

NORTHWIND POWER DEVELOPMENT CORPORATION

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7 May 2004

MS. SELINA SHUM
THE WORLD BANK
World Bank Office Manila
23rd Floor Taipan Place
Emerald Avenue,
Ortigas Center



Attention: **MR. JOE TUYOR**

Subject: **NORTHWIND BANGUI BAY PROJECT – PHASE I**
Environmental Assessment for Bangui Bay Wind
Farm Project

Dear Sir/Madam:

Reference is made to letter dated March 31, 2004 and mail dated April 8, 2004.

Please find the following documents and information for your assessment.

APPENDIXES:

1. IEE for the Transmission Line/Substation
EIA for the Transmission Line/Substation
ECC for the Transmission Line/Substation
2. IEE for the Wind Farm
EIA for the Wind Farm
ECC for the Wind Farm
3. Details of the Construction/Installation of Wind Turbines
 - General layout of wind turbines and underground cabling
 - Bored Pile Detail
 - Foundation Plan and Reinforcing Bar Arrangement
 - Cable Trench Layout
 - Wind Turbine Location Plan
 - Underground Cabling
4. Details of the 69kV line following the existing 13.8kV line
 - Drawing
 - Perspective of Proposed 69kV T/L with 13.8kV underbuilt line
 - Cross Section View of Proposed 69kV T/L with existing 13.8kV underbuilt line

FILE COPY

5. Baseline characterization of the inter-tidal and marine eco-system.

To follow

6. NCIP field-based investigation/certification on project site

To follow

INFORMATION:

Reference is made to your request on additional information.

1. Summary on why Bangui Bay was selected as the project site

- The area was identified as a potential wind site and wind measurements by National Power Corporation (NPC) over a period of several years had confirmed the viability of the project.
- Local cooperative has a rating of A+
- Shoreline is facing North from where the prevailing wind is coming from
- The site is government land, NorthWind has preference to lease agreement rather than land acquisition
- No relocation of residents
- No tree cutting
- No corals within or along the shoreline
- The site is black core sandy beach
- No infrastructure such as road construction needed
- Strong local support on the project

2. Documentation in consultation meetings conducted

Reference is made to IEE for the wind farm

3. Basic description on the construction of the wind turbines, foundations and underground cabling.

Reference is made to appendix 3 which details:

- Site layout
- Foundation details
- Underground cabling details

Each turbine will be installed on a 17m hexagonal pos-tensioned concrete foundation (pile cap), the loads induced by the wind turbines will be transduced to the ground through 8 bored piles reaching hard strada i.e. 10 to 17m deep.

The piles are drilled into the ground and the pile cap is attached to the piles by reinforcement bars/concrete as detailed in the drawing.

The insertion tower is embedded in the pile cap through reinforcement bars/concrete and the top will be elevated approximately 1.5m above ground.

The total volume of excavation is 12,500m³/tower most of which will be used as back fill while excess soil will be disposed to areas designated by DENR.

Tower sections, nacelle, rotor and blades will all be delivered to site via LCT's.

The erection of each turbine is performed in four (4) steps, button tower section, top tower section, nacelle and rotor including of blades. The erection is done with a 450T crawler crane.

The electrical infrastructure i.e. underground cables will be located as showing in attached drawing. All excavated soil will be used as compacted backfill.

The contract with the EPC contractor requires the contractor to meet all Philippines environmental requirements and regulations including requirements specified in the ECC as well as such requirements imposed by DENR and or other national agencies.

The environmental monitoring during construction will be performed by DENR.

4. Operation of Wind Turbines

Service and maintenance of modern wind turbines are very minimal. Two (2) scheduled service shutdowns per year is the only requirement.

During a service shutdown, the various safety and shutdown function are checked, in addition a gear box oil analysis is performed and a number of bearings are being greased.

The amount of oil and grease per turbine used is:

	6 months	12 months	18 months	24 months
Grease, in kg	2.4	2.4	2.4	2.4
Oil, in liters	-	-	-	260

The turbines are sealed to the surroundings and internally all equipment containing oil are provided with fail-safe containment which will guide and contain any spills internally.

5. Installation of 50km 69kV line overbuild to existing 13.8kV line of INEC

Reference is made to appendix 4 and detailed design from IEE appendix 1 detailing the design and construction.

The applicable standards for the line are:

National Standards:

- Philippine Electrical Code part 1 and 2
- National Transmission Corporation

International Standards

- ANSI/IEEE American national Standards Institute
- ASTM American Society for Testing and Materials
- IEC International Electrotechnical Commission
- CEA Canadian Electrical Association
- ISO International Standards Organization

The existing INEC right-of-way will cover the entire new 69kV line.

Aside from the sub station area which already acquired by NorthWind, no other additional acquisition is required.

As the new 69kV line is overbuild to the existing 13.8kV line, no displacement, demolition, clearing of obstruction will take place.

In the event of any possible demolition, relocation, clearing or damage to properties, NorthWind will abide with the DENR requirement stipulated in the ECC i.e. affected landowners and residents shall be properly compensated and/or relocated in accordance with Transco relocation and compensation policies and guidelines.

6. Consultation and social acceptability process

Reference is made to attached barangay resolutions attached in IEE appendix 1.

No issues or concerns have been raised during consultation meetings or succeeding meetings with local official.

Best regards,

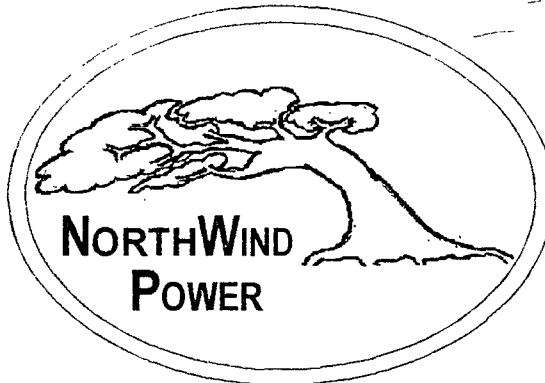


Niels Jacobsen
President & CEO

ANNEX 1

IEE for the Transmission Line/Substation
EIA for the Transmission Line/Substation
ECC for the Transmission Line/Substation

INITIAL ENVIRONMENTAL EXAMINATION CHECKLIST



NorthWind Bangui Bay Project Phase I

30 MVA Substation

**69 KV “Overbuild”
Transmission Line**

**Initial Environmental
Examination
Checklist**

February 2004

Northwind Power Development Corporation

**Unit 310 Jollibee Plaza Bldg.
Emerald Ave., Ortigas Center,
1600, Metro Manila**

INITIAL ENVIRONMENTAL EXAMINATION (IEE)
CHECKLIST REPORT FOR THE
60 MW NORTHWIND POWER PROJECT

A. GENERAL INFORMATION

Project Name : **NorthWind Bangui Bay Project - Phase I
Substation and Transmission Line**

Project Location : **Bangui stretching down to Laoag, Ilocos Norte**

Name of Proponent : **NorthWind Power Development Corporation
Atty. Ferdinand A. Dumlaو
Chairman, Board of Directors**

Address : **Unit 310 Jollibee Plaza Building,
Emerald Avenue, Ortigas Center,
Pasig City**

Telephone No. : **02 638 9090/91**

Fax No. : **02 638 9089**

1. Project Ownership

✓

Single Proprietorship

Partnership or Joint Venture

Corporation

Cooperative

Other, specify

2. Project Cost

- 2.1 Total Project Cost : US\$ 3.4 Million
2.2 Mode of Project Financing

<input checked="" type="checkbox"/>	Self Financed (Development Phase)
<input type="checkbox"/>	Bank Loan
<input type="checkbox"/>	Government Financing
<input checked="" type="checkbox"/>	Others (Foreign Financing, Implementation Phase)

3. Project Objective

- 3.1 To transmit generated power by the 25.5MW Wind Farm to the local cooperative INEC at Laoag substation

To reinforce the Northern Part of Ilocos Norte's transmission system and thereby eradicate poor power electrical quality.
- 3.2 Effects to the Community
- No displacement of residence.
 - No temporary infrastructure such as access roads etc.
 - No impact on wild life and marine life.
 - No impact on existing source of livelihood i.e. fishing and pebble picking
- 3.3 Benefits to Local Community
- PHP0.01/kwh benefits to the host communities.
 - Eradication of Grid Quality (Voltage Problems).
 - Tourism.
 - Attraction of Industries.
 - Increased economic growth/electricity demand.
- 3.4 Social Benefits
- Increase in job opportunities.
 - Local business from tourism.
- 3.5 Environmental Benefits
- Displacement of Pollution

SO ₂	802.0	Tons/year
NO ₂		
CO ₂	76,218.5	Tons/year
Particulates in suspended particulate matter (SPM)	1,604.0	SPM/year

3.6 Priority Project

NorthWind Bangui Bay Project – Phase I has been targeted as a priority on New and Renewable Projects in the Philippines which will pave the way for additional wind power projects which will ultimately reduce oil and fossil fueled energy production and further diversify the country's energy mix.

The Project would not only be the first of its kind in the Philippines, in fact it will be the first in the whole ASEAN.

World Bank through its PCF (Prototype Carbon Fund) has entered into an agreement with NorthWind on the purchase of Carbon Credits. World Bank believes that NorthWind's emission reduction will be the first Carbon Credit trading from ASEAN Countries and entry of NorthWind will pave the way for additional carbon trading from the Philippines. Signing of the Emission Reduction Purchase Agreement (ERPA) is targeted for June this year.

3.7 Future Industries

All infrastructures in Ilocos Norte are in place except for electrical quality in order to attract and build up industries.

Numerous potential foreign and domestic investors have turned down possible investment due to low electrical quality. Ilocos Norte being at the very end of the grid needs power generation local as well as upgraded transmission system to overcome the problem. To emphasize, San Miguel Corporation had purchased a tract of land in Pasuquin 25Kms from Bangui to build a bottling plant for their Pop Cola brand and use the complex as a distribution hub for Northern Luzon. They are stipulating that something should be done regarding voltage levels.

The entry of NorthWind's Wind Power Project will once and for all eradicate the problem and at the same time provide:

- Competitive Power Production
- In a clean and environmental friendly way
- Which will attract tourism and industry
- Without any displacement or disturbance for local residents

B. PROJECT DESCRIPTION

1. Project Components

- 1.1 1 x 30MVA, 69KV/13.8KV, 3PH, 60Hz outdoor substation
- 1.2 Approximately 57km 69KV transmission line, overbuild to existing 13.8KV transmission line of INEC.
- 1.3 Approximately 300m² admin/control and warehouse within substation site.

2. Land Ownership and Status of Land Ownership

- 2.1 4,432 m² located at Suyo, Barangay Baruyen, Bangui, Ilocos Norte

UTM 84 Luzon Datum

Northing	255730
Easting	2050080

has been acquired by NorthWind, documentation attached hereto.

- 2.2 Approximately 57 km. 69KV transmission line will be overbuilt to the existing 13.8KV transmission line utilizing INEC's existing right of way. Document attached hereto.

3. How do you describe the general location of the project? (Vicinity Map)

<input checked="" type="checkbox"/>
<input type="checkbox"/>

- Developed Area (within a built-up area with presence of utility systems or network, especially water supply, roads and power supply)
Foreshore Land, Underdeveloped Area (relatively far from the urban center with predominant absence of utility system)

4. Project Specifications (Design and Layout)

4.1 Substation Area

Item	Specification	Unit
Rated Output	30	MVA
Rated Voltage	13.8/69	KV
Rated Frequency	60	Hz
Medium Voltage Switchgear	15	KV

Electrical Monitoring Equipment	NA	Lot
Protection Equipment	NA	Lot
Power Line Carrier	NA	Lot
Area of Control Center	300	sq. m.
Total Project Area Covered	4,432	sq. m.

Power generated from the wind turbines are delivered through underground cables to the substation. From the substation, the power (voltage) is transformed from medium tension voltage 13.8KV to high tension voltage 69KV suitable for direct connection to the 69KV overhead transmission line.

A 300m² switchgear, storage and control center including office shall contain switchgear , SCADA (Supervision Control and Data Acquisition), power line carrier and office facilities for safe operation of wind turbine farm, substation and transmission line.

The substation will be built fully in accordance with the Philippine Grid Code, Philippine Electrical Code and International recognized standard such as ANSI/IEEE (American National Standards Institute), ASTM (American Society for Testing and Materials), IEC (International Electrotechnical Commissioning), ISO (International Standards Organization).

4.2 Transmission Line

Item	Specification	Unit
Nominal Voltage	69	KV
Structure (Concrete/Steel Poles)	65/80	feet
Post Insulators	69	KV Post/Suspension
Conductor	795	MCM ACSR
Existing Transmission Line (to be underbuild)	13.8	KV
Pole Class	2	Class

The transmission line will follow the existing 13.8 transmission line of INEC (Ilocos Norte Electric Cooperative) starting from NorthWind Power's substation located at Suyo, Bangui, Ilocos Norte ending at Transco substation located North of Laoag, Ilocos Norte. The whole line is 57km and the number of poles is 622 pcs. excluding of stud poles.

The line will be constructed in between the existing 13.8KV line which will then be transferred to the new concrete poles through cross arms and insulators.

In this manner, the new upgraded line will not need additional right of way nor will it need tree cutting or relocation of existing structures.

5. Land Use Classification

5.1 Substation Area

Land Use	Total Area occupied by the substation	Total Area within the project boundary
Agricultural	0	0
Industrial	0	0
Commercial	0	0
Residential	0	0
Tourism	0	0
Forest Land	0	0
Open Spaces	4,432 sq. m.	4,432 sq.m.
Institutional	0	0
Others, please specify (wasteland, grassland, shrubland, foreshore)		
Total Area	4,432 sq. m.	4,432 sq.m.

5.2 Transmission Line

Land Use	Total Area occupied by the transmission	Total Area within the project boundary
Agricultural	✓	✓
Industrial	0	0
Commercial	✓	✓
Residential	✓	✓
Tourism	0	0
Forest Land	0	0
Open Spaces	✓	✓
Institutional	0	0
Others, please specify (wasteland, grassland, shrubland, foreshore)	✓	✓
Total Length	57 km.	57 km.

The new transmission line is following the same route as the existing 13.8 KV line. The total length is approximately 57km, transversing various land use classification as described above.

The right of way by INEC is 10 feet on both sides of the line.

6. Barangays where the substation will be installed:

6.1 Substation Area

BARANGAY	MUNICIPALITY	TOTAL AREA, has (approx)
Baruyen (Suyo)	Bangui	4,432 sq. m.

6.2 Transmission Line

BARANGAY	MUNICIPALITY	TOTAL AREA, has (approx)
Baruyen (Suyo)	Bangui	
Burgos	Burgos	
Buduan	Burgos	
Der-ap	Burgos	
Buraan	Burgos	
Barat	Burgos	
Bojeador	Burgos	
Pubon	Burgos	
Paayas	Burgos	
Nagabungan	Burgos	
Narapunan	Burgos	
Davila	Pasuquin	
Dilabu	Pasuquin	
Caruan	Pasuquin	
Estancia	Pasuquin	
Cababaan	Pasuquin	
Nagsanga	Pasuquin	
Pasuquin	Pasuquin	
Binsang	Pasuquin	
Cadaratan	Pasuquin	
Bangsiril	Pasuquin	

Buyon	Bacarra	
Dilaan	Bacarra	
Barit	Laoag	

The proposed 69KV transmission line will follow the existing 13.8KV transmission line of INEC. The existing 13.8KV transmission line will be underbuild to the new 69KV line once the 69KV pole structures are erected.

7. Manpower Employment (listing of manpower requirements)

How many people will be employed by the project?

During the pre-construction/construction period	:	80/80 – Wind Power Project 20/60 – Transmission Line & Substation
During the operation and maintenance period	:	62 - NorthWind Bangui Bay Wind Project

8. Construction Schedule (Gantt Chart)

See attached Gantt Chart

C. DESCRIPTION OF EXISTING ENVIRONMENT

I. Physical Environment

Components/Parameters	Y	N	Remarks
What is the elevation of the area (masl)?			
<100 masl	✓		
100-300 masl		✓	
300-500 masl		✓	
500-1,000 masl		✓	
> 1,500 masl	✓		
Slope and topography of the area			
Is the terrain flat or level (0-3% slope)?	✓		
Gently sloping or undulating (3-8% slope)?		✓	
Undulating to rolling (8-18% slope)?		✓	
Rolling to moderately steep (18-30% slope)?		✓	

Steeply sloping (30-50% slope)?	✓	
Very steep to mountainous (>50% slope)?	✓	
What is the general geology of the area?	✓	Mixed area – See 5.2
Are there indications of landsliding in the area? If yes, causes of flooding or landslides: n/a Exposed slopes Slide prone steep Slopes Others Low lying area Poor drainage Others	✓	
Are there occurrences of flooding downstream of the site?	(✓)	Some transmission line Pole structures are located in rice fields
Soil type of the area: Does the area have sandy soil? Clayey soil? Sandy loam soil?		Mixed
Is there any indication of excessive soil erosion occurring in the area? If yes, what type of erosion: ➢ Natural ➢ Man-made (specify sources of erosion such as kaingin, logging, etc.) Generally categorize rate of erosion based on observation: ➢ Slight ➢ Moderate ➢ Sever	✓ NA NA	
Does the area traverse part of the drainage of a river system (s)? What river system (s) or water bodies are affected by the site? Please enumerate them under Remarks. <i>[these must be indicated or shown in the topographic map]</i>	NA NA NA	Overhead transmission line on concrete poles

Are there natural drainageways/creeks along the area that drain towards communities downstream?		NA	
Is the area frequently visited by typhoons?	✓		Typhoons are coming from South East and is weakened by the mountain area
When was the last typhoon which visited the area?			July 22, 2003 Typhoon Harerot
Average number of typhoons per year: 1999 = 4 1998 = 2 1997 = 1 1996 = 1 1995 = 2	✓		Based on PAGASA records
Is there a record of tornadoes/twisters which occurred in the area?		✓	
What is the nearest earthquake, fault zone or volcano, etc. in the area?	✓		West Ilocos Fault System
Identify the name of the zone:	✓		Approximately 2km. West
Distance:			See Annex 9
Had there any incidents such as lightning strikes at or near the site?	✓		The transmission line and substation is equipped with lightning arrestors

What are the present uses of the water bodies being drained/affected by the project site?

Y	N	Use	Remarks
	✓	Bathing	NA
	✓	Fishing	NA
	✓	Pebble picking at Brgy. Baruyen only	NA
	✓	Washing	NA
	✓	Source of drinking	NA
	✓	Irrigation	NA

I. Biological Environment

Components/Parameters	Y	N	Remarks
Are there existing trees and other types of vegetation in the project area?	✓		The 69KV transmission line will be "overbuild" to the existing 13.8KV line. As such it will not require tree

If yes, indicate the forest type/vegetation.			cutting or trimming.
Are there birds and other forms of wildlife found in the area?	✓		The transmission line will serve as resting area for birds.
Are there fishery resources in the water bodies found near or in the project area?		✓	NA
Is the area in a watershed or forest reservation area?		✓	
If near only, how near? <u>n/a</u> (m or km)		✓	
If across, indicate name of the watershed or forest reservation area.		✓	

If answer is yes to any of the above questions, please list down these species (common or local name) in the table provided below.

Birds and Other Wildlife	Trees and other Important Vegetation	Fishery Resources
NA	NA	NA

What are the existing forest resources in the project area that are important to the community?

	Forest Resource	Remarks
NA	Timber	
NA	Fuelwood	
NA	Non-timber products	
NA	Food Plants	
NA	Medicinal plants	
NA	Wild animals	
NA	Others (specify)	

II. Socio-Cultural and Economic Environment

Components/Parameters	Y	N	Total Number
1. Are there existing settlements in the project area?	✓		The transmission line is stretching from Suyo, Bangui to Laoag substation

If yes, how many households or families? how many are legitimate land owners? how many are tenants? how many are caretakers? how many are squatters?			The transmission line is transversing all typical areas in Ilocos Norte
2. What is the total population of the barangay (s) covered by the project?			The transmission line is transversing all typical areas in Ilocos Norte
Average family size			The transmission line is transversing all typical areas in Ilocos Norte
How many of the houses are made of concrete? Made of wood? Made of concrete and wood? Made of brick? Made of adobe?			
What are the sources of livelihood? Livelihood Type: Farming Fishing Backyard and poultry and piggery Vending/buy and sell Sari-sari store Other, pls. Specify: Employees Barbers, drivers, etc. Professionals (doctors, engineers, Accountants, etc.) Pebble picking	✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓		The transmission line is transversing all typical areas in Ilocos Norte
How many of the total population have reached the Elementary level? 1) Abaca 2) Baruyen 3) Taguiporo 4) Masikil Primary		NA	NA

High School Level? 1) Bangui Nat'l High School 2) Bangui School of Fisheries			
What are the dialects spoken in the area? Tagalog Cebuano Ilonggo Ilocano Chabacano Other please specify _____		NA	NA
Are there ancestral lands or indigenous people communities in the area? Indicate Group:		✓	

What are the leading illnesses in the area?

Illness/Disease	Cause (s)	% of the Population	Rate [enclose with () if decreasing]
1. URTI	NA		
2. Wounds	NA		
3. HPN	NA		
4. Diarrhea	NA		
5. Dermatitis	NA		
6. SVI	NA		
7. Osteoarthritis	NA		
8. Pneumonia	NA		
9. Cystic mass	NA		
10. UTI	NA		

Are there other local organization in the area?

✓	Y	N
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If yes, please list down these organized groups e.g. associations, cooperatives, etc. below:

1.	
2.	
3.	
4.	

Are there other social infrastructures in the barangay?

<input checked="" type="checkbox"/>	Y	<input type="checkbox"/>	N
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If yes, what are these social infrastructures? (Please check)

<input checked="" type="checkbox"/>	Schools	<input checked="" type="checkbox"/>	Health Centers/Clinics
<input checked="" type="checkbox"/>	Roads	<input checked="" type="checkbox"/>	Communications(radio, TV, mail, newspaper)
<input checked="" type="checkbox"/>	Police Station/Outpost	<input checked="" type="checkbox"/>	Community Center
<input checked="" type="checkbox"/>	Hospitals	<input checked="" type="checkbox"/>	Transportation
<input checked="" type="checkbox"/>	Churches/Chapels	<input checked="" type="checkbox"/>	Others(basketball court, water supply system)

D. IMPACT ASSESSMENT AND MITIGATION

Pre-Construction/Construction Period		Y	N	Impact Description	Mitigation/ Enhancement Measures
Project Activities Affecting the Physical Environment					
Will there be land clearing? If yes, what is the total area to be cleared? Area to be cleared: <u>None</u>		<input checked="" type="checkbox"/>		The new line will follow the existing line	
Will there be stockpiling of soil, sand and gravel materials in the project area?		<input checked="" type="checkbox"/>		No impact	
Will there be drillings, hammering, boring activities?		<input checked="" type="checkbox"/>		No impact	
Will there be earthmoving activities e.g. excavation works, cut and fill, etc.? If yes, how deep is the excavation and how much is the estimated volume of cut and fill?		<input checked="" type="checkbox"/>		Minimal excavation works for the electrical poles No Impact	
Ave. depth of excavation: Estimated volume of cut and fill		<input checked="" type="checkbox"/>		Approx. 2.5-3 m.	
Will there be any slope modifications or ground leveling to be done		<input checked="" type="checkbox"/>		Substation will be leveled	Sprinkling of water to minimize dust

Will temporary quarters or barracks and a field office be provided for construction workers in the project site?	✓		Minimal impact due to domestic waste	Coordination with LGU re: disposal
Will there be topsoil removal and replacement? If yes, how much of the removed topsoil will be replaced? <input type="checkbox"/> Entire volume <input type="checkbox"/> Partial only		✓	No impact	
If partial only, where will the rest of the topsoil go?		✓	NA	
If no, what will happen to the excavated topsoil?		NA	NA	
Will there be demolition of existing structures? If yes, what types of structures will be demolished? Type of structures: n/a		✓	No impact	
Are you constructing an access road going to the site? If yes, what type of access road? <input type="checkbox"/> All weather road <input type="checkbox"/> Concrete <input type="checkbox"/> Asphalt Length (m) _____ Width (m) _____		✓	No impact	

Pre-Construction/Construction Period				
Project Activities Affecting the Biological Environment	Y	N	Impact Description	Mitigation/Enhancement Measures
1. Will there be vegetation clearing?		✓	No Impact	
2. Will trees be affected (e.g.		✓	No Impact	

cut down or removed) during the clearing? If yes, how many and what are these species of trees?			
# of trees _____ species of trees: _____ _____			
3. Will the project encroach into precious ecological areas (e.g. forested zones, watershed areas)?	✓	No impact.	
4. Will clearing activities affect any rare, threatened or endangered plant and animal species?	✓	No impact.	

Pre-Construction/Construction Period				
Project Activities Affecting the Socio-Cultural Environment	Y	N	Impact Description	Mitigation/Enhancement Measures
1. Will there be settlements to be affected? If yes, how many households will be affected? Total no. of families/households: none		✓	No Impact	
2. Will the project provide reasonable payment terms to the affected settlements?		NA	NA	
3. Will there be locals to be hired during the construction?	✓		Positive impact	It is the Contractor's policy to prioritize local hiring
4. Are there existing public trails or routes (regularly used) that traverse the property?		✓	No impact	
5. Will the public or local community still have access to the property in terms of passing through or entering it to reach their house or		✓	Substation area is private property with no access to public.	

residence?		Transmission line is public/private land with access to public	
6. Will there be increase in economic activity in the area or rise in associated projects?	✓	Positive impact	Increase in economic activities will be due to local hiring, local purchase of goods and services and generation of small scale business
7. Will the project cause an increase in traffic or disrupt traffic in major routes due to entry or exit of construction equipment?	✓	Limited increase in traffic due to transportation of equipment	Coordination with LGU in connection with the arrival of equipment
8. Are there prevailing peace and order problems in the site which can affect the project?	✓	No impact	
9. Will the project destroy/ impose hazards to historical/cultural instruments?	✓	No impact	

Operation and Maintenance Period				
Project Activities Affecting the Physical Environment	Y	N	Impact Description	Mitigation/ Enhancement Measures
1. Will the project create a significant decrease in the aesthetic value of the area?	✓		No Impact	
2. Are there areas prone to lightning strikes?			No available data on lightning	Substation and transmission line are equipped with lightning arrestors
3. Does the project have significant noise emissions		✓	No Impact	

Operation and Maintenance Period				
Project Activities Affecting the Biological Environment	Y	N	Impact Description	Mitigation/ Enhancement Measures
1. Does the design take into account hazards to wildlife		✓	No Impact	
2. Does the design take into account possible blockade of wildlife passageways?		✓	No Impact	

Operation and Maintenance Period				
Project Activities Affecting the Socio-Cultural Environment	Y	N	Impact Description	Mitigation/ Enhancement Measures
1. Will the project create interference with other utilities? Utilities: <hr/> <hr/> <hr/>		✓	No Impact	
2. Will the project create a significant increase in the existing population in the area?		✓	No Impact	
3. Will the prevailing land value in the area increase with the project?		✓	No Impact	
4. Does the design take into account hazards to humans due to accidental failure of substation/transmission line		✓	No Impact	
5. Is there a team formed for the proper responsibilities in repairing damaged poles/towers resulting from natural (typhoons, earthquakes) or man-made calamities?		✓	Minimal Impact	INEC, the local utilities will service the transmission line. INEC has the full capability to such task
6. Will there be an increase in economic activity or rise in associated projects?		✓	Positive impact.	The transmission line will improve the electrical infrastructure and attract investments.

	PROPONENTS COMMITMENTS	Answer	
		Yes	No
Are you committing yourself to...			
1.	Comply with existing environmental rules and regulations, guidelines and criteria?	✓	
2.	Comply with all mitigation and enhancement measures that have been identified in the report?	✓	
3.	Abide and conform to the prescribed rules and specifications for power transmission lines as contained in the Electrical Code of the Philippines?	✓	
4.	Construct, operate and maintain well-designed transmission line and substation?	✓	
5.	Establish adequate buffer zones from the project area?	✓	
6.	Comply with all stipulations indicated in any agreement forged with private or public authorities?	✓	
7.	Report to proper government authorities any illegal forest activities that may be present or happening in the project area?	✓	
8.	Immediately replace/rehabilitate/repair damaged structures/lines resulting from natural or man-made calamities?	✓	
9.	Organize and conduct information, education and communication (IEC) activities on safety and potential hazards of the project?	✓	
10.	Properly brief or orient the proponent's staff about the ECC conditions, commitments and agreements made about the project?	✓	
11.	Others, please specify	✓	

E. LIST OF ANNEXES

Title or Description	Put a check (✓) mark
1. Location Map	✓
Photocopy of TCT/OCT/CLT, etc. (S/S only)	✓
2. Transmission Line Location Plan	✓
3. Pole Design and Layout	✓
4. Control and Storage Building Layout Substation and switchyard layout	✓
5. Listing of Manpower Requirements	✓
6. GANTT Chart (Schedule of Activities)	✓
7. Photocopies of Agreements/Right-of-Way Grants	✓
8. Geological Fault Map	✓
9. List of Trees and other Important Vegetation	NA
10. Noise Emission Impact Assessment	NA
11. Clearance from Office of Cultural Communities (if traversing ancestral lands Or indigenous people/communities)	NA
12. PAWB Clearance (if traversing a Protected Area)	NA
13. Endorsement of the Municipal or City Provincial Council	✓

ACCOUNTABILITY STATEMENT

This is to certify that all the information and commitments in the Initial Environmental Examination (IEE) Checklist are true, accurate and complete. Should we learn of any information to the attention of the appropriate DENR Regional Office.

We hereby bind ourselves jointly and solidarily to any penalty that may be imposed arising from any misinterpretation or failure to state material information in this IEE Checklist.

In witness whereof, we hereby set our hands this _____ day of
_____, 2000 at _____.

ATTY.FERDINAND A. DUMLAO

*Chairman, Board of Directors
NorthWind Power Development Corporation*

ACKNOWLEDGEMENT

BEFORE ME, this _____ day of _____, 2000 at _____, personally appeared with Community Tax Certificate No. _____ issued on _____ at the _____ in his capacity as _____.

And acknowledged to me that this IEE is his/her voluntary act and deed, of the entity he/she represents. This document, which consists of _____ pages, including the page on which acknowledgement is written is an Initial Environment Examination (IEE) Checklist.

Witness my hand and seal on the place and date above written.

Notary Public

Until
PTR No.
Issued at
On

Doc. No. _____
Page No. _____
Book No. _____
Series of _____

LOCATION MAP

Photocopy of TCT/OCT/CLT, etc. (S/S
only)

CONTRACT TO BUY AND SELL

KNOW ALL MEN BY THESE PRESENTS:

This Contract to Buy and Sell is made, executed and entered into by and between:

We, Spouses FELIZARDO GACES and ELENA B. GACES, both of legal age, Filipino citizens and residents of Barangay Utol, Bangui, Ilocos Norte, hereinafter referred to as the "SELLERS";

-AND-

NORTHWIND POWER DEVELOPMENT CORPORATION (NWPDC), a domestic corporation duly organized and existing under Philippine laws, with office address at Unit 310, Jollibee Plaza, Emerald Avenue, Ortigas Center, Pasig City, represented herein by its Chairman of the Board of Directors and Treasurer, Atty. Ferdinand A. Dumlaao, duly authorized to sign this document, hereinafter referred to as the "BUYER";

WITNESSETH;

That the SELLERS are the absolute owners in fee simple of parcel of land, located at Barangay Baruyen, Municipality of Bangui, Province of Ilocos Norte with an area of Sixteen Thousand Three Hundred Eighty Six Square Meters (16,386 sq. m.), more particularly described and covered by the Original Certificate of Title No. P-55671 issued by the Registry of Deeds for the Province of Ilocos Norte;

That the SELLERS offers to sell and the BUYER agrees to buy a portion of the afore-mentioned and above-described property limited to an area of Four Thousand Four Hundred Thirty Two Square Meters (4,432 sq. m.) as earlier identified and agreed by the parties herein, at a net amount of Sixty Pesos per Square Meter (PhP60.00/sq. m.) or a total amount of Two Hundred Sixty Five Thousand Nine Hundred Twenty Pesos (PhP265,920.00):

That the parties herein further agree on the following terms and conditions;

1. That the BUYER will shoulder the cost of surveying and subdivision, capital gains tax, transfer fees, titling, documentation and other miscellaneous expenses;
2. That the BUYER hereby makes a downpayment of One Hundred Thousand Pesos (PhP100,000.00) in cash handed unto the SELLERS and the SELLERS hereby acknowledge receipt thereof to their satisfaction;
3. That the SELLERS allow the BUYER to conduct a partition and subdivision survey over the property subject matter to this contract;
4. That, as soon as the survey is finalized to the satisfaction of both parties, the BUYER will pay the balance of One Hundred Sixty Five Thousand Nine Hundred Twenty (PhP165,920.00) on or before January 30, 2003, and simultaneously, the parties agree to execute the corresponding Deed of Sale and Partition of the subject property;
5. That after all documents that are needed for the consummation of the Deed of Sale and Partition, failure on the part of the BUYER to pay the SELLERS, on or before January 30, 2003, the balance of One Hundred Sixty Five Thousand Nine Hundred Twenty (PhP165,920.00), the SELLERS will have the right to forfeit the BUYER's downpayment.

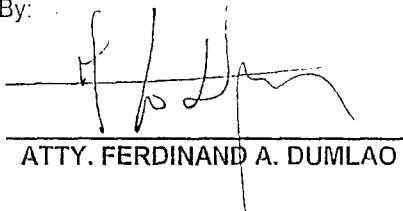
IN WITNESS WHEREOF, the parties hereto have affix their signatures this
_____ day of December 2002.



FELIZARDO GACES
(SELLER)

NORTHWIND POWER DEVELOPMENT CORP.
(BUYER)

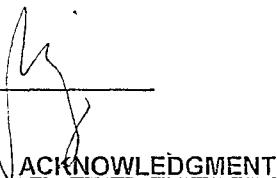
By:



ATTY. FERDINAND A. DUMLAAO

Elena B. Gaces
ELENA B. GACES
(SELLER)

SIGNED IN THE PRESENCE OF:



ACKNOWLEDGMENT

REPUBLIC OF THE PHILIPPINES)
PROVINCE OF ILOCOS NORTE) S.S.

BEFORE ME, a Notary Public for the Province of Ilocos Norte, this day of December 2002, personally appeared:

CTC NO. ISSUED AT/ON

FELIZARDO GACES

ELENA B. GACES

ATTY. FERDINAND A. DUMLAAO

all known to me and to me known to be the same persons who executed the foregoing Contract to Buy and Sell, consisting of two pages, including this page on which the acknowledgement is written and acknowledged the same to be their voluntary act and deed.

WITNESS MY HAND AND OFFICIAL SEAL on the date and place first above written.

NOTARY PUBLIC

Doc. No. ;
Page No. ;
Book No. ;
Series of .

075348

REPUBLIC OF THE PHILIPPINES

MINISTRY OF JUSTICE

NATIONAL LAND TITLES AND DEEDS REGISTRATION ADMINISTRATION

(Land Registration Commission)

OFFICE OF THE REGISTER OF DEEDS FOR THE PROV. ILOCOS NORTE

Original Certificate of Title

No. P-55671

ENTERED PURSUANT TO THE FOLLOWING PATENT

REPUBLIC OF THE PHILIPPINES

MINISTRY OF NATURAL RESOURCES

BUREAU OF LANDS

NATURAL RESOURCES DISTRICT OFFICE NO. I-2

Laod City 50858

FREE PATENT No. (I-2)

TO ALL WHOM THESE PRESENTS SHALL COME, GREETINGS:

FELIZARDO GACES

married to Elena B. Gaces, Filipino, of legal age, and a resident of Utol, Banqui, Ilocos Norte

possessing all the qualifications and having fully complied with all the conditions and requirements of Republic Acts Nos. 782 and 3872, Chapter VII of Commonwealth Act No. 141 as amended, and Batas Pambansang 223 is hereby granted this Free Patent for the land situated in Batuyen, Banqui, Ilocos Norte with an area of 16.386 sq.m., more particularly bounded and described at the back hereof subject, however, to the provisions of Sections 118 which provide, among others, that except in favor of the Government or any of its branches, units, or institutions, the land hereby acquired shall be inalienable and shall not be subject to encumbrance for a period of five (5) years from date of this patent, 119, 121 as amended by P.D. No. 763, 122 and 124 of Commonwealth Act No. 141, as amended, and P.D. No. 1198; to all public easements and servitudes prescribed in Sections 109, 110, 111, 112 as amended by P.D. No. 1361; 113 and 114 of Commonwealth Act No. 141, as amended; and to the right of government to administer and protect the timber found thereon for a term of five (5) years from the date of issuance of the patent, provided, however, that the grantee or his heirs may cut and utilize such timber as may be needed for his or their personal use.

MAY 29 1987

Witness my hand and the seal of the Republic of the Philippines this day of in the year of our Lord nineteen hundred and

By Authority Of The President
of The PhilippinesMARCELO G. DIES
District Land Officer

Transcribed in the "Registration Book" for the Province of Ilocos Norte, pursuant to the Provisions of Section 103 of P.D. No. 1529, on the day of May 28, 1987, at the time of 10:45 A.M.

EDWARD S. BURGOS
Registrar of Deeds
Register of Deeds

(TECHNICAL DESCRIPTION)

Lot No. 21126, Cad-734-D

Beginning at a point marked "1" of Lot No. 21126, Cad-734-D, being S. 81-56 W., 8405.83 m. from BLIM No. 1, Cad-734-D; thence S. 31-35 W., 48.30 m. to point 2; N. 64-26 W., 7.74 m. to point 3; N. 62-45 W., 15.84 m. to point 4; N. 20-24 E., 34.74 m. to point 5; S. 86-38 E., 34.31 m. to point 1, point of beginning.

Containing an area of ONE THOUSAND ONE HUNDRED AND THIRTY-NINE (1,139) SQUARE METERS.

All points are marked on the ground by P.S. Cyl. Conc. Mons.

Bounded on the SE., along line 1-2 by Lot 21125, Cad-734-D; on the SW., along line 2-3 by Lot 21163, Cad-734-D; along line 3-4 by Lot 21151, Cad-734-D; on the NW., along line 4-5 by Lot 21127, Cad-734-D; and on the NE., along line 5-1 by Lot 21128, Cad-734-D.

Lot No. 21141, Cad-734-D

Beginning at a point marked "1" of Lot No. 21141, Cad-734-D, being S. 81-59 W., 8315.26 m. from BLIM No. 1, Cad-734-D; thence N. 85-33 W., 80.93 m. to point 2; N. 11-08 E., 58.45 m. to point 3; N. 20-11 E., 50.25 m. to point 4; S. 74-34 E., 66.00 m. to point 5; S. 13-50 W., 192.67 m. to point 1, point of beginning.

Containing an area of FIFTEEN THOUSAND TWO HUNDRED AND FORTY SEVEN (15,247) SQUARE METERS.

All points are marked on the ground by P.S. Cyl. Conc. Mons.

Bounded on the SW., along line 1-2 by Lot 21128, Cad-734-D; on the NW., along line 2-3 by Lot 21129, Cad-734-D; along line 3-4 by Lot 21212, Cad-734-D; on the NE., along line 4-5 by Lot 21546, Cad-734-D; and on the SE., along line 5-1 by Lot 21213, Cad-734-D.

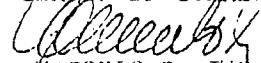
Bearings Grid.

These lots were surveyed in accordance with law and existing regulations promulgated thereunder, by Pedro A. Villabroza, Cadastral Land Surveyor, on January 11 to 26, 1983 and approved on November 27, 1984.

NOTE:

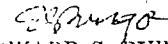
These lots are covered by F. P. A. No. (1A) 313-D.

CERTIFIED CORRECT:


MARCELO G. INES
District Land Officer

Esborrachado
Cadastral Map:

Continued on Additional Sheet Page
Register of Deeds


EDWARD S. BURGOS

Register of Deeds

MEMORANDUM OF ENCUMBRANCES

Entry No. Entry No. 146710 - BAILBOND of the accused Nestor Balosales in the amount of P56,000.00 (P8,000.00 each) in Crim. Case Nos. 7668, 7669, 7670, 7671, 7694, 7698 and 7699 filed in the Regional Trial Court of Ilocos Norte, First Judicial Region, Laoag City, of the land described in OCT Nos. P-55715 and P-55671 in so far as Lot 21141 is concerned.
Date of instrument - March 4, 1997
Date of inscription - March 5, 1997
File No. P55715

E. M. M.
ATTY. EDWARD S. MURGOS
Registrar of Deeds

Entry No. 159806 - Release of Bailbond

Upon an order of the Regional Trial Court of Ilocos Norte, First Judicial Region, Branch XVI-Laoag City, the Bailbond inscribed under Entry No. 146710 is hereby cancelled.
Date of instrument - - - January 3, 2001
Date of inscription-- - - January 3, 2001
File No. P-55715

E. M. M.
ATTY. EDWARD S. MURGOS
Registrar of Deeds

21547
CAD. 734 D

21546
CAD. 734 D

21545
CAD. 734 D

21212
CAD. 734 D

A 21141 (OCT:5-55671)
AREA = 10203 sq.m.
FELIZARDO GACES

21129
CAD. 734 D

B 21141
NORTHWIND POWER DEV'T. CORP./
FERDINAND DUMLAO

C 21141
2 BRGY. LOT 3
AREA = 612 sq.m.

BL 21
B R A N G A Y

21213
CAD. 734 D

21128
21170
21171

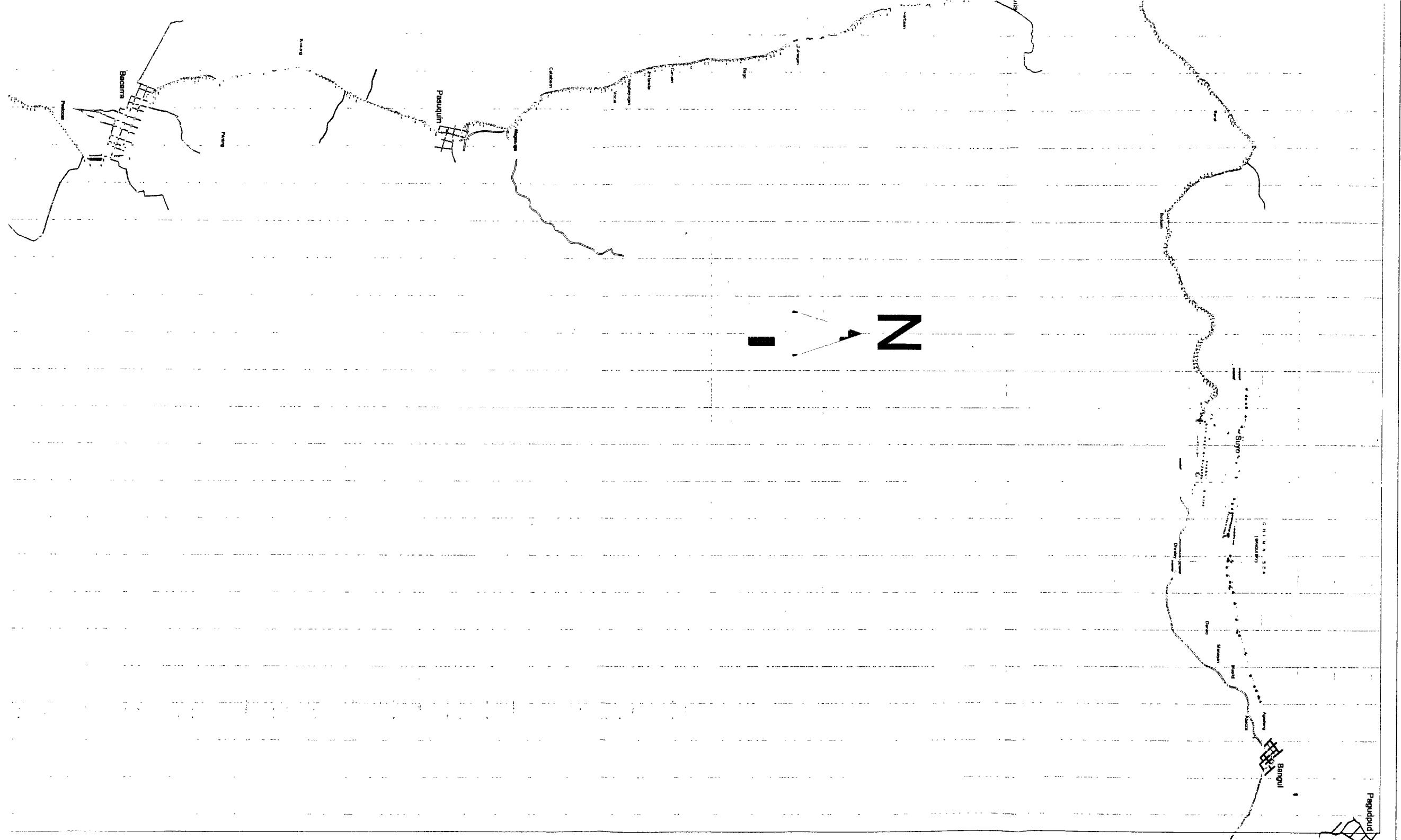
734 D. BANGUI CADASTRE TO COR. 1
8315 .26 m.
8378 .72 m.
88 .39 m.
94 .31 m.
818 581 W

455 660 220

TRANSMISSION LINE LOCATION PLAN



TRANSMISSION LINE LOCATION PLAN



POLE DESIGN AND LAYOUT

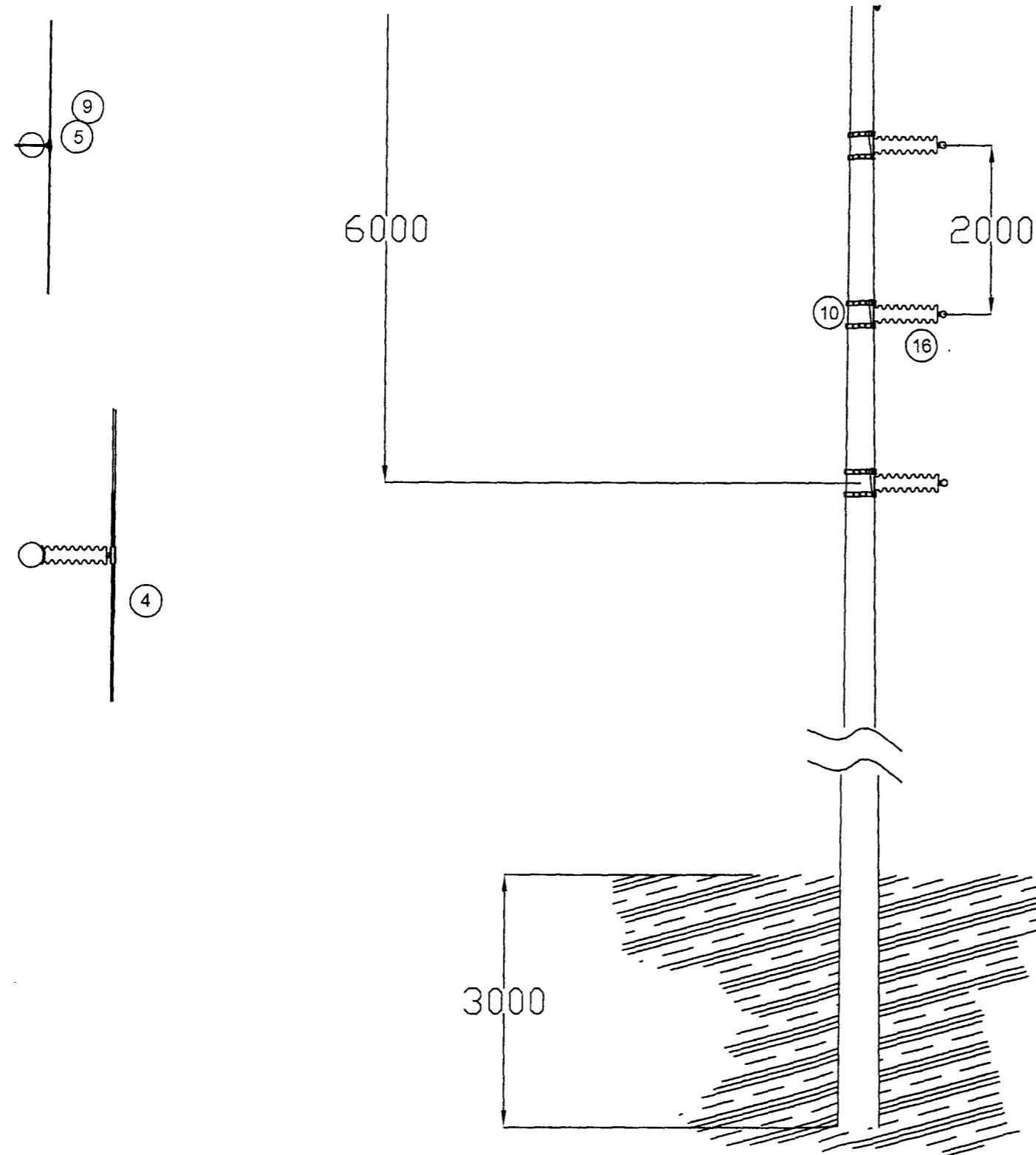
1. Pole design and layout are critical steps in the construction of a wind farm. Proper design ensures the safety and reliability of the turbines, while layout maximizes energy capture and minimizes environmental impact.

2. Pole design factors include soil resistance, wind load calculations, and structural integrity. Wind load calculations must take into account local weather patterns, terrain, and the specific characteristics of the turbines being installed.

3. Layout considerations involve determining the optimal locations for each turbine, taking into account factors such as proximity to transmission lines, land ownership, and environmental constraints. The layout must also ensure sufficient space between turbines to prevent interference with each other's performance.

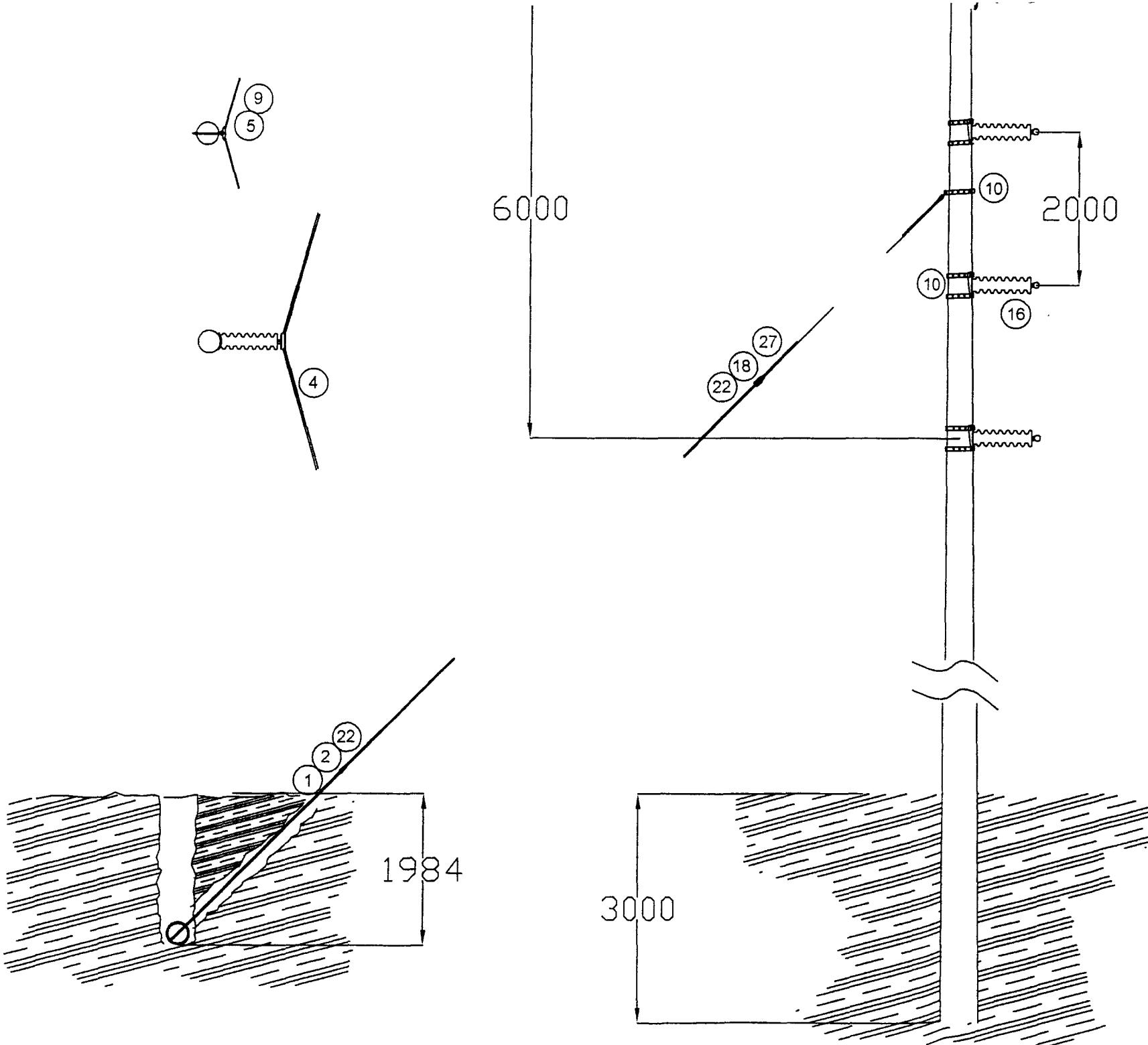
4. Once the design and layout are finalized, the poles are typically constructed using steel or concrete materials. The poles are then transported to the site and installed using specialized equipment.

5. After the poles are in place, the turbines are mounted onto them, and the entire system is connected to the electrical grid. This final step marks the completion of the wind farm's construction.



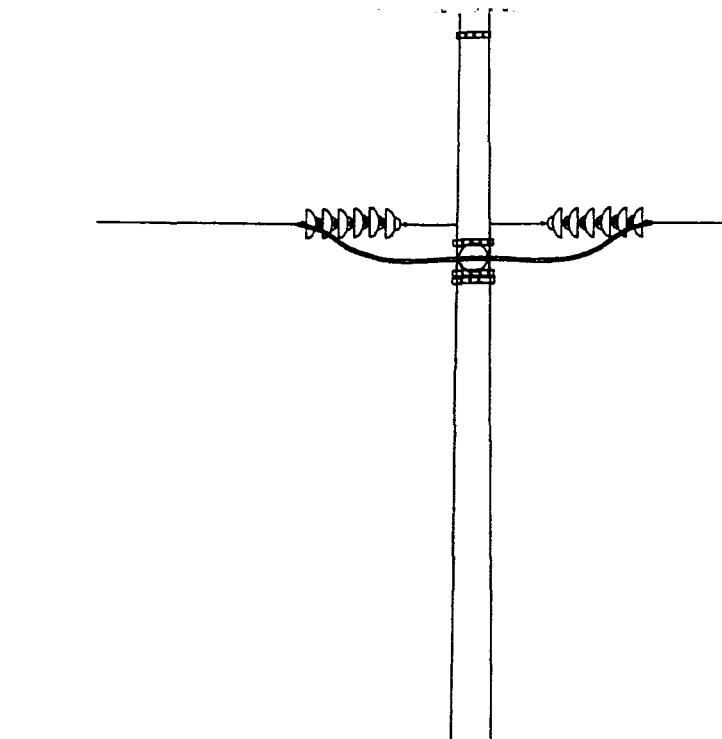
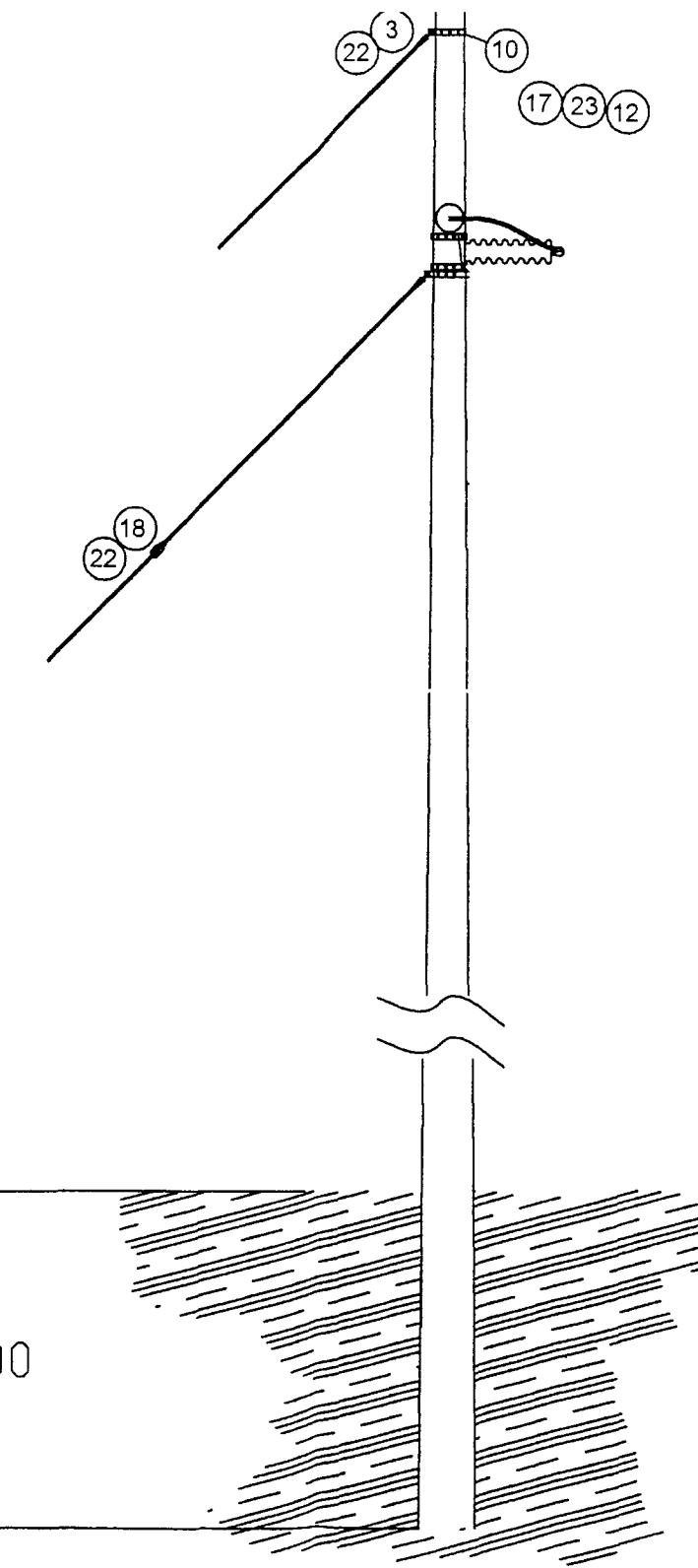
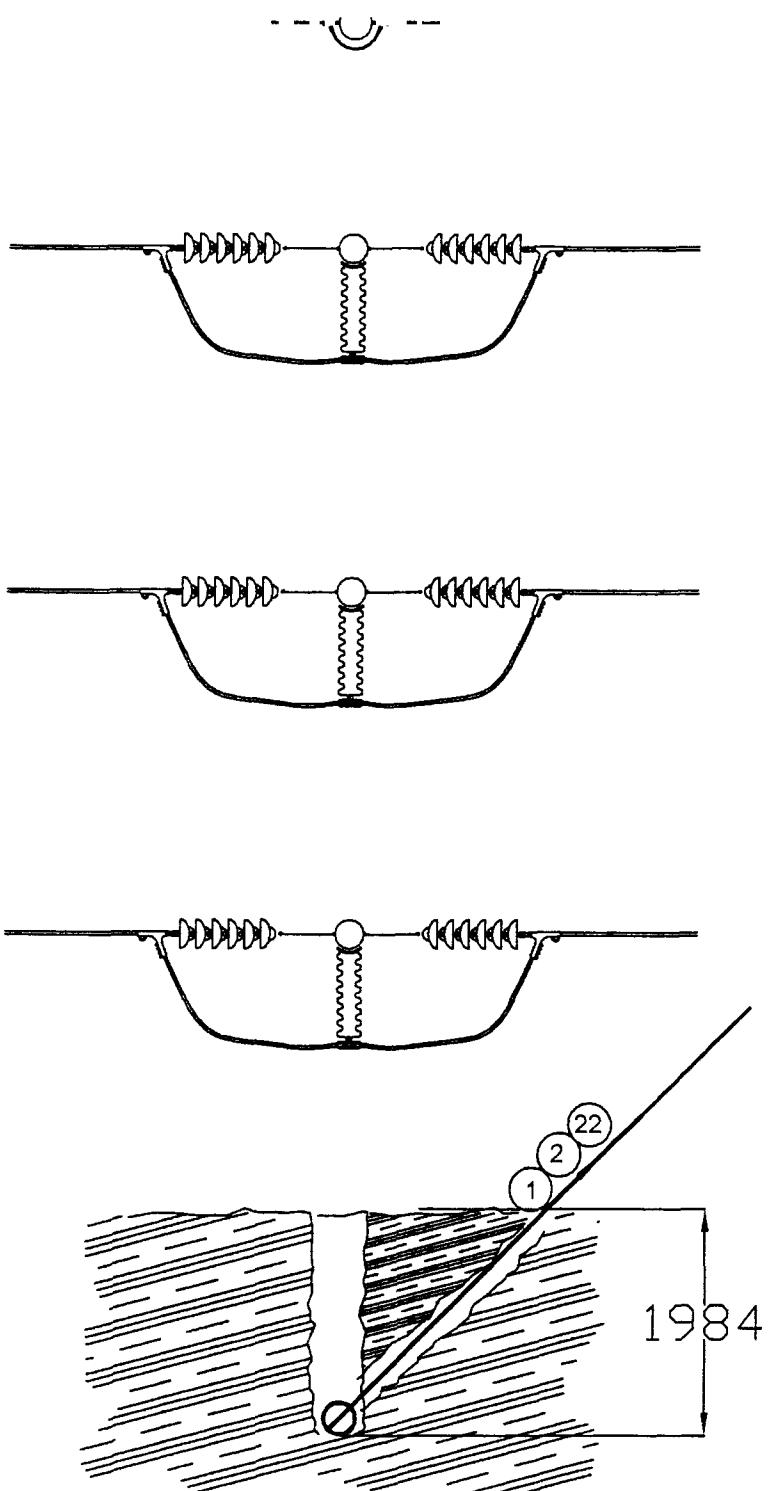
BILL of MATERIALS

item no.	description
4	armor rod, preformed for 795 MCM acsr, Drake
5	clevis-eye, twisted
7	Bolts, nuts, washers & other hardware - galvanized
8	Bolt, oval eye, with square washer, 5/8" x 12", hot dip
9	clamp, parallel groove, 2 bolt, for 3/8" OHGW
10	clamp, pole band, heavy duty
13	clamp, suspension 3/8"
16	insulator, post, 72 kv, w/ clamp for 795 MCM acsr with 20 Pole, 18m, 201mm tip, 417mm butt
25	wire, # 4 copper, bare, stranded (grounding)



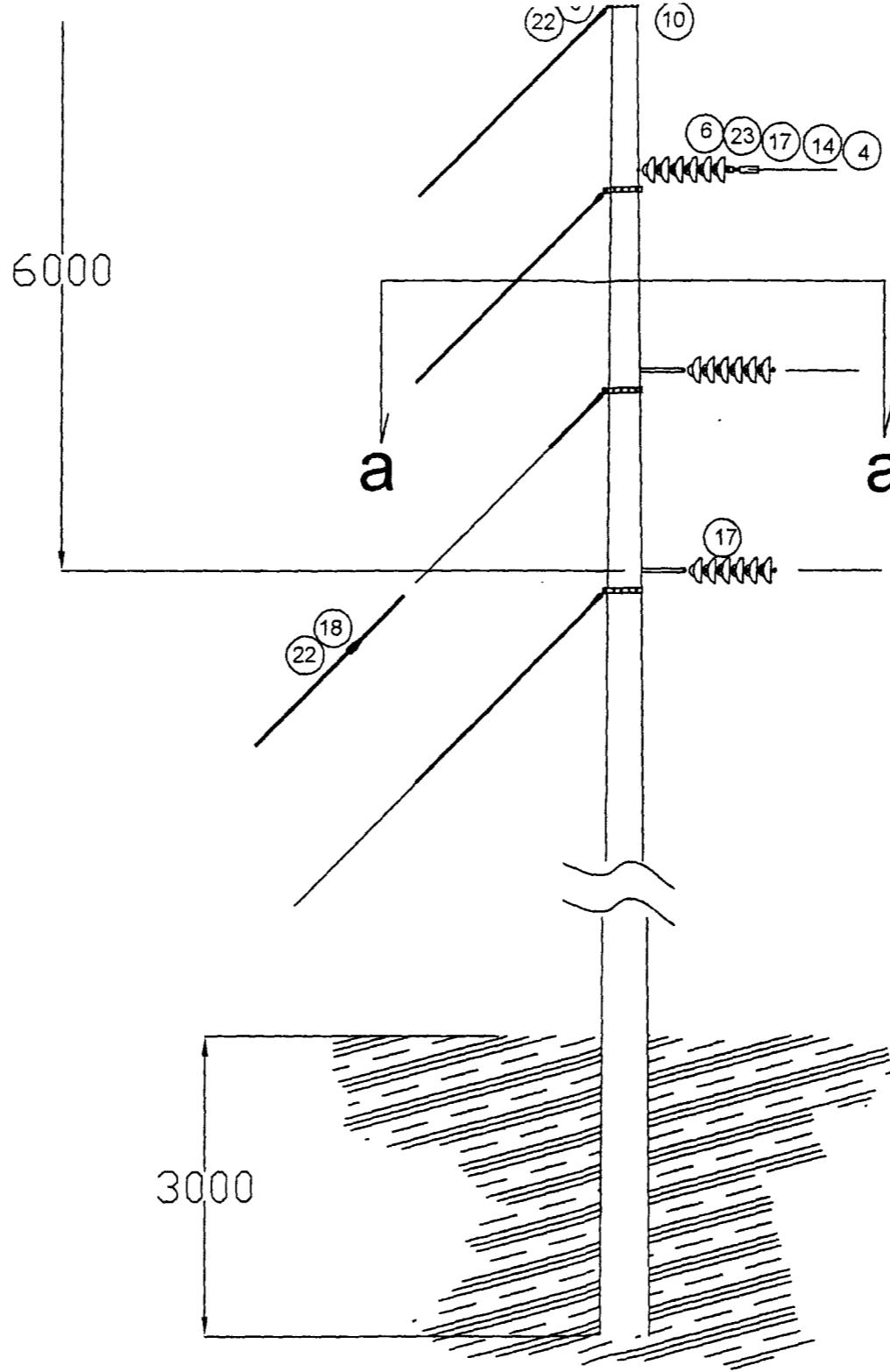
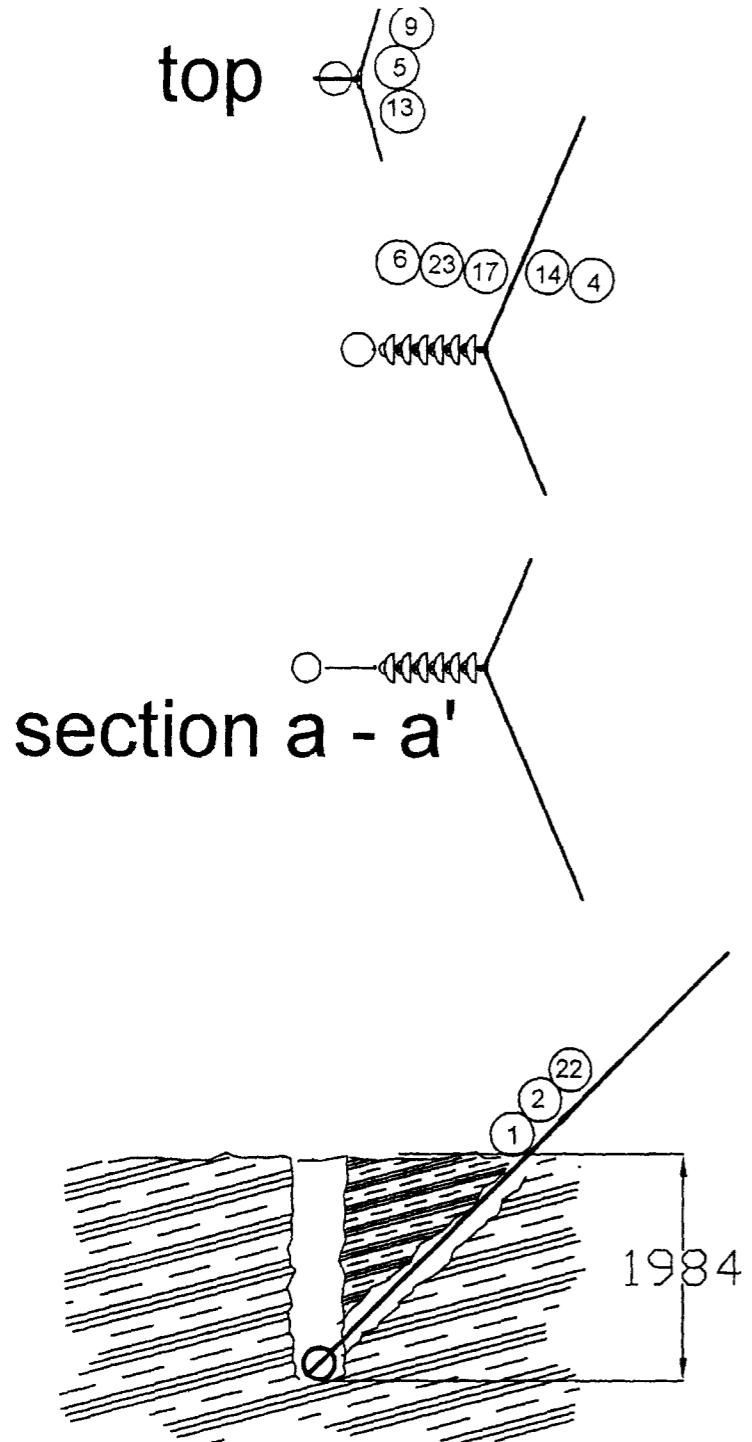
BILL of MATERIALS

item no.	description
1	anchor log, creosoted, 10"dia x 5' or concrete equivaler
2	anchor rod, 3/4" x 10', twin thimble eye, w/ 4"x4" curved
3	anchor shackle, 5/8", Joslyn 1082 NGK
4	armor rod, preformed for 795 MCM aCSR, Drake
5	clevis-eye, twisted
7	Bolts, nuts, washers & other hardware - galvanized
8	Bolt, oval eye, with square washer, 5/8" x 12", hot dip gal.
9	clamp, parallel grove, 2 bolt, for 3/8" OHGW
10	clamp, pole band, heavy duty
13	clamp, suspension 3/8"
16	insulator, post, 72 kv, w/ clamp for 795 MCM aCSR with a
18	insulator, strain, 506 heavy duty
20	Pole, 18m, 201mm tip, 417mm butt
22	preformed guy grip, 7/16"
24	nut, eye, oval, heavy duty, 5/8" hot dip galvanized
25	wire, #4 copper, bare, stranded (grounding)
27	wire, guy, 7/16" HS, G I
28	wire, OHGW, 3/8" HS, G I (utility grade)



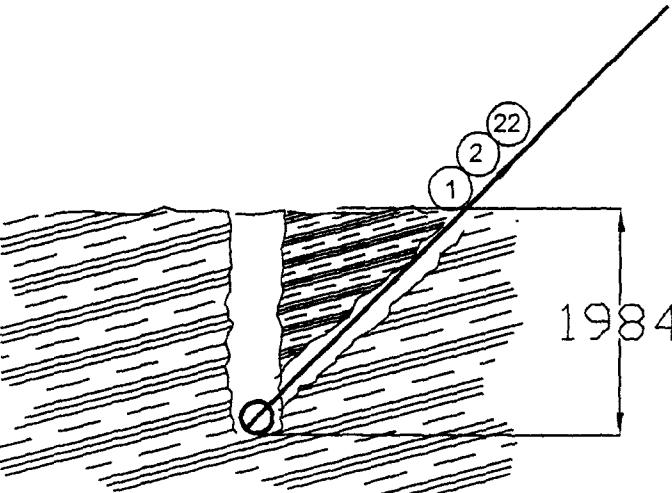
BILL of MATERIALS

item no.	description
1	anchor log, creosoted, 10"dia x 5' or concrete equivalent
2	anchor rod, 3/4" x 10', twin thimble eye, w/ 4"x4" curved s
3	anchor shackle, 5/8", Joslyn 1082 NGK
6	clevis-y ball
7	Bolts, nuts, washers & other hardware - galvanized
8	Bolt, oval eye, with square washer, 5/8" x 12", hot dip gal
9	clamp, parallel grove, 2 bolt, for 3/8" OHGW
10	clamp, pole band, heavy duty
11	clamp, strain, for 3/8" OHGW, NGK or equivalent
12	clamp, strain, for 795 MCM acsr, NGK or equivalent
15	extension link 18" heavy duty, hot dip galvanized
16	insulator, post, 72 kv, w/ clamp for 795 MCM acsr with an
17	insulator, suspension, 10", b&s type
18	insulator, strain, 506 heavy duty
20	Pole, 18m, 201mm tip, 417mm butt
22	preformed guy grip, 7/16"
23	socket eye
24	nut, eye, oval, heavy duty, 5/8" hot dip galvanized
25	wire, # 4 copper, bare, stranded (grounding)
27	wire, guy, 7/16" HS, G I

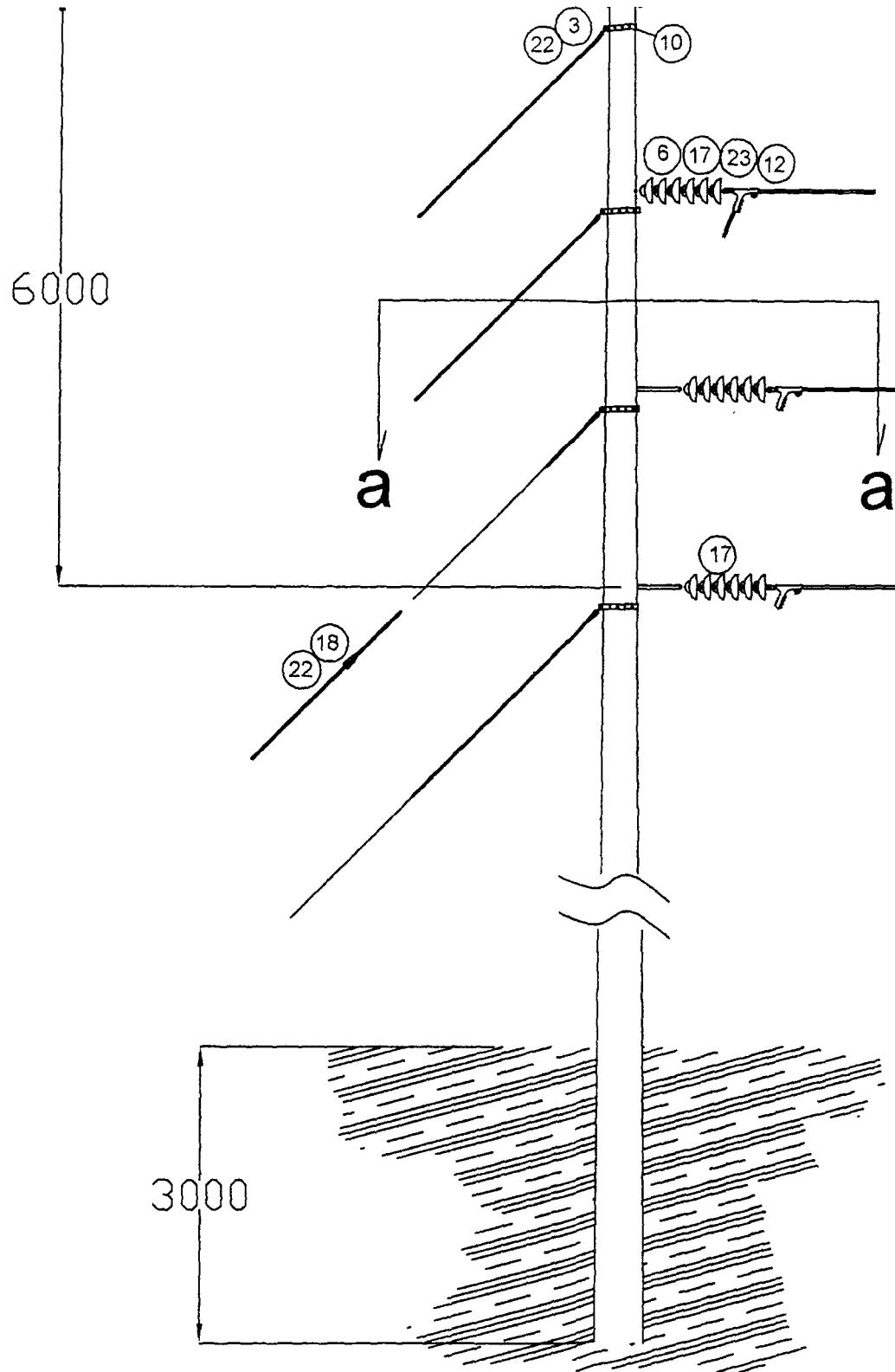
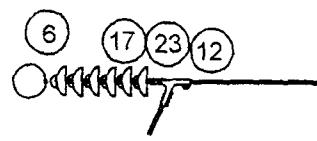


BILL of MATERIALS

item no.	description
1	anchor log, creosoted, 10"dia x 5' or concrete equivalent
2	anchor rod, 3/4" x 10', twin thimble eye, w/ 4"x4" curved
3	anchor shackle, 5/8", Joslyn 1082 NGK
4	armor rod, preformed for 795 MCM acsr, Drake
5	clevis-eye, twisted
6	clevis-y ball
7	Bolts, nuts, washers & other hardware - galvanized
8	Bolt, oval eye, with square washer, 5/8" x 12", hot dip galvanized
9	clamp, parallel grove, 2 bolt, for 3/8" OHGW
10	clamp, pole band, heavy duty
11	clamp, strain, for 3/8" OHGW, NGK or equivalent
13	clamp, suspension 3/8"
14	clamp, suspension, for 795 MCM acsr w/ armor
15	extension link 18" heavy duty, hot dip galvanized
17	insulator, suspension, 10", b&s type
18	insulator, strain, 506 heavy duty
20	Pole, 18m, 201mm tip, 417mm butt
22	preformed guy grip, 7/16"
23	socket eye
24	nut, eye, oval, heavy duty, 5/8" hot dip galvanized
25	wire, # 4 copper, bare, stranded (grounding)
27	wire, guy, 7/16" HS, G I

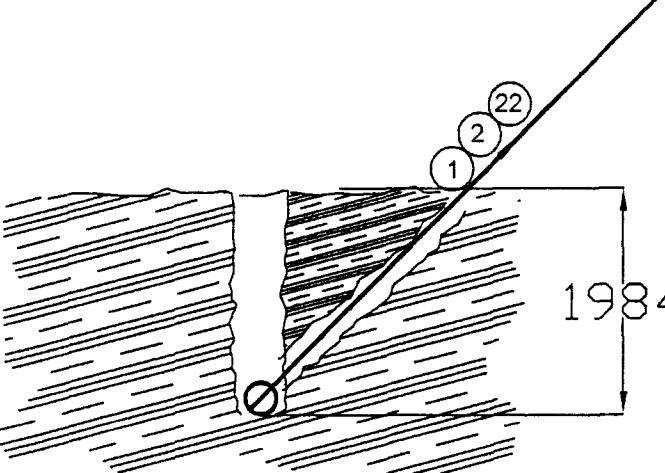


section a - a'

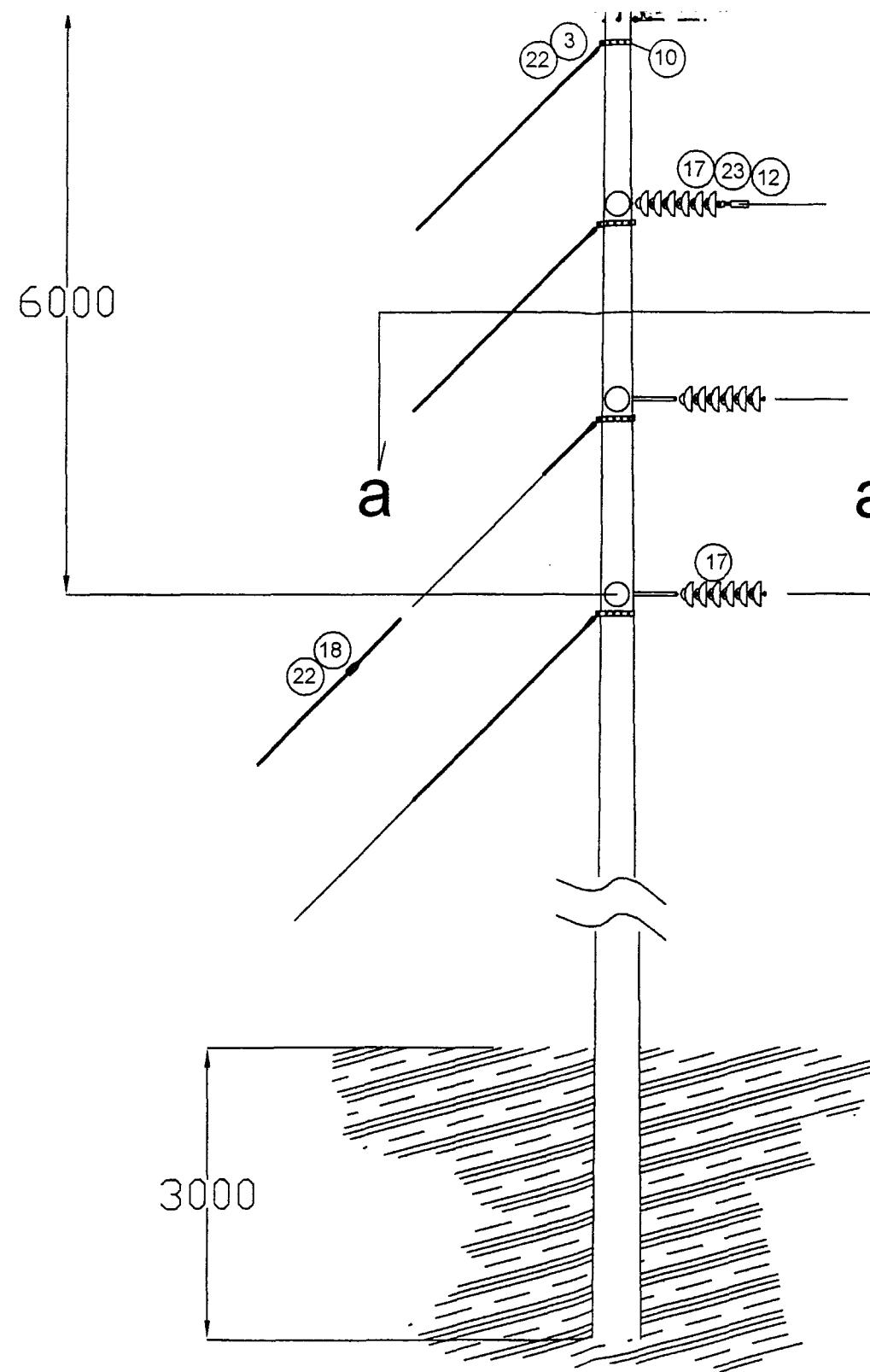
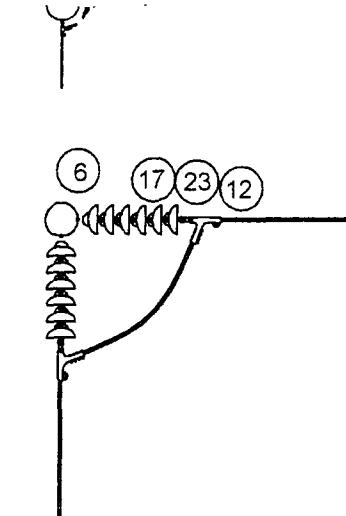
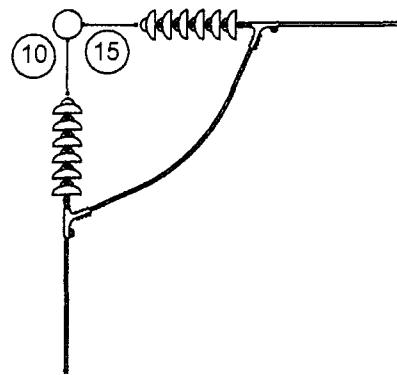


BILL of MATERIALS

item no.	description
1	anchor log, creosoted, 10"dia x 5' or concrete equivalent
2	anchor rod, 3/4" x 10', twin thimble eye, w/ 4"x4" curve
3	anchor shackle, 5/8", Joslyn 1082 NGK
6	clevis-y ball
7	Bolts, nuts, washers & other hardware - galvanized
8	Bolt, oval eye, with square washer, 5/8" x 12", hot dip galvanized
9	clamp, parallel groove, 2 bolt, for 3/8" OHGW
10	clamp, pole band, heavy duty
11	clamp, strain, for 3/8" OHGW, NGK or equivalent
12	clamp, strain, for 795 MCM acsr, NGK or equivalent
15	extension link 18" heavy duty, hot dip galvanized
17	insulator, suspension, 10", b&s type
18	insulator, strain, 506 heavy duty
20	Pole, 18m, 201mm tip, 417mm butt
21	preformed guy grip, 3/8"
22	preformed guy grip, 7/16"
23	socket eye
24	nut, eye, oval, heavy duty, 5/8" hot dip galvanized
25	wire, # 4 copper, bare, stranded (grounding)
27	wire, guy, 7/16" HS, G I

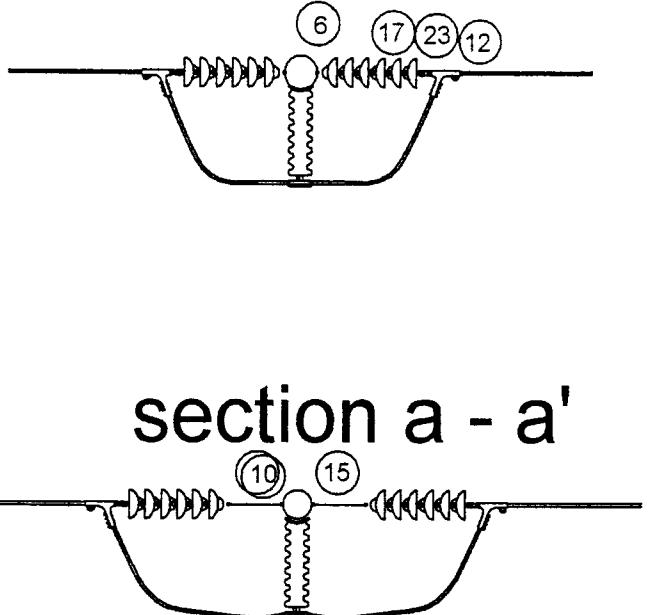


section a - a'

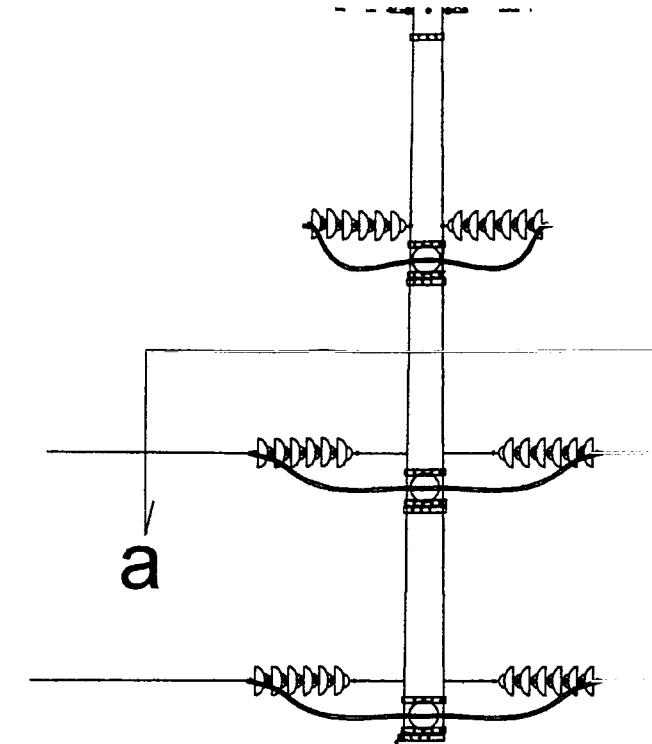
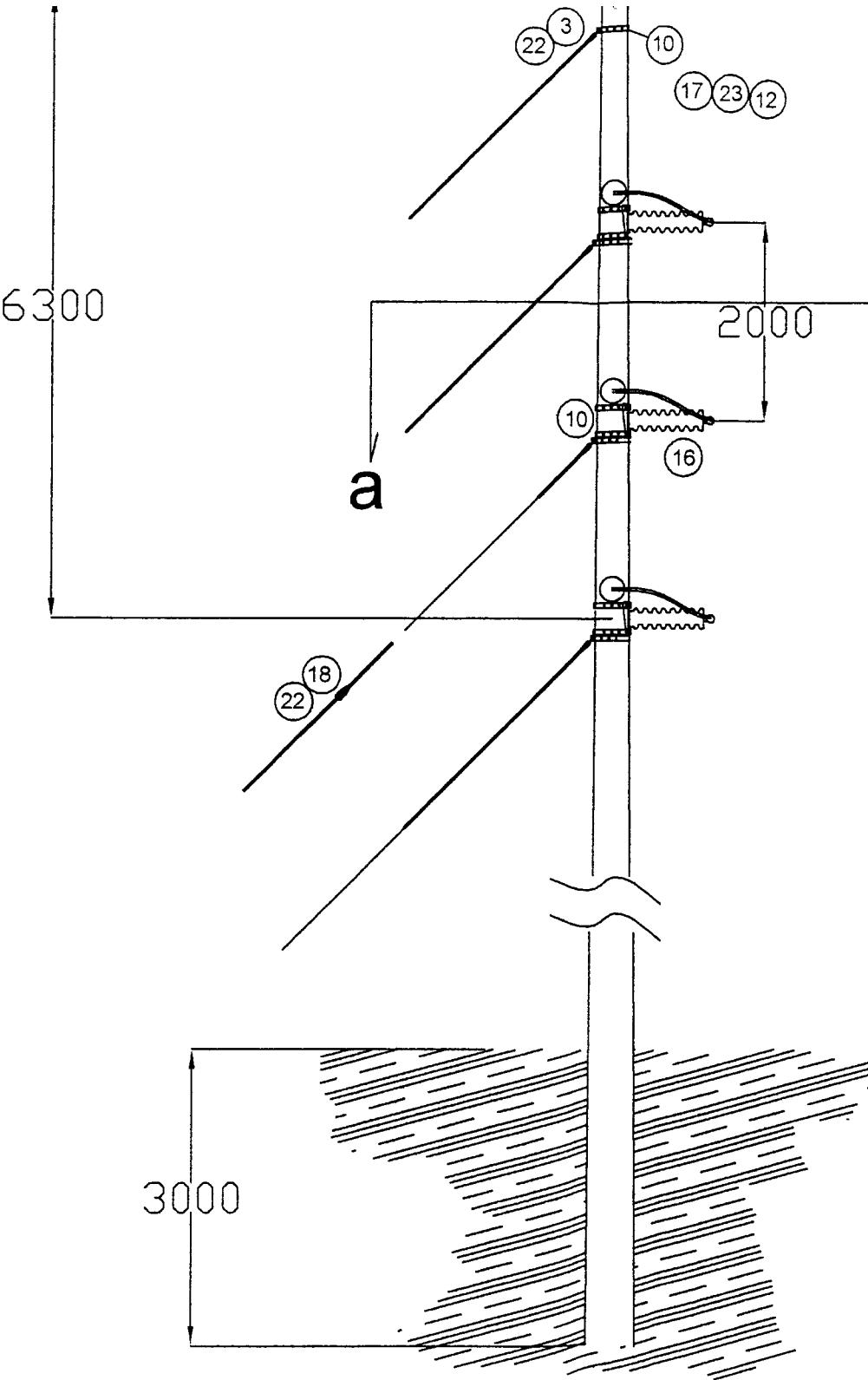
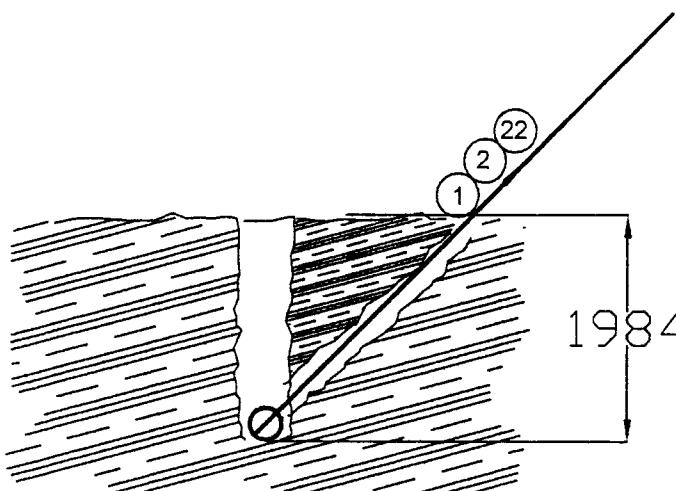


BILL of MATERIALS

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7	Bolts, nuts, washers & other hardware - galvanized
8	Bolt, oval eye, with square washer, 5/8" x 12", hot dip galvanized
9	clamp, parallel grove, 2 bolt, for 3/8" OHGW
10	clamp, pole band, heavy duty
11	clamp, strain, for 3/8" OHGW, NGK or equivalent
12	clamp, strain, for 795 MCM acsr, NGK or equivalent
15	extension link 18" heavy duty, hot dip galvanized
17	insulator, suspension, 10", b&s type
18	insulator, strain, 506 heavy duty
20	Pole, 18m, 201mm tip, 417mm butt
21	preformed guy grip, 3/8"
22	preformed guy grip, 7/16"
23	socket eye
24	nut, eye, oval, heavy duty, 5/8" hot dip galvanized
25	wire, # 4 copper, bare, stranded (grounding)
27	wire, guy, 7/16" HS, G I



section a - a'



BILL of MATERIALS

item no.	description
1	anchor log, creosoted, 10"dia x 5' or concrete equivalent
2	anchor rod, 3/4" x 10', twin thimble eye, w/ 4"x4" curved sqr
3	anchor shackle, 5/8", Joslyn 1082 NGK
5	clevis-eye, twisted
6	clevis-y ball
7	Bolts, nuts, washers & other hardware - galvanized
8	Bolt, oval eye, with square washer, 5/8" x 12", hot dip galvan
9	clamp, parallel groove, 2 bolt, for 3/8" OHGW
10	clamp, pole band, heavy duty
11	clamp, strain, for 3/8" OHGW, NGK or equivalent
12	clamp, strain, for 795 MCM acsr, NGK or equivalent
15	extension link 18" heavy duty, hot dip galvanized
16	insulator, post, 72 kv, w/ clamp for 795 MCM acsr with armor
17	insulator, suspension, 10", b&s type
18	insulator, strain, 506 heavy duty
20	Pole, 18m, 201mm tip, 417mm butt
22	preformed guy grip, 7/16"
23	socket eye
24	nut, eye, oval, heavy duty, 5/8" hot dip galvanized
25	wire, # 4 copper, bare, stranded (grounding)
27	wire, guy, 7/16" HS, G I
28	wire, OHGW, 3/8" HS, G I (utility grade)

Sag Profile

ACSR	diameter in inches	Weight #/1000ft	rated strength	H	constant H/w
336.4MCM LINNET	0.72	462.5	14,000	1,899	4105.84
795 MCM DRAKE	1.11	1,096.0	31,500	4,500	4105.84

Catenary Calculations for 336.4 & 795 MCM ACSR
 ruling span = longest span = 1000 ft. = 304meters

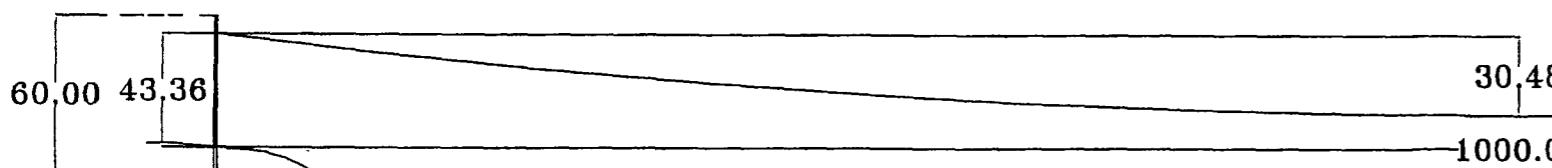
The exact catenary equation uses hyperbolic function i.e. :

$$y(x) = \frac{H}{w} \left[\cosh\left\{\frac{wx}{H}\right\} - 1 \right]$$

w = conductor weight per unit length

H = the horizontal component of tension

T = resultant tension

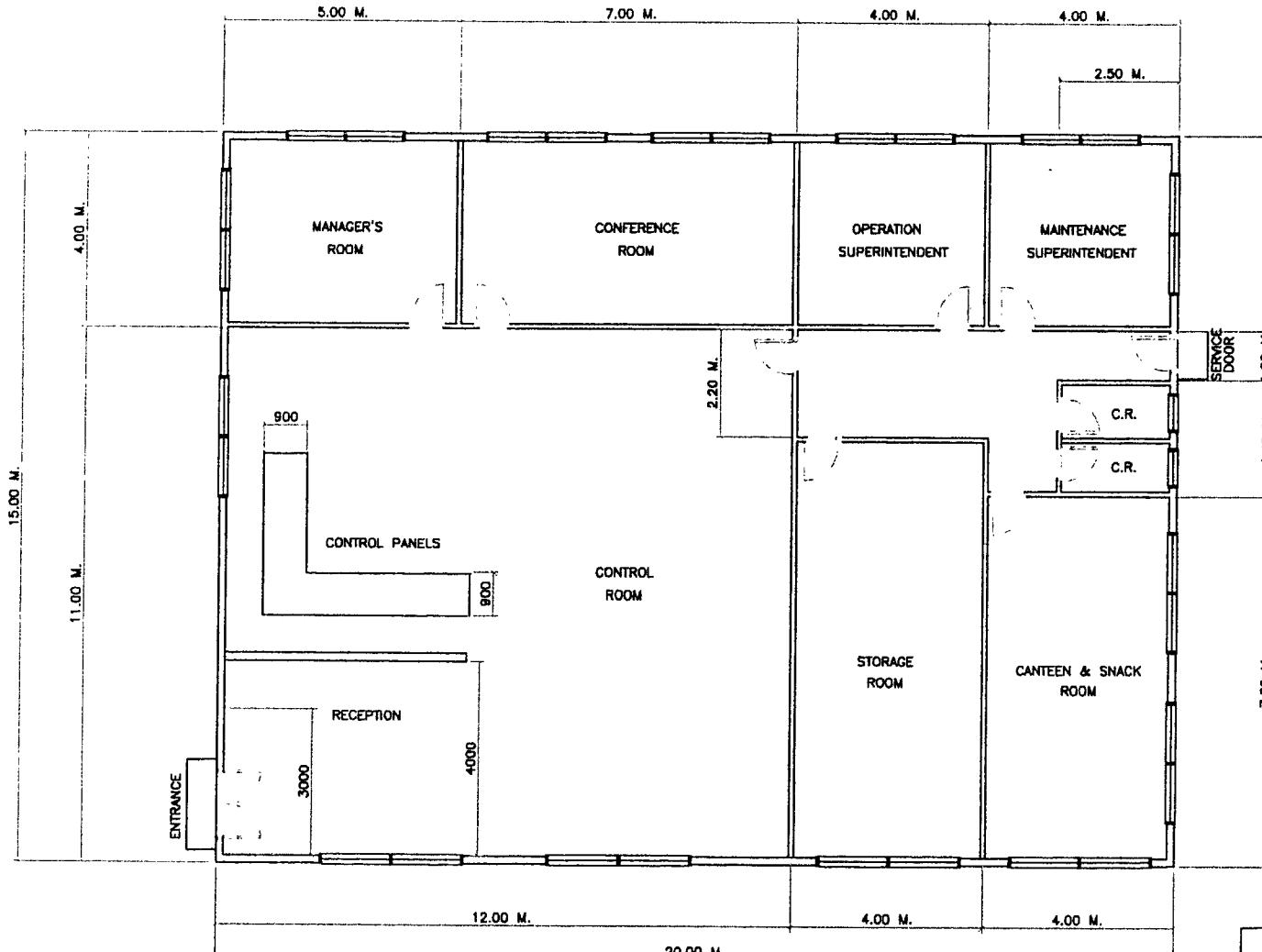


river crossing span = 304 meters
 scale : 1 drawing unit = 1 ft.

0	0.000000	0.000000	1.00
20	0.048711	0.004871	1.00
40	0.194846	0.009742	1.00
60	0.438408	0.014613	1.00
80	0.779402	0.019484	1.00
100	1.217838	0.024356	1.00
120	1.753725	0.029227	1.00
140	2.387076	0.034098	1.00
160	3.117906	0.038969	1.00
180	3.946232	0.043840	1.00
200	4.872074	0.048711	1.00
220	5.895455	0.053582	1.00
240	7.016397	0.058453	1.00
260	8.234929	0.063324	1.00
280	9.551078	0.068196	1.00
300	10.964877	0.073067	1.00
320	12.476358	0.077938	1.00
340	14.085557	0.082809	1.00
360	15.792514	0.087680	1.00
380	17.597267	0.092551	1.00
400	19.499860	0.097422	1.00
420	21.500338	0.102293	1.00
440	23.598749	0.107164	1.00
460	25.795142	0.112036	1.00
480	28.089570	0.116907	1.00
500	30.482087	0.121778	1.00
520	32.972749	0.126649	1.00
540	35.561616	0.131520	1.00
560	38.248750	0.136391	1.00
580	41.034213	0.141262	1.00
600	43.918072	0.146133	1.00

CONTROL AND STORAGE BUILDING LAYOUT

SUSBTATION AND SWITCHYARD LAYOUT



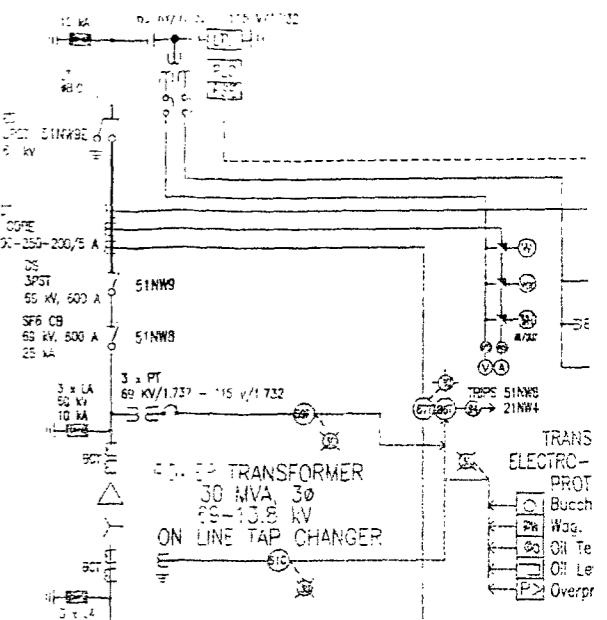
FLOOR PLAN

PRELIMINARY DRAWING ONLY

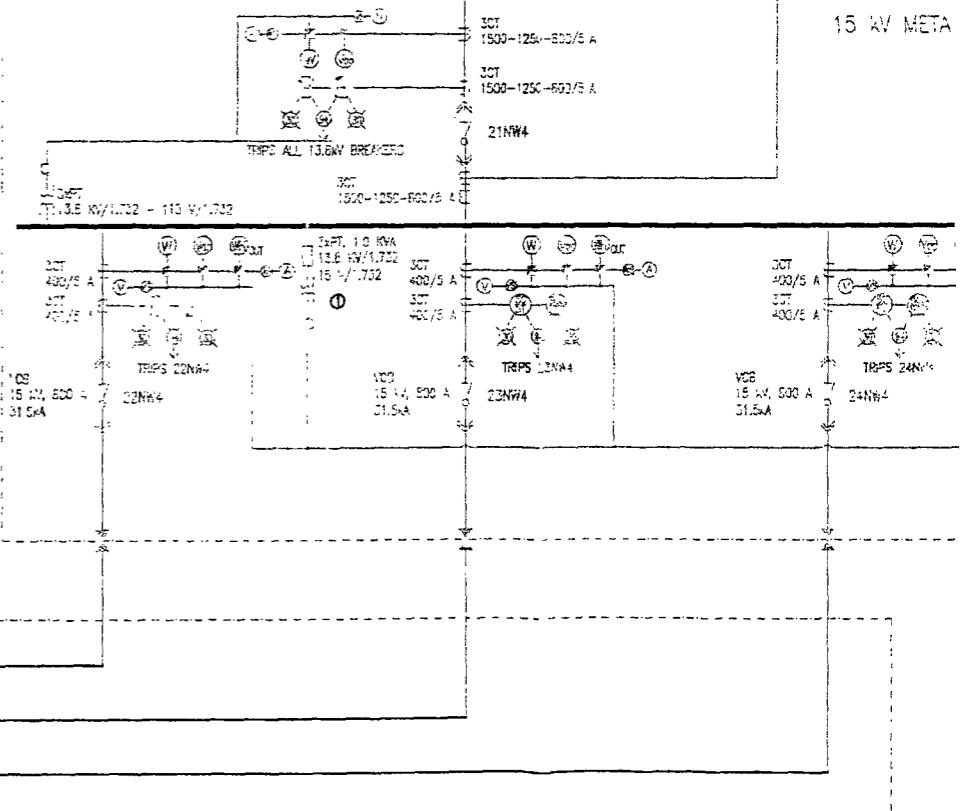
NORTHWIND POWER DEVELOPMENT CORPORATION Unit 310 Jellicoe Plaza Building Emerald Ave, Ortigas Center, Metro Manila Tel. No. (+632) 638-8080-41 Fax No. (+632) 638-8088 E-mail Address: nwpdc@msn.com			
Ref. Dwg. No. :	Project : WIND TURBINES		Station : BANGUI
	Proj. No. 0001	Date	Signature
	Drawn By: B.E.L.	11/20/00	
	Checked By: F.P.S.	11/20/00	
Rev. No. 0	Date 11/20/00	Name N.J.	Approved by: N.J.
		Drawing No. WT-CW-00001	
		Scale : 1:100	
1			

Phase overcurrent relay
 Bus and conductor line
 Line protection
 Bus section relays
 Grounded circuit breaker
 Phase shunt breaker bus
 Bus lock-out relay
 Bus differential relay
 Transformer load relay
 Transformer load limit relay
 Auxiliary tripping relay
 Sineoidal coupling potential trans.
 Frequency meter
 Lightning arrester
 Line trap
 Line tuning unit
 Meter line control
 Protection signaling equipment
 Potential transformer
 Synchronizing switch
 DC motor
 AC motor
 Winding cooler
 Resistor
 Resistor
 Ammeter
 Voltmeter
 Multimeter

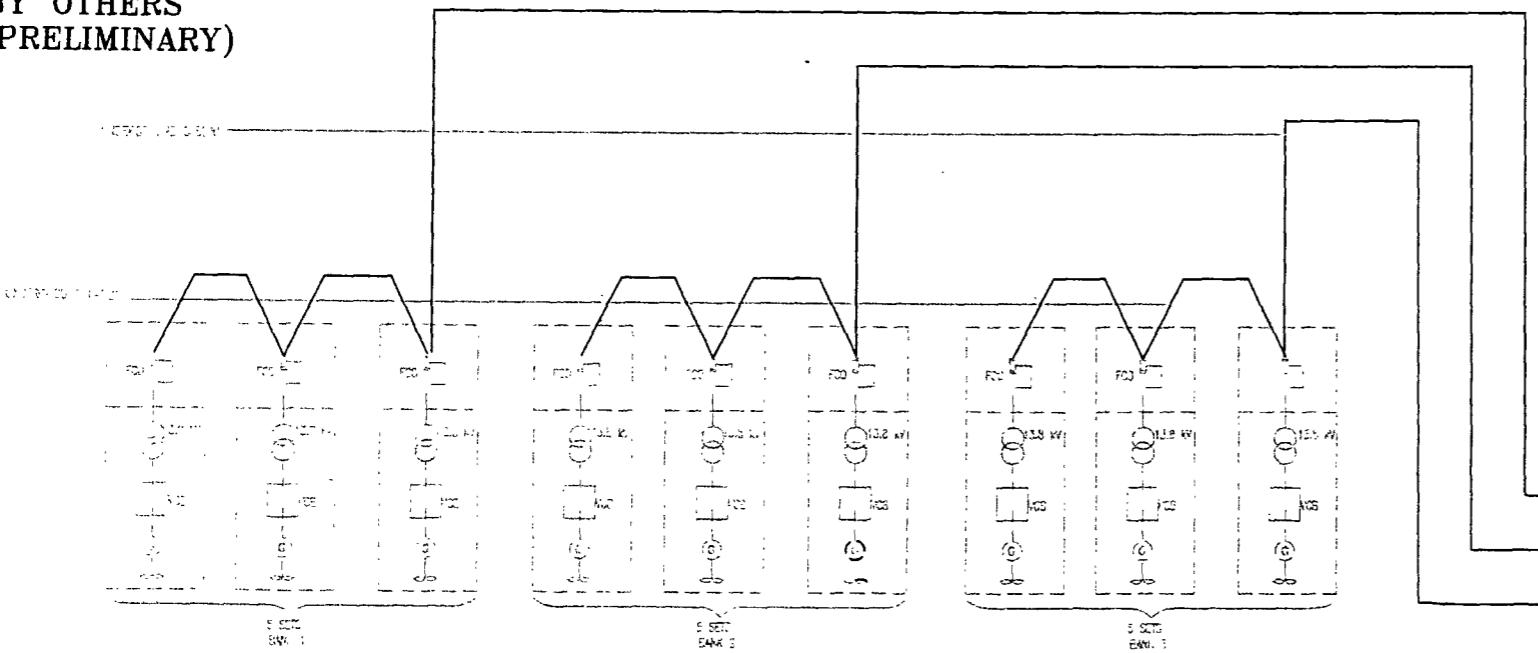
- IN THE DESIGNATION OF SWITCHES:
- IT SHALL BE CLEAR AND BURDEN SHALL BE REFERRED TO THE TECHNICAL SPECIFICATIONS.
- CIRCUIT VOLTAGE RATING SHALL BE REFERRED TO THE TECHNICAL SPECIFICATIONS.
- PROTECTIVE RELAY, AUTOMATIC DEVICE AND CONTROL DEVICES FOR ELECRICAL EQUIPMENT SHALL BE CONTAINED IN THE MEDIUM LOAD SWITCHES IF APPLICABLE TO THE SPECIFIED ENVIRONMENT.



2-1500mm² 15kV
ALFC CABLE/TUBE



BY OTHERS (PRELIMINARY)



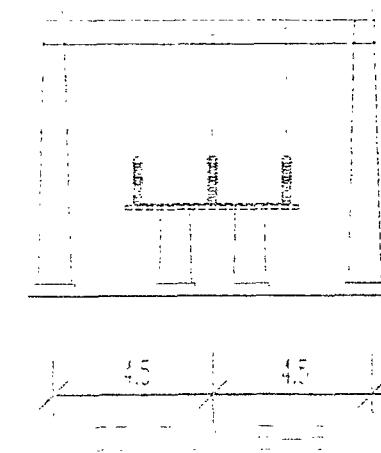
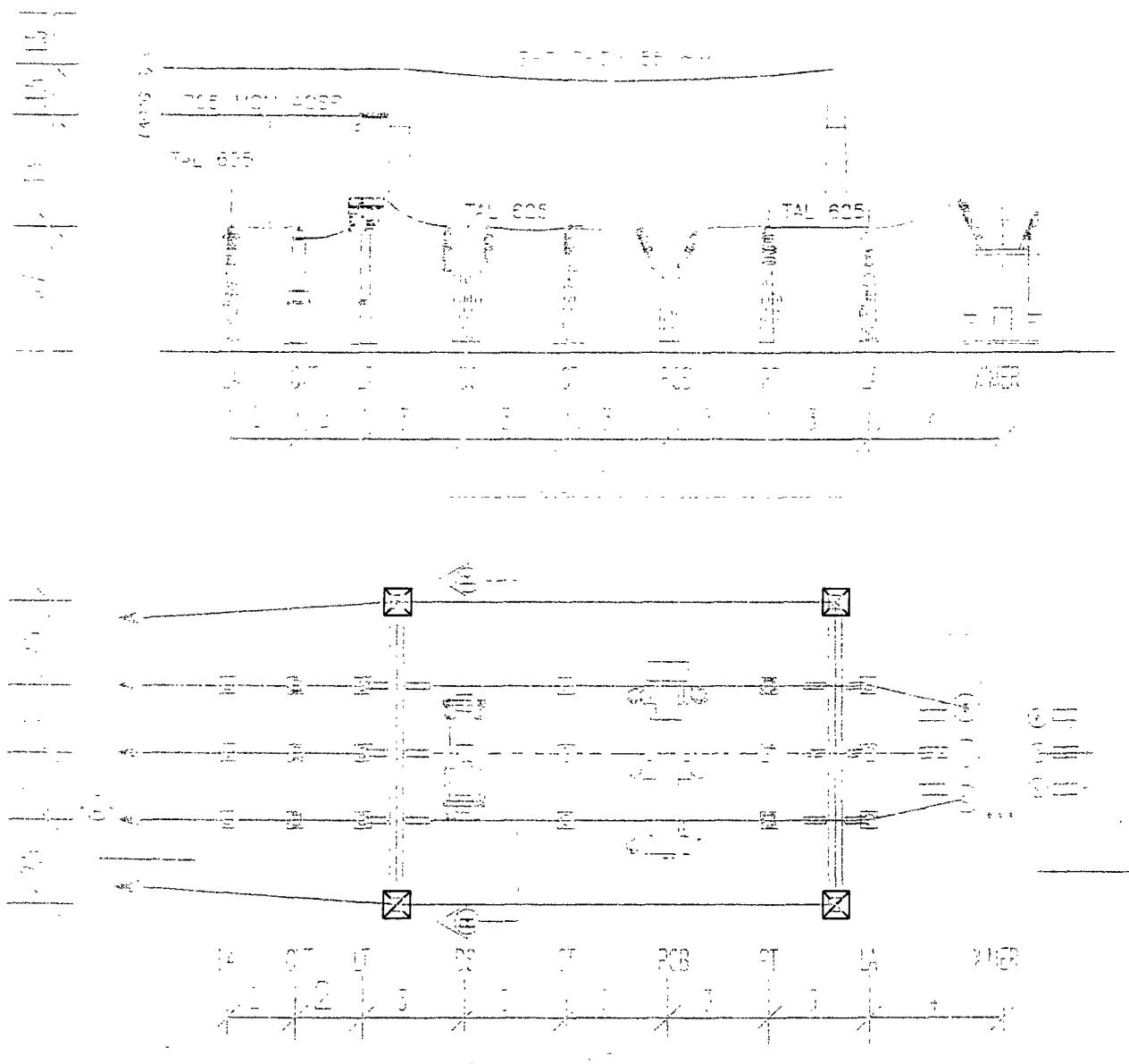
PROJECT NUMBER	PROFESSIONAL ELECTRICAL ENGINEER
EDGARDO L. BUELALES	EDGARDO L. BUELALES
MAIN ADDRESS	COMMERCIAL
PHONE NUMBER	522-3500
FAX NUMBER	

PROJECT FILE NUMBER	LOCATION
100-100-100	NORTHWIND
PAGE 1001	100-100-100
DATE REC'D.	06-11-01
DATE REC'D.	06-11-01
REGISTERED ENGINEERS AND AS	EDGARDO L. BUELALES

THIS DRAWING IS AN INSTRUMENT
 OF SERVICE OF THE PROPERTY OF
 INVENTION SYSTEMS CORPORATION
 REGISTERED ENGINEERS AND AS

SHEET CONTENTS:
 NORTHWIND
 100-100-100

MARK	SESSIONS	DATE	BY	DRAWING FILE NO.	OWNER:
①	From individual feeder PT to common PT	10-20-01	EHH	IN.WI-WT.S1012	



LEGEND:

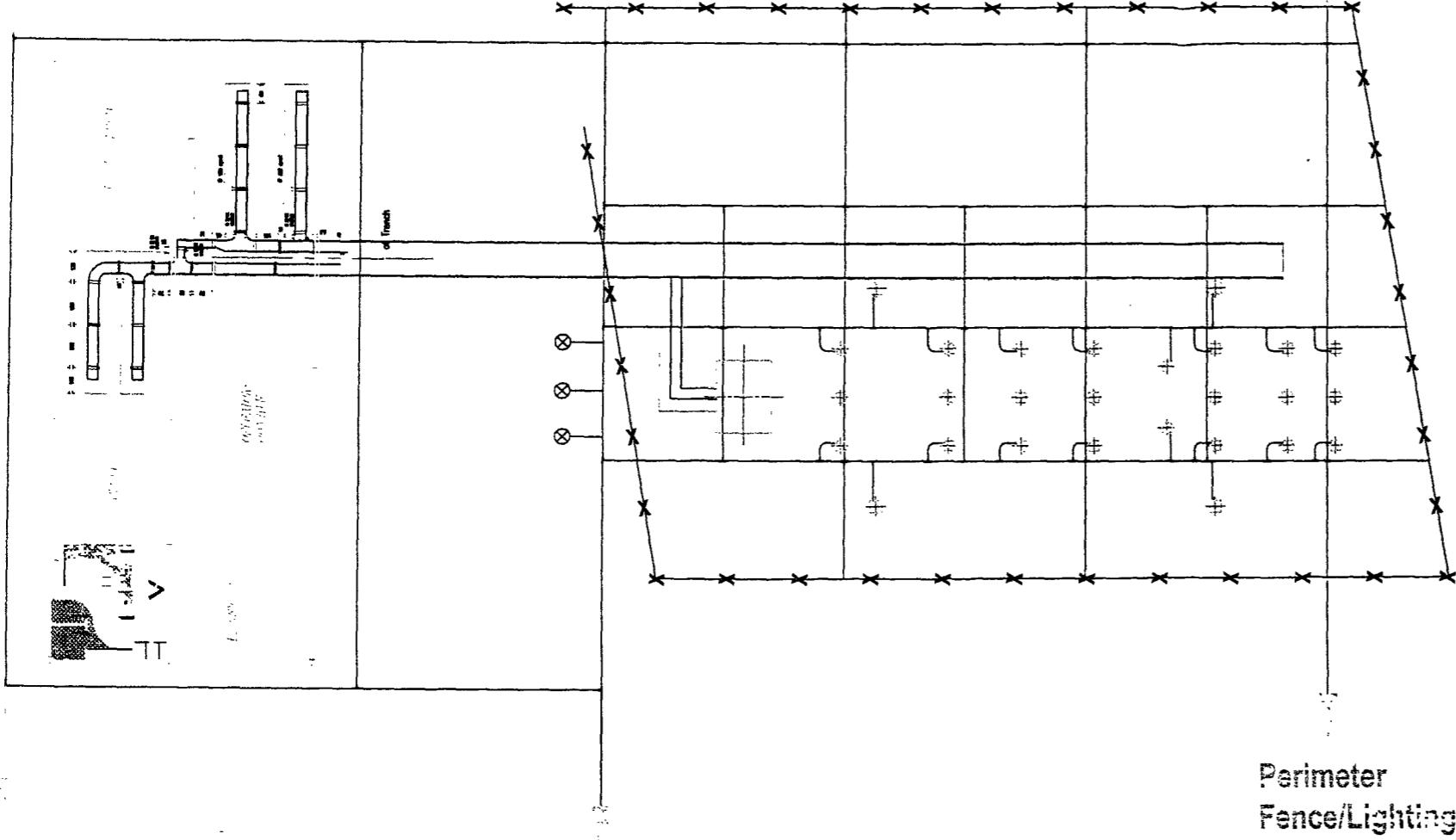
TYPE	DESCRIPTION
b	TENSION INSULATOR SET - 1G ASSE BLY
e	SUSPENSION INSULATOR STRING ASSEMBLY
f	TEE CONNECTOR (BOLTED), 795 MCM - TAL 625 SQ. MM
g	TEE CONNECTOR (BOLTED), TAL 625 SQ. MM.
h	TEE CONNECTOR (BOLTED), TAL 625 SQ. SQ. MM
i	PARALLEL GROOVE CLAMP, TAL 625 SQ. MM.
k	BUS SUPPORT CLAMP

NOTES :

1. ALL SETTINGS ARE IN METRE UNLESS OTHERWISE SPECIFIED.
 2. ALL EQUIPMENTS AND STRUCTURES SHOULD
ARE TO BE FULL ASSEMBLED, INSTALLED AND TESTED
BY THE CONTRACTOR

FENCE/ROD
Fence/Lighting

Perimeter
Fence/Lighting



Perimeter
Fence/Lighting

Perimeter
Fence/Lighting

Perimeter
Fence/Lighting

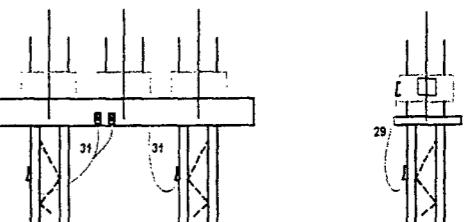
NOTES:

1. ALL DIMENSION ARE IN METERS UNLESS OTHERWISE SP
2. GROUNDING MAT SHALL BE BURIED TO 0.6 m DEPTH.
3. ALL MAJOR ELECTRICAL EQUIPMENT SHALL BE CONNECTED TO THE GROUNDING MAT BY A 120 SQ.MM, BARE STRANDED COPPER CONDUCTOR.
4. 120 MM. SQ. HARD DRAWN COPPER CONDUCTOR, TIN PVC SHEATHED AND INSULATED FOR DOWN LEADS FROM ROD/AIR TERMINAL THROUGH GROUNDING MESH.
5. ALL EQUIPMENT NOT SHOWN BUT ARE REQUIRED TO BE GROUNDED AS PER PEC REQUIREMENTS SHALL BE CONNECTED TO THE GROUNDING MAT.

LEGEND:

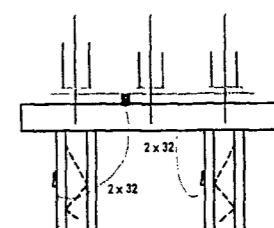
(X) — GROUNDING ROD

CONNECTION: EQUIPMENT TO STEEL STRUCTURES

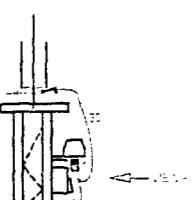


Circuit Breaker

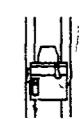
Other equipment



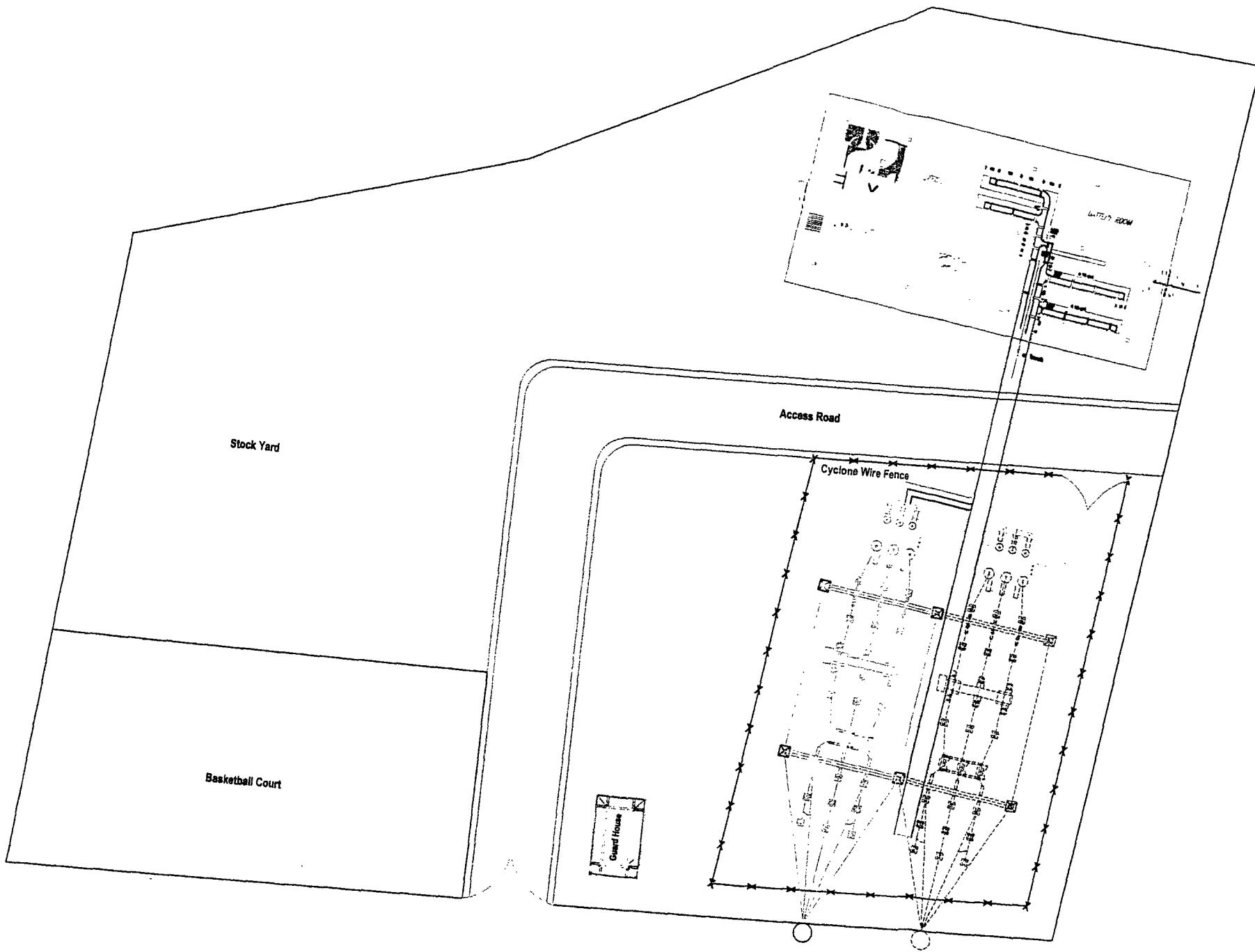
Disconnect Switch



Lightning Arrester



VIEW A



COMPANY	PROJECT TITLE	WORKER'S NAME	CHIEF CONTENTS	MARK	REVISIONS	DATE	BY	DRAWING FILE NO.	OWNER:
INTERSTATE PIPELINE CORPORATION	PALEO FISH ELECTRICAL EXCAVATION	ONE DRAWING AS AN ASSEMBLY							

3. SPANNING CAPACITIES (METERS):

SPAN, M.	100	200	300
STRUCTURE TYPE	B	C	D
WIND SPAN	120	120	120
WEIGHT SPAN	400	500	500
MAX. SPAN	130	130	130
ANGLE	0-2° 15'-40° 5'-90°	0-2° 15'-45°	75°-90°

4. GUYING AND POLE:

TYPE OF POLE: **WOOD** (NO. 100 FT.)
 NO. OF CABLES: **3** (NO. 1/2 IN. DIA. X 1/8 IN. THK.)
 EFFECTIVE GEE: **100**

SPAN, M.	100	200	300
GEE	1.0	1.7	1.8

TYPE OF POLE: **WOOD**
 NO. OF CABLES: **3**
 EFFECTIVE GEE: **100**

SPAN, M.	100	200	300
STRUCTURE TYPE	B	C	D
WIND SPAN	117	117	100
WEIGHT SPAN	134.12	133.58	133.40
MAX. SPAN	122	122	122
ANGLE	0-2° 15'-45°	0-2° 15'-45°	0-2° 15'-45°

5. GUYING AND POLE: (CONT'D.)

	UNLOADED	LOADED
	FINAL AT 15° C (59° F)	FINAL AT 15° C (59° F)
POLE LENGTH	27	30
VERTICAL GUYING SPAN	25	26
VERTICAL POLE LENGTH		40 ± 2.5

6. CLEARANCES (METERS):

	SINGLE POLE SINGLE CIRCUIT	H - FRAME SINGLE CIRCUIT	3-POLE SINGLE CKT.	SINGLE-POLE DOUBLE CIRCUIT	H-FRAME DOUBLE CIRCUIT	3-POLE DOUBLE CIRCUIT								
STRUCTURE TYPE	B	C	D	E	HS	HT	ST	SD	BB	EE	HS-HS	HT-HT	ST-ST	SD-SD
WIND SPAN	120	120	120	120	220	220	320	320	80	80	160	160	200	200
WEIGHT SPAN	400	500	500	600	1000	1000	1000	1200	200	300	500	500	600	600
MAX. SPAN	130	130	130	130	320	320	375	375	130	130	320	320	375	375
ANGLE	0-2° 15'-40° 5'-90°	0-2° 15'-45°	75°-90°	75°-90°	0-2°	0-15°	15°-75°	75°-90°	0-2°	0-15°	15°-75°	75°-90°	0-2°	0-15°

7. CLEARANCES, VALUES STRICTLY MINIMUM:

CROSSING OVER AT 70° C (158° F) NO WIND, FINAL SAG	CLEARANCE
TRACK RAILS OF RAILROADS	11.5 m. 37.72 Ft.
FEDERAL HIGHWAYS	10.0 m. 32.8 Ft.
STATE HIGHWAYS	8.50 m. 27.88 Ft.
CULTIVATED FIELDS AREA ACCESSIBLE ONLY TO PEDESTRIANS	7.50 m. 24.60 Ft.
ALONG ROADS IN RURAL DISTRICTS	7.0 m. 22.95 Ft.
ALL OTHER TYPES OF OBSTRUCTION	In accordance with PEC Part II latest edition

8. GUY:

MAX. WORKING LOAD ON 1.5 m. (5') LOG ANCHOR ----- 4,550 KGS (10,000 Lbs.)
 GUY SLOPE (L/H) ----- 0.5 TO 1.0
 MAX. DESIGN TENSION IN GUY WIRE ----- 3,300 KGS (7,250 Lbs.)

9. POLES, CROSSARMS AND BRACES:

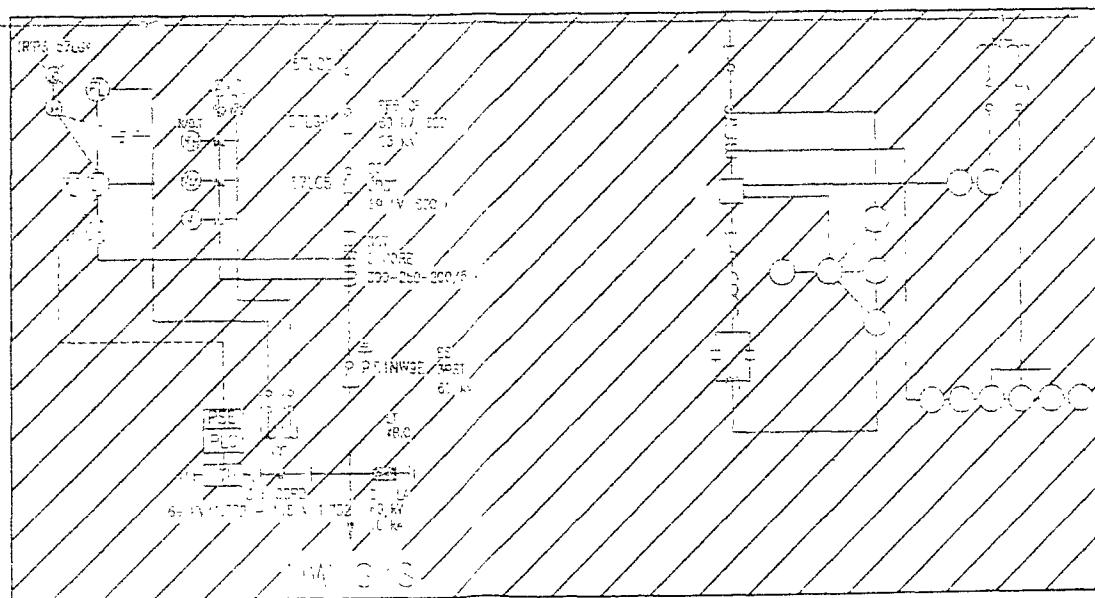
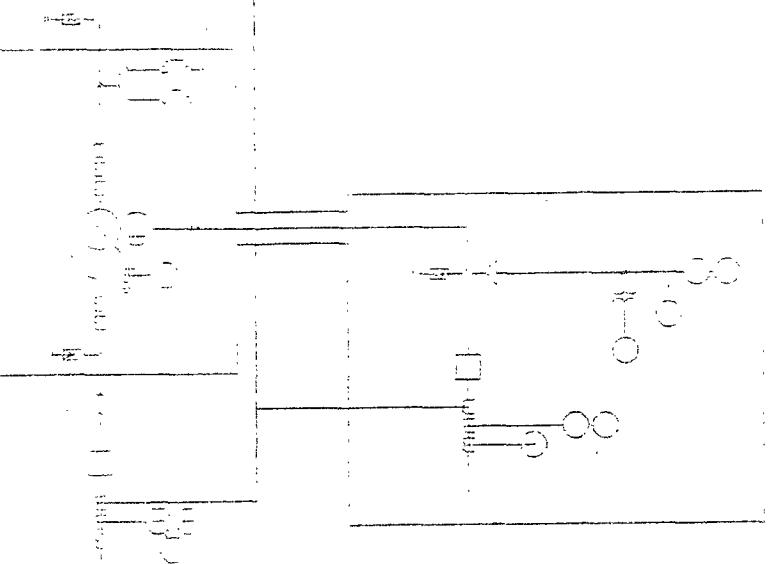
MATERIAL OF CROSSARMS	STEEL OR FIBERGLASS
ULTIMATE STRESS	Kg/Cm. ² PSI
BENDING	455 6,500
COMPRESSION, END GRAIN	510 4,400
COMPRESSION, CROSS GRAIN	60.5 860
(STRESS AT PROPORTIONAL LIMIT)	
FACTOR OF SAFETY: POLES	2.0
CROSSARM BRACES	A.C

10. POLE SETTING:

DEPTH OF POLE SETTING			
LENGTH OF POLE	IN EARTH	IN ROCK	
METER	FEET	METER	FEET
13.71	45	1.98	6.5
15.24	50	2.13	7.0
15.77	55	2.29	7.5
16.30	60	2.44	8.0
16.83	65	2.59	8.5
17.36	70	2.74	9.0
17.89	75	2.90	9.5
18.42	80	3.05	10.0
18.95	85	3.20	10.5
19.48	90	3.35	11.0

NOTES :

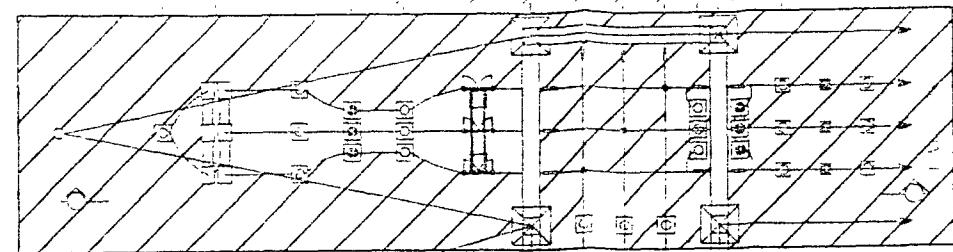
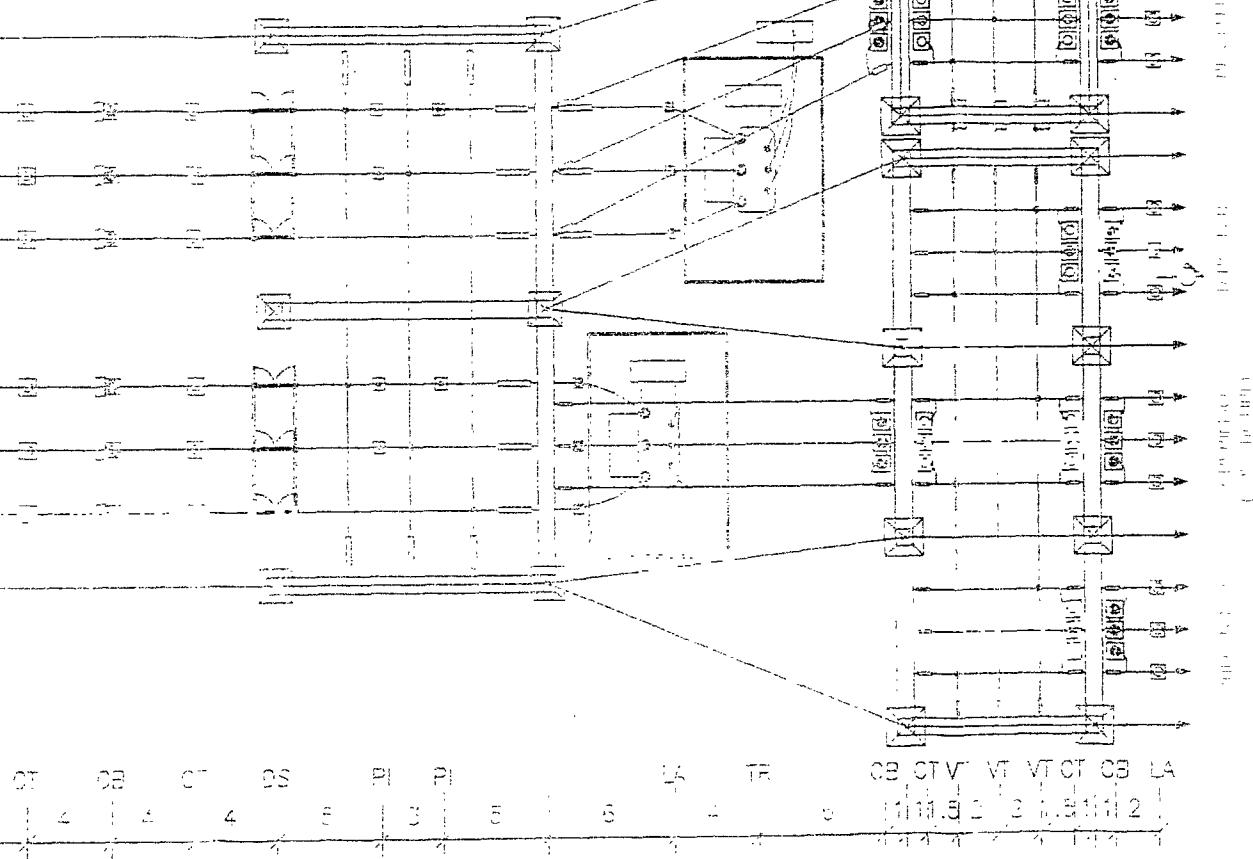
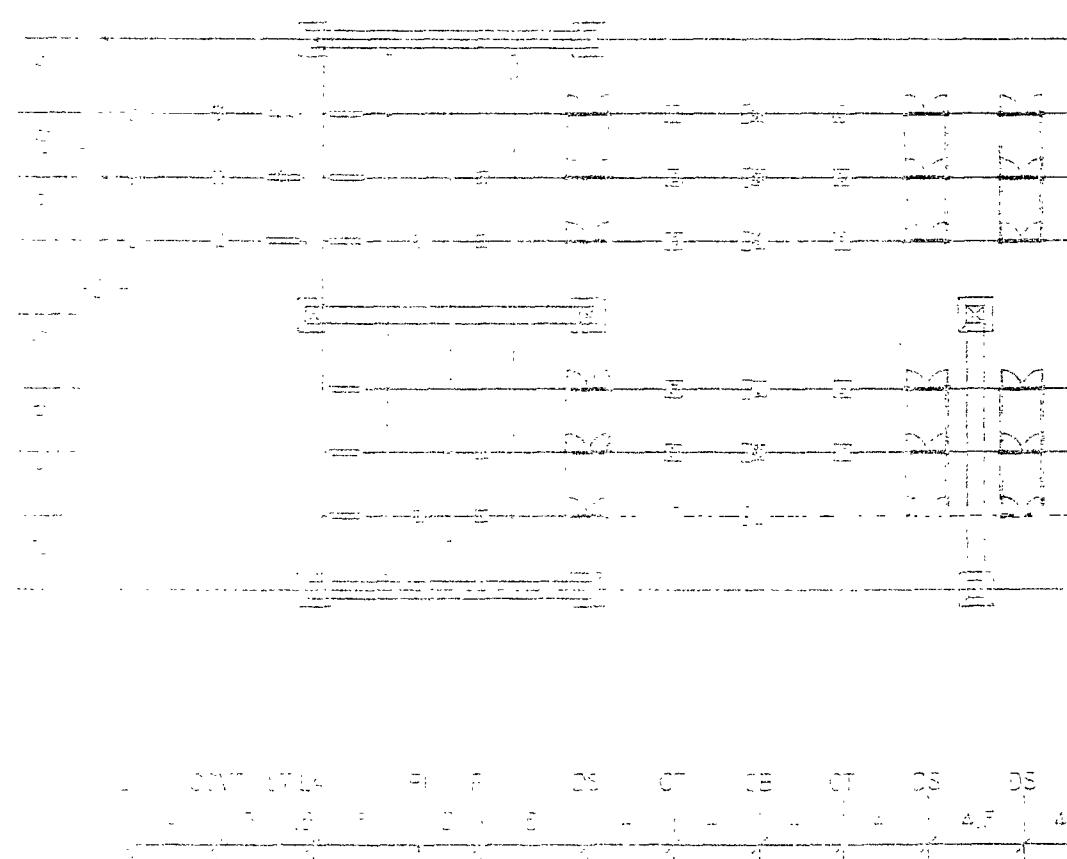
- | | |
|--|---------------------------|
| ALL EQUIPMENTS METERS AND
FORTION ARE PART OF CON- | |
| ST. PATES, CLASS AND BURDEN SH-
THE TECHNICAL SPECIFICATION | |
| 3. CORD VOLTAGE RATING SHAL,
THE TECHNICAL SPECIFICATION | |
| 4. ALL OTHER EQUIPMENTS, METERS
ARE EXISTING, FOR FUTURE J | |
| 5. LEGEND : | |
| 21 | Distance relay |
| 25/27 | Synchro/voltage check |
| 30 | Alarm/Annunciator |
| 50, 5* | Phase overcurrent rel. |
| 50/51N | Residual overcurrent rel. |
| 510 | Neutral overcurrent rel. |
| 59F | Overspeeding relay |
| 57H | Ground directional rel. |
| 67P | Phase directional rel. |
| 68 | Power swing blocking |
| 86B | Bus lock-out relay |
| 87B | Bus differential relay |
| 88T | Transformer lock-out |
| 87T | Transformer lock-out |
| 94 | Auxiliary tripping rel. |
| COPD | Capacitor coupling de |
| FM | Frequency meter |
| LA | Lightning arrester |
| LT | Line trap |
| LTU | Line tuning unit |
| PLC | Power line carrier |
| PSS | Protection signalling s |
| PT | Potential transformer |
| SS | Synchronizing switch |
| VAR | VAR meter |
| W | Watt meter |
| WH | Watt-hour meter |
| A | Transducer |
| A | Anemometer |
| AS | Ammeter switch |
| V | Voltmeter |
| VS | Voltmeter switch |



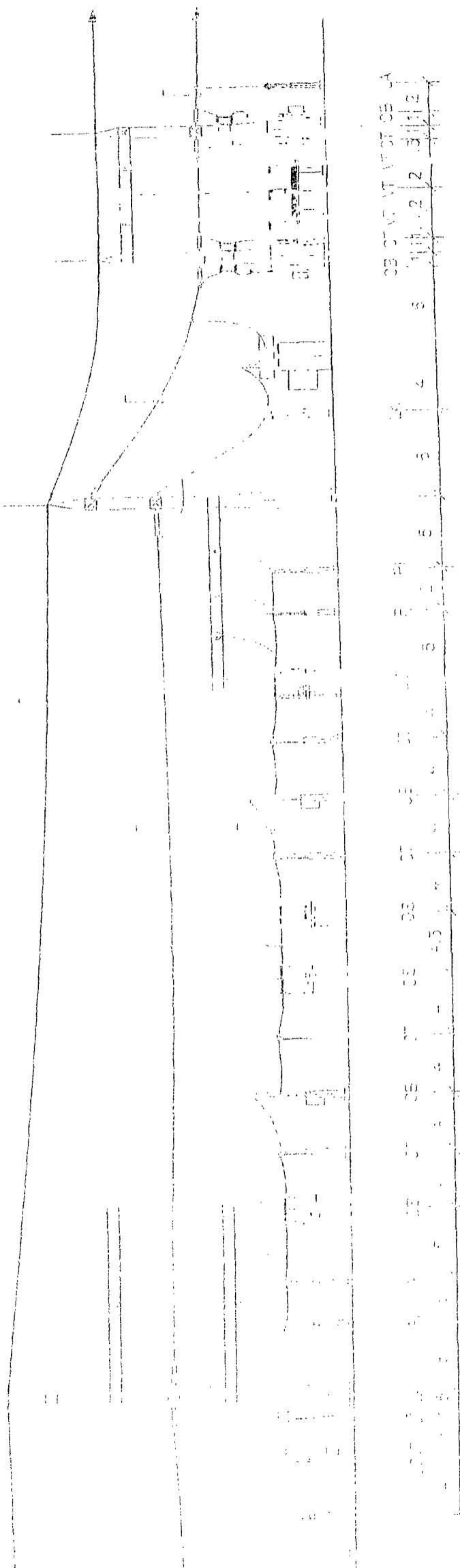
— 10 —

THE EQUIPMENT AND MATERIALS
ARE TO BE FURNISHED, INSTALLED AND TESTED
BY THE CONTRACTOR.

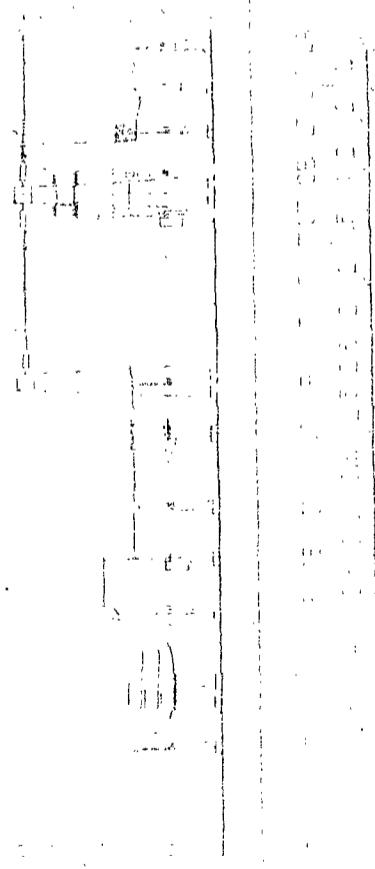
C. OTHER EQUIPMENTS AND STRUCTURES TO BE PROVIDED



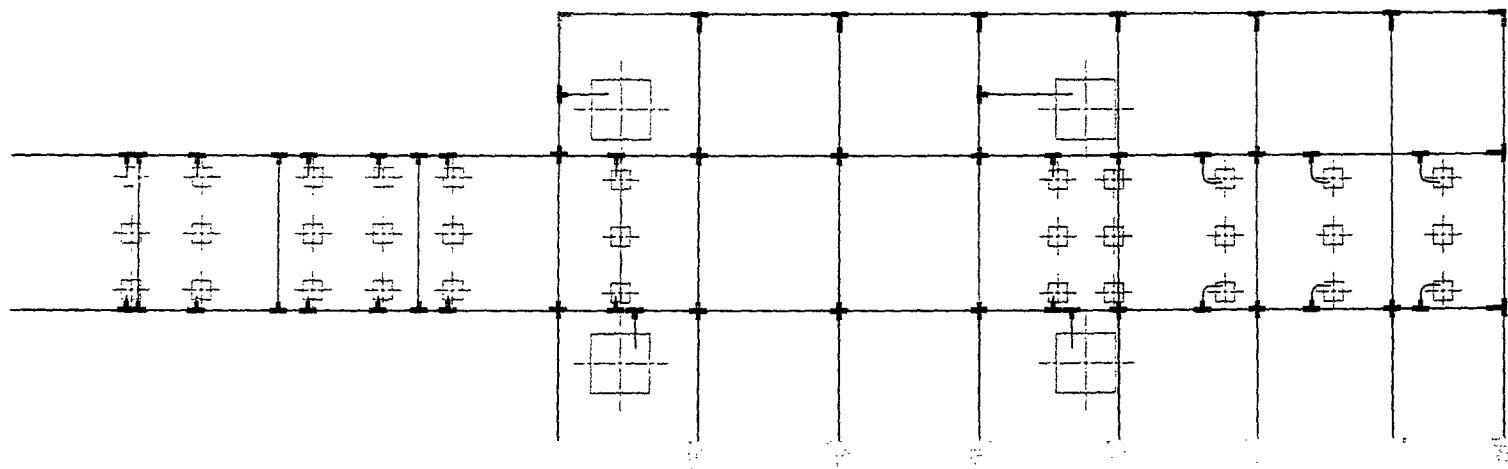
SECTION C-C



1100000000



**EXISTING LAOAG S/S
GROUNDING MAT**



EXISTING LAOAG S/S GROUNDING MAT

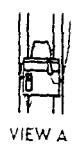
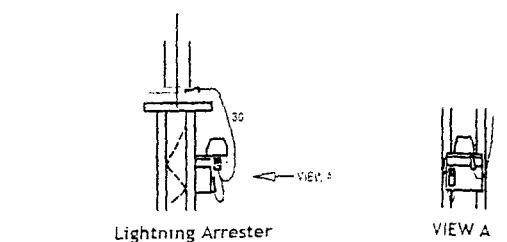
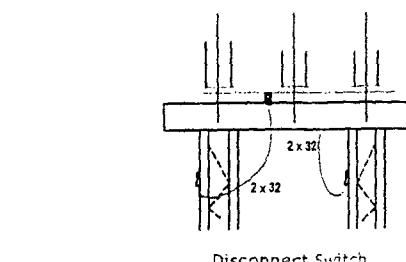
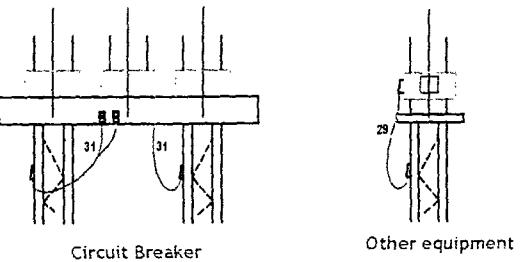
NOTES:

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5. ALL EQUIPMENT NOT SHOWN BUT ARE REQUIRED TO BE GROUNDED AS PER PEC REQUIREMENTS SHALL BE CONNECTED TO THE GROUNDING MAT.

LEGEND:

⊗ — GROUNDING ROD

CONNECTION: EQUIPMENT TO STEEL STRUCTURES



LISTING OF MANPOWER REQUIREMENTS

24.75 MW NorthWind Power Project Substation and Transmission

Manpower Requirement

I. PROJECT IMPLEMENTATION PERIOD

Project Core Team (NWPDC)	8
Civil works Construction External (Wind Farm)	80
Mechanical/Electrical Erection External (Wind Farm)	80
Sub-station and Transmission Line	40
Security	<u>12</u>
Total	220

II. PROJECT OPERATION PERIOD

NorthWind Power Development Corporation	10
Periodical Maintenance	25
Line Maintenance	15
Security	<u>12</u>
Total	62

GANNT CHART (Schedule of Activities)

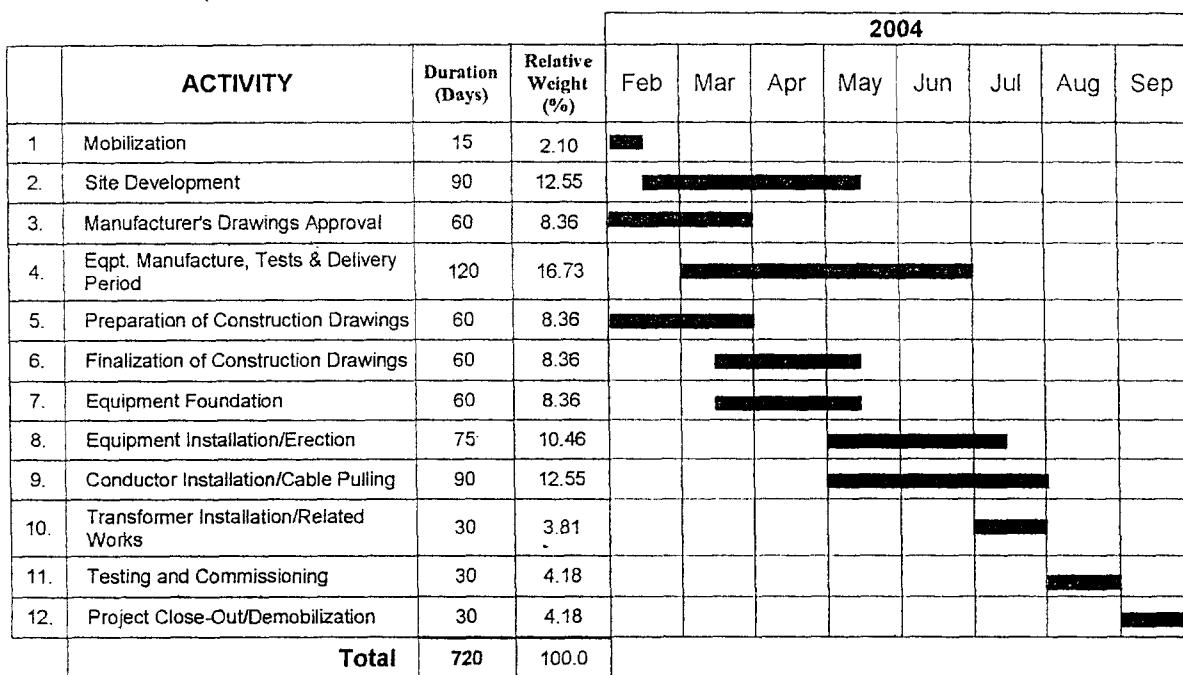
TIME SCHEDULE

The following charts show the Employer's project schedule for the 69KV transmission lines and the 30MVA Bangui Substation.

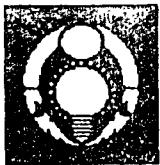
1 PROJECT IMPLEMENTATION SCHEDULE 69 KV TRANSMISSION LINE

	ACTIVITY	Duration (Days)	Relative Weight (%)	2004								
				Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
1.	Mobilization	15	1.4									
2.	Manufacturer's Drawings Approval	60	5.4									
3.	Eqpt. Manufacture, Tests & Delivery Period	90	8.1									
4.	Preparation of Construction Drawings	60	5.4									
5.	Finalization of Construction Drawings	60	5.4									
6.	Structure & Anchor Log Excavation	105	9.5									
7.	Shipping/Hauling of Concrete Poles and Logs	75	6.8									
8.	Concrete Pole & Anchor Log Dragging	135	12.2									
9.	Concrete Pole & Log Erection	135	12.2									
10.	Structure Dressing	135	12.2									
11.	Guying and Grounding	60	5.4									
12.	Stringing of 795 ACSR & OHGW	150	13.5									
13.	Testing and Commissioning	30	2.7									
Total		1110	100.0									

2 PROJECT IMPLEMENTATION SCHEDULE 30 MVA BANGUI SUBSTATION



**PHOTOCOPIES OF
AGREEMENTS/RIGHT OF WAY
GRANTS**



ILOCOS NORTE ELECTRIC COOPERATIVE, INC.
SUYO, DINGRAS, ILOCOS NORTE 2913

29 January 2003

NorthWind Power Development Corporation
Unit 310 Jollibee Plaza Building
Emerald Avenue, Ortigas Center
Pasig City

Attention: Mr. Niels Jacobsen
President and CEO

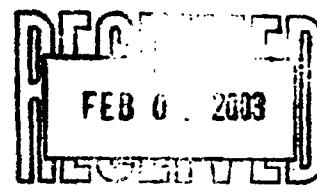
Dear Mr. Jacobsen;

In line with our Electric Sales Agreement of July 19, 2002, Ilocos Norte Electric Cooperative (INEC). Hereby allow NorthWind Power Development Corporation (NPDC) the use of our existing right of way from NPC Laoag substation to Northwind's project site in Bangui, in particular the 13.8 kV line extending from the main highway to the proposed 2 x 20 MVA substation facility.

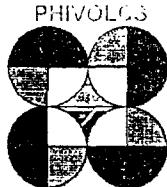
We have no objection in NorthWind revising this particular line/system wherein our 13.8 kV line shall be "underbuilt" to NorthWind's 69 kV transmission line

Very truly yours,

Romillas C. Pascual
Romillas C. Pascual
General Manager



GEOLOGICAL FAULT MAP



Republic of the Philippines
Department of Science and Technology
PHILIPPINE INSTITUTE OF VOLCANOLOGY AND SEISMOLOGY
PHIVOLCS Bldg., C.P. Garcia Ave., University of the Philippines Campus, Diliman, Quezon City
Tels. +26-1468 to 79; 928-2230; 926-7749; 926-9338
Fax: 929-8961; 926-3225

FC-Jan-01-023

25 January 2001

CERTIFICATION

TO WHOM IT MAY CONCERN:

This is to certify that the Proposed 20 MW Wind Power Project located along the shoreline of Bangui, Ilocos Norte, as indicated in the vicinity map provided, is approximately 2 kilometers west of a splay of West Ilocos Fault System, the nearest known active fault in the area, based on the map currently available in PHIVOLCS. The buffer zone against surface rupturing recommended by this office is at least 5 meters on both sides of the fault trace or from the edge of the deformation zone.

This certification is being issued upon the request of **Mr. NIELS JACOBSEN** for whatever purpose it may serve and supersedes any previous certification issued by this office regarding the area.

RAYMUNDO S. PUNONGBAYAN
Director

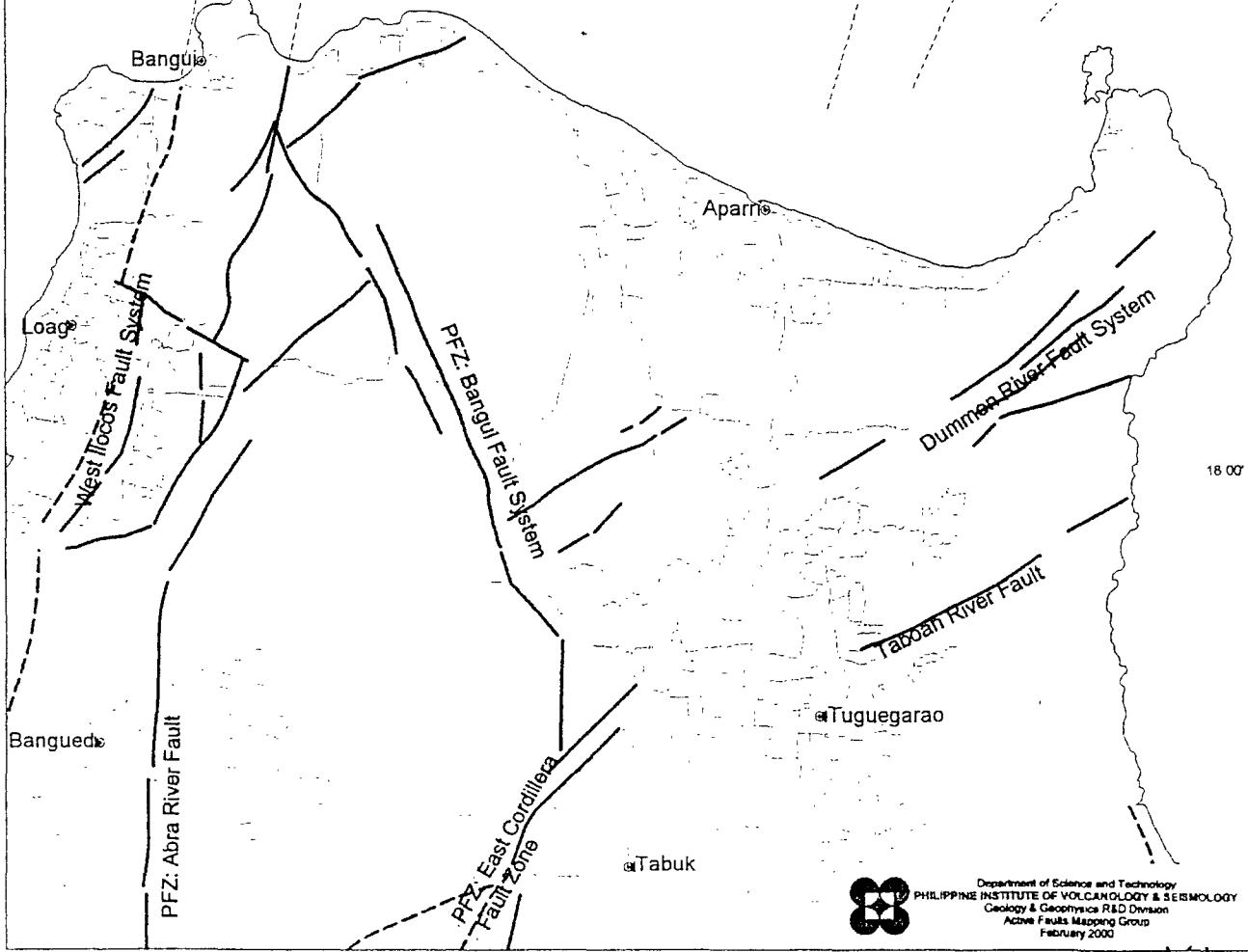
2025 RELEASE UNDER E.O. 14176 - JAN 01 2023

Distribution of Active Faults in Northern Luzon

Legend

- Active Fault: Solid line- trace certain;
- - - - - approximate offshore projection;
- - - - - dashed line- trace approximate
- - - Roads/highways
- ◎ City/Town

0 15 30 Kilometers



Department of Science and Technology
PHILIPPINE INSTITUTE OF VOLCANOLOGY & SEISMOLOGY
Geology & Geophysics R&D Division
Active Faults Mapping Group
February 2000

**ENDORSEMENT OF THE
MUNICIPAL OR CITY
PROVINCIAL COUNCIL**

Republic of the Philippines
PROVINCE OF ILOCOS NORTE
Municipality of Bangui

OFFICE OF THE MAYOR

To All Concerned:

This refers to the proposed project of NORTHWIND POWER DEVELOPMENT CORPORATION, (Northwind) to build and establish a 20 MW Wind Power Plant in this municipality.

After a series of meetings and consultations with the representatives of Northwind, headed by Atty. Ferdinand A. Dumlao, its Chairman of the Board of Directors, other technical staff of the Ilocos Norte Electric Cooperatives, the following matters has been elicited:

1. The proposed Northwind Power Project will generate a clean / environment-friendly electricity;
2. With the project in place, the unstable and fluctuating electric current we have will be efficiently corrected;
3. The project will provide employment;
4. The project will likewise boost tourism in the area, since windmills/wind turbines are in itself tourist attraction and consequently bring about progress in the municipality.
5. As mandated by law, host municipalities and barangays to this kind of project will be entitled to financial benefits;

In view thereof, subject to the compliance to existing laws, rules and regulations, I hereby strongly recommend the immediate implementation of the 20 MW Wind Power Project of Northwind Power Development Corporation.

Done in the Municipality of Bangui, Ilocos Norte, this 6th day of February 2002.


WILFRED A. GACES
Municipal Mayor

Republic of the Philippines
Municipality of Bangui
Ilocos Norte
BARANGAY MASIKIL

EXCERPTS FROM THE MINUTES OF THE REGULAR SESSION OF THE SANGGUNIANG
BARANGAY OF BARANGAY MASIKIL, BANGUI, ILOCOS NORTE HELD ON
Nov. 18, 2011 AT (2) 7:00 O'CLOCK AT ITS SESSION HALL.

PRESENTS:

WILLIAM R. TOMAS
ELMER TQMAS
ROSARIO VALIENTE
LUCRECIA MAGANA
EDGARDO MALLARI
EMILIO ACOB
EDWARD MARTINEZ
ANGEL MABINI
FROILAN MAGANA
ARTEMIO TORRADO
EDROLFO ACOB

Barangay Chairman
Baragay Kagawad
- do -
SK Chairman
Brgy. Secretary
Brgy. Treasurer

Resolution No. 14 2011

A RESOLUTION ENDORSING THE ESTABLISHMENT OF A COMMERCIAL
WINDMILL POWER PLANT IN BARANGAY MASIKIL, BANGUI, ILOCOS NORTE

WHEREAS, Barangay Masikil, Bangui, Ilocos Norte have a constant source of renewable energy in the form of wind power and also have available foreshore areas suitable for the establishment of a commercial windmill power plant;

WHEREAS, the Northwind Power Development Corporation, a private corporation has secured a foreshore lease from the Government of the Republic of the Philippines through the Department of Environment and Natural Resources over the foreshores located in the aforesaid barangay;

WHEREAS, the Northwind Power Development Corporation has proposed to develop the said leased government land into a large-scale commercial windmill power plant using wind power as a renewable source of energy;

WHEREAS, the proposed establishment of a large-scale commercial windmill power plant will provide new jobs and offer employment opportunities to the nearby residents and constituents of Barangay Masikil;

WHEREAS, the operation and establishment of the Northwind Power Development Corporation will redound to the economic benefit of the local government of Barangay Masikil by way of collection of fees, licenses, business permits and other local taxes;

WHEREAS, the long-term benefits of the establishment of a large-scale commercial windmill power plant will lead to the development and modernization of Barangay Masikil, within the municipality of Bangui and ultimately redound to the benefit of the whole province of Ilocos Norte as well.

WHEREFORE, it has been moved and duly seconded, be it;

RESOLVED, as it is hereby resolved to endorse and fully support the establishment of a commercial windmill power plant in Barangay Masikil, Bangui, Ilocos Norte;

RESOLVED FINALLY, to furnish copies of this resolution to the offices concerned for information and recommending approval.

VOTING PROFILE:
UNANIMOUSLY CARRIED

I HEREBY CERTIFY to the correctness of the foregoing resolution, FERNANDO A. CUMUL, CHAIRMAN OF THE BOARD OF DIRECTORS,
NORTHWIND POWER DEV'T. CORP.

ARTEMIO TORRADO
Barangay Secretary

APPROVED:

WILLIAM R. TOMAS
Barangay Chairman

Republic of the Philippines
Municipality of Bangui
Ilocos Norte
BARANGAY ABACA

EXCERPTS FROM THE MINUTES OF THE REGULAR SESSION OF THE SANGGUNIANG
BARANGAY OF BARANGAY ABACA, BANGUI, ILOCOS NORTE HELD ON
November 13, 2000 AT (10) O'CLOCK AT ITS SESSION HALL.

PRESENTS:

ELMER R. ACובה
RODOLFO TRINIDAD
RUBEN LAURETA
ERNESTO RIOGA
ABRAHAM ACובה
ROY VISITASION
RODOLFO ACובה
JULIO ALABA
MELCHOR TRINIDAD
TERESITA AGUSTIN
ROSALINDA VILLANUEVA

Barangay Chairman
Baragay Kagawad
- do -
SK Chairman
Brgy. Secretary
Brgy. Treasurer

Resolution No. 13-2000

A RESOLUTION ENDORSING THE ESTABLISHMENT OF A COMMERCIAL
WINDMILL POWER PLANT IN BARANGAY ABACA, BANGUI, ILOCOS NORTE

WHEREAS, Barangay Abaca, Bangui, Ilocos Norte have a constant source of renewable energy in the form of wind power and also have available foreshore areas suitable for the establishment of a commercial windmill power plant;

WHEREAS, the Northwind Power Development Corporation, a private corporation has secured a foreshore lease from the Government of the Republic of the Philippines through the Department of Environment and Natural Resources over the foreshores located in the aforesaid barangay;

WHEREAS, the Northwind Power Development Corporation has proposed to develop the said leased government land into a large-scale commercial windmill power plant using wind power as a renewable source of energy;

WHEREAS, the proposed establishment of a large-scale commercial windmill power plant will provide new jobs and offer employment opportunities to the nearby residents and constituents of Barangay Abaca;

WHEREAS, the operation and establishment of the Northwind Power Development Corporation will redound to the economic benefit of the local government of Barangay Abaca by way of collection of fees, licenses, business permits and other local taxes;

WHEREAS, the long-term benefits of the establishment of a large-scale commercial windmill power plant will lead to the development and modernization of Barangay Abaca, within the municipality of Bangui and ultimately redound to the benefit of the whole province of Ilocos Norte as well.

WHEREFORE, it has been moved and duly seconded, be it;

RESOLVED, as it is hereby resolved to endorse and fully support the establishment of a commercial windmill power plant in Barangay Abaca, Bangui, Ilocos Norte;

RESOLVED FINALLY, to furnish copies of this resolution to the offices concerned for information and recommending approval.

VOTING PROFILE:
UNANIMOUSLY CARRIED

I HEREBY CERTIFY to the correctness of the foregoing resolution.

APPROVED: Elmer R. Acובה

ELMER R. ACובה
Baragay Chairman

TERESITA AGUSTIN ATTENDS PERTINENT A. DUMATO,
Barangay Secretary CHAIRMAN OF THE BOARD
OF DIRECTORS, NORTHWEST COAST
POWER DIST. CORP.
11/12/00

Republic of the Philippines
Municipality of Bangui
Ilocos Norte
BARANGAY MANAYON

EXCERPTS FROM THE MINUTES OF THE REGULAR SESSION OF THE SANGGUNIANG
BARANGAY OF BARANGAY MANAYON, BANGUI, ILOCOS NORTE HELD ON
NOVEMBER 13, 2000 AT (9) NULE O'CLOCK AT ITS SESSION HALL.

PRESENTS:

ROGELIO A. PEDRONAN
JERRY RAGUDO
JOSEPH GUIRA
EDWIN RAMOS
MAXIMO ANCHETA
ISMAELA VALIENTE
MENANDRO ALUPAY
CECILIO OMMAYON
CYNTHIA HIDALGO
ARTEMIO APOSTOL
FROLAN ALETA

Barangay Chairman
Baragay Kagawad
- do -
SK Chairman
Brgy. Secretary
Brgy. Treasurer

Resolution No. D. 00

A RESOLUTION ENDORSING THE ESTABLISHMENT OF A COMMERCIAL
WINDMILL POWER PLANT IN BARANGAY MANAYON, BANGUI, ILOCOS NORTE

WHEREAS, Barangay Manayon, Bangui, Ilocos Norte have a constant source of renewable energy in the form of wind power and also have available foreshore areas suitable for the establishment of a commercial windmill power plant;

WHEREAS, the Northwind Power Development Corporation, a private corporation has secured a foreshore lease from the Government of the Republic of the Philippines through the Department of Environment and Natural Resources over the foreshores located in the aforesaid barangay;

WHEREAS, the Northwind Power Development Corporation has proposed to develop the said leased government land into a large-scale commercial windmill power plant using wind power as a renewable source of energy;

WHEREAS, the proposed establishment of a large-scale commercial windmill power plant will provide new jobs and offer employment opportunities to the nearby residents and constituents of Barangay Manayon;

WHEREAS, the operation and establishment of the Northwind Power Development Corporation will redound to the economic benefit of the local government of Barangay Manayon by way of collection of fees, licenses, business permits and other local taxes;

WHEREAS, the long-term benefits of the establishment of a large-scale commercial windmill power plant will lead to the development and modernization of Barangay Manayon, within the municipality of Bangui and ultimately redound to the benefit of the whole province of Ilocos Norte as well.

WHEREFORE, it has been moved and duly seconded, be it;

RESOLVED, as it is hereby resolved to endorse and fully support the establishment of a commercial windmill power plant in Barangay Manayon, Bangui, Ilocos Norte;

RESOLVED FINALLY, to furnish copies of this resolution to the offices concerned for information and recommending approval.

VOTING PROFILE:
UNANIMOUSLY CARRIED

I HEREBY CERTIFY to the correctness of the foregoing resolution. *Artemio A. Apostol*, *Northwind Power Devt. Corp*

APPROVED:

Rogelio A. Pedronan
ROGELIO A. PEDRONAN
Barangay Chairman

Artemio A. Apostol
ARTEMIO APOSTOL

Barangay Secretary

Republic of the Philippines
Municipality of Bangui
Ilocos Norte
BARANGAY TAGUIPORO

EXCERPTS FROM THE MINUTES OF THE REGULAR SESSION OF THE SANGGUNIANG
BARANGAY OF BARANGAY TAGUIPORO, BANGUI, ILOCOS NORTE HELD ON
November 13, 2010 AT (10) 10AM O'CLOCK AT ITS SESSION HALL.

PRESENTS:

EDGAR GUMALLAOI
NELSON BULUSAN
INOCENCIO ACOB
SARIKEDKED ABALOS
ROMULO MOLINA
EDGAR MARTINEZ
ALEX GACES
JEMEI ACACIO
JONEL GACES
NELY GACES
JOSUE GUMALLAOI

Barangay Chairman
Baragay Kagawad
- do -
SK Chairman
Brgy. Secretary
Brgy. Treasurer

Resolution No. 09-2010

A RESOLUTION ENDORSING THE ESTABLISHMENT OF A COMMERCIAL
WINDMILL POWER PLANT IN BARANGAY TAGUIPORO, BANGUI, ILOCOS NORTE

WHEREAS, Barangay Taguiporo, Bangui, Ilocos Norte have a constant source of renewable energy in the form of wind power and also have available foreshore areas suitable for the establishment of a commercial windmill power plant;

WHEREAS, the Northwind Power Development Corporation, a private corporation has secured a foreshore lease from the Government of the Republic of the Philippines through the Department of Environment and Natural Resources over the foreshores located in the aforesaid barangay;

WHEREAS, the Northwind Power Development Corporation has proposed to develop the said leased government land into a large-scale commercial windmill power plant using wind power as a renewable source of energy;

WHEREAS, the proposed establishment of a large-scale commercial windmill power plant will provide new jobs and offer employment opportunities to the nearby residents and constituents of Barangay Taguiporo;

WHEREAS, the operation and establishment of the Northwind Power Development Corporation will redound to the economic benefit of the local government of Barangay Taguiporo by way of collection of fees, licenses, business permits and other local taxes;

WHEREAS, the long-term benefits of the establishment of a large-scale commercial windmill power plant will lead to the development and modernization of Barangay Taguiporo, within the municipality of Bangui and ultimately redound to the benefit of the whole province of Ilocos Norte as well.

WHEREFORE, it has been moved and duly seconded, be it;

RESOLVED, as it is hereby resolved to endorse and fully support the establishment of a commercial windmill power plant in Barangay Taguiporo, Bangui, Ilocos Norte;

RESOLVED FINALLY, to furnish copies of this resolution to the offices concerned for information and recommending approval.

VOTING PROFILE:
UNANIMOUSLY CARRIED

I THEREBY CERTIFY to the correctness of the foregoing resolution

EDGAR GUMALLAOI
NELY GACES
Barangay Secretary

EDGAR GUMALLAOI
EDGAR GUMALLAOI
Chairman
- CAPTION OF THE RESOLUTION IS
HEREBY TRULY NOTED TO ATT.
FERDINANDO Z. DUMALO, CHIEF
OF THE BOARD OF REGATOES,
VIAZ NOTARIALIS, PINTO DEY., CORP.

APPROVED:

EDGAR GUMALLAOI
EDGAR GUMALLAOI
Barangay Chairman

Republic of the Philippines
Municipality of Bangui
Ilocos Norte
BARANGAY BARUYEN

EXCERPTS FROM THE MINUTES OF THE REGULAR SESSION OF THE SANGGUNIANG
BARANGAY OF BARANGAY BARUYEN, BANGUI, ILOCOS NORTE HELD ON
Nov. 13, 2011 AT (4) FOUR O'CLOCK AT ITS SESSION HALL.

PRESENTS:

ALEXANDER C. CALAPINI	Banrgay Chairman
FERNANDO LABRADOR	Baragay Kagawad
SAMUEL VELASCO	- do -
AMELITO JAMON	- do -
MEDEL SAMBRANO	- do -
ALLAN LABRADOR	- do -
ROBERT GUZON	- do -
ROQUE FERRERA	- do -
WILLIE VELASCO	SK Chairman
JALIBERT MALAPIT	Brgy. Secretary
REY BALOALOA	Brgy. Treasurer

Resolution No. 02-2010

**A RESOLUTION ENDORSING THE ESTABLISHMENT OF A COMMERCIAL
WINDMILL POWER PLANT IN BARANGAY BARUYEN, BANGUI, ILOCOS NORTE**

WHEREAS, Barangay Baruyen, Bangui, Ilocos Norte have a constant source of renewable energy in the form of wind power and also have available foreshore areas suitable for the establishment of a commercial windmill power plant;

WHEREAS, the Northwind Power Development Corporation, a private corporation has secured a foreshore lease from the Government of the Republic of the Philippines through the Department of Environment and Natural Resources over the foreshores located in the aforesaid barangay;

WHEREAS, the Northwind Power Development Corporation has proposed to develop the said leased government land into a large-scale commercial windmill power plant using wind power as a renewable source of energy;

WHEREAS, the proposed establishment of a large-scale commercial windmill power plant will provide new jobs and offer employment opportunities to the nearby residents and constituents of Barangay Baruyen;

WHEREAS, the operation and establishment of the Northwind Power Development Corporation will redound to the economic benefit of the local government of Barangay Baruyen by way of collection of fees, licenses, business permits and other local taxes;

WHEREAS, the long-term benefits of the establishment of a large-scale commercial windmill power plant will lead to the development and modernization of Barangay Baruyen, within the municipality of Bangui and ultimately redound to the benefit of the whole province of Ilocos Norte as well.

WHEREFORE, it has been moved and duly seconded, be it;

RESOLVED, as it is hereby resolved to endorse and fully support the establishment of a commercial windmill power plant in Barangay Baruyen, Bangui, Ilocos Norte;

RESOLVED FINALLY, to furnish copies of this resolution to the offices concerned for information and recommending approval.

VOTING PROFILE:
UNANIMOUSLY CARRIED

I HEREBY CERTIFY to the correctness of the foregoing resolution.

APPROVED:

ALEXANDER C. CALAPINI
Barangay Chairman

[Signature]
JALIBERT MALAPIT, *[Signature]*
Barangay Secretary COPIES OF THIS RESOLUTION IS
FORWARDED TO THE DIRECTOR OF THE
TODALIO A. DUMAO, CHAIRMAN
OF THE BOARD OF DIRECTORS,
NORTHWIND POWER CORP.

ENVIRONMENTAL IMPACT ASSESSMENT

DRAFT COPY OF ENVIRONMENTAL IMPACT ASSESSMENT
COMMUNITY ENVIRONMENT AND NATURAL RESOURCES OFFICE
Manayon, Bangui, Ilocos Norte 2920

MEMORANDUM

FOR : The Regional Executive Director
DENR, Region I-San Fernando City

ATTENTION : The Regional Director
Environmental Management Bureau

FROM : The CENR Officer
CENRO-Bangui, Ilocos Norte

DATE : April 20, 2004

SUBJECT : Submission of Environmental Impact Assessment Report (EIA) Inspection Report for 30 MVA Substation 69 KV "Overbuild" Transmission Line Project of Northwind Power Development Corporation Represented by Atty. Ferdinand A. Dumla, Located at the Municipality of Pasuquin, Burgos and Bangui, Ilocos Norte.

Respectfully forwarded is the Environmental Impact Assessment (EIA) Inspection Report together with enclosures relative to the above-cited subject.

For evaluation and approval.

BENJAMIN S. ABUCAY

Enclosed: As stated.

Copy furnished:

-Northwind Power Dev't. Corp.
Rep. by Atty. Ferdinand A. Dumla
Bangui, Ilocos Norte

-FILE

for *[initials]* ft
B. Dumla
104

1. Aluminum stranded, steel cored cable;
d. Line hardware and accessories;
e. Transmission towers foundation; and
f. Suspension and strain insulators

177



Republic of the Philippines
Department of Environment and Natural Resources
COMMUNITY ENVIRONMENT AND NATURAL RESOURCES OFFICE
Manayon, Bangui, Ilocos Norte 2920

ENVIRONMENTAL IMPACT ASSESSMENT

A. General Information:

- | | | |
|--|---|--|
| 1. Name and Address of Project Proponent | : | Northwind Power Dev't. Corp.
Rep. by Atty. Ferdinand A. Dumiao |
| 2. Type and Location of Proposed Project | : | 30 MVA Substation
69 KV "Overbuild" Transmission Line
Mun. of Pasuquin, Burgos and Bangui,
Ilocos Norte |
| 3. Date and Purpose of Inspection | : | April 15, 2004
Site Verification subject to the issuance
of Environmental Compliance
Certificate (ECC) |
| 4. Inspector/Position | : | Engr. Alberto B. Baguio
L110 III/OIC, EMS |

B. FINDINGS AND OBSERVATIONS:

1. General Description of the Project:

1.1 The project aims to supply electrical power from the Wind Power Plant to NPC Laodag Substation via the proposed 30 MVA Substation 69 KV "Overbuild" transmission line thru the existing power post of INEC.

2. General Description of the Project Location:

2.1 The project is located within the Municipalities of Pasuquin, Burgos and Bangui, Ilocos Norte.

2.2 The generally categorized as undeveloped areas to be traversed by transmission line of about 57 kilometers in length are Brgy. Suyo, Bangui, Brgys. Saoit, Ablan, Bayog, Bobon, Paayas, all of Burgos, Ilocos Norte; and Brgys. Davila, Dilavo, Caruan, Sulongan, Estancia, Susugaen, Salpad, Sulbec, Poblacion 4, Tabungao, Dadaeman, Ngabangab, and Carusipan, all of the Municipality of Pasuquin, Ilocos Norte thru the existing power post of INEC; and

2.3 The entire 57 kilometers length of transmission line, traverses land use such as: agricultural, commercial, residential and open spaces.

3. Project Site and Scale:

3.1 The project will be composed of the following components:

- Around 622 pieces of poles transmission towers
- 69 KV substation at the Wind Power Project Site
- Aluminum stranded, steel cored cable;
- Line hardware and accessories;
- Transmission towers foundation; and
- Suspension and strain insulators

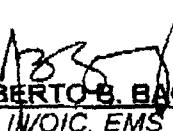
2007-04 11:00A

- a. Voltage rating ~ 69 kV; and
- b. Type of transmission line – double circuit.

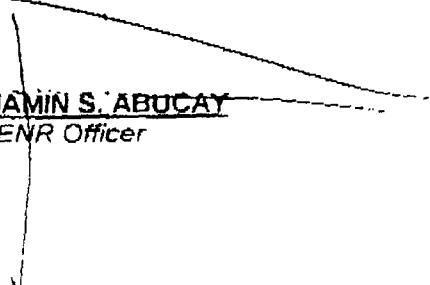
C. **REMARKS/RECOMMENDATIONS:**

1. Verification of the area was undertaken in consideration with the map prepared and other pertinent documents available;
2. There are no significant flora and fauna to be affected in the area. Further, the project does not yield significant adverse effect with the environment, provided that adequate and proper mitigating measures shall be implemented;
3. The establishment of the project will contribute to the development not only in Ilocos Norte and other adjacent provinces but within the Philippines as a whole;
4. The project proponent has submitted copy of the letter of INEC General Manager Romillas C. Pascual addressed to the DPWH, which form part of their application; and
5. The proponent is intended to utilize the existing electric post of INEC, thereby advising them to furnish this Office copy of MOA if there are any for future reference.
6. No forest land ^{area} shall be traversed by the transmission line and route.

Prepared by:


ENGR. ALBERTO S. BAGUIO
LMC/I/VOIC. EMS

Attested by:


BENJAMIN S. ABUCAY
CENR Officer

COMMUNITY ENVIRONMENT AND NATURAL RESOURCES OFFICE
Manayon, Bangui, Ilocos Norte 2920

MEMORANDUM

FOR : **The Regional Executive Director
DENR, Region I-San Fernando City**

ATTENTION : **The Regional Director
Environmental Management Bureau**

FROM : **The CENR Officer
CENRO-Bangui, Ilocos Norte**

DATE : **April 20, 2004**

SUBJECT : **Submission of Environmental Impact Assessment
Report (EIA) Inspection Report for 30 MVA Substation 69
KV "Overbuild" Transmission Line Project of Northwind
Power Development Corporation Represented by Atty.
Ferdinand A. Dumla, Located at the Municipality of
Pasuquin, Burgos and Bangui, Ilocos Norte.**

Respectfully forwarded is the Environmental Impact Assessment (EIA) Inspection Report together with enclosures relative to the above-cited subject.

For evaluation and approval.

BENJAMIN S. ABUCAY

Enclosed: As stated.

Copy furnished:

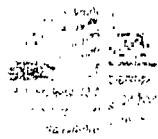
-Northwind Power Dev't. Corp.
Rep. by Atty. Ferdinand A. Dumla
Bangui, Ilocos Norte

-File

*for eval f/b. dumla
121 104*

Received BY

117



Republic of the Philippines
Department of Environment and Natural Resources
COMMUNITY ENVIRONMENT AND NATURAL RESOURCES OFFICE
Manayon, Bangui, Ilocos Norte 2920

April 19, 2004

ECA CERTIFICATION

This is to certify that the 30 MVA Substation 69 KV "Overbuild" Transmission Line (identical to the existing INEC transmission line) of NORTHWIND POWER DEVELOPMENT CORPORATION represented by ATTY. FERDINAND A. DUMLAO, located in the Municipality of Pasuquin, Burgos and Bangui, Ilocos Norte as shown in the attached location map has been determined to be within the typhoon prone area an identified Environmentally Critical Area (ECA).

This certification is issued for purposes of screening project falling within Environmentally Critical Areas (ECAs) and the proponent's compliance to the Environmental Impact Assessment (EIA) system.

BENJAMIN S. ABUCAY/
CENR Officer

DENR-CENRO No. _____

fn\c\certification\ms-cert.doc
ABB/rotelyn

**ENVIRONMENTAL COMPLIANCE
CERTIFICATE**

Report of the Philippine
Department of Environment and Natural Resources

ENVIRONMENTAL COMPLIANCE CERTIFICATE

(01 04 04 - 23 0024 - 1404)

Pursuant to Presidential Decree No. 1586 and in accordance with Department Administrative Order No. 96-37, the Department of Environment and Natural Resources (DENR), Region I, hereby grants this Environmental Compliance Certificate to **NORTHWIND POWER DEVELOPMENT CORPORATION** represented by ATTY. FERDINAND A. DUMLAO for the Substation and Transmission Line Project located at Municipality Bangui down to Laoag City, Ilocos Norte subject to the following conditions:

1. That the proponent shall secure prior to project implementation, all necessary permits/ clearances from concerned agencies with administrative jurisdiction over such project i.e. LGU, MGB, DPWH, DOTC, etc.;
2. That this Certificate covers construction, installation and operation of Northwind Bagui Bay Project-Phase I Substation and Transmission Line, consisting of a 30 MVA Outdoor Substation. Approximately 57 km of 69 KV Transmission Line, and one (1) unit Administration/ Control and Warehouse with a floor area of 300 sq. meters, all confined within a total project area of 4,432 sq. meters;
3. This Certificate shall be posted in a conspicuous place within the operations area/office; that the proponent shall inform the general public about the issuance of ECC through the installation within a conspicuous place an ECC billboard (4' x 8') at entry point containing the title of the project, name of the proponent, ECC number and date of issuance and shall submit evidence of compliance to Environmental Management Bureau (EMB), R-I within ninety (90) days upon receipt of ECC (Memo Circular No. 02, Series of 1996);
4. That any affected landowners and residents shall be properly compensated and/or relocated in accordance with Transco Relocation and compensation policies and guidelines prior to project implementation;
5. That employment for the construction/installation of the proposed transmission line shall be given priority to the host municipalities (area coverage- Municipality of Bangui to Laoag City, Ilocos Norte);
6. All trees to be cut shall be covered by a Permit from DENR Region 1, disposition of cut trees shall be in accordance with Forestry Laws and Regulations; and
7. No expansion, addition of facilities or change in operation shall be undertaken without prior clearance from this Office. Amendment to ECC condition shall subject the proponent to pay appropriate fees;)

Continued Next Page

Grow a Tree for Legacy

(01 04 04 - 23 0024 - 1404)

(2)

8. That transfer of ownership of this project carries the same conditions embodied in this ECC for which notification shall be made by herein grantee to EMB, Region I within fifteen (15) days from such transfer; and
9. All damages or adverse impact to the environment resulting from non-adoption of appropriate or adequate mitigating measures during the implementation of the project shall be the sole responsibility or liability of the proponent.

Commencement of work or operation shall be deemed acceptance of above conditions herein specified.

Non-compliance with any of the above conditions shall be sufficient cause for the suspension or cancellation of this Certificate and/or a fine in the amount not to exceed fifty thousand pesos (P50,000.00) for every violation or a part thereof, at the discretion of the Department (Section 9 of PD 1586).

Given under the seal of this Department at San Fernando City, La Union this 23rd day of April, Two Thousand and Four.



BENEDICTO O. MOLANO
OIC, Regional Director

Recommending Approval:


NICANOR C. ESTEBAN

OIC, Environmental Impact and Monitoring Division

Processing Fee	P 2,100.00	O.R. No. 1658021	Date 04-19-2004
Filing Fee	460.00	O.R. No. 1658021	Date 04-19-2004
Legal/Research Fee	240.00	O.R. No. 1658021	Date 04-19-2004
Procedural Screening Fee	200.00	O.R. No. 1658021	Date 04-19-2004

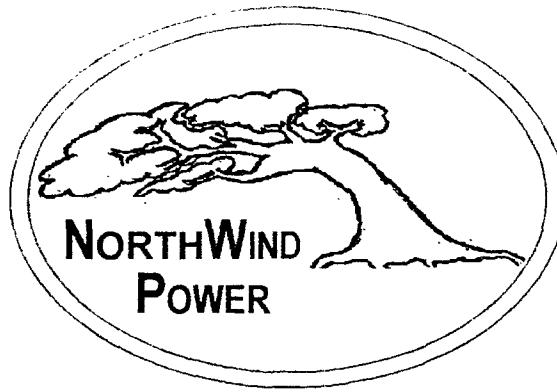
VALID ONLY IF MARKED WITH DRY SEAL

PAGE2 ECC OF NORTHWIND POWER DEVELOPMENT CORPORATION- SUBSTATION/ TRANSMISSION LINE- JCL

ANNEX 2

IEE for the Wind Farm
EIA for the Wind Farm
ECC for the Wind Farm

INITIAL ENVIRONMENTAL EXAMINATION CHECKLIST



Bangui Bay 60 MW Wind Power Project Ilocos Norte

**Initial Environmental
Examination
Checklist**

November 2000

Northwind Power Development Corporation

**Unit 310 Jollibee Plaza Bldg.
Emerald Ave., Ortigas Center,
1600, Metro Manila**

INITIAL ENVIRONMENTAL EXAMINATION (IEE)
CHECKLIST REPORT FOR THE
60 MW NORTHWIND POWER PROJECT

A. GENERAL INFORMATION

Project Name : **20 MW NorthWind Power Project Phase I**
40 MW NorthWind Power Project Phase II and III

Project Location : **Bangui, Ilocos Norte**

Name of Proponent : **Atty. Ferdinand A. Dumla**
Chairman, Board of Director
NorthWind Power Development Corporation

Address : **Unit 310 Jollibee Plaza Building,
Emerald Avenue, Ortigas Center,
Pasig City**

Telephone No. : **02 638 9090/91**

Fax No. : **02 638 9089**

1. Project Ownership

✓

Single Proprietorship

Partnership or Joint Venture

Corporation

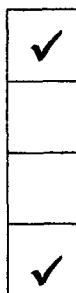
Cooperative

Other, specify

2. Project Cost

2.1 Total Project Cost : US\$ 25 Million Phase I

2.2 Mode of Project Financing



Self Financed (Development Phase)

Bank Loan

Government Financing

Others (Foreign Financing, Implementation Phase)

3. Project Objective

To generate a total of 60 MW electricity from wind power (in three phases)

B. PROJECT DESCRIPTION

1. Project Components

- 1.1 Around 30 turbines with 660 kW rated capacity each. Alt. 12 turbines rated 1.75 MW each.
- 1.2 Control Center/Office
- 1.3 Sub-station, warehouse/switch gear room
- 1.4 Transmission line – a separate IEE will be submitted. Survey of T/L route on-going.

2. Land Ownership and Status of Land Ownership

As of IEE submission date, approval of Foreshore Lease is in the process which was filed at the CENR Office, Bangui, Ilocos Norte on September 11, 2000. Documents are hereto attached. Survey of final lay-out of wind towers is still on-going.

3. How do you describe the general location of the project? (Vicinity Map)



Developed Area (within a built-up area with presence of utility systems or network, especially water supply, roads and power supply)



Foreshore Land, Underdeveloped Area (relatively far from the urban center with predominant absence of utility system)

4. Project Specifications (Design and Layout)

Item	Specification	Unit
Nominal Output	660 alt 1750	Kilo watts
Type of Generator	Asynchronous, 4 pole	
Power Regulation	Pitch regulated	
Cut in wind speed *	4	meters/second
Cut out wind speed *	25	meters/second
Hub Height *	50 alt 60	meters
Blade/rotor * diameter	47 alt 66	meters
Type of blade/rotor	Three-bladed rotor	-
Type of tower	Conical, steel, painted	-
Total no. of turbine towers	30 alt 12	units
Distance between towers	100 alt 140	meters
Voltage of Substation	13.8	kilo volt
Area of Control Center	300	square meters
Total Project Area Covered	808,630	square meters
Project Duration	25	Years

*Cut in wind speed

- the minimum wind speed to start generation

Cut out wind speed

- the maximum wind speed to cut out generation

Hub Height

- the height from the ground level to the center of the blade

Tower Height

- the height from the ground level to the top of the tower

Rotor

- solid steel hub with 3 rotor blades

The turbines will automatically start to generate electricity when the wind speed reaches 4 m/s and will achieve a maximum output at around 15 m/s. These will shut down on an individual basis when the wind speed exceeds 25 m/s (90 kph typhoon speed)

Power output from the turbines is delivered through underground cables connected to a substation within the vicinity. From the substation, the power (voltage) is transformed from medium tension voltage (13.8 kV) to high-tension voltage (69 kV), suitable for direct connection to a 69 kV high-tension transmission line. A separate IEE for the transmission line and substation components will be submitted pending completion of transmission line route survey.

A 300 m² sub-station switchgear and storage room and a control center and office of 20 x 15 shall contain a fully equipped office with data collection equipment and modem for telephone transmission.

5. Land Use Classification

Land Use	Total Area occupied by Turbines/facilities	Total Area within the project boundary
Agricultural	0	0
Industrial	0	0
Commercial	0	0
Residential	0	0
Tourism	0	0
Forest Land	0	0
Open Spaces	0	0
Institutional	0	0
Others, please specify (wasteland, grassland, shrubland, foreshore)	0.84 ha (approx.)	808,630 square meters
Total Area	0.84 ha (approx.)	808,630 square meters

6. Barangays where wind turbines will be installed:

BARANGAY	MUNICIPALITY	TOTAL AREA, has (approx)
Baruyen to Abaca	Bangui	0.84 ha

7. Manpower Employment (listing of manpower requirements)

How many people will be employed by the project?

During the pre-construction/construction period	:	42/220
During the operation and maintenance period	:	62

8. Construction Schedule (Gantt Chart)

C. DESCRIPTION OF EXISTING ENVIRONMENT

I. Physical Environment

Components/Parameters	Y	N	Remarks
What is the elevation of the area (masl)? <100 masl 100-300 masl 300-500 masl 500-1,000 masl ➤ 1,500 masl (refer to the topographic map which shows the elevation per contour line, Annex 8)			(indicate the area of each elevation range) Brgys. Baruyen to Abaca
Slope and topography of the area Is the terrain flat or level (0-3% slope)? Gently sloping or undulating (3-8% slope)? Undulating to rolling (8-18% slope)? Rolling to moderately steep (18-30% slope)? Steeply sloping (30-50% slope)? Very steep to mountainous (>50% slope)?	✓		(indicate the approximate area per slope category)
What is the general geology of the area?	✓		Black Core, Beach Sand

Are there indications of landsliding in the area?	<input checked="" type="checkbox"/>	
If yes, causes of flooding or landslides: n/a Exposed slopes Slide prone steep . Slopes Others Low lying area Poor drainage Others		
Are there occurrences of flooding downstream of the site?	<input checked="" type="checkbox"/>	Foreshore land
Soil type of the area:		Other soil types: Black Core, Beach Sand
Does the area have sandy soil? Clayey soil? Sandy loam soil?	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	
Is there any indication of excessive soil erosion occurring in the area?	<input checked="" type="checkbox"/>	The shoreline moves seasonally
If yes, what type of erosion: ➤ Natural ➤ Man-made (specify sources of erosion such as kaingin, logging, etc.) Generally categorize rate of erosion based on observation: ➤ Slight ➤ Moderate ➤ Sever	n/a n/a	
Does the area traverse part of the drainage of a river system (s)? What river system (s) or water bodies are affected by the site? Please enumerate them under Remarks. <i>[these must be indicated or shown in the topographic map]</i>	<input checked="" type="checkbox"/>	Banban River
Are there natural drainageways/creeks along the area that drain towards communities downstream?	<input checked="" type="checkbox"/>	Runoff during rainy days will drain off to the sea.

Is the area frequently visited by typhoons?	<input checked="" type="checkbox"/>		Typhoons are coming from South East and is weakened by the mountain area
When was the last typhoon which visited the area?			October 2-6, 1999 Typhoon Pepang (signal#3)
Average number of typhoons per year: 1999 = 4 1998 = 2 1997 = 1 1996 = 1 1995 = 2	<input checked="" type="checkbox"/>		Based on PAGASA records
Is there a record of tornadoes/twisters which occurred in the area?		<input checked="" type="checkbox"/>	
What is the nearest earthquake, fault zone or volcano, etc. in the area?	<input checked="" type="checkbox"/>		The Wind Turbine Generators (WTG) are designed to withstand the effects of an intensity 10 earthquake in the Modified Mercalli Intensity Scale. Further, the expected earthquake intensity in the area is about 7. (See Geological Fault Map, annex 9)
Identify the name of the zone:		<input checked="" type="checkbox"/>	
Distance:		<input checked="" type="checkbox"/>	
Bangui fault, though nearer, is inactive.			
Had there any incidents such as lightning strikes at or near the site?			No records available. Lightning arresters is installed at the turbines and tall structures

What are the present uses of the water bodies being drained/affected by the project site?

	Use	Remarks
	Bathing	
<input checked="" type="checkbox"/>	Fishing	The Turbines occupy a small area and will not affect fishing.
<input checked="" type="checkbox"/>	Pebble picking at Brgy. Baruyen only	The Turbines occupy a small area and will not affect pebble picking.
	Washing	
	Source of drinking	
	Irrigation	

I. Biological Environment

Components/Parameters	Y	N	Remarks
Are there existing trees and other types of vegetation in the project area?		✓	
If yes, indicate the forest type/vegetation.			
Are there birds and other forms of wildlife found in the area?	✓		Sea Birds
Are there fishery resources in the water bodies found near or in the project area?	✓		At the coastal area.
Is the area in a watershed or forest reservation area?		✓	
If near only, how near? <u>n/a</u> (m or km)			
If across, indicate name of the watershed or forest reservation area.	n/a	n/a	

If answer is yes to any of the above questions, please list down these species (common or local name) in the table provided below.

Birds and Other Wildlife	Trees and other Important Vegetation	Fishery Resources
1. Haliastur indus (only few seabirds)	n/a	n/a

What are the existing forest resources in the project area that are important to the community?

	Forest Resource	Remarks
n/a	Timber	
n/a	Fuelwood	
n/a	Non-timber products	
n/a	Food Plants	
n/a	Medicinal plants	
✓	Wild animals	sea birds only
n/a	Others (specify)	

II. Socio-Cultural and Economic Environment

Components/Parameters	Y	N	Total Number
1. Are there existing settlements in the project area?		✓	
If yes, how many households or families? how many are legitimate land owners? how many are tenants? how many are caretakers? how many are squatters?		n/a	
2. What is the total population of the barangay (s) covered by the project? 1. Baruyen 2. Taguiporo 3. Manayon 4. Masikil 5. Abaca		✓	(1995 census) Adjacent Barangays 1,328 523 932 737 1,457
Average family size			(1995 census)
How many of the houses are made of concrete? Made of wood? Made of concrete and wood? Made of brick? Made of adobe?		✓ ✓ ✓ ✓ ✓	None within project area. Only shades for fishing boats and pebble picking are adjacent to project area.
What are the sources of livelihood? Livelihood Type: Farming Fishing Backyard and poultry and piggery Vending/buy and sell Sari-sari store Other, pls. Specify: Employees Barbers, drivers, etc. Professionals (doctors, engineers, Accountants, etc.) Pebble picking		✓ ✓ ✓ ✓ ✓	Within project area
How many of the total population have reached the			Bangui Municipal

Elementary level?			1995 Census
1) Abaca			199
2) Baruyen			271
3) Taguiporo			84
4) Masikil Primary			44
High School Level?			
1) Bangui Nat'l High School			1,091
2) Bangui School of Fisheries			517
What are the dialects spoken in the area?			
Tagalog			
Cebuano			
Ilonggo	✓		
Ilocano			
Chabacano			
Other please specify			
Are there ancestral lands or indigenous people communities in the area?		✓	
Indicate Group: not applicable			

What are the leading illnesses in the area?

Illness/Disease	Cause (s)	% of the Population	Rate [enclose with () if decreasing]
1. URTI			
2. Wounds			
3. HPN			
4. Diarrhea			
5. Dermatitis			
6. SVI			
7. Osteoarthritis			
8. Pneumonia			
9. Cystic mass			
10. UTI			

Are there other local organization in the area?

Y

N

If yes, please list down these organized groups e.g. associations, cooperatives, etc. below:

Are there other social infrastructures in the barangay?

Y

N

If yes, what are these social infrastructures? (Please check)

<input checked="" type="checkbox"/>	Schools	<input checked="" type="checkbox"/>	Health Centers/Clinics
<input checked="" type="checkbox"/>	Roads	<input checked="" type="checkbox"/>	Communications(radio, TV, mail, newspaper)
	Police Station/Outpost	<input checked="" type="checkbox"/>	Community Center
	Hospitals	<input checked="" type="checkbox"/>	Transportation
<input checked="" type="checkbox"/>	Churches/Chapels	<input checked="" type="checkbox"/>	Others(basketball court, water supply system)

D. IMPACT ASSESSMENT AND MITIGATION

Pre-Construction/Construction Period				
Project Activities Affecting the Physical Environment	Y	N	Impact Description	Mitigation/Enhancement Measures
Will there be land clearing? If yes, what is the total area to be cleared? Area to be cleared: <u>None</u>		<input checked="" type="checkbox"/>	Of the 808,630 square meters bounded by the project, only the tower foundation area, underground cables and access roads are cleared	
Will there be stockpiling of soil, sand and gravel materials in the project area?	<input checked="" type="checkbox"/>		Minimal impact due to temporary excavation works	
Will there be drillings, hammering, boring activities?	<input checked="" type="checkbox"/>		Short-term impact. Noise emission	Avoid operation of high noise emitting heavy equipment at nighttime.
Will there be earthmoving activities e.g. excavation works, cut and fill, etc.? If yes, how deep is the excavation and how much is the estimated volume of cut and fill? Ave. depth of excavation: 4.0 m	<input checked="" type="checkbox"/>		Excavation for wind Turbine generators foundation and underground cables at the foreshore land Low dust emission	Sprinkling of water

Estimated volume of cut and fill 60 cu.m. pr foundation			to minimize dust
Will there be any slope modifications or ground leveling to be done?		✓	
Will temporary quarters or barracks and a field office be provided for construction workers in the project site?	✓	Minimal impact due to domestic waste	Coordination with LGU re: disposal
Will there be topsoil removal and replacement? If yes, how much of the removed topsoil will be replaced? <input type="checkbox"/> Entire volume <input checked="" type="checkbox"/> Partial only	✓	n/a	Foreshore land
If partial only, where will the rest of the topsoil go?	✓	n/a	Foreshore land
If no, what will happen to the excavated topsoil?		n/a	Foreshore land
Will there be demolition of existing structures? If yes, what types of structures will be demolished? Type of structures: <u>n/a</u>	✓		
Are you constructing an access road going to the site? If yes, what type of access road? <input checked="" type="checkbox"/> All weather road <input type="checkbox"/> Concrete <input type="checkbox"/> Asphalt	✓		Existing access road to be used. Equipment will be barged to site.
Length (m) _____ Width (m) _____			

Pre-Construction/Construction Period				
Project Activities Affecting the Biological Environment	Y	N	Impact Description	Mitigation/Enhancement Measures
1. Will there be vegetation clearing?		<input checked="" type="checkbox"/>	n/a	
2. Will trees be affected (e.g. cut down or removed) during the clearing? If yes, how many and what are these species of trees? # of trees _____ species of trees: _____ _____		<input checked="" type="checkbox"/>	n/a	
3. Will the project encroach into precious ecological areas (e.g. forested zones, watershed areas)?		<input checked="" type="checkbox"/>	No impact.	
4. Will clearing activities affect any rare, threatened or endangered plant and animal species?		<input checked="" type="checkbox"/>	No impact.	

Pre-Construction/Construction Period				
Project Activities Affecting the Socio-Cultural Environment	Y	N	Impact Description	Mitigation/Enhancement Measures
1. Will there be settlements to be affected? If yes, how many households will be affected? Total no. of families/households: none		<input checked="" type="checkbox"/>	n/a	
		<input checked="" type="checkbox"/>	n/a	
2. Will the project provide reasonable payment terms to the affected settlements?		<input checked="" type="checkbox"/>	n/a	

3. Will there be locals to be hired during the construction?	<input checked="" type="checkbox"/>	Positive impact	It is the Cooperative's policy to prioritize local hiring.
4. Are there existing public trails or routes (regularly used) that traverse the property?	<input checked="" type="checkbox"/>	No impact	Access for fishing activities and pebble picking will be maintained. Public will be allowed continued access to project area.
5. Will the public or local community still have access to the property in terms of passing through or entering it to reach their house or residence?	<input checked="" type="checkbox"/>	No impact	Public will be allowed continued access to the project area.
6. Will there be increase in economic activity in the area or rise in associated projects?	<input checked="" type="checkbox"/>	Positive impact	Increase in economic activities will be due to local hiring, local purchase of goods and services and generation of small scale business
7. Will the project cause an increase in traffic or disrupt traffic in major routes due to entry or exit of construction equipment?	<input checked="" type="checkbox"/>	No impact	Transport of heavy equipment will be by sea.
8. Are there prevailing peace and order problems in the site which can affect the project?	<input checked="" type="checkbox"/>	No impact	
9. Will the project destroy/ impose hazards to historical/cultural instruments?	<input checked="" type="checkbox"/>	No impact	

Operation and Maintenance Period				
Project Activities Affecting the Physical Environment	Y	N	Impact Description	Mitigation/ Enhancement Measures
1. Will the project create a significant decrease in the aesthetic value of the area?		<input checked="" type="checkbox"/>	Positive impact as the project most likely will be considered as a tourist attraction	
2. Are there areas prone to lightning strikes?			No available data on lightning	Wind towers and tall structures are provided

3. Does the project have significant noise emissions	<input checked="" type="checkbox"/>	strikes in the area.	with lightning arresters.
		Nighttime noise level theoretically may reach up to 45dBA at distance up to 200 meters from the row of turbines due to rotation of blades and mechanical noise of turbines	Use of modern turbines with low sound emissions. The Turbines are placed close to the sea, and as such the background noise will mask the Turbine noise.

Operation and Maintenance Period				
Project Activities Affecting the Biological Environment	Y	N	Impact Description	Mitigation/Enhancement Measures
1. Does the design take into account hazards to wildlife due to rotation of wind turbine blades?	<input checked="" type="checkbox"/>		Possible bird deaths, however very minimal See Attachment 3	Blades will be colored white for visibility.
2. Does the design take into account possible blockade of wildlife passageways?	<input checked="" type="checkbox"/>		Ilocos Region is not a significant part of the eastern migratory flyway of the Philippine jurisdiction.	

Operation and Maintenance Period				
Project Activities Affecting the Socio-Cultural Environment	Y	N	Impact Description	Mitigation/Enhancement Measures
1. Will the project create interference with other utilities? Utilities: <hr/> <hr/> <hr/>		<input checked="" type="checkbox"/>	No communication lines/cell sites near the project area.	Modern blades are reinforced with fiber glass which absorbs electromagnetic waves.

2. Will the project create a significant increase in the existing population in the area?	<input checked="" type="checkbox"/>	Positive Impact	Only tourist/transient visitors are expected initially. Businesses/industries which will locate in the area may attract migrant workers.
3. Will the prevailing land value in the area increase with the project?	<input checked="" type="checkbox"/>	Positive impact	Increase in land value is a natural market consequences when projects are established.
4. Does the design take into account hazards to humans due to accidental failure of the wind turbines?	<input checked="" type="checkbox"/>	Occurrence of accidents is unlikely. There is no record of such accidents in wind projects in 37 countries.	Towers are designed to withstand storms, typhoons and earthquakes of 10 magnitude. Blades will automatically reorient to stop rotation at wind speeds from 30 m/sec and up.
5. Is there a team formed for the proper responsibilities in repairing damaged poles/towers resulting from natural (typhoons, earthquakes) or man-made calamities?	<input checked="" type="checkbox"/>	No impact	
6. Will there be an increase in economic activity or rise in associated projects?	<input checked="" type="checkbox"/>	Positive impact. The project is expected to attract tourist and other investors the area.	Need LGU initiatives.

	PROPONENTS COMMITMENTS Are you committing yourself to...	Answer	
		Yes	No
1.	Comply with existing environmental rules and regulations, guidelines and criteria?	<input checked="" type="checkbox"/>	
2.	Comply with all mitigation and enhancement measures that have been identified in the report?	<input checked="" type="checkbox"/>	
3.	Abide and conform to the prescribed rules and specifications for power transmission lines as contained in the Electrical Code of the Philippines?	<input checked="" type="checkbox"/>	

4.	Construct, operate ad maintain well-designed wind turbines and other related structures?	<input checked="" type="checkbox"/>	
5.	Establish adequate buffer zones from the project area?	<input checked="" type="checkbox"/>	
6.	Comply with all stipulations indicated in any agreement forged with private or public authorities?	<input checked="" type="checkbox"/>	
7.	Report to proper government authorities any illegal forest activities that may be present or happening in the project area?	<input checked="" type="checkbox"/>	
8.	Immediately replace/rehabilitate/repair damaged structures/lines resulting from natural or man-made calamities?	<input checked="" type="checkbox"/>	
9.	Organize and conduct information, education and communication (IEC) activities on safely and potential hazards of the project?	<input checked="" type="checkbox"/>	
10.	Properly brief or orient the proponent's staff about the ECC conditions, commitments and agreements made about the project?	<input checked="" type="checkbox"/>	
11.	Others, please specify	<input checked="" type="checkbox"/>	

E. LIST OF ANNEXES

Title or Description	Put a check (✓) mark
1. Location Map	<input checked="" type="checkbox"/>
Photocopy of TCT/OCT/CLT, etc. (S/S only) Foreshore Lease	Filed and on the process at CENR office, Bangui, Ilocos Norte
2. Location Plan	<input checked="" type="checkbox"/>
3. Tower or Pole Design and Layout	<input checked="" type="checkbox"/>
4. Power Output Layout of Wind Farm	<input checked="" type="checkbox"/>
5. Control and Storage Station Layout	<input checked="" type="checkbox"/>
6. Listing of Manpower Requirements	<input checked="" type="checkbox"/>
7. GANTT Chart (Schedule of Activities)	<input checked="" type="checkbox"/>
Photocopies of Agreements/Right-of-Way Grants	n/a
8. Topographic Map	<input checked="" type="checkbox"/>

9. Geological Fault Map	✓
10. List of Trees and other Important Vegetation	n/a
11. Noise Emission Impact Assessment	✓
Clearance from Office of Cultural Communities (if traversing ancestral lands Or indigenous people/communities)	n/a
PAWB Clearance (if traversing a Protected Area)	n/a
12. Endorsement of the Municipal or City Provincial Council	✓

F. LIST OF ATTACHMENTS

1. Foreshore Lease Application/certification
2. Site Photocopies
3. Bird Impact Study
4. Corporate By-laws and SEC Registration

ACCOUNTABILITY STATEMENT

This is to certify that all the information and commitments in the Initial Environmental Examination (IEE) Checklist are true, accurate and complete. Should we learn of any information to the attention of the appropriate DENR Regional Office.

We hereby bind ourselves jointly and solidarily to any penalty that may be imposed arising from any misinterpretation or failure to state material information in this IEE Checklist.

In witness whereof, we hereby set our hands this _____ day of _____, 2000 at _____.

ATTY.FERDINAND A. DUMLAO
*Chairman, Board of Directors
NorthWind Power Development Corporation*

ACKNOWLEDGEMENT

BEFORE ME, this _____ day of _____, 2000 at _____, personally appeared with Community Tax Certificate No. _____ issued on _____ at the _____ in his capacity as _____.

And acknowledged to me that this IEE is his/her voluntary act and deed, of the entity he/she represents. This document, which consists of _____ pages, including the page on which acknowledgement is written is an Initial Environment Examination (IEE) Checklist.

Witness my hand and seal on the place and date above written.

Notary Public

Until
PTR No.
Issued at
On

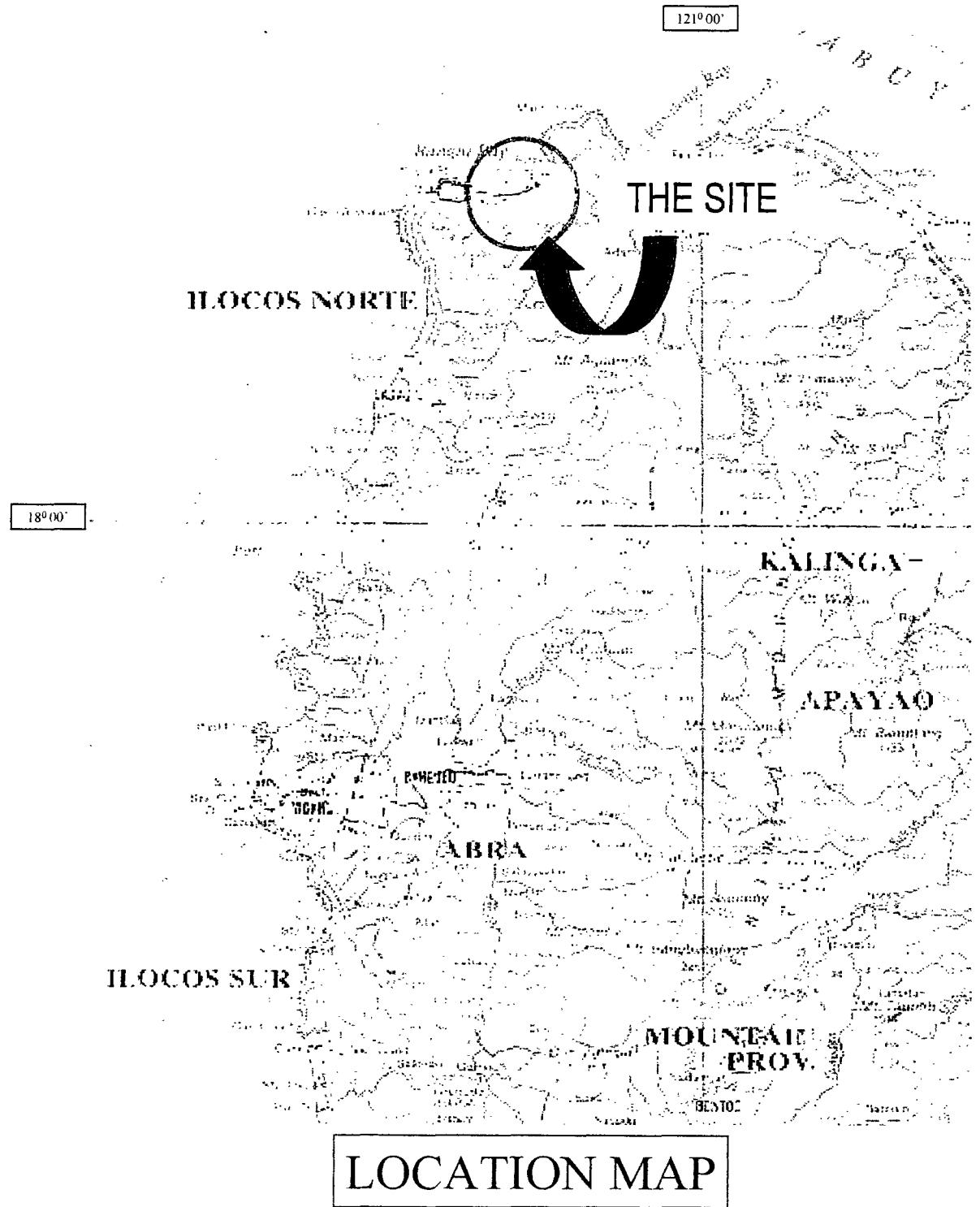
Doc. No. _____
Page No. _____
Book No. _____
Series of _____

Annex 1

Location Map

NorthWind Power Development Corporation

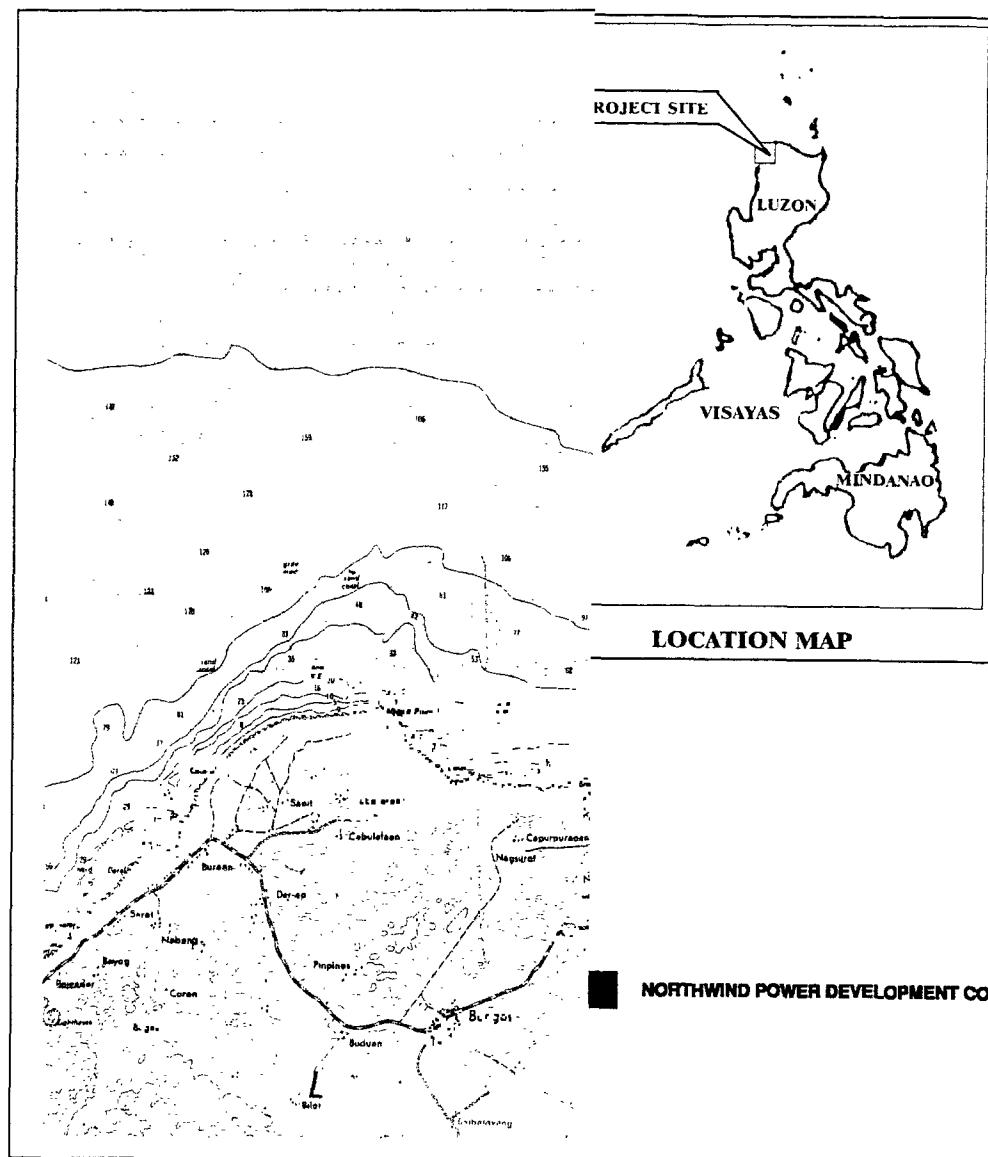
Bangui Bay, Ilocos Norte



"SD-CW-0008"

NWPDG Vicinity

AUG 2



LOCATION MAP

NORTHWIND POWER DEVELOPMENT CORP.

NORTHWIND POWER DEVELOPMENT CORPORATION
Unit 310 Jaitbee Plaza Building
Emerald Ave., Ortigas Center, Metro Manila
Tel No. (++632) 538-9000-81; Fax No. (++632) 538-9088
E-mail Address : nrd@mac.com.com

Project : WIND TURBINES		Station : BANGUI
Proj. No.	Date	Sheet Contents : -
Drawn By: B.E.L.	11/20/00	NWPDC VICINITY PLAN
Checked By: F.P.S.	11/20/00	
Approved by: N.J.	11/20/00	Drawing No. SD-CW-00008
		Sheet 1
		Scale : N.T.S.

LINES	BEARINGS	DISTANCES	LINES	BEARINGS	DISTANCES
1 2	N87° 45'W	102.08 M.	11 12	N80° 20'W	163.38 M.
2 3	S88° 45'W	140.71 M.	12 13	N80° 15'W	80.08 M.
3 4	N87° 37'W	284.18 M.	13 14	N81° 34'W	141.56 M.
4 5	N78° 33'W	488.82 M.	14 15	N80° 18'W	304.80 M.
5 6	N86° 54'W	380.74 M.	15 16	N80° 11'W	234.38 M.
6 7	N81° 48'W	344.87 M.	16 17	S88° 28'W	305.98 M.
7 8	S88° 57'W	37.88 M.	17 18	N84° 48'W	168.88 M.
8 9	S88° 58'W	88.74 M.	18 19	N10° 17'W	98.80 M.
9 10	N80° 25'W	73.83 M.	19 20	S88° 53'E	205.74 M.
10 11	S88° 51'W	92.28 M.	20 21	S74° 17'E	54.87 M.

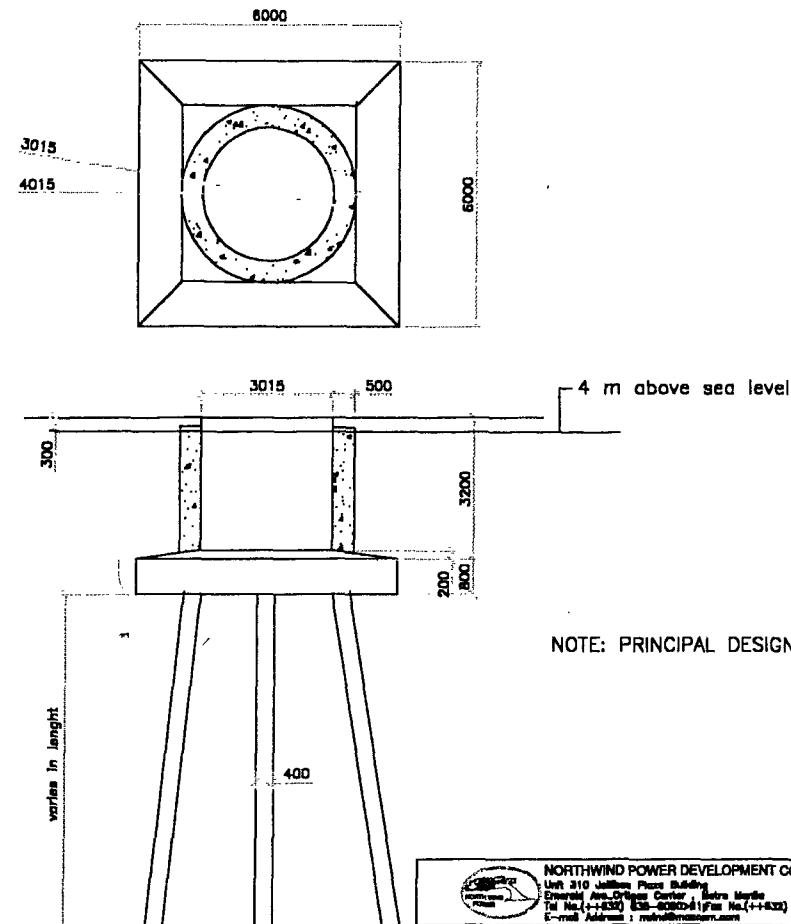
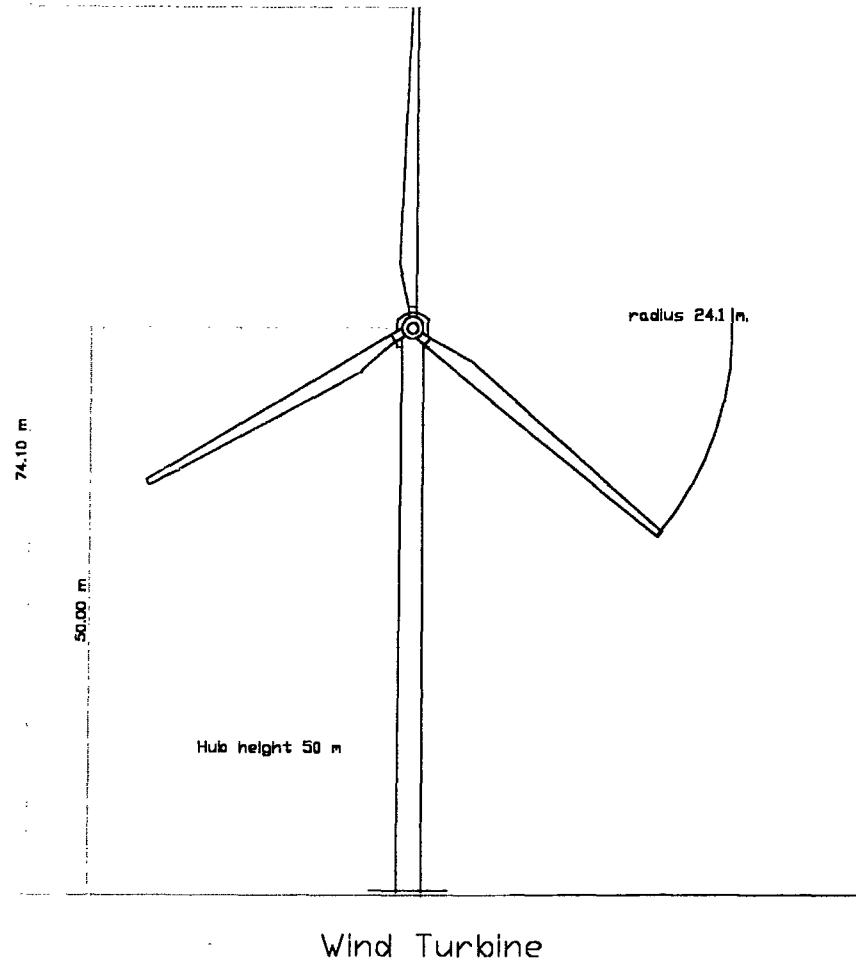
Annex 3

Turbine Tower Layout

Turbine Layout

Foundation drawing

PRELIMINARY DRAWING ONLY



WIND TURBINE LAYOUT & FOUNDATION

NOTE: PRINCIPAL DESIGN

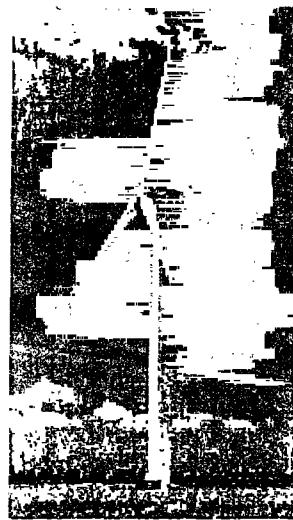
NORTHWIND POWER DEVELOPMENT CORPORATION Unit 310 - Paseo Bulacan Entertainment City, Pasay City, Metro Manila Tel No. (+632) 635-2000 ext. 411 Fax No. (+632) 635-2009 E-mail Address : nwpdc@manotel.com				Project : WIND TURBINES	Station : BANGUI
Ref. Des. No. : VESTAS	Proj. No. 0001	Date	Signature	Sheet Contents :	TURBINE LAYOUT AND FOUNDATION
	Drawn By: B.E.L	11/22/00			
	Checked By: F.P.B.	11/22/00			
0 11/22/00 N.J.	Approved by: N.J.	11/22/00		Drawing No. WT-CW-00003	Scale : NTS 1/1
Rev. Date Name				CADFILE: C:/MY DOCUMENTS/NWPDC/NORTHWIND-DWG/NWPDC/WINDTURBINE/FOUNDATION	

Power Output Layout

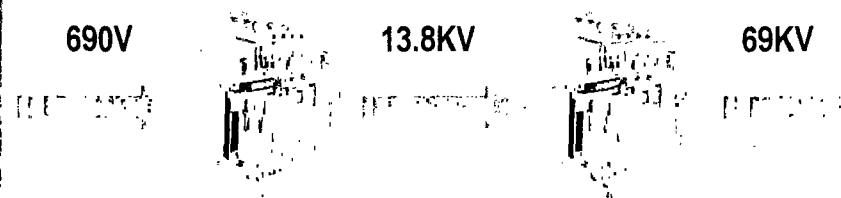
Angle A

PROCESS FLOW WIND to ELECTRICAL ENERGY

WIND with
speed of
7.5 meter/second
or 27 kph



30 units of Wind Turbine
@ 660 KW each for a
total of 19.80 MW
at generated voltage of 660V
Bangui, Bay



Laoag
Substation

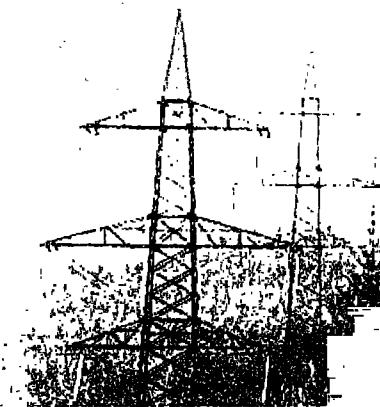
13.8KV



Step-up
Transformer

69KV

Step-up
Transformer

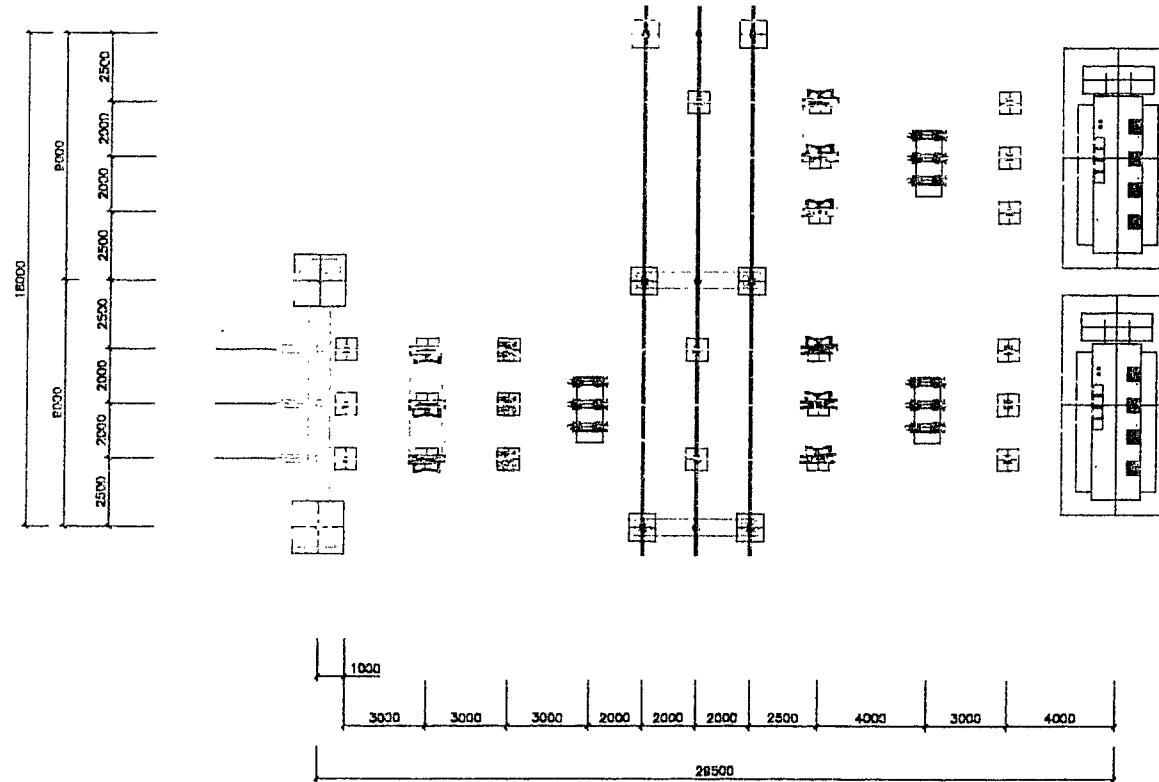


45 KM 69KV
Transmission Line
Bangui Bay to Laoag

Ilocos Norte
Electric Cooperative

North Ilocos Power Development Corporation

PRELIMINARY DRAWING ONLY

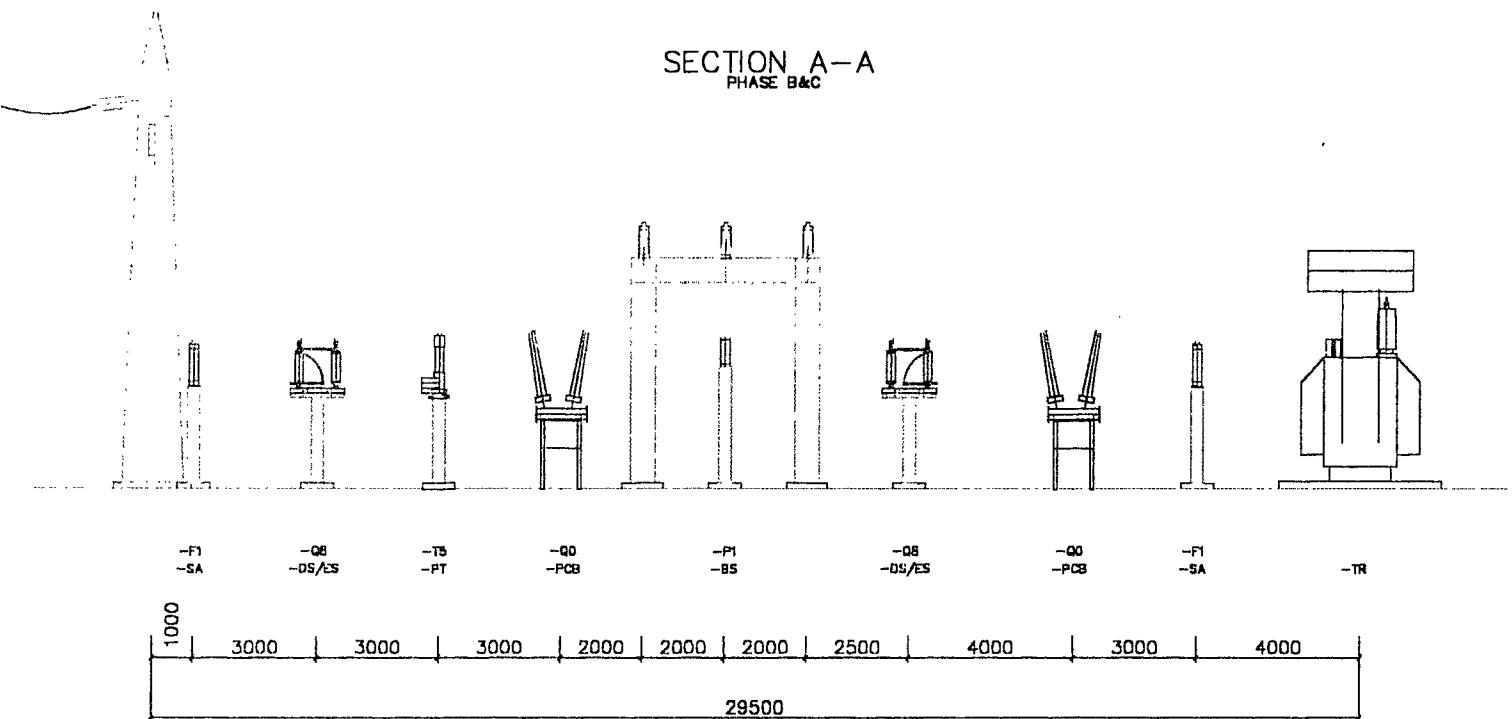


NOTES
 1. GENERAL TOLERANCES FOR SUBSTATION
 ACCORDING TO DIN 43858
 2. DO NOT SCALE WORKING DIMENSION!

NORTHWIND POWER DEVELOPMENT CORPORATION			
Unit 310, Jalan 18/1A, Petaling Jaya, Selangor, Malaysia Phone: +603-9052-4177 Fax: +603-9052-5088 E-mail Address : nwd@msmcommunications.com			
Ref. Dwg. No. :	Project : WIND TURBINE		Station : BANGUI
	Proj. No. 0001	Date	Name
	Drawn By:		
	Checked By: F.P.S. 11/17/2000		
Rev. E	Approved by: N.J.	Date 11/17/2000	Name
			Drawing No. WT-E-00002
			Scale : 1/3

PRELIMINARY DRAWING ONLY

SECTION A-A
PHASE B&C

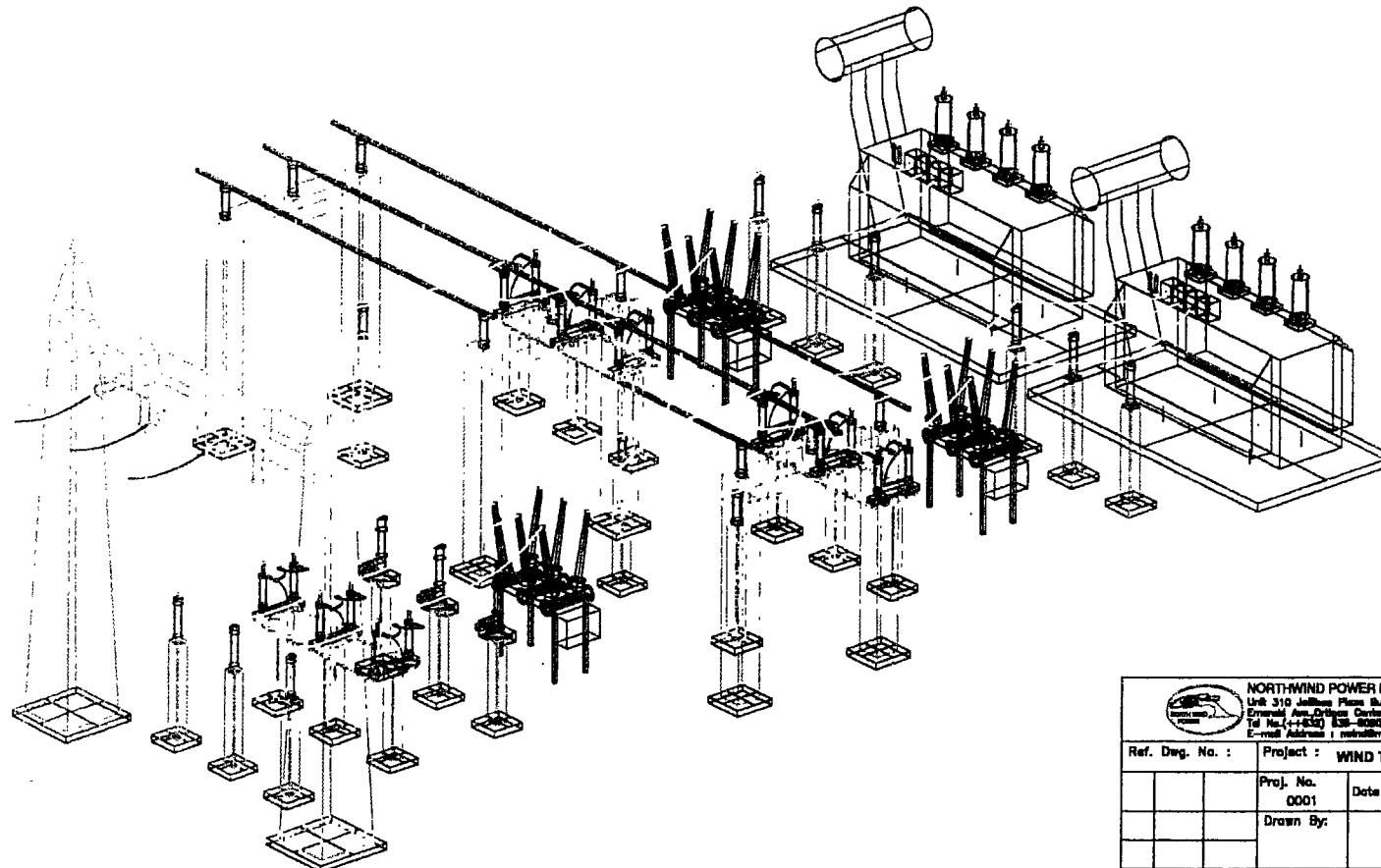


NOTES

1. GENERAL TOLERANCES FOR SUBSTATION ACCORDING TO DIN 43658
2. DO NOT SCALE WORKING DIMENSION!

NORTHWIND POWER DEVELOPMENT CORPORATION Unit 310 Jellico Place Building Dundas Ave., Dundas, Ontario, Canada N3G 1Z6 (+1-905) 325-0200 / 325-0202 (+1-905) 325-0208 E-mail address : info@northwind.ca			
Ref. Dwg. No. :	Project : WIND TURBINE		
	Proj. No. 0001	Date	Name
	Drawn By:		
	Checked By: F.P.S.	11/17/2000	
0 Rev. No.	11/17/00 Date	Approved by: N.J.	Drawing No. WT-E-00002
			Scale : 2/3

PRELIMINARY DRAWING ONLY



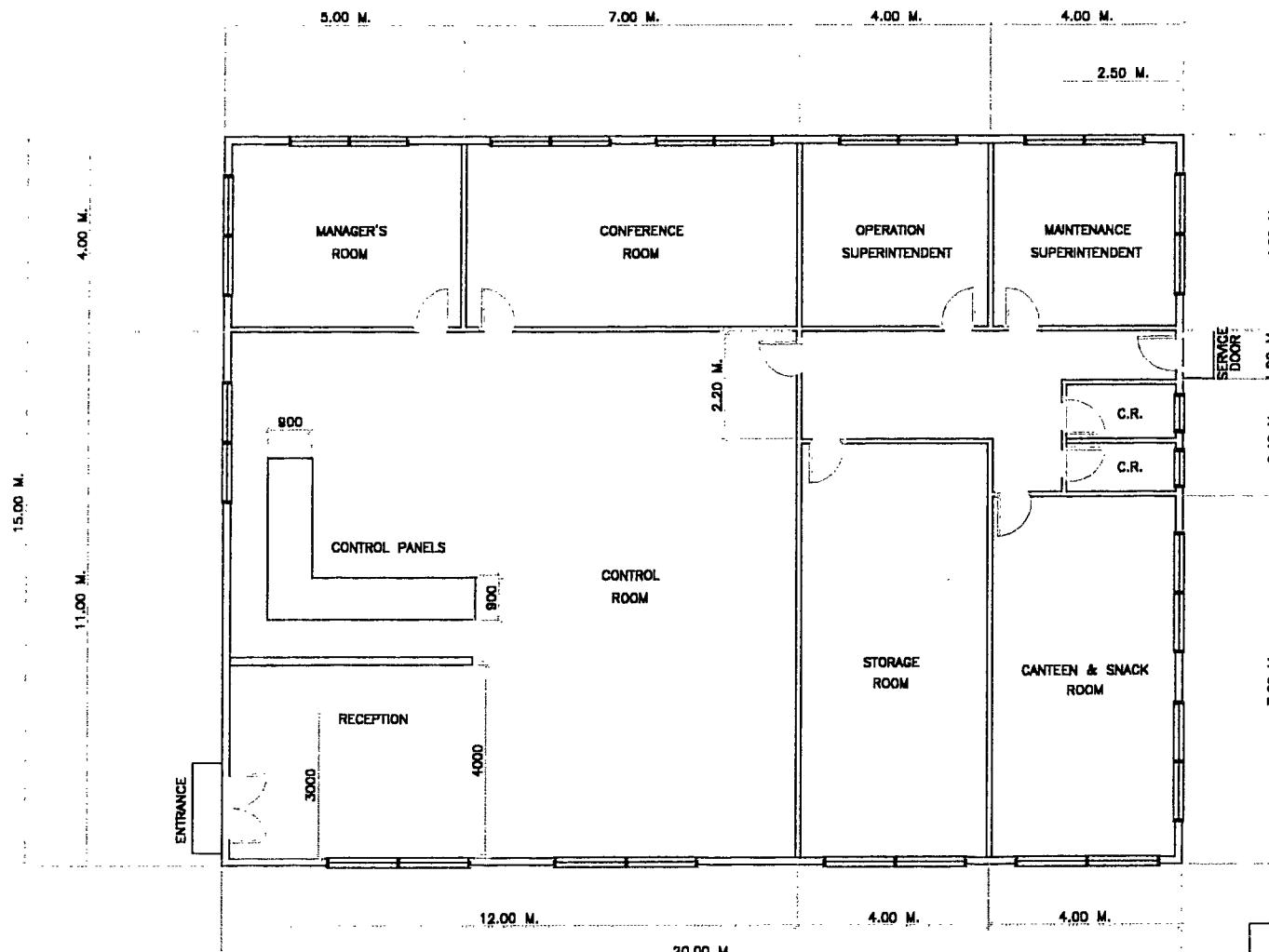
NORTHWIND POWER DEVELOPMENT CORPORATION Unit 310 Jollies Place Building Emerson Ave., Ortigas Center, Pasig City, Manila Tel No. (+632) 633-9020/417 Fax No. (+632) 633-8026 E-mail Address : nwdev@msn.com			
Ref. Dwg. No. :	Project : WIND TURBINE Station : BANGUI		
	Proj. No. 0001	Date	Name
	Drawn By:		
	Checked By: F.P.S. 11/17/2000		
0	11/17/00	Approved by:	
Rev. No.	Date	Name	Drawing No. WT-E-00002
		N.J.	Scale : 3 / 3

Annex 5

Control Center/Office

Sub-station Switchgear/storage

PRELIMINARY DRAWING ONLY

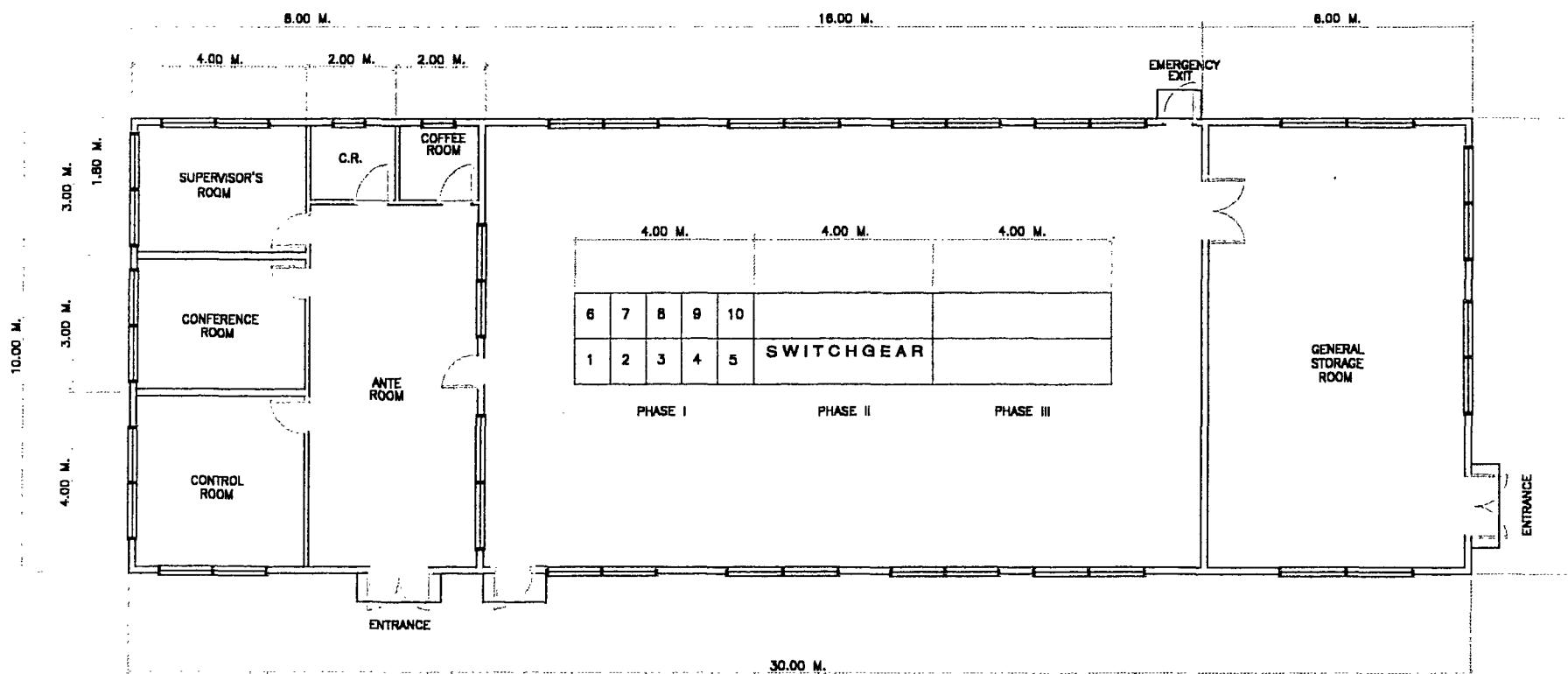


FLOOR PLAN

NORTHWIND POWER DEVELOPMENT CORPORATION Unit 310 Jollibee Plaza Building Emerald Ave. Ortigas Center, Pasig City Tel No. (+632) 638-9080-81; Fax No. (+632) 638-9081 E-mail Address : nwpdc@msn.com			
Ref. Dwg. No. :	Project :	Station :	
0001	WIND TURBINES	BANGUI	
	Date	Sheet Contents :	
	Signature	CONTROL CENTER AND OFFICES	
0	11/20/00	Approved by:	
Rev. No.	Date	Name	Drawing No.
		N.J.	WT-CW-00001
			Scale :
			1:100

CADFILE: C:/MY DOCUMENTS/NWPDC/NORTHWIND-DWG/NWPDC/CONTROLCENTER-FLOORPLAN

PRELIMINARY DRAWING ONLY



FLOOR PLAN

NORTHWIND POWER DEVELOPMENT CORPORATION Unit 310 Jollibee Plaza Building Empire City Avenue Ortigas Center, Pasig, Metro Manila Tel. No. (02) 838-4171 Fax No. (+632) 838-8088 Email Address : info@northwindcorp.com			
Ref. Drg. No. :	Project :	Station :	
	WIND TURBINES	BANGUI	
	Proj. No. 0001	Date	Signature
	Drawn By: B.E.L.	11/20/00	
	Checked By: F.P.S.	11/20/00	
0	Approved by: N.J.		
Rev. No.	Date	Name	
		N.J.	11/20/00
Drawing No. WT-CW-00002 Scale 1:100			

Annex 6

Kapital Management

20 MW NorthWind Power Project

Manpower Requirement

I. DEVELOPMENT PERIOD

Project Core Team (NWPDC)	7
Engineering External (Part-time)	6
Measuring Tower Erection (Part-time)	25
Feasibility Study and Data Recording	2
Permitting	<u>2</u>
Total	42

II. PROJECT IMPLEMENTATION PERIOD

Project Core Team (NWPDC)	8
Civil works Construction External	80
Mechanical/Electrical Erection External	80
Sub-station and Transmission Line	40
Security	<u>12</u>
Total	220

III. PROJECT OPERATION PERIOD

NorthWind Power Development Corporation	10
Periodical Maintenance	25
Line Maintenance	15
Security	<u>12</u>
Total	62

Annex 7

Construction Schedule

Wind Turbine Project Implementation

The Gantt chart illustrates the project timeline from June 2001 to June 2002. The tasks are categorized into four main phases:

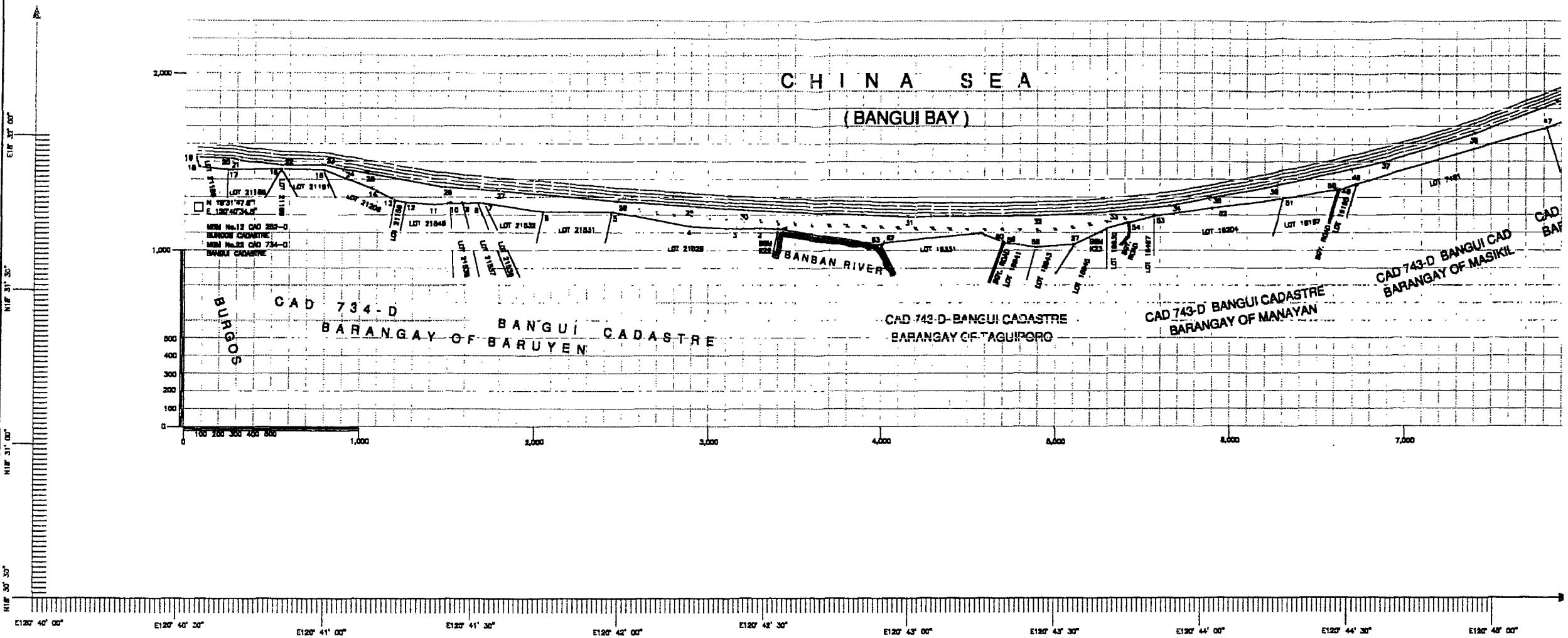
- Effective Date of Contract (Task 1):** Duration 1 day, starting on Jun '01 Month 13.
- Wind Turbine Project Implementation (Task 3):** Duration 302 days, starting on Jun '01 Month 13. It includes:
 - Start (Task 2): Duration 1 day, starting on Jun '01 Month 13.
 - Site Preparation (Task 4): Duration 131 days, starting on Jun '01 Month 13.
 - Equipment manufacturing (Task 5): Duration 131 days, starting on Jun '01 Month 13.
 - Shipment to site (Task 6): Duration 39 days, starting on Jun '01 Month 13.
 - Erection (Task 7): Duration 104 days, starting on Jun '01 Month 13.
 - Testing and Commissioning (Task 8): Duration 28 days, starting on Jun '01 Month 13.
- Substation (Task 9):** Duration 236 days, starting on Jun '01 Month 13. It includes:
 - Design and Procurement (Task 10): Duration 155 days, starting on Jun '01 Month 13.
 - Shipment to Site (Task 11): Duration 39 days, starting on Jun '01 Month 13.
 - Erection (Task 12): Duration 26 days, starting on Jun '01 Month 13.
 - Testing and Commissioning (Task 13): Duration 13 days, starting on Jun '01 Month 13.
- Transmission Line (Task 14):** Duration 247 days?, starting on Jun '01 Month 13. It includes:
 - Staking and Design (Task 15): Duration 26 days?, starting on Jun '01 Month 13.
 - Delivery of materials (Task 16): Duration 130 days, starting on Jun '01 Month 13.
 - Construction (Task 17): Duration 77 days, starting on Jun '01 Month 13.
 - Testing and Commissioning (Task 18): Duration 13 days, starting on Jun '01 Month 13.

NorthWind Power Project Project: Project1-01.13.00 Date: Mon 11/20/00 Rev.: 1	Task		Rolled Up Task		Project Summary
	Split		Rolled Up Split		External Milestone
	Progress		Rolled Up Milestone		External Milestone
	Milestone		Rolled Up Progress		Deadline
	Summary		External Tasks		

Annex 8

**Topographic Map
"SD-CW-00002"**

NORTH



LEGEND:

MUNICIPAL BOUNDARY MARKER

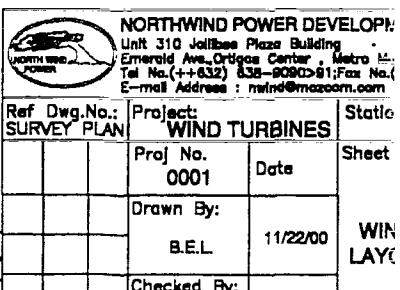
BETWEEN BURGOS & BANGUI

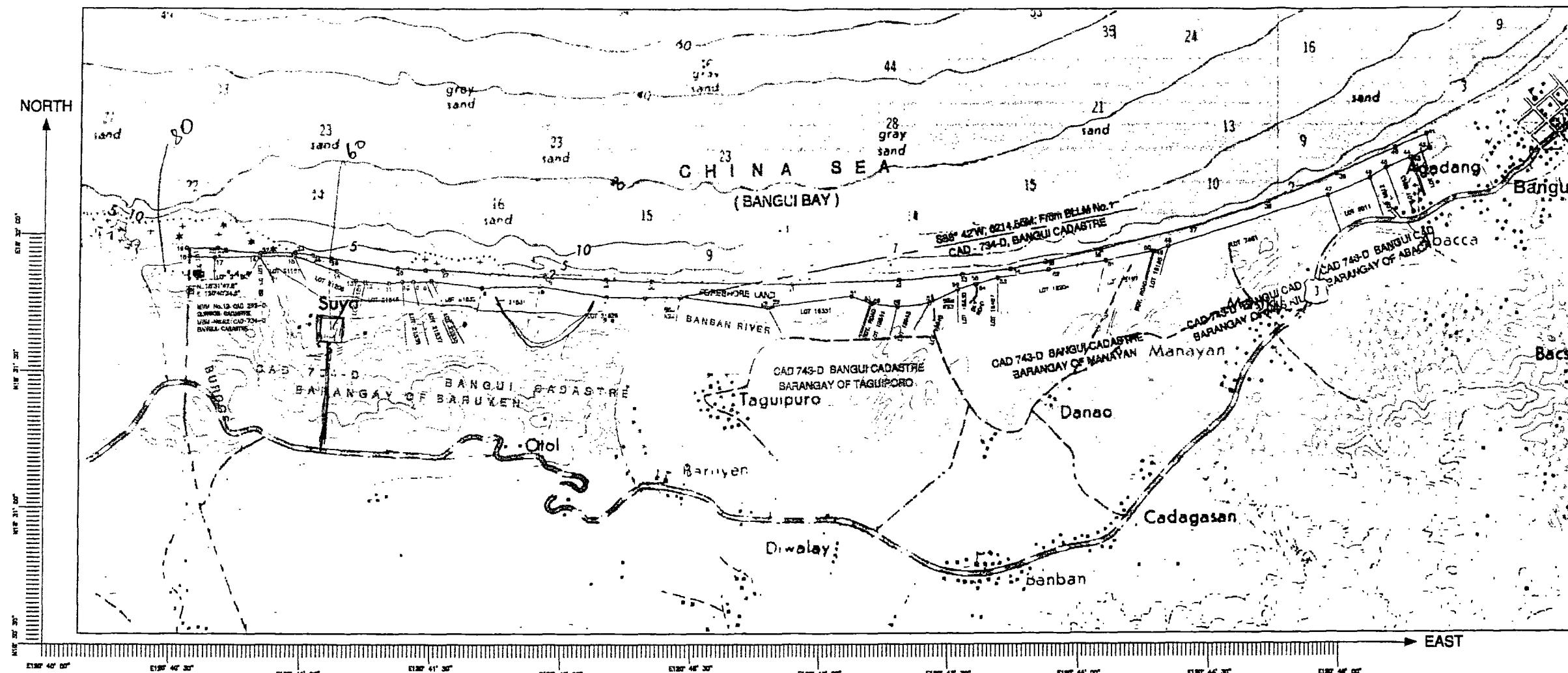
- COORDINATES: N 18°31'47.8"E
E 120°40'34.5"S
 DISTANCE: 227.73 M. TO NEAREST PROPERTY
MARKER No.18
 ELEVATION: 48.00 M. ABOVE SEA LEVEL
 PROPERTY MARKERS
 WIND TURBINE

WIND TURBINE LAYOUT

SCALE:

1 : 25000 M.





NORTHWIND POWER DEVELOPMENT
Unit 310 JaiBee Plaza Building
Emerald Ave., Ortigas Center , Metro Manila
Tel. No. (+632) 635-9090x81; Fax No. /
E-mail Address : nwinfo@msm.com.com

Ref Dwg.No.:	Project :		Station
7180 III	WIND TURBINES		
	Proj No. 0001	Date	Sheet 1
	Drawn By: B.E.L	10/18/00	LOC
	Checked By:		

Geological Fault Map

Aug 9

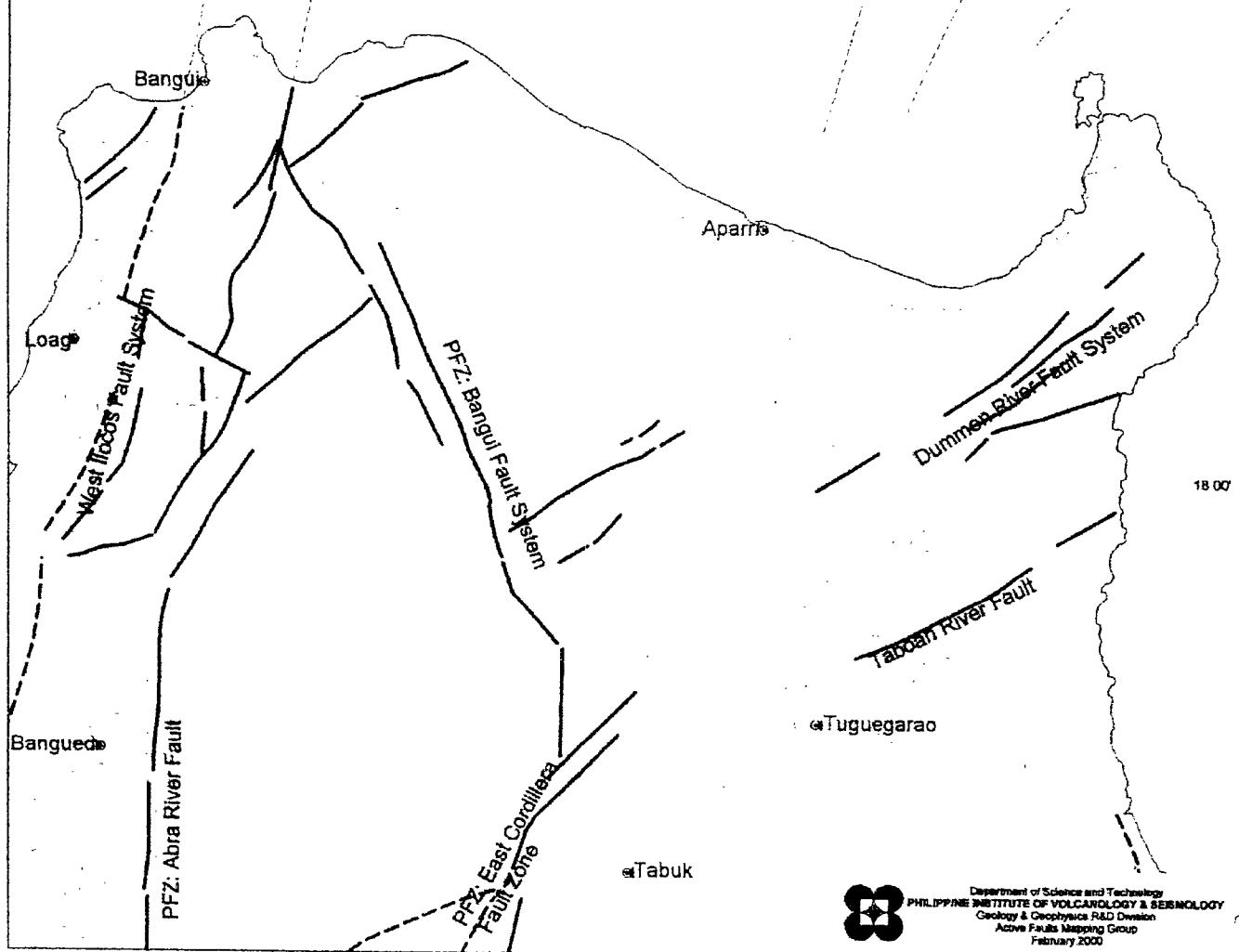
Distribution of Active Faults in Northern Luzon

Legend

- Active Fault: Solid line- trace certain;
approximate offshore projection;
- - - Active Fault: Dashed line- trace approximate
- Roads/highways
- City/Town



0 15 30 Kilometers



Department of Science and Technology
PHILIPPINE INSTITUTE OF VOLCANOLOGY & SEISMOLOGY
Geology & Geophysics R&D Division
Active Faults Mapping Group
February 2000

Anne 10

**List of Trees and Other
Important Vegetation**

n/a

Annex 11

Noise Emission Impact Assessment

TURBINE SOUND EMISSION IMPACT ASSEMBLY

1.0 Summary

Sound produced from turbines are aerodynamic (wind impact on blades) and mechanical in nature. As such, noise issue on wind turbines is now addressed through advances in turbine blade design and mechanical design, plus siting of turbines away from residential areas. Modern turbine designs aim to avoid aerodynamically emitted pure tones and audible sounds frequencies of 20-20,000 hertz. Modern designs include smoother blade tips and trailing edges, larger and slower rotational speeds of blades, and upstream orientation of rotors. Mechanical noises are reduced through improvements on gearboxes, fastenings and couplings, avoidance of vibration of components, and to certain extent sound insulation. Background noise sources and barriers help reduce the impact of sound from turbines.

Philippine standards for Noise in Residential areas are:

Daytime	55 dBA
Morning/Evening	50 dBA
Nighttime	45 dBA

Noise emission measurements from the Proposed Wind Turbine has been performed and is attached hereto.

Analysis of the noise in a distance of 75 m shows that the noise from the turbine contains no clearly audible tones or impulses.

The Proposed Turbine site is located outside residential areas and along the seashore line as such the background noise will generally mask the turbine noise completely.

2.0 Basic Concepts on Noise

2.1 Definition

Noise is defined under PD984 Implementing Rules and Regulations as “the erratic, intermittent, or statistically random oscillation, or any unwanted sound”. On the other hand, “sound means an oscillation in pressure, stress particle displacement, particle velocity , etc., in a medium whose internal forces (e.g. elastic viscous) of the superposition of such propagated oscillation which evokes an auditory sensation.”.

2.2 Perception on Noise and Sound

The distinction between noise and sound is a highly psychological phenomenon. Most people find it pleasant to listen to the sound of waves at the seashore, and quite a number are annoyed with the noise from the neighbor's radio, even though the actual sound level may be lower. As such, instruments are developed to measure sound rather than noise. To maintain objectivity of regulations, "sound levels" (which is scientifically measurable) is used rather than "noise levels" in controlling auditory effects caused by a project. People's perception of noise from wind turbines will be influenced by their attitude to the source of the noise, rather than the actual noise itself.

2.3 Sound Measurements

Sound is a form of wave energy and can be characterized by frequency of oscillations and its strength or intensity. It is through these physical measurable properties that sound level instruments are developed. The frequency is the number of wavelengths pass a point in one second, designated as cycles per second or hertz as in radio frequencies. The intensity is the pressure created by the energy, in watts per square meter. A single sound source can emit a range of sound frequencies with corresponding intensities. For simplification and public use, instruments have been developed to readily convert these two properties to a decibel (dB) unit.

Sound is measured in intensity level, L (decibels, dB). The decibel is a measure of sound pressure level - the magnitude of the pressure variations in the air, which is given by the expression

$$L = 10 \log [I/I_r]$$

Where I is the sound intensity in watts/m^2 and I_r is the reference intensity. The watt is the standard unit of power in electrical or mechanical usage.

Sound level is given with the class of the weighting network (i.e. A, C and F). The dB(A) scale is used for environmental regulations. It measures the sound intensity over a range of audible frequencies, and then uses a weighting scheme which accounts for the fact that the human ear has a different sensitivity to each different sound frequency. The reference intensity is 1×10^{-12} watts/m^2 , the minimum intensity for the human ear can sense at 1,000 hertz. Attachment 1 shows common sound intensities from various sources.

In general, medium or speech range frequencies are heard better than at low or high frequencies. In the dB(A) system, the sound pressure at the most audible frequencies (200-15,000 Hz) are to be multiplied by high numbers while the less audible frequencies (20-200 Hz and 15,000 - 20,000 Hz) are multiplied by low numbers, and everything is then added up to get an index number.

The “C” weighting network (20-20,000 Hz) is also used to determine the presence of low and high frequencies. A small difference between the “C” and “A” levels indicate a large number of higher frequency components within the normal range of human hearing. A large difference suggests the presence of a large number of lower frequency components (20-200 Hz).

A flat (“F”) frequency response (10-20000 Hz) in dB measures sound pressure level. It is a physical measure of sound without auditory sensation weighting. The “F” characteristic measurement is employed in frequency analysis and researches on sound reduction.

2.4 Types of Aerodynamics Sound Emission

Sound is produced when wind hits an object and causes vibrations, such as in buildings, house, cars and other structures. If the object is sharp, a **pure tone** such as from musical wind instruments may be produced. A pure tone can be annoying to a listener. In another case, wind may hit the leaves of trees and shrubs, or water surface creating a random mixture of high frequencies, often called **white (random) noise** which is hardly noticeable.

3.0 Noise Characterization from Wind Turbine

Modern turbines are designed to eliminate audible aerodynamic sound frequencies (20-20,000 hertz) and intensities. Designs include smooth surface and aerodynamically designed blade tips and back edges. Audible sound frequency is also reduced through slower rotating rotor blades. Rotor blades orientation, upstream of the support tower, avoids production of impulsive low frequency noises. Mechanical noises are reduced through improvements on gearboxes, fastenings and couplings, avoidance of vibration of components, and to a certain extent sound insulation. Natural background noises can mask turbine noise.

3.1 Types of Noises from Wind Turbines

There are two kinds of noise produced from the windmill, i.e. the **aerodynamic noise** produced from the blade and the **mechanical noise** produced from the gearbox and hydraulic pumps in the nacelle (generator housing).

Aerodynamic noise is the swishing sound of the rotor blade. It primarily originates at the tip and back edge of the rotor blade. The slight swishing sound may be heard at close distance to a wind turbine at relatively low wind speeds. Wind impacting at rotor blades causes emission of white (or random) noise. The blades, being very smooth, emit a minor part of the noise. Most of the noise (pure tones) originates from the trailing edge of the blades.

As discussed in the following sub-sections, aerodynamic noises have been reduced through use of smooth blade shape, larger blade to reduce rotational speed which in turn reduces sound frequency to lower non-audible frequencies.

Mechanical noise is generated by the speed-increasing gearbox and hydraulic pumps. It has virtually disappeared from modern wind turbines due to engineering advancements such as improvements on gearboxes, fastenings and couplings, avoidance of vibration of components, and to a certain extent sound insulation.

3.2 Rotor Blade Shape

Aerodynamic noise have been reduced through advances on research on noise reduction and engineering. Successes were accomplished in virtually eliminating pure tones, and only low frequency noise is emitted from rotor blades. The smooth surface and aerodynamic design of blade tips and back edges and care in installation have dramatically cut aerodynamic noise.

3.3 Rotor Blade Rotational Speed and Size

Sound pressure will increase with the fifth power of the speed of the blade relative to the surrounding air, other factors being equal. Thus, aerodynamic noise can be reduced by maintaining a slower rotation of blades, attainable using large rotor diameters. Rotor rotation increases slightly with increase wind speed. Also, the increase in noise from wind turbine is slight compared with the increase in sound emission from the wind.

3.4 Rotational Speed and Sound Frequencies

A higher frequency of sound is produced at higher rotational speeds of the rotor. The low rotational speed of large wind turbines produce a peak acoustic energy in the 8-15 Hz or infrasonic range (i.e. sound waves below the audio-frequency range). This avoids danger of hearing damage. Smaller turbines can create peaks at 20-20,000 Hz which is the frequency range of human hearing. In this frequency range, the levels of infrasonic waves radiated by large wind turbines are very low compared with other sources of acoustic energy (e.g. sonic booms, shock waves from explosions, sounds from construction/demolition sites). In general, the low acoustic energy of ultrasound frequencies (above the audio frequency level) is not a concern.

3.5 Impulsive Noise and Rotor Orientation

Except near the source, low frequency noises from wind turbine is not detectable, unless the noise has an impulsive character. It is not clear if low frequency impulse are actually heard or felt or combination of both. The impulsive nature of the emitted low-frequency energy may allow interaction between the incident acoustic impulse and the resonance of the homes which magnify the stimulus by creating vibrations as well as transforming the energy into the audible frequency

range. Thus, the nuisance is often connected with the periodic nature of the emitted sounds rather than the frequency of the acoustic energy.

Impulsive noise is generally produced from turbines with rotors operating downwind of the support towers. Impulses are generated by the interaction of the aerodynamic lift created on the rotor blades and the wave vortices being shed from the tower, especially for edged shaped towers. On the other hand, impulsive noise can be prevented by placing the rotors upstream of the tower support. The low frequency noise generated from an upwind turbine is therefore primarily the result of the interaction of the aerodynamic lift on the blades and the atmospheric turbulence in the wind. Because atmospheric turbulence is a random phenomenon, the radiated low-frequency noise also exhibits a random or non-coherent characteristic thus is less detectable or noticeable even when it interacts with an intervening resonant structure.

3.6 Background Noise and Wind Turbine Noise

Sounds from waves and winds can be heard near the seashore. At winds around 4-7 m/s and beyond, the noise from the wind in leaves of shrubs and trees will gradually mask (drown out) any potential sound from wind turbines. At wind speeds around 8 m/s and beyond, background noise will generally mask turbine noise completely.

The sound of the wind in nearby trees and hedgerows, houses and structures and over local topography increases with wind speed, but at a faster rate than that of the wind turbine. It is likely that turbine noise would then be completely masked by wind-generated background noise. This is possible at high wind speeds, but not at cut-in speed, which can be the most critical. As the sound level meets the 45 dB(A) nighttime standard, the sound intensity level is likely to still be lower inside the houses, even with windows open.

3.7 Emission and Ambient Noise Tests

A test conducted on Vestas V47-660kW wind turbine (Attachment 2) provides an idea on the noise emission and ambient level in wind energy projects. source sound levels ranged from space dBA at wind speeds of 5-8 m/sec. At wind speed of 8 m/s, pure tones or impulses from the turbine are not audible at a distance of 75 meters.

A narrow band frequency analysis (Hz) was carried out for the wind turbine during periods with wind velocity of approximately 8 m/s, to determine whether the noise contains clear audible tones. The test showed no dominant tone components in the Hz range. Calculations were done in the frequency range Hz to analyze a small peak at Hz. The findings show no clear audible tone emanating from the wind turbine.

Intensity level of some common sounds

Source	Sound level (dBA)	Description
(Hearing threshold)	0	
Normal breathing	10	Barely audible
Rustling of leaves	20	
Soft whisper (at 5 meters)	30	Very quiet
Inside a peaceful house	35	
Library	40	
Quiet living room	44	
Quiet office	50	Quiet
Aircon (at 2 m) **	55	
Aircon (at 1 m) **	56	
Normal conversation (at 1 m) **	60-65	Moderate
Normal (light) traffic/laughter (2 persons at 1 m) **	70	
Busy traffic, noisy office with machines; average factory	80	Noisy
Heavy truck (at 15 m)	90	Constant exposure Endangers hearing
Old subway train	100	
Construction noise (at 3 m)	110	
Rock concert with amplifiers (at 2 m); jet takeoff (at 60 m)	120	Pain threshold
Pneumatic riveter; machine gun	130	

Source: Tipler, P.A. (1982). Physics: Volume I. Worth Publishers, Inc. 582 pp.

**measured by proponent.

Vestas	Vestas 660 kW Variable Slip Wind Turbine, V47-660 kW and V47-660/200 kW		
Date: 30. Jan 1998	Class: 1	Item no.: 943111.R1	Page: 22 of 25

11.3 Enclosure 2, noise measurement

11.4 Noise resume of VESTAS V47-660 kW Wind Turbine

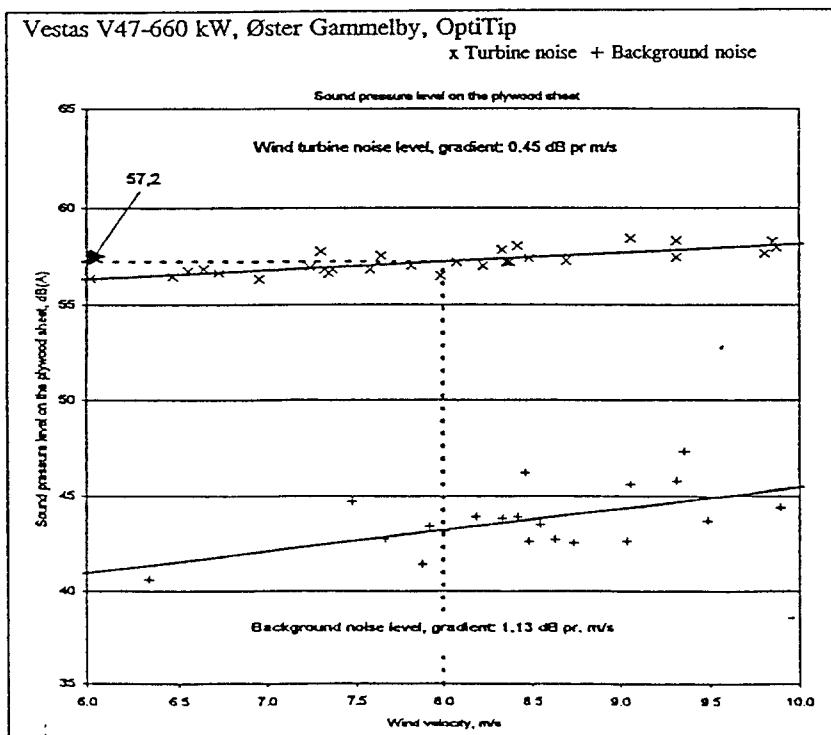
- The measurement has been done by:

Acoustica as
Fælledvej 3
8800 Viborg

under the accreditation, registration no. 134, from DANAk.

- This resume has been worked out on September 3, 1996 by Vestas Wind Systems A/S.
- The noise measurements have been reported in Acoustica report no. P4.010.97 dated August 6, 1997. The noise measurements has been carried out July 28, 1997.
- The measurements were carried out to determine the noise emission from a VESTAS V47-660 kW.
- The noise emission has been determined according to statutorial order no. 304 of may, 14, 1991, and relevant parts of Guideline no. 6/1984, "Noise from Industrial Plants", from the Danish Ministry of the Environment.

- Results of Measurements:
- a.



Vestas	Vestas 660 kW Variable Slip Wind Turbine, V47-660 kW and V47-660/200 kW		
Date: 30. Jan 1998	Class: I	Item no.: 943111.R1	Page: 23 of 25

The apparent A-weighted sound power level can be calculated from the equivalent continuous A-weighted sound pressure level, using the following expression:

$$L_{WA} = L_{Aeq} + 10 \cdot \log(4 \cdot \pi \cdot (d^2 + h^2)) - 6 \text{ dB}$$

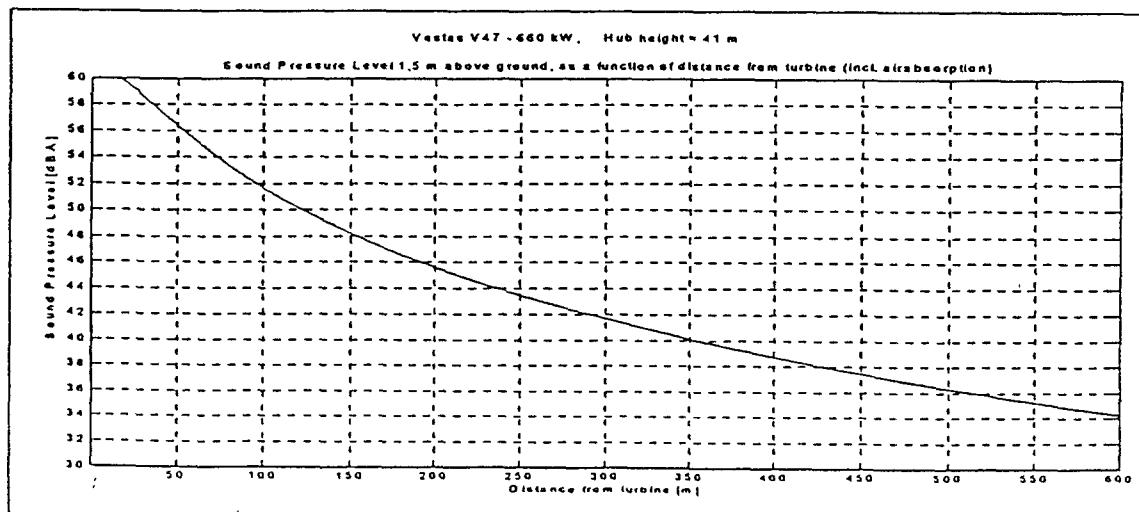
Where, d = distance from the base of the wind turbine to the measurement position ($d = 75\text{m}$).
 h = hub height ($h = 40,5\text{m} + 0,5\text{m}$).

- 6b. The measurement show the following results at a wind speed of 8 m/s. The measurements is given respectively, as the A-weighted sound pressure level $L_{Aeq,ref}$ and the A-weighted sound power level $L_{WA,ref}$.

Frequency	$L_{Aeq,ref}$ [dB(A)]	$L_{WA,ref}$ [dB(A)]
1/1 octave 63 Hz	34,6	78,2
1/1 octave 125 Hz	42,5	86,1
1/1 octave 250 Hz	46,2	89,8
1/1 octave 500 Hz	51,6	95,2
1/1 octave 1 kHz	53,4	97,0
1/1 octave 2 kHz	49,2	92,9
1/1 octave 4 kHz	44,2	87,9
1/1 octave 8 kHz	25,6	69,2
A-weighted, total	57,2	100,8

According to statoturial order no. 304 of May 14, 1991, from the Danish Ministry of the Environment, the degree of accuracy on the results is ± 2 dB.

- 6c. An analysis of the noise in a distance of 75 meter show, that the noise from the turbine contains no clearly audible tones or impulses. The analysis has been performed according to guideline no. 6/1984, "Noise from Industrial Plants", from the Danish Ministry of the Environment.
- 6d.



X

Anne Iz

Endorsement of
Barangay Councils

Republic of the Philippines
Municipality of Bangui
Ilocos Norte
BARANGAY BARUYEN

EXCERPTS FROM THE MINUTES OF THE REGULAR SESSION OF THE SANGGUNIANG
BARANGAY OF BARANGAY BARUYEN, BANGUI, ILOCOS NORTE HELD ON
NOV. 13, 2001 AT (4) FOUR O'CLOCK AT ITS SESSION HALL.

PRESENTS:

ALEXANDER C. CALAPINI
FERNANDO LABRADOR
SAMUEL VELASCO
AMELITO JAMON
MEDEL SAMBRANO
ALLAN LABRADOR
ROBERT GUZON
ROQUE FERRERIA
WILLIE VELASCO
JALIBERT MALAPIT
REY BALOALOA

Barangay Chairman
Baragay Kagawad
- do -
SK Chairman
Brgy. Secretary
Brgy. Treasurer

Resolution No. 02-2000

A RESOLUTION ENDORSING THE ESTABLISHMENT OF A COMMERCIAL
WINDMILL POWER PLANT IN BARANGAY BARUYEN, BANGUI, ILOCOS NORTE

WHEREAS, Barangay Baruyen, Bangui, Ilocos Norte have a constant source of renewable energy in the form of wind power and also have available foreshore areas suitable for the establishment of a commercial windmill power plant;

WHEREAS, the Northwind Power Development Corporation, a private corporation has secured a foreshore lease from the Government of the Republic of the Philippines through the Department of Environment and Natural Resources over the foreshores located in the aforesaid barangay;

WHEREAS, the Northwind Power Development Corporation has proposed to develop the said leased government land into a large-scale commercial windmill power plant using wind power as a renewable source of energy;

WHEREAS, the proposed establishment of a large-scale commercial windmill power plant will provide new jobs and offer employment opportunities to the nearby residents and constituents of Barangay Baruyen;

WHEREAS, the operation and establishment of the Northwind Power Development Corporation will redound to the economic benefit of the local government of Barangay Baruyen by way of collection of fees, licenses, business permits and other local taxes;

WHEREAS, the long-term benefits of the establishment of a large-scale commercial windmill power plant will lead to the development and modernization of Barangay Baruyen, within the municipality of Bangui and ultimately redound to the benefit of the whole province of Ilocos Norte as well.

WHEREFORE, it has been moved and duly seconded, be it;

RESOLVED, as it is hereby resolved to endorse and fully support the establishment of a commercial windmill power plant in Barangay Baruyen, Bangui, Ilocos Norte;

RESOLVED FINALLY, to furnish copies of this resolution to the offices concerned for information and recommending approval.

VOTING PROFILE:
UNANIMOUSLY CARRIED

I HEREBY CERTIFY to the correctness of the foregoing resolution.

APPROVED:

ALEXANDER C. CALAPINI
Barangay Chairman

JALIBERT MALAPIT, *[Signature]* COPIES OF THIS RESOLUTION IS
Barangay Secretary *[Signature]* HEREBY TRANSMITTED TO TTY.
TERONALIO A. DULALAO, CHAIRMAN
OF THE BOARD OF DIRECTORS,
NORTHWIND POWER DEV. CORP.

Republic of the Philippines
Municipality of Bangui
Ilocos Norte
BARANGAY TAGUIPORO

EXCERPTS FROM THE MINUTES OF THE REGULAR SESSION OF THE SANGGUNIANG
BARANGAY OF BARANGAY TAGUIPORO, BANGUI, ILOCOS NORTE HELD ON
November 13, 2001 AT (10) 10AM O'CLOCK AT ITS SESSION HALL.

PRESENTS:

EDGAR GUMALLAOI	Barangay Chairman
NELSON BULUSAN	Baragay Kagawad
INOCENCIO ACOPA	- do -
SARIKEDKED ABALOS	- do -
ROMULO MOLINA	- do -
EDGAR MARTINEZ	- do -
ALEX GACES	- do -
JEMEI ACACIO	- do -
JONEL GACES	SK Chairman
NELY GACES	Brgy. Secretary
JOSUE GUMALLAOI	Brgy. Treasurer

Resolution No. 09-2000

A RESOLUTION ENDORSING THE ESTABLISHMENT OF A COMMERCIAL
WINDMILL POWER PLANT IN BARANGAY TAGUIPORO, BANGUI, ILOCOS NORTE

WHEREAS, Barangay Taguiporo, Bangui, Ilocos Norte have a constant source of renewable energy in the form of wind power and also have available foreshore areas suitable for the establishment of a commercial windmill power plant;

WHEREAS, the Northwind Power Development Corporation, a private corporation has secured a foreshore lease from the Government of the Republic of the Philippines through the Department of Environment and Natural Resources over the foreshores located in the aforesaid barangay;

WHEREAS, the Northwind Power Development Corporation has proposed to develop the said leased government land into a large-scale commercial windmill power plant using wind power as a renewable source of energy;

WHEREAS, the proposed establishment of a large-scale commercial windmill power plant will provide new jobs and offer employment opportunities to the nearby residents and constituents of Barangay Taguiporo;

WHEREAS, the operation and establishment of the Northwind Power Development Corporation will redound to the economic benefit of the local government of Barangay Taguiporo by way of collection of fees, licenses, business permits and other local taxes;

WHEREAS, the long-term benefits of the establishment of a large-scale commercial windmill power plant will lead to the development and modernization of Barangay Taguiporo, within the municipality of Bangui and ultimately redound to the benefit of the whole province of Ilocos Norte as well.

WHEREFORE, it has been moved and duly seconded, be it;

RESOLVED, as it is hereby resolved to endorse and fully support the establishment of a commercial windmill power plant in Barangay Taguiporo, Bangui, Ilocos Norte;

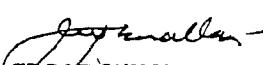
RESOLVED FINALLY, to furnish copies of this resolution to the offices concerned for information and recommending approval.

VOTING PROFILE:
UNANIMOUSLY CARRIED

I HEREBY CERTIFY to the correctness of the foregoing resolution. COPIES OF THIS RESOLUTION IS HEREBY TRANSMITTED TO MTT, FERNANDO T. DUMALAD, CHAIRMAN OF THE BOARD OF EDUCATION, AND NORTHWEST POWER DEV., CORP.

NELY GACES
Barangay Secretary

APPROVED:


EDGAR GUMALLAOI
Barangay Chairman

Republic of the Philippines
Municipality of Bangui
Ilocos Norte
BARANGAY MANAYON

EXCERPTS FROM THE MINUTES OF THE REGULAR SESSION OF THE SANGGUNIANG
BARANGAY OF BARANGAY MANAYON, BANGUI, ILOCOS NORTE HELD ON
NOVEMBER 13, 2000 AT (9) HALF O'CLOCK AT ITS SESSION HALL.

PRESENTS:

ROGELIO A. PEDRONAN
JERRY RAGUDO
JOSEPH GUIRA
EDWIN RAMOS
MAXIMO ANCHETA
ISMAELA VALIENTE
MENANDRO ALUPAY
CECILIO OMMAYON
CYNTHIA HIDALGO
ARTEMIO APOSTOL
FROLAN ALETA

Barangay Chairman
Baragay Kagawad
- do -
SK Chairman
Brgy. Secretary
Brgy. Treasurer

Resolution No. 10.00

A RESOLUTION ENDORSING THE ESTABLISHMENT OF A COMMERCIAL
WINDMILL POWER PLANT IN BARANGAY MANAYON, BANGUI, ILOCOS NORTE

WHEREAS, Barangay Manayon, Bangui, Ilocos Norte have a constant source of renewable energy in the form of wind power and also have available foreshore areas suitable for the establishment of a commercial windmill power plant;

WHEREAS, the Northwind Power Development Corporation, a private corporation has secured a foreshore lease from the Government of the Republic of the Philippines through the Department of Environment and Natural Resources over the foreshores located in the aforesaid barangay;

WHEREAS, the Northwind Power Development Corporation has proposed to develop the said leased government land into a large-scale commercial windmill power plant using wind power as a renewable source of energy;

WHEREAS, the proposed establishment of a large-scale commercial windmill power plant will provide new jobs and offer employment opportunities to the nearby residents and constituents of Barangay Manayon;

WHEREAS, the operation and establishment of the Northwind Power Development Corporation will redound to the economic benefit of the local government of Barangay Manayon by way of collection of fees, licenses, business permits and other local taxes;

WHEREAS, the long-term benefits of the establishment of a large-scale commercial windmill power plant will lead to the development and modernization of Barangay Manayon, within the municipality of Bangui and ultimately redound to the benefit of the whole province of Ilocos Norte as well.

WHEREFORE, it has been moved and duly seconded, be it;

RESOLVED, as it is hereby resolved to endorse and fully support the establishment of a commercial windmill power plant in Barangay Manayon, Bangui, Ilocos Norte;

RESOLVED FINALLY, to furnish copies of this resolution to the offices concerned for information and recommending approval.

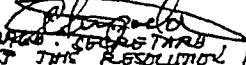
VOTING PROFILE:
UNANIMOUSLY CARRIED

I HEREBY CERTIFY to the correctness of the foregoing resolution. DIRECTOR, NORTHWIND POWER PRV. CORP.


ARTEMIO APOSTOL
Barangay Secretary

APPROVED:


ROGELIO A. PEDRONAN
Barangay Chairman


COMMITTEE OF THE RESOLUTION &
HEREBY TRANSMITTED TO THE FEDERAL
A. DUALTO, CHAIRMAN OF THE BOARD OF
DIRECTORS, NORTHWIND POWER PRV. CORP.

Republic of the Philippines
Municipality of Bangui
Ilocos Norte
BARANGAY ABACA

EXCERPTS FROM THE MINUTES OF THE REGULAR SESSION OF THE SANGGUNIANG
BARANGAY OF BARANGAY ABACA, BANGUI, ILOCOS NORTE HELD ON
November 13, 2001 AT (10) 10 O'CLOCK AT ITS SESSION HALL.

PRESENTS:

ELMER R. ACובה
RODOLFO TRINIDAD
RUBEN LAURETA
ERNESTO RIOGA
ABRAHAM ACובה
ROY VISITASION
RODOLFO ACובה
JULIO ALABA
MELCHOR TRINIDAD
TERESITA AGUSTIN
ROSALINDA VILLANUEVA

Barangay Chairman
Baragay Kagawad
- do -
SK Chairman
Brgy. Secretary
Brgy. Treasurer

Resolution No. B-2001

A RESOLUTION ENDORSING THE ESTABLISHMENT OF A COMMERCIAL
WINDMILL POWER PLANT IN BARANGAY ABACA, BANGUI, ILOCOS NORTE

WHEREAS, Barangay Abaca, Bangui, Ilocos Norte have a constant source of renewable energy in the form of wind power and also have available foreshore areas suitable for the establishment of a commercial windmill power plant;

WHEREAS, the Northwind Power Development Corporation, a private corporation has secured a foreshore lease from the Government of the Republic of the Philippines through the Department of Environment and Natural Resources over the foreshores located in the aforesaid barangay;

WHEREAS, the Northwind Power Development Corporation has proposed to develop the said leased government land into a large-scale commercial windmill power plant using wind power as a renewable source of energy;

WHEREAS, the proposed establishment of a large-scale commercial windmill power plant will provide new jobs and offer employment opportunities to the nearby residents and constituents of Barangay Abaca;

WHEREAS, the operation and establishment of the Northwind Power Development Corporation will redound to the economic benefit of the local government of Barangay Abaca by way of collection of fees, licenses, business permits and other local taxes;

WHEREAS, the long-term benefits of the establishment of a large-scale commercial windmill power plant will lead to the development and modernization of Barangay Abaca, within the municipality of Bangui and ultimately redound to the benefit of the whole province of Ilocos Norte as well.

WHEREFORE, it has been moved and duly seconded, be it;

RESOLVED, as it is hereby resolved to endorse and fully support the establishment of a commercial windmill power plant in Barangay Abaca, Bangui, Ilocos Norte;

RESOLVED FINALLY, to furnish copies of this resolution to the offices concerned for information and recommending approval.

VOTING PROFILE:
UNANIMOUSLY CARRIED

I HEREBY CERTIFY to the correctness of the foregoing resolution.

APPROVED:

ELMER R. ACובה
Barangay Chairman

11/16/01
TERESITA AGUSTIN ATTY. FERDINANDO A. DUMALTO,
Barangay Secretary CHAIRMAN OF THE BOARD
OF DIRECTORS, NORTH ILOCOS
POWER DEVT. CORP.
Affixation - copy of the resolution
is hereby transmitted to
the Board of Directors, North Ilocos
Power Devt. Corp.

Republic of the Philippines
Municipality of Bangui
Ilocos Norte
BARANGAY MASIKIL

EXCERPTS FROM THE MINUTES OF THE REGULAR SESSION OF THE SANGGUNIANG
BARANGAY OF BARANGAY MASIKIL, BANGUI, ILOCOS NORTE HELD ON
Nov. 13, 2017 AT (2) PM O'CLOCK AT ITS SESSION HALL.

PRESENTS:

WILLIAM R. TOMAS
ELMER TOMAS
ROSARIO VALIENTE
LUCRECIA MAGANA
EDGARDO MALLARI
EMILIO ACOB
EDWARD MARTINEZ
ANGEL MABINI
FROILAN MAGANA
ARTEMIO TORRADO
EDROLFO ACOB

Barangay Chairman
Baragay Kagawad
- do -
SK Chairman
Brgy. Secretary
Brgy. Treasurer

Resolution No. 14 2006

A RESOLUTION ENDORSING THE ESTABLISHMENT OF A COMMERCIAL
WINDMILL POWER PLANT IN BARANGAY MASIKIL, BANGUI, ILOCOS NORTE

WHEREAS, Barangay Masikil, Bangui, Ilocos Norte have a constant source of renewable energy in the form of wind power and also have available foreshore areas suitable for the establishment of a commercial windmill power plant;

WHEREAS, the Northwind Power Development Corporation, a private corporation has secured a foreshore lease from the Government of the Republic of the Philippines through the Department of Environment and Natural Resources over the foreshores located in the aforesaid barangay;

WHEREAS, the Northwind Power Development Corporation has proposed to develop the said leased government land into a large-scale commercial windmill power plant using wind power as a renewable source of energy;

WHEREAS, the proposed establishment of a large-scale commercial windmill power plant will provide new jobs and offer employment opportunities to the nearby residents and constituents of Barangay Masikil;

WHEREAS, the operation and establishment of the Northwind Power Development Corporation will redound to the economic benefit of the local government of Barangay Masikil by way of collection of fees, licenses, business permits and other local taxes;

WHEREAS, the long-term benefits of the establishment of a large-scale commercial windmill power plant will lead to the development and modernization of Barangay Masikil, within the municipality of Bangui and ultimately redound to the benefit of the whole province of Ilocos Norte as well.

WHEREFORE, it has been moved and duly seconded, be it;

RESOLVED, as it is hereby resolved to endorse and fully support the establishment of a commercial windmill power plant in Barangay Masikil, Bangui, Ilocos Norte;

RESOLVED FINALLY, to furnish copies of this resolution to the offices concerned for information and recommending approval.

VOTING PROFILE:
UNANIMOUSLY CARRIED

I HEREBY CERTIFY to the correctness of the foregoing resolution. *Artemio Torrado Jr.*
- COPIES OF THIS RESOLUTION
HEREBY TRANSMITTED TO MR. CUMILO, CHAIR-
MAN OF THE BOARD OF DIRECTORS,
NORTHWIND POWER DEV. CORP.

Artemio Torrado
ARTEMIO TORRADO
Barangay Secretary

APPROVED:

W. R. Tomas
WILLIAM R. TOMAS
Barangay Chairman

Attachment

**Foreshore Lease Application
and
Certification**

NORTHWIND POWER DEVELOPMENT CORPORATION

*Room 310, Jolibee Plaza, Emerald Avenue,
Ortigas Center, Pasig City, Philippines*

August 25, 2000

MR. JOSEFINO L. DAQUIOAG
CENR Officer
Bangui, Ilocos Norte

Thru: Engr. Alberto B. Baguio
OIC, EMPAS/Special Investigator

Subject: Application for Foreshore Lease

Dear Mr. Daquioag:

Northwind Power Development Corporation (NPDC) is a domestic corporation with foreign alliance engaged in the development of wind power generation. Earlier studies together with the on-going data gathering by the company indicate favorable conditions and viability for the establishment of a commercial wind power project in Bangui, Ilocos Norte, particularly in the foreshorelines of Barangays Baruyen, Taguiporo, Manayon, Masikil and Abaca.

Initial consultations with barangay and municipal officials of Bangui, Ilocos Norte regarding the proposed project have indicated their support thereon, taking into consideration the following benefits and advantages:

- a.) The project produces cleaner and cheaper electricity. Other kinds of power plants are dependent on oil or bunker fuel which is imported and subjected to price fluctuations.
- b.) It will encourage infrastructure development, not only in Bangui but the whole province of Ilocos Norte.
- c.) It will generate employment.
- d.) Wind farms are tourist attraction as well, thus, it will enhance many other livelihood projects to support the tourism aspect of the project.

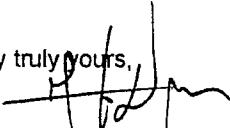
The foreshore being applied for lease is not utilized for any business or livelihood activity except for stones/pebble-picking by three to five individuals in the whole span of the identified area, hence, the project will develop idle, unutilized and unproductive lands generating additional revenue for the government.

It has been observed further that, there is very limited fishing activity in the area applied for, as conformed by the barangay officials, since the area is very windy throughout the year and making it not to conducive to fishing.

In view of the foregoing considerations, may I respectfully formalize our application for foreshore lease, as I have earlier indicated our firm reservation for the same, covering the area of 808,630 sq. m. located in the foreshorelines of Barangays Baruyen, Taguiporo, Manayon, Masikil and Abaca, all in the Municipality of Bangui, Ilocos Norte. Enclosed as Annex "A" for your reference, are copies of Sketch/Survey Plan of the Foreshore Land indicating its Technical Description.

Thank you and I look forward to your usual prompt action on this request.

Very truly yours,


ATTY. FERDINAND A. DUMLAAO

*Chairman of the Board of Director
Tel. No. (02) 634-8836
Mobile/Cellphone: (0917) 537-6671*

Copy furnished:

- The Regional Executive Director
DENR Region I, San Fernando City
- The Honorable Mayor
Municipality of Bangui, Ilocos Norte



Republic of the Philippines
Department of Environment and Natural Resources
COMMUNITY ENVIRONMENT AND NATURAL RESOURCES OFFICE
Manayon, Bangui, Ilocos Norte 2920



October 18, 2000

C E R T I F I C A T I O N

THIS IS TO CERTIFY that Northwind Power Development Corporation has a pending Foreshore Lease Application for an area of 808,630 square meters more or less, located at Barangays Baruyen, Taguiporo, Manayon, Masikil and Abaca all of Bangui, Ilocos Norte.

That the afore-mentioned land sought to be leased is not within any previously issued lease, patent, decree of title; that it is free from any adverse claim or conflict; and that there is no subsisting lease application filed by any other person or entity.

This certification is issued upon request of Atty. Ferdinand A. Dumla, Chairman of the Board of Directors of Northwind Power Development Corporation for whatever legal purpose it may serve.


JOSEFINO L. DAQUIOAG
CENR Officer

File: 'c:\certification\lms-cert.doc'
Enclosure

"Let us be Partners in the Protection of Our Environment"

Attachment 1

NorthWind Power Project

Site Photo Copies

**NORTHWIND POWER
DEVELOPMENT CORPORATION**

N 18° 35'
E 120° 40'

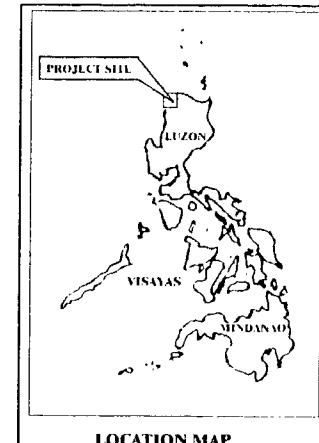
N 18° 35'
E 120° 45'

West Tower Center Tower East Tower
Highway
Bangui View Deck

N 18° 30'
E 120° 40'

N 18° 30' N
E 120° 45'

0 5,000 10,000



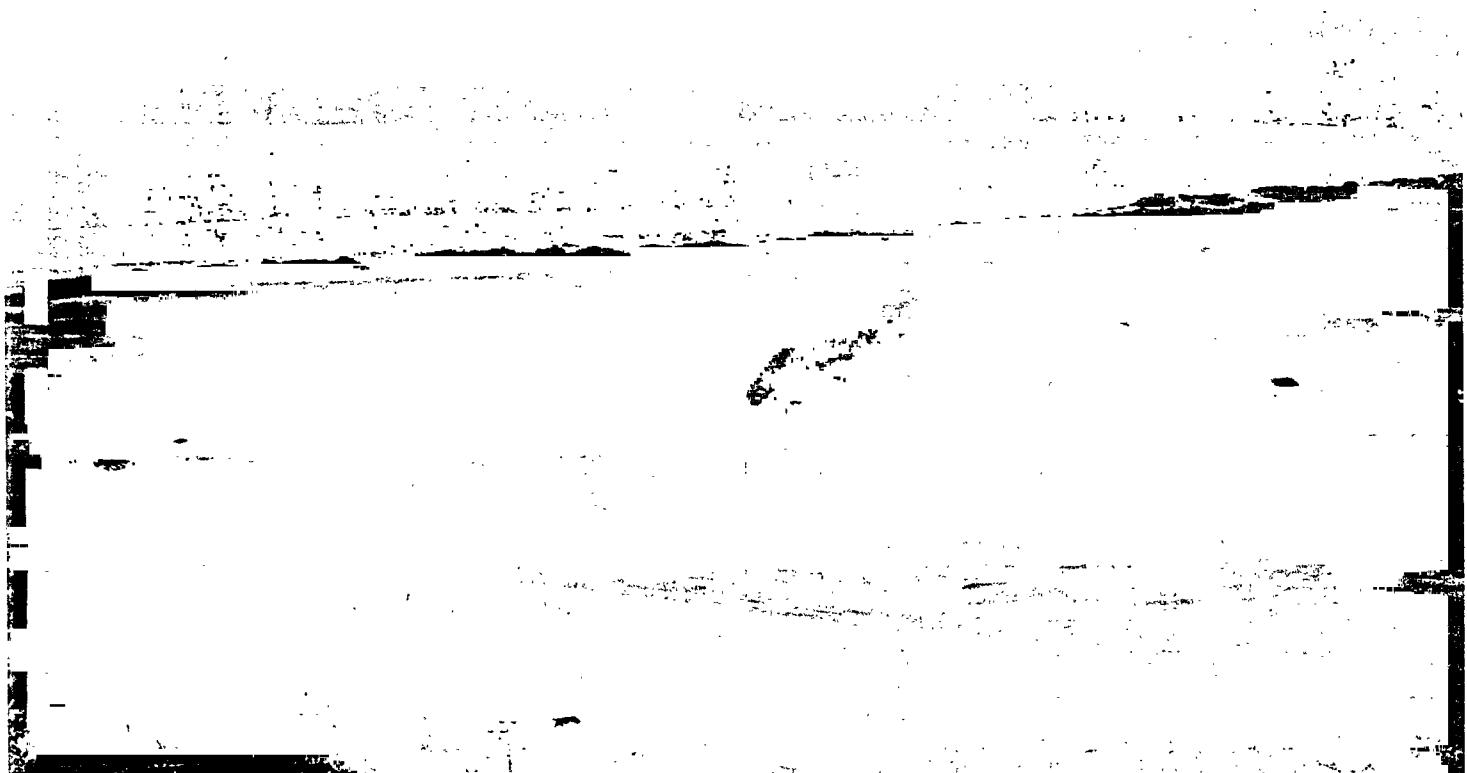
		NORTHWIND POWER DEVELOPMENT CORPORATION	
Unit 318 Jollibee Plaza Building, Brgy. Malinao, San Jose, Batangas City, Philippines Tel No. (+63 43) 852-2000 Ext. 41 Fax No. (+63 43) 852-2000 E-mail Address : nwdc@msn.com			
Ref. Dwg. No.:	Project :	Station :	
PHILMAP 7180	WIND TURBINES	BANGUI	
CAD File :	Proj. No. 0001	Date	Sheet Contents :
	Drawn By:	10/18/00	VICINITY PLAN
	B.E.L.		
	Checked By:	10/18/00	
	F.P.S.		
	Approved by:	10/18/00	Drawing No. SD-CW-0001 Sheet 1
	N.J.		Scale N.T.S.
Rev. No.	Date Name		

Castle : C:/NORTHWIND-DWG/NPDC/VICINITY-PLAN

**20 MW NorthWind Power Project
from Bangui View Deck**



20 MW NorthWind Power Project
From Bangui View Deck (105 mm Zoom)



**20 MW NorthWind Power Project
Vest Tower looking towards West**



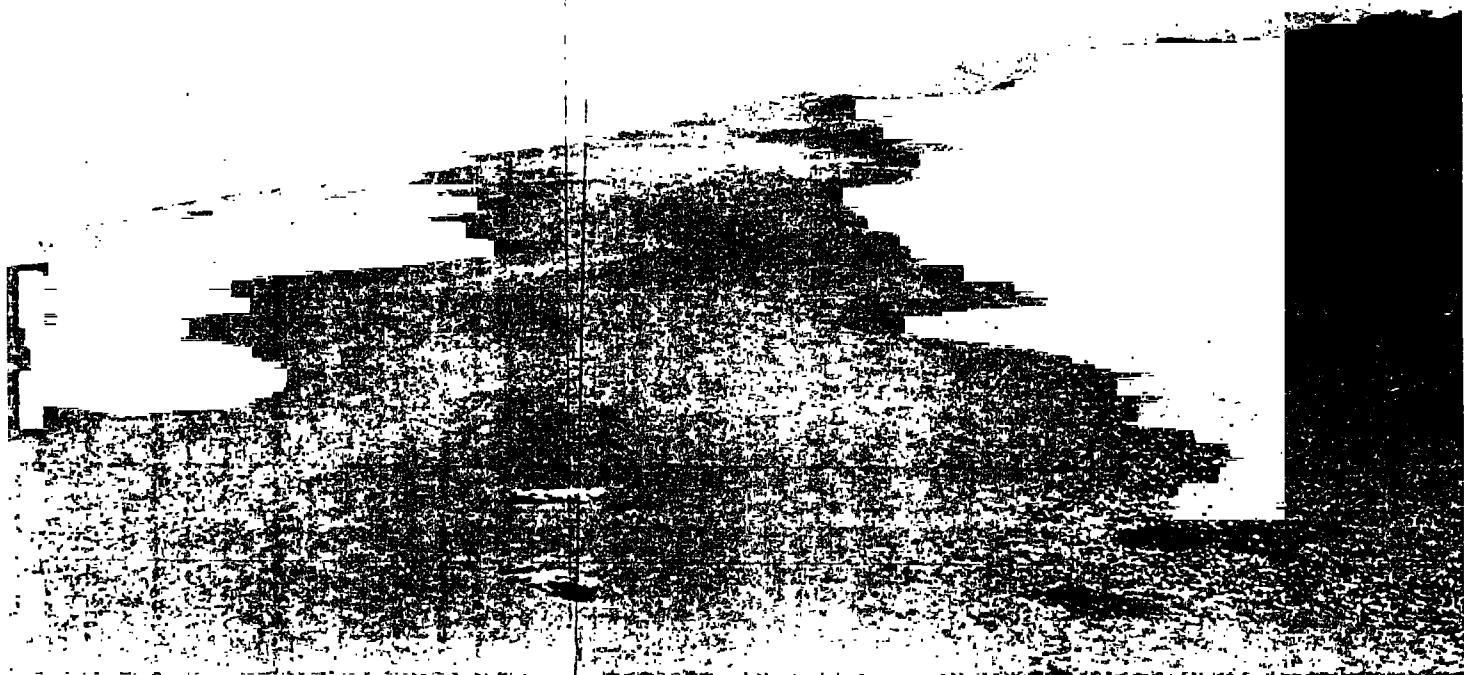
20 MW NorthWind Power Project
From Pagudpud Beach looking towards the site (105 mm Zoom)



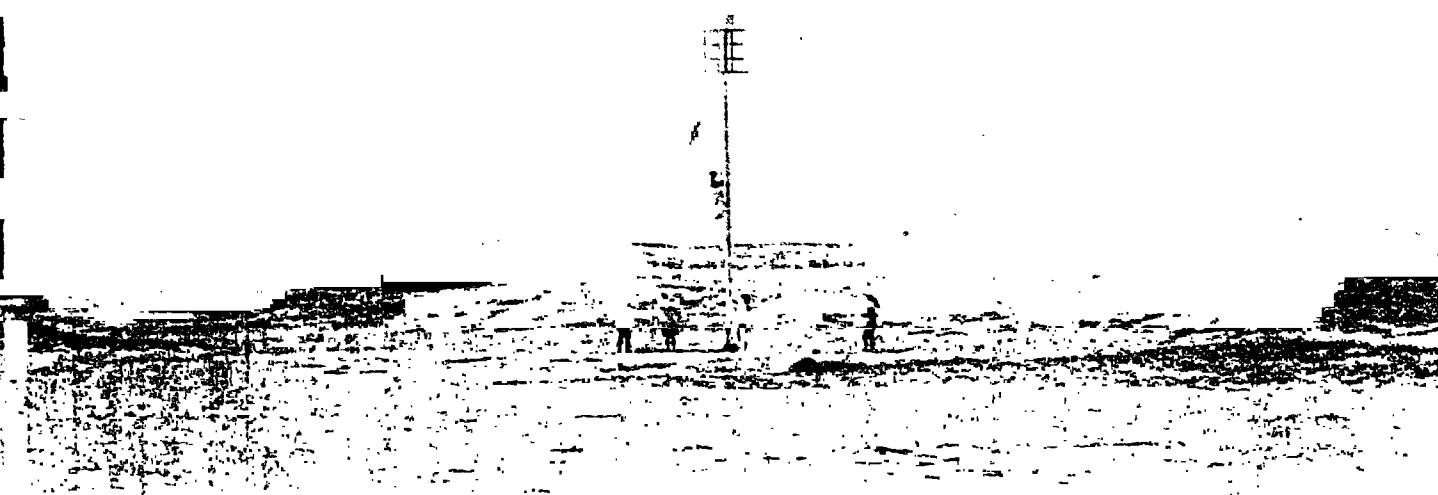
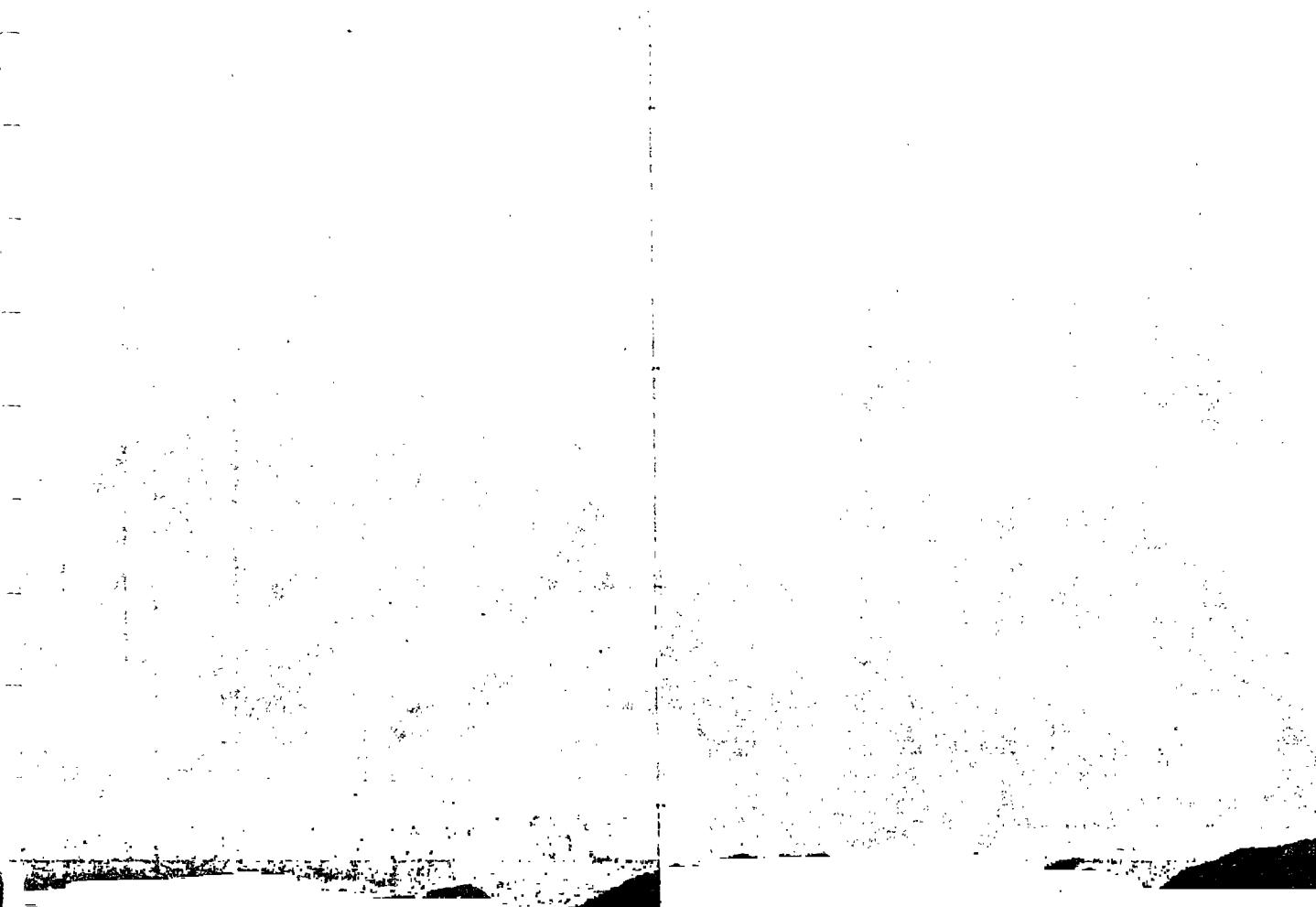
20 MW NorthWind Power Project
From Center Tower looking towards West



20 MW NorthWind Power Project
From West Tower looking towards East



20 MW NorthWind Power Project
Center Tower



✓

Attachment 3

**NorthWind Power Project
Bird Impact study on
10 MW Wind Farm of La Peña
(TARIFA)**

BIRD IMPACT STUDY ON THE 10 MW WIND FARM OF LA PEÑA (TARIFA)

N. Cererols, A. Martínez
Ecotècnia, S.C.C.L.
Amistat 23, 1st
08005 Barcelona

M. Ferrer
Estación Biológica de Doñana
Avda. María Luisa s/n Pabellón del Perú
41013 Sevilla

ABSTRACT: This paper shows the conclusions of a 16 month study of the possible impacts on the local and migrating population of birds of a wind farm located in the passageway of migrating birds between Africa and Europe. On the whole, the wind farm did not prove to represent an important impact on the birds present in its surroundings and, on the contrary, created a new habitat for some species of birds not present in adjacent areas.

Keywords: Birds, environmental aspects.

1. AIM OF THE PROJECT.

The increasing use of wind power has led to various studies about the possible impacts of wind-farms on bird populations. Although some studies have recorded bird collisions with rotor blades and other studies the loss of breeding grounds, up to now no clear indications to reject the further development of wind power in order to protect bird populations have been made known. Despite this, Ecotècnia, a wind developer in a wind-farm in Tarifa, Spain, decided to study the possible impacts of its farm on both the local bird population and migrating birds. In summer 94 a 16 month study with this aim was started. The "Estación Biológica de Doñana" (CSIC) designed the study methods and was responsible for the data interpretation.

2. METHODS.

The wind farm consists of 66 wind turbines (10 MW), about 40 m high, set 50-80 m apart from each other in one single row, on a N-S oriented mountain ridge. In this part of Spain high density of migrating and wintering birds can be observed. Tarifa is a passageway of migrating birds from Europe crossing the Strait of Gibraltar towards their African winter quarters.

Several variables concerning bird behaviour were compared between the wind-farm and two comparable adjacent mountain areas, one with an E-W orientation and the other with the same orientation of the wind-farm mountain ridge. The variables concerned were:

- (1) species, number and productivity of nesting birds,
- (2) number of roosting birds in winter time,
- (3) passages and flight altitude of local and migrating birds,
- (4) flight behaviour in the wind-farm and
- (5) collision accidents of birds with rotor blades.

2.1 Nesting birds.

The nesting birds were studied along lineal transects with a fixed length in each area (total 6.9 km). Most nesting birds belonged to Passeriforms. On the average more observations of nesting birds were performed in the wind-farm (see Table I).

Table I: Nesting birds frequency.

Area	Observation time (h)	Recorded frequency	Expected frequency
Wind Farm	335	2.673	2.306
Comparable area nr. 1	139	932	957
Comparable area nr. 2	102	360	702

This was due to the high density of species breeding in small crests or rocks, a site absent in the other two areas. Most nests located in the wind-farm belonged to Red-legged Partridge (*Alectoris rufa*), a species absent in the other two areas. Abundant species in the three study areas were Black-eared Wheatear (*Oenanthe hispanica*), Dartford Warbler (*Sylvia undata*) and Stonechat (*Saxicola torquata*). The nest of a remarkable species was located in the wind farm: An Eagle Owl (*Bubo bubo*). The mean productivity, number of fledglings per nest, was equal for the three studied areas.

2.2 Roosting birds.

Observations of roosting birds were carried out in winter, monitoring the same lineal transects that were sampled for nesting birds. Most roosting birds were Passeriforms. In the wind-farm less birds than in one of the other areas were seen. The difference observed in this area is probably related to the distinct mountain orientation and not to the existing wind farm, because on the second comparable area, with the same orientation, the frequency is also less than expected (see Table II).

Table II: Roosting birds frequency

Area	Observation time	Recorded frequency	Expected frequency
Wind Farm	273	792	840
Comparable area nr. 1	31	144	95
Comparable area nr. 2	23	70	71

2.3 Migrating birds.

Nearly one thousand hours were spent watching migrating birds from several fixed observation points in the three areas. A total of 72.000 birds were recorded, most of them passing above the wind-farm, but at a higher altitude than over the other two areas (see Table III).

Table III: Migrating birds frequency

Area	Observation time	Recorded frequency	Expected frequency
Wind Farm	408	56.423	30.572
Comparable area nr. 1	285	9.397	21.355
Comparable area nr. 2	269	6.263	20.156

Average flight altitude at the wind-farm was more than 100 m, while in the other two areas birds flew at about 60 m above the mountain ridge. Flight altitude was positively related to temperature, but negatively to wind speed. Wind direction also showed its influence; with the prevailing eastern wind the number of birds crossing over the wind-farm increased. More than 100 hours were spent recording nocturnal flights, but no significant number of birds was recorded crossing the wind-farm at night.

2.4 Local and wintering birds.

Flight movements of local or wintering birds, mostly Griffon Vultures (*Gyps fulvus*), had a slightly different character than those of the migrating birds. Although, as in the former comparison, a higher frequency of birds flying above the wind-farm was observed and a relationship between temperature and flight altitude was established, no difference in flight altitude was observed among the three areas and no relationship with wind speed was found.

The apparent relationship with atmospheric conditions and flight altitude is an important instrument to prevent collision incidence. Under certain meteorological conditions stopping the operation of wind turbines would be advisable. At the Ecotècnia wind-farm, wind turbines are locked when winds reach high speeds.

Flight behaviour in the proximity of wind turbines was registered by direct observation and by video cameras. All changes in flight, direction, altitude and wing movements, were recorded. Aspect and number of changes observed could not be related to wind speed or direction, but changes in altitude were positively related to temperature. Birds made changes in flight direction more often when crossing the wind-farm than when crossing the other areas without wind turbines. Although this higher number of direction changes could probably be entirely ascribed to the wind-farm, the number of operating turbines did not influence the frequency of changes in flight.

2.5 Collision accidents of birds.

Weekly visits were made to all the wind turbines to check any collision incidents. The visit frequency was actually higher when other activities near the turbines, not directly related to bird collision registration, were conducted. Two birds, a Griffon Vulture and Short-toed Eagle (*Circaetus gallicus*), collided with a turbine in the course of the 16 months of study at the wind farm. Annual passage of vultures over the farm is estimated to be about 45.000, and annual passage of eagles about 2.500.

3. CONCLUSIONS.

Therefore collision rate at the wind-farm was considered to be low. The figure of Griffon Vulture collision rate with power lines is higher than the observed rate at the wind-farm and even so it is considered to be low.

On the whole, the wind-farm did not prove to represent an important impact on the birds present in its surroundings. On the contrary, the wind-farm created a new habitat for some species of birds not present in adjacent areas. Although a reaction to the wind-farm could be observed in bird flight behaviour, differences in flight frequency were such that there were no indications of the wind-farm obstructing the passage of birds at all. Bird mortality was recorded but could be considered insignificant when weighted against other bird mortality causes.

✓

Attachment

**NorthWind Power Project
Corporate By-Laws
and SEC Registration**



Republic of the Philippines
SECURITIES AND EXCHANGE COMMISSION
SEB Building, EDSA, Mandaluyong City
Metro Manila

S.E.C. Reg. No. A200008219

CERTIFICATE OF INCORPORATION

KNOW ALL MEN BY THESE PRESENTS:

This certifies that the Articles of Incorporation and By-Laws of

NORTHWIND POWER DEVELOPMENT CORPORATION

were duly registered by the Commission on this date upon issuance of this
Certificate of Incorporation in accordance with the Corporation Code of the
Philippines (Batas Pambansa Blg. 18) approved on May 1, 1980 and copies of said
Articles and By-Laws are hereto attached.

IN WITNESS WHEREOF I have hereunto set my hand and caused the seal
of this Commission to be affixed at Mandaluyong City, Metro Manila, Philippines,
on the 15 day of June, Two Thousand.

[Signature]
SONIA M. BALDO
Director
Corporate and Legal Department



(STOCK)

BY - LAWS

OF

NORTHWIND POWER DEVELOPMENT CORPORATION
(Name of Corporation)

ARTICLE I

SUBSCRIPTION, ISSUANCE AND TRANSFER OF SHARES

Section 1. Subscriptions - Subscribers to the capital stock of the corporation shall pay the value of the stock in accordance with the terms and conditions prescribed by the Board of Directors. Unpaid subscriptions shall not earn interest unless determined by the Board of Directors.

Section 2. Certificate - The stockholder shall be entitled to one or more certificates for fully paid stock subscription in his name in the books of the corporation. The certificates shall contain the matters required by law and the Articles of Incorporation. They shall be in such form and design as may be determined by the Board of Directors and numbered consecutively. The certificate shall be signed by the President, countersigned by the Secretary or Assistant Secretary, and sealed with the corporate seal.

Section 3. Transfer of Shares - Subject to the restrictions, terms and conditions contained in the Articles of Incorporation, shares may be transferred, sold, assigned or pledged by delivery of the certificates duly indorsed by the stockholder, his attorney-in-fact, or other legally authorized person. The transfer shall be valid and binding on the corporation only upon record thereof in the books of the corporation. The Secretary shall cancel the stock certificates and issue new certificates to the transferee.

No share of stock against which the corporation holds unpaid claim shall be transferable in the books of the corporation.

All certificates surrendered for transfer shall be stamped "Cancelled" on the face thereof, together with the date of cancellation, and attached to the corresponding stub with the certificate book.

Section 4. Lost Certificates - In case any stock certificate is lost, stolen, or destroyed, a new certificate may be issued in lieu thereof in accordance with the procedure prescribed under Section 73 of the Corporation Code.

ARTICLE II

MEETINGS OF STOCKHOLDERS

Section 1. Annual / Regular Meetings - The annual / regular meetings of stockholders shall be held at the principal office on any day in March of each year, if a legal holiday, then on the day following.

Section 2. Special Meeting - The special meetings of stockholders, for any purpose or purposes, may at any time be called by any of the following: (a) Board of Directors, at its own instance, or at the written request of stockholders representing a majority of the outstanding capital stock, (b) President.

Section 3. Place of Meeting - Stockholders meetings, whether regular or special, shall be held in the principal office of the corporation or at any place designated by the Board of Directors in the city or municipality where the principal office of the corporation is located.

Section 4. Notice of Meeting - Notices for regular or special meetings of stockholders may be sent by the Secretary by personal delivery or by mail at least two (2) weeks prior to the date of the meeting to each stockholder of record at his last known address. The notice shall state the place, date and hour of the meeting, and the purpose or purposes for which the meeting is called.

When the meeting of stockholders is adjourned to another time or place, it shall not be necessary to give any notice of the adjourned meeting if the time and place to which the meeting is adjourned are announced at the meeting at which the adjournment is taken. At the reconvened meeting, any business may be transacted that might have been transacted on the original date of the meeting.

Section 5. Quorum - Unless otherwise provided by law, in all regular or special meeting of stockholders, a majority of the outstanding capital stock must be present or represented in order to constitute a quorum. If no quorum is constituted, the meeting shall be adjourned until the requisite amount of stock shall be present.

Section 6. Conduct of Meeting - Meeting of the stockholders shall be presided over by the President, or in his absence, by a chairman to be chosen by the stockholders. The Secretary, shall act as Secretary of every meetings, but if not present, the chairman of the meeting shall appoint a secretary of the meeting.

Section 7. Manner of Voting - At all meetings of stockholders, a stockholder may vote in person or by proxy. Unless otherwise provided in the proxy, it shall be valid only for the meeting at which it has been presented to the Secretary. All proxies must be in the hands of the Secretary before the time set for the meeting. Proxies filed with the Secretary may be revoked by the stockholders either in an instrument in writing duly presented and recorded with the Secretary, prior to a scheduled meeting or by their personal presence at the meeting.

Section 8. Closing of Transfer Books or Fixing of Record Date - For the purpose of determining the stockholders entitled to notice of, or to vote at, any meeting of stockholders or any adjournment thereof or to receive payment of any dividend, the Board of Directors may provide that the stock and transfer books be closed for ten (10) working days immediately preceding such meeting.

ARTICLE III

BOARD OF DIRECTORS

Section 1. Powers of the Board - Unless otherwise provided by law, the corporate powers of the corporation shall be exercised, all business conducted and all property of the corporation controlled and held by the Board of Directors to be elected by and from among the stockholders. Without prejudice to such powers as may be granted by law, the Board of Directors shall also have the following powers:

- a.) From time to time, to make and change rules and regulations not inconsistent with these by-laws for the management of the corporation's business and affairs;
- b.) To purchase, receive, take or otherwise acquire for and in the name of the corporation, any and all properties, rights, or privileges, including securities and bonds of other corporations, for such consideration and upon such terms and conditions as the Board may deem proper or convenient;
- c.) To invest the funds of the corporation in other corporations or for purposes other than those for which the corporation was organized, subject to such stockholders' approval as may be required by law;
- d.) To incur such indebtedness as the Board may deem necessary, to issue evidence of indebtedness including without limitation, notes, deeds of trust, bonds, debentures, or securities, subject to such stockholders approval as may be required by law, and/or pledge, mortgage, or otherwise encumber all or part of the properties of the corporation;
- e.) To establish pension, retirement, bonus, or other types of incentives or compensation plans for the employees, including officers and directors of the corporation;
- f.) To prosecute, maintain, defend, compromise or abandon any lawsuit in which the corporation or its officer are either plaintiffs or defendants in connection with the business of the corporation;

g.) To delegate, from time to time, any of the powers of the Board which may lawfully be delegated in the course of the current business of the corporation to any standing or special committee or to any officer or agent and to appoint any person to be agent of the corporation with such powers and upon such terms as may be deemed fit;

h.) To implement these by-laws and to act on any matter not covered by these by-laws, provided such matter does not require the approval or consent of the stockholders under the Corporation Code.

Section 2. Election and Term - The Board of Directors shall be elected during each regular meeting of stockholders and shall hold office for one (1) year and until their successors are elected and qualified.

Section 3. Vacancies - Any vacancy occurring in the Board of Directors other than by removal by the stockholders or by expiration of term, may be filled by the vote of at least a majority of the remaining directors, if still constituting a quorum; otherwise, the vacancy must be filled by the stockholders at a regular or at any special meeting of stockholders called for the purpose. A director so elected to fill a vacancy shall be elected only for the unexpired term of his predecessor in office.

The vacancy resulting from the removal of a director by the stockholders in the manner provided by law may be filled by election at the same meeting of stockholders without further notice, or at any regular or at any special meeting of stockholders called for the purpose, after giving notice as prescribed in these by-laws.

Section 4. Meetings - Regular meetings of the Board of Directors shall be held once a month on such dates and at places as may be called by the Chairman of the Board, or upon the request of a majority of the Directors.

Section 5. Notice - Notice of the regular or special meeting of the Board, specifying the date, time and place of the meeting, shall be communicated by the Secretary to each director personally, or by telephone, telegram, or by written message. A director may waive this requirement, either expressly or impliedly.

Section 6. Quorum - A majority of the number of directors as fixed in the Articles of Incorporation shall constitute a quorum for the transaction of corporate business and every decision of at least a majority of the directors present at a meeting at which there is a quorum shall be valid as a corporate act, except for the election of officers which shall require the vote of a majority of all the members of the Board.

Section 7. Conduct of the Meetings - Meetings of the Board of Directors shall be presided over by the Chairman of the Board, or in his absence, by any other director chosen by the Board. The Secretary, shall act as secretary of every meeting, if not present, the Chairman of the meeting, shall appoint a secretary of the meeting.

Section 8. Compensation - By resolution of the Board, each director shall receive a reasonable per diem allowance for his attendance at each meeting of the Board. As compensation, the Board shall receive and allocate an amount of not more than ten percent (10%) of the net income before income tax of the corporation during the preceding year. Such compensation shall be determined and apportioned among the directors in such manner as the Board may deem proper, subject to the approval of stockholders representing at least a majority of the outstanding capital stock at a regular or special meeting of the stockholders.

ARTICLE IV

OFFICER

Section 1. Election / Appointment - Immediately after their election, the Board of Directors shall formally organize by electing the President, the Vice-President, the Treasurer, and the Secretary at said meeting.

The Board may, from time to time, appoint such other officers as it may determine to be necessary or proper. Any two (2) or more positions may be held concurrently by the same person, except that no one shall act as President and Treasurer or Secretary at the same time.

Section 2. President - The President shall be the Chief Executive Officer of the corporation and shall exercise the following functions:

- a.) To preside at the meetings of the stockholders;
- b.) To initiate and develop corporate objectives and policies and formulate long range projects, plans and programs for the approval of the Board of Directors, including those for executive training, development and compensation;
- c.) To supervise and manage the business affairs of the corporation upon the direction of the Board of Directors;
- d.) To implement the administrative and operational policies of the corporation under his supervision and control;
- e.) To appoint, remove, suspend or discipline employees of the corporation, prescribe their duties, and determine their salaries;
- f.) To oversee the preparation of the budgets and the statements of accounts of the corporation;
- g.) To represent the corporation at all functions and proceedings;

h.) To execute on behalf of the corporation all contracts, agreements and other instruments affecting the interests of the corporation which require the approval of the Board of Directors.

i.) To make reports to the Board of Directors and stockholders;

j.) To sign certificates of stock;

k.) To perform such other duties as are incident to his office or are entrusted to him by the Board of Directors.

Section 4. The Vice-President - He shall, if qualified, act as President in the absence of the latter. He shall have such other powers and duties as may from time to time be assigned to him by the Board of Directors or by the President.

Section 5. The Secretary - The Secretary must be a resident and a citizen of the Philippines. He shall have the following specific powers and duties:

a.) To record the minutes and transactions of all meetings of the directors and the stockholders and to maintain minute books of such meetings in the form and manner required by law;

b.) To keep record books showing the details required by law with respect to the stock certificates of the corporation, including ledgers and transfer books showing all shares of the corporation subscribed, issued and transferred;

c.) To keep the corporate seal and affix it to all papers and documents requiring a seal, and to attest by his signature all corporate documents requiring the same;

d.) To attend to the giving and serving of all notices of the corporation required by law or these by-laws to be given;

e.) To certify to such corporate acts, countersign corporate documents or certificates, and make reports or statements as may be required of him by law or by government rules and regulations.

f.) To act as inspector at the election of directors and, as such, to determine the number of shares of stock outstanding and entitled to vote, the shares of stock represented at the meeting, the existence of a quorum, the validity and effect of proxies, and to receive votes, ballots or consents, hear and determine questions in connection with the right to vote, count and tabulate all votes, determine the result, and do such acts as are proper to conduct the election.

g.) To perform such other duties as are incident to his office or as may be assigned to him by the Board of Directors or the President.

Section 6. The Treasurer - The Treasurer of the corporation shall have the following duties:

- a.) To keep full and accurate accounts of receipts and disbursements in the books of the corporation;
- b.) To have custody of, and be responsible for, all the funds, securities and bonds of the corporation;
- c.) To deposit in the name and to the credit of the corporation, in such bank as may be designated from time to time by the Board of Directors, all the moneys, funds, securities, bonds, and similar valuable effects belonging to the corporation which may come under his control;
- d.) To render an annual statements showing the financial condition of the corporation and such other financial reports as the Board of Directors, or the President may, from time to time require;
- e.) To prepare such financial reports, statements, certifications and other documents which may, from time to time, be required by government rules and regulations and to submit the same to the proper government agencies;
- f.) To exercise such powers and perform such duties and functions as may be assigned to him by the President.

Section 7. Term of Office - The term of office of all officers shall be one (1) year and until their successors are duly elected and qualified.

Section 8. Vacancies - If any position of the officers becomes vacant by reason of death, resignation, disqualification or for any other cause, the Board of Directors, by majority vote may elect a successor who shall hold office for the unexpired term.

Section 9. Compensation - The officers shall receive such renumeration as the Board of Directors may determine. A director shall not be precluded from serving the corporation in any other capacity as an officer, agent or otherwise, and receiving compensation therefor.

ARTICLE V

OFFICES

Section 1. The principal office of the corporation shall be located at the place stated in Article III of the Articles of Incorporation. The corporation may have such other branch offices, either within or outside the Philippines as the Board of Directors may designate.

ARTICLE VI

AUDIT OF BOOKS, FISCAL YEAR AND DIVIDENDS

Section 1. External Auditor - At the regular stockholders' meeting, the external auditor of the corporation for the ensuing year shall be appointed. The external auditor shall examine, verify and report on the earnings and expenses of the corporation.

Section 2. Fiscal Year - The fiscal year of the corporation shall begin on the first day of January and end on the last day of December of each year.

Section 3. Dividends - Dividends shall be declared and paid out of the unrestricted retained earnings which shall be payable in cash, property, or stock to all stockholders on the basis of outstanding stock held by them, as often and at such times as the Board of Directors may determine and in accordance with law.

ARTICLE VII

SEAL

Section 1. Form and Inscriptions - The corporate seal shall be determined by the Board of Directors.

ARTICLE VIII

AMENDMENTS

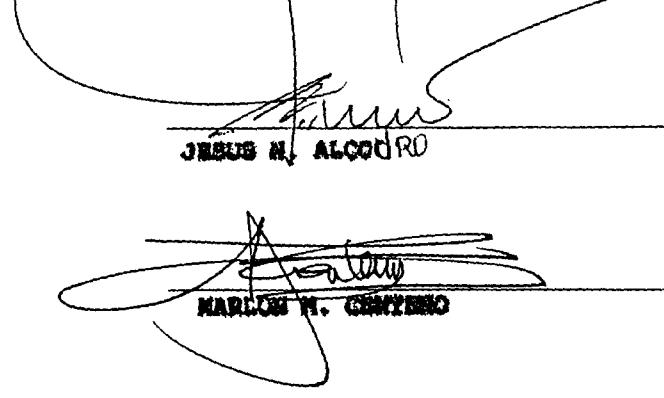
Section 1. These by-laws may be amended or repealed by the affirmative vote of at least a majority of the Board of Directors and the stockholders representing a majority of the outstanding capital stock at any stockholders' meeting called for that purpose. However, the power to amend, modify, repeal or adopt new by-laws may be delegated to the Board of Directors by the affirmative vote of stockholders representing not less than two-thirds of the outstanding capital stock; provided, however, that any such delegation of powers to the Board of Directors to amend, repeal or adopt new by-laws may be revoked only by the vote of stockholders representing a majority of the outstanding capital stock at a regular or special meeting.

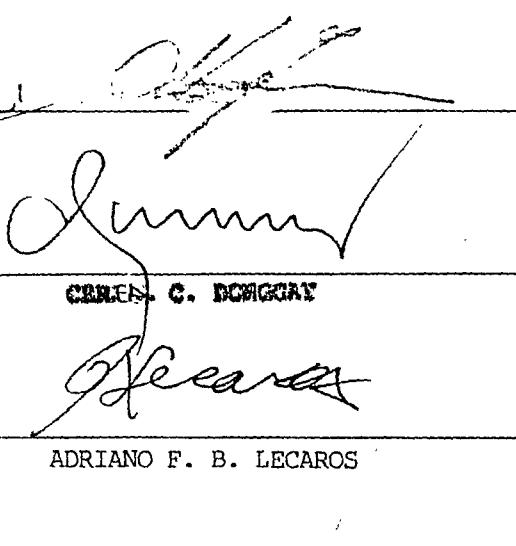
IN WITNESS WHEREOF, we, the undersigned stockholders have adopted the foregoing by-laws and hereunto affixed our signatures this 28 day of May, 1992000 at Mandaluyong City.

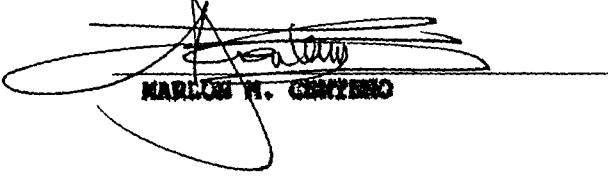
(Note: 1. If filed with Articles of Incorporation, these by-laws should be signed by all incorporators;

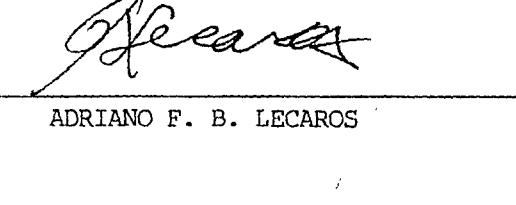
2. If filed after incorporation, should be signed by majority of the subscribers and should submit director's certificate for the adoption of the by-laws.)


FERNANDO A. DUNLAO


JESUS N. ALCORDO


CIRIACO C. DOMINGO


MARLON M. GANTING


ADRIANO F. B. LECAROS

REGISTRATION DATA SHEET
CAPITAL STOCK/INCORPORATORS/DIRECTORS/OFFICERS INFORMATION
(FOR DOMESTIC STOCK CORPORATION ONLY)

SEC NUMBER / _____

PAGE 1 OF 3

FILL-UP INSTRUCTIONS: Type or print legibly. Light-shaded boxes and codes are to be filled up by the SEC, including the SEC number. For no-par stocks, leave the authorized capital amount and the par value columns blank.

COMPANY NAME

NORTHWIND POWER DEVELOPMENT CORPORATION

CAPITAL STRUCTURE

PAID UP CAPITAL BY ASSET TYPE	C - CASH	P - PROPERTY		O - OTHERS	TOTAL
	P	P	P	P	P

INCORPORATORS / STOCKHOLDERS / DIRECTORS / OFFICERS (Use additional sheets, if necessary.)

On the column refer to the last page of this form. Refer also to the back of this page for additional instructions.

REGISTRATION DATA SHEET
CAPITAL STOCK/INCORPORATORS/DIRECTORS/OFFICERS INFORMATION
(FOR DOMESTIC STOCK CORPORATION ONLY)

SEC NUMBER / _____

PAGE 2 OF 3

FILL-UP INSTRUCTIONS : Type or print legibly. Light-shaded boxes and codes are to be filled up by the SEC, including the SEC number.

COMPANY NAME

INCORPORATORS / STOCKHOLDERS / DIRECTORS / OFFICERS



Republic of the Philippines
SECURITIES AND EXCHANGE COMMISSION
SEC Bldg., EDSA, Greenhills, City of Mandaluyong

VERIFICATION CERTIFICATE

Date: 05/23/2000

This is to certify that a verification has been made on the proposed name

NORTH WIND POWER DEV. CORP.

SEC records show the following closest name(s):

000136364 A NORTHWIND SVCS. AND DEV. CORP.

Verified By: MERLITA LIMUCO

R E M A R K S

- Available for use
 Refer to Corporate and Legal Dept.

CLD Action When Applicable

- Allowed
 Not Allowed
 Modify; subject to reverification

Q

Chief, Records Division

CLD Dir./Div. Chief

NOTE: The fact that the name is available at the date verified is not to be regarded in any way as an approval of registration. No expense for printing of materials using a verified name should be incurred until registration is effected. Any erasure or alteration on this document nullifies verification.

Ref. No. A001440054

RESERVATION NOTICE

This certifies that (proposed name)

NORTH WIND POWER DEV. CORP.

has been reserved from 05/23/2000

to 06/22/2000

Ref. No. A001440054

Chief, Records Division



ENVIRONMENTAL IMPACT ASSESSMENT

File
05-112

Republic of the Philippines
Department of Environment and Natural Resources
PROVINCIAL ENVIRONMENT & NATURAL RESOURCES OFFICE - LN.
DENR Provincial Building, Giron St. cor. Castro Avenue, 2900 Laoag City
Tel. Nos. (077) 770-34-39; 770-39-14; 773-14-65; Fax No. (077) 772-02-54; E-mail: laoag@dnr.dost.gov.ph

1st Indorsement
05 December 2000

FOR : **The Regional Executive Director**
DENR, Region I, San Fernando City

ATTENTION : **The Regional Director**
Environmental Management Bureau

FROM : **The PENR Officer**
PENRO-Ilocos Norte

SUBJECT : **PENRO-ILOCOS NORTE. SUBMISSION OF ENVIRONMENTAL IMPACT ASSESSMENT (EIA) INSPECTION REPORT FOR THE PROPOSED BANGUI BAY 60 MW NORTHWIND POWER PROJECT OF THE NORTHWIND POWER PROJECT OF THE NORTHWIND POWER DEVELOPMENT CORPORATION (NWPDC) LOCATED AT BANGUI BAY FROM BGY. BARUYEN TO BGY. ABACA, BANGUI, ILOCOS NORTE**

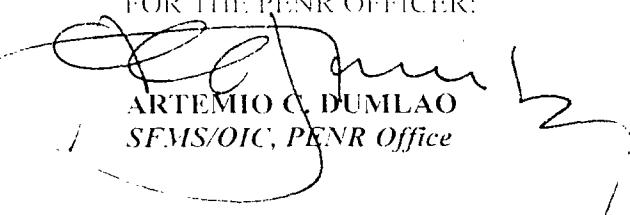
Attached is the memorandum of even date of the CENR Officer, CENRO-2, Laoag City, submitting the Environmental Impact Assessment (EIA) Inspection Report for the proposed Bangui Bay 60 MW Northwind Power Project of the Northwind Power Development Corporation (NWPDC) located at Bangui Bay from Bgy. Baruyen to Bgy. Abaca, Bangui, Ilocos Norte.

Issuance of an Environmental Compliance Certificate is strongly recommended.

For information and favorable consideration.

ELPIDIO R. FABIAN, CESO V

FOR THE PENR OFFICER:


ARTEMIO C. DUMLAO
SFMS/OIC, PENR Office

Republic of the Philippines
Department of Environment and Natural Resources
COMMUNITY ENVIRONMENT AND NATURAL RESOURCES OFFICE
Manayon, Bangui, Ilocos Norte



MEMORANDUM

FOR *The Regional Executive Director*
DENR-Region I, San Fernando City

ATTENTION *The Regional Director*
Environmental Management Bureau

THRU *The PENR Officer*
PENRO-Ilocos Norte

FROM *The CENR Officer*
CENRO-Bangui, Ilocos Norte

DATE *December 5, 2000*

SUBJECT : Submission of Environmental Impact Assessment (EIA) Inspection Report for the Proposed Bangui Bay 60 MW Northwind Power Project of the Northwind Power Development Corporation (NWPDC) Located at Bangui Bay from Brgy. Baruyen to Brgy. Abaca, Bangui, Ilocos Norte.



Respectfully forwarding herewith the EIA Inspection Report together with the mandatory requirements leading to the issuance of an Environmental Compliance Certificate relative to the above-mentioned subject.

For his information and favorable consideration.

for: Joseph S. Aguilera
JOSEFINO L. DAQUIOAG

Enclosed As stated above.

Copy furnished

- Atty Ferdinand A. Dumlaao
Chairman, Board of Director
Northwind Power Development Corporation
Unit 310 Jollibee Plaza Building
Emerald Avenue, Ortigas Center



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF ENVIRONMENT
AND NATURAL RESOURCES
COMMISSION ON ENVIRONMENT AND
NATURAL RESOURCES OFFICE
BANGUI, ILOCOS NORTE

ENVIRONMENTAL IMPACT ASSESSMENT (EIA) INSPECTION REPORT

A. GENERAL INFORMATION:

- 1 Name of Proponent - *Atty. Ferdinand A. Dumla*
Chairman, Board of Director
Northwind Power Development Corporation
Unit 310 Jollibee Plaza Building
Emerald Avenue, Ortigas Center
Pasig City
- 2 Type of Project - *BANGUI BAY 60 MW NORTHWIND POWER PROJECT*
Bangui Bay from Brgy. Baruyen to Brgy. Abaca, Bangui,
Ilocos Norte.
- 3 Date of Inspection - *December 4, 2000*
For issuance of ECC
- 4 Inspector/Position - *Engr. Alberto B. Baguio*
Spl. Investigator/OIC, EMS

B. FINDINGS AND OBSERVATION:

1 Status of the Project

- 1.1 Conduct of actual survey at the proposed project site of about 808,630 square meters area for the final lay-out of wind tower is on-going during the time of inspection. Around 30 unit turbine with 660 kW rated capacity each will be built on selective site along the bay; according to Mr. Allen Dumla, the representative of the Northwind Power Development Corporation;
- 1.2 There was no sign of equipment mobilization nor excavation activity was noticed during the time of inspection Only survey team members were present at the area; and
- 1.3 The project proponent has submitted the ECC mandatory requirements except for the Locational Viability and Engineering Geological and Geohazard Assessment Report (EGGAR) in consonance with DENR DAO 2000-28 which is the "Implementing Guidelines on Engineering Geophysical and Geohazard Assessment as additional requirement for ECC applications covering Subdivision, Housing and other Land Development and Infra Projects". More so that the project proponent wishes to construct a 15.0 m x 20.0 m Control Center/Office building and a 10.0 m x 30.0 m warehouse/switch gear room.

2 Description of Project Site.

- 2.1 The proposed project site of about 808,630 square meters underdeveloped foreshore area which ranges from 0-3% slope or maybe considered as flat terrain has a black core, beach sand type of soil;

*Re: EIA Report on the Application for Bangui
Bay 60 MW Northwind Power Project; Page 2*

- 2.2 The identified project site is located along the underdeveloped foreshore area of Barangays Baruyen, Taguiporo, Manayon, Masikil and Abaca all at Bangui, Ilocos Norte. Foreshore lease covering the whole area is in the process which was filed at the CENR Office, Bangui, Ilocos Norte on September 11, 2000. Said Lease Application have already been indorsed by this Office to the Offices of Department of Tourism, Philippine Ports Authority and Department of Public Works and Highways;
- 2.3 It was observed that there are no indications of landslide prone area. Excessive soil erosion is unlikely to occur since the shoreline moves seasonally, while run-off during rainy days will drain off to the sea; and
- 2.4 There are no existing timber type of trees in the proposed project area, only few seabirds (*haliaetus indus*) were noticed during the time of inspection.

3. Description of Project Location;

3.1 The proposed project site of about 808,630 square meters underdeveloped foreshore areas of Barangays Baruyen, Taguiporo, Manayon, Masikil and Abaca is located south of the town proper of Bangui, Ilocos Norte. Brgy. Baruyen lies of about five (5) kilometers from the town proper while Brgy. Abaca is adjacent to the town proper. The subject foreshore area has an average of 300 meters horizontal distance from the existing national road towards west.

4. Project Size and Scale:

- 4.1 The proposed Bangui Bay 60 MW Wind Power Project covers a total foreshore land area of 808,630 square meters. About 600 square meters will be occupied by Control/Center/Office and warehouse/switch gear room buildings and an area to be occupied by 30-unit windmill towers; and
- 4.2 The proposed project is intended to generate a total of 60 MW electricity from wind power in three phases.

ASSESSMENT OF IMPACTS ON THE PHYSICAL ENVIRONMENT:

Negative:

1. It will create dust or air pollution;
2. Increases level of noise due to drillings, hammering; boring and earthmoving activities; and
3. Possible effects on traversing/migrating birds.

Positive:

1. Existing access road to the vicinities of the proposed project site may be improved where public may be allowed access;
2. The project is expected to attract tourists and other investors in the area;
3. It creates job opportunities especially to members of nearby community who are to be hired during the construction phase and eventually during operations of the project;

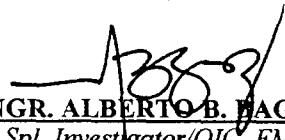
4. There will be an increase of economic activities due to local hiring, local purchases of foods and other services; and
5. Promotes other businesses in the Municipality of Bangui and nearby areas.

D. *COMMENTS AND RECOMMENDATIONS:*

1. A separate Initial Environmental Examination (IEE) Report including its mandatory requirements is expected to be proposed and submitted for the construction of Center/Office, Sub-station and Transmission Lines;
2. The project proponent is advised to acquire sand and gravel quarrying permit from the agency concerned with corresponding ECC from the DENR;
3. Sprinkling of water to stockpile of soil, sand and gravel materials in the project area should be maintained to minimize dust;
4. The project proponent is advised to furnish this Office copy of Locational Viability and Engineering Geological and Geohazard Assessment Report (EGGAR);
5. The project proponent shall comply with all the mitigating measures that have been identified in their IEE report under consideration; and
6. The proponent shall not allow his conveyances for the transport of illegally cut lumber, mines and quarry resources and other DENR controlled/regulated products without the necessary permit therefrom.

Based on the foregoing, the project proponent is recommended for the issuance of an Environmental Compliance Certificate (ECC).

Prepared by:


ENGR. ALBERTO B. PAGUIO
Spl. Investigator/OIC, EMS

Attested by:


JOSEFINO L. DAQUIOAG
CENR Officer

Republic of the Philippines
Department of Environment and Natural Resources
COMMUNITY ENVIRONMENT AND NATURAL RESOURCES OFFICE
Manayon, Bangui, Ilocos Norte

December 5, 2000

ECA CERTIFICATION

This is to certify that the proposed Bangui Bay 60 MW Wind Power Project
(indicate name of project/undertaking)

of Northwind Power Development Corporation represented by Atty. Ferdinand A. Dumlaor
(indicate name of proponent/applicant)

located in Barangay Baruyen to Barangay Abaca, Bangui, Ilocos Norte (as shown in the
attached location map) has been determined to be within the Bangui Bay/Foreshore Area an
(state ECA category)

identified Environmentally Critical Area.

This certification is issued for purposes of screening project falling within ECAs and the
proponent's compliance to the EIA system.

for: *Joseph L. Aquino*
JOSEFINO L. DAQUIOAG
CENR Officer

DENR-CENRO No _____

Republic of the Philippines
Department of Environment and Natural Resources
COMMUNITY ENVIRONMENT AND NATURAL RESOURCES OFFICE
Manayon, Bangui, Ilocos Norte

CERTIFICATION

This is to certify that Northwind Power Development Corporation (NWPDC) represented by Atty. Ferdinand A. Dumlaو with address at Unit 310 Jollibee Plaza, Emerald Avenue, Ortigas Center, Pasig City has complied with the requirement to secure an Environmental Compliance Certificate (ECC) for his Bangui Bay 60 MW Wind Power Project (type of project) located at Brgy. Baruyen to Brgy. Abaca, Bangui, Ilocos Norte.

Given this 5th day of December 2000.

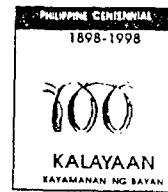
for: *Joseph L. Aquino*
JOSEFINO L. DAQUIOAG /
3/

**ENVIRONMENTAL COMPLIANCE
CERTIFICATE**



12 - 18 0036 - 1405

Republic of the Philippines
Department of Environment and Natural Resources
Regional Office No. 1
City of San Fernando, La Union
Tel. Nos. 888-38-33 • 888-29-75



ENVIRONMENTAL COMPLIANCE CERTIFICATE

Pursuant to the provisions of Presidential Decree No. 1586 and the Department Administrative Order No. 96-37, the Department of Environment and Natural Resources (DENR), Region 1, hereby grants this Environmental Compliance Certificate (ECC) to the **NORTHWIND POWER DEVELOPMENT CORPORATION (NWPDC)** for the proposed **Infrastructure Project (40 MW Wind Power)** located at **Bangui Bay from Brgy. Baruyen to Brgy. Abaca, Bangui, Ilocos Norte, which has been identified as within the Environmentally Critical Area (ECA)** subject to the following conditions:

1. That the proponent shall secure prior to project implementation all necessary permits/clearances from concerned government agencies with administrative jurisdiction over such projects/operations, i.e., DENR-EMB, MGB, LGU, DPWH, PPA, DOTC, etc.;
2. That this Certificate covers the construction and operation of the proposed 40 MW Northwind Power Project consisting of 30 units turbines with 660 KW rated capacity and/or alternative 12 units turbines with 1.75 MW each, transformer station equipped with switch gear room/warehouse, and control center office;
3. That the proponent shall properly compensate affected landowners/residents, if any, and relocation plan shall be submitted for proper coordination with the LGU, prior to project implementation;
4. That the proponent shall apply for a Foreshore Lease Permit within ninety (90) days after the issuance of ECC, and shall properly coordinate with the CENRO concerned for the adoption of measures to prevent overlapping of projects within the foreshore area;
5. That the proponent shall submit a modified Geological Fault Map as guide/reference in the construction/installation and design of wind towers and similar activities and appropriate measures be adopted to prevent hazards, accidents etc.;
6. The proponent shall not allow his conveyances for the transport of any mine and quarry resources and other DENR regulated products without the necessary permits therefrom;
7. That employment for construction/installation/operation of the project shall be given priority to the host Municipality of Bangui, Ilocos Norte and its neighboring barangay pursuant to pertinent provisions of RA No. 6885;

Continued Next Page

Grow a Tree for Legacy

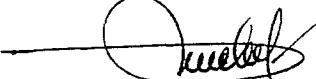
01 00 12 - 18 0036 - 1405 (2)

8. That all applicable mitigating and enhancement measures embodied in the IEE documents submitted (Section D Impact Assessment and Mitigation) shall form an integral part of the ECC Conditions which shall be undertaken in all phases of project implementation;
9. That the proponent shall appropriately locate the row of turbines closest to the sea to prevent significant sound emissions; and
10. All damages or adverse impact to the environment resulting from non-adoption of appropriate or adequate mitigating measures during the implementation of the project shall be the sole responsibility or liability of the proponent.

Commencement of work or operation shall be deemed acceptance of above conditions herein specified.

Non-compliance with any of the above conditions shall be sufficient cause for the suspension or cancellation of this Certificate and/or a fine in the amount not to exceed fifty thousand pesos (₱50,000.00) for every violation thereof, at the discretion of the Department (Section 9 of PD 1586).

Given under the seal of this Department at City of San Fernando, La Union this 18th day of December, Two Thousand.



VICTOR J. ANCHETA, CESO IV
Regional Executive Director

Recommending Approval:



JOEL G. SALVADOR

Regional Director

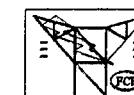
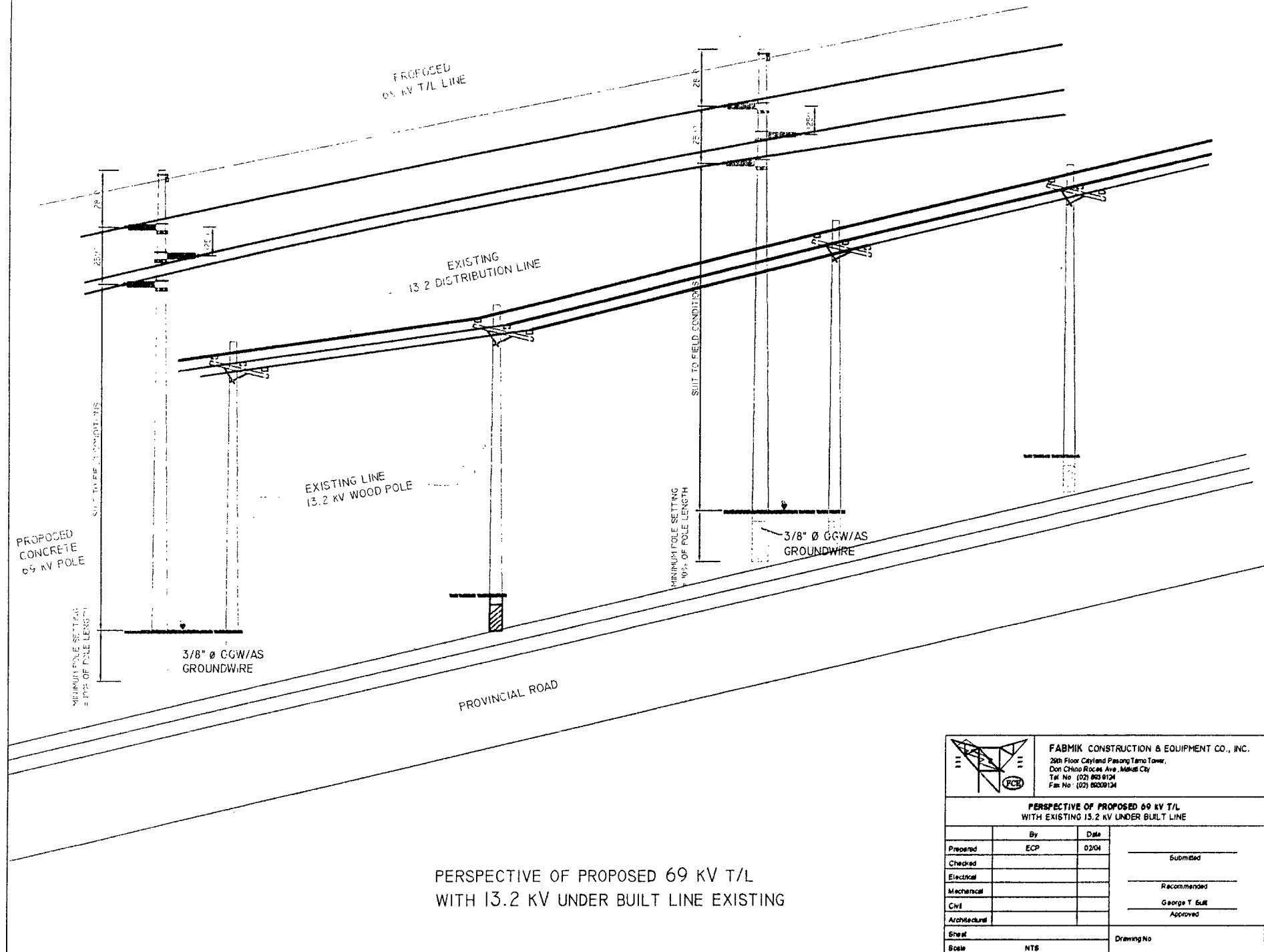
Environmental Management Bureau

Processing Fee	₱ 3,600.00	O.R. No.	6963883	Date	12-05-2000
Filing Fee :	1,560.00	O.R. No.	6963883	Date	12-05-2000
Legal Research Fee :	240.00	O.R. No.	6963883	Date	12-05-2000
Procedural Screening Fee	600.00	O.R. No.	6963883	Date	12-05-2000
TIN :					

VALID ONLY IF MARKED WITH DRY SEAL

ANNEX 3

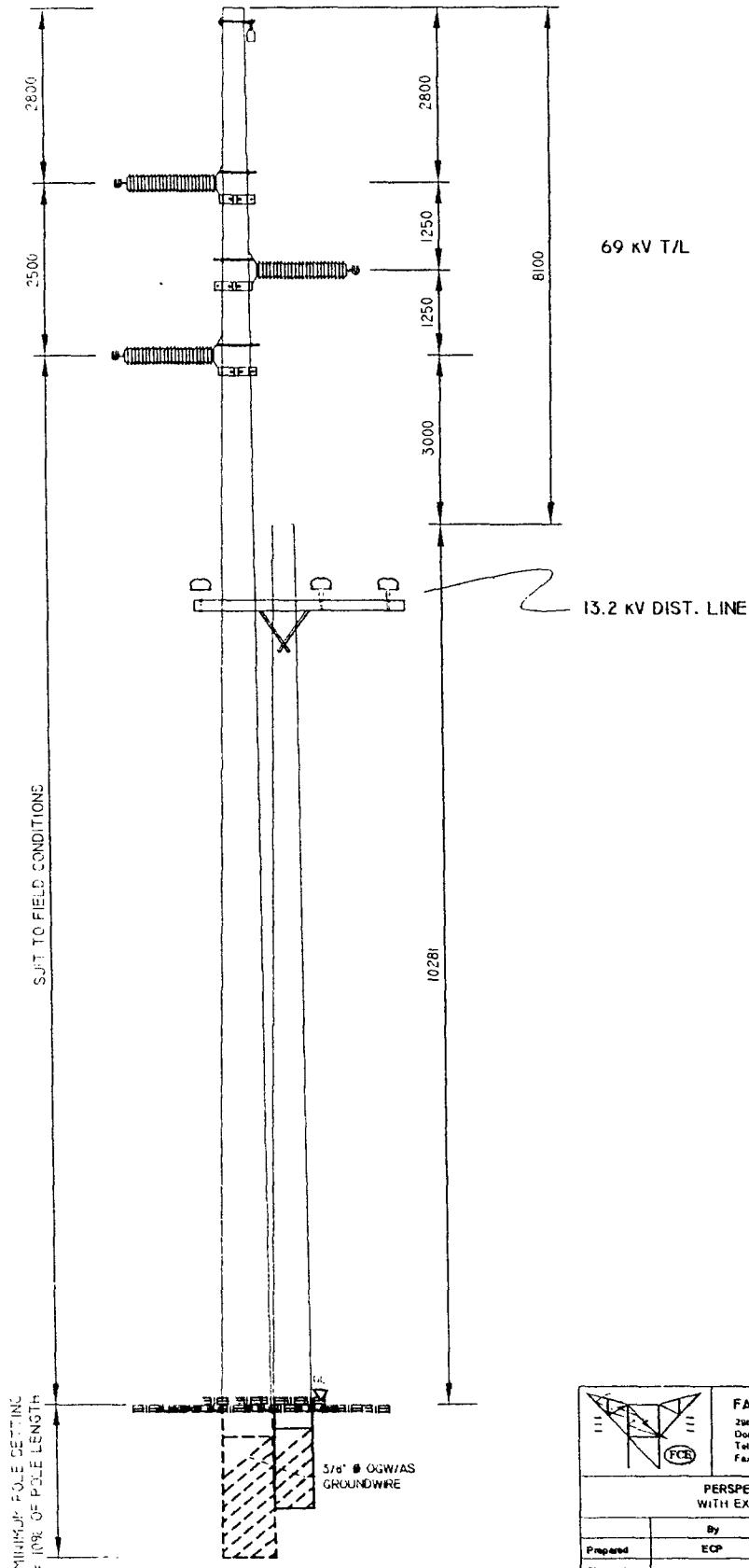
**Details of the Construction/
Installation of Wind Turbines**



FABMIK CONSTRUCTION & EQUIPMENT CO., INC.
29th Floor Cayland Pasing Tower,
Don Chino Roces Ave., Makati City
Tel No: (02) 803 9124
Fax No: (02) 800 0124

PERSPECTIVE OF PROPOSED 69 KV T/L
WITH EXISTING 13.2 KV UNDER BUILT LINE

By	Date	
Prepared	ECP	02/04
Checked		Submitted
Electrical		Recommended
Mechanical		George T. Sull
Civil		Approved
Architectural		
Sheet		Drawing No
Scale	NTS	

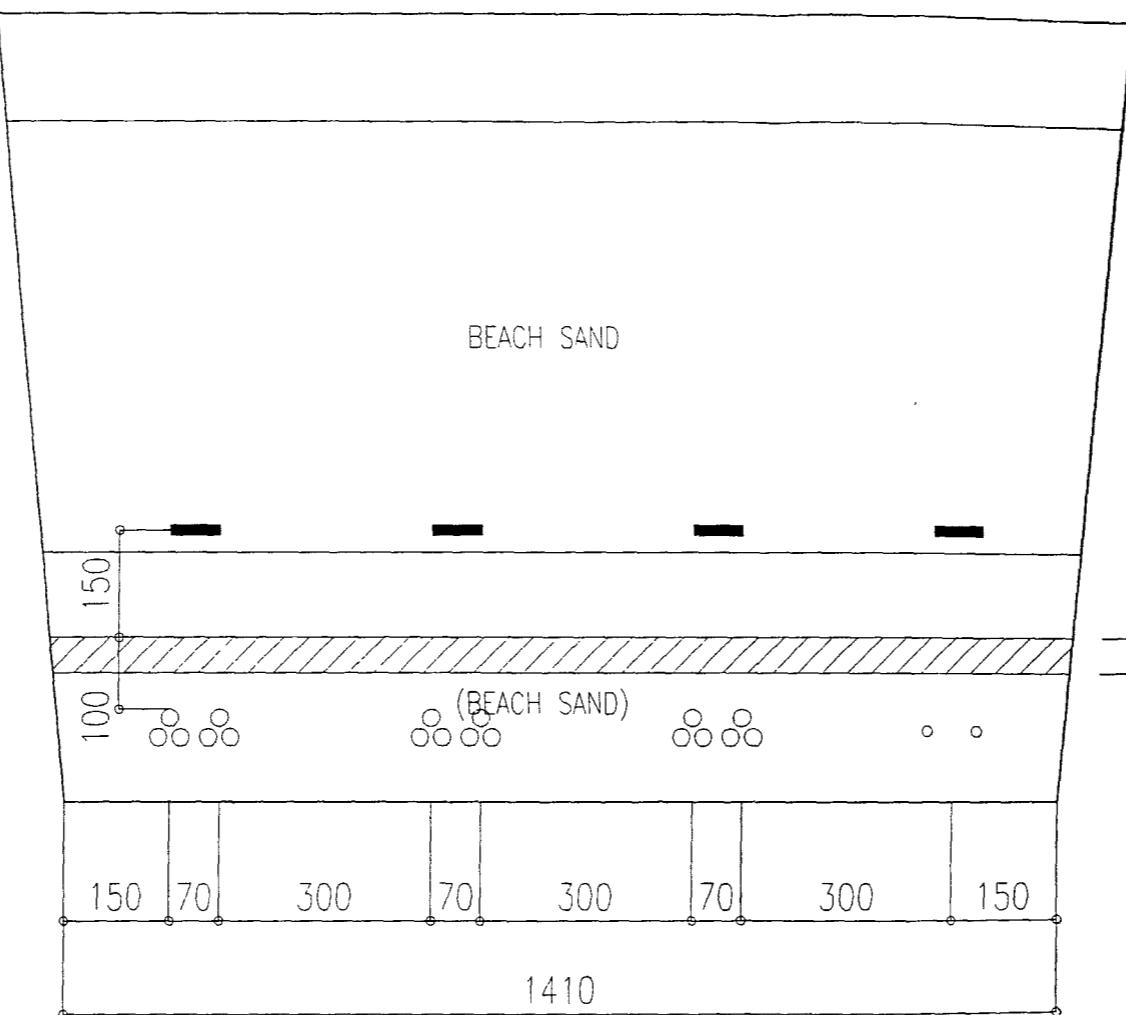
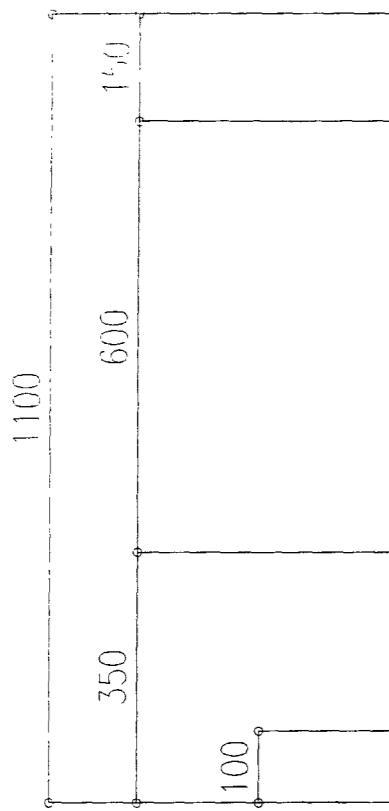


CROSS SECTION VIEW OF PROPOSED 69 KV T/L
WITH EXISTING 13.2 KV UNDER BUILT LINE

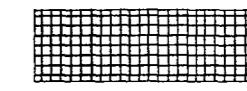
FABMIK CONSTRUCTION & EQUIPMENT CO., INC. 2nd Floor Cityland Peñaranda Tower, Don Chino Roces Ave., Makati City Tel No. (02) 853 9124 Fax No. (02) 853 9124		
PERSPECTIVE OF PROPOSED 69 KV T/L WITH EXISTING 13.2 KV UNDER BUILT LINE		
Prepared	By	Date
ECP		02/04
Checked		
Submitted		
Electrical		
Mechanical		
Civil		
Architectural		
Recommended		
George T. Sult		Approved
Sheet		Drawing No.
Scale	NTS	

ANNEX 4

Details of the 69kV line
following the existing 13.8kV line



SIGNATURE:



BACK FILL



SUBBASE



BEACH SAND



WARNING TAPE



CONCRETE ENCAS



MV CABLES



CONTROL AND MV

CABLE TRENCH						
TYPE	NO. OF CABLE SYSTEM	WIDTH OF TRENCH				
1	1	150	70	300	150	
2	2	150	70	300	70	300 150
3	3	150	70	300	70	300 70 300 150

SUBMITTED BY:



PACIFIC CONSULTANTS
INTERNATIONAL

CHEKED BY: CONSULTANT

APPROVED BY:

SR. STRUCTURAL ENGINEER

ISSUED BY: UPO - PWD

PROJECT

C5/ORTIGAS AVE. EXTENSION INTERCHANGE
PROJECT, PACKAGE II

SCALE

AS SHOWN