

## **Annexure 1**

### **Guidelines for the construction of houses in private lands within 100 m belt of water bodies under MASL**

1. Construction of houses will be permitted for residential purposes only
2. Minimum land area should not be less than 20 perches, a maximum of 300 square feet floor area is allowed and it should be limited to a ground floor area and first floor only.
3. The location of the housing unit within the land area should be positioned in such a way that the minimum distance between two housing units along the river is 20 m to avoid congestion.
4. The soakage pit of the septic tank and a separate soakage pit for kitchen wastewater should be located in the landslide of the housing unit and 15 m away from the HFL (high flood level) of the reservoir. The waste disposal at least 10 m away from HFL of the reservoir. The design of the septic tank should satisfy the sanitation requirements as per Health Authority Standards.
5. A width of 5m from HFL should be reserved without any construction in Polgolla barrage and 10 m in the other reservoir areas, but remaining wall should be provided along the reservoir embankment for its protection.
6. No disturbances to existing drainage system are permitted. Embankment protection should be provided wherever necessary with the prior approval from HAO&M division of MASL.
7. A prior approval should be obtained from the HAO&M of MASL regarding the protective measures for erosion control during the construction period.
8. Construction on slopes more than 30° is allowed only if constructing without land leveling.

The above conditions provide clearance on of MASL to proceed with construction provided they abide by existing rules and regulations that govern by the Kandy Municipal Council and local Authority.

## BREAK-OUT SESSIONS

1. Outcomes of Akurana Women's Welfare Association (AWWA)
2. Outcomes of Research Group
3. Outcomes of School teachers
4. Outcomes of Assistant Government Agents (AGA) group

### 1. Akurana Women's Welfare Association (AWWA)

The Pinga Oya has been long neglected and abused. To rectify these problems, AWWA proposes the following measures to address the long term problems of Pinga Oya. As follows.

1.1 Develop plans to protect Pinga Oya.

1.2 Various Organizations in Akurana that are interested should create a coordination body to address the problems of Ping Oya.

1.3 The Pradeshiya Sabha should implement a financing mechanism for:

Excavating the river as appropriate.

Ban clearing of vegetation and trees on either side of river

Planting plants close to the river

Strictly stopping dumping wastes and sand in to the river.

Womens groups should visit home by home and discuss options to manage waste and to protect the environment.

1.4 Educating school children in the region about environment and to protect Pinga Oya.

1.5 Support should be given for tree planting programs.

### 2. Researchers group

The research group identified the following needs and areas for further study:

- Cross section and longitudinal survey of the river particularly in regions with flooding.
- Demographic study.
- Water quality analysis.
- Climate and Hydrological monitoring for key tributories of Pinga oya (Hunan Oya, Balapitiya Oya, Kudugala Oya).
- Analysis of health and environmental conditions.
- Hydrological simulation to understand how flood risk can be mitigated.
- Study of aquatic biology in the stream and surrounding.
- Study of solid waste management
- Study of Licensing for building construction, land and other changes.
- Study of Legal and Governance aspects for managing the catchment.
- Awareness raising on legal, governance, regulatory aspects for the inhabitants.
- 

### 3. Teachers' Group

The teachers welcomed coordinated efforts to address environmental issues in the Pinga Oya catchment. They said that they already have environmental programs going on which already

addressed related programs and several projects, reports and programs have been undertaken. An effort to collect and publicize such reports and projects was identified as useful.

Other possibilities for future work identified were:

1. Install rain gauges at the schools in the catchment.
2. Measuring water discharge
3. Monitoring water quality after intervention
4. Compliance monitoring
5. Collect data about river bank erosion
6. Motivate students in catchment area to do projects related to the Pinga Oya

#### **4. Outcomes of Assistant Government Agent (AGA) group:**

##### **Proposing to formulate “Environment Protection Society” and requesting awareness program to protect Pinga Oya surroundings**

The AGA participants proposed to have awareness program as initial step for the officers who are related to protection of environment i.e. Disaster management officers and Environment officers. The awareness program should mainly focus on the “Importance of the Pinga Oya to the Akurana society”. After the awareness program Environment Protection Society will be formulate within the AGA premises and the interested employees including administrative personals can be included as members in this society. As an encouragement of the participation, award scheme can be introduce for the AGA office on protection of environment.

Further participants mentioned that, youth clubs of the each GS division, teachers and student groups from schools and, AWWA members can be included to strengthen the Environment Protection Society. AGA participants stated that, formation of such environment group is not a non legal issue for the AGA office.

The proposed Environment Protection Society can do the future awareness programs among Akurana society such as

- Introduce new timetable for the municipal garbage collection division
- Solid waste dumping at night time, and need monitoring systems for it
- Aware people to reduce of throwing garbage to the environment, self cleaning of own premises including business and home door steps

However as a big town, AGA office needs to convince all the levels of civilians of the Akurana regarding the importance of the Pinga Oya to the system. One of the main problems which AGA office is facing is that they can get the support from ground level people, but not from the upper level people. As a suggestion, AGA participants proposed that, they can request help from the business community of the Akurana area, because they are willing to upgrade their business situation at Akurana at any time. Another solution is that, requesting help from the mosque. Mosque has trustee board, and members of the trustee board will be invited for the meetings of Environment Protection Society. This trustee board can help with promoting participation among the civilians and let these groups to participate in to the meetings of Environment Protection Society. Another main hindrance to the protection of Pinga Oya is that AGA itself does not regulate or control garbage dumping.

Political intervention is the most important limitation for this subject, even if officials willing to do the protection of Pinga Oya, they don't have capability to do so as an official procedure. Finally participants proposed there should be gender neutral intervention to the problem. AWWA participants mentioned that there should be men involvement for this problem. In the Muslim community men play a major role and they can do powerful work on this. As well as once the information flows via

trustee board of the mosque, the information should go to household levels, where women do most of the productive work on this problem.

To monitor the success of the proposed program, AGA participants proposed;

- Regular water quality testing
- From MOH, the AGA office can request the information on whether the garbage disposal is reduce or not

The participants mentioned that presently they have good system to reduce Dengue in the Akurana area.

## Proposal for Pinga Oya Diagnosis, Monitoring and Restoration

Prepared by L. Zubair, Eng. J.M. Samoon, Eng. M.Z.M. Hilal, Mr. Nawas

### Summary:

This proposal addresses flood related questions, to ground mitigation work scientifically and seeks to support an educational, monitoring and advocacy program and an early warning system. The work shall be done by dedicated staff with technical input from the Faculty of Engineering, University of Peradeniya. We have consulted staff of Mahaweli Authority, University of Peradeniya and other government organizations.

### Objectives:

1. Collate information related to Pinga Oya /Balapitiya Oya
2. Start a monitoring program
3. Identify as best possible the causes of flooding and mitigation options for the short and long-term.
4. Set up a program to study and monitor the health of the river including its riverine dynamics, chemistry and biology and impacts on society with a view to promoting river restoration.
5. Making information on the river accessible with visualization tools for education and understanding

### Data Needs:

- **River geomorphology** (cross-sections, river levels, sediment levels, etc) Surveys could be done with Survey lab staff - about 20 cross sections, and an accurate trace of the river bed and major tributaries). This shall cost about 2-5 lakh and should be done soon in the upcoming dry months.
- **Rainfall and Streamflow records** (Only Katugastota and Polgolla may be available) - we should get 3 hourly data for flood dates and preceding - Relevant records from Polgolla EIC - they keep hourly records
- **Catchment Topography** - About 10-15 1:10,000 sheets at @7,500 required (Rs. 1-1.5 lakhs) from Survey Dept
- **Satellite Imagery** - we could try to get free
- **Pradeshiya Sabha permitting records, solid waste, enforcement**
- **Hospital records** water, environment related health issues

### Monitoring Needs:

- Flow Gauges
- Automatic Rainfall Gauges
- water quality testing instruments
- Ongoing permitting/construction that affects river
- Riverine biology and chemistry

We either get the tests done at Peradeniya or better still to get some instruments for a water quality lab.

### Modeling:

- set up a **Hydrological Model** of the entire Pinga Oya catchment and calibrate it. (HEC-WMS is well established open source software along with compatible GIS to enable visualizations. Simulate recent flood events. )
  - Undertake computer simulations to identify the *relative roles of various causes of flooding* - Polgolla, Catchment degradation, River Constrictions
  - Develop *Optimal Flood Zone Mapping* (this is the area that should be kept without building)
  - Be able to do "*what if*" scenarios e.g. after various structures are removed, further building, further catchment degradation or improvement.

- *Visualization tools and Presentation Materials*
- **Training** in the use of these tools for the future (All of this shall cost about 2 lakhs)
- **Archiving of data**

**Rough Budget:**

Surveying	2-5 lakhs
Topographic/Survey/Other Data	2 lakhs
Modeling work	2-3 lakhs
Project Manager - part-time -	2 lakhs
Misc Costs Supplies, Communication, etc	1 lakh
River monitoring	1-4 lakhs
Total-	10-16 lakhs

## LIST OF ATTENDEES

Name	Institutions	Title
1 Dr. MTM Mahees	Department of Sociology, University of Colombo	Senior Lecturer
2 Prof. P. Wickramagamage	Department of Geography, University of Peradeniya	Senior Lecturer
3 Ms. Lalitha Disanayake	Department of Geography, University of Peradeniya	Lecturer
4 Dr. Lareef Zubair	FECT	Principal Scientist
5 Mr. Farook Nawas	South-Eastern University	Senior Lecturer
6 Dr. Hemalie Nandalal	University of Peradeniya	Lecturer
7 Mrs. S. M. Zubair	AWWA	President
8 Ms. Sewwandhi Chandrasekara	FECT	Scientist
9 Ms. Zeenas Yahiya	FECT	Manager
10 Mr. Dumindu Herath	FECT	Scientist
11 Mr. Yasas Harishchandra	FECT	Scientist
12 Mr. Praboda Agalawatta	FECT	Scientist
13 Mr. Janan Visvanathan	FECT	IT Admin
14 Mr. K. Shanmuganathan	Sugar Cane Research Institute/FECT	Agricultural Engineer Civil Engineer
15 Eng. JM Samoon	Akurana Engineering Society	Engineer
16 Eng. MZM Hilal	Greater Kandy Water Supply	Editor
17 Mr. M. Ifran	Newsview	Teacher
18 Ms. MHK Rizana	K/Azhar Central Collage, Akurana	Teacher
19 Ms. MHS Minouz	K/Akurana Zahira Collage	Teacher
20 Ms. MWH Farwin	K/Azhar Central Collage, Akurana	Teacher
21 Ms. MIS Haroosa	K/Akurana Zahira Collage	Teacher
22 Ms. Rikza Ameen	K/Akurana Zahira Collage	Teacher
23 Mrs. SS Mafahiya	K/Akurana Muslim Balika M.V	Teacher
24 Mrs. ARS Fowzya	K/Thelumbughawatte	Teacher
25 Mrs. MACM Zahira	K/Akurana Zahira Collage	Teacher
26 Ms. MF Nawas	K/Akurana Muslim Balika M.V	Teacher
27 Ms. HS Fathima	K/Azhar Central Collage, Akurana	Teacher
28 Mrs. MZF Zilmiya	K/Thelumbughawatte MV	Development Officer Development Officer
29 Ms. Shanaz Ramy	AGA office, Akurana	Senior Lecturer Senior Lecturer
30 Ms. ARP Nusra	AGA office, Akurana	R. Teacher Teacher
31 Dr. Thilak Bandara	University of Peradeniya	Housewife
32 Dr. Shriyangi Aluwihare	Open University of Sri Lanka	Housewife
33 Mrs. ZU Sulaiman	AWWA	Housewife
34 Mrs. Yasmina	AWWA, Rightway	Housewife
35 Mrs. Nazeeha	AWWA	Student
36 Mrs. MU Thahani	AWWA	
37 Mrs. Sifaya Gaffar	AWWA	
38 Mrs. MYS Zuhaia	AWWA	
39 Ms. SHY Indrachapa	University of Peradeniya	

40 Ms. Uthpala Iranjani	University of Peradeniya	Student
41 Mr. NM Bandara	Department of Geography, University of Peradeniya	Asst. Lecturer
42 Dr. Kanthi Perera	University of Peradeniya, Faculty of Science	Senior Lecturer
43 Ms. RMK Kumarihamy	Department of Geography, University of Peradeniya	Lecturer
44 Ms. MII Muneera	Department of Geography, University of Peradeniya	Asst. Lecturer
45 Mr. SIS Subash	Department of Geography, University of Peradeniya	Asst. Lecturer
46 Ms. MYH Riswiya	AGA office, Akurana	Development Officer
47 Ms. TSN Roshida	AGA office, Akurana	Development Officer
48 Ms. MMS Satinas	AGA office, Akurana	Development Officer
49 Ms. Thamali Kithsiri	Department of Geography, University of Peradeniya	Lecturer
50 Dr. Nalani Hennayake	Department of Geography, University of Peradeniya	Lecturer
51 Mr. Yoosuf Ashraj	DSI Tires	Trainee Engineer
52 Mr. Muditha P. Perera	Department of Geography, University of Peradeniya	Lecturer
53 Mr. MSM Razik	Department of Geography, University of Peradeniya	Senior Lecturer
54 Dr. Kamal Abdul Nasem	Teaching Hospital, Peradeniya	Consultant Physician
55 Dr. ASM Nawfhal	University of Peradeniya	Senior Lecturer
56 Ms. HGCS Rajapaksha	University of Peradeniya	Student
57 Dr. Jagath Gunathilake	University of Peradeniya, Geology	Senior Lecturer
58 Mrs. MSS Nazeema	AWWA	R. Principal
59 Mrs. Yathima Hamib	AWWA	Housewife
60 Mrs. Muzeena Razik	AWWA	R. Teacher
61 Mrs. Mufeeda Aroos	AWWA	R. Teacher
62 Ms. Fareeda Amanulla	AWWA	R. Teacher
63 Mrs. Nazly Raubdean	AWWA	Secretary
64 Mr. MAM Shanaz	News view	Officer