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INITIAL ENVIRONMENTAL EXAMINATION

of the

PROPOSED INDUSTRIAL ESTATE AT

KARANAWAN WATTA (DANKOTUWA)

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

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TABLE OF CONTENTS

I.	GENERAL SITE DESCRIPTION	1
II.	PHYSICAL ENVIRONMENT	1
	Weather	1
	Topography, Soils, Groundwater	1
	Surface Water Hydrology	2
	Water Quality	2
	Air Quality and Noise	2
III.	CURRENT AND PLANNED FACITLITES AND SERVICES	
	Water Supply and Wastewater Disposal Options	3
	Infrastructure	3
	Existing Structures and Industrial Activities	4
IV.	BIOLOGICAL ENVIONRMENT AND NATURAL RESOURCES	
	Significant Flora	4
	Significant Fauna	4
	Sensitive Habitat	4
V.	SOCIAL AND CULTURAL ENVIRONMENT	
	Human Settlements	5
	Labour Force	5
	Local Economic Activity	5
	Religious and Cultural Features	5
	Aesthetic and Recreational Features	6
	Local Customs, Aspirations, and Attitudes	6
VI.	MAJOR ENVIRONMENTAL AND REGULATORY ISSUES	
	Sensitivity of the Affected Environment	6
	Regional Water Resource Limitations	6
	Regulatory Issues	6
VII.	GENERAL CONCLUSIONS AND RECOMMENDATIONS	7
	REFERENCES	
	ANNEX A-1: Regional Map	
	ANNEX A-II: Site Map	
	ANNEX A-III Site Photographs	
	ANNEX B: Detailed Soil Analysis	
	ANNEX C: Detailed Water Quality Analysis	

KARANAWAN WATTA
PROPOSED INDUSTRIAL ESTATE
INITIAL ENVIRONMENTAL EXAMINATION

I. GENERAL SITE DESCRIPTION

The proposed site is located in Mohottimulla, approximately four kilometres from Dankotuwa town, along the Mawatagama-Kuliyapitiya secondary road. The tract of about 23.5 hectares (58 acres) is currently a coconut estate which has a major section with moderately healthy fruit-bearing trees. The balance of the area is planted with younger trees, and is also partially used to cultivate pineapple and plantains. The site forms a small hill with two gradual slopes to the north and south. On the southern side a few hundred meters away from the estate boundary a small stream originating at the bottom of the slopes drains to an irrigated paddy area. See Annex A for regional and site maps.

II. PHYSICAL ENVIRONMENT

A. Weather

The site is situated within the wet zone of Sri Lanka. Average temperature (21-33°C) does not vary greatly during the year. Annual rainfall at Bandirippuwa Estate about 4 km away from the site was 1842 mm for 1993 and 1994. The maximum and minimum rainfall during this period were, respectively, 378 mm (Oct) and 3.8 mm (Jan). An average rainfall of 1027 mm is received from October to March (Maha season); average rainfall from April to September (Yala season) is 815 mm. Wind direction is predominantly SW from May to September (SW monsoon) and NE from December to February (NE monsoon), The average wind velocity is about 8.5 km/hr.

B. Topography, Soils, Groundwater

The site as surveyed is a roughly rectangular tract of 23.48ha, elongated in the NE direction and at an approximate elevation of 30m msl (see site map in Annex A-II). The land slopes at up to 1.4% downward to the northwest and southeast from a central hill, with water from both slopes draining to nearby paddy fields. The southern section covers about 1/3 of the site. The soils at the site are classified as poorly-graded sandy clay. The tests indicate that the soils in the southern section of the site have moderate permeability, while the soils to the north near the brick-making location have excellent permeability and excellent water-holding capacities. These tests suggest that the part of the site near the slopes acts as an aquifer recharge area (see Annex B for detailed soil analysis). Two dug wells on the site indicated laterites below the top soil layer of about 1-1.5m. The well on the southern slope had water at 6m depth; the well on the northern slope had water at 7.5m.

C. Surface Water Hydrology

There are no permanent flowing streams within the site boundary. However, at the northern toe of the slope there is a tiny stream originating from the site. The stream flow is about 1 x $10^{-5} m^3/sec$ (26 $m^3/month$). This water flows through the paddy field. The stream at the paddy field, which collects additional drainage water, had a flow rate measured during the team's site visit of 0.12 m^3/s (0.31 MCM/month). The stream at the southern boundary was stagnant and not flowing during the site visit due to the lack of water draining into it.

Maha Oya, which is approximately 4.5 km away from the site, is the only significant surface water source in the vicinity. Data for stream flow from 1954 to 1986 of Maha Oya at Badalgama (CEB Master Plan for Electricity Supply of Sri Lanka) located approximately 7 km upstream of the closest point to the site shows an average flow of 45.6 m^3/s (118 MCM/month). The maximum and minimum flow of Maha Oya are 114.5 m^3/s (297 MCM/month) in November and 11.4 m^3/s (29.55 MCM/month) in February.

The water uses downstream from the site other than bathing and washing include a drinking water supply intake for Negombo Town with a capacity of approximately 0.6 MCM/month. Sand mining is taking place on a large scale along Maha Oya, close to the bridge at Kochchikade.

D. Water Quality

In order to assess the current condition of water found in the vicinity of the proposed site, water samples were taken from following two locations:

(1) Shallow dug well found near the entrance to the proposed site;

(2) Drainage canal running through the paddy field bounding the proposed site.

Water sampled from the drainage canal was found to contain a significant nutrient level. Furthermore, the high fluoride level in these waters also cause concern. More detailed water quality data for parameters measured at the above locations are summarized in Annex C.

E. Air Quality and Noise

No site-specific air quality data are available. Existing local air emission sources include:

(1) Solid waste burning (black smoke) from Lanka Novelties (Pvt) ltd. soft toy factory. This is uncontrolled pit burning; children nearby also complain of burning rubber smell.

(2) Brick Kiln - cottage industry adjacent to the site. Fuel source appears to be fuelwood.

Current levels of noise from existing human activity are generally low; if noise emissions were to increase significantly it could adversely affect nearby residents.

III. CURRENT AND PLANNED FACILITIES AND SERVICES

A. Water Supply and Wastewater Disposal Options

Following are the most likely potential sources for water supply to the proposed industrial estate.

(1) Ground water: Depth to top of water in local wells was found to be between 20 and 30 ft, with the depth of water within those wells ranging between 6-8 ft, during the team's site visit. It is recommended that a quantitative pumping test be carried out before approving this source of water for industrial use.

(2) Maha Oya: This river flows to the sea at Kochchikade, south of this proposed site, at a distance of about 5 km. It should be noted that this river is not perennial and also that it already supplies potable water to Negombo town down-stream of any potential intake point to this site. Furthermore, extensive sand mining from the river bed and clay mining on the river banks was observed. Views of the NWSDB and the CEA should be sought to determine if the Maha Oya is a feasible water supply option.

The only reasonably feasible wastewater disposal option as seen from the limited site survey appears to be the surface/sub surface drainage canal originating from a point very close to the proposed location for the meat-processing plant. Detailed investigations on the current and planned downstream uses of this drainage water is recommended before approval is granted to discharge (properly treated) liquid effluent to this canal.

B. Infrastructure

1. Power: There are electric power lines on the north and south borders of the site; the closest grid substation is Bolawatte.

2. Telecommunications: Kochchi kade telecom exchange serves this site via a telephone line in the road to the south. According to Lanka Novelties, they have requested more lines to their factory, but so far they have not received any additions to their existing one. Cellular telephone service is available.

3. Transportation: The site is on the Mawatagama-Lihiriyagama road. This is a 'C' grade road and this is maintained by the Provincial Council. At present the road is not very suitable for a high volume of traffic or for heavy loads.

4. Other public services: The closest police station and all other basic public services are about 5 km away at Dankotuwa. Basic health care is available at Dankotuwa District Hospital and Kirimatiyawa Ayurvedic Hospital, which is 5 km down the Nattandiya road. Bujjampola Government School (up to ordinary level) is closest to the site. Katukenda Maha Vidyalaya is also located in Dankotuwa; this school, however, has Commerce and Arts streams only.

C. Existing Structures and Industrial Activities

As stated above, most of the site itself is still undeveloped land. However, the Lanka Novelties (Pvt) Ltd. - a BOI project - is a significant industrial activity already operating on the site, from one main building. This activity does not appear to be part of a comprehensive site development plan, because the inside road is in poor condition and there seems to be no provision for proper solid waste disposal or other central infrastructure. According to our information, a wooden toy production facility is expected, and several other potential industrial users have plans in various stages of development.

The brick-making activity adjacent to the site is continuing as a cottage industry. Sawdust required as fuel for this operation is transported from Moratuwa in lorries.

IV. BIOLOGICAL ENVIRONMENT AND RESOURCES

A. Significant Flora

The proposed site is still mostly a coconut plantation. A few natural plant species were observed along the southern stream down to paddy fields, including one *Dipterocarpus* species, Mango, and a few woody scrub species.

B. Significant Fauna

Two common lizards, namely *Calotes calotes* and *Calotes versicolor* were recorded at the site. Several bird species, including the Common Babbler, Common Mynah, Bronze-wing Pigeon, Indian Roller and Black-headed Oriole were also observed during the field visit. One common endemic fresh water fish, the Day's Killifish (*Aplocheilus dayi)* was present along the stream and at paddy fields. The Open-bill Stork, Little Egret, Indian Pond Heron and White-breasted Kingfisher were also observed in the adjacent paddy lands.

C. Sensitive Habitat

The site itself does not appear to contain any ecologically significant natural habitat. Adjacent paddy fields and drainage canal could be adversely affected by liquid effluent discharges.

V. SOCIAL AND CULTURAL ENVIRONMENT

A. Human Settlements

Karanawan Watta is within the GSD of Haldanduwana Centre. The area's relatively large population (3428) reflects the impact of new settlement colonies -- Vijayagama Colony (24 Acres) and Karanawan-watte Colony (25 Acres) located to the west and southeast of the site. There are a total of 8 GSDs within a few kilometers of the site, which indicates the local area's high population density -- Mohottimula Upper (748); Mohottimula Lower (953); Bujjampola Upper (745); Bujjampola Lower (1648); Haladanduwana Centre (3428); Haldanduwana North (1102); Haldanduwana South (1527) and Haldanduwana West (1885).

This area is within the administrative control of the Local Authority. Proper zoning regulations are apparently not in effect; prepared sites for new buildings were observed among the traditional village settlements bordering the proposed industrial estate.

B. Labour Force

The labour force of the eight GSDs is about 5450, based on an average of 54% employment for 47 GSDs of the entire Minuwangoda Division. Employment of the labour force varies from 36% to 63% within these GSDs.

C. Local Economic Activity

Local workers have traditionally found employment in coir coconut fibre mills (there are 12 within 4 km of the site), tile factories, and agriculture. With the opening of garment factories (three operate within 4 km) traditional occupations of female workers have been affected by employment in the factories. The coconut plantation on the site currently yields about 5000 nuts per two months pluck, which is much below the regional average; labour there has been curtailed to 10 persons. The Korean-owned toy factory that occupies five acres of the site employs approximately 900 local full-time workers. The Jayakody and Mawatagama descicated coconut mills, both located within 6 km of the site, each employ 80 - 110 workers. Other local business activities include a tile factory at Mohottimulla Upper that employs 15, a coir mill at Bujjampola that employs 80, and the Hanuma fireworks factory that employs another 80 persons. The nearby Dankotuwa Porcelain factory is also a significant industrial activity, even though their raw material now comes from other regions.

D. Religious and Cultural Features

Two temples are functioning at Mohettimulla and Bujjampola and a catholic church at Haldanduwana Centre. There are no notable historical or cultural sites in the vicinity.

E. Aesthetic and Recreational Features

There are no prominent features of aesthetic value in the area except the Mahamukalare forest reserve, approximately 3 km from the site, nor is there any organised local recreational activity.

F. Local Customs, Aspirations, and Attitudes

The local population is a mixture of persons of varying social status; the people appear receptive to change and welcome new avenues for employment.

VI. MAJOR ENVIRONMENTAL AND REGULATORY ISSUES

A. Sensitivity of the Affected Environment

As is stated above, the site itself does not appear to contain any ecologically significant natural habitat; effects on life forms from development of this site are more likely to occur off-site, as a result of ground-water withdrawal, fresh-water diversion from the Maha Oya, and discharge of liquid effluent into the nearby drainage canal. These water-related impacts, as well as any significant airborne toxic pollutants, could also adversely affect the adjacent paddy fields as well as nearby villagers. These potential effects should be further evaluated after more precise estimates of water use and discharge for the site are made, based on specific industry proposals.

B. Regional Water Resource Limitations

As stated above, removal of significant amounts of water either from the Maha Oya or from local ground water could adversely affect existing users. Thus any plans for surface or further 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 prior to approval.

C. Regulatory Issues

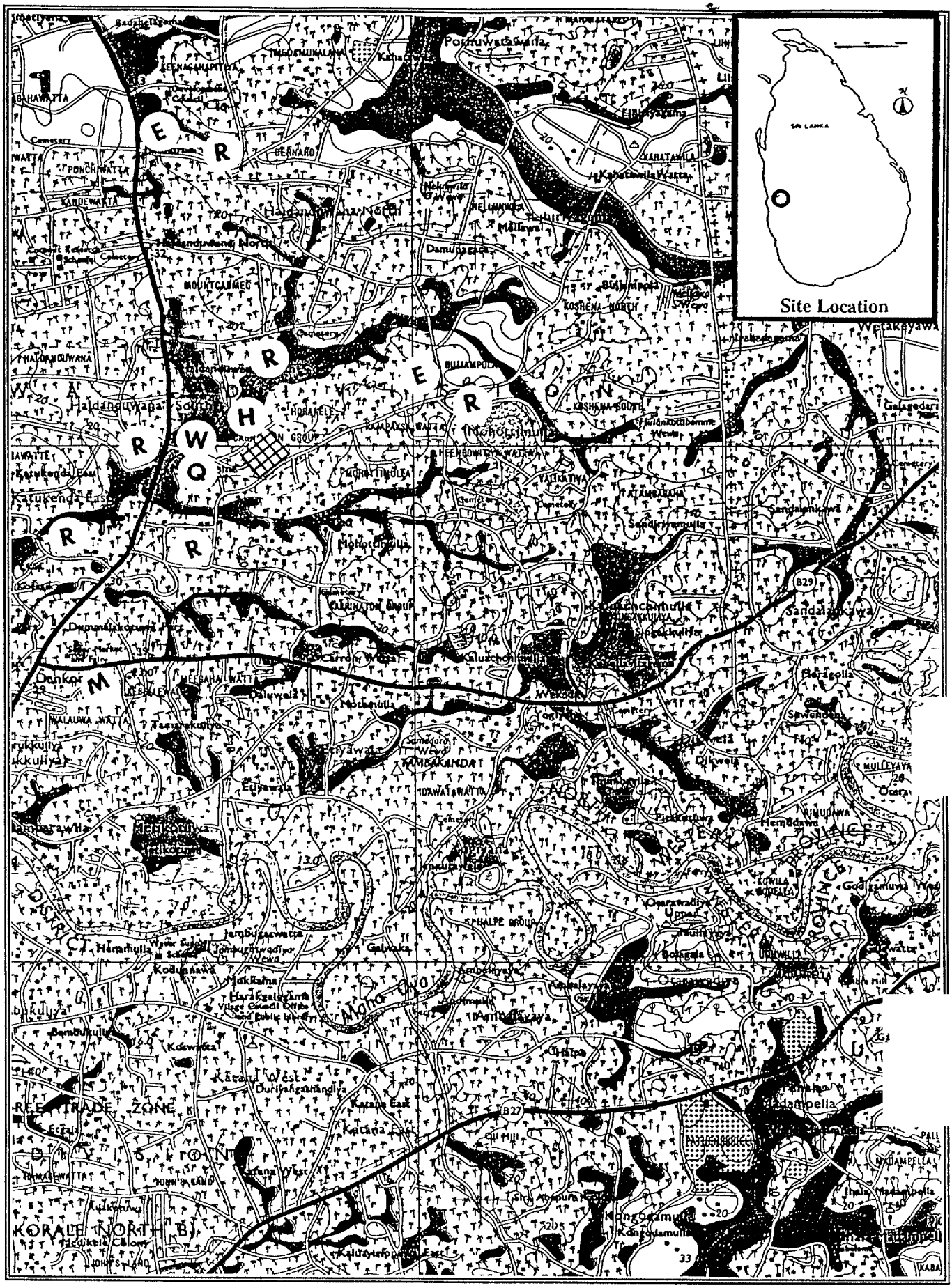
In order to avoid substantial adverse secondary effects from unplanned development of the adjacent lands, M/ID should involve local and regional authorities in developing and administering an area land-use plan before additional industries are permitted to use this estate. Furthermore, there seems to be some uncertainty as to what the conditions are for land ownership or lease or transfer at this site, and uncertainty as to which government agency or agencies have that authority. This matter should be clarified before the site is further developed.

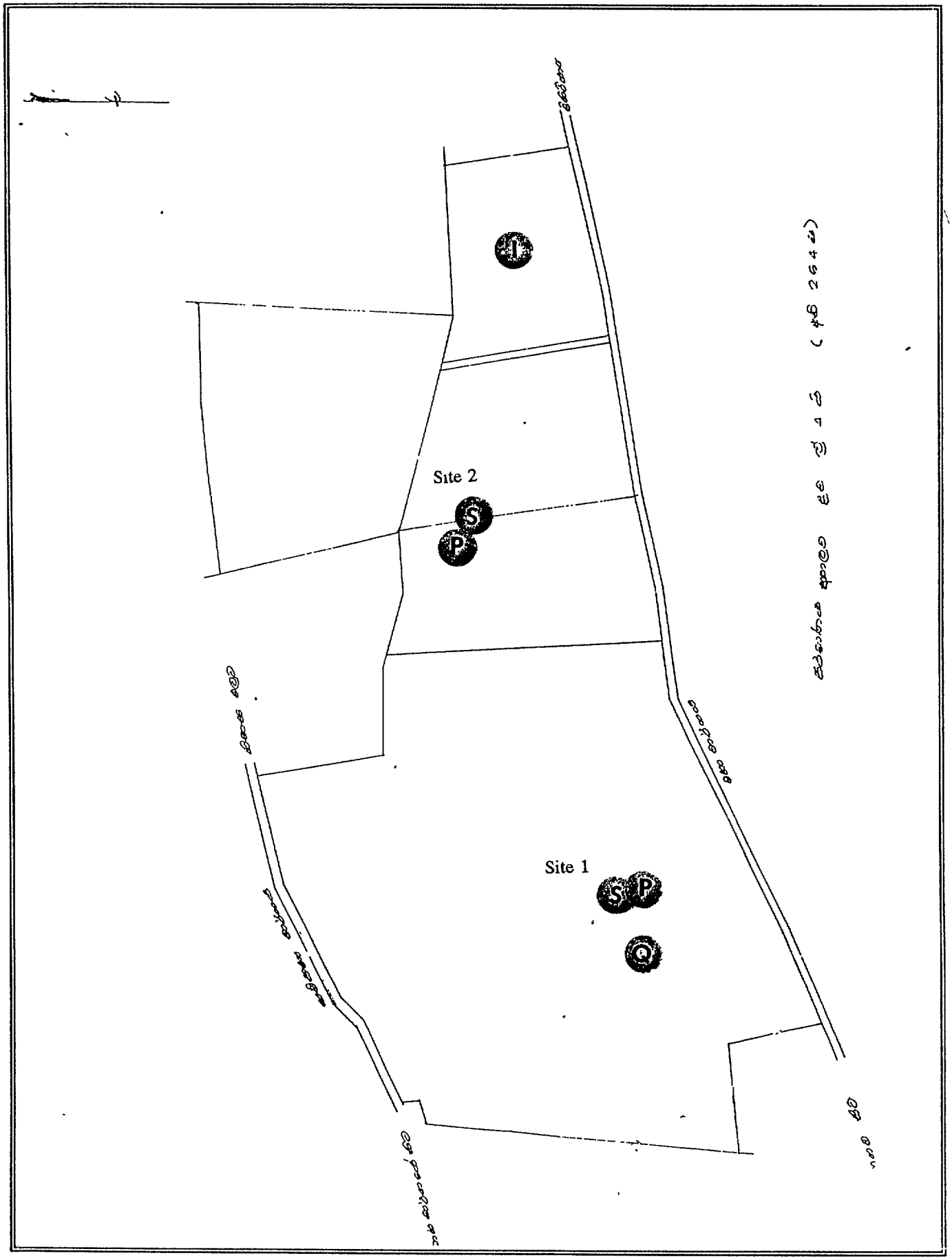
VII. GENERAL CONCLUSIONS AND RECOMMENDATIONS

This site was rated by the team as having medium to high pollution assimilative capacity, and medium to high local resource availability. The site is considered to be generally suitable for industries of medium pollution potential and resource needs. The principal limiting factors are:

- Limited surface water availability and uncertainty regarding availability of ground water;
- Low capacity for wastewater discharge and assimilation;
- Lack of existing solid waste disposal site.

The site's somewhat limited access to transportation, skilled labour, and public utilities were also given consideration. Industries most suitable for location on this site would be small to medium-scale, with relatively low need for water and low levels of liquid and solid waste generation. Several such industries have apparently expressed interest in locating at this site; **aggregate resource requirements and wastewater discharges should be estimated and compared with the site's characteristics to select the most suitable and compatible mix of industries.**


Site Location
SRI LANKA
Karanawan watta
Karana West
Karana East
Kongodamulla
Kongodamulla
Kaluwaraipola East
Kaluwaraipola
Kaluwaraipola
Kaluwaraipola



Perimeter Survey Map - Proposed Industrial Estate - Karanawan 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 Sar

A. Proposed Industrial Estate site at Karanawan watta in Dankotuwa.

B. Drainage canal collecting surface and subsurface drainage from the proposed site. Water flows over a weir-structure on the canal.

KARANAWAN WATTA

A. Proposed Industrial Estate site at Karanawan watta in Dankotuwa.

B. Drainage canal collecting surface and subsurface drainage from the proposed site. Water flows over a weir-structure on the canal.

KARANAWAN WATTA

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.

12

Soil Data for Proposed Industrial Estate at Karanawan Watta

Description	Unit	Site 1	Site 2
Sampling Depth	mm	250	250
Moisture Content	%	6.41	0.58
Organic Matter	%	5.33	1.20
Classification		SP	SP
Chloride Cl^-	mg/gr	0.50	0.30
Nitrates No^-_3 -N	mg/gr	0.00	0.0005
Fluoride Fl^-	mg/gr	0.04	0.04
Phospate PO^3_4 - P	mg/gr	N/D	N/D
pH		6.10	5.92
Hydraulic Conductivity (saturated)	cm/hr	1.17	15.12
Sorptivity	cm/(hr $^{1/2}$)	3.94	4.38

N/D = Not detected

13

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^+	Selective ion electrode	0.01
Cl^-	mg/l	Titrimetry	-
SO_4^2	mg/l	Gravimetry	-
F^-	mg/l	Colorimetry	0.1
NH_4^+ - N	mg/l	Colourization/Spectrophotometer	0.01
NO_3^- - N	mg/l	Colourization/Spectrophotometer	0.01
PO_4^3 - P	mg/l	Colorimetry	2.0
Alkalinity	mg $CaCO_3$/l	Titrimetry	-
Hardness	mg $CaCO_3$/l	Titrimetry	-

WATER QUALITY ANALYSIS :

PUTTALAM DISTRICT

PROPOSED SITE AT KARANAWAN WATTA (DANKOTUWA)

Location	Date of Sample	TSS	TDS	DO	BOD_5	COD	BOD/COD	pH	Temp.	C1	SO_4^{2-}	F^-	NH_3-N	NO_3^--N	PO_4^{3-} - P	Carb. Alk.	Bicarb. Alk.	Carb. Hard.	Non-Carb. Hard.	Flow rate
Well	Aug 1 1995	2 0	30	6 4	7 0	40	0 18	7.1	27	28	17	2 0	0 02	ND	ND	Nil	10 0	10 0	10 0	-
Irrigation/ Drainage Canal	-do-	34	100	4.0	7 0	60	0.12	7.3	29.6	28	26	1.6	5.60	0 08	ND	Nil	60 0	60 0	60.0	0 12 m^3/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