

APPENDICES

APPENDIX 1

MEMBER LIST OF THE SURVEY TEAM

1. Member of the Basic Design Study Team

Name	Work Assignment	Current Position
Mr. Hayao ADACHI	Team Leader	Development Specialist Institute for International Cooperation JICA
Mr. Atsumu IWAI	Project Coordinator	Second Project Management Division Grant Aid Project Management Department JICA
Mr. Mitsuhsa NISHIKAWA	Chief Consultant / Power Development Planner	Yachiyo Engineering Co., Ltd.
Mr. Masatsugu KOMIYA	Power Transmission and Distribution Facilities Planner	Yachiyo Engineering Co., Ltd.
Mr. Kazuhiro NAKAMURA	Substation Facilities Planner	Yachiyo Engineering Co., Ltd.
Mr. Atsuhito URUNO	Procurement Planner	Yachiyo Engineering Co., Ltd.

2. Members of the Explanation Team for the Draft Basic Design

Name	Work Assignment	Current Position
Mr. Hayao ADACHI	Team Leader	Development Specialist Institute for International Cooperation JICA
Mr. Mitsuhsa NISHIKAWA	Chief Consultant / Power Development Planner	Yachiyo Engineering Co., Ltd.
Mr. Masatsugu KOMIYA	Power Transmission and Distribution Facilities Planner	Yachiyo Engineering Co., Ltd.
Mr. Kazuhiro NAKAMURA	Substation Facilities Planner	Yachiyo Engineering Co., Ltd.

APPENDIX 2

SURVEY SCHEDULE

1. Itinerary of the Basic Design Study

No	Day		Activities		Stay at
			Official Members	Consultant Members	
1	4/25	Sun.		*Trip [Tokyo~Chicago by NH-012]. *Trip [Chicago~Miami by NH-7408]	Miami
2	4/26	Mon.		*Trip [Miami~Curacao by AA-1879] *Trip [Curacao~Paramaribo by PY-4978]	Paramaribo
3	4/27	Tue.		*Courtesy Call to: - Embassy of Japan - Ministry of Natural Resources and Energy - NV Energiebedrijven Suriname (EBS) *Submission of the Inception Report to EBS	Paramaribo
4	4/28	Wed.		*Discussion with EBS regarding the Inception Report, Field survey schedule and Contents, Background & Objectives of the Request	Paramaribo
5	4/29	Thu.		*Visiting of Soil investigation companies and General construction companies for inquiring their quotations. *Field survey and confirmation of the Project area at Commewijne district	Paramaribo
6	4/30	Fri.		*Field survey and confirmation of the Project area at Saramacca district	Paramaribo
7	5/1	Sat.		*Collection of general information and Market survey at Paramaribo city	Paramaribo
8	5/2	Sun.		*Internal Meeting and Collection of general information at Paramaribo city	Paramaribo
9	5/3	Mon.		*Field survey of substation sites at Commewijne district *Collection of proposals and quotations from soil investigation companies	Paramaribo
10	5/4	Tue.	*Trip [Tokyo~Los Angeles by NH-006]	*Field survey of substation sites at Saramacca district *Evaluation of proposals and quotations from soil investigation companies and preparation of Report to JICA Tokyo with comparison table.	Los Angeles Paramaribo
11	5/5	Wed.	*Trip [Los Angeles~Miami by AA-2133] *Trip [Miami~Caracas by AA-2133]	*Field survey of Paramaribo street P/S and Substation *Field survey of Port of Suriname river *Field survey of cable crossing points at Suriname river	Caracas Paramaribo
12	5/6	Thu.	*Courtesy call to Embassy of Japan at Caracas *Trip [Caracas~Curacao by LM-515] *Trip [Curacao~Paramaribo by PY-4978]	*Obtaining of the approval to conclude the Contract with the soil investigation company from JICA Tokyo. *Concluding the Contract of the Soil investigation work *Confirmation of core boring locations at substation sites	Paramaribo
13	5/7	Fri.	*Internal meeting *Courtesy call to: - Embassy of Japan - Ministry of Natural Resources and Energy *Meeting with EBS and submission of the Draft Minutes of Discussions (M/D) to EBS.	*A-team (Nishikawa & Komiya): Courtesy call and meeting with EBS together with Official members *B-team (Nakamura & Uruno): Confirmation of soil investigation works and detail survey of New substation sites	Paramaribo
14	5/8	Sat.	*Field survey (Commewijne district)	*A-team (Nishikawa & Komiya): Field survey together with official members *B-team (Nakamura & Uruno): Detailed Survey of the transmission and distribution routes at Commewijne district	Paramaribo
15	5/9	Sun.	*Internal meeting		Paramaribo
16	5/10	Mon.	*Field survey (Saramacca district)	*A-team (Nishikawa & Komiya): Field survey together with official members *B-team (Nakamura & Uruno): Detailed Survey of the transmission and distribution routes at Commewijne district	Paramaribo
17	5/11	Tue.	*Discussion on the Draft Minutes of Discussions (M/D) and Confirmation of background, Content and objectives of the Project with EBS	*A-team (Nishikawa & Komiya): Discussion with EBS together with official members *B-team (Nakamura & Uruno): Detailed Survey of the transmission and distribution routes at Commewijne district	Paramaribo

18	5/12	Wed	*Discussion on and Finalization of Draft Minutes of Discussions (M/D) with EBS	*A-team (Nishikawa & Komiya): Discussion with EBS together with official members *B-team (Nakamura & Urano): Detailed Survey of the transmission and distribution routes at Saramacca district.	Paramaribo
19	5/13	Thu.	*Signing of Minutes of Discussions (M/D) with EBS---Morning *Report to Embassy of Japan---Afternoon.		Paramaribo
20	5/14	Fri.	*Trip [Paramaribo~Miami by PY-4977] *Trip [Miami~Los Angeles by AA-2140]	*Detailed Survey of the transmission and distribution routes at Saramacca district.	Los Angeles Paramaribo
21	5/15	Sat.	*Trip [Los Angeles~	*Collection of general information and Market survey at Paramaribo city	On flight/ Paramaribo
22	5/16	Sun.	~Tokyo by NH-005]	*Internal meeting *Sorting of Data and information collected	Paramaribo
23	5/17	Mon.		*Detailed Survey of the transmission and distribution routes at Saramacca district.	Paramaribo
24	5/18	Tue.		*Detailed Survey of the transmission and distribution routes at Commewijne district.	Paramaribo
25	5/19	Wed.		*Detailed Survey of the transmission and distribution routes at Commewijne district.	Paramaribo
26	5/20	Thu.		*Detailed Survey of the transmission and distribution routes at Commewijne district.	Paramaribo
27	5/21	Fri.		*Collection of general data and information such as EDS's development plan, organization, operating data, financial data, etc. *Sorting and analysis of survey results of transmission and distribution routes	Paramaribo
28	5/22	Sat.		*Collection of general data and information and Quotation of the construction cost. *Sorting and analysis of survey results of the transmission and distribution routes	Paramaribo
29	5/23	Sun.		*Internal meeting *Sorting and analysis of Data and information collected	Paramaribo
30	5/24	Mon.		*Collection of general information such as National development plan(s), Natural conditions, Technical data, equipment procurement situations, labor forces etc.	Paramaribo
31	5/25	Tue.		*Collection of general information such as National development plan(s), Natural conditions, Technical data, equipment procurement situations, labor forces etc.	Paramaribo
32	5/26	Wed		*Re-confirmation of present situations of Saramacca district and collection of additional data & information.	Paramaribo
33	5/27	Thu.		*Re-confirmation of present situations of Saramacca district and collection of additional data & information	Paramaribo
34	5/28	Fri.		*Re-confirmation of present situations of Commewijne district and collection of additional data & information	Paramaribo
35	5/29	Sat.		*Internal meeting *Sorting and analysis of Data and information collected	Paramaribo
36	5/30	Sun.		*Internal meeting *Sorting and analysis of Data and information collected *Preparation of the Field report	Paramaribo
37	5/31	Mon.		*Preparation of the Field report	Paramaribo
38	6/1	Tue.		*Submission of and Explanation on the Field report	Paramaribo
39	6/2	Wed		*Explanation on and discussion of the Field report with EBS	Paramaribo
40	6/3	Thu.		*Obtaining of approvals for the Field report from EBS *Courtesy call and report to: - Ministry of Natural Resources and Energy - Embassy of Japan	Paramaribo
41	6/4	Fri.		*Trip [Paramaribo (11:00)~Curacao PY-4977] *Trip [Curacao~Miami (15:25) by AA-1880]	Los Angeles
42	6/5	Sat.		*Trip [Miami (17:10)~Los Angeles (20:10) by AA-912] *Trip [Los Angeles (13:00)~	On flight
43	6/6	Sun		~Tokyo (16:15) by NH-005]	Tokyo

2. Itinerary of Draft Report Explanation

No.	Date	Activities		Stay at
		Official member	Consultant members	
1	18 Aug.(Wed)	<ul style="list-style-type: none"> * Trip from Tokyo (11:15) to Chicago (08:40) by NH-012 * Trip from Chicago (14:25) to Caracas (22:20) by UA-869 via Miami 		Caracas
2	19 Aug.(Thu)	<ul style="list-style-type: none"> * Courtesy call to Embassy of Japan to Venezuela * Trip from Caracas (16:00) to Curacao (16:50) by LM-515 * Trip from Curacao (18:00) to Paramaribo (21:30) by PY-4978 		Paramaribo
3	20 Aug.(Fri)	<ul style="list-style-type: none"> * Courtesy call to Embassy of Japan to Suriname * Courtesy call to EBS and the Ministry of Foreign Affairs * Discussion of the Team's schedule with EBS * Submission and explanation of the Draft Final Report to EBS 		Paramaribo
4	21 Aug.(Sat)	<ul style="list-style-type: none"> * Visiting of Affobakka dam site 		Paramaribo
5	22 Aug.(Sun)	<ul style="list-style-type: none"> * Internal meeting * Sorting of data collected 		Paramaribo
6	23 Aug.(Mon)	<ul style="list-style-type: none"> * Courtesy call to the Ministry of Natural Resources * Explanation of and discussion on the Draft Final Report with EBS * Field survey of the project sites * Preparation of the draft Minutes of Discussions (the M/D) and F/R(draft) 		Paramaribo
7	24 Aug.(Tue)	<ul style="list-style-type: none"> * Explanation of and discussion on the Draft Final Report with EBS * Submission and explanation of the draft M/D to EBS * Courtesy call to Embassy of the Netherlands and the Ministry of Public Works in order to explain the contents of the Project * Field survey of the Project sites * Preparation of F/R(draft) 		Paramaribo
8	25 Aug.(Wed)	<ul style="list-style-type: none"> * Explanation of and discussion on the draft M/D with EBS * Correction of the M/D if necessary 		Paramaribo
9	26 Aug.(Thu)	<ul style="list-style-type: none"> * Signing of the M/D between the JICA Study Team and EBS * Courtesy call to EBS * Courtesy call to Embassy of Japan to Suriname * Obtaining of approval for F/R 		Paramaribo
10	27 Aug.(Fri)	<ul style="list-style-type: none"> * Trip from Paramaribo (11:00) to Curacao (12:30) by PY-4977 * Trip from Curacao (14:52) to Miami (17:52) by AA-1880 	<ul style="list-style-type: none"> * Explanation of and discussion on the specifications of the Equipment * Reconfirmation of the project sites 	Miami (Official) Paramaribo (Consultant)
11	28 Aug.(Sat)	<ul style="list-style-type: none"> * Trip from Miami (07:10) to Los Angeles (09:11) by AA-910 * Trip from Los Angeles (13:15) to Tokyo (16:25+1) by NH-005 	<ul style="list-style-type: none"> * Explanation of and discussion on the specifications of the Equipment * Reconfirmation of the project sites 	On Flight (Official) Paramaribo (Consultant)
12	29 Aug.(Sun)	<ul style="list-style-type: none"> * Arrival at Tokyo (16:25) by NH-005 	<ul style="list-style-type: none"> * Internal meeting * Sorting of data collected 	Paramaribo
13	30 Aug.(Mon)		<ul style="list-style-type: none"> * Trip from Paramaribo (11:00) to Curacao (12:30) by PY-4977 * Trip from Curacao (14:55) to Miami (17:52) by AA-1880 	Miami
14	31 Aug.(Tue)		<ul style="list-style-type: none"> * Trip from Miami (07:20) to Los Angeles (09:24) by AA-912 * Trip from Los Angeles (13:15) to Tokyo (16:25+1) by NH-005 	On Flight
15	01 Sep.(Wed)		<ul style="list-style-type: none"> * Arrival at Tokyo (16:25) by NH-005 	

APPENDIX 3

LIST OF PARTY CONCERNED IN THE RECIPIENT COUNTRY

List of Party Concerned in the Recipient Country

The Ministry of Foreign Affairs

H.E. Mr. Erroll G. Sniijders
Ambassador Drs. H. A. Alimahomed
Ms. Vyantimala Ramtaran

Minister for Foreign Affairs
Permanent Secretary
Acting Deputy Chief of the Asian-African Division

The Ministry of Natural Resources

H.E. Mr. E Alibux
Mr. Jainoel H. Abdul

Minister for Natural Resources
Permanent Secretary for Energy,
Mining and Water Supply

The Ministry of Public Works

Mr. D.K. Mungra
Mr. Ronny Blufland

Director
Project Manager of Suriname River Bridge Project

Saramacca District

Mr. Albert Gitoroemakso

District Commissioner

N.V. Energie Bedrijven Suriname (EBS)

Mr. Henry P. Wormer

President of Board of Directors
Managing Director

Mr. F.A. Watson

Manager of Electricity Division

Mr. Roy K. Tjong A Hung

Manager of Planning

Mr. Marcel K. Eyndhoven

Manager of Electrical Construction

Mr. Samuel Mehairjan

Manager of Electrical Operations

Mr. Chin Tsoe Liong

Head of Purchasing, Shipping & Store

Mr. Kenneth R. Profijt

Internal and External Affairs

Mr. Wilfred. Joval

Superintendent (Substations, Transmission & Testing)

Mr. Sendar W.J.

Superintendent of Electrical Work

Mr. Marciano I. Bohr

Economic and Financial Services

Mr. Shung Tak Chan

Superintendent (Substations)

Mr. Roy F. Hoost

Superintendent of Electrical Work (Construction)

Mr. Cha A Yong

Assistant Chef of Distribution Planning
and Calculations

Mr. Haft Leendert

Assistant Superintendent for Rural Power Stations
(Mechanical Engineer)

Mr. Amersingh Gadjo

Electrical Engineer

Mr. Rellum Lucien

Head of Drawing Room

Mr. Dwarka Biswanandsharma

Secondary Wiring Engineer

Mr. W.A. Sarmo

Superintendent of Electrical Work (Alliance Area)

Mr. Wpril Calvin

Superintendent of Electrical Work

Mr. Monadjat. T.

Superintendent of Electrical Work

Mr. Bryan Overeem
Mr. Eric Kemper

Electrical Engineer
Electrical Employee

TELESUR

Mr. Alfons Volkerts

Superintendents of Cable Networks (Fiber Optics)

Maritime Authority Suriname

Mr. A. Sastoropwawiro

Chief of Hydrographic Office

Central Bureau for Statistics

Ms. Moeri

Head of Demographic Statistics Division

Ballast Nedam International

Mr. Joseph Dassen

QA/QC Manager

Embassy of Royal Netherlands in Suriname

Mr. Huub Hendrix

Head of Development Cooperation Section

Mr. Boermans

Acting Head of Development Cooperation Section

Ms. Carin E.F. Lobbezoo

Second Secretary

Embassy of Japan in Venezuela

Mr. Akira Yasui

First Secretary

Mr. Ikuo Takahashi

Department of Technical Cooperation

Embassy of Japan in Suriname

Mr. Shinzo Uchimura

Chargé d'Affaires ad interim

Mr. Katsumi Ishiguro

Attaché

APPENDIX 4

MINUTES OF DISCUSSIONS

MINUTES OF DISCUSSIONS
BASIC DESIGN STUDY
ON
THE PROJECT
FOR
THE EXPANSION OF TRANSMISSION AND DISTRIBUTION GRID
FOR
THE DISTRICTS COMMEWIJNE AND SARAMACCA
IN
THE REPUBLIC OF SURINAME

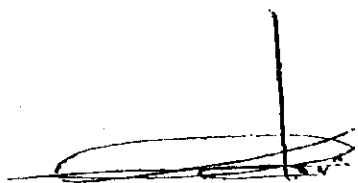
In response to a request from the Government of the Republic of Suriname, the Government of Japan decided to conduct a basic design study on the Project for the Expansion of Transmission and Distribution Grid for the Districts Commewijne and Saramacca in the Republic of Suriname (hereinafter referred to as "the Project") and entrusted the study to Japan International Cooperation Agency (JICA).

JICA has sent to Suriname a study team, headed by Mr. Hayao ADACHI, Development Specialist, Institute for International Cooperation, JICA, and scheduled to stay in the country from April 26 to June 4, 1999.

The team held discussions with the officials concerned of the Government of Suriname and personnel of NV Energie Bedrijven Suriname (EBS), and conducted field surveys at the study areas.

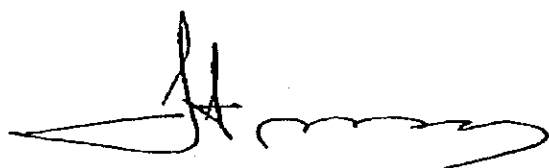
In the course of the discussions and field surveys, both parties have confirmed the main items described on the attached sheets. The team will proceed to further works and prepare the Basic Design Study report.

Paramaribo, May 13, 1999



Mr. Hayao ADACHI
Leader
Basic Design Study Team
JICA

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Mr. Henry P. Wormer
Managing Director
N.V. Energiebedrijven Suriname (EBS)
The Republic of Suriname

ATTACHMENT

1. Objective

The objective of the Project is to provide regular, reliable and constant supply of electricity to households, public, commercial and industrial facilities in the selected areas at Commewijne and Saramacca districts in the Republic of Suriname by expanding the existing power transmission and distribution grid of Paramaribo.

2. Project Sites

The Project site is located in the northern areas of Commewijne and Saramacca districts as shown in Annex-I.

3. Responsible and Implementing Agencies

The N.V. Energiebedrijven Suriname (EBS) is responsible for the administration and the implementation of the Project. The organization chart of EBS is shown in Annex-II.

4. Items requested by the Government of Suriname

After discussion with the Basic Design Study Team, the following items were finally confirmed as requested by the Suriname side.

(1) Substation facilities

1) New La Paix substation in Commewijne district

- a) Supply and installation of equipment and materials necessary for the substation such as a main transformer (33/12.6 kV, Max.10 MVA), 33 kV and 12.6 kV outdoor switchgear panels, a remote control panel, DC supply system, etc. including necessary construction materials.
- b) Construction of equipment foundations, an oil/water separator, outdoor cable pit and rain water drainage within boundary necessary for item a) above.

2) New Sidodadiweg substation in Saramacca district

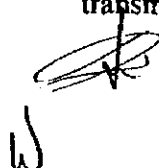
- a) Supply and installation of equipment and materials necessary for the substation such as a main transformer (33/12.6 kV, Max.10 MVA), 33 kV and 12.6 kV outdoor switchgear panels, a remote control panel, DC supply system, etc. including necessary construction materials.
- b) Construction of a control house, equipment foundations, an oil/water separator, cable pit and rain water drainage within boundary necessary for item a) above.

3) Existing substation-B

- a) Supply and installation of a 33 kV indoor switchgear panel and a remote control panel including necessary construction materials, in order to connect with a new 33 kV transmission line to New La Paix substation in Commewijne district.

4) Existing substation-D

- a) Supply and installation of a 33 kV indoor switchgear panel including necessary construction materials, in order to connect with a new 33 kV transmission line to Sidodadiweg substation in Saramacca district.



- 5) Spare parts and operation & maintenance manuals
 - a) Provision of spare parts for one (1) year operation and maintenance tools for items 1) ~ 4) above.
 - b) Provision of operation and maintenance manuals for items 1) ~ 4) above.
- (2) Equipment and materials for 33 kV transmission and 12.6 kV distribution lines
 - 1) 33 kV transmission line in Commewijne district
 - a) Supply of equipment and materials necessary for construction of 33 kV under ground transmission line (approximately 1.5km length from substation-B to the river side at Bethesda) such as underground cable, terminal kits, etc.
 - b) Supply of equipment and materials necessary for construction of 33 kV river crossing transmission line (approximately 1.6km length from the river side at Bethesda to those at Meerzorg) such as underwater cable, terminal kits, etc.
 - c) Supply of equipment and materials necessary for construction of 33 kV overhead transmission line (approximately 16.5km length from Meerzorg to La Paix) such as conductors, steel poles for angle and dead end (approximately 25 poles), steel arms, insulators, surge arrestors with counter, etc., except ordinary electric poles.
 - 2) 12.6 kV distribution lines in Commewijne district
 - a) Supply of equipment and materials necessary for construction of 12.6 kV overhead distribution line (approximately 13km length) such as conductors, steel arms, insulators, pole mounted transformers, air break switches, surge arrestors, etc., except electric poles.
 - b) Supply of equipment and materials necessary for construction of 12.6 kV river crossing distribution line (crossing of Commewijne river to Margaretta, approximately 1.5km length) such as underwater cable, terminal kits, etc.
 - 3) 33 kV transmission line in Saramacca district
 - a) Supply of equipment and materials necessary for construction of 33 kV overhead transmission line (approximately 23km length from Garnizoenspad to Sidodadiweg) such as conductors, steel poles for angle and dead end (approximately 40 poles), steel arms, insulators, surge arrestors with counter, etc., except ordinary electric poles.
 - b) Supply of equipment and materials necessary for construction of 33 kV under ground transmission line (approximately 0.8km length for Saramacca bridge) such as under ground cables, terminal kits, etc.
 - 4) 12.6 kV distribution lines in Saramacca district
 - a) Supply of equipment and materials necessary for construction of 12.6 kV overhead distribution line (approximately 42km length) such as conductors, steel arms, insulators, pole mounted transformers, air break switches, surge arrestors, etc., except electric poles.
 - b) Supply of equipment and materials necessary for construction of 12.6 kV under ground distribution line (approximately 0.8km length through Saramacca bridge) such as under ground cables, terminal kits, etc.
 - 5) Installation, operation and maintenance manual(s)
 - a) Provision of installation, operation and maintenance manual(s) for items 1) ~ 4) above.

However, final items to be supplied and installed under Japan's Grant Aid will be decided after further studies in Japan.




5. Japan's Grant Aid System

- (1) The Government of the Republic of Suriname and its implementing agency have understood the system of Japan's Grant Aid explained by the Team, as described in Annex-III.
- (2) The Government of the Republic of Suriname and its implementing agency will take necessary measures, as described in Annex-IV, for smooth implementation of the Project, on condition that the Grant Aid Assistance by the Government of Japan is extended to the Project.

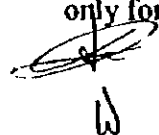
6. Schedule of the Study


- (1) The consultant will proceed to further studies in Suriname until June 4, 1999.
- (2) Based on the Minutes of Discussions and technical examination of the study results, JICA will prepare a draft report (including draft detailed specifications of equipment) in English and dispatch a mission to Suriname in order to explain its contents around the end of August, 1999.
- (3) In case that the contents of the draft report (including draft detailed specifications of equipment) are accepted in principal by the Government of the Republic of Suriname, JICA will complete the final report and send it to the Government of the Republic of Suriname by the end of December 1999.

7. Other relevant issues

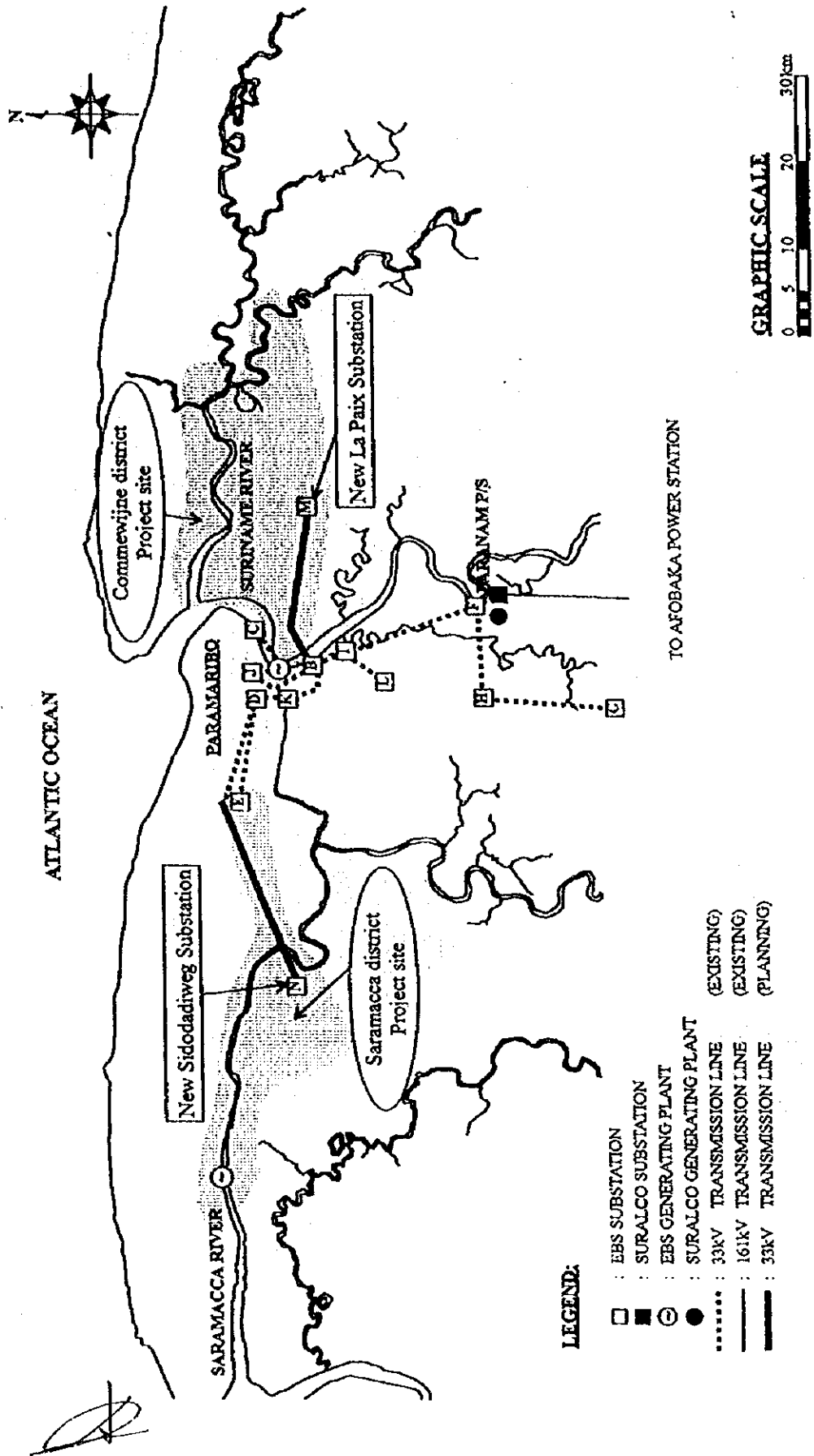
Both parties have confirmed that the following conditions have been involved in items requested by the Suriname side.

- (1) Installation of equipment & materials for transmission & distribution networks
The Suriname side agreed to complete, by own budget, the installation work for equipment and materials for the transmission & distribution networks procured under the Project within certain period to meet the requirements of Japan's grant aid.
- (2) Equipment and materials other than those that will be supplied under the Project
Necessary equipment and materials other than those that will be supplied under the Project, such as electric poles for both 33kV and 12.6 kV lines, SCADA system, low voltage equipment, etc. shall be procured and installed by the Suriname side within certain period to meet the requirements of Japan's grant aid.
- (3) Operation and Maintenance
Suriname side agreed to secure and allocate necessary budget and personnel for operation and maintenance for the new transmission & distribution networks including substation facilities provided/constructed under the Project, in order to maintain the proper function of the new transmission & distribution networks.
- (4) Usage of Equipment and materials
Suriname side agreed to use equipment and materials to be supplied under the Project, only for the Project site.



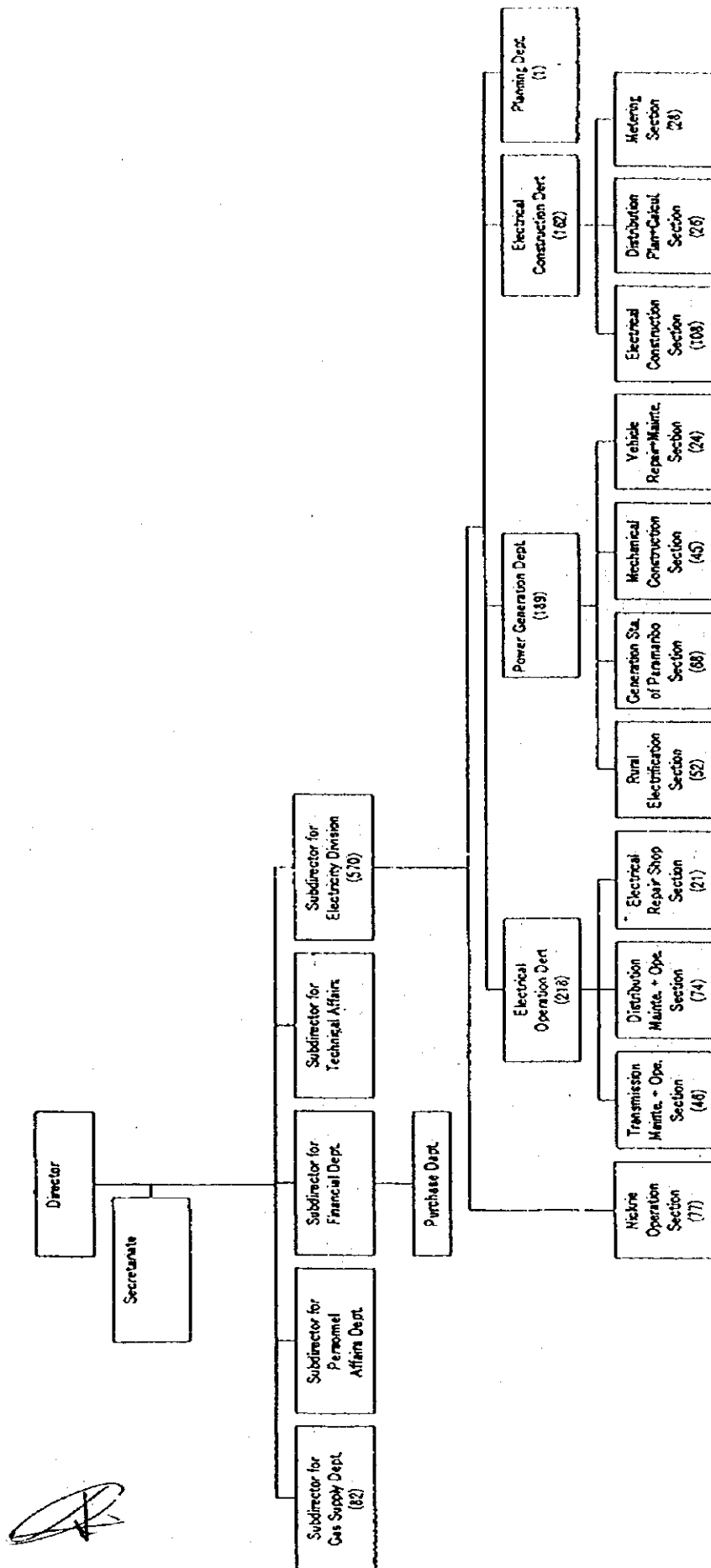
- (5) Supervisory and Control system (SCADA system)
Suriname side agreed to purchase and install necessary equipment and materials in order to incorporate new substations to be constructed under the Project, into the existing SCADA system to harmonize with the existing SCADA facilities.
- (6) Storage of Equipment and Materials
Suriname side agreed to secure the proper storage system for the equipment and materials to be supplied under the Project so as not to suffer from missing items, with necessary spaces, fences, lamps, security guards, etc., and procedures of store management, if necessary.
- (7) Counterpart training in Japan
Suriname side requested the team to invite two(2) engineers to Japan for the counterpart training related to the Project, in order to obtain the latest technology of equipment to be supplied under the Project and to learn the management system of the transmission and distribution grid.
The team replied Suriname side to convey their request to the Government of Japan and suggested to prepare and to issue the new request to the Government of Japan, because the counterpart training is a different scheme from the grant aid project.
- (8) Dispatching of supervising engineer(s) to the site
The team agreed to advise to the Government of Japan to dispatch engineer(s) to the project sites in order to supervise the installation works done by Suriname side for 33kV overhead transmission lines and those of river crossing cables.
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ANNEX-I Project Sites



Project Sites

ANNEX-II The Organization chart of EBS



Remarks : : About 900 staffs as of 1999
 () shows staffs

Source : EBS

ANNEX-III

Japan's Grant Aid Scheme

1. Grant Aid Procedures


- (1) Japan's Grant Aid Program is executed through the following procedures.
- | | |
|---------------------------------|--|
| Application | (Request made by a recipient country) |
| Study | (Basic Design Study conducted by JICA) |
| Appraisal & Approval | (Appraisal by the Government of Japan and Approval by Cabinet) |
| Determination of Implementation | (The Notes exchanged between the Governments of Japan and the recipient country) |
- (2) Firstly, the application or request for a Grant Aid project submitted by a recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is eligible for Grant Aid. If the request is deemed appropriate, the Government of Japan assigns JICA (Japan International Cooperation Agency) to conduct a study on the request. Secondly, JICA conducts the study (Basic Design Study), using (a) Japanese consulting firm(s). Thirdly, the Government of Japan appraises the project to see whether or not it is suitable for Japan's Grant Aid Program, based on the Basic Design Study report prepared by JICA, and the results are then submitted to the Cabinet for approval. Fourthly, the project, once approved by the Cabinet, becomes official with the Exchange of Notes signed by the Governments of Japan and the recipient country. Finally, for the implementation of the project, JICA assists the recipient country in such matters as preparing tenders, contracts and so on.

2. Basic Design Study

- (1) Contents of the Study
- The aim of the Basic Design Study (hereinafter referred to as "the Study"), conducted by JICA on a requested project (hereinafter referred to as "the Project") is to provide a basic document necessary for the appraisal of the Project by the Japanese Government. The contents of the Study are as follows:
- a) Confirmation of the background, objectives, and benefits of the requested project and also institutional capacity of agencies concerned of the recipient country necessary for the Project's implementation.
 - b) Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, social and economic point of view.
 - c) Confirmation of items agreed on by both parties concerning the basic concept of the Project.
 - d) Preparation of a basic design of the Project
 - e) Estimation of costs of the Project

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid project. The Basic Design of the Project is confirmed considering the guidelines of Japan's Grant Aid Scheme.

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.



(2) Selection of Consultants

For smooth implementation of the Study, JICA uses (a) registered consultant firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms. The firm(s) selected carry(ies) out a Basic Design Study and write(s) a report, based upon terms of reference set by JICA.

The consulting firm(s) used for the Study is(are) recommended by JICA to the recipient country to also work on the Project's implementation after the Exchange of Notes, in order to maintain technical consistency.

3. Japan's Grant Aid Scheme

(1) What is Grant Aid?

The Grant Aid Program provides a recipient country with non-reimbursable funds to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with the relevant laws and regulations of Japan. Grant Aid is not supplied through the donation of materials as such.

(2) Exchange of Notes (E/N)

Japan's Grant Aid is extended in accordance with the Notes exchanged by the two Governments concerned, in which the objectives of the Project, period of execution, conditions and amount of the Grant Aid, etc., are confirmed.

(3) "The period of the Grant Aid" means the one fiscal year which the Cabinet approves the Project for. Within the fiscal year, all procedures such as exchanging of the Notes, concluding contracts with (a) consultant firm(s) and (a) contractor(s) and final payment to them must be completed.

However in case of delays in delivery, installation or construction due to unforeseen factors such as weather, the period of the Grant Aid can be further extended for a maximum of one fiscal year at most by mutual agreement between the two Governments.

(4) Under the Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased.

When the two Governments deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country.

However the prime contractors, namely, consulting, contracting and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

(5) Necessity of "Verification"

The Government of recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. This "Verification" is deemed necessary to secure accountability to Japanese taxpayers.

(6) Undertakings required of the Government of the Recipient Country

In the implementation of the Grant Aid project, the recipient country is required to undertake such necessary measures as the following:

1) To secure land necessary for the sites of the Project and to clear, level and reclaim the land prior to commencement of the construction.

2) To provide facilities for the distribution of electricity, water supply and drainage and other incidental facilities in and around the sites.

3) To secure buildings prior to the procurement in case the installation of the equipment.

4) To ensure all the expenses and prompt execution for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid.

- 5) To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts.
 - 6) To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the Verified Contracts, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.
- (7) "Proper Use"
- The recipient country is required to maintain and use the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for this operation and maintenance as well as to bear all the expenses other than those covered by the Grant Aid.
- (8) "Re-export"
- The products purchased under the Grant Aid should not be re-exported from the recipient country.
- (9) Banking Arrangements (B/A)
- 1) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.
 - 2) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an authorization to pay issued by the Government of the recipient country or its designated authority.

A handwritten signature, possibly "W", is written below the text of item (9).

ANNEX-IV

Necessary measures to be taken by the Government of Suriname on condition that Japan's Grant Aid is extended.

1. To provide necessary data and information for the Project.
2. To secure and provide cleared embanked and leveled land as well as access road for new substations, prior to the commencement of the construction for the Project.
3. To ensure speedy unloading, customs clearance and tax exemption of the goods for the Project at port and /or airport of disembarkation, and internal transportation in the Republic of Suriname.
4. To accord Japanese nationals whose services may be required in connection with the supply of products and services under the verified contracts such facilities as may be necessary for their entry into the Republic of Suriname and stay therein for the performance of their work.
5. To exempt Japanese nationals from custom duties, internal taxes and other fiscal levies which may be imposed in the Republic of Suriname with respect to the supply of the products and services under the verified contracts.
6. To bear commissions to a Japanese bank for the banking services based upon the banking arrangement.
7. To bear all the expenses other than those to be borne by the Grant Aid necessary for the execution of the Project.
8. To provide proper arrangements for the construction/installation work, such as water supply, electricity, drainage, etc, if necessary
9. To assign exclusive counterpart engineers and technicians to the Project in order to transfer the operation and maintenance technique for the Project and to witness and confirm construction/installation works and qualities of equipment and materials when inspection is carried out.
10. To take necessary measures and responsibility for the stoppage of electricity during construction / installation period, when it is necessary.
11. To construct and to connect the cables supplied by the Japan's grant aid for incoming and outgoing feeders for substations that will be constructed under the Project.
12. To use and maintain properly and effectively all the equipment and materials provided under the Japan's Grant Aid.
13. To construct incidental outdoor facilities, boundary fence and entrance gate at new substations by the completion of the Project
14. To install equipment and materials for transmission and distribution networks supplied under the Project in accordance with the proper implementation schedule to meet the requirements of the Japan's Grant Aid.
15. To provide proper disposal places of excavated soil, waste water and oil discharged during the implementation period.

MINUTES OF DISCUSSIONS
BASIC DESIGN STUDY
ON
THE PROJECT
FOR
THE EXPANSION OF TRANSMISSION AND DISTRIBUTION GRID
FOR
THE DISTRICTS COMMEWIJNE AND SARAMACCA
IN
THE REPUBLIC OF SURINAME
(EXPLANATION ON DRAFT REPORT)

In April 1999, the Japan International Cooperation Agency (JICA) dispatched a Basic Design Study Team for the Project for the Expansion of Transmission and Distribution Grid for the Districts Commewijne and Saramacca in the Republic of Suriname (hereinafter referred to as "the Project") to the Republic of Suriname, and through discussions with Suriname side, field survey, and technical examination of the results in Japan, has prepared the draft report of the Study.

In order to explain and to consult the Suriname side on components of the draft report, JICA sent to Suriname the draft report explanation team (hereinafter referred to as "the Team"), which is headed by Mr. Hayao ADACHI, Development Specialist, Institute for International Cooperation, JICA, and is scheduled to stay in the country from August 19 to 30, 1999.

As a result of discussions, both parties confirmed the main items described on the attached sheets.

Paramaribo, August 26, 1999



Mr. Hayao ADACHI
Leader
Basic Design Study Team
JICA



Mr. Henry P. Wormer
Managing Director
N.V. Energiebedrijven Suriname (EBS)
The Republic of Suriname

ATTACHMENT

1. Components of the Draft Report

The Government of Suriname has agreed and accepted in principle the components of the draft report explained by the Team.

2. Japan's Grant Aid System

- (1) The Government of Suriname has understood the system of Japan's Grant Aid explained by the Team, as described in Annex-I.
- (2) The Government of Suriname will take necessary measures, as described in Annex-II, for smooth implementation of the Project, on condition that the Grant Aid assistance by the Government of Japan is extended to the Project.

3. Further Schedule

JICA will make the final report in accordance with the confirmed items, and send it to the Government of Suriname by the end of December 1999.

4. Other Relevant Issues

- (1) Installation Works for Transmission and Distribution Lines
Suriname side agreed to allocate the necessary budget and to complete all the installation works of equipment and materials for 33kV transmission and 12.6kV distribution lines, which will be supplied under the Project, within a certain period to meet the requirements of the Japan's Grant Aid.
- (2) Equipment and materials other than those that will be supplied under the Project
Necessary equipment and materials other than those that will be supplied under the Project, such as wooden electric poles for both 33kV and 12.6 kV lines, SCADA system, low voltage equipment, etc. shall be procured and installed by the Suriname side within a certain period to meet the requirements of Japan's grant aid.
- (3) Operation and Maintenance
Suriname side agreed to secure and allocate necessary budget and personnel for operation and maintenance for the new transmission & distribution lines including substation facilities provided/constructed under the Project, in order to maintain the proper function of the new transmission & distribution networks.
- (4) Usage of Equipment and materials
Suriname side agreed to use equipment and materials to be supplied under the Project, only for the Project site.
- (5) Storage of Equipment and Materials
Suriname side agreed to secure the proper storage system for the equipment and materials to be supplied under the Project so as not to suffer from missing items, with

necessary spaces, fences, lamps, security guards, etc., and procedures of store management, if necessary.

(6) Detailed specifications of the equipment and materials

The Team handed one (1) copy of the draft-detailed specifications of the equipment and materials for the Project to Mr. Henry P. Wormer, Managing Director of EBS. Both sides agreed that this draft specifications is confidential and should not be duplicated and/or released to any outside parties.

(7) Dispatching of supervising engineers

Suriname side requested the Team to dispatch technical advisors to the project site, as a part of the consulting services, for supervising the installation works of 33 kV under water cable which will be done by Suriname side.

(8) Language to be used for the Project

Suriname side agreed that all correspondence with Japanese side including notices, requests or consents shall be made in English and all drawings, specifications, reports and other documents shall also be prepared in English.

(9) Suriname River Bridge

Suriname side proposed to utilize the bridge structure for the 33kV cables to be installed crossing the Suriname River in the light of current circumstances of the bridge construction.



Annex-I Japan's Grant Aid Scheme

Japan's Grant Aid Scheme

1. Grant Aid Procedures

- (1) Japan's Grant Aid Program is executed through the following procedures.

Application	(Request made by a recipient country)
Study	(Basic Design Study conducted by JICA)
Appraisal & Approval	(Appraisal by the Government of Japan and Approval by Cabinet)
Determination of Implementation	(The Notes exchanged between the Governments of Japan and the recipient country)

- (2) Firstly, the application or request for a Grant Aid project submitted by a recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is eligible for Grant Aid. If the request is deemed appropriate, the Government of Japan assigns JICA (Japan International Cooperation Agency) to conduct a study on the request.

Secondly, JICA conducts the study (Basic Design Study), using (a) Japanese consulting firm(s).

Thirdly, the Government of Japan appraises the project to see whether or not it is suitable for Japan's Grant Aid Program, based on the Basic Design Study report prepared by JICA, and the results are then submitted to the Cabinet for approval.

Fourthly, the project, once approved by the Cabinet, becomes official with the Exchange of Notes signed by the Governments of Japan and the recipient country.

Finally, for the implementation of the project, JICA assists the recipient country in such matters as preparing tenders, contracts and so on.

2. Basic Design Study

- (1) Contents of the Study

The aim of the Basic Design Study (hereinafter referred to as "the Study"), conducted by JICA on a requested project (hereinafter referred to as "the Project") is to provide a basic document necessary for the appraisal of the Project by the Japanese Government. The contents of the Study are as follows:

- a) Confirmation of the background, objectives, and benefits of the requested project and also institutional capacity of agencies concerned of the recipient country necessary for the Project's implementation.
- b) Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, social and economic point of view.
- c) Confirmation of items agreed on by both parties concerning the basic concept of the Project.
- d) Preparation of a basic design of the Project
- e) Estimation of costs of the Project

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid project. The Basic Design of the Project is confirmed considering the guidelines of Japan's Grant Aid Scheme.

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the

implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Study, JICA uses (a) registered consultant firm(s). JICA selects (a) firms(s) based on proposals submitted by interested firms. The firm(s) selected carry(ies) out a Basic Design Study and write(s) a report, based upon terms of reference set by JICA.

The consulting firm(s) used for the Study is(are) recommended by JICA to the recipient country to also work on the Project's implementation after the Exchange of Notes, in order to maintain technical consistency.

3. Japan's Grant Aid Scheme

(1) What is Grant Aid?

The Grant Aid Program provides a recipient country with non-reimbursable funds to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with the relevant laws and regulations of Japan. Grant Aid is not supplied through the donation of materials as such.

(2) Exchange of Notes (E/N)

Japan's Grant Aid is extended in accordance with the Notes exchanged by the two Governments concerned, in which the objectives of the Project, period of execution, conditions and amount of the Grant Aid, etc., are confirmed.

(3) "The period of the Grant Aid" means the one fiscal year (April to March) which the Cabinet approves the Project for. Within the fiscal year, all procedures such as exchanging of the Notes, concluding contracts with (a) consultant firm(s) and (a) contractor(s) and final payment to them must be completed.

However in case of delays in delivery, installation or construction due to unforeseen factors such as weather, the period of the Grant Aid can be further extended for a maximum of one fiscal year at most by mutual agreement between the two Governments.

(4) Under the Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased.

When the two Governments deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country.

However the prime contractors, namely, consulting, contracting and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

(5) Necessity of "Verification"

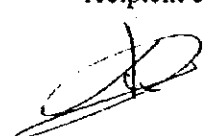
The Government of recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. This "Verification" is deemed necessary to secure accountability to Japanese taxpayers.

(6) Undertakings required of the Government of the Recipient Country

In the implementation of the Grant Aid project, the recipient country is required to undertake such necessary measures as the following:

- 1) To secure land necessary for the sites of the Project and to clear, level and reclaim the land prior to commencement of the construction.
- 2) To provide facilities for the distribution of electricity, water supply and drainage and other

incidental facilities in and around the sites.

- 3) To secure buildings prior to the procurement in case the installation of the equipment.
 - 4) To ensure all the expenses and prompt execution for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid.
 - 5) To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts.
 - 6) To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the Verified Contracts, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.
- (7) "Proper Use"
- The recipient country is required to maintain and use the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for this operation and maintenance as well as to bear all the expenses other than those covered by the Grant Aid.
- (8) "Re-export"
- The products purchased under the Grant Aid should not be re-exported from the recipient country.
- (9) Banking Arrangements (B/A)
- 1) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.
 - 2) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an authorization to pay issued by the Government of the recipient country or its designated authority.
- 

Annex-II Necessary measures to be taken by the Government of Suriname on condition that Japan's Grant Aid is extended.

1. To provide necessary data and information for the Project.
2. To secure and provide cleared embanked and leveled land as well as access road for new substations, prior to the commencement of the construction for the Project.
3. To ensure speedy unloading, customs clearance and tax exemption of the goods for the Project at port and /or airport of disembarkation, and internal transportation in the Republic of Suriname.
4. To accord Japanese nationals whose services may be required in connection with the supply of products and services under the verified contracts such facilities as may be necessary for their entry into the Republic of Suriname and stay therein for the performance of their work.
5. To exempt Japanese nationals from custom duties, internal taxes and other fiscal levies which may be imposed in the Republic of Suriname with respect to the supply of the products and services under the verified contracts.
6. To bear commissions to a Japanese bank for the banking services based upon the banking arrangement.
7. To bear all the expenses other than those to be borne by the Grant Aid necessary for the execution of the Project.
8. To provide proper arrangements for the construction/installation work, such as water supply, electricity, drainage, etc, if necessary
9. To assign exclusive counterpart engineers and technicians to the Project in order to transfer the operation and maintenance technique for the Project and to witness and confirm construction/installation works and qualities of equipment and materials when inspection is carried out.
10. To take necessary measures and responsibility for the stoppage of electricity during construction / installation period, when it is necessary.
11. To construct and to connect the cables supplied by the Japan's grant aid for incoming and outgoing feeders for substations that will be constructed under the Project.
12. To use and maintain properly and effectively all the equipment and materials provided under the Japan's Grant Aid.
13. To construct incidental outdoor facilities, boundary fence and entrance gate at new substations by the completion of the Project
14. To install equipment and materials for transmission and distribution networks supplied under the Project in accordance with the proper implementation schedule to meet the requirements of the Japan's Grant Aid.
15. To provide proper disposal places of excavated soil, waste water and oil discharged during the implementation period.
16. To obtain necessary permissions from the related authorities for installation of equipment materials for transmission and distribution lines supplied under the Project.



APPENDIX 5

COST ESTIMATION BORNE BY THE RECIPIENT COUNTRY

COST ESTIMATION BORNE BY THE RECIPIENT COUNTRY

Main items of the construction costs to be done by Suriname side are as follows:

1. Installation of 33kV Transmission Lines (including Cable Hunger for the Suriname River Bridge):	Some 1,108,000US\$
2. Installation of Underwater and Underground Cables:	Some 58,800US\$
3. Installation of 12.6kV Distribution Lines :	Some 699,000US\$
4. Civil and Building Works, etc.:	Some 235,000US\$
Total	Some 2,100,800US\$

APPENDIX 6

BORING DATA

**EXPANSION OF TRANSMISSION AND DISTRIBUTION GRID
for the districts
COMMEWIJNE AND SARAMACCA
in the
REPUBLIC OF SURINAME**

**GEOTECHNICAL INVESTIGATION
for the proposed substations at**

- La Paix (Commewijne)
- and
- Groningen (Saramacca)

**FOR:
YACHIYO ENGINEERING CO. LTD**

**CONDUCTED BY
IBT ENGINEERING CONSULTANTS
18, FAJALOBISTRAAT
PARAMARIBO
SURINAME**

**Telephone: + 597 400642 or 400647
Telefax: + 597 400642 or 492978**

May 1999

Table of Contents

1	Introduction	3
2.	THE SITE	3
2.1	Site Location	3
2.2	Site Condition	4
2.3	Geology of the Site	5
2.4	Tectonics	5
3.0	FIELD TESTS	5
3.1	General	5
3.2	Cone Penetration Tests	5
3.3	Disturbed and Undisturbed Soil Samples	6
3.4.	Ground water Table	6
4.	LABORATORY TESTING	6
5.	FIELD AND LABORATORY TEST RESULTS	6
5.1	Field Test Results	6
5.2	Laboratory Test Results	7
6.	EVALUATION OF THE BEARING CAPACITY	7
6.1	General	7
6.2	Allowable bearing Capacity	7
7.	CONCLUSIONS AND RECOMMENDATIONS	8
	ANNEX 1: List of drawings, field tests and pictures	9
	ANNEX 2: Results of the laboratory tests	10

1 Introduction

In May 1999 Yachiyo Engineering Co. Ltd contracted IBT Engineering Consultants in Suriname to conduct geotechnical investigations at the proposed sites for new power substations at:

- La Paix, in the district of Commewijne, and at
- Groningen, in the district of Saramacca. (Earlier a site at Sidodadi was considered. Actually, the chosen site has no specific name; being close to Groningen, we have found this name on EBS maps)

The investigation followed an agreed scope of work aimed at the following:

- i. Preparation of a work implementation schedule
- ii. Confirmation of the location of the test holes and determination of the exact CPT and boring location through test boring by an auger drill
- iii. Measurement of the height above mean sea level (MSL) in the local NSP datum
- iv. Transportation, assembling and disassembling of CPT, boring and field test equipment
- v. Installation of all safety measures during the execution of the works
- vi. Implementation of miscellaneous works related to CP testing, boring, field test and laboratory test
- vii. Execution of field tests
- viii. Sampling and transportation of soil samples
- ix. Report on geological aspects based on laboratory tests and field tests
- x. Submission of geological samples for inspection
- xi. Presentation of the investigation results and necessary calculations in report form
- xii. Backfilling of boreholes.

2. THE SITE

2.1 Site Location

The sites are both located close to the main East-West Road, connecting Albina at the Eastern border and Nickerie at the Western Border to Paramaribo, the capital of Suriname.

The location of the sites are included in ANNEX 1, drawing 00 in this report.

2.2 Site Condition

At the time of the investigation, the conditions at the sites were:

at La Paix: Dry and easily accessible by public roads in sand. The EBS site is already enclosed by concrete brick walls, with one concrete building and a transformer foundation erected.

The surrounding area is covered with grass and weeds which grows typically in dry areas, with some sparse trees.

The transformer site is somewhat on a low hill, which was created by excavation of soil around this site. Excavated soil were used as fill sand, since this type of soil is commonly used as a good compactable fill material.

Flooding is not expected since the grade is 1.15 meters above the waterlevel in the public drain along a Reeberg road.

Because some works were already erected on this site, topographical measurements were made of typical points, related to drainage to the drain ditch. These results are in drawings 01 and 02.

There are no industries or houses in the immediate surroundings of the site. A small citrus tree nursery is at about 50 meters from the site, while some cows were grazing around the site.

at

Groningen: The new site was cleared by a bulldozer on May 20. A site visit that day shows wet and soft soil, with standing water at lower areas.

The site is next to the asphalted Bethlehem Road, which is part of the East-West Connection. Access at the time of the soil investigation was by an entrance from an adjacent site.

The grade is surveyed and lies 0.50 to 0.70 meter below streetlevel and at average 0.55 meter lower than the grade at the Eastern site. The site must be raised with fill sand to prevent flooding, which we encountered during heavy rainfall.

Houses are on both sides of the site. Except for a paddy drier, mill and storage facility at about 70 meters from the transformer site there are no industries in the immediate vicinity.

The top soil is very soft: CPT taking was only possible with the assistance of a tractor towing the equipment to the site. At the last day of field test on May 27, the site was flooded by heavy rainfall.

The level of the grades will be expressed in NSP datum, which is equivalent to the elevation of mean sea level in the mouth of the Suriname River in 1956, in our final report.

2.3 Geology of the Sites

Both sites are in the Young Coastal Plain, which was created by sediments from the Atlantic Ocean and from erosion of the hinterland.

The origin is in the Holocene, and the soil will consist mostly of clay, with ridges and layers of sand or shells.

2.4 Tectonics

There are no reports of earthquakes in the history of Suriname.

3.0 FIELD TESTS

3.1 General

The fieldwork was conducted in accordance with BS 5930 198: "Code of Practice for Site investigations" and the equivalent rules of "NEN", the Dutch Code of Practice. For the CPT's the ASTM standard D 3441-86 was applicable.

At the start of the soil investigation at La Paix, boring and sampling were instructed and supervised by the Head of the Laboratory of the University of Suriname (Also named Anton de Kom University)

The fieldwork consisted of CPT tests, rotary boring, recovery of disturbed and undisturbed soil samples and topographical survey.

3.2 Cone Penetration Tests

The equipment used for the CPT's is a "Gouda" 20 tons Cone Penetration and Sleeve Friction test, diesel motor driven machine.

The CPT equipment is anchored on the ground by large augers and the Cone, Shell and Sleeve are pushed in the soil by a diesel driven motor. At each 20 cm the Cone alone is pushed deeper and the force to drive the Cone down (in kg, kilograms), divided by the size of the Cone (in cm^2) will give the actual stress (in kg/cm^2) at which the soil at that particular depth will fail.

With the Cone pushed deeper, the Sleeve around the shaft becomes free for separate pushing of this Sleeve. With readings at every 20 cm depth the wall friction of the soil can be recorded.

To better understand the long term settlements which may occur after construction, the CPT's were pushed to 12 meters below grade at both sites.

The CPT data for La Paix, including the location and depth of the samples taken and the depth of the ground water level are in drawings O4 and O5. To differentiate between pure sand, pure clay and a mix of sand and clay we have also included in drawing O6 the Friction Ratio (Friction divided by Cone pressure, in percentages)

Likewise, the data for Groningen are in drawings 07, 08 and 09.

3.3 Disturbed and Undisturbed Soil Samples

A total of 7 disturbed and undisturbed samples were taken at La Paix, since the soil at both holes proved to be homogenous.

At Groningen a total of 9 disturbed and undisturbed samples were taken due to more layering in the subsoil.

The disturbed samples are stored at our office at the Fajalobistraat.

With sampling tubes undisturbed samples were collected at pre-identified depths and were subsequently taken for laboratory testing.

3.4. Ground water Table

The ground water tables are:

- | | |
|----------------------|---|
| <i>at La Paix:</i> | 0.60 meter below grade in the morning and in the evening, in two holes made by augers. Since the site contains mainly sand, no 24 hours waiting time between the readings were necessary; |
| <i>at Groningen:</i> | 0.38 meter below grade on May 21 and May 24, in two holes made by augers. |

4. LABORATORY TESTING

Laboratory testing was performed by the University of Suriname, which is trained to do the lab testing.

Tests include:

- Specific Gravity (4 tests);
- Particle Size Distribution (4 tests);
- Unconfined Compression Tests (6 tests);
- Moisture Content Tests (4 tests).

5. FIELD AND LABORATORY TEST RESULTS

5.1 Field Test Results

La Paix

The top soil at the la Paix site consists of a 3.20 meters thick sand deposit with thin layers of well consolidated clay. Between 3.30 and 6.80 meters below grade there is a medium soft clay which is reasonable consolidated due to the sand layers at 3.00 and 7.00 meter depth. Both materials were deposited by the sea between 4000 and 6000 years ago.

The cone pressure of the soil from grade to 3.40 meter below grade has an average of 30 kg/cm². The minimum cone pressure below 4 meter is 2 kg/cm². (Note: the friction values are here used to determine the type of soil by the Friction Ratio)

Groningen

At Groningen the top 0.60 cm consists of soft clay and organic material. Between 0.60 and 2.80 meter depth there is fine sand, with a fine layer of clay in between. From 2.80 to 8.00 meter depth there is medium soft clay with a fine layer of sand at 5.60 meter depth. Due to the sand layers above 2.80 meter, at 5.60 meter and below 7.60 meter depth, this clay will be reasonable consolidated. Both materials were deposited by the sea between 4000 and 6000 years ago.

The cone pressure of the soil from grade to 2.80 meter below grade has an average of 45 kg/cm². The minimum cone pressure below 2.80 meter is 2 kg/cm². (Note: the friction values are here used to determine the type of soil by the Friction Ratio)

5.2 Laboratory Test Results

The results of the laboratory tests are included in Annex 2 with this report.

6. EVALUATION OF THE BEARING CAPACITY

6.1 General

CPT's and Friction tests are normally sufficient for foundation engineering in sandy and layered soils for relative low loads. (In soft, not consolidated clay soils lab tests may provide more information on shear failure and long term settlements by heavy concentrated loads, which is not the case for either La Paix or Groningen).

The following is also based on several foundations for transformers and buildings we have designed for EBS.

6.2 Allowable bearing Capacity

La Paix

Based on the CPT's and the Friction Tests the allowable bearing capacity at 0.40 meter below grade for a spread footing not wider than 4 meters is 2.0 kg/cm². For foundations wider than 4 meters this value will be 1.6 kg/cm² to prevent long term settlements. Failure by shear is not expected.

For a 30.000 kg transformer the actual stresses on the existing foundation will be far less than the allowable bearing capacity.

Groningen

The allowable bearing capacity at 0.70 meter below grade for a spread footing not wider than 3 meters is 4.0 kg/cm². For foundations wider than 3 meters this value will be 3.2 kg/cm² to prevent long term settlements. Failure by shear is not expected.

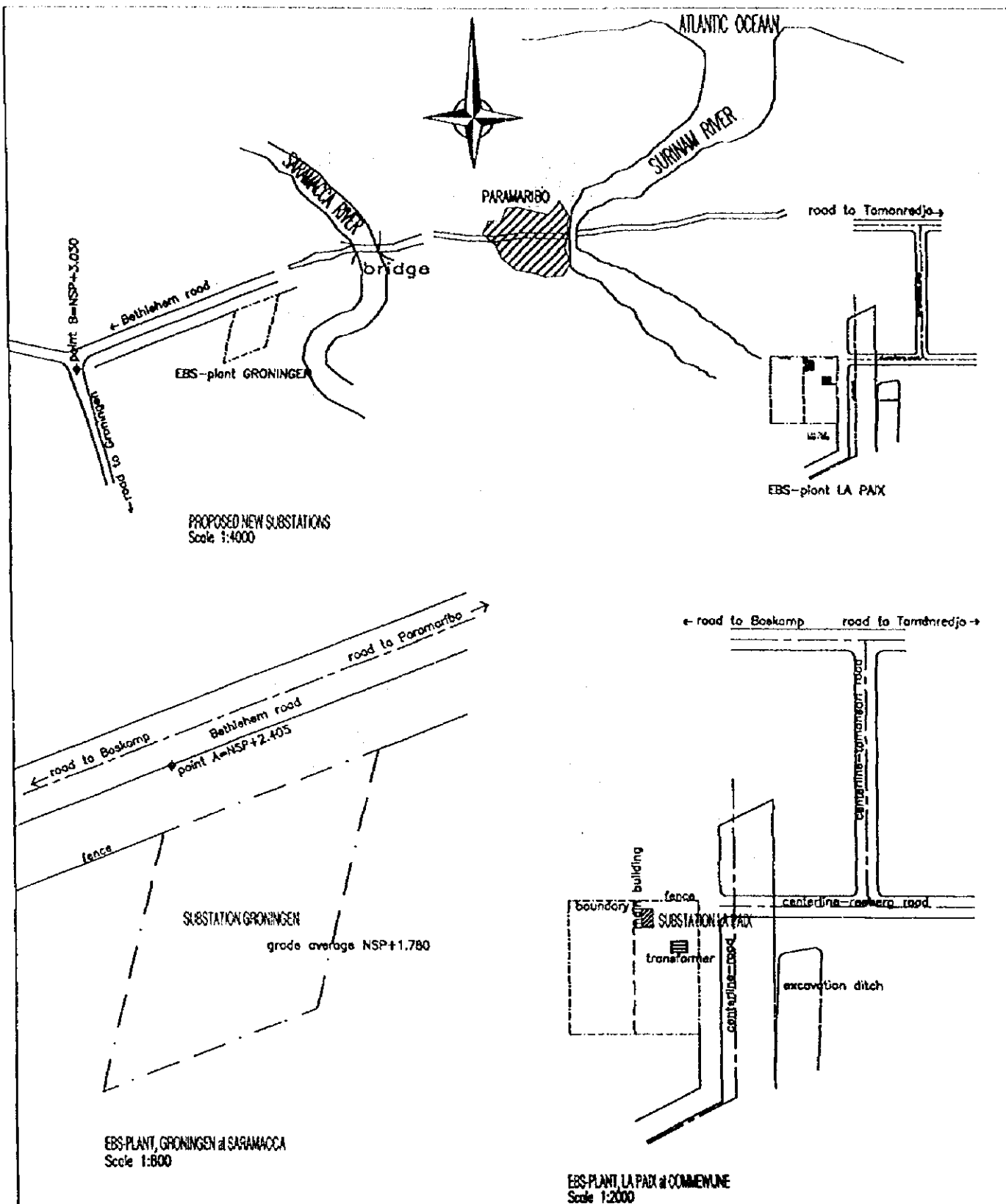
However, since the top 0.60 meter of soil must be excavated and filled with graded fill and an additional fill of 0.60 meter is required to raise the site above flood levels, the allowable bearing capacity will be substantially influenced by this 1.20 meter of new soil. With the locally available equipment for compacting the fill the allowable stress capacity on this fill will be 0.6 - 0.8 kg/cm².

7. CONCLUSIONS AND RECOMMENDATIONS

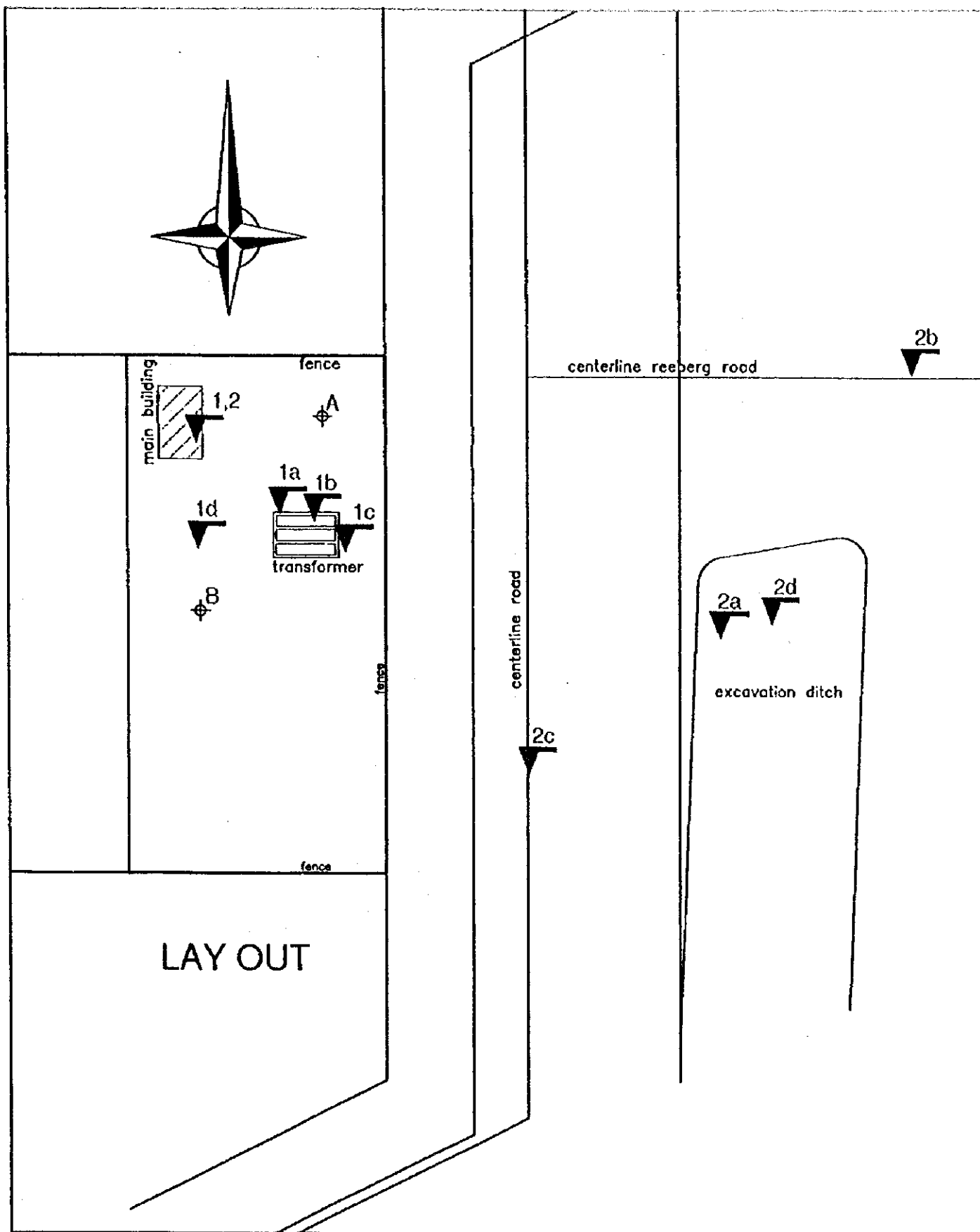
- i. The allowable stress at both sites is by far greater than the actual stresses, due to the expected size of the transformer foundation.
- ii. La Paix:
 - 1. No structural shortcomings has been detected on the existing foundation.
 - 2. For new foundations the soil must be excavated at least 0.25 meter to remove organic material; spilled concrete and gravel from earlier construction must be removed and filled properly.
 - 3. No site drains were detected.
- iii. Groningen:
 - 1 0.60 meter of the topsoil must be excavated; excavated material must be piled on site for later use as fill material on the site, except where construction work is expected.
 - 2 The site must be filled with compactable fill sand with a total thickness of 1.20 meter, in layers of 40 cm each (20 cm on the locations for foundations and inner roads). On areas where no construction work or inner roads for installation of equipment is expected the excavated soil may be used as fill material.
 - 3 On areas where construction work or inner roads for installation of equipment is expected, fill material must be compactable fill sand. Each layer of 20 cm fill must be compacted by mechanical means to a Standard Proctor Compaction of 90%


ANNEX 1: List of drawings, field tests and pictures

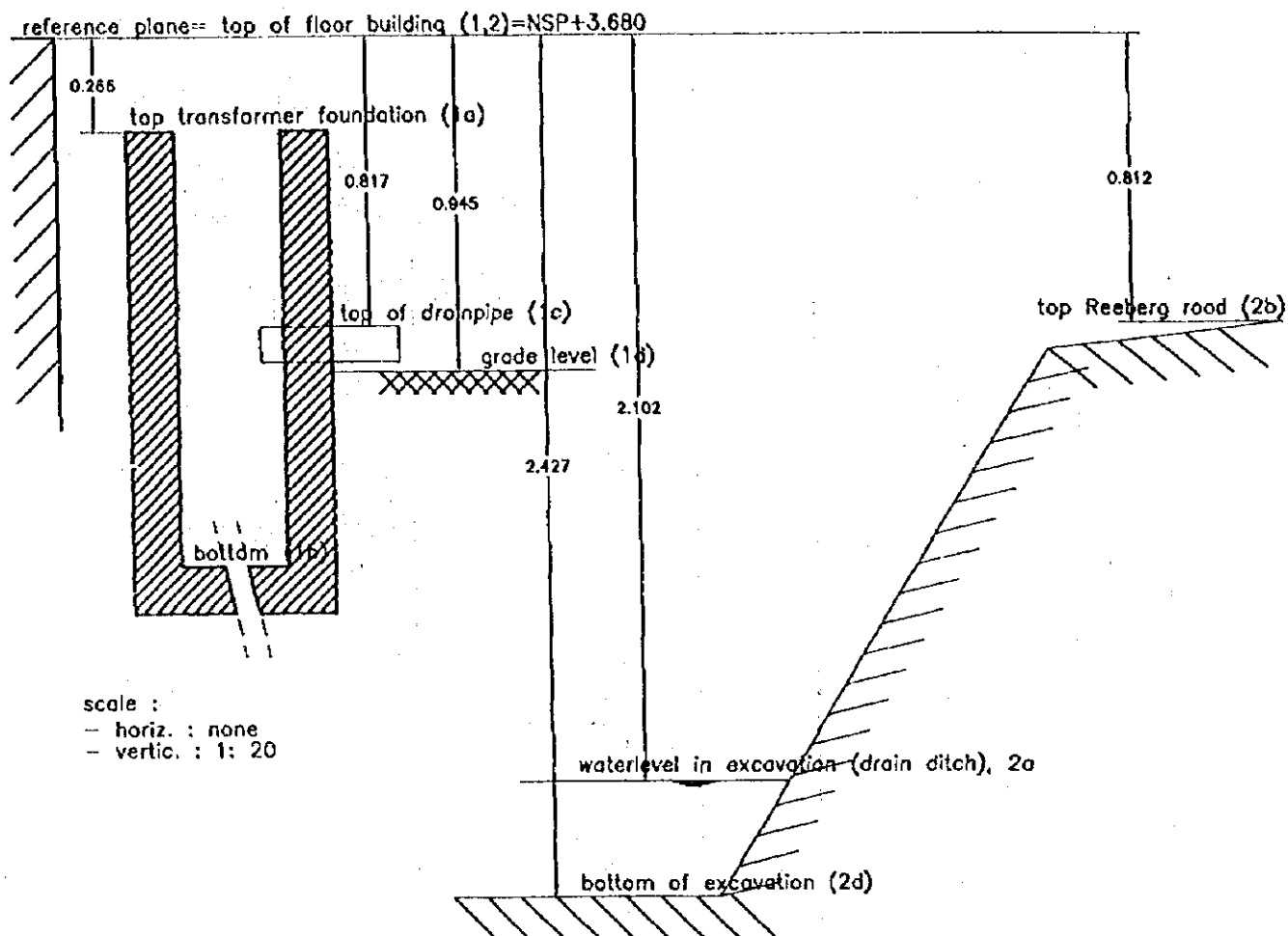
<u>Drawing nr.</u>	<u>Contents</u>
00	Location of proposed substations
01	Location of boreholes and survey points at La Paix site
02	Topographic data on existing works at La Paix
03	Location of boreholes at Groningen site
04	CPT results borehole A at La Paix site, with depth of samples taken and ground water level
05	CPT results borehole B at La Paix site, with depth of samples taken and ground water level
06	Friction Ratio's borehole A and B at La Paix site
07	CPT results borehole A at Groningen site, with depth of samples taken and ground water level
08	CPT results borehole B at Groningen site, with depth of samples taken and ground water level
09	Friction Ratio's borehole A and B at Groningen site
	Pictures of tests at La Paix site
	Pictures of tests at Groningen site



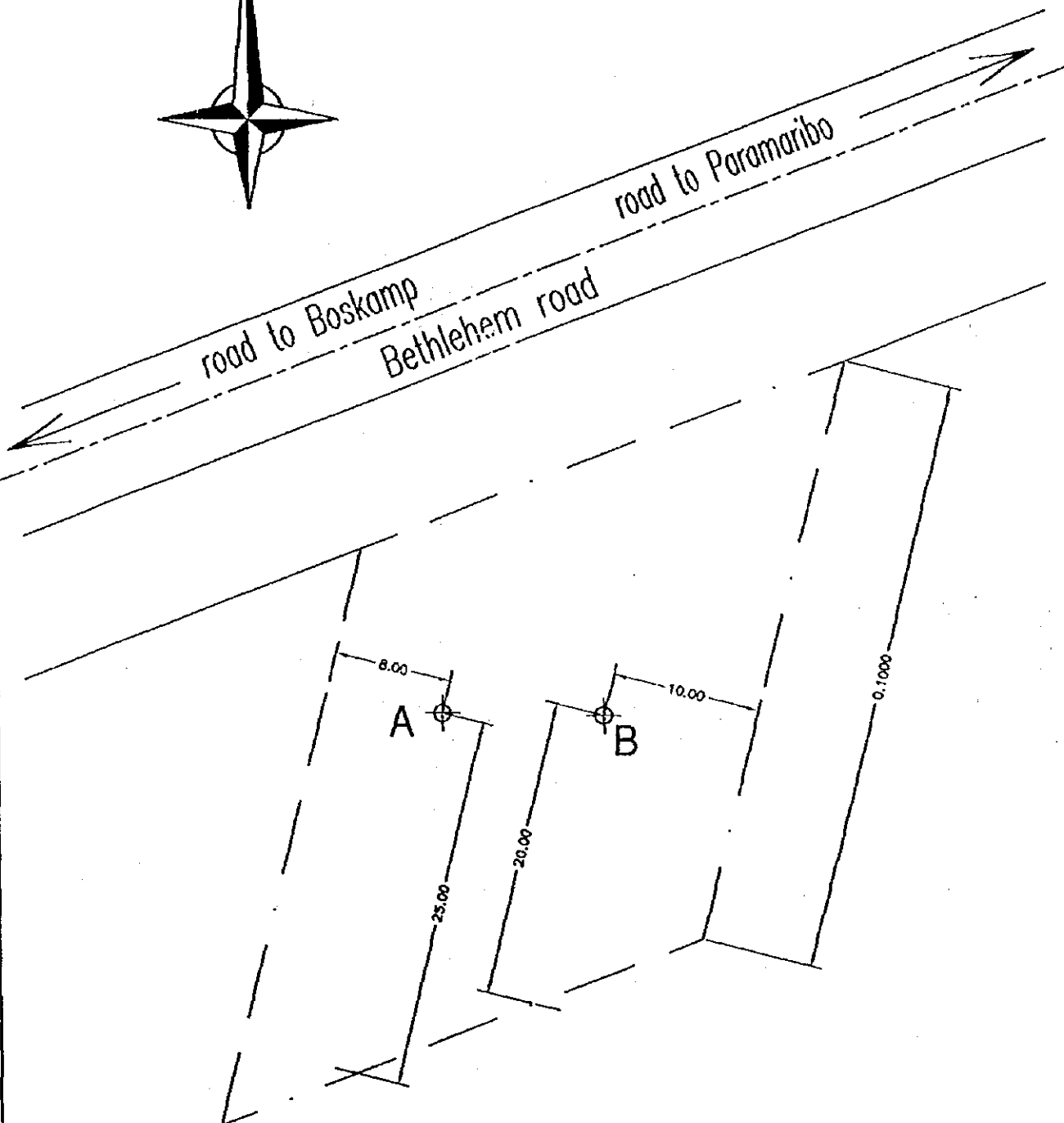
REMARKS	LEGEND	CHANGED	YACHIYO ENGINEERING CO., LTD		
			SUBSTATION LA PAX AT COMMUNE and GRONINGEN AT SARAMACCA		
			A4 scale 1:400,2000,800		
			IBT		
			soil investigation topographical survey	Date 17/5/99	00
			location proposed substation	Drawn	
				Checked	
				Pages 10	



REMARKS	LEGEND	CHANGED	YACHIYO ENGINEERING CO., LTD		
	⊕=boring locations		SUBSTATION LA PAIX AT COMMEWIJNE		
			A4		
			SCALE 1:50		
				soil investigation	Date 17/5/99
				topographical survey	Drawn 18/5/99
					Checked 18/5/99
					Pages 10
					01



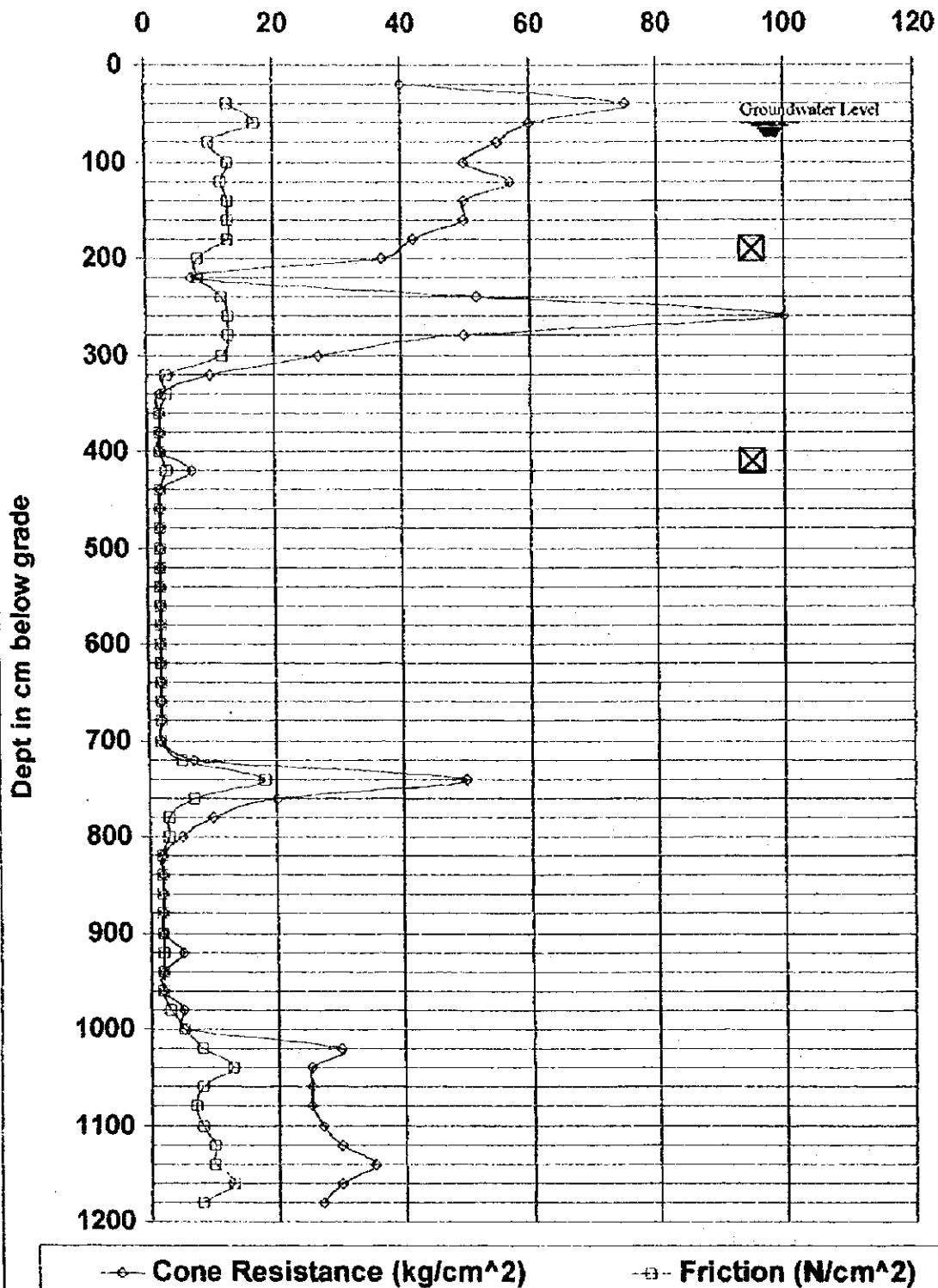
REMARKS	LEGEND	CHANGED	YACHIYO ENGINEERING CO., LTD	
units in meters.			SUBSTATION LA PAIX AT COMMEWIJNE	
			A4	
			SCALE 1:20	
			IBT	02
			soil investigation	Date 17/5/99
			topographical survey	Drawn 17/5/99
				Checked 17/5/99
				Pages 10



LAY OUT

REMARKS	LEGEND	CHANGED	YACHIYO ENGINEERING CO., LTD			
	⊕ = boring locations		SUBSTATION GRONINGEN AT SARACACCA		A4	SCALE 1:400
			IBT	soil investigation	Date 17/5/93	03
				topographical survey	Drawn [Signature]	
					Checked [Signature]	
					Pages 10	

CPT La Paix Location A



✕ Disturbed Samples Taken

⊕ Undisturbed Samples Taken

Note: Units are different to accommodate both graphs

YACHIYO ENGINEERING CO., LTD

SUBSTATION LA PAIX AT COMMEWIJNE

A4

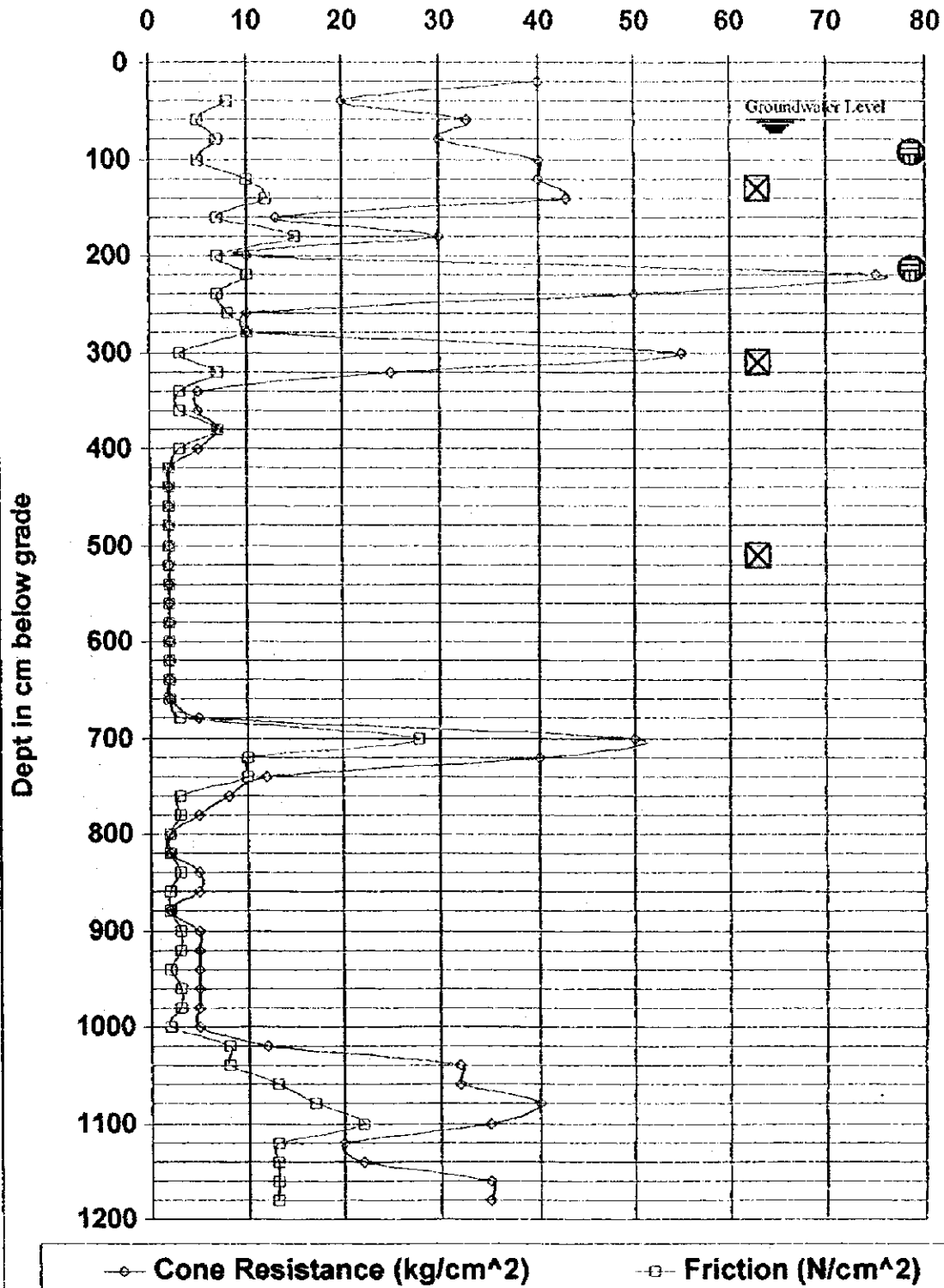


soil Investigation
CPT

Date 11/5/93
Drawn 11/5/93
Checked 11/5/93
Pages 10

04

CPT La Paix Location B



⊗ Disturbed Samples Taken

⊕ Undisturbed Samples Taken

Note: Units are different to accomodate both graphs

YACHIYO ENGINEERING CO., LTD

SUBSTATION LA PAIX AT COMMEWIJNE

A4

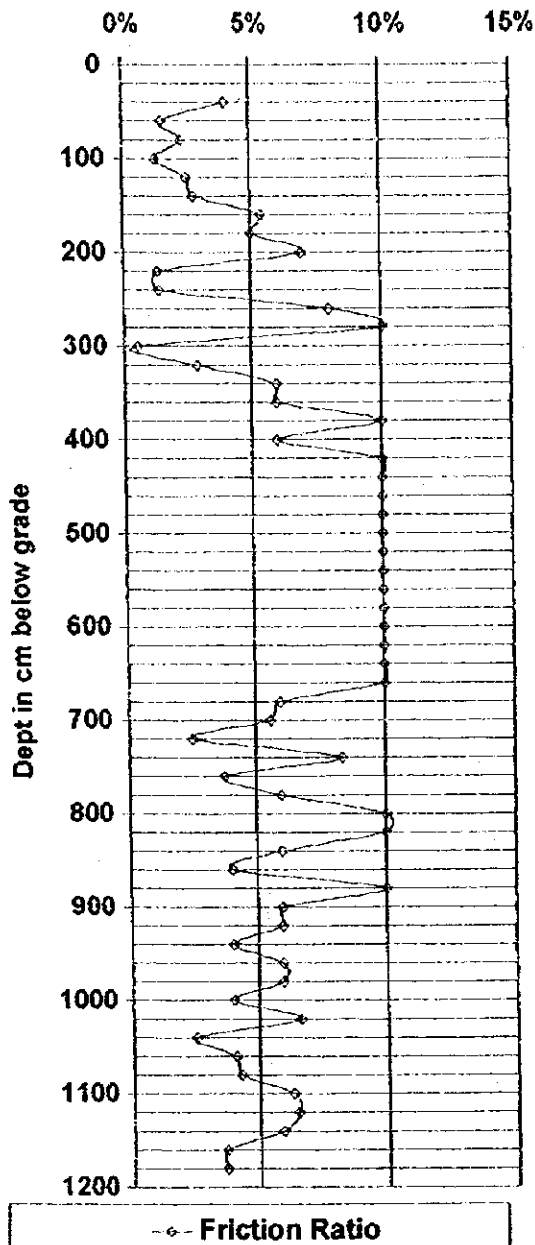


soil Investigation
CPT

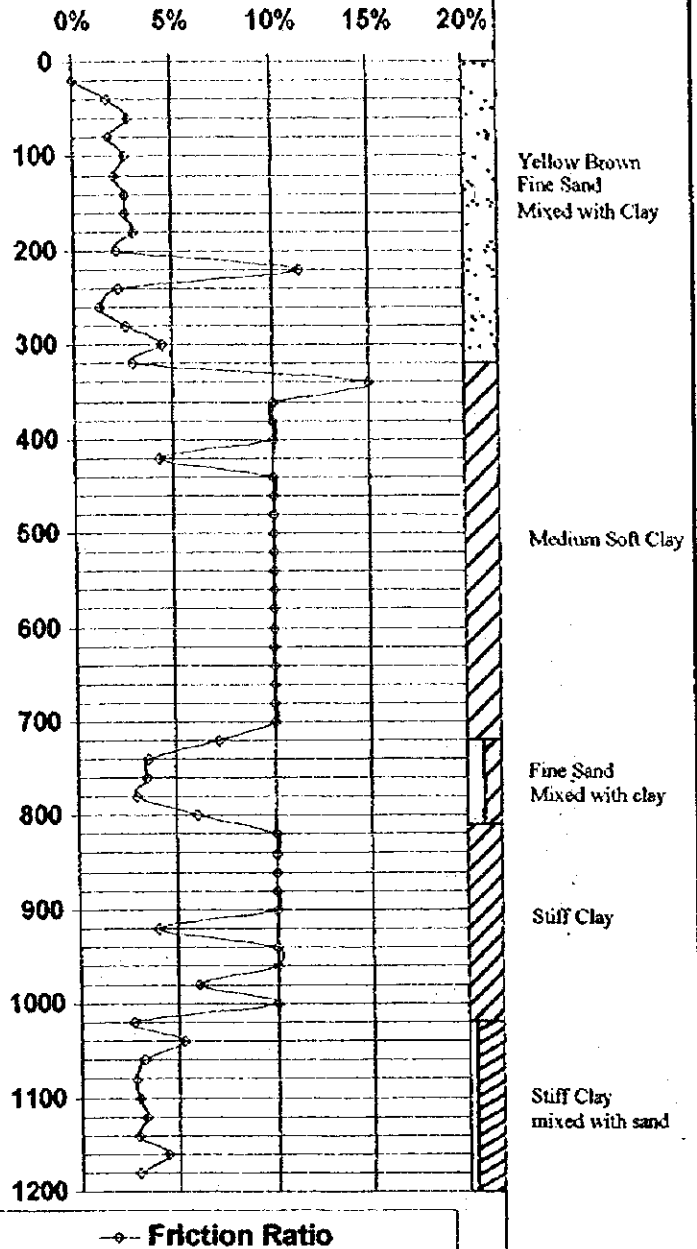
Date 17/5/99
Drawn J. J. J.
Checked J. J. J.
Pages 10

05

CPT La Paix Location B



CPT La Paix Location A



YACHIYO ENGINEERING CO., LTD

SUBSTATION LA PAIX AT COMMEWIJNE

A4

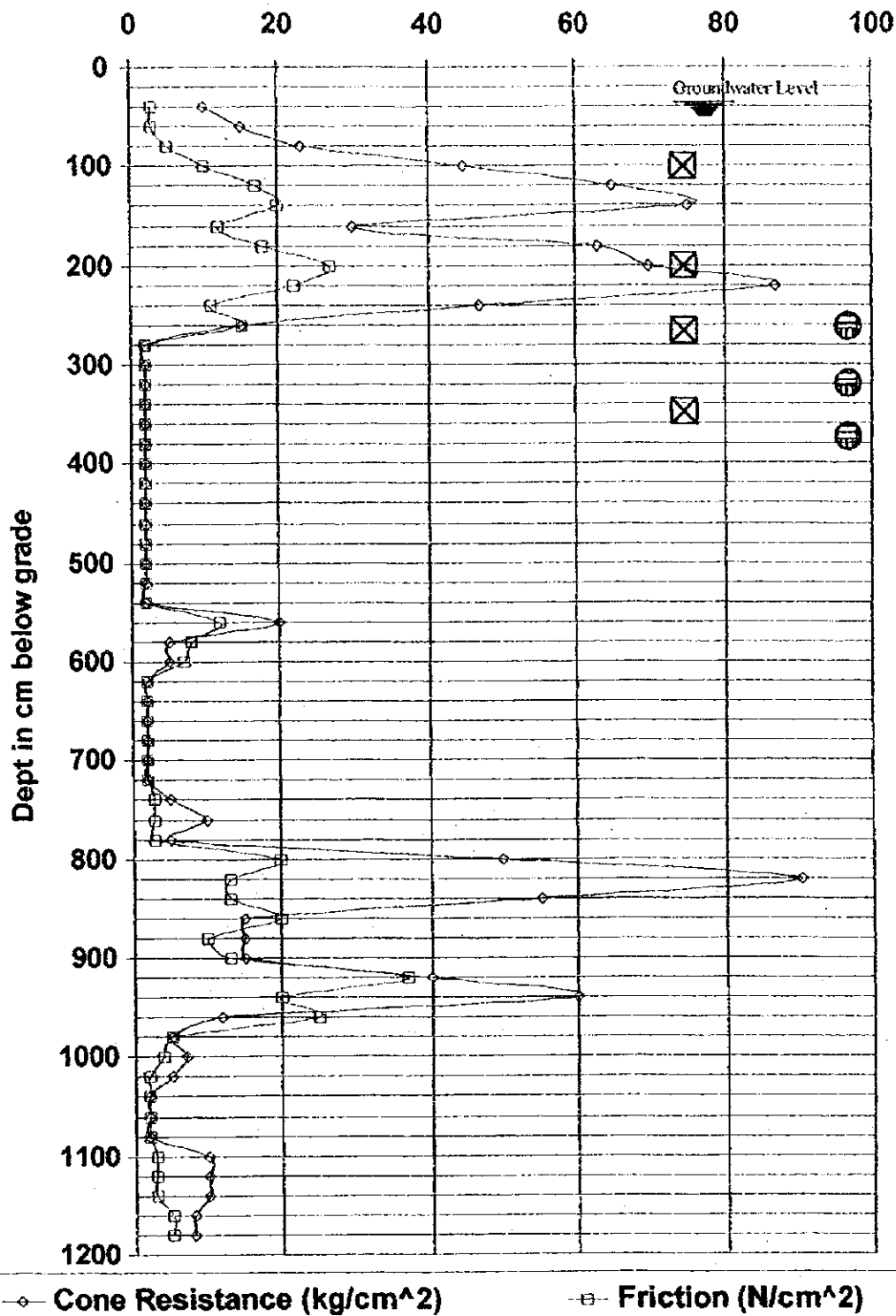


soil investigation
Friction Ratio

Date 11/5/99
Drawn 11/10/99
Checked 11/10/99
Pages 10

06

CPT Groningen Borehole A



Sample 3
Sample 4
Unconfined only
Sample 5

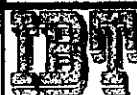
- ⊗ Disturbed Samples Taken
- ⊖ Undisturbed Samples Taken

Note: Units are different to accommodate both graphs

YACHIYO ENGINEERING CO., LTD

SUBSTATION GRONINGEN AT SARAMACCA

A4

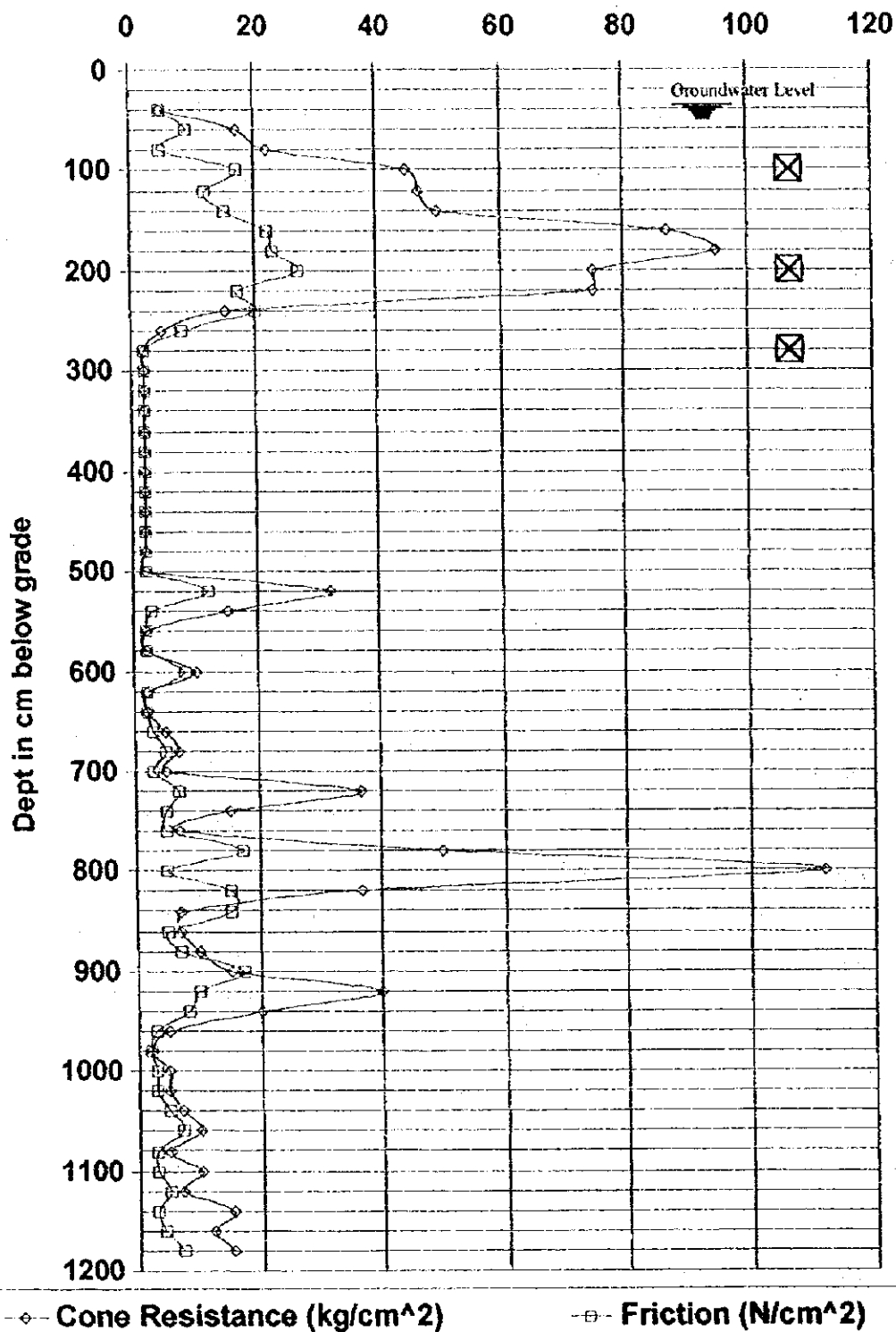


soil investigation
CPT

Date 17/5/99
Drawn A. B. B. B.
Checked A. B. B. B.
Pages 10

07

CPT Groningen Borehole B



⊗ Disturbed Samples Taken

⊙ Undisturbed Samples Taken

Note: Units are different to accommodate both graphs

YACHIYO ENGINEERING CO., LTD

SUBSTATION GRONINGEN AT SARAMACCA

A4

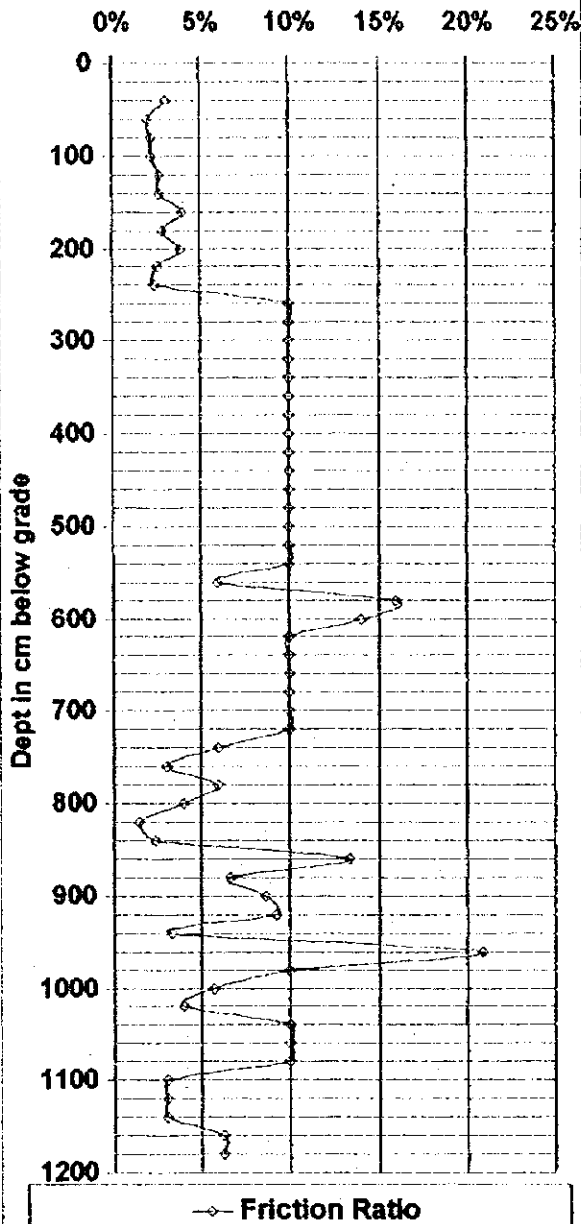


soil investigation
CPT

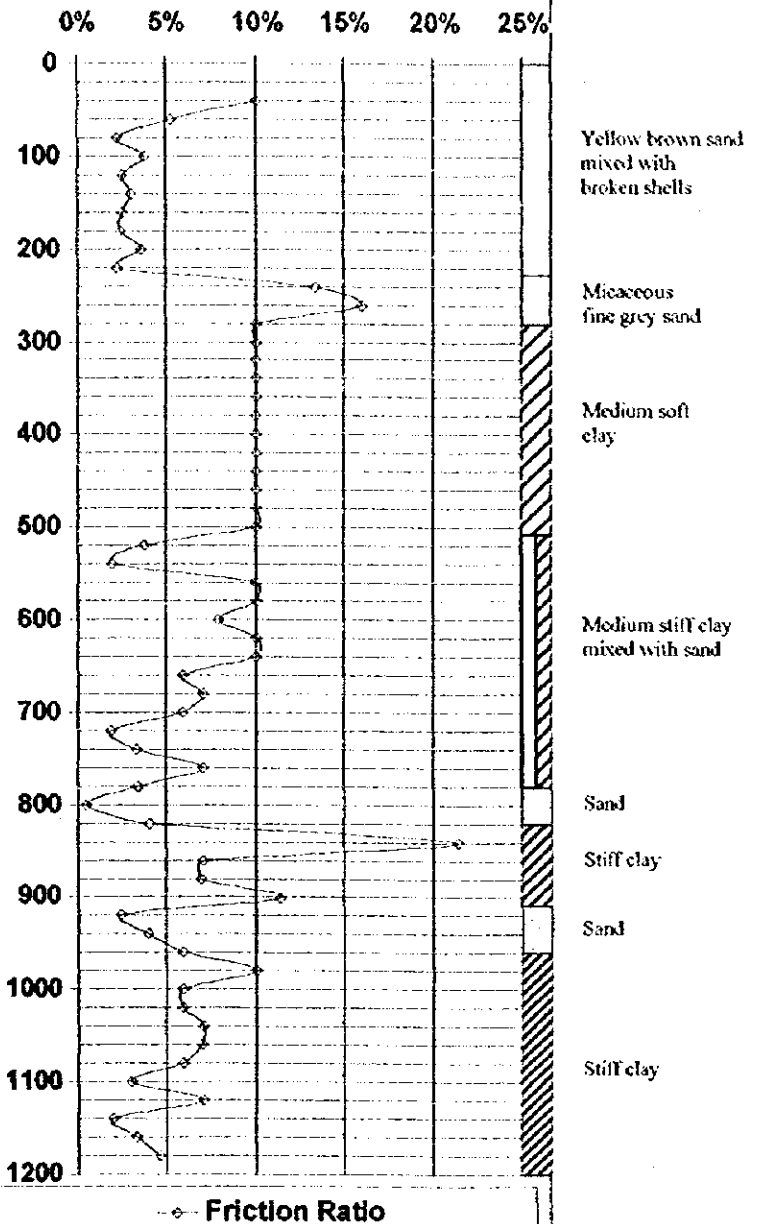
Date 11/5/99
Drawn 11/5/99
Checked 11/5/99
Pages 10

08

CPT Groningen Borehole A



CPT Groningen Borehole B



YACHIYO ENGINEERING CO., LTD

SUBSTATION GRONINGEN AT SARAMACCA

A4



soil investigation

Friction Ratio

Date 17/5/99

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Pages 10

09

Soil Investigations at La Paix



Soil Investigations at Groningen



ANNEX 2: Results of the laboratory tests

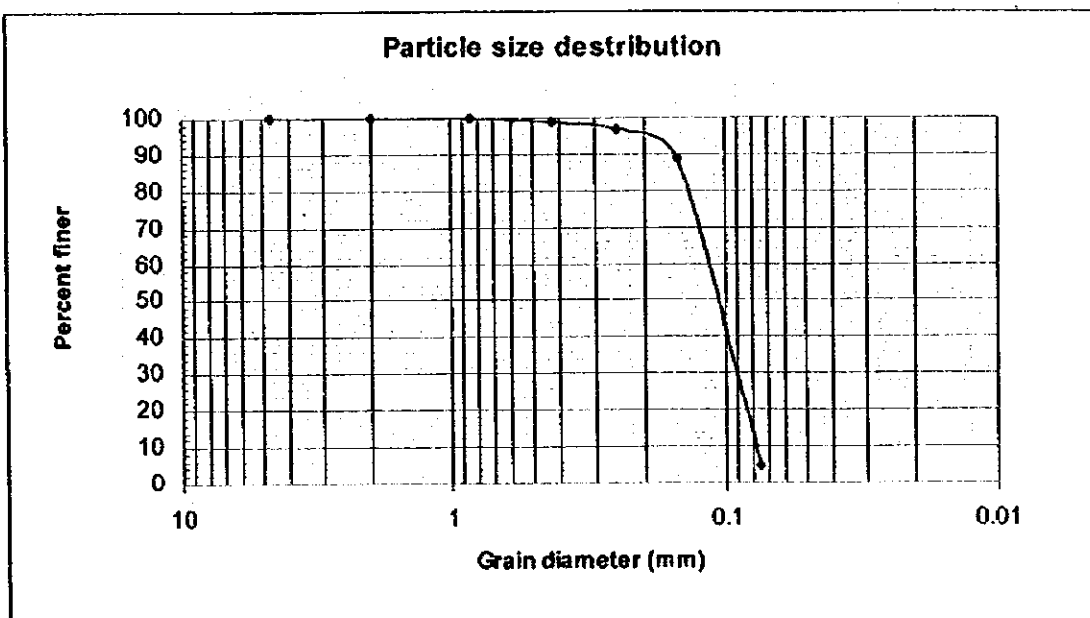
Sample 1; La Paix, location B

Description of soil: Yellow brown fine sand
 Dept of Sample: 0.8 -- 1m below grade

Sieve analysis.

Weight sample (gr.): 200

Sievenos.	diameter (mm)	Wt. Sieve (gr.)	Wt. Sieve + sand (gr.)	Wt. Retained (gr)	% retained	% passing
4	4.750	453.9	453.9	0.0	0.00	100
10	2.000	407.3	407.3	0.0	0.00	100
20	0.850	364.9	364.9	0.0	0.00	100
40	0.425	323.7	325.2	1.5	0.75	99
60	0.250	308.0	312.0	4.0	2.00	97
100	0.150	303.3	320.7	17.4	8.70	89
200	0.075	292.8	459.0	166.2	83.10	5
rest		279.8	290.7	10.9	5.45	0



Moisture content

Dry Mass (gr)	Wet Mass (gr)	Moisture content (%)
33.3	28.5	17

Specific gravity

	Test 1	Test2	Average
Volume Sample Container	500	500	500
Weight container, sample with water	780.3	779.2	779.8
Temperature (C°)	24	24	24
Weight container and water	704.2	703.7	704
Weight dry sample	120	120	120
Weight water	43.9	44.5	44.2
Specific gravity (1000kg/m ³)	2.73	2.69	2.71

(Sand: unconfined compression test not possible)

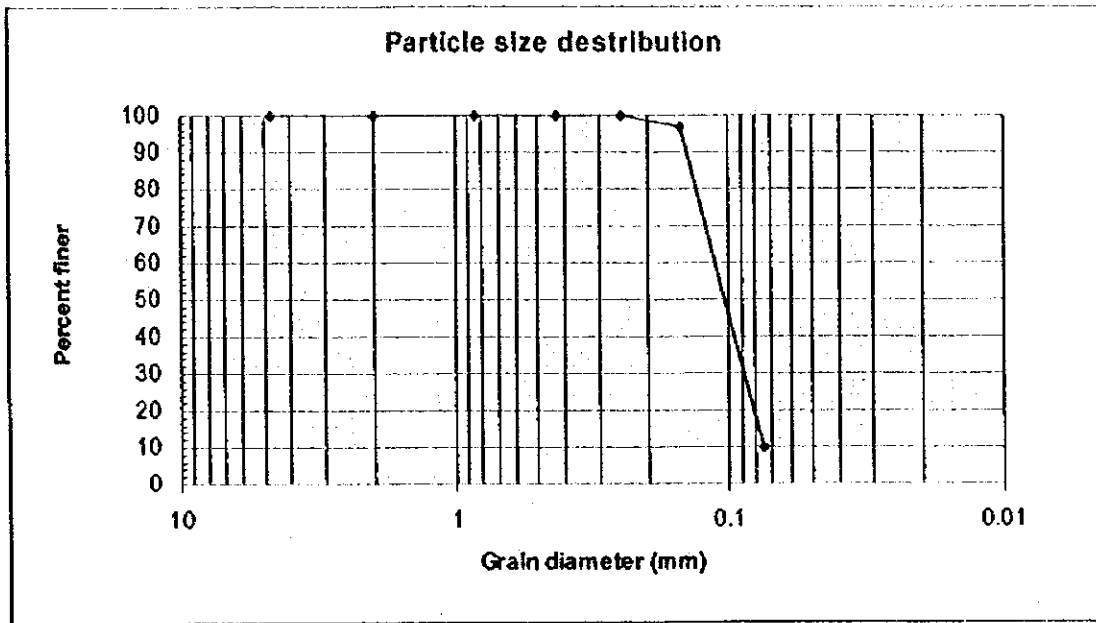
Sample 2; La Paix, location B

Description of soil: Yellow brown fine sand
 Dept of sample: 2 – 2.20m below grade.

Sieve analysis.

Weight sample (gr.): 200

Sieven.	diameter (mm)	Wt. Sieve (gr.)	Wt. Sieve + sand (gr.)	Wt. Retained (gr)	% retained	% passing
4	4.750	453.9	453.9	0.0	0.00	100
10	2.000	407.3	407.3	0.0	0.00	100
20	0.850	364.9	364.9	0.0	0.00	100
40	0.425	323.7	323.7	0.0	0.00	100
60	0.250	308.0	308.0	0.0	0.00	100
100	0.150	303.3	309.1	5.8	2.90	97
200	0.075	292.8	467.0	174.2	87.10	10
rest		279.8	299.7	19.9	9.95	0



Moisture content

Dry Mass (gr)	Wet Mass (gr)	Moisture content (%)
57.8	47.7	21

Specific gravity

	Test 1	Test2	Average
Volume Sample Container	500	500	500
Weight container, sample with water	777.7	777	777.4
Temperature (C ^o)	24	24	24
Weight container and water	703.6	704.4	704
Weight dry sample	120	120	120
Weight water	45.9	47.4	46.7
Specific gravity (1000kg/m ³)	2.61	2.53	2.57

(Sand: unconfined compression test not possible)

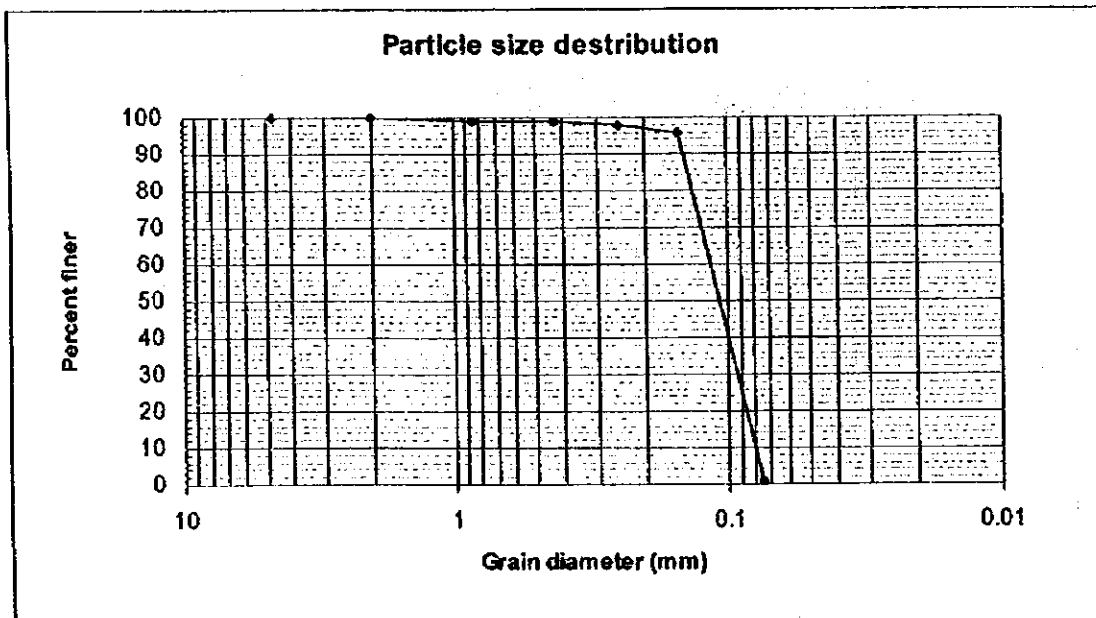
Sample 3; Groningen

Description of soil: Micaceous fine grey sand with clay.
Dept of sample: 2.45 – 2.65m below grade

Sieve analysis.

Weight sample (gr.): 300

Sieveno.	diameter (mm)	Wt. Sieve (gr.)	Wt. Sieve + sand (gr.)	Wt. Retained (gr)	% retained	% passing
4	4.750	453.9	454.3	0.4	0.13	100
10	2.000	407.3	408.0	0.7	0.23	100
20	0.850	364.9	366.5	1.6	0.53	99
40	0.425	323.7	325.2	1.5	0.50	99
60	0.250	308.0	309.9	1.9	0.63	98
100	0.150	303.3	310.0	6.7	2.23	96
200	0.075	292.8	577.1	284.3	94.77	1
rest		279.8	283.6	3.8	1.27	0



Moisture content

Dry Mass (gr)	Wet Mass (gr)	Moisture content (%)
38.5	29.9	29

Specific gravity

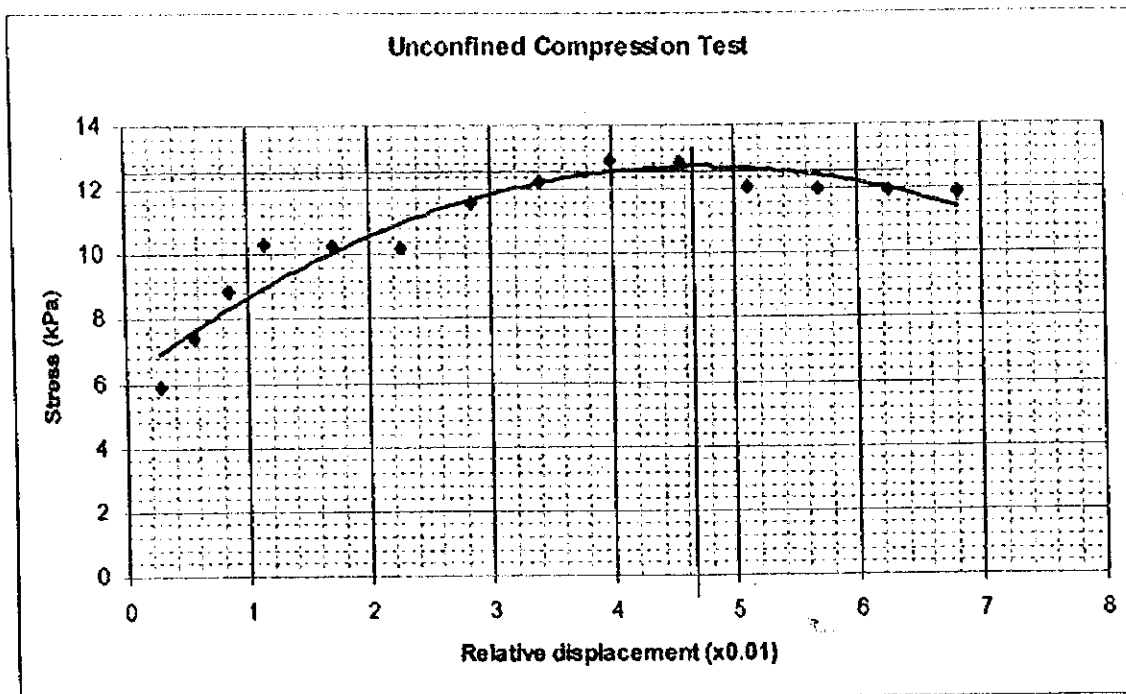
	Test 1	Test2	Average
Volume Sample Container	500	500	500
Weight container, sample with water	779.2	779.4	779.3
Temperature (C°)	24	24	24
Weight container and water	703.7	704.2	704.0
Weight dry sample	120	120	120
Weight water	44.5	44.8	44.7
Specific gravity (1000kg/m ³)	2.69	2.68	2.69

Unconfined Compression Test

Diameter:	35.4 mm	Wet Mass	120.3 gr
Size:	9.84 cm ²	Dry Mass	60.8 gr
Height:	88 mm	Moisture Content	97.9 %
Volume	86.61 cm ³	LRC	0.1493 kg/div

Deformation Readings (x 0.01)	Load (kg/cm ²)	Deformation Sample (mm)	Relative Deformation (x 0.01)	Size (cm ²)	Total Load on Sample (kg/cm ²)	Stress on Sample (kPa)
0	0.0	0.00	0.00	9.84	-	-
25	4.0	0.25	0.28	9.87	0.60	5.94
50	5.0	0.50	0.57	9.89	0.75	7.40
75	6.0	0.75	0.85	9.92	0.90	8.86
100	7.0	1.00	1.14	9.94	1.05	10.31
150	7.0	1.50	1.70	9.99	1.05	10.26
200	7.0	2.00	2.27	10.04	1.05	10.20
250	8.0	2.50	2.84	10.09	1.19	11.60
300	8.5	3.00	3.41	10.15	1.27	12.26
350	9.0	3.50	3.98	10.20	1.34	12.92
400	9.0	4.00	4.55	10.25	1.34	12.85
450	8.5	4.50	5.11	10.31	1.27	12.07
500	8.5	5.00	5.68	10.36	1.27	12.01
550	8.5	5.50	6.25	10.41	1.27	11.95
600	8.5	6.00	6.82	10.47	1.27	11.88

Unconfined compression strength q (kPa)	12.71
Cohesion q/2 (kPa)	6.35



Sample 4; Groningen; Dark Gray Clay (unconfined compression only)

Dept of sample: 3.05 – 3.25m below grade

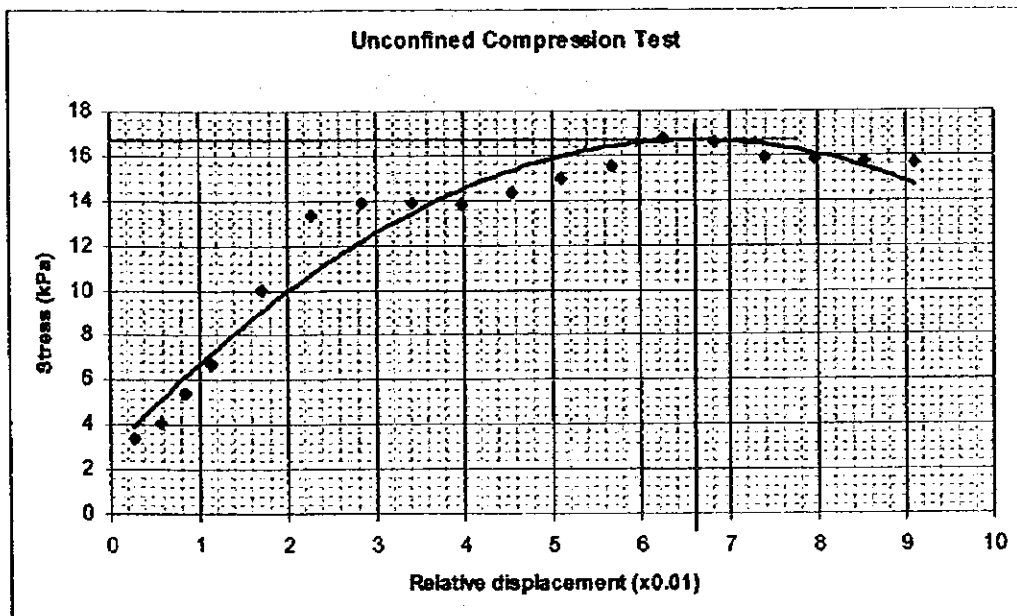
Unconfined Compression Test

Diameter:	37.0 mm	Wet Mass	134.4 gr
Size:	10.75 cm ²	Dry Mass	72.3 gr
Height:	88 mm	Moisture Content	85.9 %
Volume	94.62 cm ³	LRC	0.1493 kg/div

Deformation Readings (x 0.01)	Load (kg/cm ²)	Deformation Sample (mm)	Relative Deformation (x 0.01)	Size (cm ²)	Total Load on Sample (kg/cm ²)	Stress on Sample (kPa)
0	0.0	0.00	0.00	10.75	-	-
25	2.5	0.25	0.28	10.78	0.37	3.40
50	3.0	0.50	0.57	10.81	0.45	4.06
75	4.0	0.75	0.85	10.83	0.60	5.41
100	5.0	1.00	1.14	10.86	0.75	6.74
150	7.5	1.50	1.70	10.92	1.12	10.06
200	10.0	2.00	2.27	10.97	1.49	13.34
250	10.5	2.50	2.84	11.03	1.57	13.94
300	10.5	3.00	3.41	11.08	1.57	13.87
350	10.5	3.50	3.98	11.14	1.57	13.80
400	11.0	4.00	4.55	11.20	1.64	14.38
450	11.5	4.50	5.11	11.26	1.72	14.95
500	12.0	5.00	5.68	11.32	1.79	15.52
550	13.0	5.50	6.25	11.38	1.94	16.73
600	13.0	6.00	6.82	11.44	1.94	16.64
650	12.5	6.50	7.39	11.50	1.87	15.91
700	12.5	7.00	7.95	11.56	1.87	15.83
750	12.5	7.50	8.52	11.62	1.87	15.74
800	12.5	8.00	9.09	11.69	1.87	15.66

Unconfined compression strength q (kPa) 16.67

Cohesion $q/2$ (kPa) 8.34



Sample 5; Groningen; Dark Grey Clay

Dept of sample: 3.6 – 3.8m below grade

Wet sieve analysis

Sieve (mm)	Mass sample (gr)	Mass rest	% passing
0.063	200	1.8	99.1

Moisture content

Dry Mass (gr)	Wet Mass (gr)	Moisture content (%)
35.1	20.1	75

Specific gravity

	Test 1	Test2	Average
Volume Sample Container	500	500	500
Weight container, sample with water	774.8	775.3	775.1
Temperature (C°)	24	24	24
Weight container and water	703.7	704.2	704.0
Weight dry sample	120	120	120
Weight water	48.9	48.9	48.9
Specific gravity (1000kg/m ³)	2.45	2.45	2.45

Unconfined Compression Test

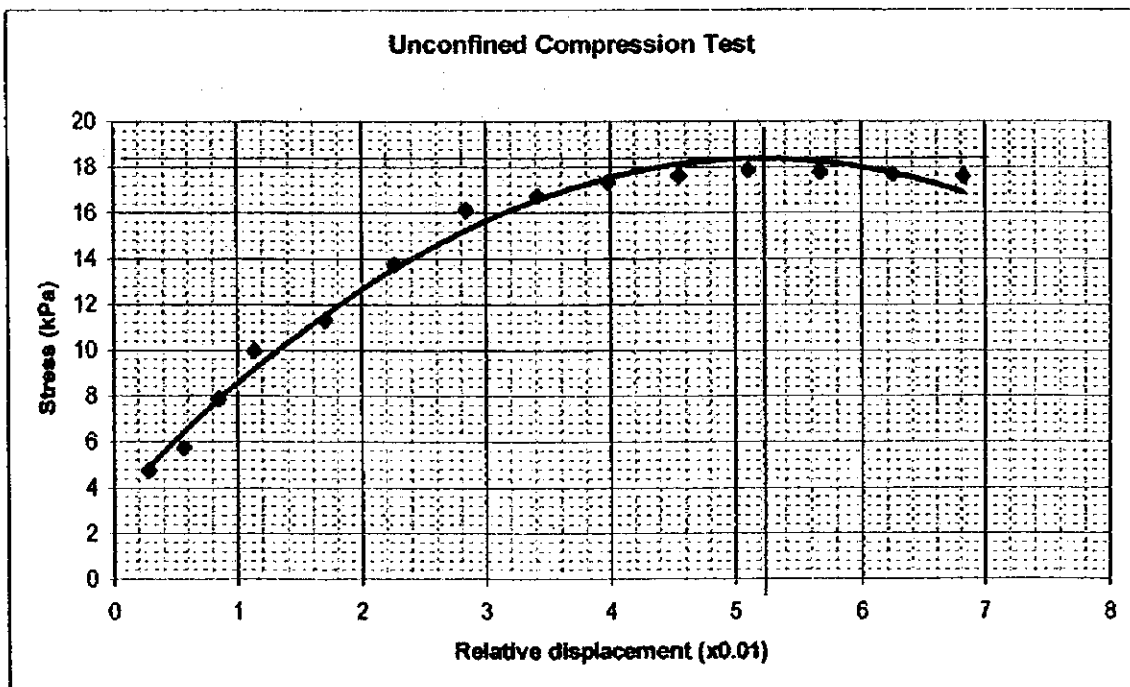
Diameter: 36.0 mm
 Size: 10.18 cm²
 Height: 88 mm
 Volume: 89.57 cm³

Wet Mass 131.8 gr
 Dry Mass 71.7 gr
 Moisture Content 83.8 %
 LRC 0.1493 kg/div

Deformation Readings (x 0.01)	Load (kg/cm ²)	Deformation Sample (mm)	Relative Deformation (x 0.01)	Size (cm ²)	Total Load on Sample (kg/cm ²)	Stress on Sample (kPa)
0	0.0	0.00	0.00	10.18	-	-
25	3.3	0.25	0.28	10.20	0.49	4.73
50	4.0	0.50	0.57	10.23	0.60	5.72
75	5.5	0.75	0.85	10.26	0.82	7.85
100	7.0	1.00	1.14	10.28	1.05	9.97
150	8.0	1.50	1.70	10.33	1.19	11.33
200	9.8	2.00	2.27	10.39	1.46	13.74
250	11.5	2.50	2.84	10.44	1.72	16.13
300	12.0	3.00	3.41	10.49	1.79	16.74
350	12.5	3.50	3.98	10.55	1.87	17.35
400	12.8	4.00	4.55	10.60	1.90	17.60
450	13.0	4.50	5.11	10.66	1.94	17.86
500	13.0	5.00	5.68	10.71	1.94	17.76
550	13.0	5.50	6.25	10.77	1.94	17.67
600	13.0	6.00	6.82	10.83	1.94	17.58

Unconfined compression strength q (kPa) 18.34

Cohesion q/2 (kPa) 9.17



JICA