

PN-ABY-881

**INITIAL ENVIRONMENTAL EXAMINATION**

of the

**PROPOSED INDUSTRIAL ESTATE AT**

**WALJAPALA WATTA**

**November 1995**

**Prepared for the Ministry of Industrial Development**

by

**NAREPP/IRG**

**Colombo, Sri Lanka**

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The findings and recommendations contained herein represent the best professional judgement of the study team only.

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**WALJAPALA WATTA  
PROPOSED INDUSTRIAL ESTATE  
SUMMARY ENVIRONMENTAL REPORT**

**I. GENERAL SITE DESCRIPTION**

This proposed industrial site is located in the Minuwangoda Divisional Secretariat Division, along the B13 road approximately 2 km from the town of Minuwangoda. The site is approximately 6 hectares (15 acres), and is located on a hill draining primarily towards the north and north-eastern sides of the site (see the regional and site maps, Annex A). The site is an idle rubber plantation; according to the settlers around the estate, the tapping stopped about 18 months ago. Adjoining areas are mainly coconut, rubber and paddy cultivations. There is a stream generating from the hill at the bottom of the slope near the northern boundary.

**II. PHYSICAL ENVIRONMENT**

**A. Weather**

The site is situated within the wet zone of Sri Lanka. The average temperature of the region does not vary significantly (21-33°C) during the year. Average annual rainfall for the Gampaha District for 1989 and 1990 was 1864 mm/yr. Most rainfall (an average of 1122 mm) is received during the Maha season, from October to March; average rainfall during the Yala season from April to September is about 742 mm. Maximum and minimum rainfall experienced during the period are 411 mm (Nov.) and 9.8mm (Feb.). Wind direction is predominantly SW from May to September (SW monsoon) and NE from December to February (NE monsoon). Average wind velocity is about 8.5 km/hr.

**B. Topography, Soils, Ground Water**

A perimeter survey of the proposed site shows straight boundaries along the north and west; the boundary at the east is crooked. The extent of the land proposed for this site is 6.07 ha (15 acres). The site encompasses a steep hill with elevation approximately 25m above MSL, and slopes up to 7%. Approximately 2/3 of the land drains toward the North and NE slopes of the site into a small stream which originates at the bottom of the slope near the northern boundary. All site drainage is towards the paddy fields to the northeast, where it is intercepted by an irrigation canal that drains to the Mapalam Oya downstream of the road bridge. Mapalam Oya is a branch of the Attanagalu Oya.

The soil is sandy and gravelly, falling into the category of well-graded sand; substantial soil erosion was visible on the more exposed upper half of the site. Further information pertaining to soils at the site is given in Annex B.

At the top of the hill a dug well had ground water at a depth of about 10.5 meters, whereas at the bottom of the slope water was present at about 0.5m from the surface. Although no quantitative groundwater measurements were made at this site, the team noted that most of the industries located in the region depend on ground water.

### C. Surface Water Hydrology

On-site surface runoff drains to the Mapalam Oya. There are no permanent flowing streams within the boundary of the site. The stream at the northern boundary has a discharge of about 0.007 m<sup>3</sup>/s (i.e., ≈0.017 MCM/month)

The closest surface water body to the site is the Mapalam Oya, which is a branch of Attanagalu Oya. The flow at the bridge across Mapalam Oya at the B13 road was measured during the site visit and amounted to 3.8 m<sup>3</sup>/s (9.85 MCM/month). The estimated average, maximum and minimum flows at the bridge are 19.84, 29.4 and 1.25 MCM per month respectively.

The flow at the road bridge across Dadugam Oya (another branch of Attanagalu Oya) located 16.5 km on Road B13 off Road A33, was measured during the site visit and amounted to 17.5 m<sup>3</sup>/s (45 MCM/month). The peak and minimum flows at this bridge could not be estimated due to the branching of Attanagalu Oya approximately 5 km upstream.

Downstream from the site, Mapalam Oya water is used for bathing, fishing, agriculture, and domestic water supply. The Raddoluwa Housing Scheme takes water from Dadugam Oya below the bridge at 16.5 km on Road B13 at the rate of 45,000 m<sup>3</sup>/month. Downstream uses of Dadugam Oya are agriculture, fishing, bathing and other domestic purposes.

### D. Water Quality

Water samples were obtained from the below-mentioned locations and analysed to determine the quality of water found in and around the proposed site.

- (1) Mapalam Oya, at the bridge (very close to Minuwangoda town) on the Jaela-Minuwangoda road;
- (2) Dandugam Oya, at the bridge on the Jaela-Minuwangoda road;
- (3) Ground water from a shallow-dug well found at a house (at the top of the hill) near the proposed site;
- (4) Drainage canal carrying surface and sub-surface drainage from the proposed site.

Generally, these waters were found to contain significant levels of fluorides and nutrients. Acidic pH of the shallow well water and the surface/sub-surface drainage water signifies the acidic nature of the local soil (soil containing a significant organic acid

fraction and sulphates). Additional water quality data for this site are reported in Annex C.

#### **E. Air Quality and Noise**

No site-specific air quality data were collected or available from existing sources. The local air quality was observed to be quite good during the site visit, i.e., it was free of significant particulate matter or obvious industrial pollutants, reflecting the generally rural nature of the area. No significant noise sources or problems were noted. The site is an untapped rubber plantation, with no existing industries in the vicinity. Only the few nearby residences at Gunasevanagama could contribute to anthropogenic air or noise emissions.

### **III. CURRENT AND PLANNED FACILITIES AND SERVICES**

#### **A. Water Supply and Wastewater Disposal Options**

The most likely water sources to supply this proposed industrial estate site are:

- (1) Dandugam Oya, flowing about 7-8 km south of the proposed site. This river, however, already supplies water to the Housing estate at Raddoluwa, which is downstream from any potential intake points to this site. The water supply scheme for Raddoluwa is designed for a capacity of 70,000m<sup>3</sup>/month, but currently the monthly consumption is around 40,000 m<sup>3</sup> (Hapuarachchi, M K., 1995).
- (2) Ground water at or near the site. No specific quantitative ground-water analysis was done for this study. Based on the present level of quality of surface and shallow ground water, it would be advisable to evaluate extraction of deep ground water via tube wells. The geology of the area and secondary information from the site visit indicates that the yield of a deep ground water aquifer is likely to be much higher than the yield of the shallow (and more impermeable) aquifer.

The most likely potential post-treatment liquid effluent disposal options are:

- (a) The existing surface and sub-surface drainage canal in the proposed site, which ultimately meets Mapalam Oya;
- (b) Direct discharge to Mapalam Oya.

In either case, treatment prior to discharge should meet CEA water quality standards for existing downstream uses.

## **B. Infrastructure**

1. Power: Power lines border the site along the B13 Road; the nearest substation (CEB) is approximately 4 km away, at Kotugoda. Given the present capacity, any extra demand cannot be met. Additional demand could be considered once the Arniyakanda project is completed in 1996.
2. Telecommunications: There is no telecommunication service at the site; the closest point served is Polwatte village. The town of Minuwangoda, about 1 km away, is fully served and there is a proposed expansion and development program that would include underground cabling. Cellular telephone access is available. According to the Regional Telecommunication Engineer for Negambo, additional loops are not available at present.
3. Transportation: The site has a motorable gravel road around the perimeter. The site is close to the Minuwangoda-Ellangala road, along which public and private transportation services are available. The proposed Katunayake-Veyangoda Road would improve access as well. The Gampaha Rail Station is 3 km (5 miles) away; Katunayake Airport is only 5 km (8 miles) away.
4. Other public services: Minuwangoda is a developed town, and all basic amenities are available there. These include a Police Station, District Hospital, and several schools, including the Minuwangoda Nalanda Central College and the Japala Central College. The Minuwangoda Pradeshiya Sabha refuse service operates up to Polwatte; however, the disposal site is on rented land and is not recommended. Petroleum fuels can be obtained from Minuwangoda.

## **C. Existing Structures and Industrial Activities**

There are no existing structures on the site. The only structures bordering the site are houses of families who have been allocated land from the original estate. The site itself is not developed -- it is still a rubber estate. However, some partitioning plans have been done and some industrialists have already been promised sites. Team members spoke to a potential developer who initially expressed preference but has now given up the idea. Several other industries have expressed interest in the site.

## **IV. BIOLOGICAL ENVIRONMENT AND RESOURCES**

### **A. Significant Flora**

The proposed site is a fairly old rubber plantation. A few species of scrub plants and weeds were observed among the rubber trees; no ecologically important flora were observed. Nearby the Mapalam Oya is being used as a dumping site for solid waste near the bridge. Both banks are covered with grass; in some places, adjoining paddy fields

extend up to the river bank. *Nymphaea stallata* is recorded at Mapalam Oya (Wijesinghe, 1994).

## **B. Significant Fauna**

Several common birds, including the Common crow, Common mynah, Common babbler, Tailor bird, Purple sunbird and Common coucal were observed at the site. Along the Mapalam Oya, several water birds, including the Cattle egret, Median egret and White breasted water hen were noted. The Water monitor, *Varanus salvator*, was also observed near the bridge. There are no known endangered or threatened species on or adjacent to this site.

According to local fishermen and team observations the following fish species were present in Mapalam Oya: Orange Chromide (*Epiplatys maculatus*), Day's Killifish (*Aplocheilichthys dayi*), Dwarf Panchax (*Aplocheilichthys parrisi*), and the Stinging Catfish (*Heteropneustes fossilis*). The Day's Killifish is an endemic but common species.

## **V. SOCIAL AND CULTURAL ENVIRONMENT**

### **A. Human Settlements**

The site is located in the Pattanduwana Gramasevaka Division of the Minuwangoda Secretariat Division of Gampaha District, a larger part of which forms the outer perimeter of Greater Colombo. Pattanduwana consists of two GSDs of the same name (North and South) with a total population over 2000 and is ringed by the GSD of Ambegahawatte to the north, with a population of 1193, Weliya with 1012, and Ellangala to the east with 567, according to 1995 records of the District Secretariat. The majority of people are Sinhalese; other ethnic groups in the area account for less than 200. The majority of Muslims are concentrated in the adjoining village of Galoluwa.

The site is bounded on two sides by houses of a resettlement scheme which are occupied mostly by rubber tappers of the plantation now proposed for the Industrial Estate. The number of houses in the broader area are marginally lower than the householders, who were numbered at 204 in Pattanduwana North, 251 in Ambegahawatte, 146 in Ellangala and 183 in Weliya, according to current statistics maintained at the District Secretariat. In January 1994 Pattanduwana North had 186 families and a total population of 686.

Health facilities are available at Minuwangoda District Hospital. With regard to local schools, high educational standards are maintained at the Minuwangoda Nalanda Central College accounting for student strength of 2552 girls and 2836 boys. Waljapala Central College, another standard college, has a student strength of 1369. For all these schools admission is competitive. Five other junior schools are also located in the area, within approximately 6 km of the site, including Burallapitiya, with 1332 children and 48 teachers and Galollawa, with 774 children and 22 teachers.

## **B. Labour Force**

A majority of the local labour force is involved in self-employment within the area and outside due to limitations on direct employment in the Government and lack of available employment in the private sector. Pattanduwana North has a labour force of 394, of which only 29% of women and 40% of men are employed. In Weliya only about 20 % of total the labour force is employed.

## **C. Local Economic Activity**

The main local economic activity is coconut cultivation, though at Weliya 26 acres are still under rubber -- a vestige from the past. Pattanduwana North is more diversified, with ten acres of banana and four acres of pineapple among other agricultural uses. The paddy fields at the foot of the site near the town appear to be in fallow condition but not the fields at Ellangala upstream. In the absence of any area land-use plan there has been an over-concentration of development along the Divulapitiya road, including haphazard distribution of coconut-based industries.

## **D. Religious and Cultural Features**

The Buddhist temple at Pattanduwana is famous among other village temples. Christians and Muslims also have their places of worship in the town of Minuwangoda. Historical sites are found nearby towards Gampaha in Asgiriya and Dhoranagoda but are not given prominence by historians.

## **E. Aesthetic and Recreational Features**

The local area, including the town of Minuwangoda has no outstanding natural aesthetic features. There is no organized public recreational facility in Minuwangoda, but the large playing field of Waljapala Central College might offer a recreational opportunity for workers at the site.

## **F. Local Customs, Aspirations, and Attitudes**

Self-sustenance and self-determination are the hallmarks of the local populace. They want to achieve a transformation of Minuwangoda into a more viable economic center.

# **VI. MAJOR ENVIRONMENTAL AND REGULATORY ISSUES**

## **A. Sensitivity of the Affected Environment**

This site lacks any outstanding natural features worthy of special protection. Regarding potential off-site effects of industrial development, any effluent from industries at the site should be treated up to a level such that it does not hinder the current downstream uses of this river (such as irrigation, fisheries and contact recreation).

## B. Regional Water Resource Limitations

If any water withdrawal is contemplated from the Dandugam Oya, care should be taken to assure that such withdrawal will not adversely affect the existing housing estate at Raddoluwa. If ground-water withdrawal is to be permitted for industrial use, further on-site analysis of ground-water quality and sustainable quantity should be undertaken to ensure that such withdrawals are feasible, particularly during the dry season.

## C. Regulatory Issues

Approval of plans for surface or ground-water use for this estate should be coordinated with the Irrigation Department, the Water Supply and Drainage Board, the C.E.A., and local authorities.

In order to avoid substantial adverse secondary effects from unplanned development of the adjacent lands, M/ID should involve local and regional authorities in developing and administering an area land-use plan before allowing industries to use this estate.

## VII. GENERAL CONCLUSIONS AND RECOMMENDATIONS

**This site was rated by the team as having medium to high pollution assimilative capacity and high to medium local resource availability.** The site is considered to be generally suitable for industries of medium pollution potential and resource needs. The site has adequate access to local labour, both skilled and unskilled, and to transport and infrastructure. The principal constraints on the site's suitability for high-polluting industries are:

- The site's relatively small size and limited expandability, making it probably unsuitable for locating a centralized wastewater treatment plant;
- Nearby residential areas and schools, which could be adversely affected by pollutants and noise.
- Lack of existing solid waste disposal site.

The site also has relatively steep slopes and erosive soils, which will have to be managed carefully during construction to avoid sediment discharges into nearby water bodies and paddy fields. The site's proximity to Minuwangoda provides good community resources for potential workers; however **plans should be developed to properly locate any new residential and commercial areas near the site that might be needed if the site is developed as an industrial estate.**

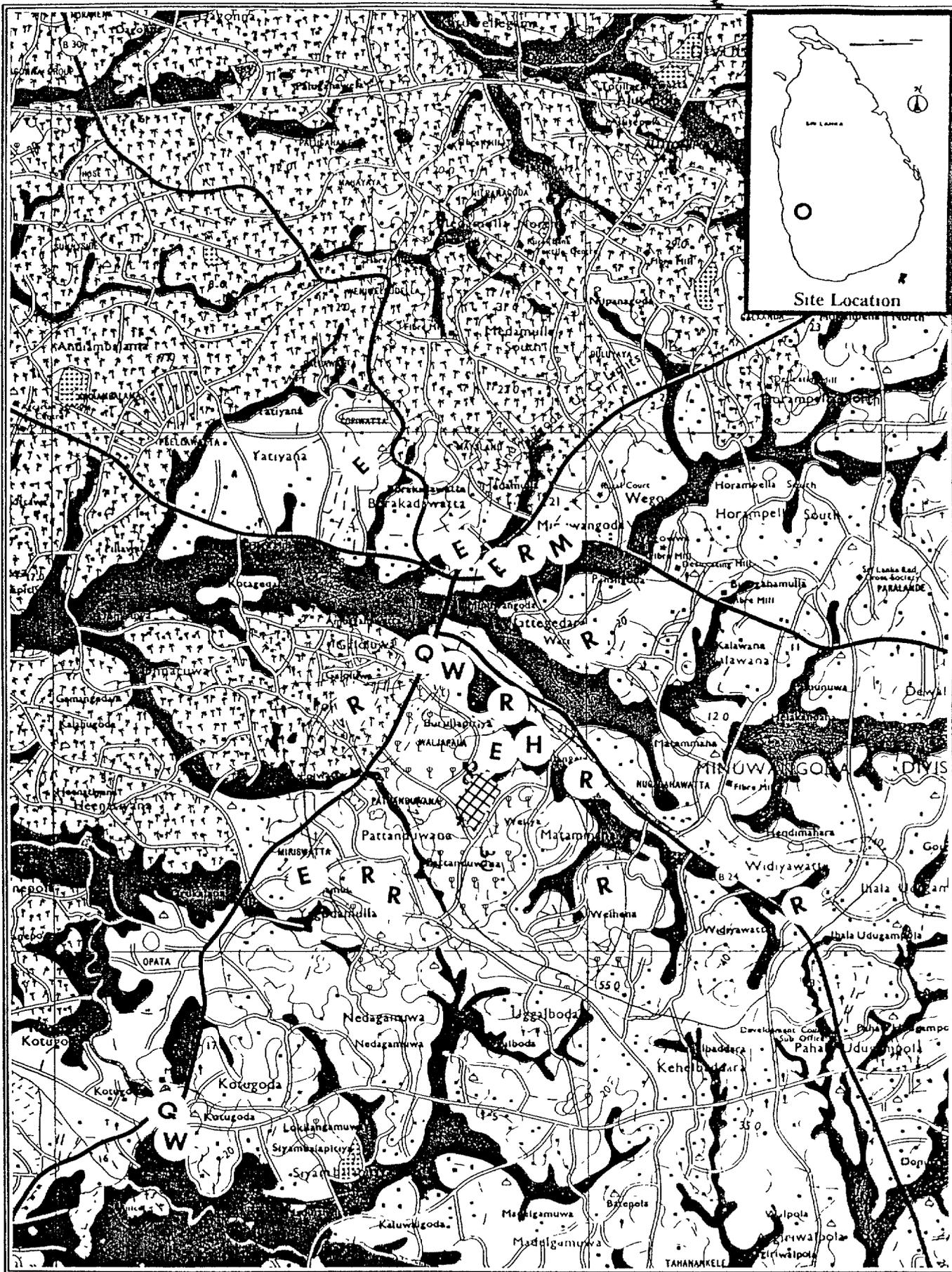
## REFERENCES

Hapuarachchi, M. K. (1995) "Computation of Water Demands in Water Supply Schemes," Seminar Report Presented at the University of Moratuwa, Sri Lanka.

Natural Resources, Energy and Science Authority of Sri Lanka (1991) Natural Resources of Sri Lanka: Conditions and Trends.

Pethiyagoda, R. (1991) Freshwater Fishes of Sri Lanka, Wildlife Heritage Trust of Sri Lanka.

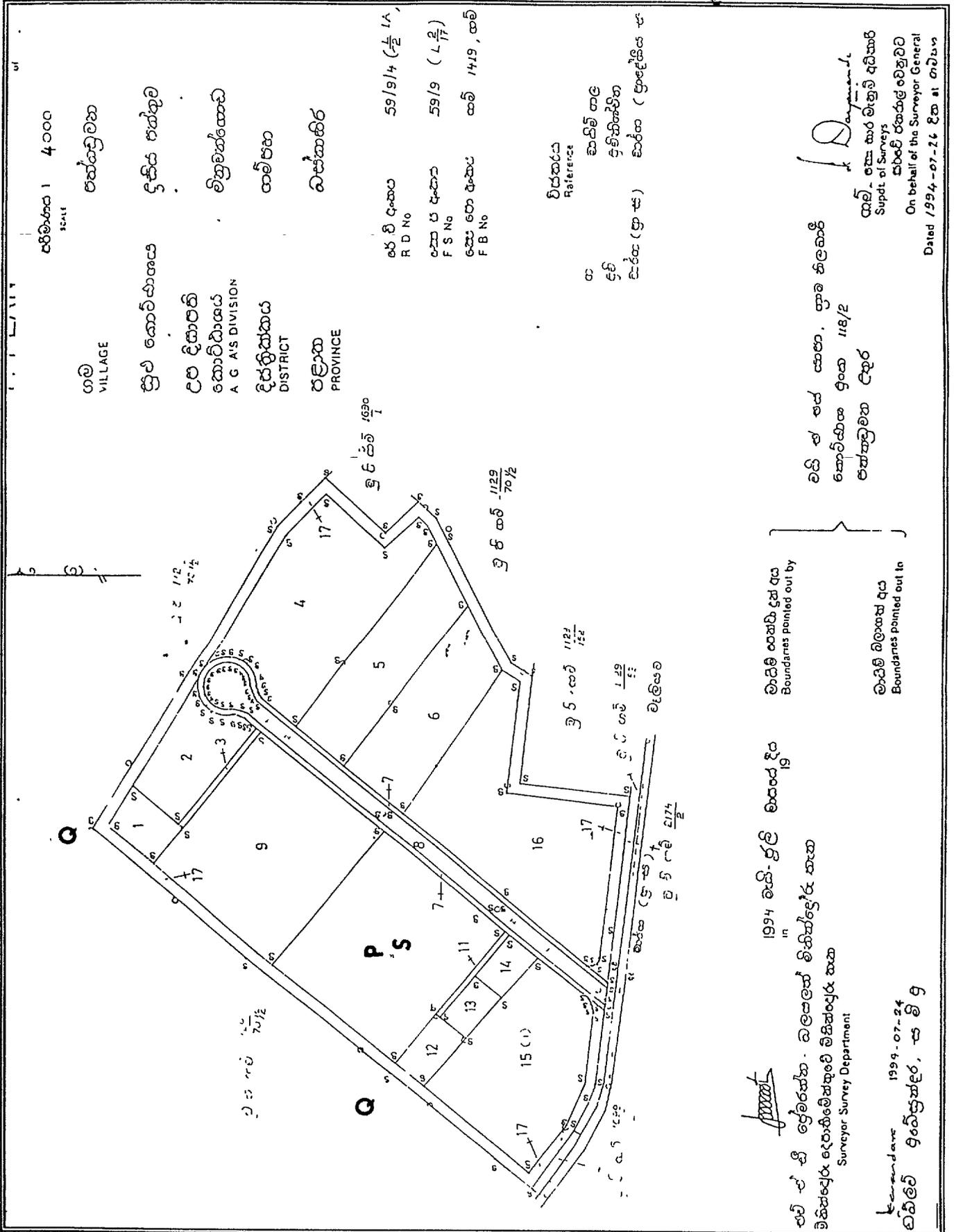
Wijesinghe, Yvonne (1994) Checklist of Woody Perennial Plants of Sri Lanka, Natural Resources, Energy and Science Authority/Forest Department



Location Map of Proposed Industrial Estate - Waljapala watta

Scale Produced using 1 50,000  
Topographic Map

- A - Archeological
- E - Schools
- H - Important Habitats
- I - Industries
- M - Medical Facility (Hospital)
- P - Percolation Measurement Point
- Q - Water Quality Sampling Point
- R - Religious(Temple, Church, Kovil/Mosque)
- S - Soil Sampling Point
- W - Water Quantity Measurement Point



Perimeter Survey Map - Proposed Industrial Estate - Waljapala watta

- A - Archeological
- E - Schools
- H - Important Habitats
- I - Industries
- P - Percolation Measurement Point
- Q - Water Quality Sampling Point
- R - Religious(Temple, Church, Kovil/Mosque)
- S - Soil Sam Point

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**ANNEX A-III: SITE PHOTOGRAPHS - WALJAPALA WATTA**

**A. Proposed site for Industrial Estate at Waljapala in Minuwangoda.**

**B. Mahalama Oya - recipient of drainage water from the proposed Waljapala site.**

**WALJAPALA WATTA**



A. Proposed site for Industrial Estate at Waljapala in Minuwangoda



B. Mabalama Oya - recipient of drainage water from the proposed Waljapala site.

12.

## ANNEX B: DETAILED SOIL ANALYSIS

### SOIL AND SURFACE WATER : METHODS OF COMPUTATION

- ◆ Site Elevations in MSL are based on Survey Department Topographic Maps or available contour maps for the respective site.
- ◆ Maximum slope values are based on physical measurements during study.
- ◆ Reservoir capacity estimates other than from irrigation department are based on the average depths observed during site visits.
- ◆ Rainfall values are based on data collected from regional institutions during site visits and the historical data from hydrological annuals and Ceylon Electricity Board Water Resources Data Base (July 1987).
- ◆ Maximum, Minimum and Average river flows are based on the historical flow data. In cases where streamflow data were absent, representative runoff ratios from hydrological annuals were used with rainfall in respective regions and watersheds identified using topographic maps.
- ◆ Hydraulic Conductivity Data and Sorptivity data are based on Infiltrometer Tests done at each site fitted to infiltration curve by Philip (1957).
- ◆ Soil moisture contents and the organic matter contents by Gravimetry.
- ◆ Soil quality by liquid (water) extraction and relevant water quality methods.
- ◆ Wind and temperature estimates are based on the information in the National Atlas of Sri Lanka.
- ◆ Soil classification is according to the unified system.

**Soil Data for Proposed Industrial Estate at Waljapala Watta**

Description	Unit	Site 1
Sampling Depth	mm	250
Moisture Content	%	18.535
Organic Matter	%	18.71
Classification		SW
Chloride Cl <sup>-</sup>	mg/gr	0.10
Nitrates NO <sub>3</sub> <sup>-</sup> -N	mg/gr	0.0015
Fluoride F <sup>-</sup>	mg/gr	0.030
Phospate PO <sub>4</sub> <sup>3-</sup> - P	mg/gr	N/D
pH		6.27
Hydraulic Conductivity (saturated)	cm/hr	N/A
Sorptivity	cm/(hr <sup>1/2</sup> )	N/A

N/D = Not detected  
 N/A = Not available

## ANNEX C: DETAILED WATER QUALITY ANALYSIS

### INDUSTRIAL ESTATES SITING STUDY, 1995

#### SUMMARY OF ANALYTICAL METHODS

PARAMETER	UNITS	METHOD	DETECTION LEVEL
TSS	mg/l	Gravimetry	-
TDS	mg/l	Gravimetry	-
DO	mg/l	Titrimetry	-
BOD	mg/l	Titrimetry	-
COD	mg/l	Open - Reflux, Titrimetry	-
pH	-log H <sup>+</sup>	Selective ion electrode	0.01
Cl <sup>-</sup>	mg/l	Titrimetry	-
SO <sub>4</sub> <sup>2-</sup>	mg/l	Gravimetry	-
F <sup>-</sup>	mg/l	Colorimetry	0.1
NH <sub>4</sub> <sup>+</sup> - N	mg/l	Colourization/Spectrophotometer	0.01
NO <sub>3</sub> <sup>-</sup> - N	mg/l	Colourization/Spectrophotometer	0.01
PO <sub>4</sub> <sup>3-</sup> - P	mg/l	Colorimetry	2.0
Alkalinity	mg CaCO <sub>3</sub> /l	Titrimetry	-
Hardness	mg CaCO <sub>3</sub> /l	Titrimetry	-

WATER QUALITY ANALYSIS :

PROPOSED SITE AT WALJAPALA WATTA (MINUWANGODA)

GAMPAHA DISTRICT

Location	Date of Sample	TSS	TDS	DO	BOD <sub>5</sub>	COD	BOD/COD	pH	Temp.	Cl <sup>-</sup>	SO <sub>4</sub> <sup>2-</sup>	F <sup>-</sup>	NH <sub>3</sub> -N	NO <sub>3</sub> -N	PO <sub>4</sub> <sup>3-</sup> - P	Carb. Alk.	Bicarb. Alk.	Carb. Hard.	Non-Carb. Hard.	Flow rate
Mabalam Oya	Aug 15 - Aug 16, 1995	29	110	6.0	2.7	64	0.04	7.1	29	28	16.2	1.6	0.36	0.05	26.1	Nil	20	15	Nil	3.8 m <sup>3</sup> /S
Well	-do-	3.0	160	6.2	6.0	42	0.15	6.6	27	21	15.6	6.0	0.40	0.15	ND	Nil	100	80	Nil	-
Dandugam Oya	-do-	15	100	8.5	2.0	24	0.08	7.3	29.5	18	19	6.0	0.32	0.10	ND	Nil	30	25	Nil	17.5 m <sup>3</sup> /S
Site drainage canal	-do-	7.0	80	4.9	2.5	44	0.06	6.2	29	21	12.3	0.8	0.63	0.05	ND	Nil	10	10	5	0.3 ft <sup>3</sup> /S
Proposed minimum ambient quality		-	-	3.0	4.0	-	-	5-8.5	-	1200	400	1.5	4.0	5.0	0.7	-	-	600		

ND = Not Detected