Appendices

With the Advisory Review of the EIA for Land Reclamation Vilufushi, Thaa Atoll, Maldives

(appendices 1 to 3)

APPENDIX 1

Letter from DGIS in which the Commission has been asked to submit .

Letter with request for advice d.d. 31 March 2005

-----Oorspronkelijk bericht-----
Van: Anton van Elteren [mailto:A.van.Elteren@fmo.nl]
Verzonden: 31 maart 2005 14:55
Aan: Arend Kolhoff
CC: Roel Vriezen
Onderwerp: ORET: EIA Reconstruction of Vilufushi Island, Thaa Atol, Maldives

Dear Arend,

As just discussed, here are some remarks / questions with respect to your input in the above-mentioned project.

Boskalis has submitted an application for an ORET grant for the dredging & land reclamation works on the Vilufushi Island. We would like to obtain the advise of the Netherlands Commission for EIA on the EIA process and content.

An IEE for the project is already available. A paper copy of this is underway to you.

Although ORET supports quick processing of the grant application, it is felt that potential environmental (and social) impacts should be properly addressed.

We would like to have your advise on the following steps required to ensure that environmental and social matters are taken into account satisfactory. We hope that in your advice the following questions can be answered.

1. The IEE suggests that 'full' EIA is not necessary. Would you agree with that, looking at the Maldivian Guidelines for EIA? Would it not be advisable to execute the proposed elements (survey of existing situation - sensitive areas -, consultation of fishermen, development of management and monitoring plans) in the framework of an EIA procedure, so that it is clear what the consequences are when dredging and construction activities start? Of course such procedure should take into account the urgency of the project.

2. Should the EIA not also look into bathymetry and flow patterns that may change as a result of the dredging of the borrow area, but especially as a result of the enlargement of the island? Are there any risks of erosion at other islands, or erosion of subsurface sensitive areas? Could there be any influence at the water quality inside the lagoon (altered replenishment)? It appears that this issue is only marginally addressed in the IEE. Would hydrological modeling be required?

APPENDIX 1 (continued)

3. Should the EIA not also look into the existing situation with respect to (hazardous) waste and other sources of pollution possibly dispersed by the tsunami, and the risk of covering up those pollutions by the reclamation works?

4. What would be the best way to work together with the World Bank Coral Reef Impact Assessment Program and the World Bank Biodiversity Survey and Recovery Plans?

5. What would be the social impacts of the project? Any risk of disputes with respect to the execution of work by local inhabitants?

6. What would be the optimal timing of the EIA? Would it be feasible to have such EIA done and decided upon before the actual dredging and reclamation starts?

As discussed, the idea suggested by you of a desk-study type advice supported by a local expert who could travel to the project site together with myself seems an excellent approach. Such expert would then also be able to exchange views with the technical expert that will be asked to review the project (desk study) on behalf of ORET.

We would like inform you that according to the information available to us, the World Bank is working on Strategic environmental assessment of overall rehabilitation and reconstruction on the Maldives. In our view it could be an advantage if the Commission would take part in that as well...

We look forward to your valued input. Please do not hesitate to contact me should you require any further clarification. FMO Investment Officer is Roel Vriezen, tel 070 314 9875.

Kind regards, Anton van Elteren

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APPENDIX 2

Appendix 2: Minor Observations and Recommendations

General Remark:

Some parts are a bit superfluous and there is a tendency to repetition. A bit more analysis instead of presentation of data and a bit more focus on the relevant impacts could improve the report.

Chapter 2: Problem Analysis and Need of the Project

This chapter does not contain a description of the living conditions in the temporary settlements (as asked for in ToR, 2.1), such as the problem of the polluted wells and the lack of clean and safe water on the host island Buruni. It is therefore not possible to determine whether the temporary settlement will indeed be temporary or whether people may decide to stay, which potentially could undermine the need for the project. Paragraph 7.5 of the EIA report however does provide this information. It would have been better to have this information as part of Chapter 2, to demonstrate that the temporary settlement of affected Vilufushi residents to other islands is not sustainable. This information can help to emphasize the urgent need for the project (and thus justifies its costs).

Chapter 3: Policy, Planning and Legal Framework

The possibility of the coral blocks to be re-used for construction of tourist resorts has not been elaborated.

Planning aspects are hardly touched upon in this chapter, better change the name to Policy, Institutional and Legal Framework.

Chapter 4: Description of the Project

Alternative sources of fill material have actually not been considered as part of the EIA, but as part of the IEE. Better refer to the IEE.

Chapter 5: Baseline Conditions- Physical Environment

- Page 68, Sea level rise: not clear which scenario is referred to, please give reference.
- Page 71, Figure 5.3. No use in presenting this figure on this size since depth figures can not be read. A map with iso lines would provide the required information.

- Page 76, 5.5 Geology and geomorphology: geomorphology is not dealt with, better change chapter to Geology and soils.
- Page 76, 77 and 78: first part of paragraph 5.5 and the quotes of the KCT Consultancy report deal with soils on Vilufushi and other islands, the Boskalis survey refers to the geology of the sea (reef flat) bed. These are totally different things.
- Page 78, 5.6 Groundwater. Vulnerability to sea water intrusion is not related to the proximity of the aquifers to the surface but to the over extraction.
- Landscape integrity (ToR 5.2) is not addressed.

Chapter 6: Baseline Conditions- Existing Natural Environment

- Why not call the chapter Existing Biological Environment or Existing Flora and Fauna, since the physical environment (as described in Chapter 5) is also part of the natural environment, but is not described here.
- Paragraph 6.2.1: Basic information. This information is not relevant here, fits better in Chapter 2.
- Paragraph 6.2.4: Soils: already dealt with in chapter 5. Remove.
- Paragraph 6.4: Fisheries: is an economic activity, not part of the natural environment and addressed in Chapter 7.3, remove here.
- The EIA report states that 'the spawning period of coral fish is September to December'. It remains unclear where the fish do spawn (in the sea grass beds?) and whether dredging/reclamation activities should be postponed in this period.

Chapter 7: Baseline Conditions- Social and Economic

Page 100, second paragraph: Please explain the impact on surrounding reef and sea.

Chapter 8: Assessment of Impacts and Mitigating Measures

- (8.3.3.) It is good that the EIA report recommends to remove the top layer (with organic material) to place it back after the island is elevated. Will this recommendation actually be carried out by the constructor?
- Page 110, Dredging and reclamation: Temporary bund around the borrow area 6th line: there will be no beneficial effect, but a less damaging effect.

Chapter 9: Summary Evaluation and MEA

- Page 1.2.1, Chapter title: why Summary…, change to Evaluation of alternatives and MEA.
- Page 121, 9.1 General, 3rd paragraph, 2nd line: delete large. No large environmental impacts have been identified in Chapter 8.

- Page 122, 9.2 Dredging Alternatives, first line: why not give the more precise estimate of 1.25 million m^3, as given on page 51?.
- P.122, Concerning the dredging location and its impact, the Commission finds that arguments for selecting the reef flat (from an environmental point of view) are not totally convincing (e.g. why is a larger area needed, why is the turbidity so much higher in the atoll?). Fifteen percent of the sea grasses around the Vilufushi Island and the associated benthic communities (although not very valuable) are destroyed. It has to be taken into account that another 25% will be destroyed as a result of the reclamation. A larger area of 1 million m^2 in the lagoon would still only represent a very small percentage of the total lagoon area, whereas very little is known about the ecological values (corals ?, benthic organisms) in that area. Fishes and part of the benthic community may move out of the area where the dredger is operated. The choice for the reef flat location is probably much more determined by economic than by environmental arguments.
- Page 123, CSD (option 1), 5th line: spread of suspended sediments is not so much determined by the water depth over the reef flat, but by the flow velocities. The argument of a rather deep basin is valid.
- Page 124, Table 9.2:
    - The use of the + sign suggests a positive impact, this is not the case: negative impacts should be indicated with a – sign, only positive impacts should get a + sign. This is also valid for the other tables in the chapter.

    - The blue colour, planned project situation, is used a bit strange. If CSD dredging of the reef is the planned project situation, all cells in the column CSD/Reef should be blue and other alternatives should score either neutral, or negative or positive as compared to that planned project. This is also valid for the other tables in the chapter.

    - Impacts on vegetation and groundwater are not related to the dredging but to the land reclamation and should be removed from the table.

    - How is the difference in impacts of CSD/reef and CSD/reefs in Thaa atoll explained? They should, with the exception of the costs, be more or less the same, e.g. why is a larger area needed, why is the turbidity so much higher?

- Page 125, Table 9.3: Why is cost not included as in the other tables?
- Page 129, 9.7 Most environmental friendly alternative:
    - First paragraph: Since coral bleaching is not related to the project or the project alternatives the part describing this event could be removed.

Chapter 11: Environmental monitoring program

- Page 133, Turbidity and sedimentation, *Sea grass*, last line: The sea grass area is important as a nursery area for fish. This statement is not made before and deserves attention in chapter 8, Assessment of

Impacts, not only because 40% of the nursery area will disappear, but also because disturbance may also affect this function.

- Page 133, Sunlight:
  - 4th line: The sensitivity of sea grass for turbidity depends on …. and local turbidity. Only one type of sea grass seems relevant. Of course sensitivity for turbidity depends on turbidity, while at a certain turbidity, the deeper the water the more light is extinguished, which does not mean that sensitivity depends on depth.
  - 7th line: Sea grass in the area is 5 to 20 cm high (last paragraph of page 133). This means that up to a meter of water may be above the sea grass. At high levels of turbidity this will be enough to reduce the SI with more than 25%. Monitoring is therefore recommended.
- Page 134, 11.1.4 Soil salinity and 11.1.4 Groundwater quality: see remarks made regarding Chapter 8, what is the proof of these statements?
- Page 136, Parameters to be measured. It seems important to monitor the hydro-carbon (oil, grease) content of the water in the vicinity of the dredger and the construction sites.

Project Summary

- The policy and legal framework is not addressed: main legal requirements should be stated, and project proponent and competent authority need to be identified.
- Baseline conditions are not described.
- Impacts of the project and possible mitigation measures (except for superficial in the chapter on alternatives) are not discussed.
- In the chapter on alternatives the preferred alternative and the Most Environmental Friendly Alternative are not discussed.
- According to the figures presented the ratio between housing-social structure (11 ha) and green zones (5 ha) is in the present situation 69:31, while it will be 77:23 (47 ha resp. 14 ha) in the situation after reclamation. So in proportion there will be less green zones. On the other hand population pressure will reduce from 114 persons per ha to 100 (App. 18, page A18.1).
- Chapter 2, Page S10, second paragraph: also give the size of the borrow area, not only the depth.
- Chapter 2, Page S10, third paragraph: ..frequency of between 1:200 years.., remove between.
- In Chapter 3, Alternatives considered: additional headings have to be added: after the first heading: Dredging Alternatives, headings like 'Reclamation alternatives', 'Alternatives for the entrance channel', and 'Construction alternatives' are missing. Such headings would make the text more readable. Also, on page S13, last paragraph, the sentence 'In fact all alternatives ….' Should be replaced with: 'In fact all construction alternatives …'.
- Chapter 4, second paragraph: replace 'long term' with 'the period (the first 2 years??) after project implementation'.
- Chapter 4, second paragraph: add: 7. Erosion and sedimentation patterns at the tips of the new Vilufushi Island and the Hodelifushi Island.
- Chapter 6: Conclusions: one of the important conclusions is that impacts on the marine and terrestrial environment are probably minor and can easily be mitigated. The only exception might be the re-suspension of sediments. This should be stated before going to conclusion 5.
- Conclusion 4: add to this conclusion: …most attractive from an environmental and economic point of view.
- Conclusion 5: minimum should be maximum
- In the Summary a number of times (page S5, S10, S11, S16) the amount of sand to be dredged is given as 1 million m3. In reality it is 1.25 million m^3.

Appendix 14: not really relevant, can be removed.

Appendix 18: Land Use Plan Summary

Apparently the way of water supply has not been chosen yet (page A 18.3). That makes this an important issue for the socio-economic addendum, as well as waste management and sewerage, that are not fully worked out yet either.
It is good that some of the old features of the original island will be preserved, like a small housing area, the original vegetation around the island (green belt), the old cemetery and one mosque (page A18.4).

Development controls (page A18.4): apparently there is a preliminary phasing plan which caters for resettlement of the original population. Does this deal only with plot allocation, or also with size of plots and houses. What is or can be the role of the Red Cross in this? Does the local population have any influence on this? And on the future immigration from other islands and housing and plot allocation for immigrants? The impression is given that till so far all

plans have been developed on Government Ministries and Departments and that the Vilufushi residents have been informed but were not involved. The present plan looks very nice on paper but it is not realistic to have same size plots and same size houses all over the island while there are big differences in needs for different families.

Minor Comments:

- Page 14, 2.1, under most important problems Tsunami's is stated. Notwithstanding the enormous damage caused by the Tsunami of December 2004, it should be clear that tsunami's are a very rare phenomena and should not be considered on the level of problems caused by sea level rise, population growth or extreme weather conditions.
- Page 14, 2.2.1, second paragraph: melting ice caps are not the main cause of sea level rise, increasing temperature and so volume of the oceanic water mass is much more important.
- Page 17, first line direct damage instead of potential damage ?.
- Page 17, 6th line: Beach damage, repetition of beach erosion mentioned under Coastal damage (line 4).
- Page 17, 15th line: temporary houses instead of tents ?
- Page 31, Fig. 4.4 Legend is missing.
- Page 99 and 100: 227 house plots, average household equals 6 persons: total 1362 persons. Where are the remaining 500 people?
- Page 119, table 8.1. last column: person should be person months.
- Page 121, Table 9.1, figure caption: what is meant with safe islands ?

APPENDIX 3

Project information and composition of the Commission's working group

Proposed activity: A Netherlands dredging company applied for ORET-grants for a dredging and land reclamation project on the tsunami stricken Vilufushi Island at the Thaa atoll in the Maldives. This has been done at the request of the Ministry of Finance and the Ministry of Planning and Development in the Maldives.
The proposed project aims at creating a safer and larger island for the Vilufushi residents, who were temporarily evacuated to Buruni island, as well as for the population of some other smaller nearby islands. The project involves increasing the level of a part of the existing island and the reclamation of a part of the surrounding shallow reef flats, to provide extra land for residential purposes. The surface of the island will be increased to over 4 times its present size. In addition, construction of about 2000 m. of revetment around the island is planned, as well as a new fishing harbour. The harbour will include 350 m. of breakwater and 350 m. of quay wall. The required amount of sand is estimated at about 1.1 million m^3. The required equipment comprises a medium sized cutter suction dredger, a pipeline system and various bulldozers and wheel loaders.

Categories: DAC/CRS codes: 41010, Environmental management and protection

Project numbers: Netherlands Commission for EIA (NCEIA): 060

Procedural information:

Receipt e-mail with request for Advice	: 31 March 2005
Site visit to Maldives by the Working Group	: 20-23 June 2005
Submission of Final Draft Advisory ToR	: 27 June 2005
EIA report available	: 2 November 2005
Receipt e-mail with request for advice	: 10 November 2005
Submission of Final Draft Advisory review	: 8 December 2005

Significant details: The Commission is of the opinion that the EIA report on the Post-Tsunami Reconstruction of Vilufushi Island in the Thaa Atoll is well written, well illustrated and fairly complete. A lot of information has been collected and analysed in a short period of time. The Commission nevertheless concludes that the EIA report shows some essential shortcomings and recommends to provide additional information on specific issues in a supplement to the EIA re-port before decision-making on license granting. The Commission feels that it is not a very time-consuming task to prepare such a supplement, since most of the information is already available in other documents. Chapter 3 contains these issues which are considered essential for decision-making. The findings are presented per chapter of the EIA report in order to facilitate easy correction/adaptation.
Chapter 4 contains information gaps and shortcomings that can be addressed after decision making on the license, and can be included as part of the socio-economic addendum or monitoring program.

Composition of the working group of the Commission for EIA:

Mr. Klaas Jan Beek
Mr. Rinus Vis
Ms. Trudy van Ingen

Technical secretary:

Ms. Ineke Steinhauer