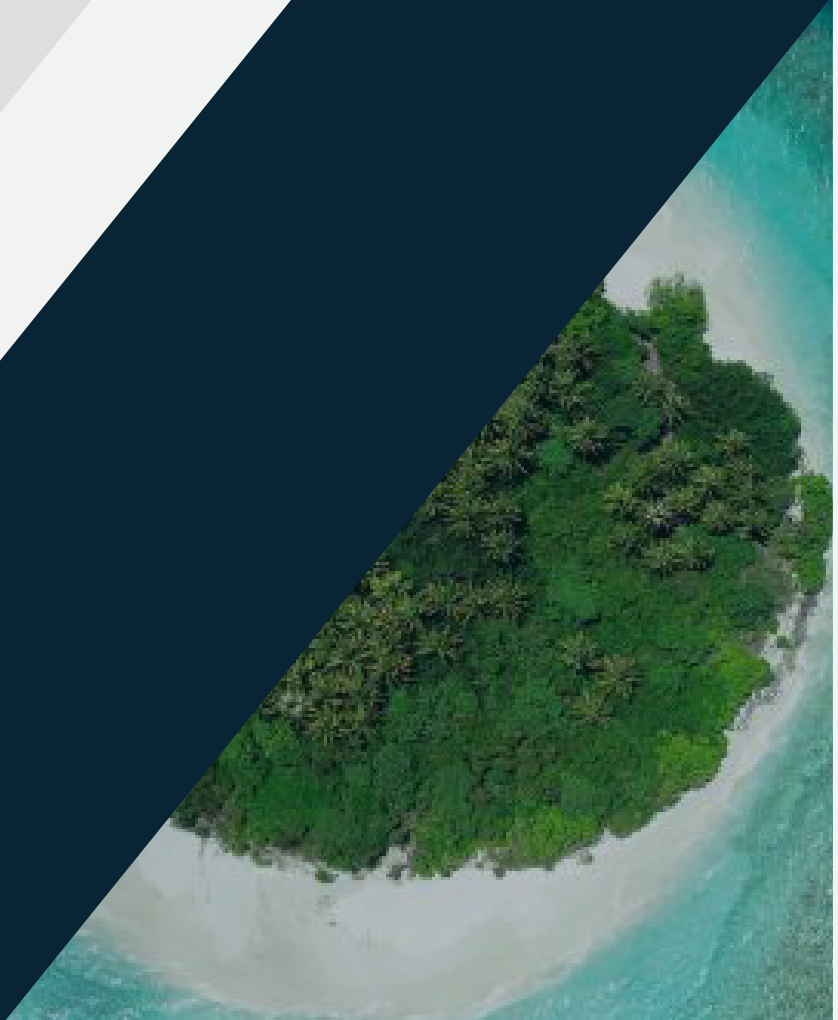


# Island Scoping Study of 4 Islands Announced for Bidding

(Ha. Alidhuffarufinolhu,  
HDh. Vaikaramuraidhoo,  
Sh. Kudalhaimendhoo  
and N. Kunnamalei)



## 4 Alidhuffarufinolhu, Haa Alif

### 4.1 Island Profile

*Alidhuffarufinolhu* is a sand bank located on the eastern rim of *Haa Alif* Atoll, facing *Gallandhoo Kan'du*. The sand bank is located at approximately 73° 6' 12.406" E, 6° 51' 41.501" N. Table below summarises information about *Alidhuffarufinolhu*.

**Table 4.1: Summary of basic information about Alidhuffarufinolhu Island**

<i>Island Name</i>	<i>Alidhuffarufinolhu</i>
<i>Location</i>	73° 6' 12.406" E, 6° 51' 41.501" N
<i>Island Area</i>	
<i>Within Vegetation Line</i>	-
<i>Within Low Tide Line</i>	2.13 Ha
<i>Est. Mean tide (sq. m)</i>	1.60 Ha
<i>Reef Area</i>	
<i>Overall area</i>	423.87 Ha
<i>Within shallow reef</i>	421.74 Ha
<i>Length</i>	~ 380 m
<i>Width at the widest point</i>	~ 82 m
<i>Distance to Malé International Airport</i>	~ 299.20 km
<i>Distance to nearest domestic Airport</i>	~ 14.00 km
<i>Distance to nearest resort</i>	~ 5.70 km from <i>Hideaway Beach &amp; Spa</i>

## 4.2 Terrestrial Environment

The following table summarizes key findings from the rapid assessment of the terrestrial environment associated with Alidhuffarufinolhu sandbank on 13th September 2013.

**Table 4.2: Terrestrial environment of Alidhuffarufinolhu**

Parameter	Description
<i>Air Quality</i>	- Overall ambient air quality on the sandbank was good.
<i>Floral observations</i>	- Beach pioneer halophytes: observed along or in between the strand vegetation, dominated by <i>Hai</i> , <i>Kuredhi</i> , <i>Boashi</i> and <i>Magoo</i>
<i>Faunal observations</i>	- Birds: Observed on the island include <i>Kirudhooni</i> , <i>Maakanaa</i> and <i>Findhana</i> . - No reptiles or mammals observed on the sandbank. - Crustaceans and Amphibians: <i>Kirukakuni</i> , <i>Bodu-Kirukakuni</i> and <i>Baraveli</i> were the only crustaceans spotted on the sandbank with no amphibian spotting throughout the field period.
<i>Pest and Diseases, Invasive species</i>	- None.
<i>Unique Habitats / Key species spotting</i>	- Signs of the sandbank being used as a picnic site was observed - Signs of sand mining was observed - Bird roosting site for <i>Kirudhooni</i>
<i>Overall impression</i>	- With no natural vegetation system on the sandbank and due to its relatively small size, the island would require extensive land reclamation along with extensive landscaping activities to make resort operation viable here. Additionally, a small bird island may need to be developed within the lagoon to mitigate any potential loss of habitats.



**Figure 4.1: Relatively small sandbank with no tall standing trees or shrubs**



**Figure 4.2: Hai was the most dominant beach pioneer species on the island**

### 4.3 Marine Environment

Key information regarding reef system of Alidhuffarufinolhu is provided in the table below.

**Table 4.3: Coral reef of Alidhuffarufinolhu**

Parameter	Description
<i>Reef features</i>	<ul style="list-style-type: none"> <li>- North and north eastern side of house reef comprised mainly of sandy terrain</li> <li>- Southern side of reef consisted of rock and mostly rubble</li> </ul>
<i>Live coral</i>	<ul style="list-style-type: none"> <li>- Overall live coral coverage was poor along the top reef though some areas had very good coverage (~3 - 30% coverage).</li> <li>- Dominant coral types observed were boulder corals.</li> </ul>
<i>Fish life</i>	<ul style="list-style-type: none"> <li>- Fish life was good, the reef provides for a variety of fish species.</li> <li>- Most abundant fish family observed was <i>Triggerfish</i> and <i>Fusiliers</i>.</li> </ul>
<i>Key species spotted</i>	<ul style="list-style-type: none"> <li>- Nurse Shark (adult, about 1m).</li> </ul>
<i>Sensitive site(s)</i>	<ul style="list-style-type: none"> <li>- Nil</li> </ul>
<i>Overall impression</i>	<ul style="list-style-type: none"> <li>- Mostly dead rock and sandy terrain, not very ideal for snorkeling.</li> </ul>



**Figure 4.3: Blue coral colony**



**Figure 4.4: Massive type coral colonies**



**Figure 4.5: Blue coral colonies**

#### 4.4 Coastal Environment

This is a small bank, no notable coastal features observed.

#### 4.5 Stakeholder Consultation

The Island Councils of *Utheemu* and *Dhidhdhoo* as well as Haa Alif Atoll Council were consulted regarding *Alidhuffarufinolhu*. In addition, few people from both *Utheemu* and *Dhidhdhoo* were also consulted. During each consultation, information about the island including the nature of the island, history, current use and key features of the island were discussed. A summary of the findings from the consultation are given in the table below. List of people consulted are attached in Appendix B.

**Table 4.4: Findings of stakeholder consultation regarding *Alidhuffarufinolhu***

<i>Current use of the island</i>	- As a picnic island mostly by the locals of <i>Utheemu</i> and by Hideaway Beach Resort and Spa.
<i>Key features</i>	- Turtle nesting site.
<i>View on resort development</i>	- There were no reservations about developing <i>Alidhuffarufinolhu</i> as a resort.

#### 4.6 Recommendations

The island is recommended for tourist resort development taking into consideration the following limitations and issues.

- Due to the small size of the sand bank, it would require extensive reclamation to develop a suitable size island for a resort.
- In addition extensive landscaping will be required including the importation of a large number of palm trees to make this island viable for resort operation.
- As this is one of the two major sand banks in the region, loss of this sand bank will affect bird roosting and may cause the loss of a potential future picnic spot for locals and tourists.
- The coral reef around the island is poor, hence is not ideal for snorkeling.

## 9 Vaikaramuraidhoo, Haa Dhaalu

### 9.1 Island Profile

Vaikaramuraidhoo Island is located in Haa Dhaalu Atoll. The island is located at approximately 72° 53' 53.473" E, 6° 32' 26.502" N. Table below summarises information about Vaikaramuraidhoo.

**Table 9.1: Basic information about Vaikaramuraidhoo**

<i>Island Name</i>	<i>Vaikaramuraidhoo</i>
<i>Location</i>	<i>72° 53' 53.473" E, 6° 32' 26.502" N</i>
<i>Island Area</i>	
<i>Within Vegetation Line</i>	<i>58.25 Ha</i>
<i>Within Low Tide Line</i>	<i>67.13 Ha</i>
<i>Est. Mean tide (sq. m)</i>	<i>63.93 Ha</i>
<i>Length</i>	<i>About 2000 m</i>
<i>Width at the widest point</i>	<i>About 814 m</i>
<i>Distance to Malé International Airport</i>	<i>About 269.00 km</i>
<i>Distance to nearest domestic Airport</i>	<i>About 38.11 km</i>
<i>Distance to nearest resort</i>	<i>About 35.80 km from Hondaafushi Island Resort</i>

## 9.2 Terrestrial Environment

The following table summarizes key findings of the rapid assessment of the terrestrial environment associated with *Vaikaramuraidhoo* Island on 16<sup>th</sup> September 2019.

**Table 9.2: Terrestrial environment of *Vaikaramuraidhoo***

Parameter	Description
<i>Air Quality</i>	- Overall ambient air quality on the island was good.
<i>Floral observations</i>	<ul style="list-style-type: none"> <li>- Littoral edge scrubland: observed along the shorelines, dominated by <i>Kuredhi</i>, <i>Boashi</i>, <i>Boakashikeyo</i>, <i>Dhiggaa</i>, <i>Hirundhu</i> and <i>Magoo</i>.</li> <li>- Sub-littoral thicket: observed as large and dense patches in the western and eastern half of the island, dominated by <i>Hirundhu</i>, <i>Dhigga</i>, <i>Funa</i>, <i>Midhili</i> and <i>Uni</i>.</li> <li>- Coconut grove: observed as pure stands of <i>Ruh</i> planted in rows along the central parts of the island.</li> <li>- Coastal strand vegetation: observed along the southern and western shorelines of the island, dominated by <i>Boakashikeyo</i>, <i>Boashi</i>, <i>Kuredhi</i>, <i>Halaveli</i> and <i>Magoo</i>.</li> <li>- Beach pioneer halophytes: observed along or in between the strand vegetation, dominated by <i>Hai</i>, <i>Boashi</i>, <i>Magoo</i> and <i>Kulhlhafilaa</i>.</li> <li>- Agricultural land: A large part of the eastern half of the island is cleared for agricultural farming, growing multiple varieties of crops.</li> <li>- Built-up area: There are several infrastructures built in the center of the island to support its agricultural operations.</li> </ul>
<i>Faunal observations</i>	<ul style="list-style-type: none"> <li>- Birds: Observed on the island include <i>Kaalhu</i>, <i>Koveli</i>, <i>Maakanaa</i> and <i>Findhana</i>. According to locals, <i>Dhandifulhudhooni</i> and <i>Kirudhooni</i> also known to frequent the island.</li> <li>- Reptiles &amp; Mammals: Observed on the island include <i>Vaa</i>, <i>Meedha</i>, <i>Hoanu</i>, <i>Fani</i>, <i>Garahitha</i>, <i>Bondu</i> and <i>Nannugathi</i>.</li> <li>- Crustaceans and Amphibians: <i>Kirukakuni</i>, <i>Bodu-Kirukakuni</i> were the only crustaceans spotted. According to locals, amphibian species such as <i>Boh</i> can also be found on the island.</li> </ul>
<i>Pest and Diseases, Invasive species</i>	<ul style="list-style-type: none"> <li>- <i>Vaa</i> was the most notable animal pest on the island due to large number of fruit bearing trees on the island.</li> <li>- <i>Rukumadi</i> was the most notable insect pest on the island.</li> <li>- <i>Madhiri</i> was relatively low on the island.</li> <li>- <i>Velanbuli</i>, the only notable invasive plant on the island was recorded in minimal numbers.</li> </ul>
<i>Unique Habitats / Key species spotting</i>	- Some of the shoreline shrub species such as <i>Boashi</i> and <i>Kuredhi</i> were observed as quite large, several meters in height.
<i>Overall impression</i>	- Western half of the island has been modified for agricultural purposes. Palms on the island are well-managed. Some key road infrastructure has been developed, allowing easy access to most

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<b>Parameter</b>	<b>Description</b>
	parts of the island. Overall health of the terrestrial ecosystem seems to be in good condition.

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*Figure 9.1: Coastal strand vegetation observed in the western end of the island.*



*Figure 9.2: A large section of eastern half of the island is cleared for agricultural farmland.*



*Figure 9.3: Kuredhi was one of the most dominant species along the shorelines.*



*Figure 9.4: Several built-up structures are observed along the central parts of the island*



*Figure 9.5: Some of the coastal shrub species such as this Boashi are seen as growing as large as trees.*



*Figure 9.6: Velanbuli was the most notable invasive species on the island.*

### 9.3 Marine Environment

The following table summarizes key findings of the rapid assessment of the reef associated with *Vaikaramuraidhoo* Island on 16<sup>th</sup> September 2019.

**Table 9.3: Coral reef of *Vaikaramuraidhoo***

Parameter	Description
<i>Reef features</i>	<ul style="list-style-type: none"> <li>- Reef measures over 579 ha.</li> <li>- Mostly rocky and sandy terrain.</li> </ul>
<i>Live coral</i>	<ul style="list-style-type: none"> <li>- South eastern side of the reef had low coral coverage and was mostly sand and rocks.</li> <li>- Northern edge of reef had more live corals.</li> </ul>
<i>Fish life</i>	<ul style="list-style-type: none"> <li>- Fish life was lacking in variety.</li> <li>- Most abundant fish family observed was <i>Triggerfish</i>.</li> <li>- Larger fish were present on the northern reef edge where the turtle was spotted.</li> </ul>
<i>Key species spotted</i>	<ul style="list-style-type: none"> <li>- Green Turtle.</li> </ul>
<i>Sensitive site(s)</i>	<ul style="list-style-type: none"> <li>- Nil</li> </ul>
<i>Overall impression</i>	<ul style="list-style-type: none"> <li>- Northern reef maybe suitable for snorkeling. However, it is more than a kilometer from the shoreline and will need to be accessed via a sea vessel.</li> </ul>



Figure 9.10: Turtle resting on the reef



Figure 9.11: Reef bed



Figure 9.12: Overview of the reef edge



Figure 9.13: Massive coral colonies

## 9.4 Coastal Environment

The following table summarizes key findings of the rapid assessment of the coastal environment of Vaikaramuraidhoo Island on 16<sup>th</sup> September 2019.

**Table 9.4: Coastal environment of Vaikaramuraidhoo**

<b>Parameter</b>	<b>Description</b>
<i>Beach conditions</i>	The beaches were wide on northern and southern sides of the island with three bays. Minor erosion was observed on the northern and the southern side. The eastern side of the island, which is closest to the edge of reef, was completely eroded.
<i>Beach compositions</i>	The beach rocks were formed on eastern side due to the strong wave breaks from atoll-ward side. The south-western side also contains beach rocks relatively far from the shore. Overall, the beaches contain fine and coarse sand.
<i>Wave conditions</i>	Approximately 170m from the eastern shoreline is the reef edge. Due to the short distance from the reef edge, high-energy waves break on the beach. Moderate-waves break on the south-western side of the island. There were no significant wave activities observed elsewhere on the island.
<i>Overall Impression</i>	Island requires hard engineering measures on the eastern side and beach nourishments on the south-western side. Wave breaks are needed on the southern side of the island to prevent strong waves during south-west monsoon. The northern and the southern side of island coast were overall in good condition.



**Figure 9.14: Severe erosion and beach rock on the south-western side of the island**



**Figure 9.15: Wide beach on the northern side of the island composed of fine and coarse sand**



Figure 9.16: Western beach of island is composed of fine and coarse sand



Figure 9.17: Minor signs of erosion observed on the southern side of the island

## 9.5 Stakeholder Consultation

The Island Councils of *Vaikaradhoo* and *Neykurendhoo* and Haa Dhaalu Atoll Council were consulted regarding *Vaikaramuraidhoo*. In addition, the Manager in *Vaikaramuraidhoo* and few people from both *Vaikaradhoo* and *Neykurendhoo* were also consulted. During each consultation, information about the island including the nature of the island, history, current use and key features of the island were discussed. A summary of the findings from the consultation are given in the table below. List of people consulted are attached in Appendix B.

**Table 9.5: Findings of stakeholder consultations regarding *Vaikaramuraidhoo***

<i>History of the island</i>	<ul style="list-style-type: none"> <li>- One half of <i>Vaikaramuraidhoo</i> (the bigger half) is known as <i>Muraidhoo</i> and the other half is known as <i>Fushi</i>.</li> <li>- Previously, <i>Vaikaramuraidhoo</i> was used by the locals of <i>Vaikaradhoo</i> for farming.</li> <li>- <i>Muraidhoo</i> has been leased for agriculture to Aliya since a long time.</li> <li>- Since part of the island is being leased, locals were given access to <i>Fushi</i> for recreational use.</li> </ul>
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## 9.6 Recommendations

This island is recommended for resort development, taking into consideration following issues.

- The island has good beaches, lagoon and reef.
- Vegetation cover is low in the proposed resort site.
- Island already leased for agriculture. Hence, new model for tourism development required.

## 12 Kudalhaimendhoo, Shaviyani

### 12.1 Island Profile

Kudalhaimendhoo Island is located in Shaviyani Atoll. The island is located at approximately 73° 17' 45.463" E, 6° 0' 55.712" N. Table below summarises information about Kudalhaimendhoo Island.

**Table 12.1: Basic information about Kudalhaimendhoo**

<i>Island Name</i>	<i>Kudalhaimendhoo</i>
<i>Location</i>	<i>73° 17' 45.463" E, 6° 0' 55.712" N</i>
<i>Island Area</i>	
<i>Within Vegetation Line</i>	<i>10.71 Ha</i>
<i>Within Low Tide Line</i>	<i>10.77 Ha</i>
<i>Est. Mean tide (sq. m)</i>	<i>11.45 Ha</i>
<i>Length</i>	<i>About 600 m</i>
<i>Width at the widest point</i>	<i>About 200 m</i>
<i>Distance to Malé International Airport</i>	<i>About 238.40 km</i>
<i>Distance to nearest domestic Airport</i>	<i>About 16.04 km</i>
<i>Distance to nearest resort</i>	<i>About 13.20 km from Vagaru Island Resort</i>

### 12.2 Terrestrial Environment

The following table summarizes key findings of the rapid assessment of the terrestrial environment associated with *Kudalhaimendhoo* Island on 18<sup>th</sup> September 2019.

**Table 12.2: Terrestrial environment of Kudalhaimendhoo**

<b>Parameter</b>	<b>Description</b>
<i>Air Quality</i>	- Overall ambient air quality on the island was good.
<i>Floral observations</i>	<ul style="list-style-type: none"> <li>- Littoral edge scrubland: observed along the shorelines, dominated by <i>Kuredhi</i>, <i>Boakashikeyo</i>, <i>Magoo</i>, <i>Dhigga</i>, <i>Funa</i>, <i>Dhakandha</i> and <i>Uni</i>.</li> <li>- Sub-littoral thicket: observed in the central-eastern half of the island, dominated by <i>Boakashikeyo</i>, <i>Dhigga</i>, <i>Funa</i>, <i>Nika</i>, <i>Midhili</i> and <i>Uni</i>.</li> <li>- Coconut grove: observed in the north-central as well as the eastern part of the island, dominated by <i>Ruh</i> and occasionally by <i>Funa</i> and <i>Midhili</i>.</li> <li>- Mangroves: Three separate mangrove ecosystems were observed on the island, the largest one being in the north and a relatively smaller one on the south-eastern tip of the island. The third one, which is a small patch, was observed near the eastern shoreline of the island. All mangrove ecosystems were dominated by <i>Kan'doo</i> along with <i>Kuredhi</i>. The two larger ones had a small water body in them but are likely to dry up during the warmer seasons.</li> </ul>
<i>Faunal observations</i>	- Birds: Observed on the island include; <i>Kaalhu</i> , <i>Koveli</i> , <i>Maakanaa</i> , <i>Dhandifulhudhooni</i> and <i>Findhana</i> . According to

Parameter	Description
	<p>locals <i>Kirudhooni</i>, <i>Gaadhooni</i>, <i>Ilholhi</i> and <i>Reyru</i> is also known to frequent the island.</p> <ul style="list-style-type: none"> <li>- Reptiles &amp; Mammals: Observed on the island include <i>Vaa</i>, <i>Meedha</i>, <i>Hoanu</i>, <i>Fani</i>, <i>Garahitha</i>, <i>Bondu</i> and <i>Nannugathi</i>.</li> <li>- Crustaceans and Amphibians: <i>Kirukakuni</i>, <i>Bodu-Kirukakuni</i>, <i>Kulhi-kakuni</i>, <i>Thoshi-kakuni</i> and <i>Baraveli</i> were the only crustaceans spotted on land with no amphibian spotting throughout the field period.</li> </ul>
<i>Pest and Diseases, Invasive species</i>	<ul style="list-style-type: none"> <li>- <i>Meedha</i> was the most notable animal pest on the island due to large amounts of waste on the island.</li> <li>- <i>Rukumadi</i> was the most notable insect pest on the island with clear signs of a severe infestation on the island.</li> <li>- <i>Madhiri</i> was very high in number on the island along with <i>Sandflies</i> near the shoreline.</li> <li>- <i>Velanbuli</i>, the only notable invasive plant on the island was recorded in minimal numbers.</li> </ul>
<i>Unique Habitats / Key species spotting</i>	<ul style="list-style-type: none"> <li>- Several mangrove ecosystems</li> </ul>
<i>Overall impression</i>	<ul style="list-style-type: none"> <li>- The island appears to have a rich biodiversity due to its multiple ecosystems, and any viable resort development will require conservation of these areas. Heavy intervention will also be required to control the pest and disease issues on the island.</li> </ul>



*Figure 12.1: The small mangrove observed on the south-eastern tip of the island*



*Figure 12.2: Coconut grove observed in the central parts of the island*



*Figure 12.3: Southern shorelines are dominated by Kuredhi, Magoo, Uni and Boakashikeyo*



*Figure 12.4: Several footpaths are observed underneath the dense canopy of the island*



*Figure 12.5: The larger Kan'doo mangrove ecosystem found in the northern part of the island*



*Figure 12.6: The permanent water body observed in the mangrove ecosystem*



### 12.3 Marine Environment

The following table summarizes key findings of the rapid assessment of the reef associated with Kudalhaimendhoo Island on 18<sup>th</sup> September 2019.

**Table 12.3: Summary of key findings of Kudalhaimendhoo reef**

Parameter	Description
<i>Reef features</i>	<ul style="list-style-type: none"> <li>- Reef measures over 60 ha.</li> <li>- Rocky on the reef ward side.</li> <li>- This is the only island in this reef system.</li> </ul>
<i>Live coral</i>	<ul style="list-style-type: none"> <li>- Overall live coral coverage was poor along the top reef (~5 - 10% coverage).</li> <li>- Dominant coral types observed were massive corals.</li> <li>- Large boomies served as nurseries for juvenile schools of fishes</li> </ul>
<i>Fish life</i>	<ul style="list-style-type: none"> <li>- Fish life was good, the reef provides for a variety of fish species.</li> <li>- Most abundant fish family observed was <i>Triggerfish</i>.</li> </ul>
<i>Key species spotted</i>	<ul style="list-style-type: none"> <li>- Eagle Ray</li> </ul>
<i>Sensitive site(s)</i>	<ul style="list-style-type: none"> <li>- Nil</li> </ul>
<i>Overall impression</i>	<ul style="list-style-type: none"> <li>- Boomies are great snorkeling spots where schools of fish can be found.</li> </ul>



Figure 12.7: Overview of seabed composition



Figure 12.8: Overview of seabed composition

## 12.4 Coastal Environment

The following table summarizes key findings of the rapid assessment of the coastal environment of Kudalhaimendhoo Island on 18<sup>th</sup> September 2019.

**Table 12.4: Coastal Environment of Kudalhaimendhoo reef**

Parameter	Description
<i>Beach conditions</i>	The beach of southern side of shallow area was severely eroded and deep bay area beach was moderately eroded. There was no backshore dry beach on northern side of the island. There was no beach on southern end and the south-western end as well.
<i>Beach compositions</i>	Beach on the island’s southern side covered granule and cobble rocks where the lagoon is shallow. Beach of the southern deep lagoon bay consisted of coarse and medium sand. The northern side of the island contained cobble and boulder rocks.
<i>Wave conditions</i>	Wave strength was high on the northern side and the north-eastern side of the island. This is due to the high energy wave from east Indian ocean. The distance between the shoreline and the reef wave break was approximately 155m. Moderate wave strength was observed on the south-western side and the south-eastern side.
<i>Overall Impression</i>	Island requires hard engineering measures on the northern side and the southern end to prevent soil erosion and to protect island vegetation. Southern side of the island was also moderately eroded due to sand mining and natural factors. Awareness and legal measures are required to protect the island.



**Figure 12.9: Vegetation growth with no beach on south-eastern side**



**Figure 12.10: Wide beach on middle of southern side with coarse and medium sand**



Figure 12.11: Severe erosion on south-western edge with granule rocks



Figure 12.12: Cobble and boulder rocks on northern side with no dry beach area

## 12.5 Stakeholder Consultation

The Island Councils of *Maaungoodhoo* and *Funadhoo* and Shaviyani Atoll Council were consulted regarding *Kudalhaimendhoo*. In addition, few people from both *Maaungoodhoo* and *Funadhoo* were also consulted. During each consultation, information about the island including the nature of the island, history, current use and key features of the island were discussed. A summary of the findings from the consultation are given in the table below. List of people consulted are attached in Appendix B.

**Table 12.5 Summary of findings from consultations regarding *Kudalhaimendhoo***

<i>History of the island</i>	- <i>Kudalhaimendhoo</i> was previously used for farming by the locals in <i>Maaungoodhoo</i> .
<i>Current use of the island</i>	<ul style="list-style-type: none"> <li>- Locals in <i>Maaungoodhoo</i> mine sand from <i>Kudalhaimendhoo</i> extensively for construction purposes.</li> <li>- Used by the locals in <i>Maaungoodhoo</i> for collecting palm fronds to make thatch.</li> <li>- As a picnic island by the locals in <i>Maaungoodhoo</i>.</li> </ul>
<i>Key features</i>	<ul style="list-style-type: none"> <li>- There is a small mangrove.</li> <li>- Occasional turtle nesting site.</li> <li>- Whale Sharks and Manta occur to the west of <i>Kudalhaimendhoo</i>.</li> <li>- Good snorkelling points <i>Thila</i> to the north and south of <i>Kudalhaimendhoo</i></li> </ul>
<i>View on resort development</i>	- Locals in <i>Maaungoodhoo</i> are in favour of developing <i>Kudalhaimendhoo</i> as a resort.

## **12.6 Recommendations**

It is recommended to develop a resort at this island taking into consideration the following limitations and issues.

Kudalhaimendhoo is a small Island with limited beach. The eastern side beach is predominantly composed of coral rubble and beach rock. This is affected by very strong waves and severe erosion. Enlarging the island, beach redevelopment and shore protections will be required to develop a typical tourist resort property on the island. In addition, the island possess a rich biodiversity due to multiple ecosystems, and any sustainable resort development will require conservation of these areas. Heavy intervention will also be required to control the pest and disease issues on the island.

## 14 Kunnamalei, Noonu

### 14.1 Island Profile

Kunnamalei Island is located in Noonu Atoll. The island is located at approximately 73° 7' 59.056" E, 5° 57' 10.555" N. Table below summarises information about Medhafushi Island.

*Table 14.1: Basic information about Kunnamalei*

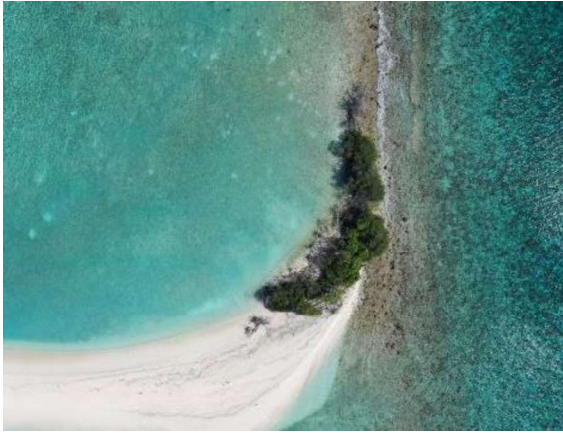
<i>Island Name</i>	<i>Kunnamalei</i>
<i>Location</i>	<i>73° 7' 59.056" E, 5° 57' 10.555" N</i>
<i>Island Area</i>	
<i>    Within Vegetation Line</i>	<i>5.89 Ha</i>
<i>    Within Low Tide Line</i>	<i>9.43 Ha</i>
<i>    Est. Mean tide (sq. m)</i>	<i>8.34 Ha</i>
<i>Length</i>	<i>About 750m</i>
<i>Width at the widest point</i>	<i>About 210 m</i>
<i>Distance to Malé International Airport</i>	<i>About 200.00 km</i>
<i>Distance to nearest domestic Airport</i>	<i>About 29.00 km</i>
<i>Distance to nearest resort</i>	<i>About 15.70 km from Velaa Private Island Maldives</i>

## 14.2 Terrestrial Environment

The following table summarizes key findings of the rapid assessment of the terrestrial environment associated with *Kunnamaeli* Island on 20<sup>th</sup> September 2019.

**Table 54.2: Terrestrial environment of *Kunnamaeli***

Parameter	Description
<i>Air Quality</i>	- Overall ambient air quality on the island was good.
<i>Floral observations</i>	<ul style="list-style-type: none"> <li>- Littoral edge scrubland: observed along the entirety of the island, dominated by <i>Ruh</i>, <i>Funa</i> and <i>Midhili</i> in the upper canopy while <i>Kuredhi</i>, <i>Boakashikeyo</i>, <i>Magoo</i>, <i>Dhigga</i>, <i>Dhakandha</i> and <i>Uni</i> dominate the lower canopy.</li> <li>- Coastal strand vegetation: observed along the shorelines of the north-western and the south-eastern tips of the island, dominated by <i>Boakashikeyo</i>, <i>Kuredhi</i>, <i>Uni</i> and <i>Magoo</i>.</li> <li>- Beach pioneer halophytes: observed along or in between the strand vegetation, dominated by <i>Hai</i>, <i>Boashi</i> and <i>Magoo</i>.</li> <li>- Huraa: a small island on the eastern side, where both islands have their beaches connected, and is dominated by <i>Kuredhi</i>.</li> </ul>
<i>Faunal observations</i>	<ul style="list-style-type: none"> <li>- Birds: Observed on the island include <i>Kaalhu</i>, <i>Koveli</i>, <i>Maakanaa</i>, <i>Findhana</i> and <i>Kirudhooni</i>. According to locals, <i>Dhandifulhudhooni</i> and <i>Kurang</i>i are also known to frequent the island, including for their nesting.</li> <li>- Reptiles &amp; Mammals: Observed on the island include <i>Vaa</i>, <i>Meedha</i>, <i>Hoanu</i>, <i>Fani</i>, <i>Garahitha</i> and <i>Bondu</i>.</li> <li>- Crustaceans and Amphibians: <i>Kirukakuni</i>, <i>Bodu-Kirukakuni</i> and <i>Baraveli</i> were the only crustaceans spotted on land with no amphibian spotting throughout the field period.</li> </ul>
<i>Pest and Diseases, Invasive species</i>	<ul style="list-style-type: none"> <li>- <i>Meedha</i> was the most notable animal pest on the island due to large amounts of waste on the island.</li> <li>- <i>Rukumadi</i> was the most notable insect pest on the island with clear signs of a severe infestation on the island.</li> <li>- <i>Madhiri</i> levels were moderate on the island</li> <li>- <i>Velanbuli</i>, the only notable invasive plant on the island was recorded in minimal numbers.</li> </ul>
<i>Unique Habitats / Key species spotting</i>	<ul style="list-style-type: none"> <li>- Unique shape of the island, that looks like a whale shark when seen from above</li> <li>- Signs of old turtle nest sites observed.</li> </ul>
<i>Overall impression</i>	- The island's vegetation system appears to be quite pristine and untouched with minimal signs of human activity on the island. The beaches are long and wide surrounding the entirety of the island. Some importation of palm trees will be required to develop a resort operation on the island.



*Figure 14.1: The small Huraagandu observed to the east*



*Figure 14.2: The Huraagandu is dominated by kuredhi*



*Figure 14.3: Dense littoral edge scrubland is observed throughout the island*



*Figure 14.4: Beach pioneer halophytes observed to the east*



*Figure 14.5: Kuredhi dominated the western shoreline*



*Figure 14.6: Uni, Magoo and Kuredhi are the most commonly observed shoreline species*

### 14.3 Marine Environment

The following table summarizes key findings of the rapid assessment of the reef associated with *Kunnamalei* Island on 20<sup>th</sup> September 2019.

**Table 14.3: Coral reef of *Kunnamalei***

<b>Parameter</b>	<b>Description</b>
<i>Reef features</i>	<ul style="list-style-type: none"> <li>- Reef measures over 194 ha.</li> <li>- Mostly rocky terrain on both the eastern and the western sides of the top reef.</li> <li>- This is the only island in this reef system.</li> </ul>
<i>Live coral</i>	<ul style="list-style-type: none"> <li>- Overall live coral coverage was poor along the top reef (~5 - 15% coverage).</li> </ul>
<i>Fish life</i>	<ul style="list-style-type: none"> <li>- Fish life was good, the reef provides for a variety of fish species.</li> <li>- Most abundant fish families were <i>Triggerfish</i> and <i>Surgeonfish</i>.</li> </ul>
<i>Key species spotted</i>	<ul style="list-style-type: none"> <li>- Manta Ray spotted on the eastern side of the reef</li> </ul>
<i>Sensitive site(s)</i>	<ul style="list-style-type: none"> <li>- Nil</li> </ul>
<i>Overall impression</i>	<ul style="list-style-type: none"> <li>- Exceptional visibility on the western reef, making it very ideal for snorkeling.</li> </ul>





*Figure 14.7: Rocky seabed*



*Figure 14.8: Rocky sea bed*



*Figure 14.9: Manta Ray feeding*



*Figure 14.10: Massive coral colony*

## 14.4 Coastal Environment

The following table summarizes key findings of the rapid assessment of the coastal environment of *Kunnamalei* Island on 20<sup>th</sup> September 2019.

**Table 14.4: Coastal environment of *Kunnamalei***

Parameter	Description
Beach conditions	North-western beach on the island was moderately eroded. All other sides of the island had a wider beach except for the severely eroded part on the north-eastern end. The small islet ( <i>Huraagandu</i> ) connected to the eastern side of the island was completely eroded but protects the main island from strong waves.
Beach compositions	Beaches of <i>Kunnamalei</i> are covered mainly by fine sand with granules. Beach rocks were observed on the north-eastern end with brown algal ( <i>Phaeophyta</i> ) growth. North-eastern end consisted of medium sand with pebble coral rocks. Each side of small islet was covered with cobble and boulder rocks. No beach area was observed on the small islet.
Wave conditions	Wave strength to the island was high on the eastern atoll-ward side due to the small distance between the reef and the small islet shore. Strong waves break on the north-eastern end of the main island.
Overall Impression	Island requires mitigation measures on the north-eastern end of the island. Overall, the coastal conditions of <i>Kunnamalei</i> was good, with wide white sand beaches.



**Figure 14.11: Wide beach area on north-western side with minor erosion.**



**Figure 14.12: Wide beach area on northern side with fine sand and granules**



Figure 14.13: Phaeophyta or brown algae growth on beach rocks of north-eastern side.



Figure 14.14: Cobble rocks without a beach area on the small islet.

### 14.5 Stakeholder Consultation

The Island Councils of *Komandoo*, *Shaviyani Atoll* and *Alifushi*, *Raa Atoll* and *Noonu Atoll* Council were consulted regarding *Kunnamalei*. In addition, few people from both *Komandoo* and *Alifushi* were also consulted. During each consultation, information about the island including the nature of the island, history, current use and key features of the island were discussed. A summary of the findings from the consultation are given in the table below. List of people consulted are attached in Appendix B.

**Table 14.5: Findings of stakeholder consultations regarding *Kunnamalei***

<i>Current use of the island</i>	<ul style="list-style-type: none"> <li>- Locals in <i>Komandoo</i> use the island for picnics on an occasional basis, mostly during school holidays.</li> <li>- Locals in other islands of <i>Noonu Atoll</i> do not use this island for any purpose.</li> </ul>
<i>Key features</i>	<ul style="list-style-type: none"> <li>- Minimal information received on this island as this island is not frequently visited by people due to its location.</li> </ul>
<i>View on resort development</i>	<ul style="list-style-type: none"> <li>- There were no reservations about developing <i>Kunnamalei</i> as a resort.</li> </ul>

### 14.6 Recommendations

The island's vegetation system is pristine and untouched with minimal signs of human activity on the island. The beaches are long and wide surrounding the entirety of the island. In addition the reef is excellent for snorkeling. Hence it is recommended to develop a tourist resort on this island.