark Bay Maintenance Dredging



|                   |  |
|-------------------|--|
| <b>Appellant</b>  | Shark Bay Prawn Trawler Operators' Association |
| <b>Proponent</b>  | Shark Bay Resources Pty Ltd                    |
| <b>Authority</b>  | Environmental Protection Authority (EPA)       |
| <b>Appeal No.</b> | 029 of 2021                                    |
| <b>Date</b>       | October 2021                                   |

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**This report**

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Cover image: Aerial view of Shark Bay, Department of Biodiversity, Conservation and Attractions (DBCA)

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**Acknowledgement of Country**

The Office of the Appeals Convenor acknowledges the traditional custodians throughout Western Australia and their continuing connection to the land, waters and community.

We pay our respects to all members of the Aboriginal communities and their cultures, and to Elders past, present and emerging.

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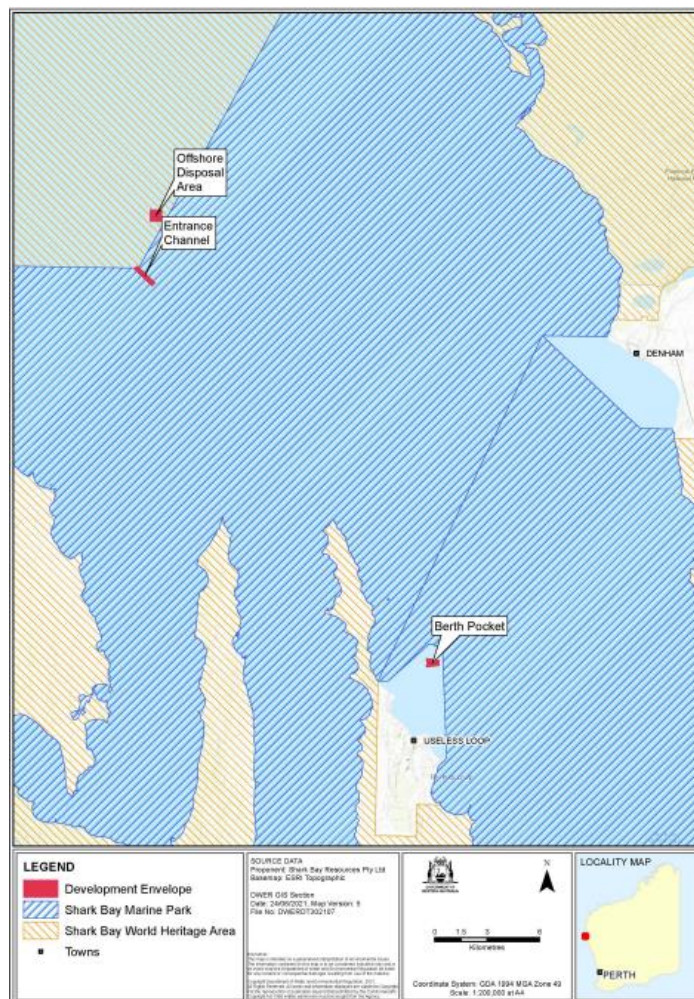
# 1 Executive summary

## 1.1 Decision under appeal

Shark Bay Resources Pty Ltd (the proponent) operates 2 solar salt fields and associated port facilities at Useless Loop, Shark Bay. In June 2020 the proponent referred a proposal to the EPA to undertake maintenance and capital dredging and seabed levelling to restore navigable depths within Shark Bay at the berth pocket adjacent to the wharf, and the entrance channel. The proposal also involves the disposal of dredge material at an offshore location within Shark Bay.

Under the *Environmental Protection Act 1986* (EP Act), the EPA set the assessment level at Assess – Referred Information with Additional Information (see section 3.2). The EPA identified 3 key environmental factors during its assessment, including:

- Marine environmental quality
- Benthic communities and habitats
- Marine fauna.



**Figure 1** Location of proposal and development envelopes in Shark Bay, Report 1703

Having formed the view that the impacts of the proposal could be managed consistent with the EPA's objectives for the above environmental factors, the EPA recommended that the proposal may be implemented subject to conditions. In June 2021 the EPA published Report 1703, and it is against this report that an appeal was lodged.



## 1.2 Grounds of appeal and appellant concerns

The appellant is the Shark Bay Prawn Trawler Operators' Association, supported by Western Australian Fishing Industry Council (WAFIC). The appellant raised concerns about the impact of the proposal on the Shark Bay managed fisheries, the EPA's assessment of the proposal and the recommended conditions. The appellant sought for the proposal to be remitted to the EPA to assess an alternative option for dredge spoil disposal, and the inclusion of additional recommended conditions. The appellant's specific concerns are summarised in Table 1 below.

**Table 1** Grounds of appeal

| Ground     | Main concerns the appellant submitted  |
|------------|--|
| Assessment | The proponent and EPA did not adequately consider all alternatives for disposal locations, including disposal outside Shark Bay.<br>Dredge spoil disposal will impact the Shark Bay managed fisheries such as scallop, prawn, and pink snapper.                |
| Conditions | The EPA should restrict disposal to between May and July<br>The current monitoring does not include impacts to microbenthic fauna<br>The recommended conditions should include additional monitoring of scallop abundance in the offshore Zone of High Impact. |

## 1.3 Key issues and conclusions

The appeal relates to the EPA's report and recommendations for the Shark Bay Maintenance Dredging proposal. Having regard for the appellant's concerns, which are limited to the disposal of dredge spoil, the key question for the appeal investigation to determine is, was the EPA's assessment of dredge spoil disposal adequate? And if so, given the EPA's recommendation that implementation be allowed, are the recommended conditions adequate? The appeal investigation focused on these 2 determinative issues, which are summarised below. Section 2 provides our further details about our reasons and supporting information is provided in Section 3.

### Did the EPA adequately consider dredge spoil disposal in its assessment?

We conclude that the EPA assessed the proposal as referred, which included the consideration of several options for dredge spoil disposal. The EPA required the proponent to demonstrate how impacts to the Shark Bay World Heritage Area and Shark Bay Marine Park had been avoided, minimised, and mitigated, including impacts related to disposal.

The EPA considered the proposal against its environmental factors for Marine Fauna, Benthic Communities and Habitats and Marine Environmental Quality, and following its assessment, did not consider that offshore disposal outside of Shark Bay was warranted.

The EPA's assessment had regard for the following:

- the short duration and localised extent of the dredging and disposal activities,
- the low severity of the turbidity plume expected to be generated by the dredging and disposal activities,
- the change to the proposal activities from disposal of sediments potentially contaminated with tributyltin from the berth pocket to seabed levelling, and
- the avoidance of creating a new 'greenfield' disposal site.

In its assessment, the EPA considered the proponent's modelling for the disposal of dredge material at the offshore location which took into consideration the existing managed fisheries. This included consideration of the following key elements:

- the small spatial extent of the zone of high impact and what it might mean for scallops, prawns, and snapper,
- the tolerance to turbidity of prawns and crabs,
- the exposure thresholds of snapper eggs and larvae to suspended solids,
- the natural mortality rates of snapper eggs and larvae.

Having established that the EPA considered the proposed disposal of dredge spoil in its assessment, including potential impacts to managed fisheries, the investigation turned to whether the recommended conditions are adequate to protect the identified values.

### **Are the recommended conditions adequate to protect the identified values?**

We conclude that an additional condition should be included to restrict dredging and disposal activities to avoid key ecological windows for commercial fisheries during May to July. Given the avoidance of this important period, we do not consider the appellant's requested monitoring is justified at this time.

We note that the EPA considered key ecological windows in its assessment, for example, spawning and breeding, and migration periods for commercial fishing species, whales, and dugongs. The EPA concluded that restricting proposal activities to avoid key ecological windows was challenging as these windows occur all year round for different species, and not warranted due to the small spatial extent of the zone of high impact. In any event, the EPA considered that the impacts of the proposal could be managed at any time of year.

As established above, the investigation considered that the EPA's assessment of the proposal's impacts was adequate and noted the EPA's advice that the impacts will be short and localised. However, we consider that an additional condition to restrict timing of dredging and disposal could be included, having regard for the finding that scallops are likely to be impacted in the zone of high impact, the appellant's specific concerns about the May to July window, and the proponent's commitment to avoid this period.

Noting that the appellant sought for additional monitoring of scallop abundance to occur if the May to July period could not be avoided, we consider that the requested monitoring is not necessary.

## **1.4 Recommendation to the Minister**

Overall, we consider that the EPA's assessment was adequate, and the recommended conditions are proportionate to the scale of the proposal and potential impacts. However, noting a key outcome sought on appeal was for the period of May to July to be avoided and that the proponent has agreed to undertake activities outside of this period, it is recommended the appeal be upheld to the extent that a condition of this type be included. We otherwise recommend the appeal be dismissed.

## 2 Reasons for recommendation

### 2.1 Did the EPA adequately consider dredge spoil disposal in its assessment?

The appellant raised concerns about the impact of the proposed dredge disposal on its commercial fisheries, particularly in the context of recent marine heatwave events:

Based on the historic observations from the previous dredge/disposal site combined with the fact that Shark Bay hasn't recovered from the previous 2010/11 heatwave event, we are concerned about any impact that could further impede recovery.<sup>1</sup>

The appellant suggested a disposal site outside of Shark Bay would resolve its concerns and requested that this be considered by the proponent and assessed by the EPA.

We conclude that the EPA has assessed the proposal as referred to it, which included consideration of alternative offshore disposal locations, and that its conclusion that the impacts related to the proposed disposal location could be managed at any time of the year was reasonable and supported by the available evidence.

We explain our reasoning further below.

#### The EPA assessed the defined proposal

The proponent referred the proposal to the EPA in June 2020 and the EPA determined to assess the proposal based on the information provided by the proponent which included consideration of alternative locations (discussed further below). We note that the proposal was also determined to be a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999* in May 2021.

Table 2 illustrates the elements of the proposal assessed by the EPA.

**Table 2** Location and proposed extent of proposal elements (EPA Report 1703)

| Proposal element                       | Maximum extent or range   |
|--|---|
| Berth pocket                           | Levelling of no more than 10,000 m <sup>3</sup> of material, to a maximum depth of -10 m LAT, within the 28.1 ha Berth Pocket footprint.      |
| Entrance channel                       | Dredging of no more than 80,000 m <sup>3</sup> of material, to a maximum depth of -10.5 m LAT, within the 35.3 ha channel entrance footprint. |
| Offshore disposal area                 | Disposal of no more than 80,000 m <sup>3</sup> of material within the 43.2 ha offshore disposal area footprint.                               |
| Dredging and spoil disposal activities | No more than 14 cumulative days within a 28-day period  |

<sup>1</sup> SBPTOA (2021) Appeals against EPA Report 1703, page 1

## Several disposal sites were considered in the EPA's assessment

The appellant submitted that the proponent should have considered a disposal site outside of Shark Bay, and the EPA should assess such an alternative.

The investigation understands that in referring the proposal to the EPA in 2020, the proponent provided a comparison of alternative disposal site options. The EPA requested additional information from the proponent on its options for disposal prior to formal assessment, along with evidence to demonstrate how the proponent was to avoid, minimise and mitigate impacts to the Shark Bay World Heritage Area and Shark Bay Marine Park. The EPA then assessed the preferred option and considered it consistent with its environmental objectives (see below and section 3.3).

The alternative disposal sites provided to the EPA are outlined in section 3.7 of this report. In summary, the options included:

- a) an inner disposal site, within Shark Bay World Heritage Area and Marine Park, which was previously approved in 2001, but would potentially destroy 26 ha of seagrass.
- b) offshore disposal sites, within and outside of Shark Bay.
- c) 3 onshore options including a salt pond; stockpiling for resource recovery; stockpiling for beach renourishment.

The EPA advised that the proponent removed the inner disposal site option and therefore concluded that:

The proposal has avoided impacts to an area of about 26 ha of dense (70 -100% coverage) perennial seagrass by removing an inner offshore disposal option from the proposal.

The proponent advised that its preferred option was selected due to the following key points:

- the offshore disposal site selected has been previously approved and was used for disposal of material during the 1982 dredging campaign,
- offshore disposal outside of Shark Bay would require an additional 80-100km of spoil transportation, at considerable cost and time,
- Useless Loop is geographically restricted, with only a single dirt road access point by land. Offshore disposal heavily reduces the logistical restraints involved in onshore placement and then secondary re-use in terms of equipment and travel time/costs,
- onshore re-use options were not evident and stockpiling on their lease area was not a long-term solution given their limited space and potential for secondary environmental impacts because of dust/contaminants.

The proponent further advised in response to the appeal that it considered that the selection of the preferred location was proportional to the risk of potential impacts to the marine environment:

The placement of dredged channel material at the proposed offshore disposal site, rather than a site further offshore was ultimately selected due to the negligible risk posed to the environment, including key commercial fisheries species. The offshore disposal site represents a disturbed 'brownfield' site that was used for the disposal of dredged material during the 1982 dredging campaign. In selecting this location, we sought to avoid creation of a new 'greenfield' site of disturbance, onshore or offshore, within or beyond the Shark Bay World Heritage Area.<sup>2</sup>

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<sup>2</sup> Shark Bay Resources (2021) Response to Appeal against EPA Report 1703, page 3



In response to the appeal, the EPA advised that it considered all onshore and offshore disposal sites provided in the additional assessment information and assessed the proposed offshore disposal site at its current location.

The EPA advised that it did not consider the proposal warranted the offshore disposal site to be located outside of Shark Bay based on:

- the short duration and localised extent of the dredging and disposal activities,
- the low severity of the turbidity plume expected to be generated by the dredging and disposal activities,
- the change to the proposal's activities from disposal of sediments potentially contaminated with tributyltin from the berth pocket to seabed levelling; and
- the avoidance of creating a new 'greenfield' disposal site.<sup>3</sup>

In summary, we note that the proponent's supporting information included an offshore disposal option outside Shark Bay. The EPA has assessed the proposal as referred and concluded that in conjunction with the proponent's proposed measures to avoid and minimise impacts, the proposal could be implemented to meet its objectives for the relevant environmental factors, subject to implementation of recommended conditions. The EPA's assessment of these factors is discussed below.

### **The EPA concluded that the proposal is consistent with the objectives for its environmental factors**

The EPA identified 3 key environmental factors relevant to the proposal - Marine Environmental Quality; Benthic Communities and Habitats; Marine Fauna. The EPA considered that the proposal, including the disposal activity, could be implemented to meet its objectives for each of these environmental factors (see section 3.3 for the objectives). Based on the information available to the EPA we consider that its conclusions are reasonable.

The EPA's assessment of these environmental factors is discussed in detail in Section 3.3 as it relates to the dredge disposal activity. We have summarised the EPA's key considerations below.

- The EPA assessed the proposal having regard for the required maximum level of ecological protection for marine water quality due to its location within a World Heritage Area and Marine Park, in accordance with its *technical guidance- protecting the quality of WA's marine environment*.
- Commercial fisheries are present within the Bay, with the key commercial fisheries targeting prawn, scallop, crab and scalefish and pink snapper. The disposal site does not interact directly with the Shark Bay Scallop managed fishery (see below for discussion of fishery boundaries). Scallop, prawn, and pink snapper larvae are likely to be impacted by dredge disposal via smothering from sedimentation and turbidity.
- Plume modelling demonstrated that in the vicinity of the offshore disposal site, Total suspended solids (TSS) will exceed thresholds for compliance with the maximum ecological protection for a short period, but within 1 month will no longer be in exceedance.<sup>4</sup>
- Benthic communities mapping identified that the disposal site is largely bare ground, but that at the offshore disposal site, 2 ha of seagrass will be lost due to smothering

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<sup>3</sup> EPA (2021) Appeal Report 1703, page 2

<sup>4</sup> BMT (2020) Plume Dispersion Modelling

(zone of high impact (ZOHI)), and up to 27 ha of sparse seagrass is predicted to be impacted from reduced light availability but expected to recover within five years (zone of moderate impact).

- This is considered to represent a small and incremental loss of ephemeral seagrass species within the Bay, with the 2-ha impacted in the ZOHI representing a 1.04 % loss of sparse seagrass.
- Scallop mortality is expected within the ZOHI at the disposal site due to sedimentation. The ZOHI is 0.7 km<sup>2</sup> compared to the total Denham Sound fishery area which is 720 km<sup>2</sup> and therefore represent a small impact on scallop stock abundance.
- Disposal of dredge plume will increase turbidity, however the predicted maximum turbidity generated (greater than 20 mg/L) is only likely to be present for between 3–24 hours.
- Increased turbidity may impact on survivorship of pink snapper larvae. However, natural mortality is relatively high, at about 49% per day. The proposal therefore is likely to increase mortality by up to 0.15%.
- The proponent has applied mitigation measures to minimise impacts to the marine environment through a reduction in the total volume of sediment from up to 100,000m<sup>3</sup> to 80,000 m<sup>3</sup> to be disposed of at the offshore disposal area; a reduction in the duration of the dredge activities from upwards of 4 weeks to less than 2 weeks; a reduction in the likely extent and duration of the turbidity plume resulting from dredge and disposal activities.

As a result of its assessment, the EPA recommended a number of conditions to ensure that the impacts were not greater than predicted, including monitoring to demonstrate the water quality and benthic habitats have recovered post the activity. The recommended conditions (condition 2) require the proponent to demonstrate that:

- water quality has returned to pre-activity levels within 1 month of cessation of disposal activities, along with requirements for monitoring and reporting to support this outcome, and
- there are no irreversible impacts outside the ZOHI related to benthic communities and habitats during implementation of the proposal.

Based on the above, we note that by ensuring that water quality is returned to its pre-activity levels and that there are no project attributable impacts beyond the ZOHI, it is reasonable to conclude that the EPA's environmental objectives for the relevant factors can be met.

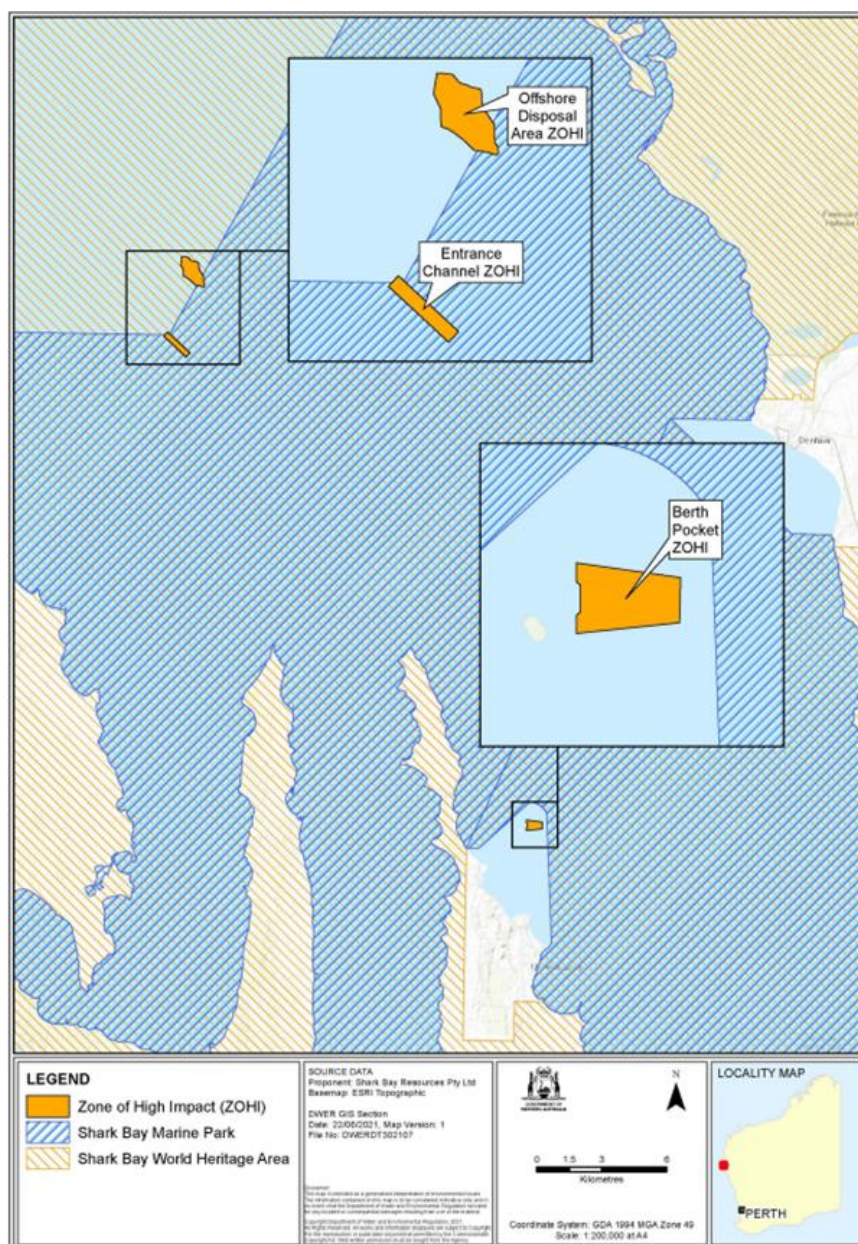
### **The EPA considered the impact of disposal on scallops**

The appellant was particularly concerned about the impact of the dredge disposal on scallop abundance, as it submitted that the disposal ZOHI was within the Shark Bay Scallop managed fishery (SBSMF), and scallops were likely to be present.

In summary, the investigation considers that the disposal area ZOHI may interact with a portion of the SBSMF area, contrary to the EPA and proponent's advice. However, we agree with the EPA's conclusion that the potential impact resulting from the proposed activity is small in extent and duration.

Report 1703 considered risks to scallops from the proposal and identified a ZOHI related to the dredge spoil disposal (Figure 2, below). The ZOHI was defined as:

The ZOHI associated with the spoil disposal, where impacts to benthic communities and habitat are predicted to be irreversible, was defined by several factors, including the sedimentation of more than 3 cm...The [disposal area] ZOHI equates 0.7 km.<sup>25</sup>



**Figure 2** Zones of High Impact, EPA Report 1703

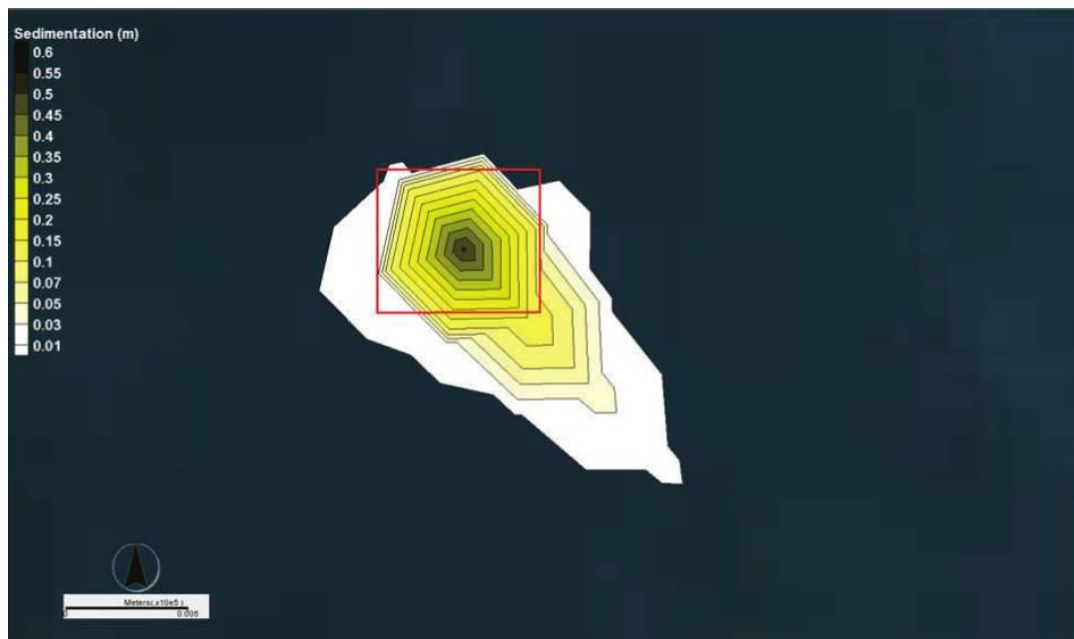
Report 1703 states that scallops have a higher incidence of mortality when sedimentation is above 3-5 cm. The EPA acknowledged that scallop mortality is expected within the ZOHI at the disposal site due to sedimentation. Outside the ZOHI sedimentation levels will be lower and impacts from sedimentation reduced.

Figure 3 below is a model of expected sediment levels at the disposal site, with the darker yellow and grey in the centre being the area where sedimentation may be higher than this 3cm threshold, which would be the expected tolerance limit for scallops. This approximately correlates with the ZOHI.

<sup>5</sup> Shark Bay Resources (2021) Response to appeal against EPA Report 1703, page 3

The EPA advised that it recognised that:

While mortality to benthic fauna and infauna are likely as a result of this proposal, the extent of impact to this habitat type is small within both the offshore LAU and more broadly within Shark Bay.<sup>6</sup>



**Figure 3** Sediment accumulation at disposal site during dredge campaign (based on a high production rate), BMT (2020) Plume Dispersion Modelling

Similarly, the proponent considered that the disposal site ZOHl would equate to 0.1% of the total Denham Sound SBSMF area (which is approximately 720.3 km<sup>2</sup>), which in its view, would represent a negligible impact on scallop stock abundance.

The investigation notes that there is dispute about whether the disposal site is within the boundaries of the SBSMF. Report 1703 states that the disposal site is within closed waters (ie cannot be fished) for both the SBSMF and Shark Bay Prawn managed fisheries. The proponent's supporting information also indicates that the disposal area is not within the fishery boundaries.

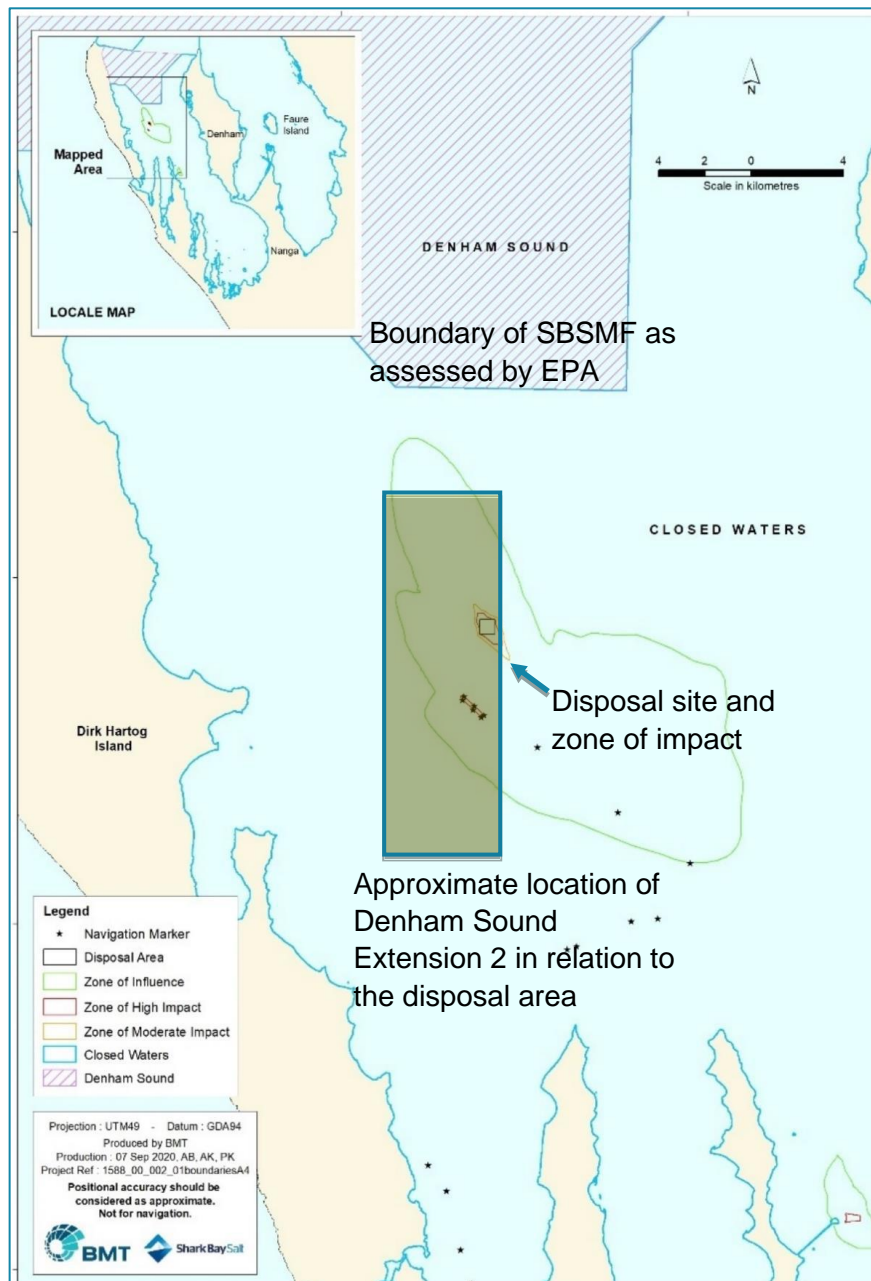
However, additional advice from the Department of Primary Industries and Regional Development (DPIRD) confirmed that 2 extensions to the boundaries of the Denham Sound fishery area were formalised in 2019 (see Figure 6 in Section 3). The extension areas may be open each season depending on scallop size and abundance results from surveys undertaken each November. If the surveys demonstrate high abundance, trawling of an extension area is permitted for one fishing period of up to 10 nights during December, January, or February. Only 1 extension area can be open in any one year.<sup>7</sup>

Figure 4 below illustrates that Denham Sound Extension 2 may overlap with the proposed dredge disposal area ZOHl. We understand that Denham Sound Extension 2 was open for the first time in the 2020/2021 scallop season (prior to the EPA's assessment). The future use of these extension areas will depend on abundance surveys undertaken by DPIRD.

<sup>6</sup> EPA (2021) Report 1703, page 19

<sup>7</sup> DPIRD (2020) Saucer Scallop Resource of Shark Bay Harvest Strategy 2020-2025





**Figure 4** Location of the disposal site and zone of impact in the context of the approximate location of Denham Sound Extension 2 (yellow).

We note that the appellant advised that natural abundance of scallop varies across the fishery, and that recent fishing activity in the vicinity of the proposed disposal site (Denham Sound Extension 2) demonstrated high abundance, likely to be well above the 0.1-0.2% of the SBSMF. The appellant advised that should disposal go ahead at the time of spawning (May to July), and there is 100% mortality within the ZOHI, then the impact on the whole fishery could be significant.<sup>8</sup> We consider timing of activities in section 2.2.

In conclusion, we note that the EPA assessed and identified some impact to scallops and other commercial fisheries resulting from spoil disposal and remained of the view that the proposal could be implemented to meet its objectives.

<sup>8</sup> SBPTOA (2021) Appellant response to EPA Appeal Report 1703, page 1



We note that the EPA identified that scallops are particularly vulnerable to smothering from spoil disposal compared to other marine fauna, and there is some uncertainty as to whether the ZOHI may intersect with a seasonal extension of the Denham Sound scallop fishery. However, for the reasons discussed in the following section we conclude that potential impacts can be mitigated via further conditions.

## **2.2 Are the recommended conditions adequate to protect the identified values?**

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The appellant submitted that if the disposal site remains unchanged, the timing of disposal should occur outside key ecological windows for its specific species of interest, and that this should be included as a recommended condition. Given the new information regarding the boundaries of the SBSMF and the evidence of occurrence of scallops in the vicinity of the disposal site, we agree with the appellant that restricting the timing of activity is justified.

The appellant requested that, if the proponent cannot avoid dredging between May and July, an additional monitoring condition be required to monitor the impact of dredge disposal on scallop abundance. Provided the additional condition is included as suggested, we consider additional monitoring is not warranted.

We explain our reasons below.

### **Timing of activity should be restricted**

The appellant requested that if the location of the disposal remains unchanged, the timing of dredging and disposal activities should be restricted to avoid the period May to July, which is the most critical time for migration, spawning, and larval settlement of pink snapper, prawns, and saucer scallops.

The EPA acknowledged that several stakeholders raised concerns about the timing of dredging and disposal activities during key ecological windows for conservation significant marine fauna and commercially important fish species.

The EPA advised that timing to avoid key ecological windows is a common minimisation measure used during dredging campaigns. The EPA considered the key ecological windows, including spawning, breeding and migration of commercial fishing species, whales, and dugongs of Shark Bay in relation to this proposal. In this case, the EPA advised that it was difficult to use this minimisation measure for this proposal due to the complexity in choosing an optimal time to avoid key ecological windows. The EPA advised that these windows occur throughout the year for different species.

We note that the appellant acknowledged this fact:

We recognise there are other competing interests that the proponent has had to consider around timing...<sup>9</sup>

Report 1703 provides an example of the different ecological windows considered by the EPA and proponent:

The Shark Bay World Heritage Advisory Committee requested that dredging activities occur between March to April to minimise impacts to dugongs and calves in shallow waters.

In addition, the proponent's supporting information demonstrates the range of threatened marine fauna utilising Shark Bay at different times of year, including dugongs, turtles, and

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<sup>9</sup> SBPTOA (2021) Appeal against EPA Report 1703, page 2

whales. The proponent also provided the key life stages of commercial fishing species within Shark Bay. It demonstrated that while May to July is key spawning periods for pink snapper and saucer scallops, other species likely to interact with the proposal spawn over different windows, for example, Whiting (*S. analis*) spawn between October to April and Goldspotted rockcod (*Epinephelus coioides*) spawn in January and December.<sup>10</sup>

In this regard the proponent advised:

Given the diverse range of threatened and ecologically significant flora and fauna species present within Shark Bay the preference is to include monitoring and mitigation of risks that are protective of all species at any time throughout the year.<sup>11</sup>

The proponent further advised that management and mitigation measures are outlined in its draft dredging environmental management plan that are appropriate throughout the year, as key ecological windows could not be avoided for all species.

In response to this aspect of the appeal, the EPA advised that it had regard for the small scale of the predicted impacts related to the proposed disposal. The key factors in its consideration of the timing of activities included:

- the small proportion of the fishery areas likely to be impacted by the proposal
- a tolerance of elevated turbidity by crabs and prawns in the context of the likely turbidity plumes
- suspended solids exposure thresholds for snapper eggs and larvae
- natural mortality rates of snapper eggs and larvae
- the small spatial extent of the ZOHI and therefore any irreversible impacts to prawns, scallops and snapper.

The proponent provided a similar response:

The results of the impact assessment on key commercial fisheries, with reference to specific concerns raised by DPIRD and WAFIC regarding crabs, prawns, snapper, and scallops, indicated a low risk, regardless of the season for dredging and/or the current status of the fishery.<sup>12</sup>

As discussed above and in section 3.3, the EPA considered that at any time of year, the residual impacts of the proposal could meet the EPA factor objectives for Marine Environmental Quality, Benthic Communities and Habitats and Marine Fauna, and that subject to implementation of the recommended conditions, the values related to Social Surrounds would also be protected.

We accept the EPA's assessment of relevant key ecological windows and its conclusion that the proposed impact of the activity can be managed at any time of year, based on the short and localised impact of the activity. Given the information available, we consider that the EPA was justified in not applying additional conditions to restrict timing.

Notwithstanding the above conclusion, as discussed in section 2.1, during the investigation we sought further advice from DPIRD on the SBSMF boundaries and abundance of scallops in the area. The EPA's assessment, and its conclusion that residual impacts to commercial fisheries will be low, was based on the disposal area being outside the SBSMF boundaries. However, advice from DPIRD confirms that the SBSMF may extend further south

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<sup>10</sup> BMT (2021) Shark Bay Resources Dredging Environmental Impact Assessment, page 42

<sup>11</sup> BMT (2020) Stakeholder Consultation report, page 9

<sup>12</sup> Shark Bay Resources (2021) Response to appeal against EPA Report 1703, page 3

periodically, based on scallop monitoring results. Therefore, it is possible that the disposal site and ZOHI overlaps with areas that may be within the boundaries of the fishery.

DPIRD also provided mapping of scallop recruit abundance in the area, which indicated that scallop recruits were present within the vicinity of the proposed ZOHI in November 2020.

Having regard for the new information regarding:

- the new (but temporary) boundaries of the fishery area (Figure 6), and
- the evidence that scallops may occur in the vicinity of the dredge disposal area,

we consider that while the nature and scale of the activity remains unchanged, there is the potential that impacts to the SBSMF may be greater than considered by the EPA.

In this case, the investigation agrees with the appellant that restricting the timing of dredging and disposal in order to avoid the key ecological window identified for the saucer scallops is justified, (ie no dredging and disposal between May and July). This conclusion was discussed with the proponent who indicated that it had no objections to limitations of this type.

### **Monitoring of scallop abundance is considered unnecessary**

Noting that the EPA has recommended several conditions related to monitoring, the appellant requested a specific condition be included to require before and after (BACI) monitoring of scallop abundance in the ZOHI.

Report 1703 states that dredging proposals usually include a monitoring and management program that is approved prior to proposal commencement. In this case however, the EPA has not recommended such a condition due to the short duration of proposed activities and its finding that the residual impacts to commercial fisheries will be low. The key factors that the EPA considered when forming this view were:

- the location of the offshore disposal site within closed waters of the SBSMF (discussed previously),
- the small proportion of the fishery areas likely to be impacted by the proposal, and
- the small spatial extent of the ZOHI and therefore any irreversible impacts to prawns, scallops and snapper.

The EPA advised that it commissioned a peer review<sup>13</sup> of the suitability of the proposed monitoring, among other things. The peer review supported the EPA's conclusion regarding the pre-approved monitoring program.

Having regard for the appellant's request that monitoring within the ZOHI at the disposal area, the EPA advised that it recognised that sedimentation is likely to have an impact on scallop mortality within the offshore disposal ZOHI. The proponent also acknowledged this fact:

the ZoHI impact [is defined as] an 'area where impacts on benthic communities or habitats are predicted to be irreversible'. The term irreversible means 'lacking a capacity to return or recover to a state resembling that prior to being impacted within a timeframe of five years or less'. As such, the expectation is that there will be loss within the ZoHI.

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<sup>13</sup> Peer review by Dr Ray Masini, Western Australian Marine Science Institute, Dredging Science Program

However, the EPA advised:

The monitoring of impacts within the Zone of High Impact is not consistent with the EPA *Technical Guidance Environmental Impact Assessment of Marine Dredging Proposals* (Technical Guidance).<sup>14</sup>

Instead, the EPA has required specific monitoring conditions of water and sediment quality, and monitoring to demonstrate no irreversible impacts occur outside the ZOHs.

In summary, the EPA's advice is that the proposal is small and localised in extent, and short in duration. The EPA considered that the impact of the proposal on social surrounds, including commercial fishing, was not significant and was manageable (and therefore determined that it was not a key environmental factor). The EPA considered that the residual impacts of the proposal are consistent with the EPA factor objectives for Marine Environmental Quality, Benthic Communities and Habitats and Marine Fauna, and that the recommended conditions ensure likely consistency with these factor objectives. The EPA considered these conditions will also ensure the residual impacts to Social Surroundings are consistent with the EPA's objective for this factor.

In any event, we consider that the additional condition discussed above in relation to the timing of disposal will decrease the potential impact to scallop spawning by avoiding the key ecological window during May to July. As such we do not consider the requirement for additional monitoring of scallop abundance is warranted.

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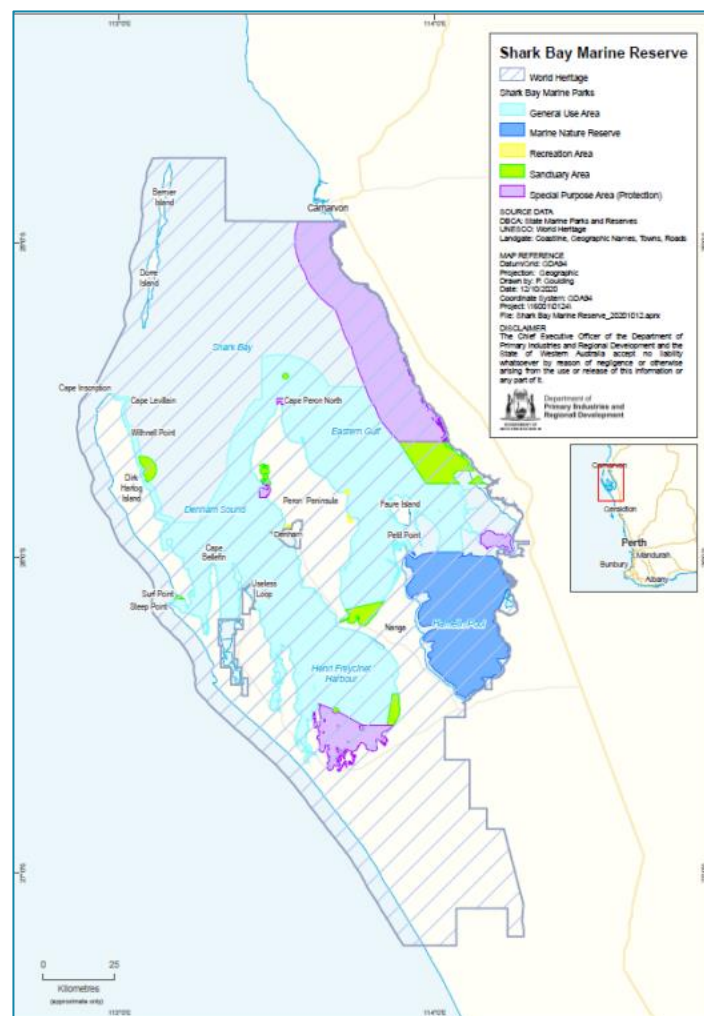
<sup>14</sup> EPA (2021) Appeal Report 1703, page 5

## 3 Supporting information

### 3.1 Location

The proposal is located within Shark Bay, 800 km north of Perth. Shark Bay covers an area of approximately 13,000 km<sup>2</sup> and is the largest marine embayment in Australia. Shark Bay supports the most extensive and diverse seagrass meadows in the world. The embayment is mostly shallow, with an average depth of 9 m and increasing to 29 m deep in the north.

The embayment is of great significance to recreational, commercial and conservation sectors, and was added to the World Heritage List in 1991 (Figure 5). Parts of Shark Bay are also managed as part of the Shark Bay Marine Park and Hamelin Pool Marine Nature Reserve.<sup>15</sup> Shark Bay is an area of high biodiversity, with over 320 fish species and 218 species of bivalves. Shark Bay is also an important habitat for large and small cetaceans and supports large dugong and turtle populations. Other endangered, threatened, or protected species that utilise the bay include sea snakes, seahorses and pipefish, sharks and seabirds.



**Figure 5** Shark Bay Marine Park and World Heritage Area (DPIRD, Fisheries Management Paper 301)

<sup>15</sup> DPIRD (2020) Fisheries Management Paper 301: Saucer Scallop Resource of Shark Bay Harvest Strategy 2020-2025, page 3



## 3.2 Proposal

The proponent has operated 2 solar salt fields and an associated port facility at Useless Loop within Shark Bay since the 1960s. The port is accessed via the Denham entrance channel which extends through the northern entrance of Shark Bay.

The proponent advised:

Over time, areas of the Port berth pocket and entrance channel have become shallower due to siltation, reducing the allowable draft for incoming and outgoing salt cargo vessels. We wish to complete dredging works within the Port berth pocket and entrance channel to bring navigable depths back to design levels to ensure ongoing port accessibility.

The most recent maintenance dredging of the entrance channel occurred in 1982, when approximately 100,000 m<sup>3</sup> was removed and disposed of at an offshore disposal site (the same site proposed in this proposal). Dredging of the berth pocket has not occurred since the original construction in the 1960s. Instead, the berth has been levelled via under water sweeping and ploughing at regular intervals since 2011. Sweeping has also occurred at the entrance channel (2018), however while there was improvement in available water depth as a result of the sweeping, surveys determined that channel design levels and widths were not successfully restored.

The current proposal therefore involves a) maintenance and capital dredging from the entrance channel of the port and b) seabed levelling in the berth pocket to restore navigable depths. The dredge material will be disposed of offshore (Figure 1).

### Proposal referral and decision to assess

In June 2020 the proponent referred the proposal to the EPA. The proponent proposed to undertake maintenance and capital dredging of up to 100,000 m<sup>3</sup> from the berth pocket and entrance channel of the port to restore navigable depths. The referral was submitted with supporting information prepared by BMT.

In December 2020 the EPA determined the level of assessment at – ‘Assess a) Referral information’. The EPA considered that it had enough information so that it could undertake the assessment on Referral Information, however the EPA requested some additional information. This included further sediment analysis, additional information regarding the selection of the spoil disposal location and targeted consultation with key stakeholders.

**Table 3** Timeline of assessment

| Date      | Details  |
|-----------|--|
| June 2020 | Proponent referred proposal to EPA                                   |
| Dec 2020  | EPA requested additional information from proponent                  |
| July 2020 | Referral documents made available for public comment 15-21 July 2020 |
| Dec 2020  | EPA set level of assessment at Assess - Referral Information         |
| May 2021  | Proposal determined to be a controlled action under EPBC Act         |
| June 2021 | Proponent amended proposal under s43A                                |
| June 2021 | EPA published Report 1703  |

### 3.3 EPA's assessment of environmental factors

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The EPA identified and assessed 3 environmental factors in relation to this proposal. Its assessment of these is summarised in section 2.1 and discussed in more detail below.

#### Marine Environmental Quality (MEQ)

The EPA's environmental objective for marine environmental quality (MEQ) *is to maintain the quality of water, sediment and biota so that environmental values are protected.*

The EPA advised that it has an environmental quality management framework for dealing with marine water quality. This framework, described in its 2016 *technical guidance-protecting the quality of WA's marine environment*, establishes levels of ecological protection required for different areas. The technical guidance states that a World Heritage Area and Marine Park should have a maximum level of ecological protection applied. The EPA advised that, consistent with this guidance, it assessed the proposal having regard for the maximum level of ecological protection required in this location.

Report 1703 identified turbidity as a potential residual impact resulting from the proposal. Its assessment was based on plume dispersion modelling provided by the proponent<sup>16</sup> which modelled proposal specific hydrodynamic and sediment parameters to predict the extent, duration and severity of turbidity plumes generated by the proposal. The plume modelling predictions are:

- Total suspended solids (TSS) concentrations greater than 20 milligram per litre mg/L above background levels will be evident for up to 12 kms from the offshore disposal site for a maximum of 24 hours over the entire dredging program
- TSS concentrations will be above background levels for up to 28 days
- TSS concentrations will be less than 5 mg/L within 7 days of dredging and disposal activities ceasing.<sup>17</sup>

Having regard for the TSS modelling, the EPA's assessment identified that in the vicinity of the entrance channel and offshore disposal area, the proposal will not be consistent with the maximum levels of ecological protection for a short time. However, the EPA noted that consistency with the maximum level of ecological protection will be achieved within one month of activities ceasing. The EPA therefore considered the impacts from TSS are likely to be consistent with:

- the EPA's environmental quality management framework
- protecting the values of the World Heritage Area and Marine Park, and
- the EPA's factor objective for MEQ.

To ensure this environmental outcome is achieved, the EPA recommended a specific condition ensuring water quality outcomes related to TSS would be met during implementation of the proposal, along with requirements for monitoring and reporting (condition 2, see Section 3.6)

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<sup>16</sup> BMT (2021) Shark Bay Resources Dredging: Plume Dispersion Modelling

<sup>17</sup> The EPA noted that the turbidity plume modelling was based on parameters that included dredging material from the berth pocket. The removal of dredging from the berth pocket has resulted in an approx. 50% reduction in the duration of the dredge campaign (from up to 4 weeks to now up to two weeks), and removal of finer sediment which has a longer settling time and greater effect on turbidity generation. This will result in a reduced extent, duration and severity of the turbidity plume from dredging and disposal activities. The peer review acknowledged that the plume modelling is likely to be conservative given this change to the proposal.

In summary, the EPA concluded that the increase in turbidity from the plume was temporary – short in duration and small in extent, and therefore was not expected to be inconsistent with the objective for MEQ, subject to conditions.

### **Benthic communities and habitats (BCH)**

The EPA's environmental objective for benthic communities and habitats (BCH) is *to protect benthic communities and habitats so that biological diversity and ecological integrity are maintained*.

Report 1703 identified that the main types of BCH within the vicinity of the proposal are seagrass and bare rock and rock rubble. The EPA's assessment of potential impacts to these BCH was based on a desktop assessment and BCH mapping surveys, as well as modelling of light (PAR) availability and sedimentation rates during dredging and disposal activities, undertaken by the proponent. Two BCH surveys were undertaken in July 2019 and February 2020. The BCH surveys mapped an area of approx. 47.2 km<sup>2</sup>, including the berth pocket and a 25 km<sup>2</sup> survey area, including the entrance channel and offshore disposal site. These survey areas define the local assessment units (LAU), in accordance with the EPA's *Technical Guidance – Protection of benthic communities and habitats*.

The EPA determined that the proposal has the potential to significantly impact on BCH from:

- direct loss of BCH (seagrass) by removal or smothering during dredging, disposal, and seabed levelling activities
- indirect impacts to BCH (sea grass) from a reduction in PAR availability caused by turbidity plumes generated during dredging, disposal, and seabed levelling activities.

The EPA's 2016 *Technical guidance – Environmental impact assessment of marine dredging proposals* provides a framework for identifying the zones of impact based on extent, severity, and duration. The EPA has therefore identified the areas that may be impacted by this proposal as ZOHI - impacts are irreversible; and Zone of Moderate Impact (ZOMI) - recoverable within 5 years.

The EPA advised that at the offshore disposal site, its assessment indicated that 2 ha of sparse seagrass will be removed or smothered because of offshore disposal activities (defined as the ZOHI). In addition, up to 27 ha of sparse seagrass is predicted to be impacted from reduced light availability from offshore disposal activities but expected to recover within five years (ZOMI). The EPA noted that seagrass recovery may be quicker than 5 years, based on the seagrass species to be impacted and the duration and low levels of turbidity predicted.

The EPA noted that the proponent has avoided the loss of 26 ha of dense perennial seagrass by removing the inner offshore disposal option (discussed further in section 2.2).

The EPA considered that the predicted losses from this proposal represents a small and incremental increase in the loss of ephemeral seagrass species. At the offshore disposal area LAU, the 2 ha impacted in the ZOHI represents a 1.04 % increase in the cumulative loss to sparse seagrass and a 0.12 % increase in the cumulative loss to all seagrass in this LAU. The total cumulative loss in this LAU is 1.9 % of the estimated area of pre-European seagrass coverage. More than 1,600 ha of seagrass in the LAU will remain.

The EPA advised that its assessment had regard for the minimisation measures the proponent committed to, related to the offshore disposal site:

- disposing of dredge material in the north-west quarter of the offshore disposal area on incoming spring tides to minimise the extent of the turbidity plume in relation to the seagrass adjacent to the south of the offshore disposal area
- locating the offshore disposal area in an area of bare sand and rubble to minimise impacts to seagrass.<sup>18</sup>

To ensure the environmental outcome is achieved, the EPA recommended a specific condition ensuring no irreversible impacts outside the ZOHl related to BCH during implementation of the proposal, along with requirements for monitoring and reporting (condition 2, see Section 3.6).

In summary, the EPA concluded that while the proposal will have both direct and indirect impacts on seagrass because of dredge disposal, the predicted impact is relatively small given the extensive seagrass meadows within Shark Bay. The limited impact and the short duration and small extent of turbidity plumes mean the proposal can be consistent with the EPA objective for BCH and the protection of the values of the World Heritage Area and Marine Park, subject to the implementation of recommended conditions.

## Marine Fauna

The EPA's environmental objective for marine fauna is *to protect marine fauna so that biological diversity and ecological integrity are maintained*.

Report 1703 identified that the proposal has the potential to significantly impact on marine fauna from a direct habitat loss and indirect impacts to fauna habitat from sediment deposition, as well as indirect impacts to marine fauna and fauna habitat from turbidity.

The EPA's assessment of marine fauna was informed by an online search for species undertaken by the proponent using relevant databases. The EPA advised that the proponent consulted with the commercial fishing industry during the assessment.

The EPA acknowledged that commercial fisheries are present within the World Heritage Area and Marine Park, with the key commercial fisheries targeting prawn, scallop, crab and scalefish and pink snapper. Shark Bay is one of two pink snapper spawning locations in WA, with peak spawning occurring between May and July. The impacts from dredge disposal on scallop, prawn and pink snapper larvae include sedimentation and turbidity.<sup>19</sup>

Impacts to scallops are discussed in section 2.1.

Regarding turbidity, the EPA acknowledged that during implementation of the proposal, turbidity generated may affect marine fauna:

The predicted maximum turbidity generated (greater than 20 mg/L) is only likely to be present for between 3–24 hours for the entire dredge program. Most conservation significant marine fauna are mobile species and given the lack of significant key habitats within the extent of the modelled plumes, are unlikely to be significantly affected by turbidity.<sup>20</sup>

The EPA advised that increased turbidity is known to have an impact on survivorship of pink snapper larvae. However, natural mortality has been estimated as relatively high, at about 49% per day. The proponent has conservatively estimated that this proposal is likely to increase mortality by up to 0.15 % and cause additional sub-lethal impacts of up to 0.39 %.

<sup>18</sup> EPA (2021) Report 1703, page 13

<sup>19</sup> EPA (2021) Report 1703, page 17

<sup>20</sup> EPA (2021) Report 1703, page 19

The EPA therefore considered that the proposal is unlikely to have a significant impact on pink snapper spawning or stocks within Shark Bay.

The EPA advised that it encouraged the proponent to adopt additional minimisation measures throughout the assessment process. A change in methodology at the berth pocket has reduced the volume, duration, extent, and severity of turbid plumes at the disposal site. The proponent has committed to utilising deeper dredge routes to avoid shallow waters where dugongs live. This is in addition to the iterative changes made by the proponent through the process to reduce the environmental risks, including:

- reduction in the total volume of sediment from up to 100 000 m<sup>3</sup> to 80 000 m<sup>3</sup> to be disposed of at the offshore disposal area.
- reduction in the duration of the dredge activities from upwards of 4 weeks to less than 2 weeks.
- reduction in the likely extent and duration of the turbid plume resulting from dredge and disposal activities.
- exclusion of potential tributyltin contaminated sediments from the Shark Bay World Heritage Area.

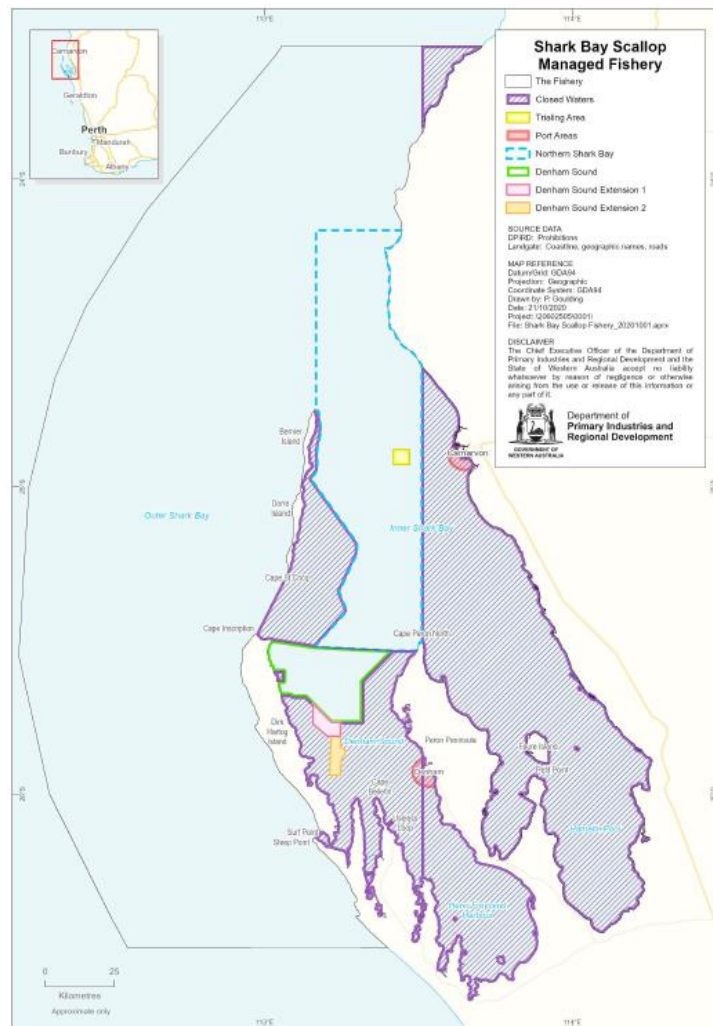
The EPA advised that with the conditions to limit the extent and duration of the proposal activities, the effects of turbidity on levels of marine fauna local and regional populations which utilise Shark Bay is not expected to be significant.

In summary, the EPA concluded that the proposal would result in a small incremental loss of marine fauna habitat (both seagrass and sand and rock rubble) and indirect impacts from turbidity and smothering. This represents a very small proportion of these habitats found elsewhere both with the LAUs and within Shark Bay more generally. Given the short duration and small extent of the turbidity plume, and the management and mitigation measures proposed, it is expected that the proposal can be consistent with the EPA's factor objective for marine fauna and the protection of the values of the World Heritage Area and Marine Park.



### 3.4 Shark Bay Scallop Managed Fishery (SBSMF)

The western saucer scallop is distributed from Broome in the north to Israelite Bay in the south of WA. Despite its extensive distribution, the species tends to be restricted to areas of bare sand in the more sheltered environments found in the lee of islands and reef systems. The greatest numbers in WA are found in Shark Bay and around the Abrolhos Islands.



**Figure 6** Shark Bay Scallop Managed Fishery, including Denham Sound Extensions

Saucer scallops in Shark Bay typically live no more than 2 years and attain a maximum size of around 115 mm. There are 2 discrete stocks in Shark Bay; Denham Sound and northern Shark Bay (see Figure 6). The 2 stocks are considered as one broader scallop resource but assessed and managed separately.

Denham Sound spawning occurs in 2 distinct spawning peaks, during winter in July and August, and during summer in February and March. Reproduction and survival of larvae is greatly influenced by environment conditions, particularly water temperature.

Saucer scallops in the waters of Shark Bay are primarily harvested commercially using low-opening otter trawls. Commercial scallop catches fluctuate significantly in response to variable recruitment but have typically ranged between 200 and 500 tonnes (meat weight) annually. Very high annual catches above 2000 tonnes were observed in the early 1990s, following a period of favourable environmental conditions that led to exceptional recruitment.

The fishery is currently managed primarily through output controls in the form of a Total Allowable Commercial Catch (TACC) set annually for each of the 2 scallop stocks (northern Shark Bay and Denham Sound).

The SBSMF was closed to fishing for 3 years from 2012 to 2014 in response to low scallop abundance caused by adverse environmental conditions (marine heatwave of 2010/11). Since the fishery reopened to limited fishing in 2015, catches gradually increased to around 300 tonnes. The Denham Sound fishery is considered fully recovered.<sup>21</sup>

### 3.5 Other statutory processes

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We note that the proponent is required to obtain a sea dumping permit for all dredging and offshore spoil disposal activities from the Commonwealth Department of Agriculture, Water and the Environment (DAWE), in accordance with the *Environment Protection (Sea Dumping) Act 1981*. The purpose of this Act is to prevent marine pollution by controlling dumping at sea. The sea dumping permit process is expected to manage the potential environmental effects of the dredge spoil disposal and conditions are expected to be imposed to monitor the sediment plumes expected during dumping activities.<sup>22</sup>

We understand that the EPA had regard for this requirement and that the regulation of marine pollution via a sea dumping permit was a consideration in its assessment.

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<sup>21</sup> DPIRD (2020) Fisheries Management Paper 301: Saucer Scallop Resource of Shark Bay Harvest Strategy 2020-2025, page 7

<sup>22</sup> EPA (2021) Report 1703, page 7

## 3.6 Recommended Condition 2

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### 2 Marine Environmental Quality and Benthic Communities and Habitats

- 2-1 The proponent shall ensure the implementation of the proposal achieves the following environmental outcomes:
- (1) no **irreversible impacts** to benthic communities and habitats outside the **Entrance Channel Zone of High Impact, Offshore Disposal Area Zone of High Impact** and the **Berth Pocket Zone of High Impact**;
  - (2) during seabed levelling activities, concentrations of tributyltin in waters within the **Port Exclusion Area** shall be no more than 0.02 µg/L and no more than 0.0004 µg/L at the boundary of the Shark Bay Marine Park;
  - (3) within one (1) month following cessation of dredging and spoil disposal activities, **water quality** at the Entrance Channel and Offshore Disposal Area is to have returned to reference site conditions; and
  - (4) within one (1) month following cessation of seabed levelling activities, **water and sediment quality** at the boundary of the Shark Bay Marine Park is to have returned to reference site conditions.
- 2-2 The proponent shall undertake monitoring during and following the cessation of dredging, spoil disposal and seabed levelling activities capable of demonstrating whether the outcomes in condition 2-1 will be met.
- 2-3 The proponent shall submit as part of the Compliance Assessment Report required by condition 7-6, and to the Department of Biodiversity, Conservation and Attractions, that shall:
- (1) outline the monitoring that was undertaken during the implementation of the proposal;
  - (2) outline the results of the monitoring undertaken to report whether that the environmental outcomes specified in condition 2-1 were achieved;
  - (3) report whether that the outcome in condition 2-1(1) was achieved through analysis of photosynthetically active radiation collected during implementation of the proposal;
  - (4) outline any management actions undertaken during the implementation of the proposal to meet the outcomes in condition 2-1.
- 2-4 Unless otherwise demonstrated in the Compliance Assessment Report required by condition 7-6, within eighteen (18) months following the cessation of dredging, spoil disposal and seabed levelling activities, the proponent shall submit to the CEO a Seagrass Report that reports whether, through seagrass surveys and mapping, that seagrass outside the Zones of High Impact identified in condition 2-1(1) have **recoverable impacts** and that the outcome in condition 2-1(1) was achieved.

- 2-5 In the event that the monitoring required by condition 2-4 does not demonstrate impacts are recoverable, the proponent shall conduct additional seagrass surveys and mapping to demonstrate whether the outcome in condition 2-1(1) is achieved.
- 2-6 In the event that monitoring or reports identifies that any of the environmental outcomes set in condition 2-1 are not being achieved, the proponent shall:
- (1) immediately implement contingency management actions until the CEO has determined in writing that the environmental outcomes set in condition 2-1 are being achieved and will continue to be achieved;
  - (2) investigate to determine the likely cause of the environmental outcomes set in condition 2-1 not being achieved;
  - (3) investigate to provide information for the CEO to determine potential environmental harm or alteration of the environment that occurred due to non-achievement of the environmental outcomes set in condition 2-1;
  - (4) within twenty-one (21) days of monitoring or reports identifying that any of the environmental outcomes set in condition 2-1 are not being achieved, submit to the CEO a report detailing the following:
    - (a) the results of the monitoring that led to the identification that any of the environmental outcomes set in condition 2-1 are not being achieved;
    - (b) details and effectiveness of the contingency actions implemented;
    - (c) findings of the investigation required by conditions 2-6(2) and 2-6(3);
    - (d) measures to prevent, control or abate impacts which may have occurred.

### 3.7 Alternative disposal site options analysis

Source: Shark Bay Resources Dredging Environmental Impact Assessment

Table 2-3 Alternative disposal site options for Shark Bay Resources dredging

| Disposal option  | Advantages  | Disadvantages  | Decision  |
|--|---|--|---|
| 1<br>Offshore – all material to either the inner or outer previously approved disposal areas within the Shark Bay World Heritage Area (SBWHA) and/or Shark Bay Marine Park (SBMP). | <b>Engineering</b> <ul style="list-style-type: none"> <li>Less time to complete disposal run due to closer alignment of disposal sites relative to the berth pocket and entrance channel dredge areas.</li> <li>Less equipment required compared to onshore disposal options (Options 3–7)</li> </ul> <b>Environment</b> <ul style="list-style-type: none"> <li>Previously approved disposal site in 2001, approval extended in 2004.</li> <li>Previously used outer area (brown-field site) for disposal of entrance channel dredge material in 1982.</li> </ul>           | <b>Environment</b> <ul style="list-style-type: none"> <li>Potential loss of 26 ha of perennial seagrass from the inner 'greenfield' disposal area, within the SBMP/SBWHA.</li> <li>DAWE Sea Dumping permit required.</li> </ul>  | <b>Option not progressed</b><br>due to feedback from DWER related to the inner disposal site; positioned within the SBMP and potential loss of perennial seagrass, which also represents a 'greenfield' site for disposal.  |
| 2<br>Offshore – all material to the outer previously approved disposal area  | <b>Engineering</b> <ul style="list-style-type: none"> <li>Less equipment required compared to onshore disposal options (Options 3–7).</li> <li>Avoid 'greenfield' area and potential loss of 26 ha of perennial seagrass from the inner disposal site.</li> <li>Located outside of the SBMP boundary.</li> </ul> <b>Environment</b> <ul style="list-style-type: none"> <li>Previously used outer area (brownfield site) for disposal of entrance channel dredge material in 1982.</li> <li>Previously approved disposal site in 2001, approval extended in 2004.</li> </ul> | <b>Engineering</b> <ul style="list-style-type: none"> <li>Increased time to complete disposal run due to distance of disposal site relative to the berth pocket (~2-hour turnaround).</li> </ul> <b>Environment</b> <ul style="list-style-type: none"> <li>Located within the SBWHA.</li> <li>DAWE Sea Dumping permit required.</li> </ul>   | Option initially considered based on pre-referral discussions and an ability to retain disturbance within an existing 'brownfield' site.<br><br>Based on stakeholder concerns regarding elevated concentrations of tributyltin (TBT) within berth pocket sediments, <b>offshore disposal for ALL material will not be progressed.</b> |
| 3<br>Onshore – salt pond (placement 'C' in Figure 2-1)   | <b>Engineering</b> <ul style="list-style-type: none"> <li>Use dredge material to even out depressions within the Shark Bay Resources (SBR) lease area (excised from the SBWHA) to create a suitable site for a new salt crystalliser. Potential stockpiling of dredge material for use on site as fill material, though no available site use evident at the time of completing this assessment.</li> </ul>   | <b>Engineering</b> <ul style="list-style-type: none"> <li>All onshore disposal options require material from dredging to be stockpiled onshore with return water to the marine environment. The following land disturbance activities will be required to stockpile material for reuse or trucking offsite to a resource recycling facility: <ul style="list-style-type: none"> <li>a reclamation area to be constructed</li> <li>borrow site to win material to be used to construct reclamation bund wall</li> </ul> </li> </ul> | <b>Option not progressed</b><br>as the salt pond 'C' site was only available for a limited time due to near-term necessity, which is no longer a viable option.<br><br>This site would have only accounted for a small  |



| Disposal option | Advantages   | Disadvantages  | Decision  |
|-----------------|--|--|---|
|                 | <b>Environment</b> <ul style="list-style-type: none"> <li>• DAWWE Sea Dumping permit not required.</li> <li>• Beneficial reuse of dredged material.</li> </ul> | <ul style="list-style-type: none"> <li>– construction of a pipeline corridor.</li> <li>• Additional cost associated with mobilisation of earth moving plant and equipment.</li> <li>• Not all material will fit within the salt pond and so placement option 3 would need to be completed in unison with another option – likely increasing costs for plant and equipment if different disposal options are chosen.</li> <li>• Geotechnical survey data to confirm acceptable for use in salt pond.</li> </ul> <b>Environment</b> <ul style="list-style-type: none"> <li>• Onshore stockpiling and resource recycling would require additional environmental monitoring against: <ul style="list-style-type: none"> <li>– Contaminated Site Guidelines (DER 2014) – to investigate the disposal of sediments with potential to create a contaminated site and/or contaminated leachate.</li> <li>– Landfill Waste Classifications and Waste Definitions 1996 (as amended 2019; DWER 2019) – to determine whether disposal of dredged material to a gazetted landfill site is required.</li> <li>– Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG 2018) – to determine impacts as a result of return water discharged to the marine/freshwater environment.</li> </ul> </li> <li>• Turbidity generated at the site of return water and potential impacts to nearshore/shallow water perennial seagrass meadows.</li> <li>• Consideration of other guidance and regulations for use of the waste-derived materials.</li> <li>• Stockpiling material may require a Works Approval (licence) under Part V of the EP Act.</li> <li>• Native vegetation clearing permit may be required.</li> <li>• The availability for re-use in salt ponds is highly dependent on the results of soil sampling and subsequent landfill/contamination classification.</li> </ul> | <p>volume of total dredge material and so could only be considered in unison with other disposal option(s).</p> |

| Disposal option |  | Advantages  | Disadvantages   | Decision   |
|-----------------|--|---|---|--|
|                 |  |   | <ul style="list-style-type: none"> <li>An assessment of SBR's site indicated limited space for stockpiling material and wind-blown dust may have other environmental/operational impacts for consideration (Figure 2-1).</li> <li>Depending on the site, land disturbance may require cultural heritage approval.</li> <li>No beneficial re-use options evident at the time of preparing the DEIA</li> </ul>  |  |
| 4               | Onshore – stockpile to resource recovery (placement 'A–C' in Figure 2-1) | <p><b>Engineering</b></p> <ul style="list-style-type: none"> <li>Potential stockpiling of dredge material for use on site as fill material, though no available site use/need evident at the time of completing this assessment (Option 3).</li> </ul> <p><b>Environment</b></p> <ul style="list-style-type: none"> <li>DAWE Sea Dumping permit not required.</li> <li>Beneficial reuse of dredged material, though additional testing for use of the waste-derived materials required.</li> <li>SBR lease area excised from the SBWHA/SBMP.</li> </ul> | <p><b>Similar to Option 3</b>, with the inclusion of the below points.</p> <p><b>Engineering</b></p> <ul style="list-style-type: none"> <li>At the time of preparing this impact assessment there were no known resource recycling plants in Shark Bay, meaning considerable costs/logistics in relation to trucking material out of Useless Loop.</li> <li>Additional cost associated with mobilisation of earth moving plant and equipment.</li> <li>Not all material will fit within any one of the onshore placement areas and so duplication of onshore disposal areas or staging of stockpiling material would be required to effectively place all material onshore, with significant cost/time implications.</li> </ul> <p><b>Environment</b></p> <ul style="list-style-type: none"> <li>The choice of disposal site is highly dependent on the results of soil sampling and subsequent landfill/contamination classification.</li> <li>If dredged material is disposed via a third-party the local landfill site and government levy/fees apply, adding considerable costs to the Project.</li> <li>Additional risks to seagrass at placement option 'A' due to reclamation, halo effect, return water turbidity.</li> <li>Comparisons required in-line with Option 3 and no beneficial re-use options evident at the time of preparing the DEIA.</li> </ul> | <p><b><u>Option not progressed</u></b> given lack of resource recycling options and negligible contamination risk attributed to majority of dredge material.</p> |
| 5               | Onshore – stockpile to beach nourishment                                 | <p><b>Engineering</b></p> <ul style="list-style-type: none"> <li>Potential stockpiling of dredged material as beach nourishment material.</li> </ul>  | <p><b>Similar to Option 3</b>, with the inclusion of the below points.</p>  | <p><b><u>Option not progressed</u></b> due to lack of viable beach renourishment options as well as</p>  |

| Disposal option  | Advantages  | Disadvantages  | Decision   |
|--|---|--|--|
|  | <b>Environment</b> <ul style="list-style-type: none"> <li>• DAWE Sea Dumping permit not required if above low water mark.</li> <li>• Beneficial reuse of dredged material, though additional testing for use of the waste-derived materials required.</li> </ul>  | <b>Engineering</b> <ul style="list-style-type: none"> <li>• Most likely requirement for beach nourishment would be the Denham town beach, adjacent to the local boat ramp. It is noted that these beaches are generally nourished by maintenance works that the Department of Transport carry out at the local boating facility (Oceanica &amp; BMT JFA 2012). Significant transport distance to the disposal site would add to the logistic and economic challenges (~20–50 km from the berth and channel dredge areas). The water depths adjacent to the disposal site are shallow, thus direct placement via the dredge and a pipeline would require mobilisation and installation of a large length of steel pipeline (and potential impacts to benthic habitat where pipe is installed).</li> <li>• It is unlikely that <u>all</u> material could be used for beach nourishment and so secondary options would need to be considered in parallel to beach nourishment near Denham, with significant cost/time implications.</li> </ul> <b>Environment</b> <ul style="list-style-type: none"> <li>• Project works beyond SBR's lease holding would require additional stakeholder consultation to ensure Project does not disrupt Shire of Shark Bay precinct and other environmental aspects at this new location.</li> <li>• Comparisons required in-line with Option 3 and no beneficial re-use options evident at the time of preparing the DEIA.</li> </ul> | logistical consideration for pursuing beach renourishment.   |
| 6<br><br>Onshore disposal of contaminated material within SBR Lease area (placement 'A–C' in Figure 2-1), remaining material disposed offshore within the SBWHA but outside the SBMP (proposed disposal site Figure 1-1) | <b>Engineering</b> <ul style="list-style-type: none"> <li>• Potential stockpiling of dredge material for use on site as fill material, though no available site use evident at the time of completing this assessment (Option 3) and implications for acceptable use in-line with relevant guidelines.</li> </ul> | <b>Similar to Option 3</b> , with the inclusion of the below points.<br><br><b>Environment</b> <ul style="list-style-type: none"> <li>• offshore placement within the SBWHA.</li> <li>• DAWE Sea Dumping permit required.</li> <li>• Third-party landfill/resource recovery and government levy/fees apply, adding considerable costs to the Project.</li> </ul>   | <b><u>Option not progressed in the near-term</u></b> , with preference to level high spots adjacent to the berth, avoiding introduction of any contaminants to offshore area, and limiting potential secondary environmental impacts associated with |

| Disposal option |  | Advantages   | Disadvantages  | Decision   |
|-----------------|--|--|--|--|
|                 |  | <b>Environment</b> <ul style="list-style-type: none"> <li>Potential options for beneficial reuse of dredged material, though additional testing for use of the waste-derived materials required.</li> </ul>  | <ul style="list-style-type: none"> <li>Comparisons required in-line with Option 3 and no beneficial re-use options evident at the time of preparing the DEIA.</li> </ul>   | dewatering and creation of a newly disturbed onshore site.   |
| 7               | Onshore disposal of contaminated material within SBR Lease area (placement 'A–C' in Figure 2-1), remaining material disposed offshore outside the SBWHA/SBMP | <b>Engineering</b> <ul style="list-style-type: none"> <li>Potential stockpiling of dredge material for use on site as fill material, though no available site use evident at the time of completing this assessment (Option 3) and implications for acceptable use in-line with relevant guidelines.</li> </ul> <b>Environment</b> <ul style="list-style-type: none"> <li>Potential options for beneficial reuse of dredged material, though additional testing and guideline comparisons required in-line with Option 3, and no beneficial re-use options evident at the time of preparing the DEIA.</li> <li>Disposal outside the SBWHA/SBMP.</li> </ul> | <b>Similar to Option 3</b> , with the inclusion of the below points.<br><br><b>Engineering</b> <ul style="list-style-type: none"> <li>Duplication of dredge plant to provide scope for both onshore and offshore disposal options is logistically complex and has significant cost/time implications.</li> <li>Disposal of material offshore beyond the SBWHA/SBMP would include transfer 80–100 km offshore, which would, at a minimum, double the current estimated timeline for the Project (~4-hour turnaround on disposal runs), adding considerable costs to the Project.</li> </ul> <b>Environment</b> <ul style="list-style-type: none"> <li>DAWE Sea Dumping permit required.</li> <li>Placement of material on undisturbed 'greenfield' site, not within an existing footprint for dredge disposal.</li> </ul> | <b>Option not progressed</b> given negligible risk of contamination attributed to remaining (channel) dredge material and preference to avoid creation of a new 'greenfield' site of disturbance, onshore or offshore. |
| 8               | All material disposed of offshore outside of the SBWHA and SBMP  | <b>Engineering</b> <ul style="list-style-type: none"> <li>Single disposal option (e.g. offshore only) reduces requirements for mobilisation of earth moving plant and equipment associated with onshore disposal (Options 3–7).</li> </ul> <b>Environment</b> <ul style="list-style-type: none"> <li>Disposal outside the SBWHA/SBMP</li> <li>No requirement to assess against terrestrial receptors/guidelines (refer disadvantages under Option 3).</li> </ul>   | <b>Engineering</b> <ul style="list-style-type: none"> <li>Disposal of material offshore beyond the SBWHA/SBMP would include transfer 80–100 km offshore, which would, at a minimum, double the current estimated timeline for the Project (~4-hour turnaround on disposal runs), adding considerable costs to the Project.</li> </ul> <b>Environment</b> <ul style="list-style-type: none"> <li>DAWE Sea Dumping permit required.</li> <li>Placement of material on undisturbed 'greenfield' site, not within an existing footprint for dredge disposal.</li> </ul>  | <b>Option not progressed</b> given negligible risk of contamination attributed to majority of dredge material and a preference to avoid creation of a new 'greenfield' site of disturbance, onshore or offshore.       |
| 9               | All material disposed of onshore outside of the SBWHA.   | <b>Environment</b> <ul style="list-style-type: none"> <li>Disposal outside the SBWHA/SBMP.</li> </ul>  | <b>Similar to Option 3</b> , with the inclusion of the below points.   | <b>Option not progressed</b> given lack of resource recycling options, the negligible contamination risk attributed to majority  |

| Disposal option   | Advantages   | Disadvantages  | Decision  |
|---|--|--|---|
|   |  | <b>Engineering</b> <ul style="list-style-type: none"> <li>At the time of preparing this impact assessment there were no known resource recycling plants in Shark Bay, meaning considerable costs/logistics in relation to trucking material out of Useless Loop.</li> <li>Additional cost associated with mobilisation of earth moving plant and equipment.</li> <li>Not all material will fit within any one of the onshore placement areas for stockpiling and so duplication of onshore disposal areas or staging of stockpiling material would be required to effectively place all material onshore prior to trucking off-site, with significant cost/time implications.</li> </ul> <b>Environment</b> <ul style="list-style-type: none"> <li>Limited brownfield space within the existing SBR lease within the proximity of the water for dewatering.</li> <li>The choice of disposal site is highly dependent on the results of soil sampling and subsequent landfill/contamination classification.</li> <li>If dredged material is disposed via a third-party the local landfill site and government levy/fees apply, adding considerable costs to the Project.</li> </ul> | of dredge material, and a preference to avoid creation of a new 'greenfield' site of disturbance, onshore or offshore.  |
| 10<br>Entrance channel material to the outer previously approved disposal area and seabed levelling within the berth pocket (proposed option) | <b>Engineering</b> <ul style="list-style-type: none"> <li>Less equipment required compared to onshore or split onshore/offshore disposal options (Options 3–7)</li> </ul> <b>Environment</b> <ul style="list-style-type: none"> <li>Avoid potential loss of 26 ha of perennial seagrass from the inner 'greenfield' disposal site.</li> <li>Avoid disposal of potentially contaminated berth pocket material at offshore disposal site; maintains material within area excised from the SBMP.</li> <li>Offshore disposal site previously approved and historically used for disposal of dredged material (i.e. use of a brownfield site).</li> </ul> | <b>Engineering</b> <ul style="list-style-type: none"> <li>Material remains in and around the berth pocket area and is available for resuspension by vessel wash, increasing risk of future high spots that affect available drafts</li> </ul> <b>Environment</b> <ul style="list-style-type: none"> <li>Offshore site located within the SBWHA.</li> <li>Contaminated material remains in the system is not removed, mixed/diluted or capped.</li> <li>DAWE Sea Dumping permit required.</li> </ul>  | <b>Current proposal</b><br>proposed due to: <ul style="list-style-type: none"> <li>seabed levelling minimising spread of potentially contaminated material (kept in situ)</li> <li>minimise potential for secondary environmental impacts from onshore disposal</li> <li>avoid creating a new 'greenfield' site of disturbance</li> <li>salt operations, including dredging and disposal of material within the World Heritage</li> </ul> |



| Disposal option | Advantages   | Disadvantages | Decision  |
|-----------------|--|---------------|---|
|                 | <ul style="list-style-type: none"> <li>• Located outside of the SBMP boundary.</li> <li>• Avoid secondary environmental impacts associated with onshore placement, e.g. return water and terrestrial receptors.</li> </ul> |               | property, were “not deemed to be a threat to the heritage values or integrity”. |

Note:

1. 'DAWE' = Department of Agriculture, Water and the Environment, 'EP Act' = Environmental Protection Act 1986, 'SBMP' = Shark Bay Marine Park, 'SBR' = Shark Bay Resources, 'SBWHA' = Shark Bay World Heritage Area

## Appendix 1 Appeal process

### The Minister assesses the merits of a decision

Environmental appeals follow a merits-based process. This means the Minister can consider all the relevant facts, legislation and policy aspects of the decision and decide whether it was correct and preferable.

For appeals in relation to an EPA report and recommendations, the Appeals Convenor normally considers the environmental merits of the assessment by the EPA, based on objectives as set by the EPA as well as other environmental factors. The appeals process considers environmental significance, additional information not considered by the EPA, technical errors and attainment of policy objectives.

### We report to the Minister, as does the decision-making authority

To decide an appeal's outcome, the Minister for Environment must have a report from both:

- the Appeals Convenor [see section 109(3) of the EP Act], and
- the authority that originally made the decision under appeal [see section 106(1)].

To properly advise the Minister in our report, our investigation included:

- reviewing the appeal and supporting documents from the appellant
- reviewing documents from the EPA
- review documents provided by the proponent in response to the appeal
- meeting with the appellant on 2 September 2021
- meeting with the proponent on 1 September 2021
- meeting with DPIRD on 22 September 2021.

**Table 4** Documents we reviewed in the appeals investigation

| Document   | Date        |
|--|-------------|
| EPA Appeal Report 1703   | August 2021 |
| EPA Report and Recommendation 1703   | June 2021   |
| BMT, Dredging Environmental Impact Assessment  | June 2021   |
| BMT, Plume Dispersion Modelling  | June 2020   |
| BMT, Benthic Habitat Mapping   | June 2020   |
| BMT, Stakeholder Consultation  | June 2020   |
| DPIRD (2020) Fisheries Management Paper: Saucer Scallop Resource of Shark Bay Harvest Strategy 2020-2025 | Nov 2020    |