ENVIRONMENTAL IMPACT ASSESSMENT FOR THE EXTENSION OF SERVICE JETTY, MALÉ AERATED WATER COMPANY, MAWC, THULUSHDHOO – K MALÉ

APRIL 2010

M. S. ADAM (EIA 01/07)
A. NASEER

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Acronyms

MoFA	Ministry of Fisheries and Agriculture
MHTE	Ministry of Housing, Transport and Environment
EPA	Environmental Protection Agency
MAWC	Malé Aerated Water Company Pvt. Ltd.
IWMC	Island Waste Management Centre
MRC	Marine Research Centre
IDC	Island Development Committee
MFDA	Maldives Food and Drug Authority

Declaration of the Consultant

I certify that the statements made in this Environmental Impact Assessment study are true complete and correct

MS Adam (EIA01/07)
10 April 2010

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1 EXECUTIVE SUMMARY

1. Malé Aerated Water Company is first to establish a bottling plant in the Maldives. Under the franchise agreement between Coca Cola® the ir bottling plant became operational in 1998. The plant is located in K. Thulusdhoo, North Malé Atoll on rented land from Government. Recently the volume of the production has increased and as a result the frequency and volume of the material that comes and goes from the plant has increased tremendously. The existing service jetty is small and is not designed to serve more than one boat at time. Presently MAWC uses shallow –draft barges for supply of its products to Malé. The amount of space on the quay wall is extremely limited and requires extending the present service jetty.
2. This EIA is related to the proposal for extension of the MAWC service jetty. MAWC has acquired 745 sq m (58 m beach line) of land adjacent to the existing service jetty. The land is leased for a period of the 10 years. The lease agreement was signed on 20 July 2009 between K. Atoll Office and MAWC.
3. It is proposed to construct a jetty quay-wall along the 58 m long beach line. Three options for construction of the quay wall were considered; concreted bags, placing pre fabricated concreted T-block (available from the newly formed Works Cooperation) and proper metal sheet piling. The developer has opted to use the concrete T-blocks to construct the quay wall.
4. Starting from the Customs Jetty to the existing MAWC jetty steel reinforced concreted T-blocks will be placed to 'sheet-pile' the place. The back will be filled with dredged material taken from the surrounding areas. A total of the 2,500 cubic meters of material will be required to fill the place and level the ground.
5. The material will be removed from the adjacent area. The area is shallow about -0.5m. The basin requires deepening to about -2.0 m. The required volume of material is not significant to have any noticeable impact to the area. Sedimentation is unavoidable during dredging works. But similar to many such projects, even in much larger projects involving dredging lasting weeks, the sediment plume is dispersed to negligible level almost immediately (2-3 days) when the dredging stops.
6. The construction works of this project will be contracted to professional contractors and the developer will ensure environmental standards are maintained, including the recommendation and mitigation measures identified in the EIA. The project is expected to complete in 3 months.
7. Stake holder consultations have been undertaken since 2006. The consultant also met the Island Chief and the Island Councilor. They have re-iterated the decision of the Island Committee and the implementation of the agreement made between the K. Atoll Office and MAWC
8. Under MAWC corporate social responsibility programme it has been proposed that northern section of the quay wall is to be used by the community especially the fishermen. At present there only the official jetty
9. It is proposed to monitor the beach in the northern north of the island for a period of 12 months following the proposed extension of the jetty. Beach width should be taken at 10 points along the beach every month. Depth measurements will need to be

measured along the quay wall from MAW C jetty to the Custom s jetty at 6 points replicating the baseline depth measurements collected as part of this assessment.

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2 DESCRIPTION OF THE PROJECT

Malé Aerated Waters Company (MAWC) was the first to start the bottling business. Under the franchises agreement its Coca Cola bottling plant was established in 1998 on K. Thulusdhoo. Initially the production was limited and supplied to few tourist resorts and Malé.

With the expansion and diversification of Maldivian economy MAWC's business also expanded. More recently bottling business of desalinated and mineralized drinking water has exploded in the Maldives with other companies also taking a market share. However, the largest share of the bottled water appears to be maintained by MAWC.

MAWC now bottles popular fizzy drinks (Coke, Fanta, Diet-coke, Sprite, Bitter-lemon, Tonic Water, Soda Water, and now trendy energy drinks). More recently it has added Bonaqua brand of mineralized water to its product line, in addition to already well-established Kinley brand mineral water. Bonaqua has been an immediate success and slowly gaining ground in the stiff competition between the manufactures.

The increased production would mean increase in supplies of both raw materials from Malé and elsewhere and transporting the finished products. Similarly the requirements of back-of-the house activities have also grown. Existing service jetty is now too small to cater for the demand of traffic to and from the facility.

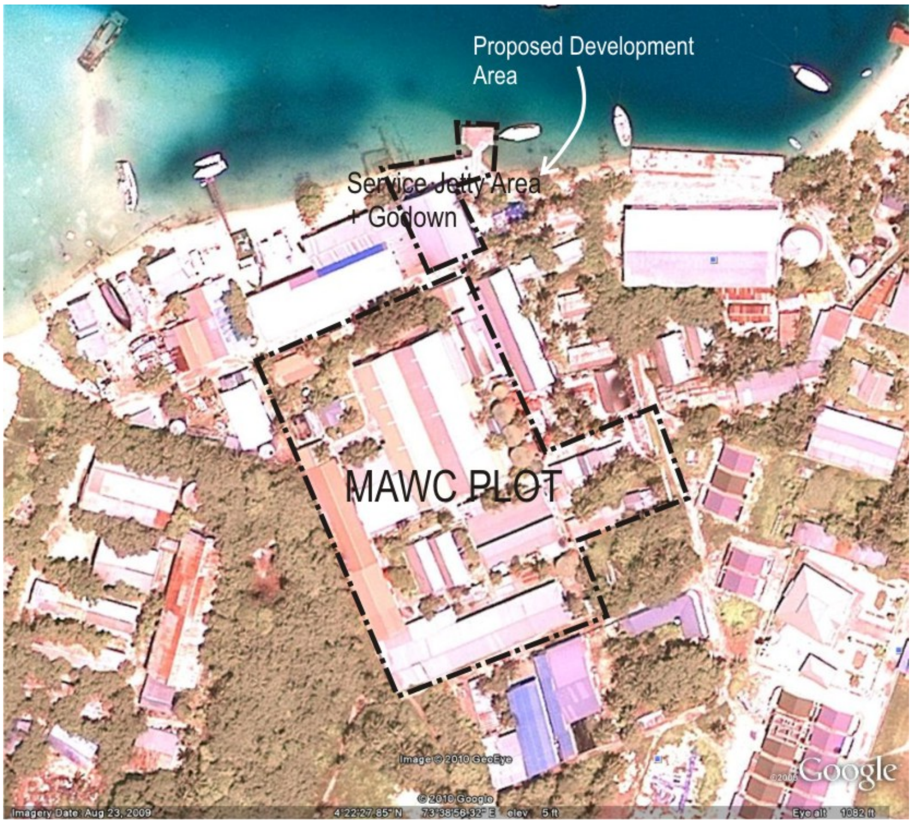


Figure 1: Location of the MAWC Facility in K. Thulusdhoo with the proposed area of development.

The development project is to expand the service the service jetty to meet its present and future requirements. This expansion is also part of the Company's corporate responsibility programme to help the Thulusdhoo island community. Part of the service jetty is to be allocated for use by the community, especially the fishermen who now finds difficult to service load and unload their vessels.

2.1 STATUS OF THE EXISTING SERVICE JETTY

The existing service jetty was constructed in 2000. At the time it was anticipated the volume of the bottled products would not increase much and so the jetty size was kept to a minimum. In order to obtain the maximum quay wall space the jetty was constructed in the shape of the pentagon which allowed more than one boat to be served at any given time.

In the last couple of years, the demand for the soft drinks has increased dramatically in particular there has been an explosive increase in demand for the bottled water. MAWC has taken the full advantage of this market and has expanded the production markedly. MAWC remains the largest bottling company in the Maldives with majority of market share.

Over 90% of the products are transported to Malé – the capital island which gets re-distributed to the resorts and atolls. Currently there are four barges used for transporting the soft drinks to Malé. The barges when along-side across the jetty head there are no space for other vessels. Large production volume also means the large volume of raw-materials. Because of this large increase in volume of production and therefore of transport requirement the existing jetty restricts the operation to its full potential.

Figure 2: Existing Service Jetty looking towards the lagoon. The jetty head is of hexagonal shape to increase the length of the 'quay-wall'.

2.2 EXTENSION OF THE SERVICE JETTY

It has been proposed to extend the service jetty to the north, to short stretch of coastline that lies between the service jetty and the Customs Jetty. The land area allocated for extension of the jetty is about 750 sq m. The land is leased to MAWC by K. Atoll office and the agreement was signed on 20 July 2009 (Appendix 2). The section of the coastline is about 60 m in length (Figure 1, Figure 3 and Figure 3).

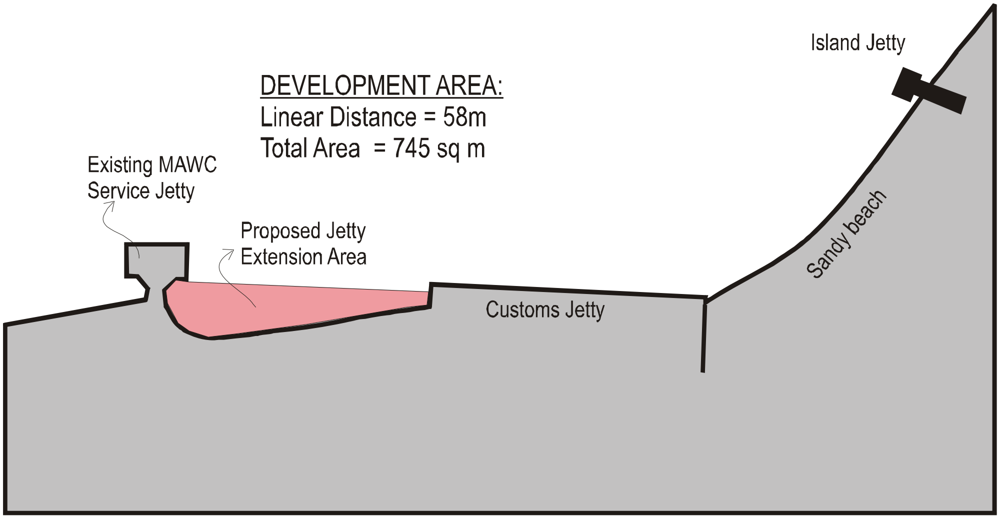


Figure 3: Schematic Drawing of the area showing the existing MAWC (Coca Cola) service jetty and the proposed area of the extension.

The major development activity would be to dredge the immediate area and to build the quay wall. Concrete slabs of the type described in Figure 4(a) and Figure 13 will be placed along a straight line starting from the Customs Jetty to the corner of the existing MAWC jetty as shown in Figure 4 (b). The point at which the concrete sheets touch the Custom Jetty is important. Customs jetty has two sections; a section constructed on stilts on the front and a filled section at the back. It is proposed that MAWC's extension should be aligned to Customs Jetty at the point intersection as identified Figure 4. A total of 22 such concrete slabs would be required. They are available for sale (Rf, 28,000/-) at Maldives Works Corporation.

It is estimated that about 2,300 cubic meters of material would be required to fill the area to the level of the island. Fill material may be excavated around the area. At present the area is shallow about -0.5m and would require excavate to a depth of -2.0 m to be able to used as jetty. Once levelled capping may be required before the quay wall can be constructed.

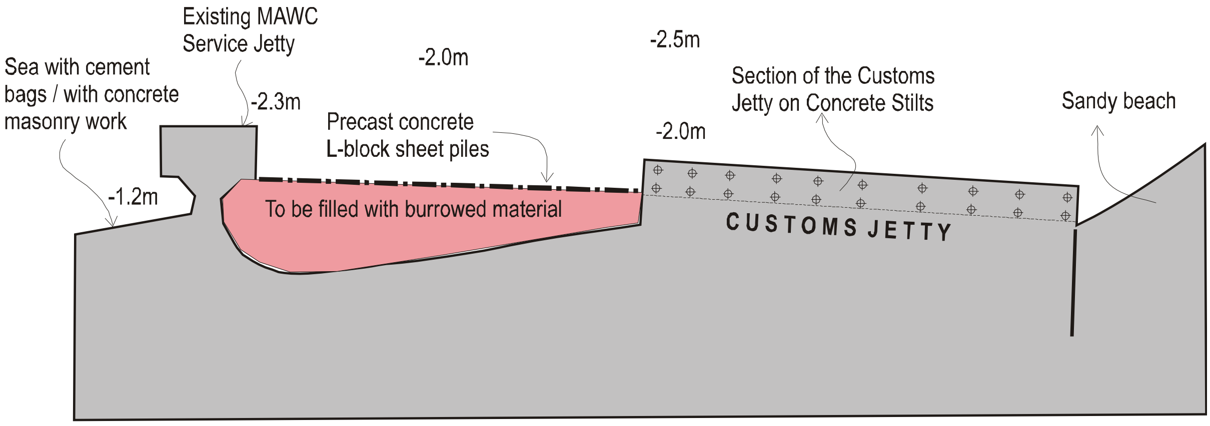


Figure 4: Detailed plan view of the project area. The area will be filled with the material borrowed from the adjacent areas

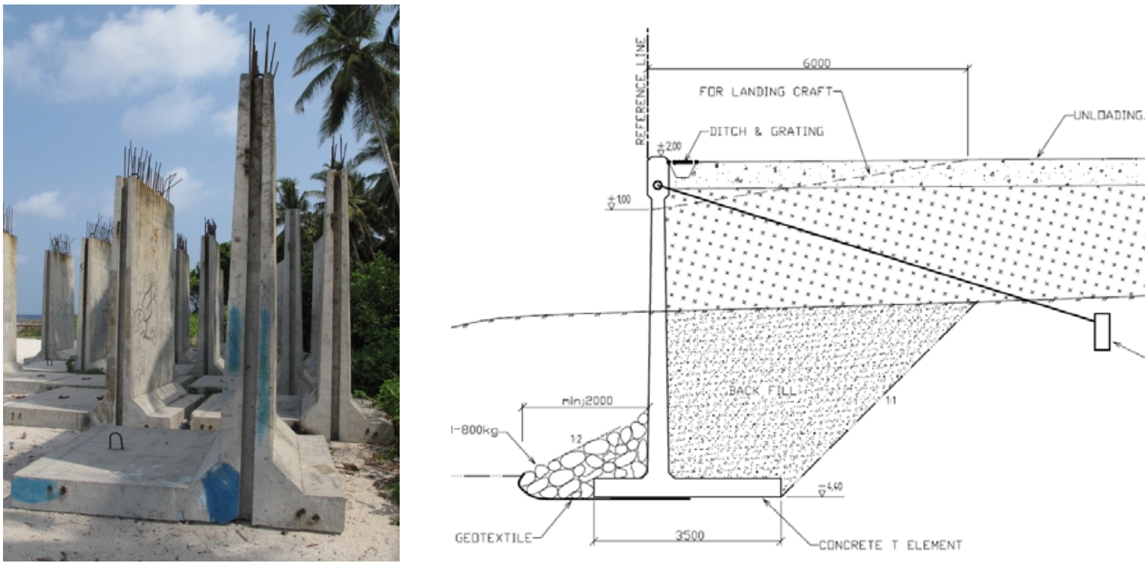
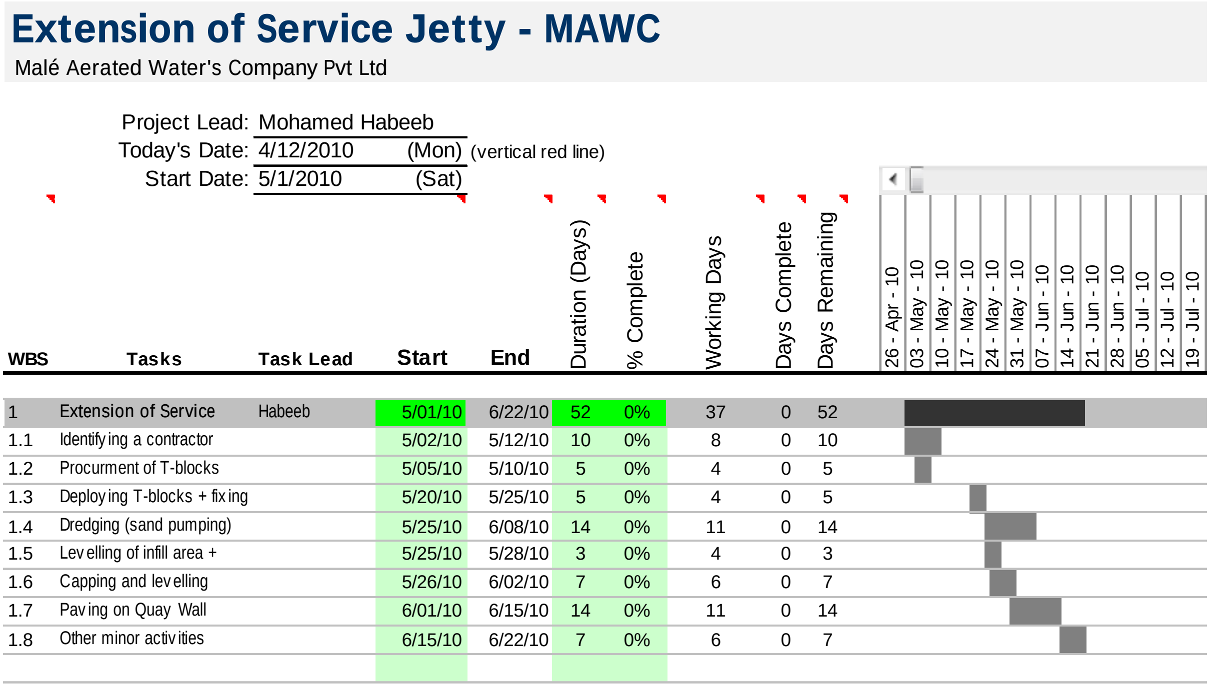


Figure 5: Image Concrete T-Blocks (3.7 m x 2.6 m) available from Works Cooperation (left) and how the block fits to a typical quay-wall construction with reinforcements with rubble mound foot and geotextile lining.

2.3 SCHEDULE OF WORK

The schedule of work is given below. It is expected activities will be complete within 52 days. The work is expected to start on 01 May 2010.


Extension of Service Jetty - MAWC

Malé Aerated Water's Company Pvt Ltd

Project Lead: Mohamed Habeeb
Today's Date: 4/12/2010 (Mon) (vertical red line)
Start Date: 5/1/2010 (Sat)

WBS	Tasks	Task Lead	Start	End	Duration (Days)	% Complete	Working Days	Days Complete	Days Remaining
1	Extension of Service	Habeeb	5/01/10	6/22/10	52	0%	37	0	52
1.1	Identifying a contractor		5/02/10	5/12/10	10	0%	8	0	10
1.2	Procurment of T-blocks		5/05/10	5/10/10	5	0%	4	0	5
1.3	Deploying T-blocks + fixing		5/20/10	5/25/10	5	0%	4	0	5
1.4	Dredging (sand pumping)		5/25/10	6/08/10	14	0%	11	0	14
1.5	Levelling of infill area +		5/25/10	5/28/10	3	0%	4	0	3
1.6	Capping and levelling		5/26/10	6/02/10	7	0%	6	0	7
1.7	Paving on Quay Wall		6/01/10	6/15/10	14	0%	11	0	14
1.8	Other minor activities		6/15/10	6/22/10	7	0%	6	0	7

Figure 6: Work schedule including the expected duration for the identified tasks.

3 EXISTING ENVIRONMENTAL CONDITIONS

Thulusdhoo Island is located at the north eastern tip of a large rim reef on the south western side of North Malé Atoll. The reef is about 6 km in length and has a width of about 2 km. The total area of the reef is about 15 sq km (Figure 7). The reef houses two other islands namely Gasfinolhu and Lhohifushi. Both are popular tourist resorts.

Figure 7: Island of Thulusdhoo and the adjacent area.

The reef of Thulusdhoo is characterized by a large deep lagoon (about 9-10 meters in some places) which occupies most of the north western section of the reef. The area of the island is 36.8 hectares.

Thulusdhoo Island was earmarked for industrial development by the government in the 1980s. Many private companies and parties rented land for industrial development. The first such development was a garment factory operated from 1984 to 1996. The factory was owned by a Sri Lankan party. There was also the Multilinks factory which produced several lines of the cleaning products. At present a carton factory, toilet tissue factory, boat building yard and bottling plant (Coca Cola plant) are in operation. The most prominent and most active of these is the MAWC's bottling plant.

3.1 OVERALL STATE OF THE ENVIRONMENT

Despite government's initiative the island has not developed as an industrial hub. Large areas of land have been allocated for putting up factories. However, most of the investments have not been materialized as planned. Lack of regulatory framework and centralized administration and most importantly ineffective implementation of the existing rules on these developments have resulted large areas of derelict land which in turn is causing poor environmental outlook of the island.

The situation is compounded by the erosion of the coastal areas, inadequate solid waste management and pollution of the ground water table.

For instance the Dinum Garment factory that operated during 1984 – 1996 practiced poor handling of the diesel fuel for their power generators. Leakages from the barrels and poor handling resulted oil spills that has seriously affected the water table[1]. In an attempt to extract the contaminated oil following the closure of the factory, people on the island burnt pieces of old cotton cloth material on open well acting as wick on oil laden ground water. Despite their attempts the ground water continues to be contaminated. The situation is worsened by the high rates of extraction relative to natural recharge of the aquifer.

3.2 WASTE MANAGEMENT

Waste management is a major issue on the island. While an IWMC is present, like in several major islands, the resources are not sub-optimal to adequately manage the Centre. The waste is not sorted properly and despite the close proximity to Thilafushi there has not been regular removal of the waste. As a result the IWMC mostly full. Cursory inspection of the beaches and surrounding areas lead us to believe there is no organized rubbish collection on the island. Plastic bottles, PVC, scrap metals, plastic wrapping and metal cans were everywhere littering the beaches and bushy vegetation of the coastal area.

3.3 BEACH EROSION

The north-eastern side of Thulusdhoo has always been vulnerable to swells and high energy waves. As a result the coastal area is highly vulnerable to erosion and scouring during storm surges and freak weather events. To avoid worsening situation the Island Development Committee (IDC) spent over 1 million Rf to put a breakwater around the area in 2002. Regrettably it was believed the contracted Maamigili group took the easy way out and quarried coral boulders from the house reef as well for the breakwater. Sadly the December 2004 Tsunami took away a substantial section of the breakwater making now ineffective and continuously deteriorating the situation. There has been no money for repairs of this breakwater and it has been causing serious erosion of the island on the north and eastern side.

A UNDP supported project on Integrating Climate Change Risks into Resilient Island Planning in the Maldives Thulushdoo was selected as one of the island for its vulnerability and its strategic development. The project is expected to support the renovations and improvements of the breakwater and help them to adapt to climate change impacts.

3.4 CORAL REEF AREAS

The reef of Thulusdhoo is oriented NE to SW so that the reef faces the SE swells generated from the southern oceans on the oceanward side. Well defined reef zonations were evident on the reef.

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[1] Information provided by Mr. Abdul Hameed, Island Councillor, who used to the Supervisor at the Dinum Factory during its operation in the 1980s.

The outer reef slope is wide and leads to a well developed reef crest on the upper perimeter of the reef. Just inside of the crest, the wide back-reef flat consist of coral boulders scattered on a hard reef platform . Hardy corals such as *Porites* sp and *Pocillopriids* are common on the flat.

The inner flat of Thulusdhoo is dominated by a deep lagoon. The lagoon consisted of a few coral patches. Close examination of these patches showed that most were in very poor condition (Anon, 2004)

The island beaches were well formed in many areas of Thulusdhoo and protected by healthy beach vegetation in many areas. However signs of degradation of beach habitats were common all around the island. This is attributed to poor waste disposal practices and the construction of coastal structures (Figure 6). The inner reef flat of the southern end of the island was dominated by a large seagrass bed.

Owing to the limited activities of the development in question, coral reef was not surveyed. It expected condition of the coral reef is average to poor reefs on the eastern section of the central Maldives have poor-coral cover, about 5-10%. Thulusdhoo reef been heavily impacted by the poor environmental quality of coastal areas it is expected that live coral cover would be in the lower range.

3.5 PROJECT AREA

As described earlier the actual area of project and it impact foot print is relatively small (Figure 12). It occupies and area of only 745 sqm (58m linear length) between the Custom Jetty and the present Coca Cola Jetty (Figure 8 and Figure 9).

Figure 8: Project site looking from Customs Jetty with the broken jetty in the foreground.

This short stretch of coastal area is devoid of sandy beach . Rubble and coastal vegetation dominate the area. A jetty built on stilts with iron struts lie broken one third of the way from the Customs Jetty. The concrete stilts have been shattered exposing its reinforced deformed bars. The struts are rusted and corroded heavily. The rocky beach is littered with construction waste of masonry origin.

Two dhigaa trees (*Hibiscus tiliaceus*) and five coconut palms (*Cocos nucifera*) exists in the area. At the southern section close the Coca Cola Jetty, a small area of the kuredhi (*Pemphis acudula*) exist. Here a large rubble mound of masonry origin has been dumped presumably in effort to arrest the scouring and erosion taking place. Diagonally starting from the main Coca Cola Jetty a sand-bagged seawall/breakwater has been erected to prevent erosion.

Figure 9: Project site; looking from north towards to Coal Jetty (left) and looking from south towards Customs Jetty (right).

The surrounding marine area was studied extensively during the 2004 when an IEE conducted to protect coastal area between the Coca Cola Jetty and Precision Marine's yard. Over 100 depth measurements and its GPS positions were taken using a handheld GPS (Figure 10). The results indicated that near-shore areas were about 0.8-7.0 m (Figure 11). Close the jetty the depth is around 1.0 which is sufficient for the supply vessels used by the MAWC.

3.6 WATER QUALITY

In order to check the water quality of the area a water sample was obtained from the jetty area and was tested at the MDFDA's National Laboratory. Test results for a control sample obtained from the lagoon of a typical uninhabited island (B. Kihaavahuravalhi) are also given.

Table 1:Water quality tests results at MAWC Jetty area along with the results for control.

Parameter	**Test Result: Thulusdhoo**	**Test Result: Control**
Physical appearance	Clear with suspended particles	Clear
Amonia / Nitrogen	0.07 mg/L	0.00 (trace) mg/L
Electrical conductivity	46200 µs/cm	54500 µs/cm
Oxygen demand	4 mg/L	-
pH 8.3		8.3
Salinity	35,400 mg/L	35,500 mg/L
Turbidity 2NTU		0-1 NTU

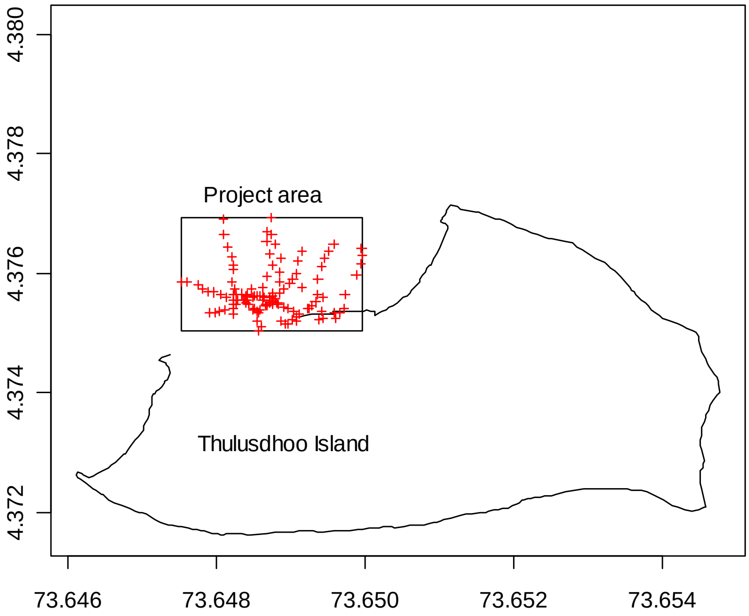

Figure 10: Schematic Section of the Thulusdhoo showing the project area and the area where depth measurements were taken. The crosses represent individual depth measurements.

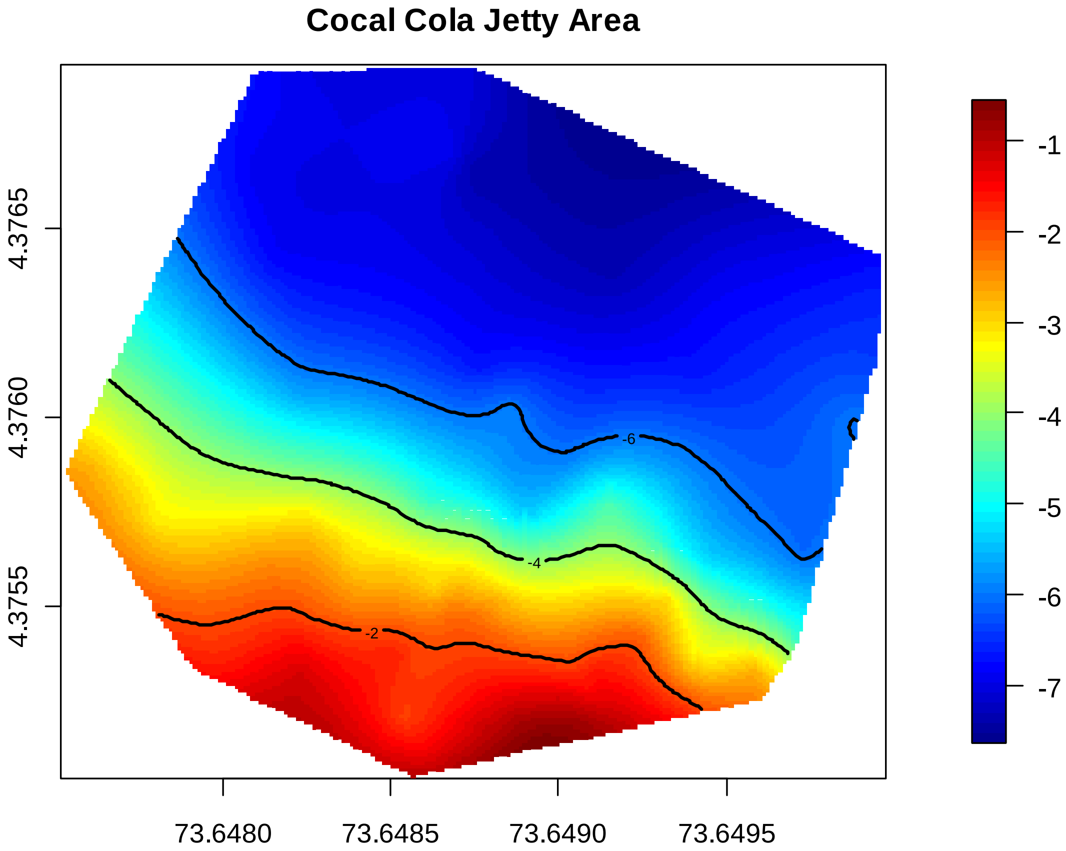

Figure 11: Depth contours of the project depicted using kriging function in R-statistical Package. Close to the jetty it is quite shallow ranging from 1.0 m and gradually going to 7.0m.

4 STAKEHOLDER CONSULTATIONS

Wide ranging discussions were held between the MAWC and various stakeholders on the request for extension of MAWC Service Jetty. MAWC's request for this extension was filed at the Thulusdhoo Island Office as early as 2006. The issue was discussed at the Thulusdhoo Island Development Committee meetings and was agreed to authorise the lease of the 8,022 sq feet (745 sq) of land between the Customs Jetty and the present Coca Cola Jetty[2]. Thulusdhoo Office, at the time, also had obtained authorization from the previous Ministry of Housing and Urban Development[3]. This was further confirmed by Malé Atoll Office by the communication of North Central Province[4]

Based on these official exchanges of communication a lease agreement between Malé Atoll Office and MAWC was signed on 20 July 2009 (Reference No. B-2009/H-4/17). Under the agreement the land was leased for a period of 10 years at the rate of MRf. 0.50 per sq feet, Total Rf 4,011.00 per month. A copy of this agreement is given in Appendix 2.

At the scoping meeting officials from the Ministry of Housing Transport and Environment and its Construction Department was present. The substantive discussions were incorporated as part of the TOR of the report (Appendix 1).

The consultant also met the the Island Councillor Mr. Abdul Hameed and Bodu Katheeb of Thulusdhoo Mr. Abdul Hakeem. In the discussions both re-iterated the extent of the discussions with the IDC and the approvals obtained for leasing the land from MAWC. They were in fact quite pleased the MAWC is starting work to build the quay wall and jetty in the area. It was also agreed earlier by the management and owner of the MAWC that northern section of the jetty can be used by the community, especially the fishermen who presently do not have adequate jetty facilities for them.

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[2] The reference for this authorization is the official communication from Thulusdhoo Office, date 27 August 2006, D-2006/459/KTO).

[3] Ministry of Housing and Urban Development No. 138-F/H/2007/81, dated 30 September 2007

[4] North Central Province's Official Communication (M)C-2009/156 dated 05 July 2007.

5 DEVELOPMENT IMPACTS

This section describes the development impacts of the extension of the jetty (Figure 12). Impacts from the proposed method of the construction and back-filling are discussed. Major Impacts from the extension of the jetty proposed in this development relates to the following activities:

1. *Dredging and deepening of the proposed area (Figure 3, 7 & 10)*
2. *Construction of the quay wall (Figures 3 and 4)*
3. *Infilling and reclamation of the quay wall with dredged material*

Figure 12: Coca Cola Factory area to show the impact footprint. The foot print will be limited to the surrounding areas immediate to the project activities.

The most practical and simple method of dredging and deepening the area would be the use of an excavator. This is the preferred method for this activity. After the dredging operation, three methods are proposed for the construction of the quay wall of the jetty: sheet-piling, piling using prefabricated concrete slabs (or T-blocsk), and by constructing a sea wall of cement bags.

Dredging using an excavator will produce copious amounts of fine sediments which will remain in suspension for a short period of time. This cannot be avoided in any way in this project. Experience from other similar dredging activities on reefs lagoons show that suspended sediments disappear quickly after the dredging stops. Given the small size of the area to be dredged and filled it is considered this method is most suitable for this project. It is also observed that the dredging will only take place for a couple of days. The lagoon of Thulusdhoo is large and well flushed and it is likely that sediments will dissipate quickly.

Impacts of sedimentation are well known on coral reefs. Corals and coral reef organisms are simply "suffocated" by settling fine sediments. Loss of habitats for fish and small marine life is possible. Settling fine sediments sometime create an anoxic layer of soft sediments at the bottom of the lagoon. There are no ecologically significant habitats that will be affected by the activity in the immediate area.

Beach environments (part of the lower beach and nearshore lagoon area) on all reefs in the Maldives are known to be nursery areas for larval and early life of many coral reef animals. The development of a quay wall replacing the beach leads to loss of the natural beach habitat. Beach habitat in this project will be replaced by a deep harbour wall which essentially displaces the habitat for larval and early life of marine animals.

It is however noted that the development activity in this project removes only a small portion of the beach habitat (745 sq meters, Fig 6 and 7). Furthermore there is a well developed natural beach further north of the development area. The conclusion is that the impact of this development on early marine life is negligible given the small impact foot print and the abundance of beach habitats in the area and around the island of Thulusdhoo.

It is noted that there are few coral heads in the immediate vicinity of the dredging activity but no significant loss of habitat is anticipated by this activity. Based on experience from other similar situations we can confidently conclude that there will be no impacts on coral reef habitats around the reef slope of Thulusdhoo.

The dredged material should be more than sufficient to in fill area for the jetty extension . Wherever possible infill material should be sought from concrete and building wastes produced on the island. In return dredged sediments can be donated to the island community. The extra dredged sand could be used by the island community for building works on the island. This is considered a positive outcome of the project.

The project is small in magnitude and of short term duration. However dredging, reclamation and concrete works projects will produce a number of solid wastes. The management and disposal of metals and solid wastes was noted to be a major issue on Thulusdhoo Island. The project should not in any way aggravate this situation. Heavy equipment will need to be placed on the site. Machinery will need to be mobilised. Hydrocarbons and other chemicals generated from construction activities are harmful to all marine life.

Mitigation: Dredging should be carried out from shore at appropriate tide levels and in a manner that dredged material does not flow back into the sea creating more sedimentation.

Heavy equipment should be delivered to the site on barges by sea. Use of the local roads should be minimised if possible.

Construction works should be carried out during day time so that the island community are not burdened by the project.

Oils and construction materials should be collected and removed and stowed away properly so that they can be properly disposed at Thilafushi Waste Management Site and per government regulations on solid waste management. Extra precautions should be undertaken to accidental discharge of waste oils and solid wastes into the sea area.

A complete list of chemicals should be produced by the Construction supervisor and managed throughout the project construction phase.

5.1 PREDICTIONS OF EXPECTED SHORELINE CHANGES

The area under development and modification is shown in Figure 12. There are already existing significant shoreline modifications in the area. There is a customs jetty and landing platform to the east of the development. This is a solid jetty quay that has been in operation for over 20 years. The quay wall has been later extended by a piled platform.

There is a natural beach to the east of the Customs quay and piled landing platform. The beach is in excellent condition and little erosion was observed in the area overall.

The observation is that the existing customs jetty and the beach have coexisted for a long period of time and the combined shoreline appears to be stabilized and in an equilibrium in terms of coastal movements (accretion and erosion).

There is considerable erosion currently in the proposed area (Figure 8, Figure 9). The extension of the MAWC jetty appears to consolidate and stabilize the shoreline further. This will have to be properly studied and determined by monitoring the beach movements.

It is predicted that the stability of the beach to the north-east of the development depends on the “bay-effect” created by shape of the shoreline (Figure 7). The development proposed here does not alter the shoreline significantly to produce a major change in shoreline and will not alter the “bay-effect” of the area.

Major sedimentary movements and processes are evident towards the western side of Thulusdhoo Island. Major accretion processes are also observed to the west of the island (Figure 7). These moments appear to be the net result of the SE swells and the SW monsoon winds reaching the reef of Thulusdhoo. The movement of sand around the west end of the island towards north and east means that the quay side will have to be deepened up periodically.

5.2 EFFECTS OF REMOVAL OF SAND FROM ADJACENT AREAS

It was generally observed that both the existing MAWC jetty area and the Customs jetty area were in need of some deepening. It follows that dredging and deepening the extension area in the middle of these two would lead to sediment movement readjustment from either side over time. The overall outcome is predicted to be positive.

5.3 OVERALL IMPACT OF THE DEVELOPMENT

Consultation with the island community leaders indicated that they expected benefits to the island as a result of this development. Apart from receiving a fixed rent from the leased land area to be developed, the community also expected that they may be able to use the jetty in some situations under well founded agreements. Fishermen expected that part of the jetty can used for their needs.

The area to be developed is currently an eye sore (Figure 8, Figure 9). The development activity will result in improved beach and shoreline conditions and present a more aesthetically appealing look overall. The jetty is expected to improve the production capacity and transport, and marketing of MAWC beverage products possibly leading to job opportunities and more income to the community.

6 ALTERNATIVES TO DEVELOPMENT

6.1 NO DEVELOPMENT OPTION

MAWC is the producer of Coca Cola brand beverages in the Maldives. They control a large market share of these beverages and markets them country wide. A practical and functional jetty is critical for their expansions. Expansion of shipping vessels is also dependent of this jetty. Currently their work is severely constrained by the lack of a private quay wall as part of their main jetty extension. Therefore the company cannot expand their business without the development proposed here. No development here means severe constraints on the business.

6.2 DEVELOPMENT OPTIONS

There are several development methods or options for the jetty and quay wall proposed in this project. Three common methods have been observed for the kind of development proposed here.

1. **Pre-fabricated concrete structures:** (Figure 13). This is the most preferred option for the quay wall. It is the most environmentally sound method given the nature of the sediments and hydrodynamics. The concrete slabs are manufactured and sold by major construction companies (e.g., Maldives Works Ltd). Building the structures and delivery to site is an environmentally sound option. It speeds up the project thereby lessening the overall impacts of construction phase. These structures have also proven to be longer lasting and stronger.
2. **Use of cement bags:** Cement bags have been to use construct quay walls in many habours in the Maldives. Structurally they are less compact and weak. They break down quickly and is an eyesore on many islands. Examples of failures are found in many harbours all over the country. The cumulative socio environmental impacts negate this option as an alternative method in this project.
3. **Sheet piling**: (Figure 14): Construction of the quay wall by piling in metal sheets is commonly called sheet piling. This has been the preferred methods in large development projects. It is expensive an unnecessary for a small project of this nature.

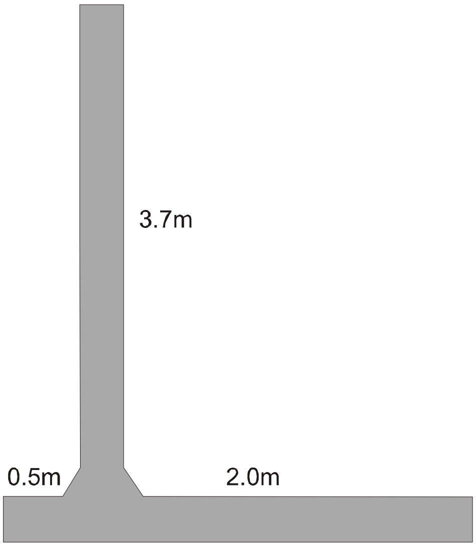

Figure 13: Example of how pre-cast concrete slabs can be used alternative to sheet piling of the breakwater and quay wall. The technique is commonly used in the Maldives instead of cement-bagged breakwaters.

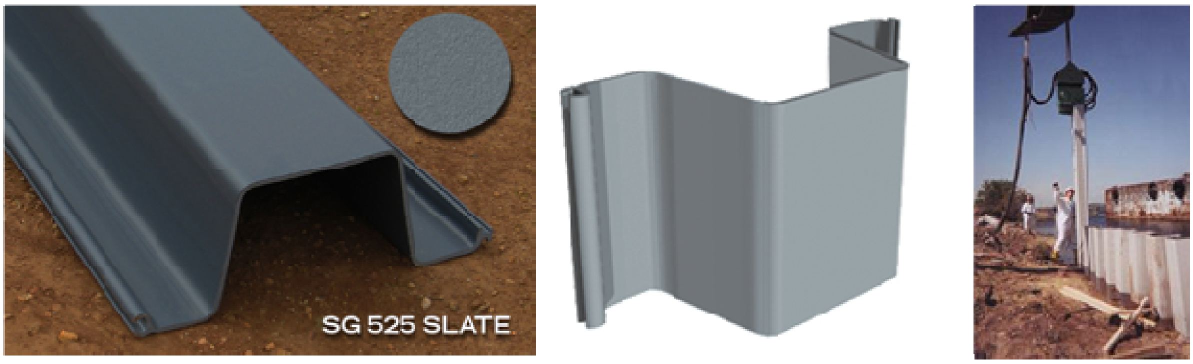

Figure 14: Example of the metal sheet piling. Both the material and the construction is expensive.

7 MONITORING AND EVALUATION

The predicted impacts of this project relate to possible re-working of coastal sediments over time. No other major impacts are anticipated. Beach measurements and depth measurements at selected sites for one year will suffice.

1. The existing natural beach on the northern side of the island will need to be monitored for a period of 12 months following the proposed extension of the jetty. Beach width should be taken at 10 predetermined and geo referenced points along the beach every month. Standard methods should be used for beach measurements.
2. Depth measurements will need to be measured along the quay wall from MAWC jetty to the Customs jetty at 6 points replicating the baseline depth measurements collected as part of this assessment. The objective will be to observe any major changes in large scale sediment moments.

+++

8 REFERENCES

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Malé Aerated Water Co Pvt Ltd
M. Palm View, Izzudhen Magu
Malé, Republic of Maldives,
Phone: + (960) 333-2999; Fax: + (960) 332-6703

Ref:

12 April 2010

Mr. Mohamed Aslam
The Minister
Minister of Housing Transport & Environment
C/- Environment Protection Agency
3rd Floor, Old JPS Bldg, Nikagasmagu,
Malé, Maldives

Dear Sir.

Re: Proposed Extension Work of Service Jetty

As the developer of the above project, we hereby confirm our commitment to carry out the environmental mitigation measures and monitoring programme outlines in this EIA report

Yours faithfully,

Hassan Habeeb
General Manager

ދިވެހިރާއްޖެ
5 ރުފިޔާ

بسم الله الرحمن الرحيم

ތުލުސްދޫ އޮފީސް
ކ. ތުލުސްދޫ ، ދިވެހިރާއްޖެ

ނަންބަރު: B-2009/H-4/17

އެރިއެރި ބޯފެނި ވަސްއަރުވާ ފެކްޓަރީއާއި ކަންތައްތަކަށް
ރާއްޖޭގެ ވިޔަފާރީގެ ކަންކަމަށް ބިން ދޫކުރުމުގެ އެއްބަސްވުން

ބިންކުއްޔަށްހިފި ފަރާތުގެ ނަން: މާލެ އެރޭޓެޑް ވޯޓަރ ކޮމްޕެނީ ޕްރައިވެޓް ލިމިޓެޑް
ބިންކުއްޔަށްހިފި ފަރާތުގެ އެޑްރެސް: ފިއުޖިއޮނިންމަގު / މާލެ
ކޮމްޕެނީގެ ނަމުގައި ރަޖިސްޓްރީ ނަންބަރު: C-8/1991 (27-04-1991)
ބިންކުއްޔަށް ހިފި ތާރީޚު: 2009 - 07 - 20
މުއްދަތު ހަމަވާ ތާރީޚު: 2019 - 07 - 19

01- މިއީ، " މާލެ އެރޭޓެޑް ވޯޓަރ ކޮމްޕެނީ ޕްރައިވެޓް ލިމިޓެޑްއިން ކ. ތުލުސްދޫގައި ހިންގަމުންދާ ކާރުޚާނާ ފުޅިޕެކޭގެ މުދަލާއި ގެޗި ބަހައްޓާފައިވާ ބޭނުންވާގޮތަށް މިގޮތުން ބޭނުންވާ ގުދަނެއްގެ ބޭނުމަށް ބިމެއް އިސްތިއުމާލު 191'X42' (8022 އަކަފޫޓު) ބިން ދިރާސާކޮށް އެދި މާލެ އެރޭޓެޑް ވޯޓަރ ކޮމްޕެނީ ޕްރައިވެޓް ލިމިޓެޑުން ހުށަހަޅުއްވާފައިވާތީއާއި، އެބިން އެފަރާތަށް ދޫކުރުން އެންމެ ރަނގަޅުވާނެކަން އެނގުނު ރ.ކ. ކޮމިޓީން ނިންމާފައިވާގޮތަށް ތުލުސްދޫ އޮފީސްގެ ނަންބަރު D-2006/459/KTO (27-08-2006) ލިޔުމުން އެންގުމާ ހިނދު، ތުލުސްދޫގެ ކޮމިޓީގައި ފާސްކުރެވިފައިވާ މިބިން ކުއްޔަށް ދޫކުރުމަށް ކުއްޔަށް ހިފުމަށް މާލެ އެރޭޓެޑް ވޯޓަރ ކޮމްޕެނީ ޕްރައިވެޓް ލިމިޓެޑާއި ތުލުސްދޫއޮފީހާއި ދެމެދު ކުރެވޭ އެއްބަސްވުމެކެވެ.

02- ކ. ތުލުސްދޫން މާލެ އެރޭޓެޑް ވޯޓަރ ކޮމްޕެނީ ޕްރައިވެޓް ލިމިޓެޑަށް ދޫކުރެވުނު ކަނޑައެޅި 191'X42' (8022 އަކަފޫޓު) ބިން އެވަގުތަށް ދޫކުރުން އެންމެ ރަނގަޅުވާނެކަމަށް ކައުންސިލުގެ ވިސްނުމަށް އޮތް ހައިސިއްޔަތު އެންމެ މާލިއްޔަތު ބޮޑުވާގޮތަށްވާ ނަންބަރު 138-F/H/2007/81 (30-09-2007) ސިޓީއާއި ތުލުސްދޫ ކޮމިޓީގެ ނަންބަރު (M)C-2009/156 (05-07-2007) ލިޔުމުން ވަނީ އަންގާފައެވެ.

03- މިއެއްބަސްވުމާއި ތުލުސްދޫގެ ކޮމިޓީގައި ފާސްކުރެވުނު ގޮތުގެމަތިން (8022 އަކަފޫޓު) ބިން 2009-07-20 ތާރީޚުން ފެށިގެން 10 (ދިހައެއް) އަހަރު ދުވަހުގެ މުއްދަތަށް މިއެއްބަސްވުމުގެ 04 ވަނަ ނަންބަރުގައި ބަޔާންކުރެވިފައިވާ ކުލީގެ އަގަށް ކުއްޔަށް ހިފުމަށާއި، ކުއްޔަށް ދޫކުރުމަށް އެއްބަސްވެވުނެވެ.

04- ކުލި ނަގަމުން ގެންދާނީ 2009-07-20 ތާރީޚުން ފެށިގެން މަހަކު އަކަފޫޓަކަށް -/50 ލާރިއެވެ. އަދި މިބިން ދޫކުރެވުނު ބިމުގެއަގަށް ބަދަލު ގެނެސްދިނުން ސަރުކާރަށް ފެނިއްޖެ ހިނދެއްގައި އެބަދަލު ގެނެވިދާނެއެވެ.

05- (ހ) 04 ވަނަ ނަންބަރުގައިވާ ގޮތުގެމަތިން ކޮންމެ މަހެއްގެ ކުލި އެމަހެއްގެ 10 ވަނަ ދުވަހުގެ ކުރިން ޑިޕާޓްމަންޓް އޮފް އިންލޭންޑް ރެވެނިއުއަށް ދައްކަންވާނެއެވެ. (އެއީ މިސާލަކަށް ޖޫންމަހުގެ ކުލި ޖޫންމަހު 10 އާއި ކުރިން ދައްކަން ޖެހޭނެއެވެ.)

ތުލުސްދޫ އޮފީސް

MALE' AERATED WATER CO. PVT. LTD.
M.A.W.C

(ނ) މިއެއްބަސްވުމުގެ 04 ، އަދި 05 ވަނަ ނަންބަރުގައިވާ ގޮތުގެމަތިން ކުލި ދައްކަން ފެށުމަށްފަހު، ކަނޑައެޅިފައިވާ މުއްދަތުތަކުގައި ކުލި ނަގާނެ ދުވަސްތަކުން، އެބުރަކު ކުލީގެ އަދަދުގެ 25% ބޮޑުކުރަން ކަނޑައަޅާނެއެވެ.

(ރ) 01 ވަނަ ނަންބަރު ދިމާ މުއްދަތުތަކުން ކުލި ދައްކަން އެދޭނަމަ އެގޮތަކުން ފަސް ކުލި ދެއްކެވޭނެއެވެ.

06- 05 ވަނަ ނަންބަރުގައިވާ ގޮތުގެމަތިން ކުލި ނަގާއިރު 03 މަސްދުވަހުން ފެށިގެންނަށް ކުލި ދައްކަން އަންނަ ކުލި ނަގާއިރުކަމުގައިވާނަމަ، ބިން ވަނިކުރުމުގެބާރު މާލެއަތޮޅު އަތޮޅުއޮފީހަށް ލިބިގެން ވެއެވެ.

07- މިއެއްބަސްވުމުގެ މުއްދަތު ހަމަވުމުގެ ކުރިން ސަރުކާރަށް ބިން ބޭނުންވެއްޖެނަމަ، ބިން ހުސްކުރުމަށް ވަރުވުމުގެ 03 މަސްދުވަހުގެ ނޯޓިސް ދިނުމަށްފަހު ބިން ވަނިކުރުވިދާނެއެވެ. މިގޮތުން ވަނިކުރާއިރު ކުރިއަށް ކުލި ދައްކާފައިވާނަމަ، ބާކީ ދުވަސްތަކުގެ ކުލި، ކުއްޔަށްހިފި ފަރާތަށް ދޫކޮށްދޭނެއެވެ. އަދި ތަރައްޤީކުރުމަށް ހަރަދުކޮށްފައިވާ ބިނާތަކުން އަގުވެލިއު ބަދަލު ދޫކޮށްދޭނެއެވެ.

08- މިއެއްބަސްވުމުގެ މުއްދަތު ހަމަވުމުގެކުރިން ކުއްޔަށްހިފި ފަރާތުން ބިން ދޫކޮށްލަން ބޭނުންވެއްޖެނަމަ، 02 މަސްދުވަހުގެކުރިން އެކަން ކުއްޔަށްދޫކުރި ފަރާތަށް ލިޔުމުން އަންގަން ވާނެއެވެ. މިގޮތުން ދޫކޮށްލާއިރު ކުރިއަށް ކުލި ދައްކާފައި އޮތްކަމުގައިވިޔަސް ބާކީ ދުވަސްތަކުގެ ކުލި ކުއްޔަށްހިފި ފަރާތަކަށް ނުދޭނެއެވެ.

09- ބިންކުއްޔަށްހިފި ފަރާތުން ބިމުގައި ހިންގާ މަސައްކަތާއި، އެމަސައްކަތުގެ ހިންގާގޮތް ބަލަން ބޭނުންވެއްޖެ ކޮންމެ ހިނދެއްގައި ބެލުމުގެ އިޚްތިޔާރު ބިން ކުއްޔަށް ދޫކުރި ފަރާތަށް ލިބިގެންވެއެވެ. އަދި ބިންކުއްޔަށް ދޫކުރި ފަރާތުން ބަލާއިރު އެހީތެރިކަން ކުއްޔަށްހިފި ފަރާތުން ދޭންވާނެއެވެ.

10- ބިން ކުއްޔަށް ހިފި ފަރާތުން، އެއިރަކު ބާޒާރު މަސައްކަތްތަކާއި، ކަންތައްތަކަށް ތަރައްޤީގެ ލާރިއަށް ބަރާބަރަށް ބިންދޫކުރުމުގެ ގަވާއިދާ އެއްގޮތަށް ކުރަން ޖެހޭނެއެވެ. އަދި ބިން ކުއްޔަށް ހިފި ފަރާތުގެ ބަލާލުމަށް އާންމު މުއްދަތުގެ ތެރޭގައި، މިފަދަ ބިންބިމާ ބެހޭގޮތުން ޤާނޫނުތަކާ އެއްގޮތަށް ކަންތައް ދަށުފަރުން ކުރަ ހިނގާ ގަވާއިދުތަކާއި، އަންގާ އަންގާ ގޮތަކަށް ކުއްޔަށްހިފި ފަރާތުން ކުރިއަށް ގެންދަން ޖެހޭނެއެވެ.

11- ކުލި ދެއްކުމުގައި އަހަރަކުންގައި މިއެއްބަސްވުމުގެ މާއްދާއާ ކުއްޔަށް ހިފި ފަރާތުން ޚިލާފުވެއްޖެނަމަ، އެކަމެއް ރަނގަޅު ކުރުމަށް ކުއްޔަށް ދޫކުރި ފަރާތުން ލިޔުމުން އަންގާނެއެވެ. މިގޮތުން އަންގާތާ 30 ދުވަހުގެތެރޭގައި އެކަން ރަނގަޅު ކުރުމަށް ނުކުރާނަމަ، ބިންވަނި ކުރުމުގެބާރު މާލޭއަތޮޅު އަތޮޅުއޮފީހަށް ލިބިގެންވެއެވެ.

12- މިއެއްބަސްވުމުގެ މުއްދަތު ހަމަވުމުން ނުވަތަ ކުއްޔަށްހިފި ފަރާތުން ބޭނުންވެގެން ނުވަތަ މިއެއްބަސްވުމާ ޚިލާފުވެގެން ބިން ވަނިކުރާނަމަ، ބިމުގައި ތަރައްޤީކޮށްފައިވާ ބިނާތައް އެއިރަކު ހުރި ގޮތުގެމަތިން އިމާރާތް ގެއްލުމެއް ނުދީ ސަރުކާރަށް ހަވާލު ކުރަން ޖެހޭނެއެވެ. އެތަކެތީގެ ސަރުކާރުން އަދި ނުވަތަ ބަދަލު ދިނުމެއް ނުވާނެއެވެ. އެއްގަނޑަށް އަންނައުނަ ގެއްލުމާއި ކުއްޔަށް ހިފި ފަރާތުގެ އަމިއްލަ ބަޔާ އެފަރާތުން ގެންދިޔުން ވާނެއެވެ.

13- ބިން ކުއްޔަށް ދޫކުރާ ދުވަހުން ފެށިގެން 06 މަސްދުވަހުގެ ތެރޭގައި މަގުބަދަލު ސަރަޙައްދުގެ މަސައްކަތް ހިންގަން ނުފެށިނަމަ، ބިންވަނި ކުރުމުގެ އިޚްތިޔާރު މާލޭއަތޮޅު އަތޮޅުއޮފީހަށް ލިބިގެންވެއެވެ.

14- އިތުރު މުއްދަތަކަށް ބިން ބޭނުންވާނަމަ، އެއްބަސްވުމުގެ މުއްދަތު ހަމަވުމުގެ 03 މަސްދުވަހުގެކުރިން ކުއްޔަށް ހިފި ފަރާތުން ބިން ކުއްޔަށް ދޫކުރި ފަރާތަށް ހުށަހަޅާ ދެފަރާތުގެ އެއްބަސްވުމާ ގޮތުގެމަތިން، ކުއްޔަށް ދޫކުރާނެ މުއްދަތު އަލުން ކަނޑައަޅާނެއެވެ.

02/03 ......

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M.A.W.C

15- މިއެއްބަސްވުމުގައި ބަޔާންކޮށްފައިނުވާ މައްސަލައެއް ދިމާވެއްޖެނަމަ، އެކަމާމެދު ދެފަރާތުން ވާހަކަދައްކައިގެން އެއްބަސްވުމަކަށް ބަލާނީއެވެ. ދެފަރާތް އެއްބަސް ނުވެވިއްޖެ މައްސަލައެއްނަމަ، ޝަރީޢަތަށް ހުށަހަޅާ ޝަރީޢަތުން ނިމުނު ގޮތުގެމަތިން އަމަލު ކުރާނީއެވެ.

ތިރީގައި ބަޔާންކޮށްފައިވާ ފަރާތުން އަމަލު ކުރުމަށް ބިން ކުއްޔަށް ހިފިފަރާތް (މާލެ އޭރޭޓެޑް ވޯޓަރ ކޮމްޕެނީ ޕްރައިވެޓް ލިމިޓެޑް) އާއި ބިން ކުއްޔަށް ދޫކުރިފަރާތް (މާލެއަތޮޅު އޮފީސް) އެއްބަސްވެއްޖެއެވެ.

20 ޖުލައި 2009

ކުއްޔަށް ހިފުމަށް
މާލެ އޭރޭޓެޑް ވޯޓަރ ކޮމްޕެނީ ޕްރައިވެޓް ލިމިޓެޑްގެ ފަރާތުން
ހުސައިން ހަބީބު
ޖެނެރަލް މެނޭޖަރ
(A032797)

MALE' AERATED WATER CO. PVT. LTD.
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ކުއްޔަށް ދޫކުރުމަށް މާލެއަތޮޅު
އޮފީހުގެ ފަރާތުން
އާދަމް ނާސިރު
މާލެއަތޮޅު ކައުންސިލަރ

(1) ހެކިން: އަލްފާޟިލް އަހުމަދު ޝަރީފު
އެޑްމިނިސްޓްރޭޓިވް އޮފިސަރ
(A061847)

(2) ހެކިން: އިބްރާހީމް މުޙްސިނާ
އެޑްމިނިސްޓްރޭޓިވް މެނޭޖަރ (ކަސްޓަމަރ ސަރވިސް)
(A024983)

بسم الله الرحمن الرحيم

To: Mr. Mukund.
C.O.O

23/2/2010

މާލެއަތޮޅު ތުލުސްދޫ އޮފީސް
ތުލުސްދޫ/ދިވެހިރާއްޖެ

ނަންބަރު: H-4-D/MIS/2010/31

މާލޭ އަތޮޅު ވޯޓަރ ކޮމްޕެނީގެ ޖެނެރަލް މެނޭޖަރ އަލްފާޟިލް ޙަސަން ހަބީބަށް

ވެދުން ސަލާމަށްފަހު ދަންނަވަމެވެ.

މަތިކޮށްވާ ނަންބަރު: MAWC/GM/07/2010(17 ފެބްރުއަރީ 2010) ސިޓީއާއި ހަވާލާދީ ދަންނަވަމެވެ.

ތިޔަ ކުންފުނިން މިރަށުގައި ހަދައި މިހާރު ބޭނުންކުރަމުންދާ ޖީޕީ ބޭސްކުރެވުން ދުކާންފަހާލާ ހިމާޔަތްކުރުން މިއަދު ކުންފުނިންގާއި މާލެއަތޮޅު ތުލުސްދޫ އޮފީހާ ދެމެދު ވަގުތީ އެއްބަސްވުމާ ގޮތުގެ މަތިން ޖީޕީ ބޭނުންކުރުމުގެ ހުއްދަ ދިނީމެވެ. މިގޮތުން ޖީޕީ ބޭނުންކުރުމުގެ މަސައްކަތް ކުރިއަށްގެންދިޔުމަށް ޖަހާކައި ހުއްދަދެވޭނީ އެންވަޔަރަންމަންޓް މިނިސްޓްރީގެ ހުއްދައާއެކު މަސައްކަތް ކުރިއަށް ގެންދިއުމަށް އެދޭކަމަށް ޝުކުރާއެކު ފުރުސަތުގައި ދަންނަވަމެވެ.

އިޙްތިރާމް ފޮނުވީ ޚިދުމަތުގައި އެދެމެވެ.

02 ރަބީޢުލްއައްވަލް 1431

16 ފެބްރުއަރީ 2010

އަބްދުލްހަމީދު މުހައްމަދު
(ތުލުސްދޫ ކައުންސިލަރ)

މާލޭ އަތޮޅު ވޯޓަރ ކޮމްޕެނީ ޕްރައިވެޓް ލިމިޓެޑް
މާލެ / ދިވެހިރާއްޖެ.

Environment Research Centre
Ministry of Housing, Transport and Environment
Male', Republic of Maldives

Terms of Reference for Environmental Impact Assessment

The following is the TOR based on the points discussed in the scoping meeting held on 21st March 2010 for undertaking the EIA of the proposed **Extension service jetty at Coca-Cola Factory in Thulusdhoo, Kaafu Atoll, Maldives.**

This document is a legally binding document prepared after consultation with all relevant stakeholders and the EIA report must strictly follow the activities under this ToR.

1. *<u>Introduction</u> - Identify the development project to be assessed.*

2. *<u>Study Area</u> - Specify the boundaries of the study area for the assessment as well as any adjacent or remote areas that should be considered with respect to the project (e.g. dredged material disposal site/s).*

3. *<u>Scope of Work</u> - The following tasks will be performed:*

<u>Task 1. Description of the Proposed Project</u> - Provide a brief description of the proponent, how the project will be undertaken, full description of the relevant parts of the project, using clearly labeled maps, scaled site plan (indicating the changes and modifications that will be brought)

Provide details of extension of jetty, sheet piling using vibration. sand pumping,land land filling using the pumped sand; type of pumping equipment and sheet piling equipment to be used and the manner of deployment including handling, transportation, and disposal of waste material, how wastes and emissions will be managed, project inputs and outputs, project schedule; and life span. Report should also highlight how the location was determined. And justify that the proposed location and the design for the jetty is most appropriate.

<u>Task 2. Description of the Environment</u> - Where baseline data is to be collected, careful consideration must be given to the design of the survey and sampling programme. Data collection must focus on key issues needing to be examined for the EIA. <u>Consideration of likely monitoring requirements should be borne in mind during survey planning, so that the data collected is suitable for use as a baseline to monitoring impacts.</u>

Assemble, evaluate and present baseline data on the relevant environmental characteristics of the study area (and disposal sites), focused on the marine environment, including the following:

- *Substrate condition of fill area*
- *Physical environment:; geomorphology, meteorology (rainfall, wind, waves and tides), sea currents, surface hydrology, long shore sediment transportation patterns, climatic and oceanographic conditions in the area, bathymetry, marine receiving water quality (including parameters ; turbidity, dissolved oxygen, salinity, suspended solids, pH, nitrate, nitrite, phosphate, COD, and BOD among other chemical parameters.) This should include both borrow area and fill area.*
- *Biological environment: fish communities and coral communities of the project area.*
- *Beach profiles (minimum 4shoreline map of the island showing the project area)*

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- *Socio-cultural environment: socioeconomic status of the atoll (people that have the likelihood to have direct benefits from the development), population, major income generating activities.*

d) Hazard vulnerability; vulnerability of area to storm surge.

Provide description of the work methodology for collection and compilation of report, approach to specific assumptions and predictions made identification of information and data gaps and discussions of major limitations. Characterize the extent and quality of the available data, indicating significant information deficiencies and any uncertainties associated with the prediction of impacts. All available data from previous studies, if available should be presented. Geographical coordinates of all sampling locations should be provided. All water samples shall be taken at a depth of 1m from the mean sea level or mid water depth for shallow areas. The report should outline the detailed methodology of data collection utilized to describe the existing environment. Baseline conditions should be presented for the marine environment.

An average of at least 5 measurements must be given for each parameter tested and analyzed from a certified laboratory. Provide details of calibration for any onsite data analysis.

Task 3. Legislative and Regulatory Considerations - Describe the pertinent national and international legislation, regulations and standards, and environmental policies that are relevant and applicable to the proposed project, and identify the appropriate authority jurisdictions that will specifically apply to the project.

Task 4. Determine the Potential Impacts of the Proposed Project – An assessment of the impacts (environmental, social and economic) for both constructional and operational phase shall be provided. Short term and long term effects of the potential impacts shall be distinguished. Special attention to be paid to:

- *Sedimentation impacts,*
- *Impact of live coral,*
- *Impact on beach dynamics*

Task 5. Analysis of Alternatives to the Proposed Project. –Describe the alternatives examined for the proposed project that would achieve the same objective including the "no action alternative. This includes alternative construction/dredging methodologies; alternative technologies (e.g type of quay wall), material, locations (barrow sites etc.) and mitigation options. Distinguish the most environmentally friendly alternatives.

Task 6. Mitigation and Management of Negative Impacts – Identify possible measures to prevent or reduce sedimentation impacts, impact of live coral, impact on beach dynamics and other significant negative impacts to acceptable levels with particular attention paid. Mitigation measures should be identified for both construction and operational phase. Cost of the mitigation measures, equipment and resources required to implement those measures. A commitment regarding the mitigation measures should be submitted by the responsible person.

Task 7. Environmental Management Plan and Monitoring - A time frame should be outlined for monitoring focused on the construction and operational phase. Identify the critical issues requiring monitoring to ensure compliance to mitigation measures and present impact management and monitoring plan for dredging/disposal operations. Detail of the monitoring programme including the physical and biological parameters for monitoring, frequency, duration and cost commitment from responsible person, detailed reporting time table and ways and means of undertaking the monitoring programme must be provided.

Task 8. Stakeholder Consultation – *Major stakeholder consultation to include Ministry of Housing, Transport and Environment(Housing and construction Department) ,K. Thulusdhoo island community and Island office, Medhu Uthuru Province Office and any other relevant stakeholders. EIA report should include a list of people/groups consulted and the methodology of consultation. The discussions held at the scoping meeting will be also used as a part of consultation. Include the official communication from the island / province office regarding the jetty extension.*

Presentation - *The Environmental Impact Assessment Report, to be presented in print and digital format, will be concise and focus on significant environmental issues. It will contain the findings, conclusions and recommended actions supported by summaries of the data collected and citations for any references used in interpreting those data. The environmental assessment report will be organized according to, but not necessarily limited by, the outline given in the Environmental Impact Assessment Regulations, 2007.*

Timeframe for submitting the EIA report – *The developer must submit the completed EIA report within 3 months from the date of this Term of Reference.*

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(29 march 2010)

ENVIRONMENTAL PROTECTION AGENCY
Malé, Republic of Maldives