

**SUPPLEMENTARY APPENDIX**  
**Project Climate Risk Assessment and Management Report**

**I. Basic Project Information**

<b>Project Title: Kulhudhuffushi Harbor Expansion Project</b>
<b>Project Budget: \$ 10.4 million</b>
<b>Location: Kulhudhuffushi Island, Haa Dhall Atoll, Maldives</b>
<b>Sector: Transport</b>
<b>Theme: Inclusive Economic Growth</b>
<b>Brief Description:</b>  The key project outputs will be (i) increased harbor passenger and cargo capacity in Kulhudhuffushi, through the expansion of the existing multi-purpose harbor, and (ii) strengthened institutional capacity in harbor operation, maintenance, safety and financial management.

**II. Summary of Climate Risk Screening and Assessment**

<b>A. Sensitivity of project component(s) to climate/weather conditions and sea level</b>	
<i>Project component</i>	<i>Sensitivity to climate/weather conditions</i>
<ul style="list-style-type: none"> <li>1) Recreational wall front</li> <li>2) Harbor separation wall</li> <li>3) Passenger / Cargo harbor</li> </ul>	<ul style="list-style-type: none"> <li>1) Project components necessitate installation of breakwater, quay wall, and revetments which are all subject to a wide variety of climate/weather conditions such as sea level rise, storm surges, and tropical cyclonic winds.</li> </ul>

**B. Climate Risk Screening**

Risk topic	Description of the risk
1) Sea Level Rise (SLR)	1) SLR estimates for the Maldives by HadCM2 (IS92a - under a medium emissions scenario) project SLR of 19.9 cm and 48.9 cm by 2050 and 2100 respectively. Estimated that by 2050, $\approx$ 31% of Maldives will be inundated due to SLR.
2) Storm Surges (m)	2) The storm tide data indicates that the probable maximum storm tide in the northeastern islands of the Maldives can be about 1.82 meters, in the northern islands, corresponding to a 100-year recurrence period.
3) Tropical Cyclonic Winds ( knots)	3) The project falls in a tropical zone where the probable maximum cyclonic wind speed will reach 96.8 knots according to a 500-year return period.

Climate Risk Classification: **High**

**C. Climate risk assessment**

As part of the Initial Environmental Examination (IEE) report a section on Climate Change Risk Assessment has been prepared. Under this section general climate change risks were identified to be SLR, storm surges and cyclonic winds (as listed above). However, given the small project scope and short design life of only 25 years, , only the risk of SLR by 20 cm was found to be relevant and applicable to the project.

### **III. Climate Risk Management Response within the Project**

In accordance to the identification of a sea level rise by 20 cm as a potential risk during the Project design life the height of the breakwater was raised by 20 cm. The estimated additional cost for this is \$53,000 amounting to 0.65% of the total allocation for civil works of \$8.11 million. Further adaptive maintenance management or incremental adaptation has been recommended to be implemented over successive short timescales (say every 5-10 years or so). This approach has the advantage to manage climate change uncertainty iteratively, based on gradually increasingly reliable climate change data whilst reducing the risk to commit to highly expensive investment which could turn out to be inadequate and jeopardize the economic viability of the project.