

4.3 Basic Plan

4.3.1 Facilities

(1) Site and Layout

The premises of the Road Construction Center is located along the National Road RN4. No problems arise for delivery of the equipment to the Center. Through site investigation and analysis in Japan it is concluded that existing three buildings within the premises which were constructed in the regime of Democratic Kampuchea be rehabilitated, and a workshop (A) and an administration office be newly constructed. The premises has enough space for rehabilitation or construction of the facilities under the Project. However, future extension is very probable, hence, the layout of possible facilities in future shall be considered.

(2) Building Plan

1) Floor

The floor area of each shop/room are given in Table 4-1.

Table 4-1 Floor Area of the Planned Shop/Room

A. Workshop (A) (New building)

Shop / Room	Unit Floor Area	Planned Area (m ²)
Chassis Repair Shop	6.0mx12.0m/bay	288.0 (4 bays)
Heavy Vehicle Repair Shop	"	72.0 (1 bay)
Light Vehicle Repair Shop	"	72.0 (1 bay)
Undercarriage Repair Shop	"	144.0
Welding & Fabrication	According to the equipment to be installed	72.0
Engine Repair Shop	"	102.0
Power Line Repair Shop	"	102.0
Machine Shop	"	162.5
Fuel Component Repair Room	"	42.5
Battery Service	"	14.0
Electric Component Repair Room	"	20.0
Corridor	-	153.75
Compressor Room	-	16.0
Tool Room	-	27.0
Spare Part Storage	-	63.75
Reception	-	5.0
Administration Office	4.5~5.5m ² /person	40.0
Pantry/Toilet	"	18.0
Total		1,415.0

Table 4-1 Floor Area of the Planned Shop/Room

B. Administration office (New building)

Shop / Room	Unit Floor Area	Planned Area (m ²)
Hall corridor	-	95.0
Director's Room	20~25m ² /person	35.0
Deputy Director's Room	15m ² /person	35.0
Drawing Room	-	35.0
Office	4.5~5.5m ²	52.5
Warehouse	-	17.5
Engineer's Room	10~15m ² /person	52.5
Practice Room	3.0~4.0m ² /person	70.0
Meeting	3.5~4.5m ² /person	35.0
Pantry Room		17.5
WC		35.0
Total		480.0

C. Operation quarter/Warehouse (Rehabilitation of the existing machine shop)

Shop / Room	Unit Floor Area	Planned Area (m ²)
Locker & Resting Room	5~8m ² /person	180.0
Office	4.5~5.5m ² /person	50.0
Meeting Room (A, B)	3.5~4.5m ² /person	140.0
Practice Room		200.0
Warehouse		400.0
Corridor		60.0
Engineer's Room	5~8m ² /person	80.0
Storage		21.0
Shower Room	2~3m ² /person	25.0
WC (A, B)		44.0
Total		1,200.0

D. Workshop (B) (Rehabilitation of the existing workshop)

Shop / Room	Unit Floor Area	Planned Area (m ²)
Materials/Equipment Warehouse		106.65
Repairing Space		853.35
Total		960.0

Table 4-1 Floor Area of the Planned Shop/Room

E. Garage/Parts Storage (Rehabilitation of the existing facilities)

Shop / Room	Unit Floor Area	Planned Area (m ²)
Garage		480.0
Parts Storage		480.0
Total		960.0

F. Ancillaries

Shop / Room	Unit Floor Area	Planned Area (m ²)
Generator Room	-	90.0
Carpentry Shop		24.0
Paint Shop		24.0
Tire Shop		24.0
Washing Tools Storage		18.0
Guard Room		4.0
Total		184.0

2) Section

- The floor height of the workshop(A) where the overhead traveling cranes be installed will be determined based on hoisting height of crane (7m), required clearance above the crane and height of the beam..
- The floor height of each shop will be determined based on installation height of the jib crane or equipment and height of the beam.
- The floor height of parts warehouse is determined based on height of the parts rack (double-shelves) and height of the beam.
- The floor height of office room is determined based on ceiling height (2.6 m - 2.8 m), beam height and equipment installation space.

3) Structural Design

A. Principles

The following principles will be applied for structural designs of the buildings.

- Where possible, the design shall allow the maximum use of local construction method.
- The design shall ensure structural safety and durability.
- The design shall be suited to local conditions.
- The design shall allow the maximum use of local materials.

B. Foundation

It is assumed that a soil bearing capacity be around 20 ton/m² by observation of a pit on site. The load shared by a column of building does not exceed approximate 30 ton, a spread foundation will be adopted.

C. Superstructure

Building structures in Cambodia are generally frame structure composed of reinforced concrete column, beam and slab with concrete brick or block wall. Because the size of planned buildings allows the frame structure which is economical, same structure will be employed. In respect to shop bay in the Workshop (A) with a long spanned and height ceiling a steel-frame roof truss will be used to minimize the construction period.

D. Seismic Design

Since the Project site is not located in an earthquake-prone area, there is no need to consider seismic design. However, a standard shear modulus of 0.20 equivalent to Japanese standard will be employed for the present design to maintain the safety of structures.

E. Dead Load

The weight of structural materials, finishing materials and equipment to be installed shall all be considered to sum up dead loads.

F. Live Load

The live load for the present structural design shall be based on Building Standards Act of Japan as summarized in Table 4-2.

Table 4-2 Standard Live Load for Structural Design

(Unit kg/m²)

Category	Floor beam Small beam	Main beam Column Foundation	Seismic design
Office	300	180	80
Meeting room/Corridor/Hallway	360	330	210
Warehouse	500	300	200
Practice room	550	400	200

G. Wind Load

The maximum wind velocity recorded in the area is 12m/sec. Thus considering safety, a 20m/sec of wind will be adopted for calculation of design wind load in accordance with the Building Standards Act of Japan as below:

Maximum wind velocity (V) : 20m/sec

Assumed Air density (ρ) : 0.125kg sec²/m⁴

Thus,

Design Wind Pressure (load) $q = 1/2 \rho \times (v)^2 = 1/2 \times 0.125 \times 20^2 = 25 \text{ kg/m}^2$

4) Electric Facilities Plan

A. Principles

- Electric installation plan must take into consideration the climate and local practices, and the special conditions with planned facilities.
- Installed electric system should be easy to operate and maintain.
- Electrical equipment, appliances and components used for the Project should be of standard products in order for an easy replacement.
- Zoning of lighting should adopt as small as possible units for the energy saving purposes.

B. Electric Power Supply

As there is no public power supply, generators shall be installed within the compound and electricity will be distributed to each building by aerial cable.

For power equipment : 3 phase 4 wire 380/220v 50HZ
For lighting and outlet : single phase 2 wire 220v 50HZ

C. Generator Set

2 sets of diesel engine generator (300 KVA, 1800 RPM, 380/220V) will be provided with distribution panel and synchronized panel. Oil tank of 6000 lr for the generator shall be installed on the ground near generator house.

D. Lighting and Outlets

Fluorescent lamps will be used for lightning of shops/rooms. For the shops/rooms with high or large floor area, mercury lamps will be provided. The expected average luminous intensity is given below.

1) Office room / meeting room	300 - 400 Lux
2) Repair shop	200 - 200 Lux
3) Parts storage	50 - 100 Lux
4) Outdoor	5 - 10 Lux

E. Interphone System

An interphone system shall be provided to the Administration Office and appropriate positions within the compound.

F. Announcing System

An amplifier, microphone, timer and chime are installed at the office room of the Administration Office, and speakers be at the suitable places within the compound for announcing time signal etc.

5) Mechanical Work Plan

A. Principles

Mechanical work design shall take into consideration the climate and environmental conditions. Equipment which are easy to operate and maintain be selected.

B. Air-conditioning

Separate-type air conditioners are installed at the Director's room, Deputy Director's room, Reception room, Meeting room and Practice room, Engineer's room in the Administration Office.

C. Ventilation

Ceiling fan are installed at the office room, meeting room (A & B), Engineer's room, practice room, locker & rest room in the Operation quarter and Warehouse Building. Supply and exhaust fan are installed at the shower room pantry room and generator room.

D. Water Supply

A new bore hole is provided within the premise. Deep well pumps are provided to an existing well and new one. Water is pumped up by deep well pump, then stored in the water tank thorough sedimentation tank. The water stored in the water tank is pumped up to the elevated FRP water tank (an old concrete-made water tank is removed and replaced with FRP water tank, the existing concrete pedestal will be used), then, distributed by gravity to each building and facilities.

E. Hot Water Supply System

Sockets outlet for the electric pot are installed in the pantry.

F. Sewage and Drainage System

Fig. 4-1 shows drainage system to be employed subject to the source.

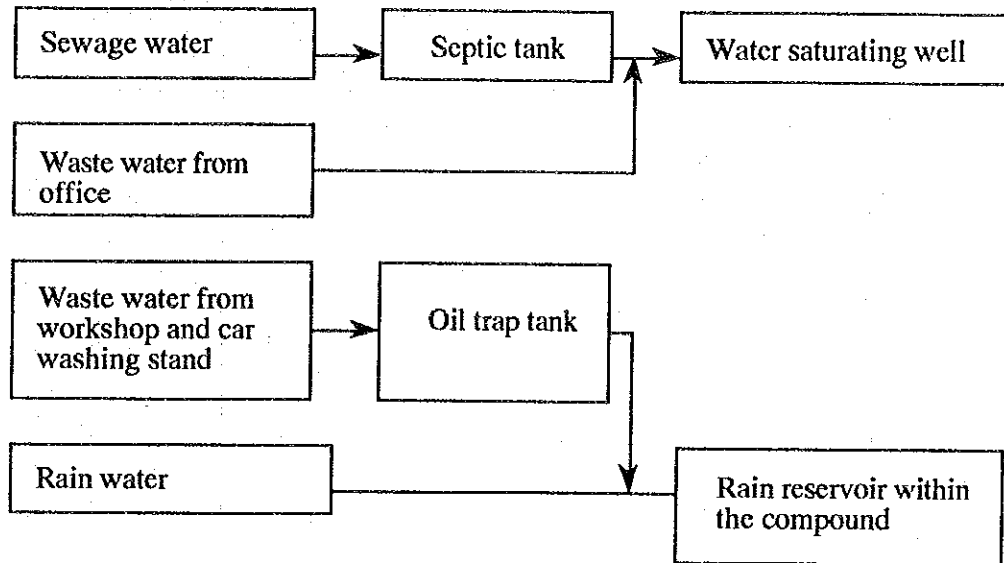


Fig. 4-1 Sewage and Drainage System

G. Sanitary Fixtures

Sanitary fixtures including water closets installed in WC room and shower room will be the mixture of western and/or oriental styles.

H. Compressed Air Supply

Compressed air supply will be provided for the Workshop (A) and other facilities where it is required.

I. Fire extinguishing Facilities

Fire extinguisher (10kg) are provided at following places.

Workshop (A)	:	6
Workshop (B)	:	2
Operator Quarter and Warehouse	:	3
Garage and Parts Storage	:	2
Administration Office	:	2

The main electrical and mechanical facilities are summarized in Table 4-3.

Table 4-3 Electrical and Mechanical Facilities installed at Shops and Rooms

	Air Condit ioning	Venti- lation	Water Supply	Hot- water Supply	Sewage /Drai- nage System	Comp- ressed Air Supply	Inter- phone System
(1) Workshop (A)							
Office Room							0
Reception							
Chassis Repair Shop						0	0
Under Carriage Rebuilding Shop			0		0	0	
Power Train Repair Shop			0		0	0	
Welding and Fabrication Shop						0	
Engine Repair Shop			0		0	0	
WC for men		0	0		0		
Pantry		0	0	0	0		
Corridor							
General tools & Special tools Room							
Parts Warehouse							
Fuel component Repair & Test Room			0		0	0	
Battery Service Room							
Electric Component Repair & Test Room							
Machine Shop						0	
Compressor Room		0					
(2) Workshop (B)							
Storage							
Workshop							0
(3) Operation quarter and Warehouse							
Warehouse Room							
Practice Room		0					
Meeting Room (A)		0					
Meeting Room (B)		0					
Engineers Room		0					0
Office Room		0					0
Storage							

	Air Condit ioning	Venti- lation	Water Supply	Hot- water Supply	Sewage /Drai- nage System	Com- pressed Air Supply	Inter- phone System
Locker & Resting Room		0					
Corridor							
WC (A)		0	0		0		
WC (B)		0	0		0		
Shower Room		0	0		0		
(4) Garage & Parts Storage							
Parts Storage							0
Garage							
(5)Administration Office							
Entrance Corridor							
Office Room		0					0
Engineer Room	0						0
Practice Room	0						
Meeting Room	0						
Directors Room	0						0
Deputy Directors Room	0						0
Deputy Directors Room	0						0
Reception Room	0						
Storage							
Pantry		0	0	0	0		
WC for men		0	0		0		
WC for women		0	0		0		
(6)Generator Room		0					
(7)Ancillaries							
Storage							
Tire Shop						0	
Paint Shop						0	
Carpentry Shop							
(8) Washing Stand			0		0		
(9) Unloading Deck							
(10) Fuel & Lubricant Stand							

6) Finishing

The materials required for finishing works for the planned buildings will be procured generally from local sources. Following factors should be taken into consideration for selection of the materials.

- High durability for easy maintenance.
- Quality of material shall comply with JIS (Japan Industrial Standards), or e equivalent standards.
- The material should be of wide availability and popular use in Cambodia in order to ensure practicability of works and save the construction period.

The materials used for exterior and interior finishing works are as below:

A. Workshop (A)

- | | |
|---------------|--|
| Roof | : Oil paint coating on the steel structure truss, large wave corrugated cement slate sheet |
| Exterior wall | : Corrugated cement slate sheet on the light gauge steel |
| Floor | : Concrete with steel trowel finish, vinyl tile, mosaic tile |
| Interior wall | : Mortar and emulsion paint coating |
| Ceiling | : Flexible board, vinyl emulsion paint coating |

B. Workshop (B)

- | | |
|---------------|--|
| Roof | : Wooden truss, large wave corrugated cement slate sheet |
| Exterior wall | : Concrete block oil paint coating |
| Floor | : Concrete with steel trowel finish |
| Interior wall | : Concrete block oil paint coating |
| Ceiling | : --- |

C. Operation Quarter and Warehouse

Roof	: Wooden truss, large wave corrugated cement slate sheet
Exterior wall	: Oil paint on existing wall
Floor	: Cement mortar, vinyl tile, mosaic tile
Interior wall	: Emulsion paint spraying on the concrete block, mortar emulsion paint coating
Ceiling	: Flexible board

D. Garage and Parts Storage

Roof	: Wooden truss, large wave corrugated cement slate sheet
Exterior wall	: Corrugated cement asbestos sheet on the light gauge steel
Floor	: Concrete steel trowel finish
Interior wall	: ---
Ceiling	: ---

E. Administration Office

Roof	: Oil paint coating on steel structure truss, roof tile
Exterior wall	: Cement mortar finish on the concrete block, oil paint coating
Floor	: Vinyl tile, mosaic tile, mortar steel trowel finish
Interior wall	: Mortar emulsion paint coating, ceramic tile
Ceiling	: Acoustic board

F. Ancillary Facilities

Roof	: Oil paint coating on the steel structure truss
Exterior wall	: Cement slate sheet on the light gauge steel, oil paint coating
Floor	: Concrete with steel trowel finish
Interior wall	: ---
Ceiling	: ---

Facility plan is summarized in Table 4-4.

Table 4-4 Summary of Facility Plan

Item	Shop / Room	Planned Area	Remarks
1	Workshop (A) - Chassis repair shop - Engine repair shop - Fuel component repair & test room - Electric component repair & test room - Battery service room - Power line repair room - Machine shop - Welding and fabrication shop - Undercarriage rebuilding shop - General tools & special tools room - Parts warehouse - Office / Reception - WC / Pantry, Corridor	1,415m ²	New construction/reinforced concrete structure, one story building, steel truss structure
2	Workshop (B) - Garage - Parts storage	960m ²	Rehabilitation of existing workshop building/flooring, reinforcement of existing pillar & beam, roofing
3	Operation Quarter & Warehouse - Engineer's room - Office - Meeting room - Practice room - Warehouse of equipment/materials - Locker-resting room - Shower room - WC	1,200m ²	Rehabilitation of existing vehicle & machine shop building/flooring, reinforcement of existing pillar & beam, roofing
4	Garage & Parts Storage - Parts storage - Garage	960m ²	Rehabilitation of existing warehouse building/flooring, reinforcement of existing pillar & beam, roofing

5	Administration Office - Director's room - Deputy Director's room - Engineer's room - Meeting room - Practice room - Office / Reception - Storage - Pantry - WC, Corridor	540m ²	New construction/reinforced concrete structure, one story building
6	Other Ancillary Facilities - Generator house - Fuel stand - Washing stand - Paint shop - Unloading deck - Equipment yard - Elevated water tank & well - Parking - Guard house - Power lead-in - Transformer facility - In-site announcing facility		Rehabilitation of existing facilities/new construction
7	Water Supply Facility		New installation
8	Power Supply Facility		Now installation
9	Sewage Facility		New installation
10	In-Site Road		Concrete paving
11	Equipment Yard		Gravelling

4.3.2 Equipment Schedule

(1) Workshop Equipment

Workshop equipment is shown in Table 4-5.

Table 4-5 Workshop Equipment Schedule

A. Chassis Repair Shop

Item	Description	Specification	Qty
1	Overhead Traveling Crane	5 ton	1
2	Overhead Traveling Crane	3 ton	1
3	Portable Hydraulic Jack	50 ton	2
4	Mobile Work Bench (wood cover)	Max load 1,200 kg	2
5	Parts Rack	Max load 1,800 kg	2
6	Mechanic Tool Set		2
7	Tool Cabinet		2
8	Parts Cleaner	100 lr	1
9	Hydraulic Garage Jack	10 ton	1
10	Portable Lubricator (Mobile Type)		1
11	Air Operated Oil Lubricator		1
12	Portable Lubricator (Mobile Type, Air Operated)		1
13	Tractor Support (Front)		2
14	Tractor Support (Rear)		4
15	Tractor Lift & Cart		1
16	Air Hose Reel		2
17	Other equipment and tools		1

Table 4-5 Workshop Equipment Schedule

B. Engine Repair Shop

Item	Description	Specification	Qty
1	Jib Crane Wall Type	3 ton	1
2	Work Bench with Cabinet and Locker		1
3	Machinists Vise		1
4	Bench Electric Grinder		1
5	Hand Truck	300 kg	2
6	Bench Drill Press	13 mm	1
7	Engine Positioner	3,000 kg	1
8	Parts Rack		2
9	Air Hose Reel		2
10	Tool Cabinet		2
11	Mechanic Tool Set		2
12	Tool Locker		2
13	Parts Washer		1
14	Cylinder Boring Machine		1
15	Other equipment and tools		1

C. Fuel Component Repair and Test Room

Item	Description	Specification	Qty
1	Fuel Injection Pump Tester	range 40~4000rpm	1
2	Base Mounted "p" Series Pump		1
3	Feed Pump Tester		1
4	Pre-Stroke Gauge Kit		1
5	Rack Travel Gauge Kit		1
6	Measuring Device PE(S)		1
7	Work Bench		2
8	Pump Mounting Vice Kit		1
9	Mini Cabin		1
10	Other equipment and tools		1

Table 4-5 Workshop Equipment Schedule

D. Electric Component Repair and Test Room

Item	Description	Specification	Qty
1	Starter Generator Test Bench	25 ps	1
2	Regulator Tester	2 KW	1
3	Motor Puller Set		1
4	Work Bench		1
5	Tool Cabinet		1
6	Other equipment & tools		1

E. Battery Service

Item	Description	Specification	Qty
1	Silicon Quick Charger	12~24V, 140A	1
2	Parts Rack		2
3	Other equipment and tools		1

F. Power Train Repair Room

Item	Description	Specification	Qty
1	Engine Positioner	2,000 kg, 360°	1
2	Parts Rack		2
3	Work Bench		1
4	Surface Plate		1
5	Air Hose Reel		2
6	Mechanic Tool Set		2
7	Tool Cabinet		2
8	Mobile Work Bench (Wood Cover)	Max load 1,200kg	2
9	Mobile Floor Crane	2 ton	1
10	Other equipment and tools		1

G. Tire Service

Item	Description	Specification	Qty
1	Hydraulic Tire Removing Tool	20.00~26.00	1
2	Thermopress for passenger car to truck	10 kg/cm ²	1
3	Tool Locker		1
4	Other equipment and tools		1

Table 4-5 Workshop Equipment Schedule

H. Machine Shop

Item	Description	Specification	Qty
1	Precision Lathe	1,500m (center to center)	1
2	Bit Set		6
3	Tip Set		6
4	Taper Shank Twist Drill Set		1
5	Straight Shank Twist Drill Set		3
6	Bench Drill Press	23 mm	1
7	Work Bench		2
8	Tool Locker & Cabinet		5
9	Tool Locker		2
10	Air Hose Reel	9.0mmx10m	1
11	Hack Sawing Machine	dia. 200mm	1
12	Other equipment and tools		1

I. Welding and Fabrication Shop

Item	Description	Specification	Qty
1	A.C Arc Welder	50-400A	2
2	CO ₂ Gas-Shield Arc Welder		1
3	Accessories for CO ₂ Gas		1
4	Gas Welder Set		1
5	High-Speed Abrasive Cut-Off		1
6	Hydraulic Shop Press	100 ton	1
7	Air Hose Reel		1
8	Cylinder Carrier		2
9	Welding Rod (Mild)		1
10	Welding Wire (Mild)		1
11	Diesel Engine Driven		2
12	Other equipment and tools		1

Table 4-5 Workshop Equipment Schedule

J. Undercarriage Rebuilding Shop

Item	Description	Specification	Qty
1	Roller & Idler Press with Power Unit and 0.5 ton jib	100 ton	1
2	Roller Hanger		1
3	Front Idler Hanger		1
4	Conveyor Stand for Roller Line		1
5	Track Press with Hydraulic Winch without Conveyor	230 ton	1
6	Track Press		1
7	SALT Lubricator & Tester Kit		1
8	Turn Table for Disassembled		1
9	Shoe Bolt Impact Wrench with		1
10	Torque Limiter		1
11	Conveyors and Shoot		1
12	Bench Electric Grinder		1
13	Parts Wagon with caster and 4 shelves		1
14	Tool Locker		2
15	Electric Portable Grinder	dia. 125mm	1
16	Air Hose Reel		1
17	Parts Washer (Shaking Type) with one basket & solvent		1
18	Other equipment and tools		1

K. Compressor

Item	Description	Specification	Qty
1	Air Compressor	6.1 m ³ /min.	1
2	Exhaust Pipe Line		2

L. Cleaning Area

Item	Description	Specification	Qty
1	Hot Water High Pressure Washer	1600lr/h	1
2	Steam Cleaner	800 lr/h	1
3	Water Hose Reel	dia. 14mm	1

Table 4-5 Workshop Equipment Schedule

M. General Tools

Item	Description	Specification	Qty
1	Torque Wrench	1000-7000 kgf.cm	1
2	Torque Wrench	1000-8500 kgf.cm	1
3	Torque Wrench	1000-10000 kgf.cm	1
4	Cylinder Gauge (Bore Gauge)	250-450mm	1
5	Diesel Timing and Tacho Tester		1
6	Magnetic Flow Detector		1
7	Socket Wrench Set (1"sq.)		2
8	Socket Wrench Set (1"sq.)		2
9	Screw Plate Set		2
10	Screw Plate Set		2
11	Adjustable Reamer with Pilot		2
12	Air Impact Wrench (1/2" sq.)		4
13	Air Impact Wrench (3/4" sq.)		2
14	Air Impact Wrench (1"sq)		2
15	Morse Taper Shank Twist Drill		2
16	Parts Rack		3
17	Parts Rack		3
18	Parts Rack		4
19	Other equipment & tools		1

N. Parts Warehouse

Item	Description	Specification	Qty
1	Rack for Medium Item Parts	1855x540x2430mm	20
2	Rack for Medium and Large Parts	1855x1020x2430mm	4
3	Rack for Small Item Parts	900x300x2100 mm	10
4	Rack for Small Item Parts	1800x300x2100 mm	10
5	Rack for Small and Medium	1800x600x2100 mm	20
6	Pallet Rack for 8-Pallets	2600x1100x2975mm	2
7	Cupboard		1
8	Work Bench with One Drawer		1
9	Cardex Cabinet		5
10	Fork lift	1 ton	1
11	Other equipment & tools		1

Table 4-5 Workshop Equipment Schedule

O. Special Tools

Item	Description	Specification	Qty
1	Special Tools for Engine		1
2	Special Tools for Chassis		1
3	Special Tools for Test		1

(2) Construction Equipment

Construction equipment schedule is shown in Table 4-6.

Table 4-6/1 Construction Equipment Schedule

A. Road Emergency Repair Unit (ERU)

Item	Name	Specification	Nos.
1	Bulldozer with ripper	21t class	4
2	Motor Grader	3.7m class	4
3	Wheel Loader	10t class	4
4	Hydraulic Shovel	19t class	2
5	Tandem Roller	8-10t class	2
6	Vibration Roller	8 t class	4
7	Dump Truck	10t class	8
8	Asphalt Distributor	6,000 lr	2
9	Asphalt Sprayer		4
10	Rammed		4
11	Hand Guided Vib. Roller		4
12	Water Tanker	8,000 lr	4
13	Fuel Tanker	8,000 lr	4
14	Pick up	double cabin	4
15	Station Wagon		4
16	Chip Spreader		2

Table 4-6/2 Construction Equipment Schedule

B. Drainage Unit, Aggregate Production Unit, Transport Unit, Mobile Workshop Unit

Item	Name	Specification	Nos.
1	Hydraulic Truck Crane	30t class	1
2	Trailer/Tractor	25t class	1
3	Mobile Workshop		1
4	Wheel Loader	16t class	2
5	Tractor Shovel	18 t class	1
6	Portable Stone Crusher	30-40t class	1
7	Pickup		2
8	Station Wagon		1
9	Flat Bet Truck		2
10	Crawler Drill		1
11	Air Compressor	17m ³ /min	1
12	Air Compressor	5m ³ /min	2
13	Generator	45 KVA	2
14	Concrete Cutter	dia. 65cm	1
15	Line Marker		1
16	Concrete Mixer	1.0m ³	4
17	Concrete Vibrator		8
18	Asphalt Kettle	6m ³	2
19	Water Pump	diesel	4
20	Radio Set		11

4.4 Project Implementation Plan

4.4.1 Project Implementation Policy

(1) Project Implementing Agency

In case the Project be implemented on the basis of the Japanese grant aid, the overall structure of the Project will be shown in Fig. 4-2.

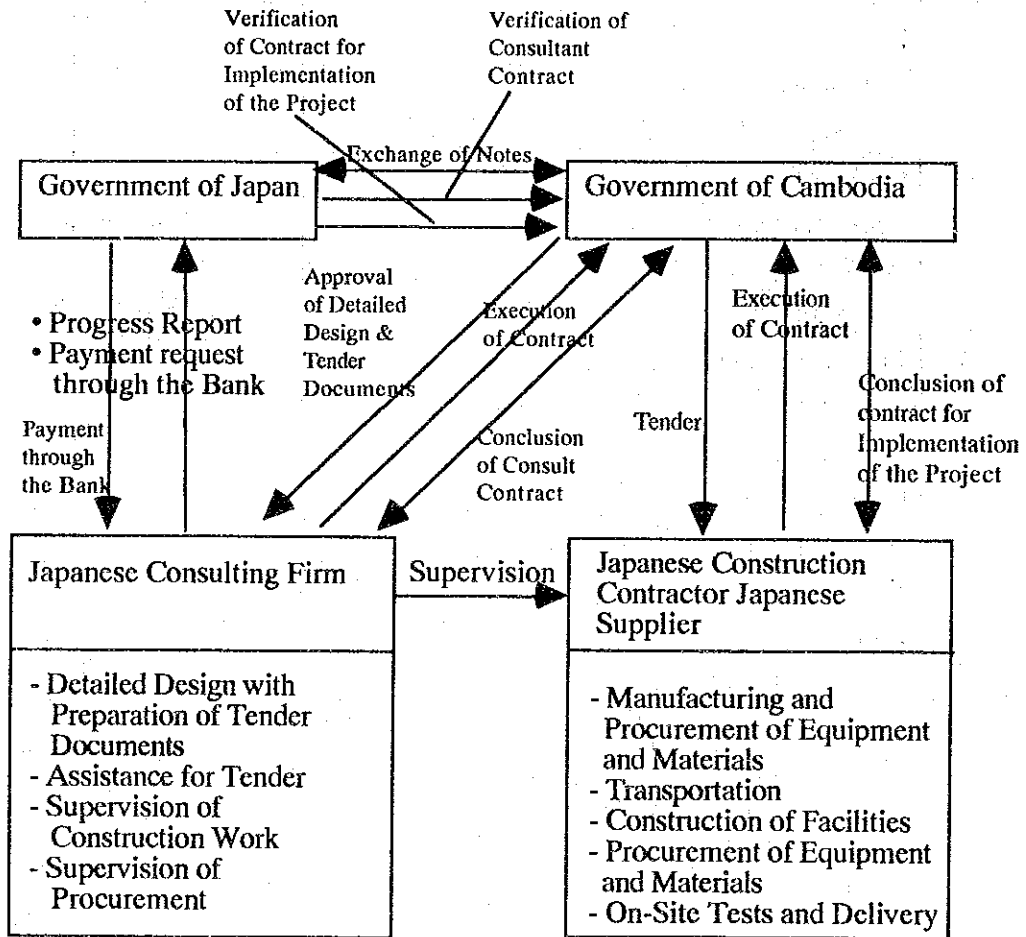


Fig. 4-2 Overall Structure of the Project

The project implementing agency on Cambodian side is the MPWT. For construction of facilities a Japanese general construction contractor will be awarded contract, and for procurement of equipment, Japanese supplier(s) will be contractor(s). In accordance with the Japanese grant aid, contract for detailed design and supervision will be awarded to a Japanese consulting firm.

(2) Consultant

Following the Exchange Notes (E/N), the MPWT should swiftly conclude consultant contract with a Japanese consulting firm. The consulting firm contracted with the MPWT will then provide engineering services including preparation of detailed design for both facilities and equipment, preparation of the tender documents, assistance in tender and supervisory services.

(3) Construction Contractor/Suppliers

The Japanese construction contractor, who is a successful tenderer in open competitive bidding based on technical capability and cost competitiveness, shall conclude a construction agreement with the MPWT to execute the construction work.

The Japanese supplier(s), who are successful tenderer(s) in open competitive tender based on technical capability and cost competitiveness, will conclude procurement agreement with the MPWT to deliver and/or install the planned equipment to the designated site.

4.4.2 Specified Note for Construction Work

Special attention should be paid to the following points.

- All Cambodian laws and regulations shall be abided by throughout the entire construction period.
- Careful consideration shall be given to prevent any adverse affect on the construction work, i.e., noise, vibration and waste water, etc., onto the surrounding area.
- The work schedule shall take into consideration local labor conditions including religious holidays system.
- Transportation of the equipment for construction use shall not cause any damage to existing roads and structures.

- Due attention shall be paid throughout the construction period for safety of vehicles and pedestrians on RN4.
- As there are new buildings to be constructed in the proximity to the existing buildings, every care must be taken to avoid damage to these buildings.
- As normal business will be conducted at the existing buildings within the premises throughout the construction period, every care must be taken to prevent any accident or damage to the third parties.

4.4.3 Work Supervision Plan

(1) Principles

In case the Project is implemented with Japanese grant aid, the following items must be given attention in carrying out the consulting services.

- Thorough understanding of the background of the Project, contents of the Basic Design Study Report, the Japanese grant aid programme, and the contents of the E/N signed between the Government of Japan and Government of Cambodia.
- Compatibility of the Project with the technical cooperation project under which experts may be dispatched to provide technical assistance.

Assuming that the above requirements are met, points to note are outlined below.

1) Scope of Consulting Work

Following the E/N, the consultant will enter into a consultant contract with the Government of Cambodia. The scope of consulting works is given below.

A. Detailed Design

- Preparation of detailed design and tender documents,
- Securing of approval of tender documents by the Government of Cambodia,
- Assisting the Government of Cambodia in the tender and tender evaluation. Witnessing of the contracts,
- Confirmation of the scope and progress of the measures to be undertaken by the Government of Cambodia prior to the commencement of Project-related construction work.

B. Work Supervision

- Issue of notice to proceed,
- Preparation of pre-work report,
- Discussions with parties involved in construction work prior to the commencement of the work,
- Securing of official approval for the work schedule and holding of work schedule meetings,
- Securing of official approval for work drawings,
- Witnessing of the inspection of materials/equipment, witnessing of construction work and the issue of the relevant instruction as and when deemed necessary,
- Inspection of interim progress of the work. Inspection for final hand over and issue for final acceptance certificates,
- Preparation of monthly progress reports throughout the construction period,
- Conducting of all necessary work for final hand over,
- Preparation of final report and undertaking of the Project completion procedure.

C. Initial Training for Operation and Maintenance of Construction Equipment

Regarding operation of construction equipment to be introduced under the Project, because the operators and mechanics are not familiar with the equipment of Japanese origin, an initial instruction and training for operation, preventive maintenance, and routine maintenance by the suppliers under control of the Consultant, is required.

Initial training for equipment operation (construction equipment, vehicles and supporting equipment) covers:

- Lecture on operation manual and practice,
- Lecture on basic concept of cooling system, hydraulic system, engine, power line system, etc. and practice of daily examination.

Initial training for equipment maintenance covers:

- Lecture on shop manual,
- Lecture on spare parts manual,
- Practice for preventive maintenance,
- Assistance for establishment of routine maintenance system.

2) Important Points to Note

A. Detailed Design

(a) Reconfirmation of Equipment Procurement Conditions

Reconfirmation of the procurement conditions of the construction and maintenance equipment, identified at the basic design stage, is necessary. As the construction materials and equipment will be procured locally where possible, it is important to check whether or not they meet the requirements/specifications set out by the basic design.

(b) Preparation of and Briefing on Specification Documents

The contents of the specification documents must comply with the objectives of the grant aid and must be thoroughly examined during the field survey for the detailed design so that they can be authorized as official tender documents together with the detailed design drawings.

B. Work Supervision

(a) Progress Control

Since the Project will be implemented under the Japanese grant aid cooperation system, the actual work schedule to be prepared as part of the detailed design must reflect certain conditions attached to this system. It is needless to say that the work must be completed as planned. The progress of the work can be seriously affected by the timing of the delivery of materials and equipment which are to be imported. Strict progress control must be conducted on the manufacturing and import of machinery/equipment, and also on the delivery of domestically procured materials and equipment.

(b) Quality Control

The materials and equipment to be procured in Cambodia may not be of uniform quality, forcing some alterations of the specifications relating to the materials which are established as part of the detailed design. In case of alterations, proper quality control of the new materials must be conducted to ensure that the original design requirements are met.

(c) Supervisors

Supervisors of the contractor should be mobilized in the Project site as soon as the notice to proceed is issued to the contractor. At least one full-time supervisor responsible for building construction must be on-site throughout the construction period. Supervisors in such special fields as machinery, building services and electrical equipment will be dispatched in accordance with a request by the on-site supervisor to conduct specific supervisory work. Japanese experts will also be required to conduct the factory inspection of equipment procured in Japan prior to shipment to Cambodia.

4.4.4 Procurement Plan

(1) Origin of Material and Equipment

The materials and equipment to be used for construction will be procured in Cambodia where conditions such as quantity, quality, cost, etc. permit. It appears that some 30% of the materials and equipment required will be procured locally. However, it will be necessary to import equipment for the facilities related to the building, and maintenance and construction equipment. Material and equipment sources for main items are shown in Table 4-7.

Table 4-7 Material and Equipment Sources

Facilities and Equipment	Local supply	Import from Japan or Third Country
Building	aggregates, cement, bricks, reinforcement bars, terrazzo tiles, form work, glass	structural steels, metal doors and windows, finishing hardware, wooden door, shutters, long corrugated steel, machine products, waterproofing materials, slate, ceiling board, calcium silicate board, etc.
Air-conditioning	-	air-conditioners, ventilation fans, pipes
Plumbing	concrete pipes, sanitary fixtures (in part)	pumps, pipes, shower units, sanitary fixtures (in part)
Electrical Installation	lamps, power outlets, cables (in part)	distribution panel, lighting, radio set, generator
Equipment to be Provided	-	maintenance equipment, construction equipment

4.4.5 Implementation Schedule

(1) Scope of Work

The Government of Japan and the Government of Cambodia will undertake the following work for the implementation of the Project.

1) Work to be undertaken by the Government of Japan

A. Construction/rehabilitation of facilities

1. Workshop (A)
2. Workshop (B)
3. Operation quarter & warehouse
4. Garage & parts storage
5. Administration office
6. Other related facilities

B. Equipment supply

1. Maintenance equipment
2. Construction equipment

2) Work to be undertaken by the Government of Cambodia

A. Construction works

- (a) Securing of land for construction facilities,
- (b) Ground preparation prior to the commencement of construction work and the removal of structures, equipment and materials on site which will obstruct construction work,
- (c) Landscaping,
- (d) Erection of perimeter fence and gate,
- (e) Provision of furniture and fixtures (including curtain).

B. Services and Cost Sharing

- (a) Provision of necessary information and data for the implementation of the Project,
- (b) Insurance of prompt customs clearance of machinery and equipment required for the Project and their exemption from any domestic taxes,

- (c) Exemption of Japanese companies and personnel involved in the Project from any domestic taxes (customs duties, income tax and VAT, etc.),
- (d) Accordance to Japanese personnel of all facilities necessary for them to conduct their Project-related assignments during their stay in Cambodia,
- (e) Bearing of all maintenance expenses of the planned buildings and equipment,
- (f) Make the following arrangements and bear the cost incurred.
 - Banking services
 - All cost relating to official permits or required authorizations.

(2) Project Implementation Schedule

The implementation schedule for the Project is outlined in Table 4-8.

The period required for each work is as follows:

- From Exchange of Notes (E/N) to the contract of construction and contract of equipment supply to be 2.5 months each for both 1st and 2nd fiscal year.
- Construction of facilities : 1st FY 10 months, 2nd FY 12 months
- Equipment supply : 1st FY 10 months, 2nd FY 12 months

The component in each fiscal year is as follows:

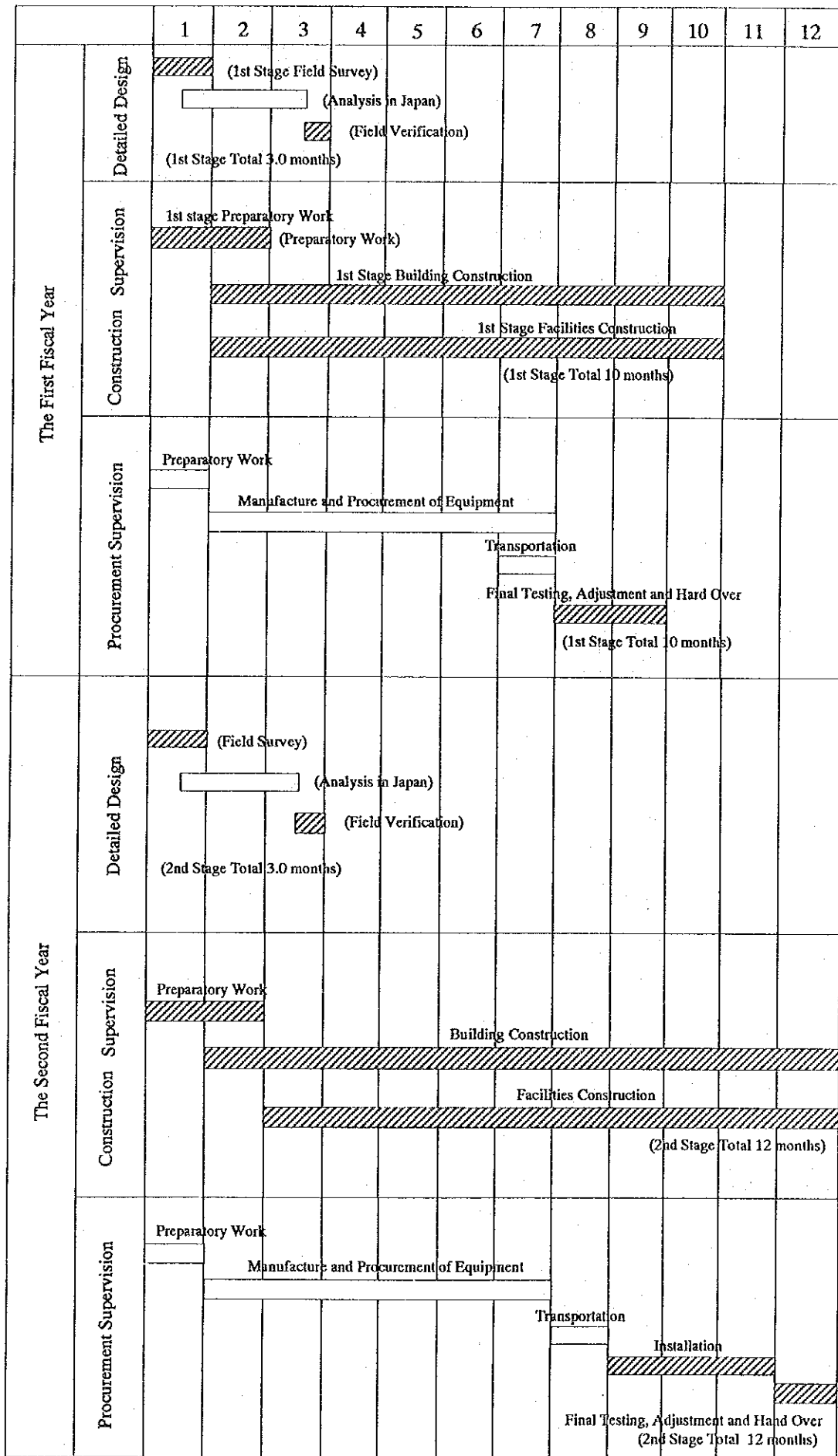
The First Fiscal Year

1) Facilities	Item	Area
	1. Administration office	New construction 520 m ²
	2. Generator house	New construction 120 m ²
	3. Elevated water tank	New construction 2
	4. Power supply facility	New construction 1 LS
	5. Water supply & sewage facility	New construction 1 LS
	6. Generator	New construction 2
	7. Waterpump	New construction 2
2) Equipment	Item	Q'ty
	Construction Equipment	
	1. Bulldozer	1
	2. Motor grader	1
	3. Wheel loader 12 t class	1
	4. Wheel loader 16 t class	1
	5. Hydraulic shovel	1
	6. Tandem roller	1
	7. Vibration roller	1
	8. Dump truck	2
	9. Asphalt distributor	1
	10. Asphalt sprayer	1
	11. Rammer	1
	12. Hand vibration roller	1
	13. Water tanker	1
	14. Fuel tanker	1
	15. Pick up	2
	16. Station wagon	1
	17. Trailer/Tractor	1
	18. Mobile workshop	1
	19. Tractor shovel	1
	20. Portable stone crusher	1
	21. Crawler drill	1
	22. Air compressor 17 m ³ /min	1
	23. Flat bed truck	1
	24. Concrete mixer	1
	25. Concrete vibrator	2
	26. Asphalt Kettle	1
	27. Radio set	3
	28. Spare parts	LS

The Second Fiscal Year

1) Facilities	Item	Area
	1. Workshop (A)	New construction 1,420 m ²
	2. Workshop (B)	Rehabilitation 960 m ²
	3. Operation quarter & warehouse	Rehabilitation 1,200 m ²
	4. Garage & parts storage	Rehabilitation 960 m ²
	5. Other ancillary facility	New construction 1 LS
	6. Power supply facility	New construction 1 LS
	7. Water & sewage facility	New construction 1 LS
	8. In-site road	Rehabilitation 1 LS
	9. Equipment yard	1 LS
2) Equipment	Item	Q'ty
	Construction Equipment	
	1. Bulldozer	3
	2. Motor grader	3
	3. Wheel loader 12 t class	3
	4. Wheel loader 16 t class	1
	5. Hydraulic shovel	1
	6. Tandem roller	1
	7. Vibration roller	3
	8. Dump truck	6
	9. Asphalt distributor	1
	10. Asphalt sprayer	3
	11. Rammer	3
	12. Hand vibration roller	3
	13. Water tanker	3
	14. Fuel tanker	3
	15. Pick up	4
	16. Station wagon	4
	17. Chip spreader	2
	18. Hydraulic truck crane	1
	19. Flat bed truck	1
	20. Air compressor 5 m ³ /min	2
	21. Generator	2
	22. Concrete cutter	1
	23. Line marker	1
	24. Concrete mixer	3
	25. Concrete vibrator	6
	26. Asphalt Kettle	1
	27. Water pump	4
	28. Radio set	8
	29. Spare parts	1
	Workshop Equipment	
	1. Chassis repair	LS
	2. Engine repair	LS
	3. Fuel component repair & test	LS
	4. Electric component repair & test	LS
	5. Battery service	LS
	6. Power train repair	LS
	7. Tire service	LS
	8. Machine	LS
	9. Welding & fabrication	LS
	10. under carriage rebuilding	LS
	11. Compressor	LS
	12. Cleaning	LS
	13. General tools	LS
	14. Rack, workbench, etc	LS
	15. special tools	LS

Table 4-8 Implementation Schedule



□ : Cambodia ▨ : Japan

CHAPTER V CONCLUSION

CHAPTER V CONCLUSION

The Road Construction Center of RBD under the jurisdiction of MPWT is located along RN4 in the western suburb of Phnom Penh, which embraces a commanding role in the comprehensive road recovery programmes of Cambodia.

The Project will reorganize and reinforce capacity of the existing Road Construction Center by virtue of improvement of the facilities together with workshops and provision of construction equipment for the Emergency Repair of the Trunk National Roads. The positive impact accrued by the Project is summarized in Table 5-1.

In addition to these direct effects the following benefits are expected:

- To stimulate economic activities by providing reliable road facility, thus saving transport cost between agricultural producing area and the capital,
- To realize price stability by saving distribution cost,
- To facilitate rural population to access to social services such as medical service, education, etc.,
- To promote displaced people to settle down in permanent abode.

In conclusion, the Project will contribute significantly to increase the social stability and public welfare, thus early implementation of the Project under Japan's grant aid is strongly recommended.

The workshop to be improved under the Project will be the first workshop equipped with essential facilities in Cambodia which can provide self-sustainable services. It can also be a leading case for a workshops in order to be deployed in the regional center of the remote area in future. An initial operation is important for smooth and effective management and development of successive operation. Thus, it is recommended to dispatch technical experts in the fields of workshop management and equipment maintenance.

As for introduction of construction equipment, both type and number concluded in the basic design study shall only to satisfy the minimum and essential requirements for urgent repair and maintenance of the trunk national roads within a some 100 km of radius of metropolitan circle. There shall be fundamental needs for construction equipment, in

medium and long term prospect, in order for the establishment of rehabilitation and reconstruction system of the principal roads in Cambodia.

The Road Construction Center is expected to expand its functions to provide an integrated technical training in routine in the field of road rehabilitation and equipment maintenance. Hence, it is recommended an establishment of the training facilities and provision of training equipment in grant aid are strongly recommended.

Table 5-1 Summary of the Project Effects

Status quo and problems	Measures to be realized under the Project	Expected positive impacts and the extent of Project																				
<p>Emergency recovery of the economic infrastructures, particularly a 6,000 km of principal roads (3,000 km of National Road and 3,000 km of Provincial Road) which had been adversely affected during the hostilities mainly due to neglect of repair and maintenance, demands to be placed the highest priority in the current 5-year National Development Plan.</p> <p>In relation to the establishment of the new administration, almost all the physical functions of RBD which is located in Phnom Penh are being transferred to the Road Construction Center which is intended to become virtually a head quarter for the implementation of the road recovery programmes of Cambodia. However, the existing ODEM's facilities which includes a workshop for construction equipment and vehicles were seriously deteriorated or destroyed during the civil war before 1979. Also the existing workshop equipment are valued totally unusable.</p>	<p>To reorganize and strengthen the capacity of the Road Construction Center which will act key roles to attain the road recovery programme.</p> <p>The national roads covered by RCC are part of the most important sections of the National Roads RN1, RN2, RN3, RN5, RN6, RN7, RN15 and RN26 within a some 100 km of radius of metropolitan circle.</p> <p>To rehabilitate the facilities of existing Road Construction Center to meet its primary functions expected as a head quarter for implementation of the road recovery programme.</p> <p>To provide workshop equipment to satisfy the essential requirements for equipment repair, and establish an appropriate maintenance system.</p>	<p>To realise emergency repair and maintenance of the objective section of the trunk national roads:</p> <table border="1" data-bbox="343 224 542 672"> <tr><td>RN1</td><td>61 km</td><td>RN7</td><td>68 km</td></tr> <tr><td>RN2</td><td>76 km</td><td>RN15</td><td>97 km</td></tr> <tr><td>RN3</td><td>75 km</td><td>RN26</td><td>40 km</td></tr> <tr><td>RN5</td><td>91 km</td><td>Others</td><td>50 km</td></tr> <tr><td>RN6</td><td>42 km</td><td>Total</td><td>600 km</td></tr> </table> <p>To strengthen a function of existing workshop to repair and maintain the construction equipment including those introduced under the Project, which will be used not only for the implementation of the emergency road recovery programmes with inclusion of the Emergency Trunk National Roads repair scheme under the Project. To upgrade the equipment repair and maintenance techniques to cover the equipment of western countries.</p>	RN1	61 km	RN7	68 km	RN2	76 km	RN15	97 km	RN3	75 km	RN26	40 km	RN5	91 km	Others	50 km	RN6	42 km	Total	600 km
RN1	61 km	RN7	68 km																			
RN2	76 km	RN15	97 km																			
RN3	75 km	RN26	40 km																			
RN5	91 km	Others	50 km																			
RN6	42 km	Total	600 km																			
<p>Provision of appropriate type and number of construction equipment is essential for execution of the road recovery programme. Most of available construction equipment of RBD of USSR or east-European block origin are aged, and new supply of spare parts becomes virtually impossible. Thus, implementation of the recovery programmes is seriously hindered by the lack of efficient and operable equipment.</p> <p>Urgent recovery of trunk roads national is very essential for achievement of socio-economic stability of the Country. However, shortage of fund affects every aspects of inputs and resources in order for implementation of the road recovery programme.</p>	<p>To provide construction equipment and establish the four Trunk National Road Emergency Repair Units (ERUs), one Drainage Unit, one Aggregates Production Unit, one Transport Unit and one Mobile Workshop Unit, separate from existing road rehabilitation units.</p> <p>To mitigate the Government's financial burden through the grant aid for improvement of the facilities of the Road Construction Center and provision of the equipment in order to realize emergency repair of trunk national roads.</p>	<p>To enhance recovery of the objected national roads in the vicinity of metropolitan circle, supplementary to the capacity of existing road rehabilitation unit which may cover relatively remote sections of national roads, and to realise continuous work for routine and periodic maintenance of the projected roads.</p> <p>To secure the access between the capital and rural areas within some 100 km of radius of metropolitan circle. To provide opportunity of vocational training. To promote the agricultural production in the influence area.</p>																				

ANNEX

- ANNEX - 1 List of Study Members**
- ANNEX - 2 Survey Schedule**
- ANNEX - 3 List of the Relevant Officials**
- ANNEX - 4 Minutes of Discussions**
- ANNEX - 5 Basic Design Drawings**
- ANNEX - 6 Topographic Survey Maps**
- ANNEX - 7 Condition of Construction Equipment owned by RBD**
- ANNEX - 8 Urgent Roads and Bridges Rehabilitation Programme of
Principal Roads by Multilateral and Bilateral Donor Agencies**
- ANNEX - 9 Calculation of Operation Costs of the Equipment**
- ANNEX - 10 Calculation of Number of Bay Required for the Workshop**
- ANNEX - 11 Calculation of Required Number of The Equipment**

ANNEX 1 List of Study Members

Survey for Basic Design Study

Mr. Masao Takai	Leader Director of Second Basic Design Study Div., Grant Aid Study and Design Dept., JICA
Mr. Atsushi Sugiyama	Construction Equipment Planner Senior Staff of Engineering Dept. Tokyo 2nd Operation Bureau, Japan Highway Public Corporation
Mr. Yoichi Higaki	Project Manager Construction Project Consultants, Inc.
Mr. Kiyohiro Yoshikawa	Equipment Planner Construction Project Consultants, Inc.
Mr. Yutaka Takahashi	Architectural Planner Yachiyo Engineering, Co., Ltd.
Toshiko Shibata	Interpreter

Explanation and Discussion on Draft Final Report

Yodo Kakuzen	Leader First Project Management Div., Grant Aid Project Management Dept., JICA
Youichi Higaki	Project Manager Construction Project Consultants, Inc.
Toshiko Shibata	Interpreter

ANNEX 2 Survey Schedule

Survey for Basic Design Study

<u>Item</u>	<u>Date</u>	<u>Activities</u>
1.	Aug. 1993 11 (Wed.)	Consultant's Team (including Interpreter) Departed from Tokyo at 10:55 (JL -717) Arrived in Bangkok at 15:05, stay overnight
2.	12 (Thu.)	Departure from Bangkok at 10:50 (TG-696) Arrival in Phnom Penh at 12:00 p.m. Courtesy call on the Ministry of Public (MOPW), Roads and Bridges Department (RBD)
3.	13 (Fri.)	a.m. Inspection of the Road Construction Center site p.m. Discussions with Mr. Chankosal, Deputy Director of RBD, and discussions with Mr. Fujimoto, JICA Expert
4.	14 (Sat.)	a.m. Discussions with the relevant officials of MOPW p.m. Collecting necessary data, materials, etc.
5.	15 (Sun.)	(1) Inspection of road condition for National Roads, RN2, RN3, RN5 and RN26 by Mr. Higaki, Project Manager, and Mr. Fujimoto, JICA Expert (Stay overnight in Kompong Chhnang) (2) Inspection of the Road Construction Center site by Mr. Takahashi, Architectural Planner and Mr. Yoshikawa, Equipment planner
6.	16 (Mon.)	(1) Inspection of road condition for National Roads, RN6 and RN7 by Mr. Higaki, Mr. Fujimoto (Stay overnight in Kompong Cham) (2) Inspection of the Road Construction Center site by Mr. Takahashi and Mr. Yoshikawa
7.	17 (Tue.)	(1) Inspection of road condition for National Roads, RN15 and RN1 by Mr. Higaki and Mr. Fujimoto (2) Inspection of the Road Construction Center by Mr. Takahashi and Mr. Yoshikawa
8.	18 (Wed.)	a.m. Discussions with the relevant officials of RBD p.m. Collecting necessary data, materials, etc.
9.	19 (Thu.)	Mr. Takai, Team Leader, and Mr. Sugiyama, Construction Equipment Planner arrived in Phnom Penh at 12:00 (TG-696) p.m. Courtesy call to the Japan Embassy in Cambodia

10. 20 (Fri.) a.m. Courtesy call to the Ministry of Public Works
Discussions with the relevant officials
- p.m. Courtesy call to the Ministry of Foreign Affairs
Internal Meeting
11. 21 (Sat.) a.m. Inspection of the Road Construction Center site
Discussions with the relevant officials
- p.m. Internal Meeting
12. 22 (Sun.) Internal Meeting, Collecting necessary data, materials, etc.
13. 23 (Mon.) a.m. Inspection of road condition for National Roads RN6 and
RN6A by Mr. Takai, Mr. Sugiyama, Mr. Higaki and Mr.
Fujimoto
- Preparation of the Minutes of Discussion (draft) by Mr.
Takahashi and Mr. Yoshikawa
14. 24 (Tue.) Discussions with the relevant officials of MOPW on the
Minutes of Discussion (draft)
15. 25 (Wed.) a.m. Inspection of road condition for National Roads RN2 and
RN3 by Mr. Takai, Mr. Sugiyama, Mr. Higaki, Mr.
Yoshikawa and Mr. Fujimoto
- p.m. Courtesy call to the Ministry of Finance and Economy by
Mr. Takai
16. 26 (Thu.) a.m. Final discussion with the relevant officials of MOPW on
the Minutes of Discussion (draft)
- p.m. Signing of the Minutes of Discussion
17. 27 (Fri.) Mr. Takai and Mr. Sugiyama left Cambodia /
Departure from Phnom Penh at 13:15 (TG-697)
- Other member continued the survey
Discussions with the relevant officials, collecting necessary
data, materials, etc.
18. 28.(Sat.) Discussions with the relevant officials, collecting necessary
data, materials, etc.
19. 29 (Sun.) Internal Meeting, collecting necessary data, materials, etc.
20. 30 (Mon.) Discussions with the relevant officials, collecting necessary
data, materials, etc.

21. 31 (Tue.) (1) Consultant's member, Mr. Takahashi and Mr. Yoshikawa left Cambodia/Departure from Phnom Penh at 13:15 (TG-697)
(2) Inspection of road condition for National Roads RN2 and RN4 by Mr. Higaki and Mr. Fujimoto
(Stay overnight at Kampot)
22. 1 Sep. (Wed.) Inspection of road condition for National Road, RN2 and RN4 by Mr. Higaki and Mr. Fujimoto
23. 2 (Thu.) Discussions with the relevant officials of the Ministry of Planning, UNDP
Collecting supplementary materials
24. 3 (Fri.) Mr. Higaki and Miss Shibata, Interpreter left Cambodia / Departure from Phnom Penh at 13:15 (TG-697)
Arrival in Bangkok at 14:25
Leave Bangkok at 23:30 (JL-718)
25. 4 (Sat.) Arrival in Tokyo at 05:55

Explanation and Discussion on Draft Report

<u>Item</u>	<u>Date</u>	<u>Activities</u>
1.	Nov. 1993 13 (Sat.)	Consultant's Team (including Interpreter) Departed from Tokyo at 10:55 (JL -717) Arrived in Bangkok at 15:05, stay overnight
2.	14 (Sun.)	Departure from Bangkok at 10:50 (TG-696) Arrival in Phnom Penh at 12:00 Discussion with the Leader
3.	15 (Mon.)	Discussion with the relevant officials of MPWT on the Draft Report.
4.	16 (Tue.)	Discussion with the relevant officials of MPWT on the Draft Report.
5.	17 (Wed.)	a.m. Signing of the Minutes of Discussion p.m. Collecting supplementary data and information.
6.	18 (Thu.)	Collecting supplementary data and information
7.	19 (Fri.)	Mr. Higaki and Miss Shibata, Interpreter left Cambodia/ Departure from Phnom Penh at 13:15 (TG-697) Arrival in Bangkok at 14:25 Leave Bangkok at 23:30 (JL-718)
8.	20 (Sat.)	Arrival in Tokyo at 05:55

ANNEX 3 List of the Relevant officials

Survey for Basic Design Study

1. Embassy of Japan in Cambodia

Ambassador Extraordinary and Plenipotentiary	Mr. Yukio Imagawa
First Secretary	Mr. Takashi Hoshiyama
First Secretary	Ms. Noriko Abe

2. JICA

JICA Expert in the Ministry of Public Works	Mr. Akira Fujimoto
JICA Expert in the Ministry of Planning	Mr. Toshiyuki Kasai

3. ANTAC/PKO

Senior Staff	Mr. Koukichi Tsuchiya
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4. Ministry of Public Works

Minister	H. E. Ing Kieth
Vice Minister	H. E. Dr. Iv Tek Tram
Permanent Secretary	Mr. Chin Ckimsreng
Assistant permanent Secretary	Mr. Tan Naysien
Director of Department of Technique	Mr. Yith Bunna
Director of Department of Planning	Mr. Chum Sokun
Director of Department of Finance	Mr. Meas Sakhon
Chief Director	Mr. Iv Kheng
Department of Finance	Ms. Em Sotha
Department of Technique	Mr. Ung Bun Ly
Department of Technique	Mr. Ouk Nida

(Roads and Bridges Department, RBD)

Director	Mr. Uk Chan
Deputy Director	Mr. Tauch Chankosal
Chief of the Planning Office	Mr. Duong Moeun
Chief of Administration Office	Mr. Tong Beng Song
Chief of Material Office	Mr. Iv Meng
Chief of Finance Office	Mr. Sar Sitham
Vice Chief of Planning	Mr. Ou Mor
Finance Office	Mr. Hou Seng Huor
Chief of ODEM Workshop	Mr. Kim Sok Heng

Vice Chief of ODEM Workshop	Mr. Lao Lay
Vice Chief of Technical Office	Mr. Mon Sambath
Mechanical Engineer of ODEM Workshop	Mr Uk Sota
Civil Engineer	Mr. Chreung Soktharath
Chief of Survey Team	Mr Keo Leap
5. Ministry of Finance and Economy	
Minister	H. E. Sam Rainsy
Director of Department of Investment	Ms. Kim Seon
Center Bank	Mr. Kang Y
6. Ministry of Foreign Affairs	
Vice Minister	H. E. Uch Kiman
Director of Economic • Cultural Cooperation	Ms. You Ay
Technical Cooperation between Japan	Mr. Ros Simara
7. Ministry of Planning	
Director of Department of Planning	Mr. Yanara Chhieng
Acting Director of Department of Economic Cooperation	Mr. Pra Sopheak
Assistant Director of Department of Economic Cooperation	Mr. Seck Soven
8. Committee of Minister	
9. Kompong Som City	
Municipal Standing Committee	Mr. Meas Laing
Director of Municipal Public Works	Mr. So Chung Hour
10. Kompong Chhnang Province	
Vice Governor	Mr. Sao Saroeun
Director of Roads and Bridges Department	Mr. Kao Kosar
Vice Director of Roads and Bridges Department	Mr. Chan Sophan
11. Kompong Cham Province	
Director of Public Works Department	Mr. Than Doern
Vice Director of Public Works Department	Mr. Bung Eng
Vice Director of Public Works Department	Mr. Soeung Many

12. Kampot Province

Director of Roads and Bridges Department
Director of Roads and Bridges Department
Engineer
Engincer

Mr. Bour Chin Hell
Mr. Chin Narith
Mr. Lim Sam Bo
Mr. Tel Chandrith

13. United Nations Development Programme (UNDP)

Senior Programme Assistant Fellowship

Mr. Te Duong Tara

Explanation and Discussion on Draft Final Report

1. Embassy of Japan in Cambodia

Ambassador Extraordinary and Plenipotentiary
First Secretary
First Secretary

Mr. Yukio Imagawa
Mr. Takahashi Hoshiyama
Mr. Noriko Abe

2. JICA

JICA Expert in the Ministry of Planning

Mr. Toshiyuki Kasai

3. Ministry of Public Works

State Minister of Minister of Public Works
and Transport
Vice Minister
Vice Minister
Vice Minister
Chief of Service
General Director
Director of Technical Dept.
Director of Civil Construction Dept.
Director of Planning Dept.
Director of Financial Dept.
Director of Construction Dept.
Director of Financial and Planning,
General Direction of Construction
Vice Director of Construction
General Direction of Construction

H.E. Ing Kieth
H.E. Chin Kimsreng
H.E. Tram Iv Tak
H.E. Nu Sank Khon
Mr. Iv Kheng
Mr. Sieng Har
Mr. Yct Bona
Mr. Tan Naysien
Mr. Chum So Kon
Mr. Meas So Khon
Mr. Lean Chick

Mr. Sun Chan Thol

Mr. Pong Bon Hun

RBD
Director
Vice Director
Vice Director
Chief of Planning
Chief of Technical
Technical Staff
Ministry of Planning

Mr. Uk Chan
Mr. Tauch Chankosal
Mr. Koy Van
Mr. Ou Mol
Mr. Mon Sambath
Mr. Phen Soweheano
Mr. Chhieu Nam

MINUTES OF DISCUSSIONS
BASIC DESIGN STUDY ON THE PROJECT FOR
IMPROVEMENT OF THE ROAD CONSTRUCTION CENTER
IN CAMBODIA

Based on the results of the preliminary study, the Japan International Cooperation Agency (JICA) decided to conduct a basic design study on the improvement of the Road Construction Center in Cambodia (hereinafter referred to as "the Project").

JICA sent to Cambodia a study team, which is headed by Mr. Masao TAKAI, director, basic design study division II, grant aid study and design department, JICA, and is scheduled to stay in the country from August 12 to September 3, 1993.

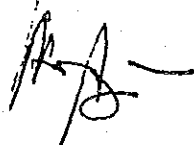
The team held discussions with the officials concerned of the government of Cambodia and conducted a field survey at the study area.

In the course of discussions and field survey, both parties have confirmed the main items described on the attached sheets. The team will proceed to further works and prepare the basic design study report.

Phnom Penh, August 26, 1993

高井正夫

Masao Takai
Leader
Basic Design Study Team
JICA



H.E. Ing Kieth
State Minister
Ministry of Public Works
Cambodia

ATTACHMENT

1. Objective

The objective of the Project is to assist Cambodia in his task to fulfill his mission in rehabilitation and to strengthen the capacities of the Road Construction Center for road construction and equipment maintenance.

2. Project site

The Project site is located in Phnom Penh area which is shown in ANNEX 1.

3. Executing agency

Department of Roads and Bridges (RBD), Ministry of Public Works

4. Items requested by the Cambodian authorities

After discussions with the basic design study team, the following components were finally requested by the Cambodian authorities, which is shown in ANNEX 2.

(1) Improvement of workshop facilities

- Newly construction of workshop building
- Rehabilitation of existing machine shop to the multi purpose building
- Rehabilitation of existing warehouse to the parts warehouse and garage for construction equipment
- Newly construction of administration and engineer's office
- Ancillary facilities such as generator room, fuel and lubricant stand, unloading deck etc.

(2) Procurement of the workshop equipment

(3) Procurement of some required necessary construction equipments

(4) In addition to the sub-items (1) to (3) described above, the Cambodian authorities requested strongly to the mission to include the construction materials as shown in ANNEX 4, which, however, could fall out of the scope of the mission, the mission replied to the Cambodian authorities to convey such an additional request to the authorities concerned in Japan.

However, the final components of the Project will be decided after further studies through consultation with the authorities concerned in Japan.

5. Japan's Grant Aid System

- (1) The Cambodian authorities understood the system of Japan's Grant Aid explained by the basic design study team.
- (2) The Cambodian authorities will take necessary measures described in ANNEX 3, for smooth implementation of the Project on condition that the Grant Aid Assistance by the government of Japan is extended to the Project.

6. Schedule of the study

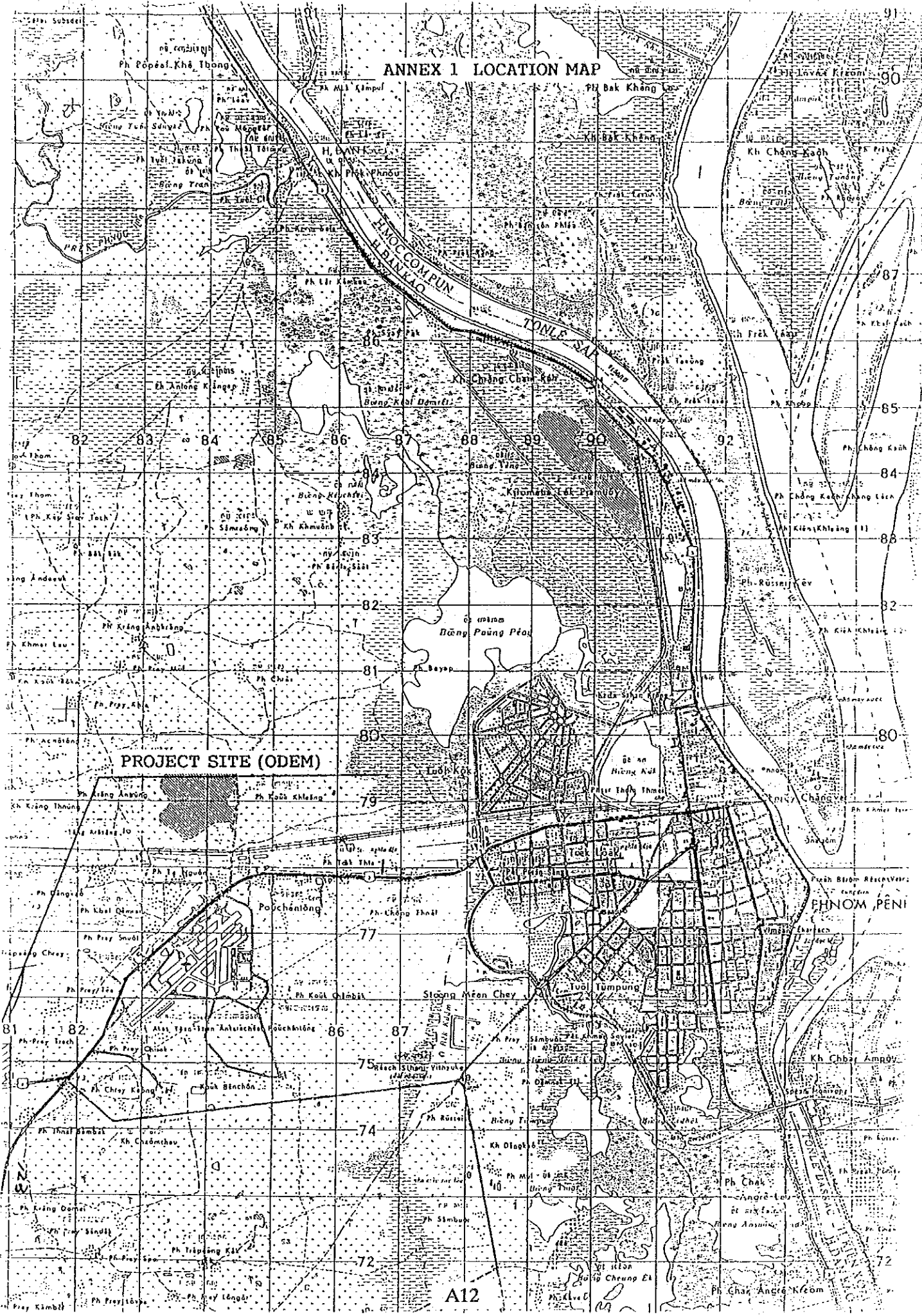
- (1) The basic design study team will conduct further studies in Cambodia until september 3,1993.
- (2) JICA will prepare the draft report in english and dispatch a mission in order to explain its contents around middle of november,1993.
- (3) In case that the contents of the draft report is accepted in principle by the Cambodian authorities, JICA will complete the final report and send it to Cambodia around february,1994.

7. Technical Assistance

The Cambodian authorities pointed out the need for dispatch of japanese experts as well as technical training of counterpart personnel in Japan. The Cambodian authorities also understood that the technical cooperation cannot be requested in the Grant Aid System and that another official request should be submitted through diplomatic channels.

M.T

ANNEX 1 LOCATION MAP



PROJECT SITE (ODEM)

PHNOM PENH

ANNEX 2

The components requested by the Cambodian authorities are as follows:

(1) Improvement of workshop facilities

1) Newly construction of workshop

- chassis repair shop
- fuel component repair shop
- battery service shop
- tire service shop
- welding & fabrication shop
- compressor room
- tool room
- others
- engine repair shop
- electric component repair shop
- power train repair shop
- machine shop
- undercarriage rebuilding shop
- cleaning area
- parts warehouse

2) Rehabilitation of existing machine shop to the multi purpose building

- resting room
- locker room
- meeting room
- engineer's room
- shower room & toilet
- practice room
- office

3) Rehabilitation of existing warehouse to the spare parts & materials warehouse and garage for construction equipment

- spare parts warehouse
- garage

4) Newly construction of administration & engineer's office

- director's room
- engineer's room
- meeting room
- deputy director's room
- office
- toilet

5) Ancillary facilities

- generator room
- washing stand
- unloading deck
- well for drinking & workshop
- car parking
- guard house
- fuel & lubricant stand
- paint shop
- construction equipment yard
- water tank
- radio set for radio room

(2) Procurement of the workshop equipment

- 1) chassis repair equipment and tools
 - overhead crane (5 t & 3 t)
 - mechanic tool set
- 2) engine repair equipment and tools
 - engine positioner
 - cylinder boring machine
 - parts washer
 - valve refacer
- 3) fuel component repair, test equipment and tools
 - fuel injection pump tester
 - nozzle tester
 - parts cleaner
- 4) electric component repair, test equipment and tools
 - starter, generator, test bench
 - circuit tester
- 5) battery service equipment and tools
 - silicon quick charger
 - battery tester
- 6) power train repair equipment and tools
 - engine positioner
 - mobile floor crane
- 7) tire service equipment and tools
 - hydraulic tire removing tool
 - thermopress
 - tire service tool set
- 8) machine shop equipment and tools
 - precision lathe
 - upright drilling machine
 - bench drill press
 - hack sawing machine
- 9) welding and fabrication equipment and tools
 - AC arc welder
 - electrode drier
 - hydraulic shop press 100 ton
 - engine driven generator welder
- 10) undercarriage rebuilding equipment and tools
 - roller and idler press
 - truck press
 - shoe bolt impact wrench
- 11) compressor
 - compressor
 - exhaust pipeline
- 12) cleaning equipment
 - hot water high pressure washer
 - steam cleaner
- 13) common tools
 - testing tools
 - repairing tools
- 14) special tools
 - for engine
 - for chassis
 - for inspection

(3) Procurement of some required necessary construction equipment

1) For brigade

		priority A	priority B	priority C
- bulldozer	17 ton class	4	3	2
- motorgrader	3.7 m class	4	3	2
- wheel loader	10 ton class	4	3	2
- back hoe with sevral attachment	19 ton class	4	3	2
- road roller tandem	10 ton class	4	3	2
- vib roller	8 ton class	4	3	2
- dump truck	10 ton class	12	9	6
- asphalt distributer	6 cubic meter	4	3	2
- water tanker(with spray)	8 cubic meter	4	3	2
- fuel tanker	8 cubic meter	4	3	2
- pick-up(double cab)		8	6	4
- land cruiser		4	3	2

2) For central workshop

- truck crane hydraulic	30 ton class	1	1	1
- truck crane hydraulic	7 ton class	1	1	1
- trailer & tractor	25 ton class	1	1	1
- mobile workshop		1	1	1
- wheel loader	16 ton class	2	2	2
- tractor shovel	18 ton class	1	1	1
- portable crusher & screen		1	1	1
- pick-up(double cab)		2	2	2
- land cruiser		1	1	1
- flat bed truck(with 500 kg crane)		2	2	2
- air compressor(portable 5 cubic meter/min.)		2	2	2
- generator(45 KVA)		2	2	2
- others(tamper & rammer, concrete cutter, line marker braker, asphalt sprayer, vibrator(diesel) hand guide vib roller 1 ton)			1 lump sum	

NOTE: 1) "priority A" means equipment which form the most ideal brigades essential to the rehabilitation purpose of the trunk roads.

2) "priority B" means equipment which include additional equipment to "priority C" to form the standard fleet of the RBD to accomplish the rehabilitation works.

3) "priority C" means equipment which are absolutely indispensable to supplement the essential core of the existing fleet in order to proceed the rehabilitation of the trunk roads.

ANNEX 3

Necessary measures to be taken by Cambodian authorities in case that Japan's Grant Aid is extended to the Project are as follows:

1. To secure a lot of land necessary for the construction of the building and facilities including temporary land for a construction liaison office, warehouse, stockyard, etc.
2. To clear, level and reclaim the Project site, when needed, prior to commencement of the construction.
3. To undertake incidental outdoor works such as gardening, fencing, gates around the Project site.
4. To provide general furniture such as carpets, curtains, tables, chairs, etc.
5. To bear payment commissions to the Japanese foreign exchange bank for the banking services based upon the Banking Arrangement (B/A).
6. To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in Cambodia with respect to the supply of the products and services under the Verified Project Contracts.
7. To ensure prompt unloading and customs clearance at ports of disembarkation in Cambodia and internal transportation therein of the products purchased under the Grant.
8. To accord Japanese nationals whose services may be required in connection with the supply of products and services under the verified contracts such facilities as may be necessary for their entry into Cambodia and stay therein for the performance of their work including preparation of ID card for them.
9. To coordinate and solve any matters related which may arise with third party and inhabitants living in the Project area during implementation of the Project.

10. To provide necessary data and information for detailed design.
11. To provide disposal places of the soil, water, etc., discharged during the construction period.
12. To ensure that the facilities constructed and the products purchased under the Grant be maintained and used properly and effectively for the execution of the Project.
13. To bear all the expenses other than those covered by the Grant, necessary for the execution of the Project.

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ANNEX 4

Additional request

Bituminous material required for the rehabilitation of about 100 km of the national highways.

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A

MINUTES OF DISCUSSIONS
BASIC DESIGN STUDY ON THE PROJECT FOR
IMPROVEMENT OF ROAD CONSTRUCTION CENTER
THE KINGDOM OF CAMBODIA
(CONSULTATION ON DRAFT REPORT)

In August, 1993, Japan International Cooperation Agency (JICA) dispatched a Basic Design Study Team on the Project for Improvement of the Road Construction Center (hereinafter referred to as "the Project") to the Kingdom of Cambodia, and through discussions, field survey, and technical examination of the results in Japan, has prepared the draft report of the study.

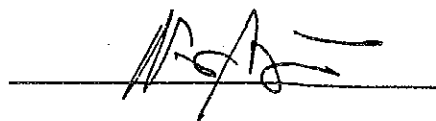
In order to explain and to consult the Royal Government of Cambodia on the components of the draft report, JICA sent to the Kingdom of Cambodia a study team, which is headed by Mr. Yodo Kakuzen, First Project Management Div., Grant Aid Project Management Dep., JICA, and is scheduled to stay in the country from November 12 to 19, 1993.

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

Phnom Penh, November 17, 1993



Yodo Kakuzen
Leader,
Basic Design Study Team,
JICA



H.E. Ing Kieth
Senior Minister,
Ministry of Public Works
and Transport,
The Kingdom of Cambodia

ATTACHMENT

1. Component of Draft Report

The Royal Government of Cambodia has agreed and accepted in principle the components of the draft report proposed by the Team.

2. Japan's Grant Aid System

- (1) The Royal Government of Cambodia has understood the system of Japan's Grant Aid explained by the Team.
- (2) The Royal Government of Cambodia will take necessary measures, described in ANNEX for smooth implementation of the Project, on condition that the Grant Aid Assistance by the Government of Japan is extended to the Project.

3. Further Schedule

The Team will make the final report in accordance with the confirmed items, and send it to the Royal Government of Cambodia by February, 1994.

4. Technical Assistance

The Royal Government of Cambodia pointed out the need for dispatch of Japanese experts as well as technical training of counterpart personnel in Japan. The Royal Government of Cambodia also understood that the technical cooperation can not be required in the Grant Aid System and that another official request should be submitted through diplomatic channels.

3

ANNEX

Necessary measures to be taken by the Royal Government of Cambodia in case that Japan's Grant Aid is extended to the Project are as follows:

1. To secure a lot of land necessary for the construction of the building and facilities including temporary land for a construction liaison office, warehouse, stockyard, etc.
2. To clear, level and reclaim the project site, when needed, prior to commencement of the construction.
3. To undertake incidental outdoor works, gardenings, fencing, gates around the Project site.
4. To provide general furniture such as carpets, curtains tables, chairs, etc.
5. To bear commissions to the Japanese foreign exchange bank for the banking services based upon the Banking Arrangement (B/A).
6. To exempt Japanese nationals from custom duties, internal taxes and other fiscal levies which may be imposed in the Kingdom of Cambodia with respect to the supply of the products and services under the verified contracts.
7. To ensure prompt unloading and custom clearance at port of disembarkation in the Kingdom of Cambodia and internal transportation therein of the products purchased under the Projects.
8. To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the verified contract such facilities as may be necessary for their entry into the Kingdom of Cambodia and stay therein for the performance of their work, including preparation of ID card for them.

9. To coordinate and solve any issues related to the Project which may arise with third parties and inhabitants living around the Project area during implementation of the Project.

10. To provide necessary data and informations for detailed design.

11. To provide disposal places of the soil, water etc., discharged during construction period.

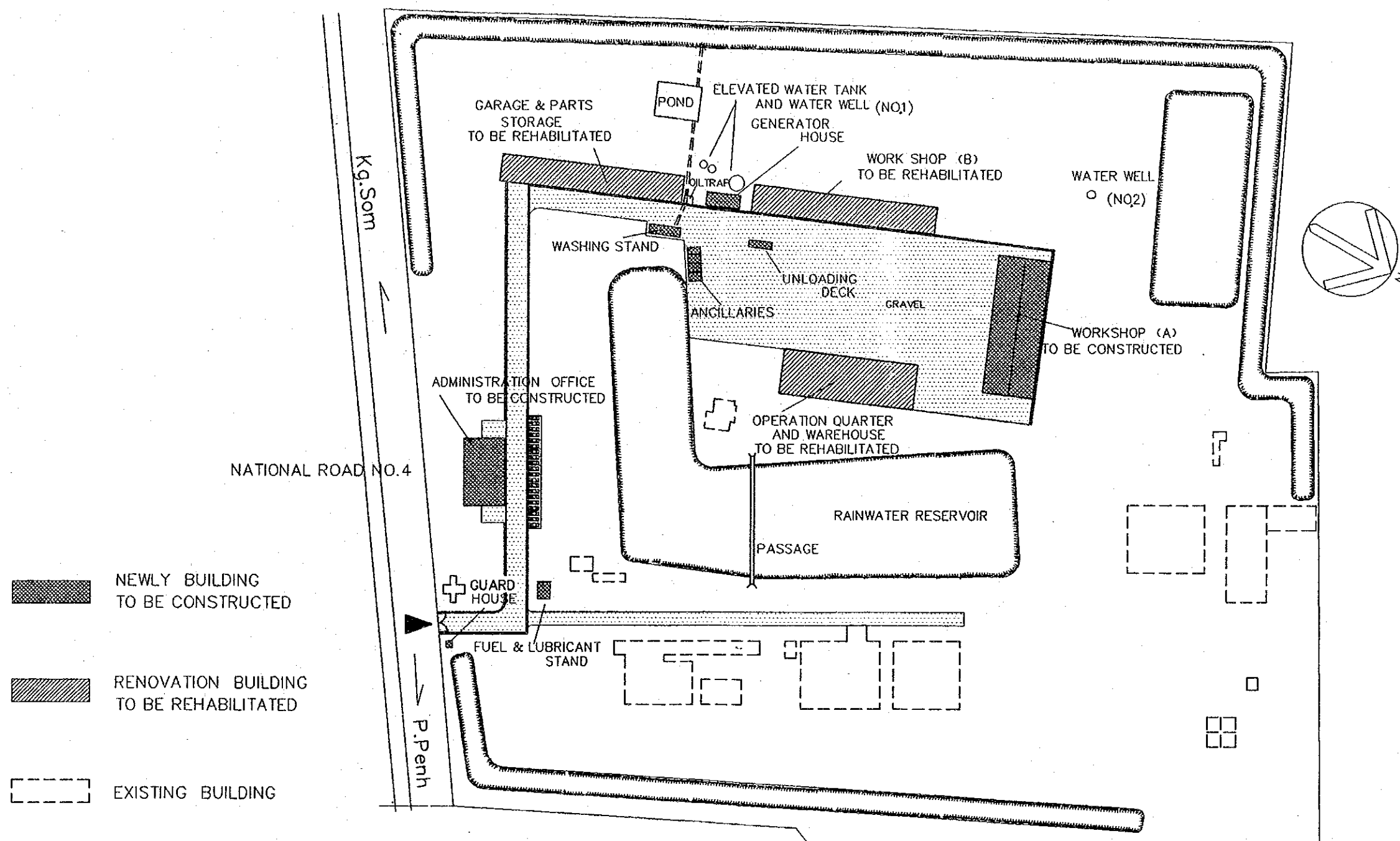
12. To ensure that facilities constructed and the products purchased under the Grant be maintained and used properly and effectively for the execution of the Project.



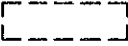
13. To bear all the expenses other than those to be covered by the Grant, necessary for the execution of the Project.

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②

DRAWING LIST OF BASIC DESIGN

DWG NO.	DRAWING	TITLE	SCALE
A-1	PLOT PLAN		1/2,000
A-2	FINISH SCHEDULE (1)		-
A-3	FINISH SCHEDULE (2)		-
A-4	WORKSHOP (A) PLAN		1/200
A-5	WORKSHOP (A) ELEVATION		1/200
A-6	WORKSHOP (A) ELEVATION & SECTION		1/200
A-7	WORKSHOP (B) PLAN, ELEVATION & SECTION		1/200
A-8	WORKSHOP (B) ELEVATION		1/200
A-9	OPERATION QUARTER AND WAREHOUSE PLAN		1/200
A-10	OPERATION QUARTER AND WAREHOUSE ELEVATION		1/200
A-11	OPERATION QUARTER AND WAREHOUSE ELEVATION & SECTION		1/200
A-12	GARAGE AND PARTS STORAGE PLAN, ELEVATION & SECTION		1/200
A-13	GARAGE AND PARTS STORAGE ELEVATION		1/200
A-14	ADMINISTRATION OFFICE PLAN		1/200
A-15	ADMINISTRATION OFFICE ELEVATION & SECTION		1/200
A-16	ANCILLARIES PLAN, ELEVATION & SECTION		1/200
A-17	ANCILLARIES PLAN, ELEVATION & SECTION		1/200
A-18	GENERATOR HOUSE PLAN, ELEVATION & SECTION		1/200

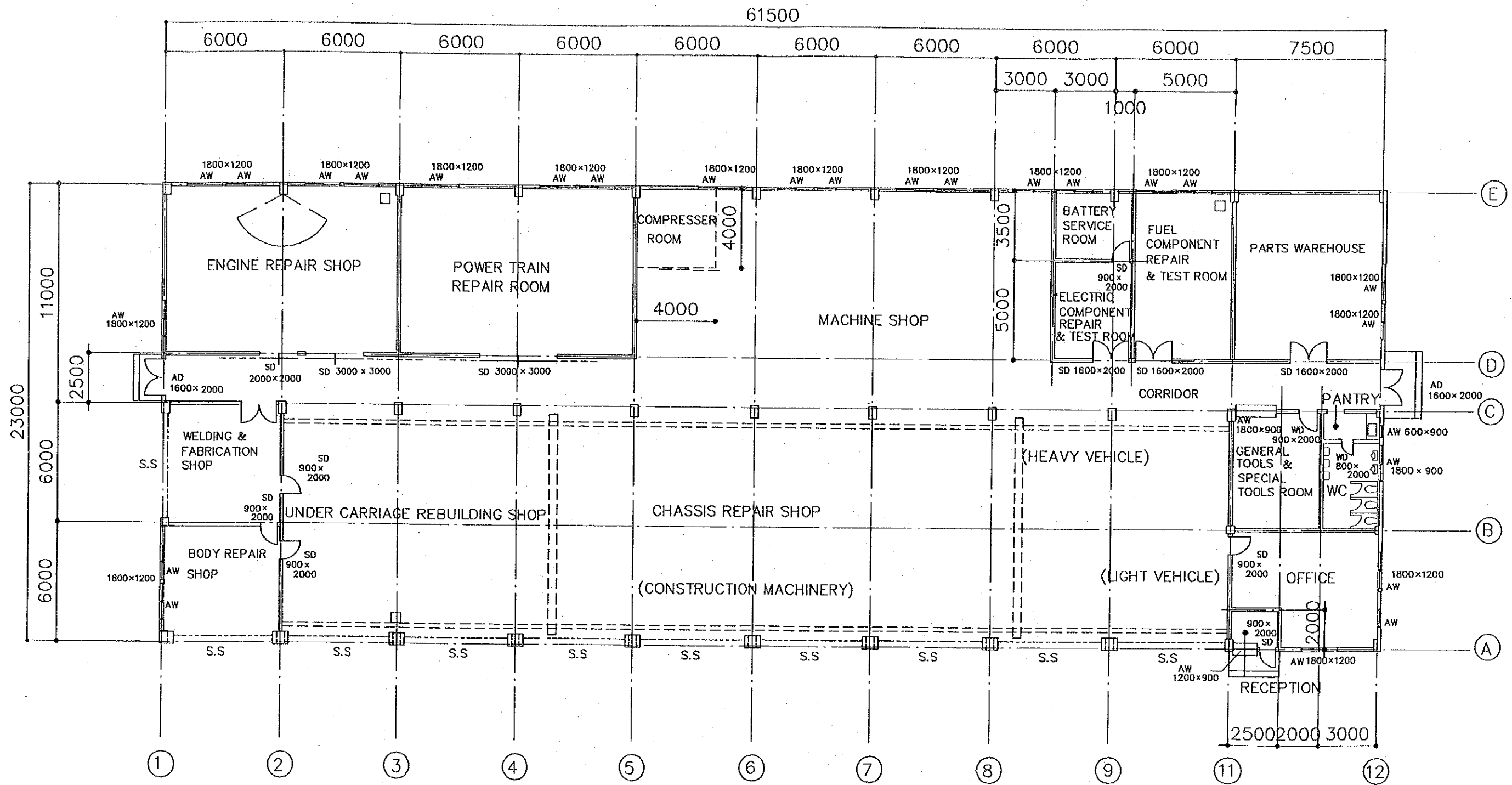


-  NEWLY BUILDING TO BE CONSTRUCTED
-  RENOVATION BUILDING TO BE REHABILITATED
-  EXISTING BUILDING

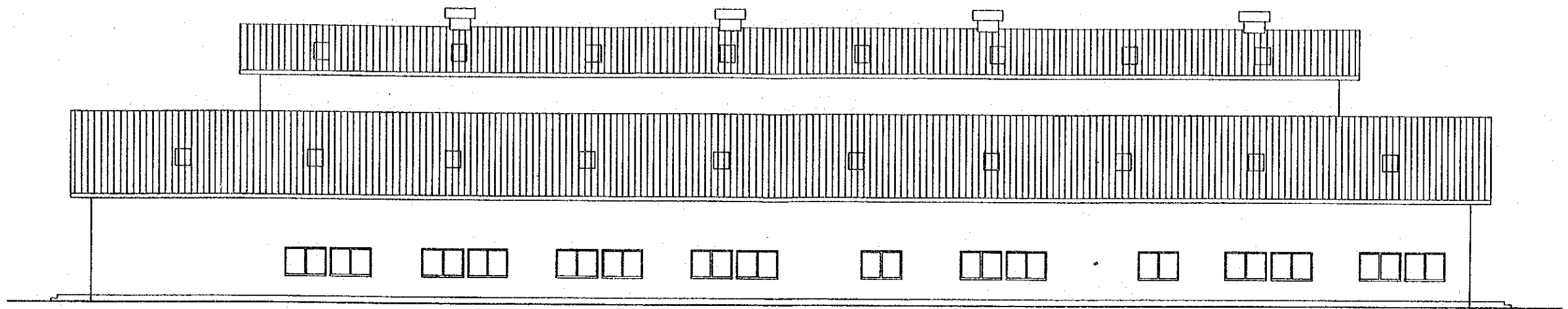
A-1 PLOT PLAN 1/2,000

	ROOF	EXTERNAL WALL	ROOM NAME	AREA	FLOOR	SKERTING	INTERNAL WALL	CEILING	
ADMINISTRATION OFFICE 472.5 M ²	STEEL TRUSS OP LOCAL ROOFING TILE	CONCRETE BLOCK 150 MORTAR SPRAY PAINT	ENTRANCE & CORRIDOR	92.9 M ²	LOCAL VINYL TILES 12" x 12" T=2.0	VINYL H=100	MORTAR & PAINTED	LGS 25kg P.B 9 VEP/GLASSWOOL	H=3000
			OFFICE	52.5 M ²	LOCAL VINYL TILES 12" x 12" T=2.0	∕	∕	LGS 25kg P.B 9 VEP/GLASSWOOL	H=3000
			ENGINEER'S ROOM	52.5 M ²	LOCAL VINYL TILES 12" x 12" T=2.0	∕	∕	ALUMI TBAR ACOUSTIC BOARD T=9	H=3000
			PRACTICE ROOM	70.0 M ²	LOCAL VINYL TILES 12" x 12" T=2.0	∕	∕	LGS 25kg P.B 9 VEP/GLASSWOOL	H=3000
			MEETING ROOM	35.0 M ²	LOCAL VINYL TILES 12" x 12" T=2.0	∕	∕	LGS 25kg P.B 9 VEP/GLASSWOOL	H=3000
			DIRECTOR'S ROOM	35.0 M ²	LOCAL VINYL TILES 12" x 12" T=2.0	∕	∕	ALUMI TBAR ACOUSTIC BOARD T=9	H=3000
			DEPUTY DIRECTOR'S RM	12.6 M ²	LOCAL VINYL TILES 12" x 12" T=2.0	∕	∕	ALUMI TBAR ACOUSTIC BOARD T=9	H=3000
			DEPUTY DIRECTOR'S RM	17.0 M ²	LOCAL VINYL TILES 12" x 12" T=2.0	∕	∕	ALUMI TBAR ACOUSTIC BOARD T=9	H=3000
			RECEPTION ROOM	35.0 M ²	LOCAL VINYL TILES 12" x 12" T=2.0	∕	∕	ALUMI TBAR ACOUSTIC BOARD T=9	H=3000
			STORAGE	17.5 M ²	MORTAR	MORTAR H=100	∕	LGS P.B 9 VEP	H=3000
			PANTRY	17.5 M ²	MOSAIC TILES	—————	CERAMIC TILE H=1800 MORTAR & PAINTED	FLEXIBLE BOARD(4) VP	H=2500
			WC	35.0 M ²	MOSAIC TILES	—————	∕	FLEXIBLE BOARD(4) VP	H=2500
			WORK SHOP (A) 1414.5 M ²	STEEL TRUSS OP LARGE CORRUGATE ASBESTOS SHEET	LGS.FRAM & PAINTED SMALL CORRUGATE ASBESTOS SHEET	OFFICE	40.00 M ²	LOCAL VINYL TILES 12" x 12" T=2.0	VINYL H=100
RECEPTION ROOM	5.00 M ²	LOCAL VINYL TILES 12" x 12" T=2.0				VINYL H=100	∕	LGS 25kg P.B 9 VEP/GLASSWOOL	H=2500
CHASSIS REPAIR SHOP	432.00 M ²	CONCRETE FINISH				—————	STEEL PAINTED CON.BLOCK W/PAINTED	STEEL PAINTED	—————
UNDER CARRIAGE REBUILDING SHOP	144.00 M ²	∕				—————	∕	∕	—————
POWER TRAIN REPAIR ROOM	102.00 M ²	∕				—————	∕	∕	—————
WELDING & FABRICATION SHOP	72.00 M ²	∕				—————	∕	∕	—————
ENGINE REPAIR SHOP	102.00 M ²	∕				—————	∕	∕	—————
W.C.	13.50 M ²	MOSAIC TILES				—————	CERAMIC TILE H=1800 MORTAR & PAINTED	FLEXIBLE BOARD(4) VP	H=2500
PANTRY	4.50 M ²	MOSAIC TILES				—————	∕	FLEXIBLE BOARD(4) VP	H=2500
CORRIDOR	153.75 M ²	CONCRETE FINISH				—————	STEEL PAINTED CON.BLOCK W/PAINTED	STEEL PAINTED	—————
GENERAL TOOLS & SPECIAL TOOLS ROOM	27.00 M ²	∕				—————	∕	∕	—————
PARTS STORAGE	63.75 M ²	∕				—————	∕	∕	—————
FUEL COMPONENT REPAIR & TEST ROOM	42.50 M ²	∕				—————	∕	∕	—————
BATTERY SERVICE ROOM	14.00 M ²	∕				—————	∕	∕	—————
ELECTRIC COMPONENT REPAIR & TEST ROOM	20.00 M ²	∕				—————	∕	∕	—————
MACHINE SHOP	162.50 M ²	∕				—————	∕	∕	—————
COMPRESSOR ROOM	16.00 M ²	∕				—————	∕	∕	—————

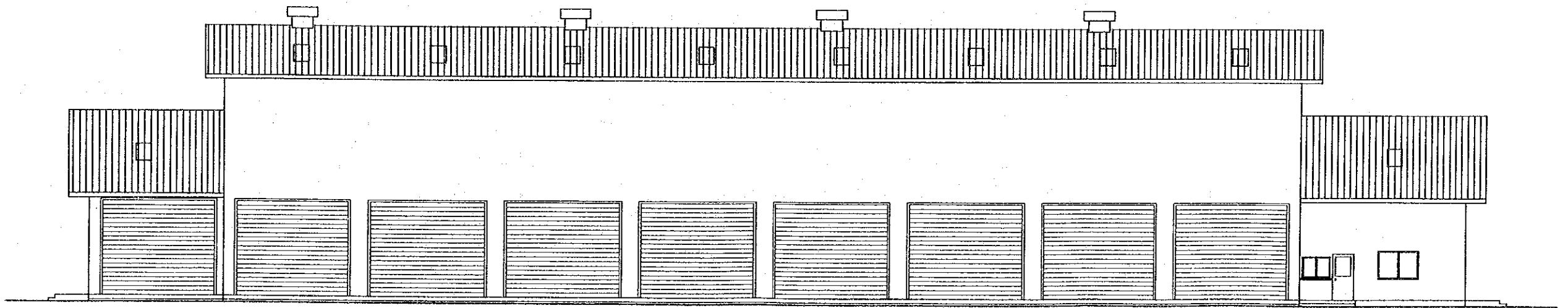
	ROOF	EXTERNAL WALL	ROOM NAME	AREA	FLOOR	SKERTING	INTERNAL WALL	CEILING		
WORK SHOP(B) 960M ²	WOOD TRUSS OP REMAIN EXISTING STRUCTURE LARGE CORRUGATE ASBESTOS SHEET 1ST FLOOR (NEWRY) CONCRETE SLAB T=200	CONCRETE BLOCK (150) FINISH PAINTED	STORAGE	106.65M ²	CONCRETE FINISH	—————	PARTITION WALL C.B (150) STEEL PAINTED	STEEL PAINTED	—————	
			WORK SHOP	853.35M ²	CONCRETE FINISH	—————	STEEL PAINTED	STEEL PAINTED	—————	
OPERATION QUARTER & WAREHOUSE 1200M ²	WOOD TRUSS OP REMAIN EXISTING STRUCTURE LARGE CORRUGATE ASBESTOS SHEET 1ST FLOOR (NEWRY) CONCRETE SLAB T=200	REMAIN EXISTING WALL /SPLAY PAINTED	WAREHOUSE	400.00 M ²	MORTAR	—————	CON.BLOCK PAINTED	WOOD PAINTED	—————	
			PRACTICE ROOM	200.00 M ²	MORTAR	—————	CON.BLOCK PAINTED	WOOD PAINTED	—————	
			MEETING ROOM (A) (B)	140.00 M ²	LOCAL VINYL TILES 12"×12" T=2.0	VINYL H=100	MORTAR&PAINTED	TBAR GLASSWOOL LGS P.B 9 VEP 25kg	H=3000	
			ENGINEER'S ROOM	80.00 M ²	LOCAL VINYL TILES 12"×12" T=2.0	VINYL H=100	MORTAR&PAINTED	TBAR GLASSWOOL LGS P.B 9 VEP 25kg	H=3000	
			OFFICE	50.00 M ²	LOCAL VINYL TILES 12"×12" T=2.0	VINYL H=100	MORTAR&PAINTED	TBAR GLASSWOOL LGS P.B 9 VEP 25kg	H=3000	
			STORAGE	21.00 M ²	MORTAR	—————	MORTAR	LGS P.B 9 VEP	H=3000	
			LOCKER & RESTING RM	180.00 M ²	MORTAR	—————	MORTAR	—————	—————	
			CORRIDOR	60.00 M ²	LOCAL VINYL TILES 12"×12" T=2.0	VINYL H=100	MORTAR&PAINTED	TBAR GLASSWOOL LGS P.B 9 VEP 25kg	H=2500	
			W.C. (A) (B)	44.00 M ²	MOSAIC TILES	CERAMIC TILE H=1800	MORTAR&PAINTED	FLEXIBLE BOARD(4) VP	H=2500	
			SHOWER ROOM	25.00 M ²	MOSAIC TILES	CERAMIC TILE H=1800	MORTAR&PAINTED	FLEXIBLE BOARD(4) VP	H=2500	
GARAGE & PARTS STRAGE 960M ²	STEEL TRUSS OP LARGE CORRUGATE ASBESTOS SHEET 1ST FLOOR (NEWRY) CONCRETE SLAB T=200	LGS.FRAM & PAINTED SMALL CORRUGATE ASBESTOS SHEET	PARTS STORAGE	480.00 M ²	CONCRETE FINISH					
			GARAGE	480.00 M ²	CONCRETE FINISH					
GENERATOR HOUSE 90M ²	STEEL TRUSS OP LARGE CORRUGATE ASBESTOS SHEET	CONCRETE BLOCK (150) FINISH PAINTED	GENERATOR ROOM	90.00 M ²	CONCRETE FINISH					
ANCILLARIES 90M ²	STEEL TRUSS OP LARGE CORRUGATE ASBESTOS SHEET	CONCRETE BLOCK (150) FINISH PAINTED	STORAGE TYRE SERVICE PAINT SHOP CARPENTRY SHOP	90.00 M ²	CONCRETE FINISH					
GUARD HOUSE 4M ²	STEEL TRUSS OP LARGE CORRUGATE ASBESTOS SHEET	CONCRETE BLOCK (150) FINISH PAINTED			CONCRETE FINISH	—————	CON.BLOCK PAINTED	TBAR GLASSWOOL LGS P.B 9 VEP 25kg		



A-4 WORKSHOP (A) PLAN 1/200

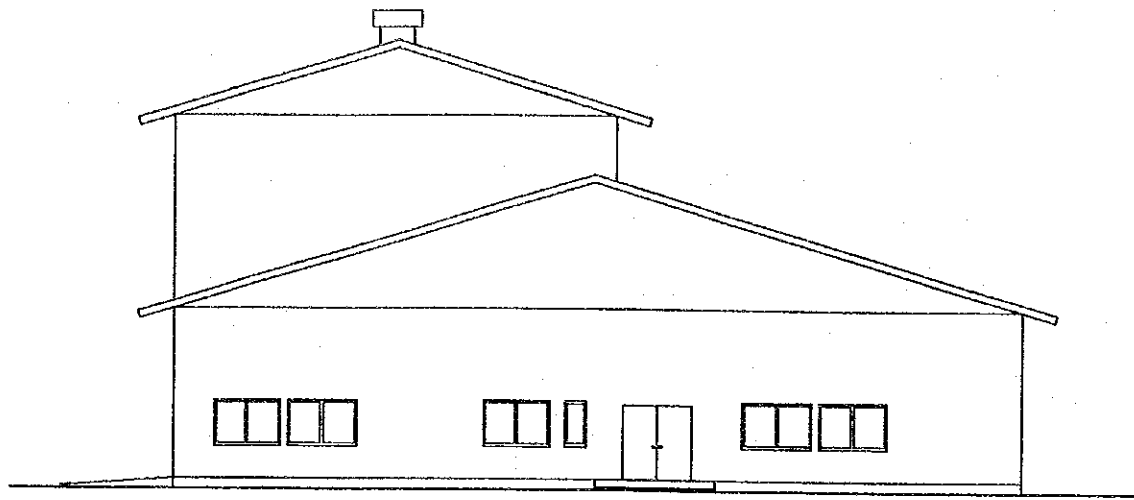


NORTH ELEVATION

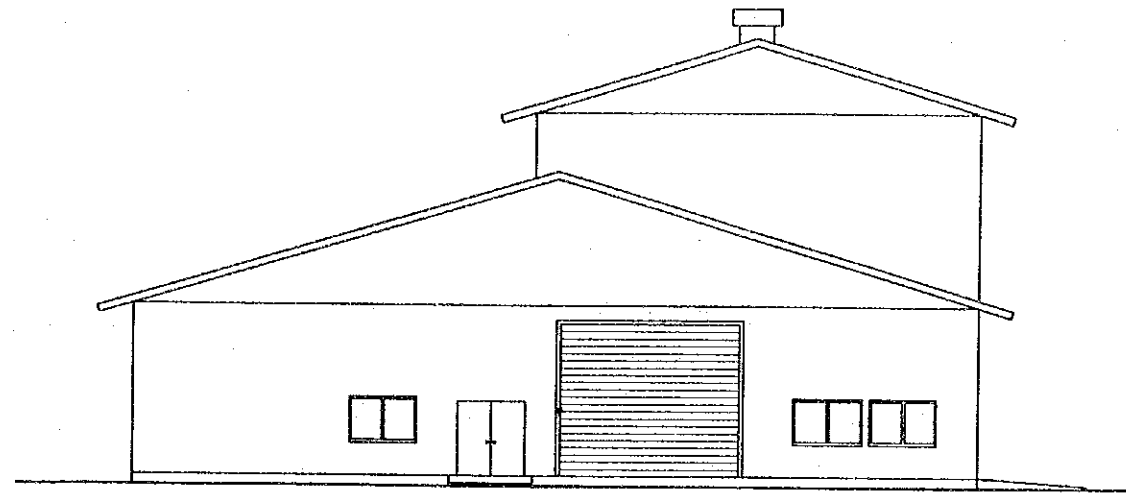


SOUTH ELEVATION

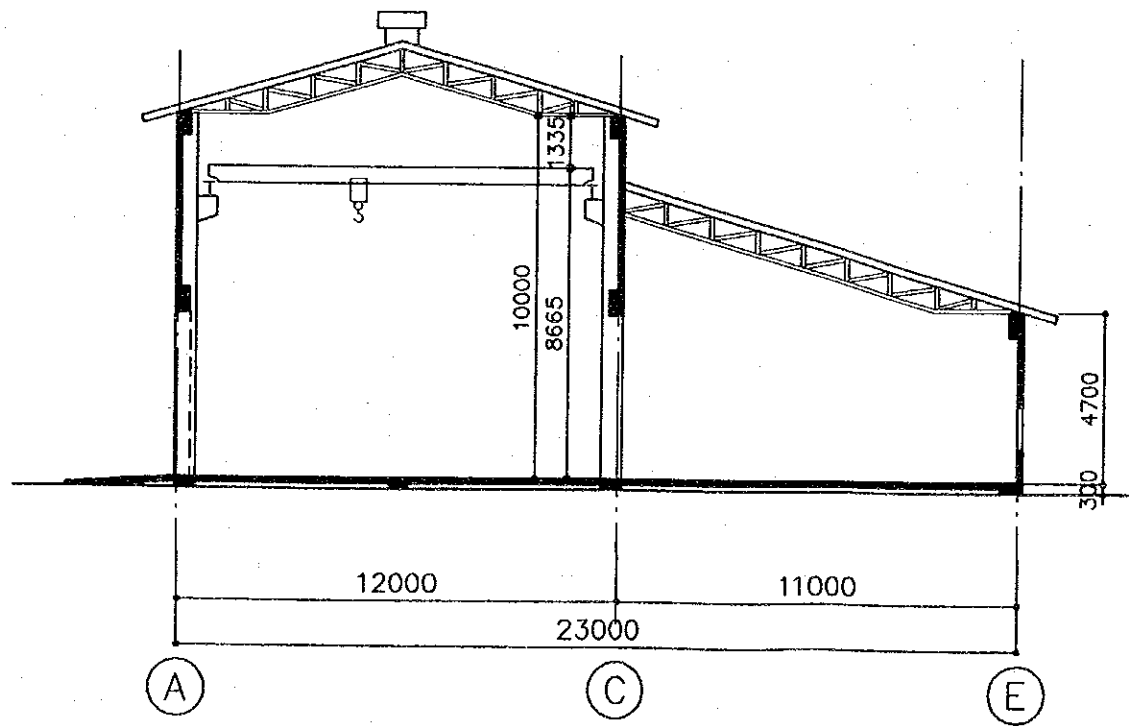
A-5 WORKSHOP (A) ELEVATION 1/200



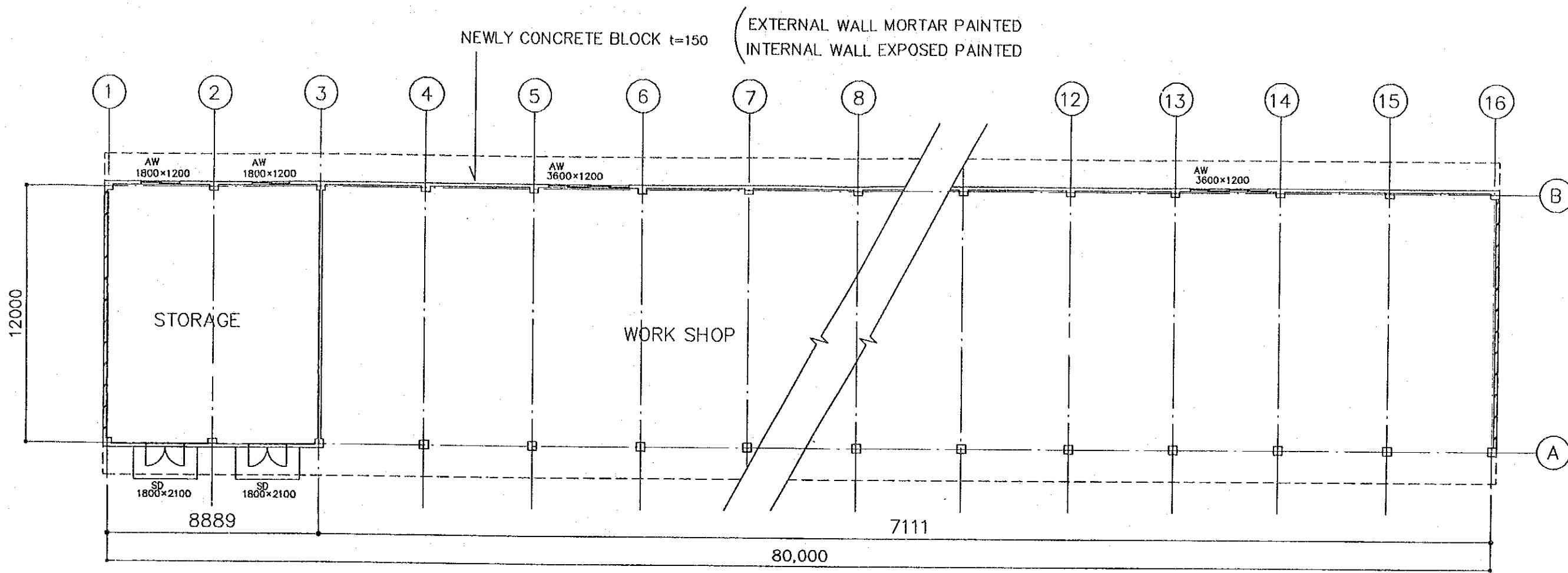
EAST ELEVATION



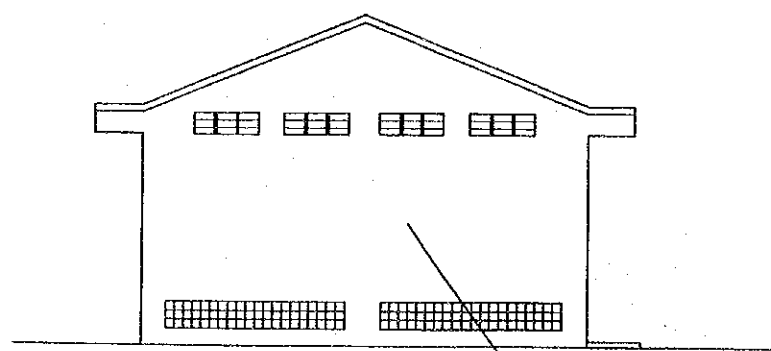
WEST ELEVATION



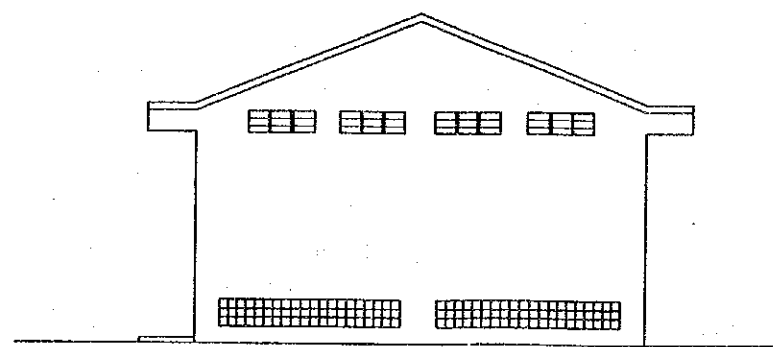
SECTION



REHABILITATED WORK SHOP (B) 960m²

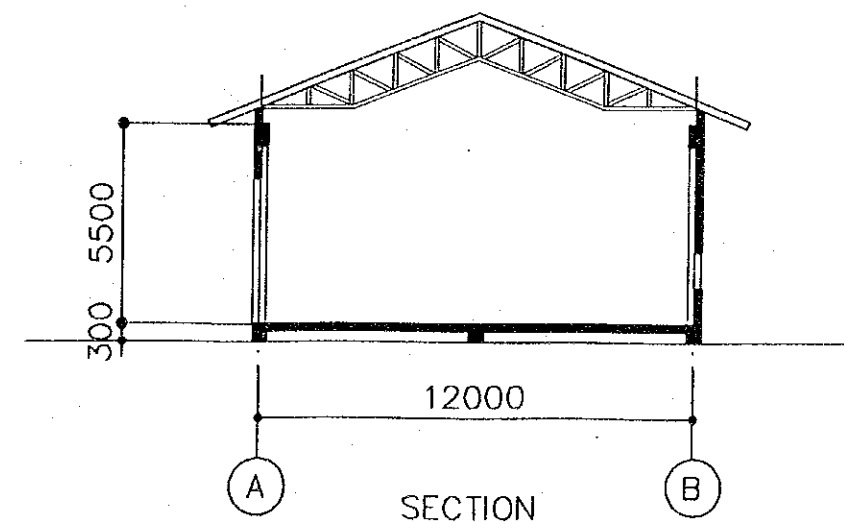


SOUTH ELEVATION

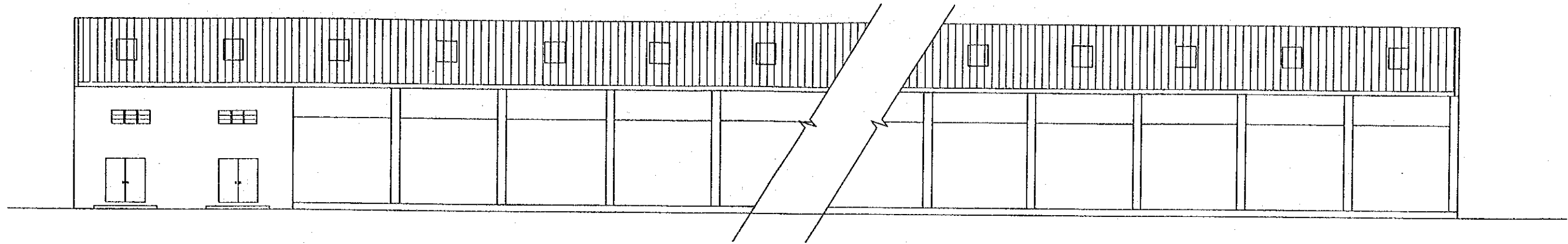


NORTH ELEVATION

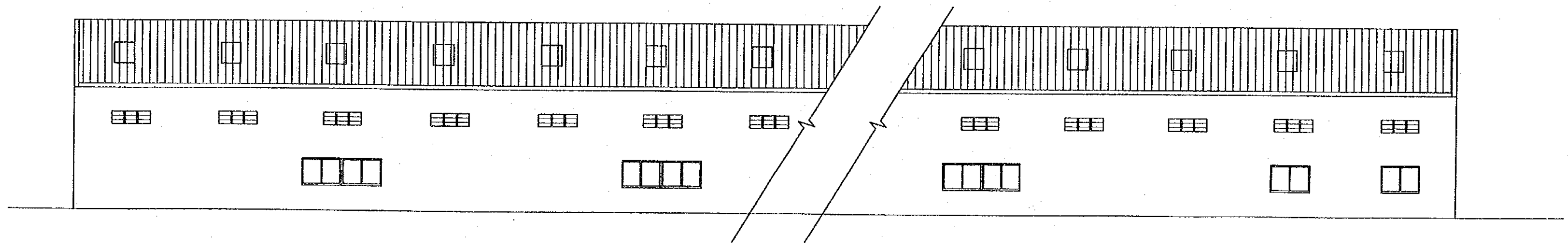
EXISTING WALL CONCRETE BLOCK
W/PAINT



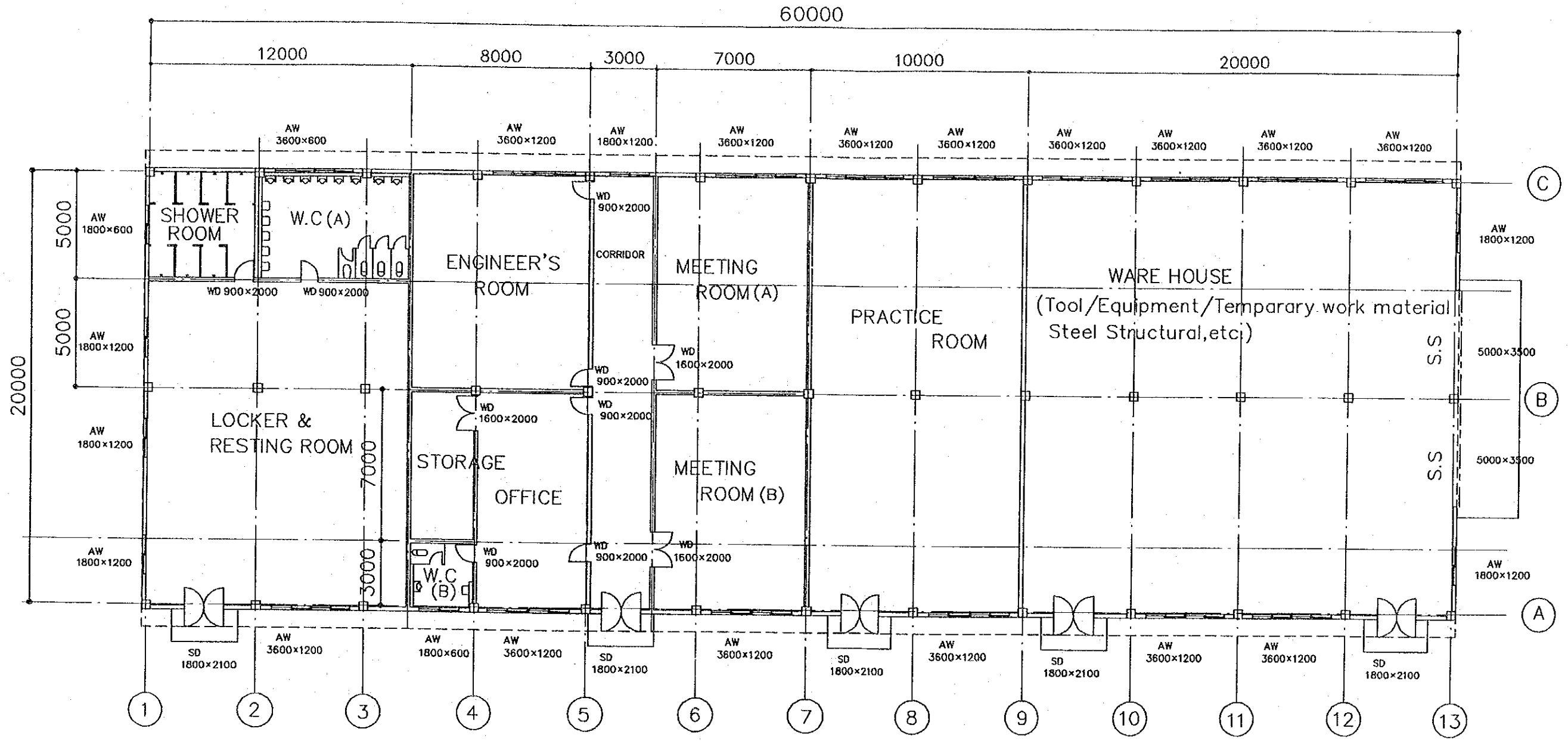
SECTION



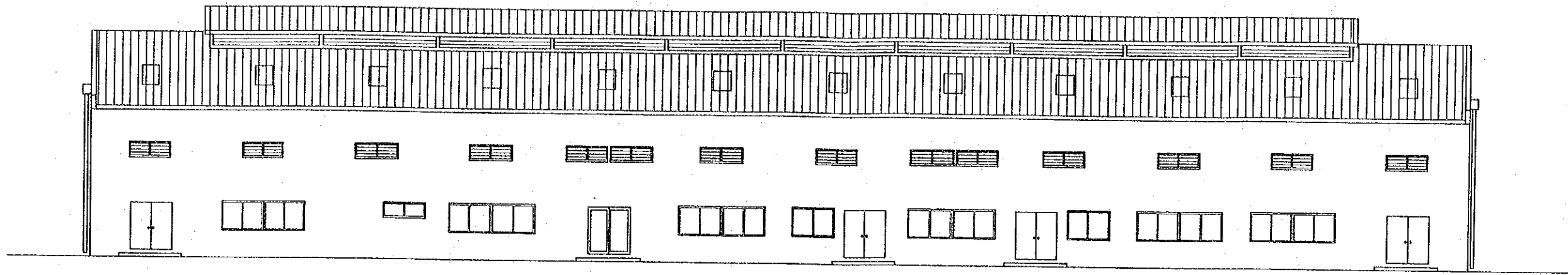
EAST ELEVATION



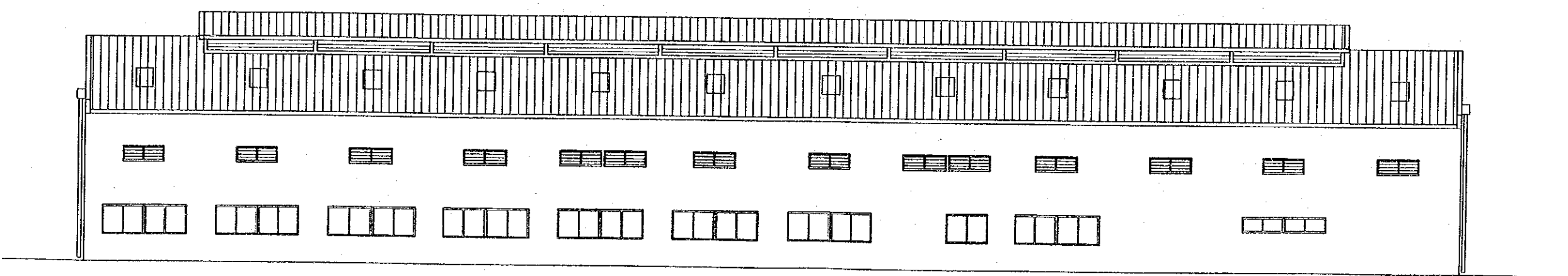
WEST ELEVATION



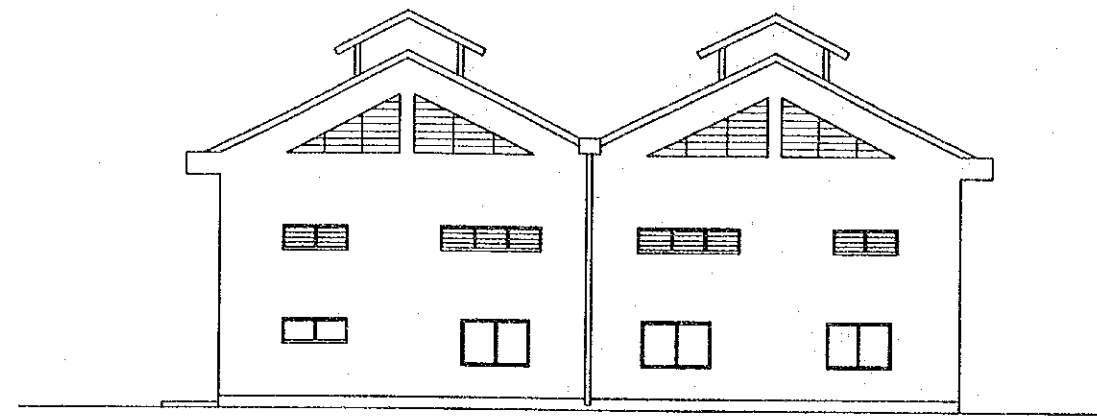
A-9 OPERATION QUARTER AND WAREHOUSE PLAN 1/200



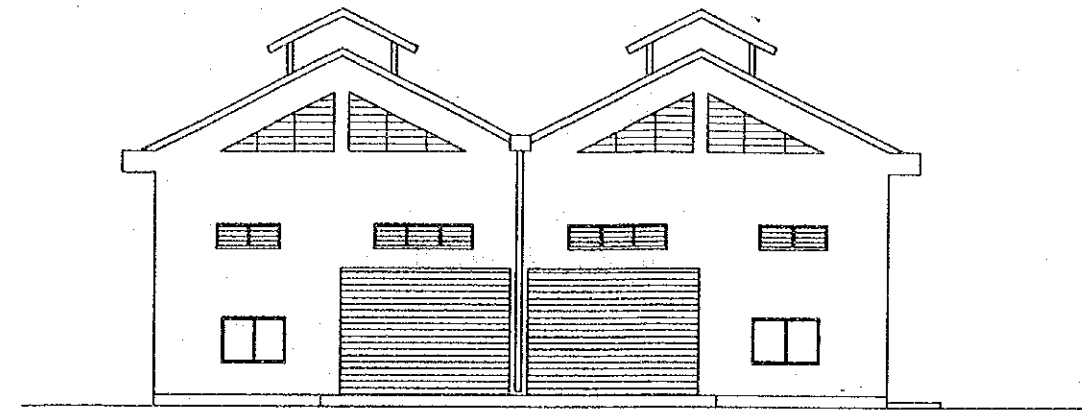
WEST ELEVATION



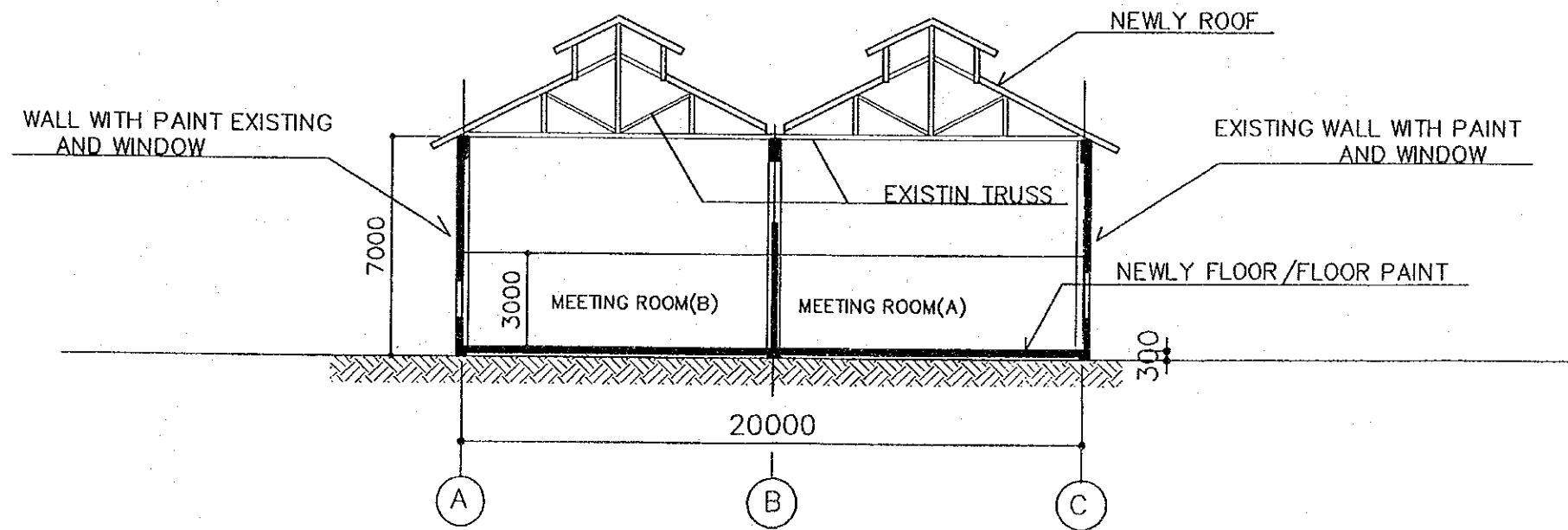
EAST ELEVATION



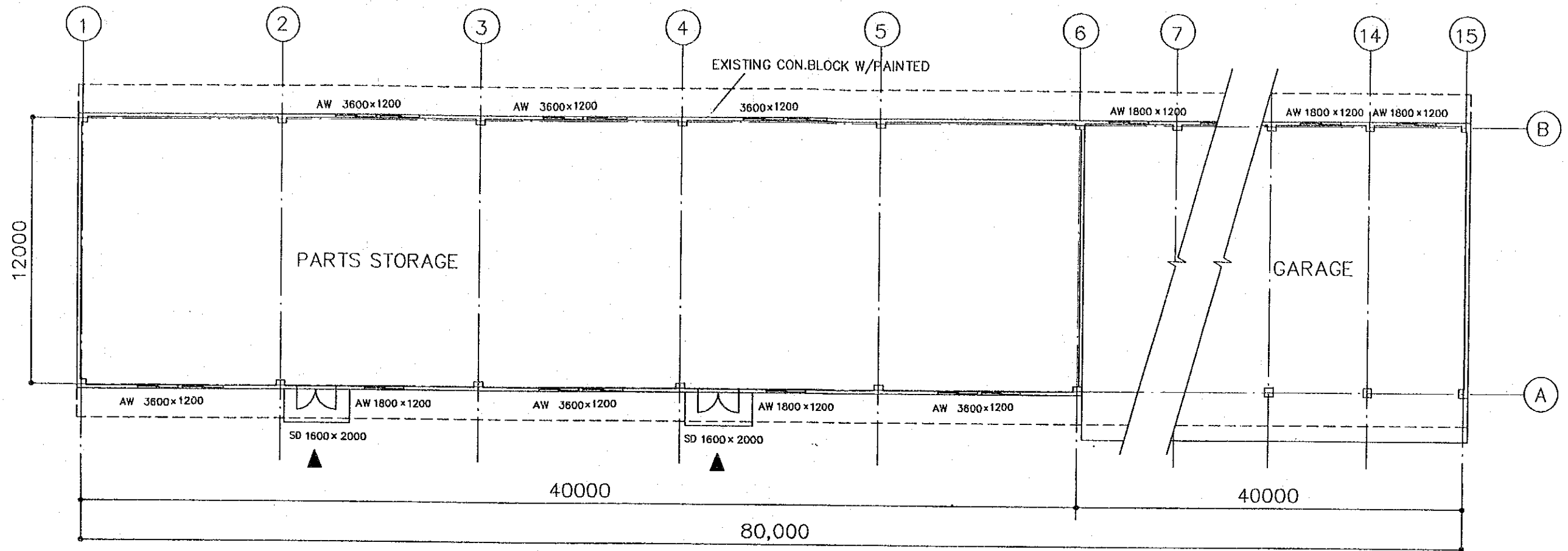
NORTH ELEVATION



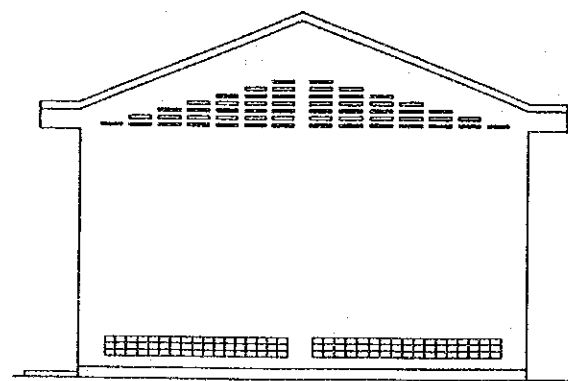
SOUTH ELEVATION



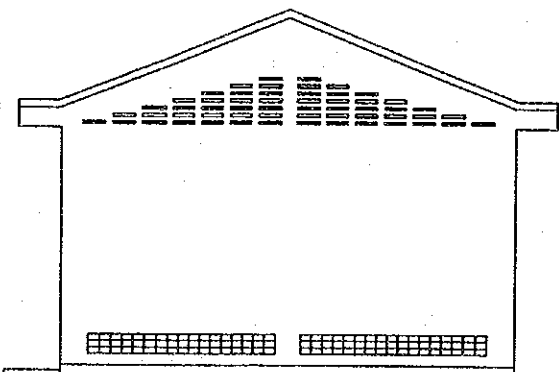
SECTION



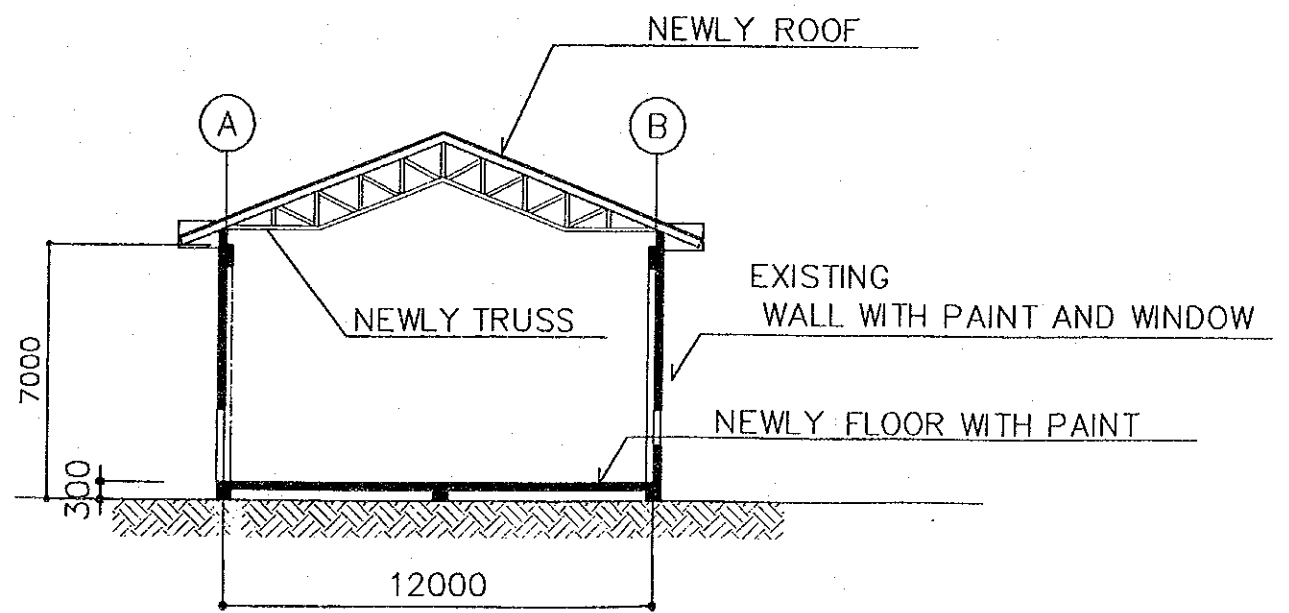
GARAGE & PARTS STORAGE



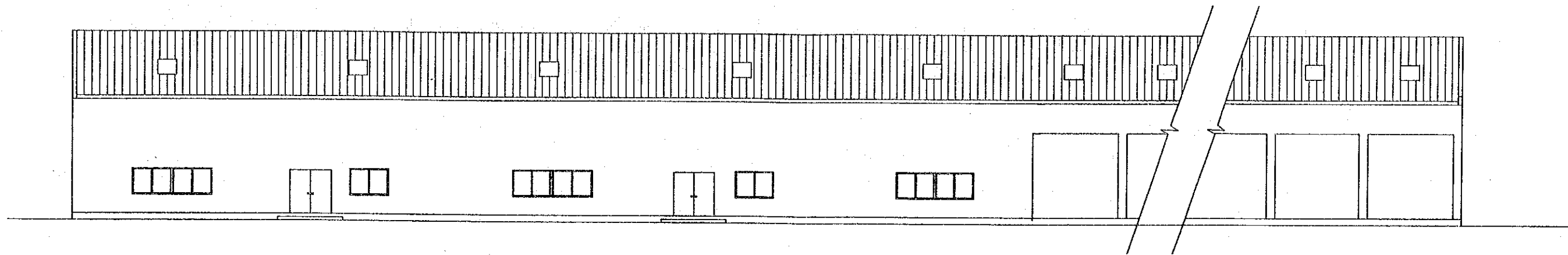
SOUTH ELEVATION



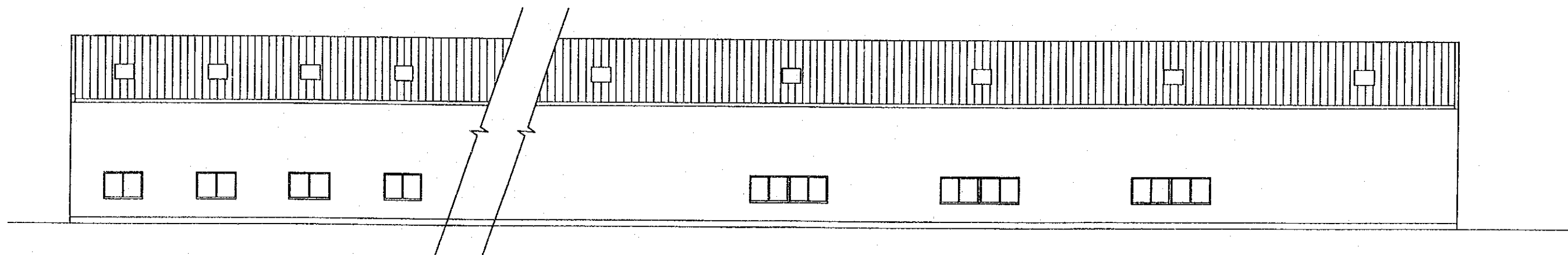
NORTH ELEVATION



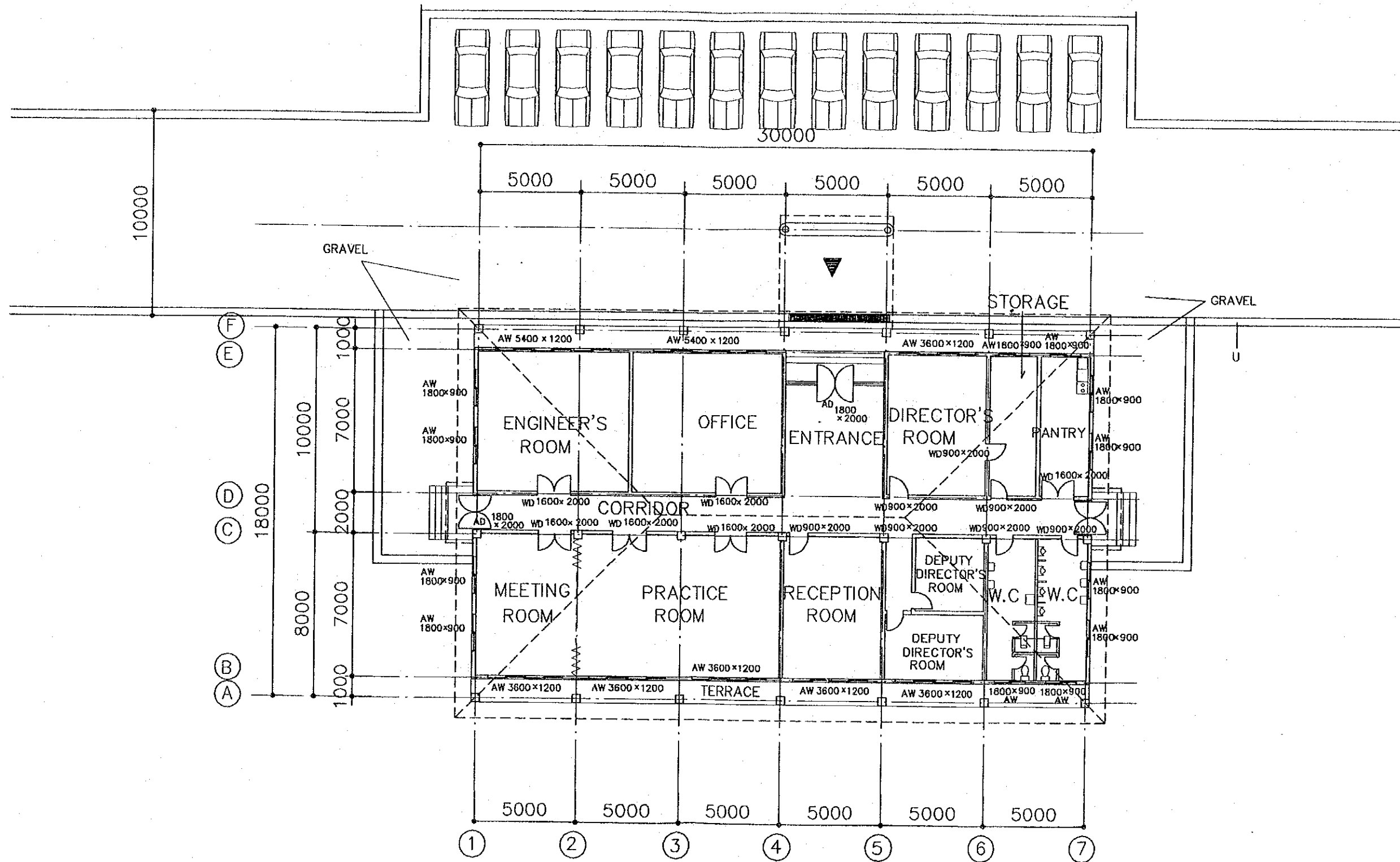
SECTION



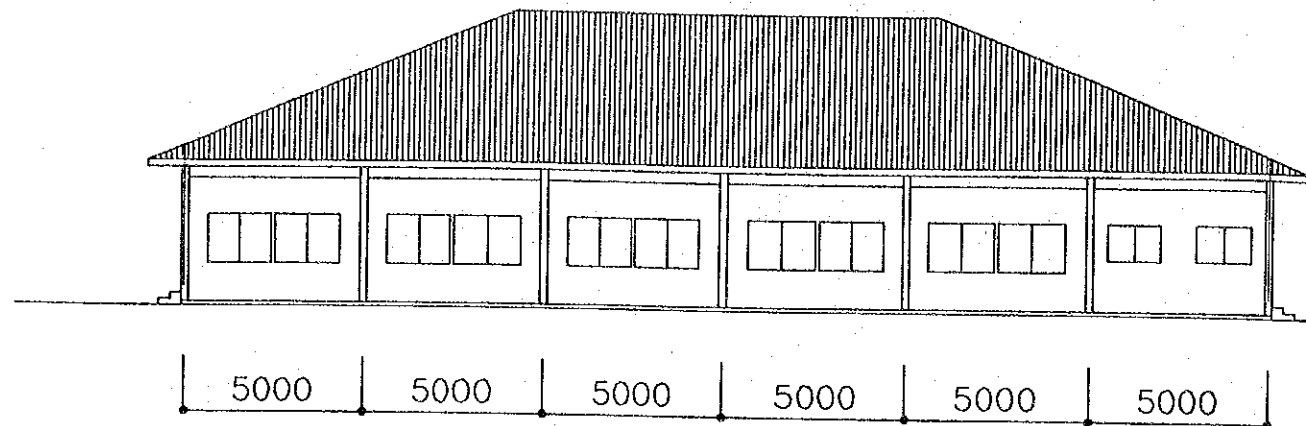
EAST ELEVATION



WEST ELEVATION

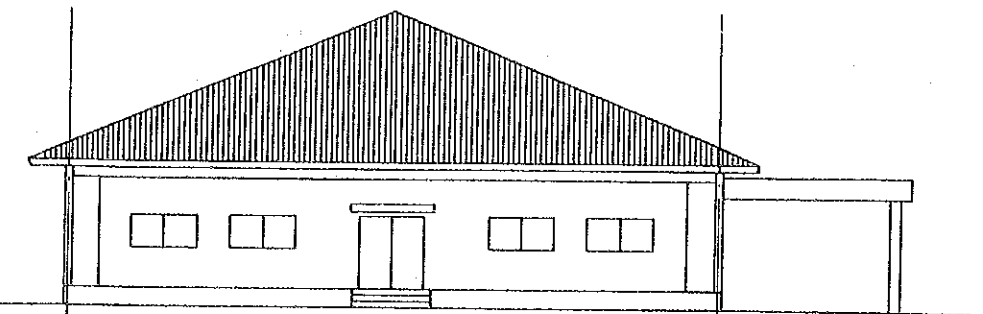


A-14 ADMINISTRATION OFFICE PLAN 1/200

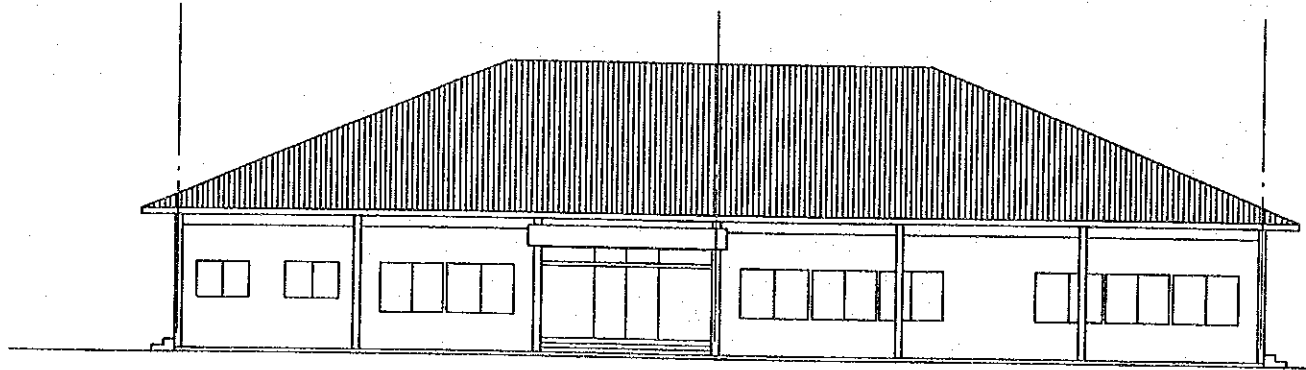


5000 5000 5000 5000 5000 5000

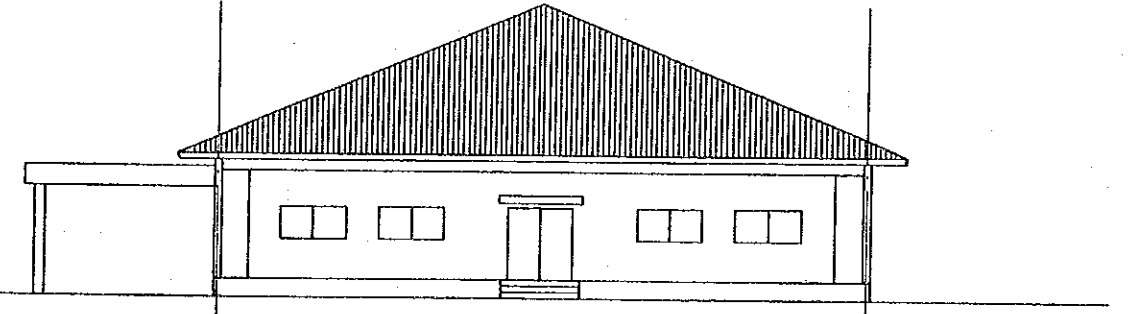
SOUTH ELEVATION



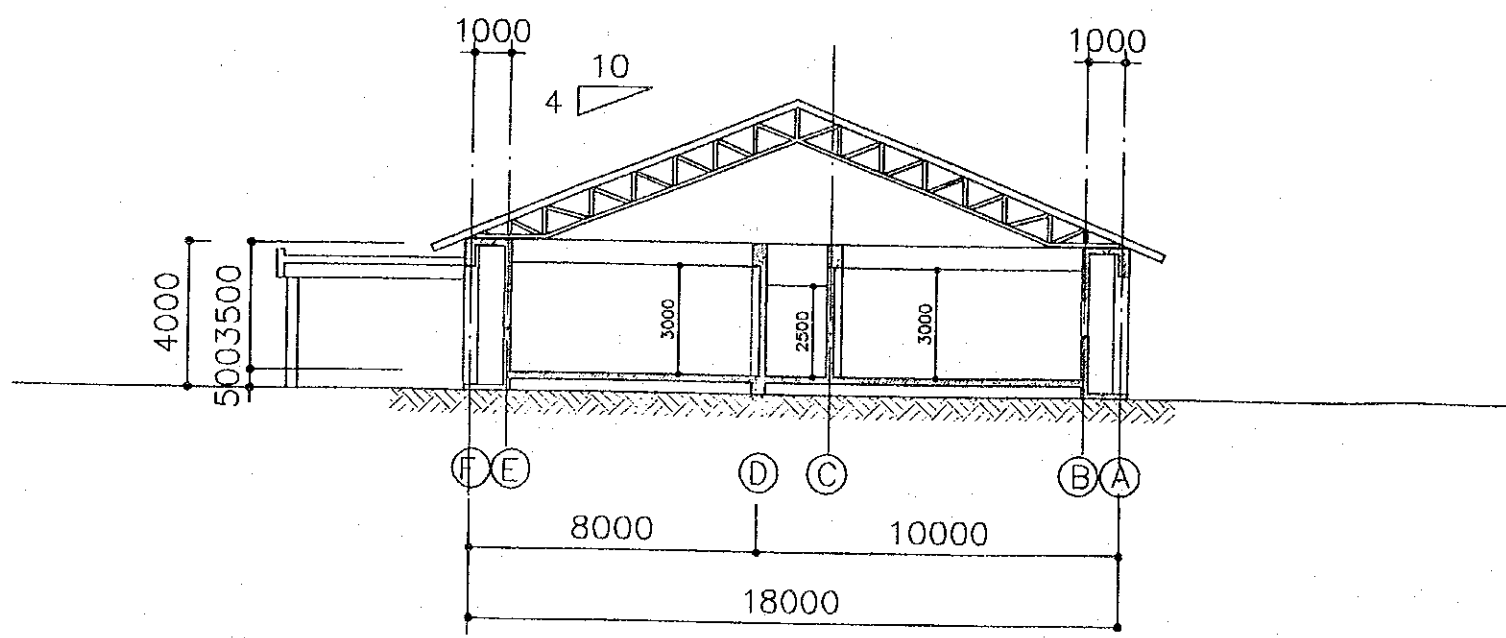
EAST ELEVATION

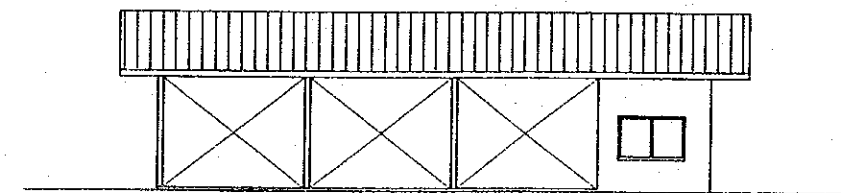
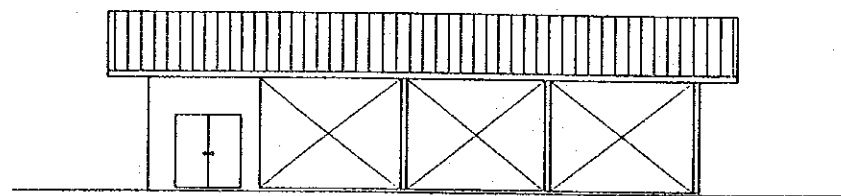
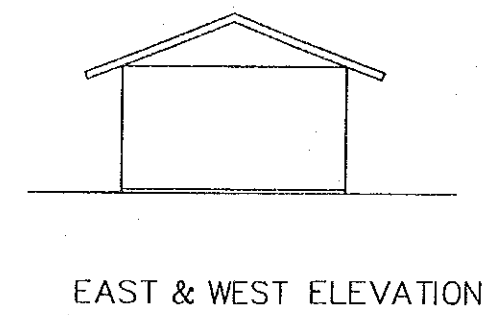
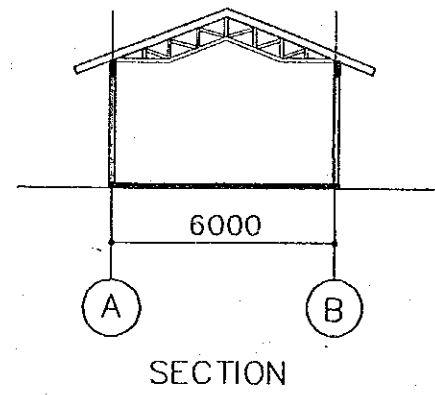
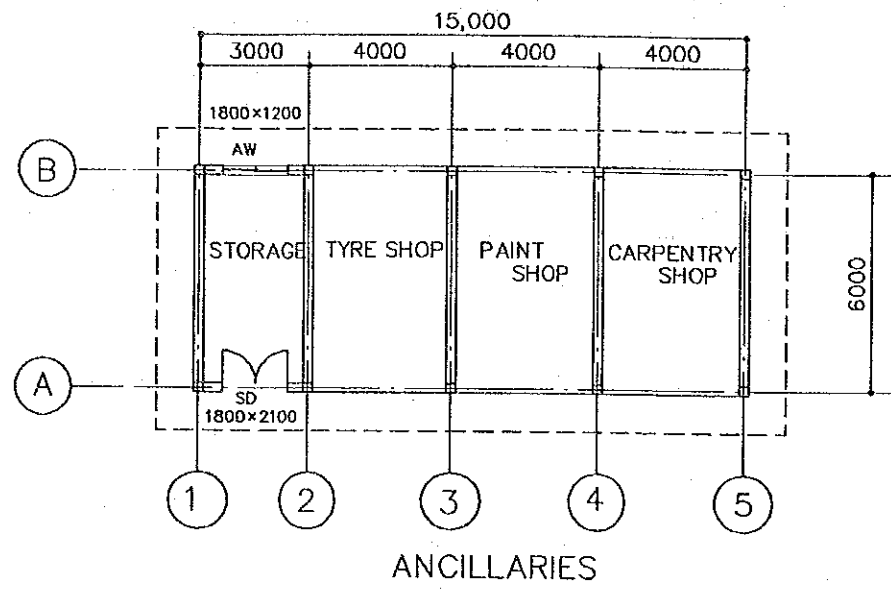


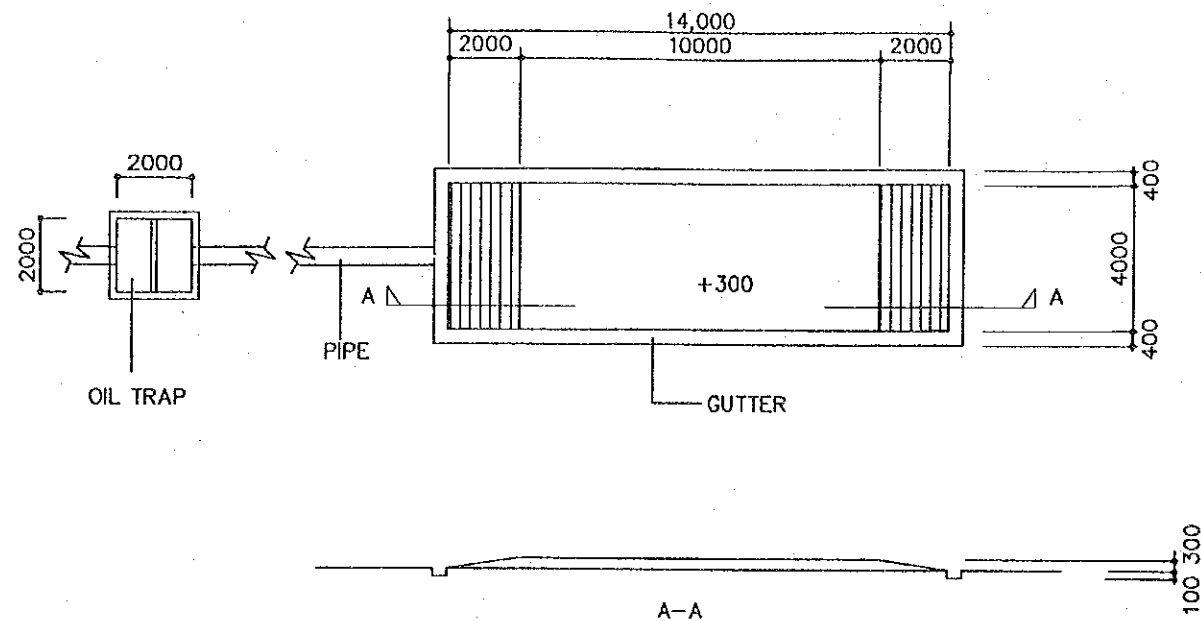
NORTH ELEVATION



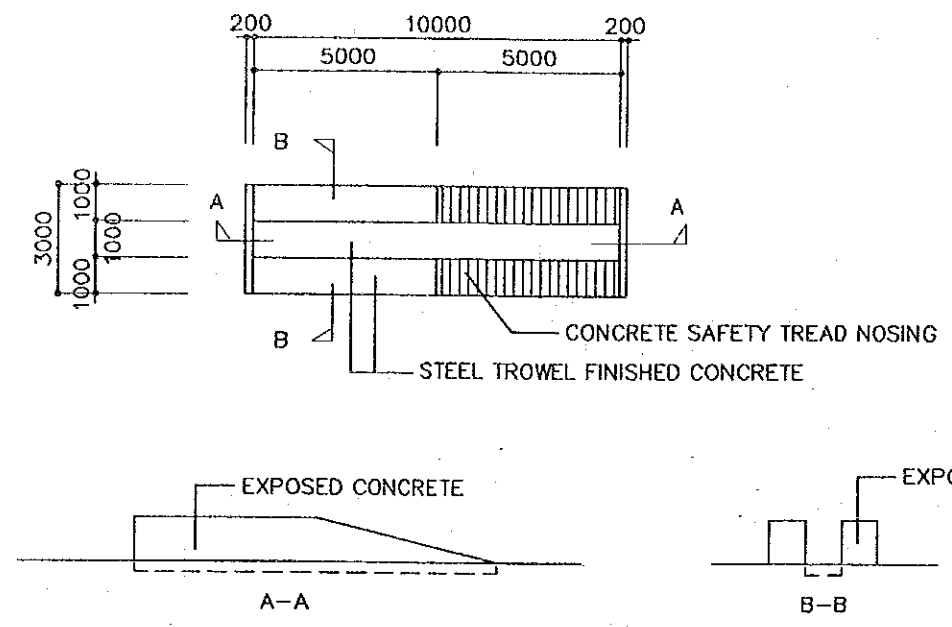
WEST ELEVATION



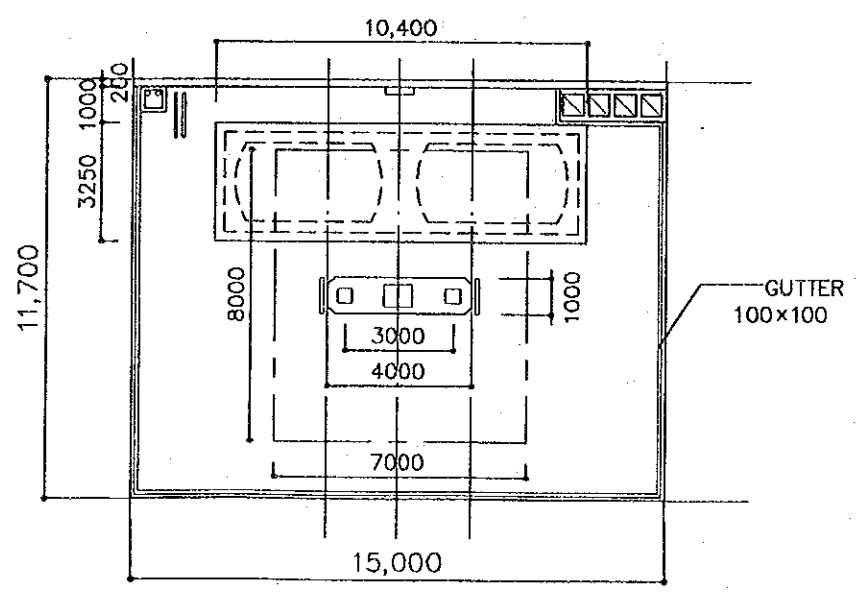




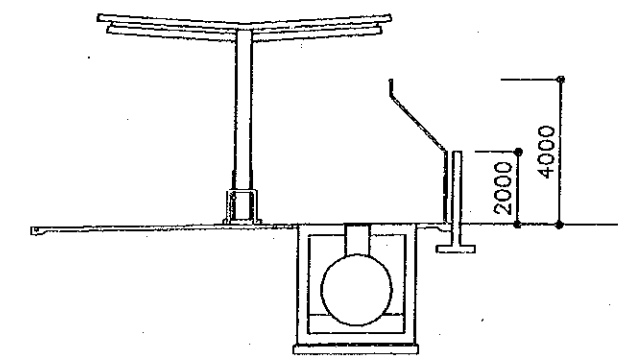
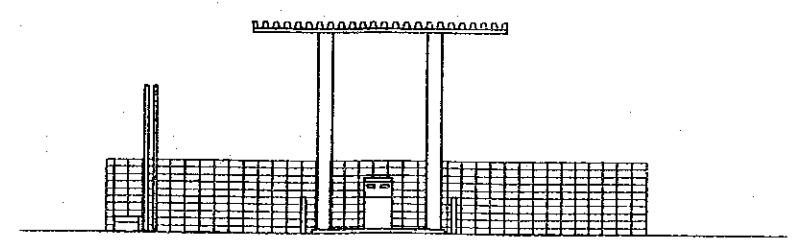
WASHING STAND

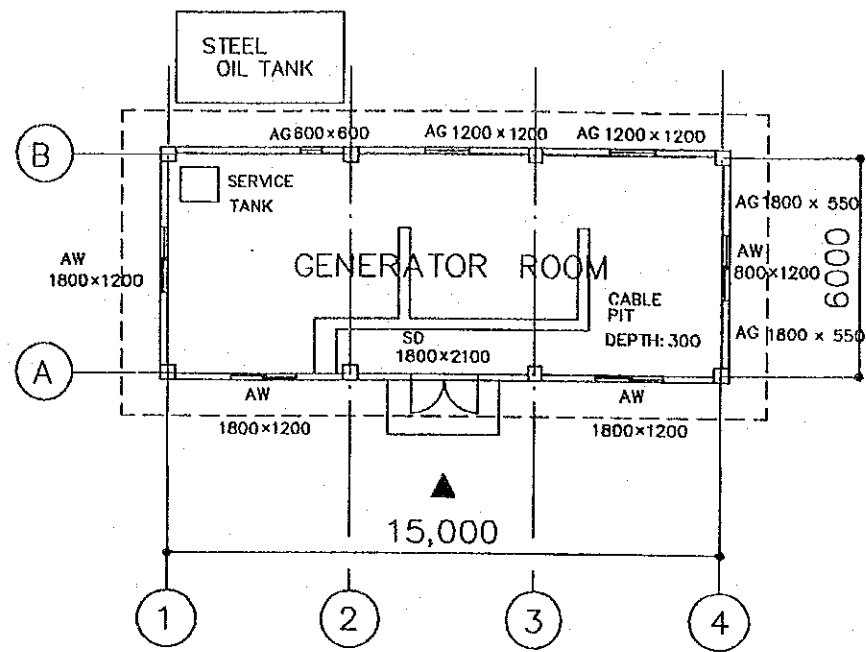


UNLOADING DECK

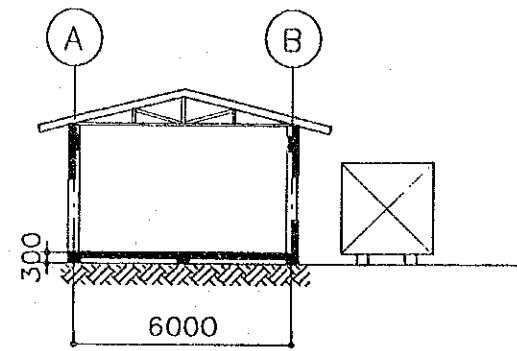


FUEL & LUBRICANT STAND

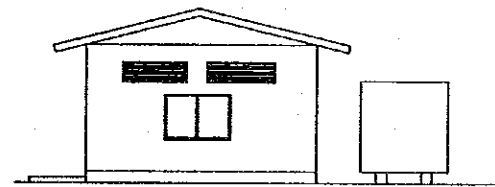




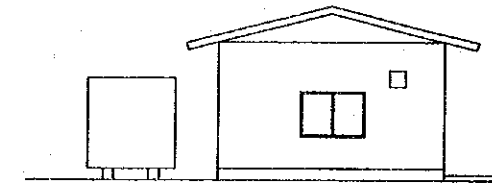
GENERATOR HOUSE



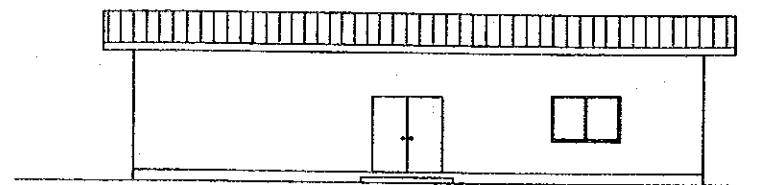
SECTION



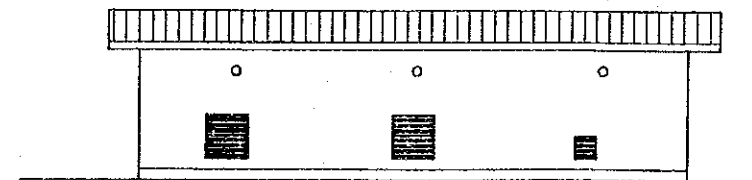
NORTH ELEVATION



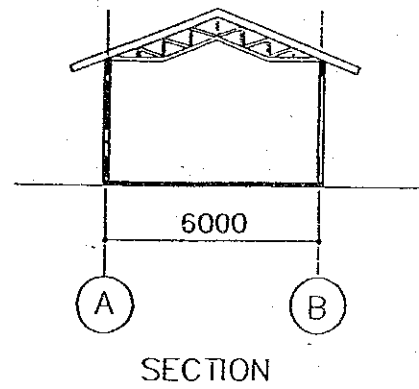
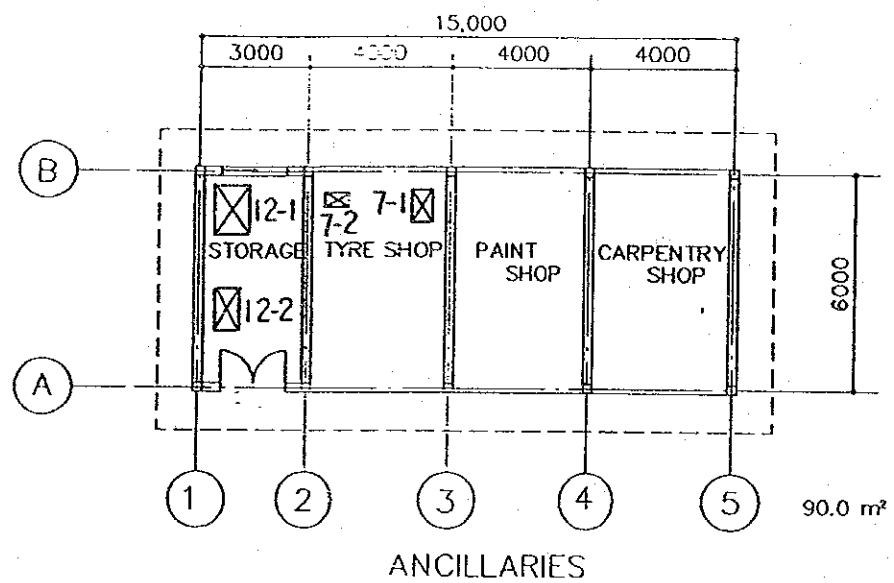
SOUTH ELEVATION



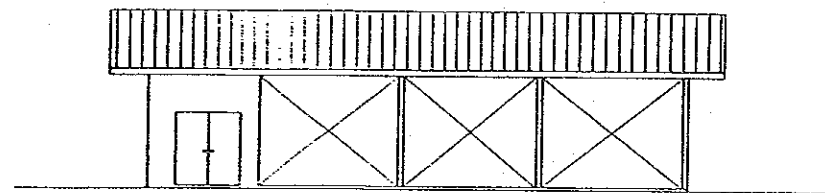
EAST ELEVATION



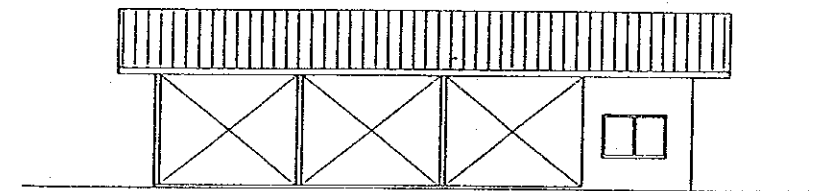
WEST ELEVATION



<u>7. Tire Service</u>			
1	XO-0114	Air compressor	1
2	CG-7001	Thermopress	1
<u>12. Cleaning Area</u>			
1	OL-0912	Hot Water High Pressure Washer	1
2	OL-1002	Steam Cleaner	1



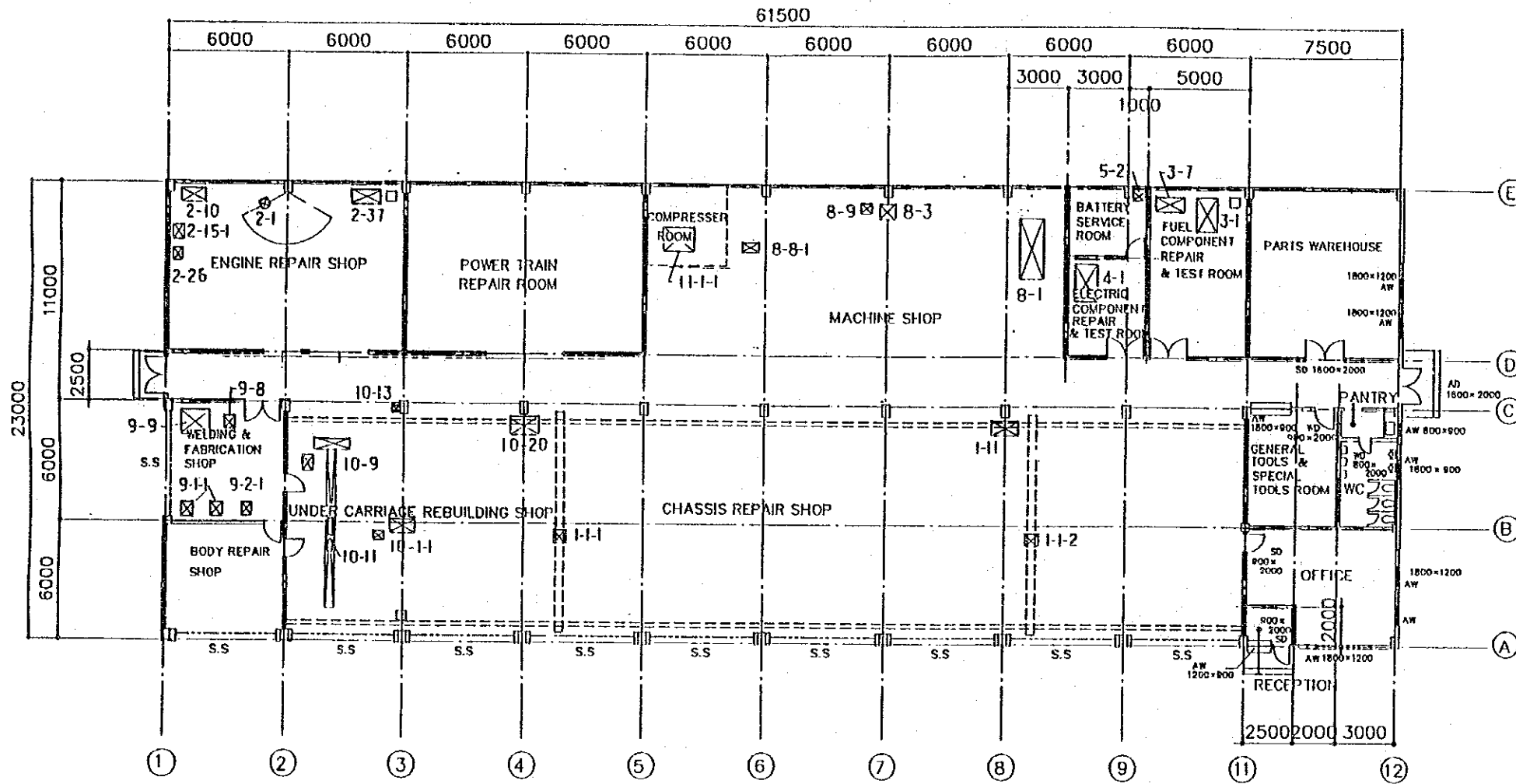
SOUTH ELEVATION



NORTH ELEVATION

LAYOUT PLAN FOR ANCILLARIES FACILITIES

ANCILLARIES 1/200



WORK SHOP (A) 1414.5 M² 1/200

INTERNAL WALL SHALL BE EXPOSED CONCRETE BLOCK t=150 H=4.0M

1. Chassis Repair Shop

- 1-1 Over head crane 5 ton
- 1-2 Over head crane 3 ton
- 11 UL-0802 Parts Cleaner

2. Engine Repair Shop

- 1 Jib crane 3 ton 3m
- 10 UL-0802 Parts Cleaner
- 15-1 AA-1701 Valve Refacer
- 26 AA-4103 Piston Heater (Bearing Heater)
- 37 DL-0805 Parts Washer

3. Fuel Component Repair And Test Room

- 1 PGM-20-12 Fuel Injection Pump Tester
- 7 UL-0804 Parts Cleaner

4. Electric Component Repair & Test Room

- 1 DL-0303 Starter Generator Test Bench

5. Battery Service

- 2 DL-2807 Silicon Quick Charger

8. Machine Shop

- 1 TAL510X1500 Precision lathe
- 3 AUD-550 Upright Drilling Machine
- 8 SU-1402 Hack Sawing Machine
- 9 LP-1408 Bench Electric Grinder

9. Welding & Fabrication Shop

- 1-1 RJ-0102 A.C. Arc Welder
- 1-1 RJ-0102 A.C. Arc Welder
- 2-1 RJ-1312 CO₂ Gas-shield Arc Welder
- 8 SU-1602 High-Speed Abrasive Cut-Off machine
- 9 SS-0133 Hydraulic Shop Press 100 ton

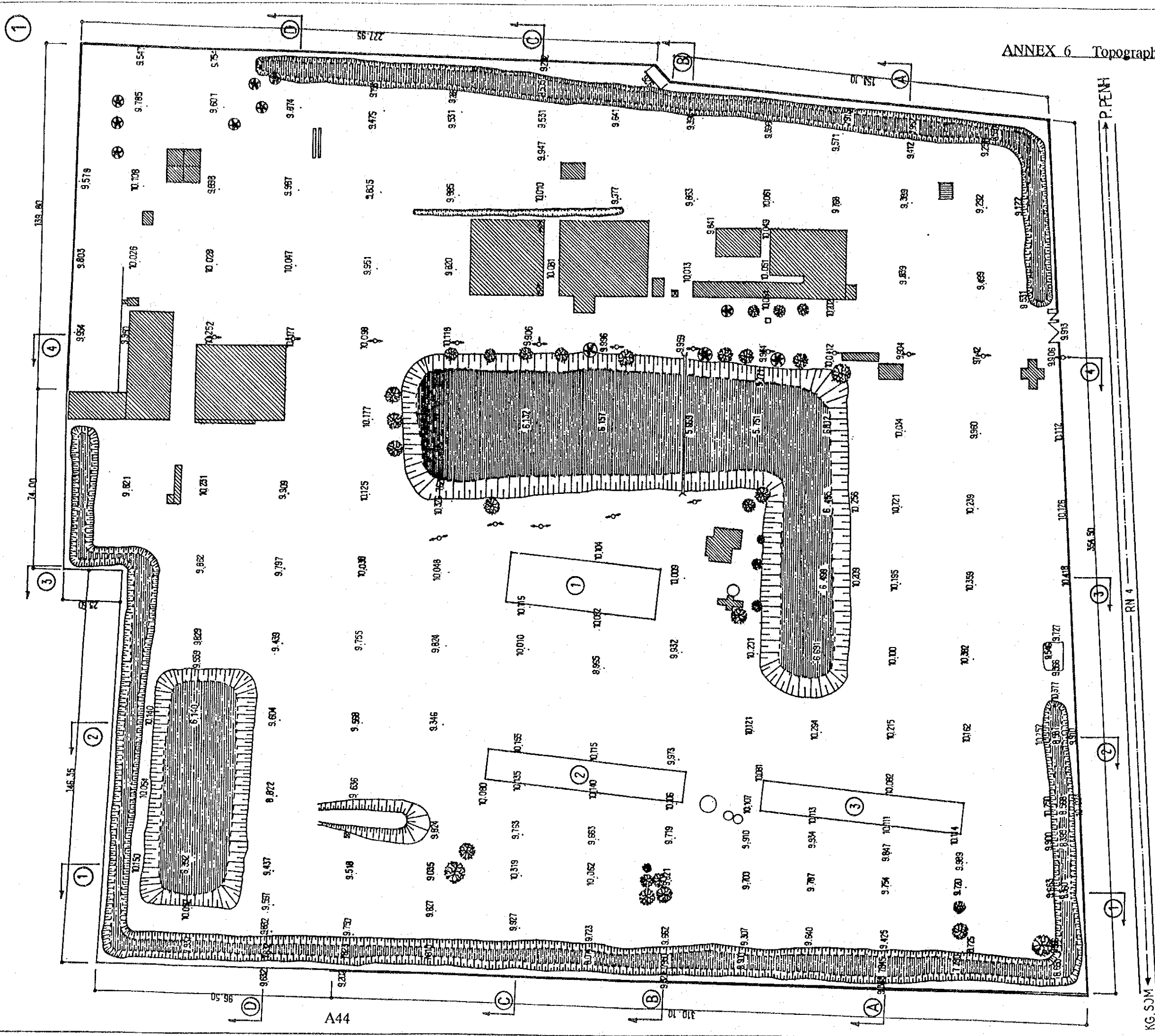
10. Undercarriage Rebuilding Shop

- 1-1 CE-1301 Roller & Idler Press Power Unit
- 9 CE-0801 Track Press MIP230
- 11 CE-0301 Shoe Roll Impact Wrench
- 13 LP-1408 Bench Electric Grinder
- 20 UL-0805 Parts Washer

11. Compressor

- 1-1 USP-37EA11 Air Compressor

LAYOUT PLAN FOR WORKSHOP FACILITIES



ODEM SITE LOCATION SCALE 1:1000

LAND SURVEYING DRAWING

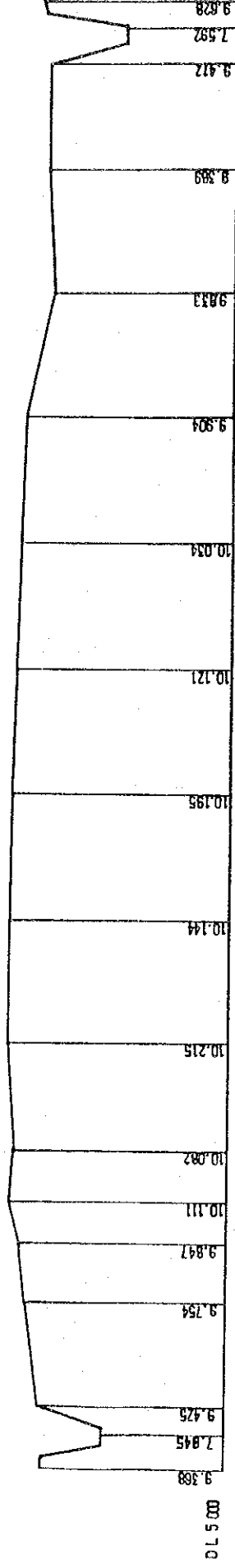
LEGEND

- ① MULTI PURPOSE BUILDING
- ② WORKSHOP
- ③ GARAGE & PARTS STORE BUILDING
- TREE AND PALM TREE
- ▨ EXISTING BUILDING
- RENOVATION BUILDING
- POND
- ▬ PASSAGE

DATE	SIGNATURE
	SURVEYED M ^r NHEM SAREN
	DRAWN M ^r SAMAN SOKLY
	CHIEF SERVICE M ^r KED LEAP
	DIRECTOR BRIDGES AND ROADS DEPARTMENT

2

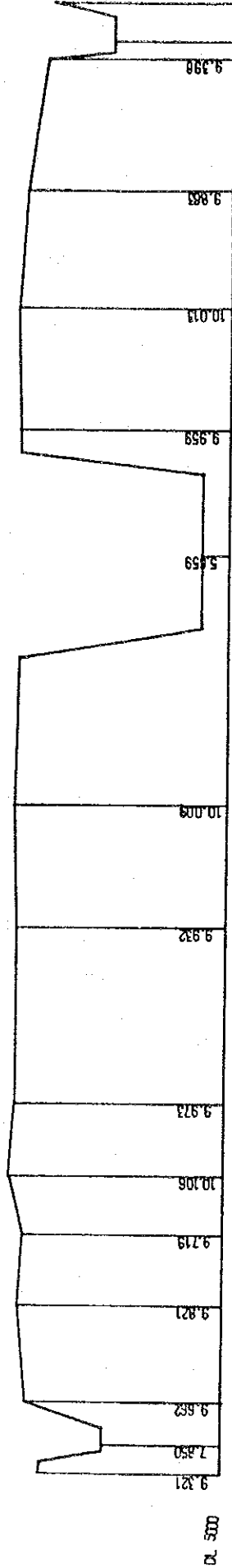
CROSS SECTION A
H 1:100
L 1:1000



000 5 10

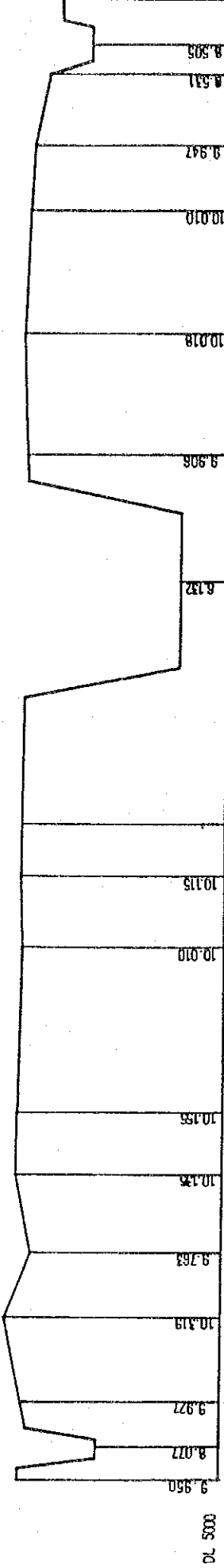
A45

CROSS SECTION B



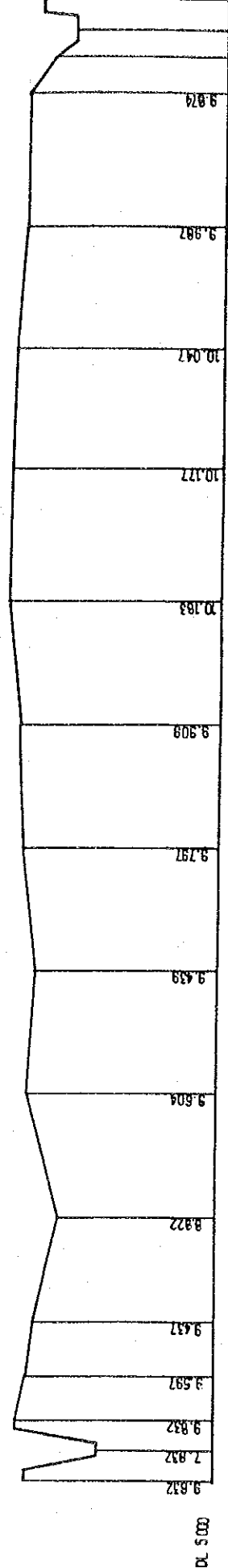
000 5 10

CROSS SECTION C



000 5 10

CROSS SECTION D



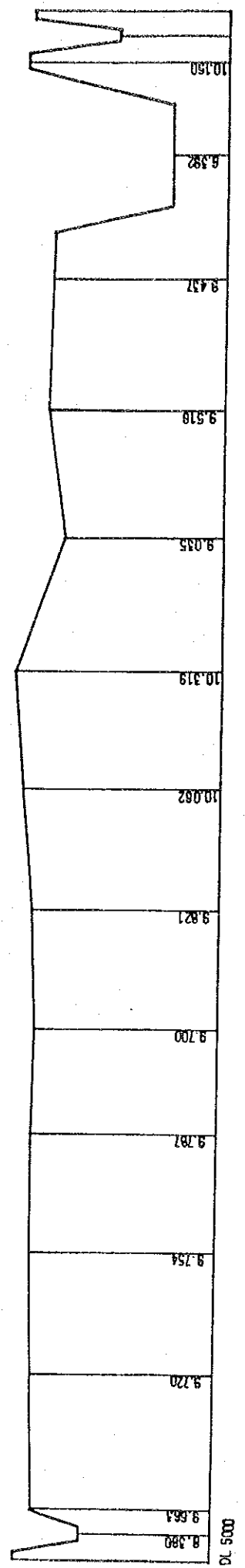
000 5 10

LATITUDINAL CROSS SECTION DRAWING

3

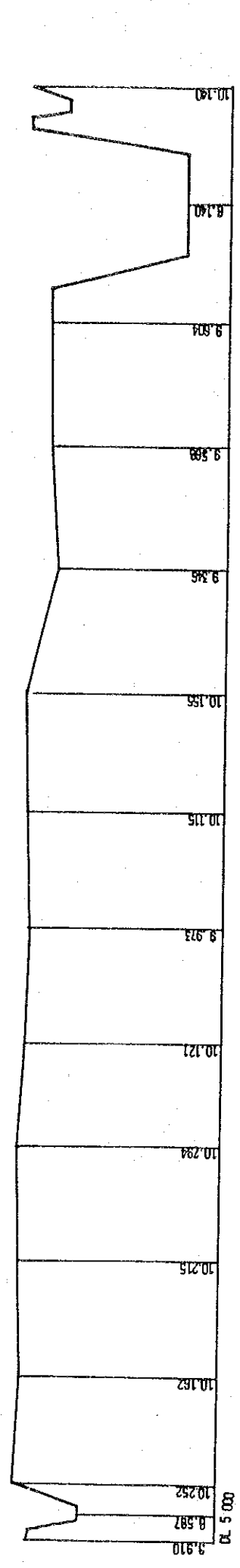
H 1:100
L 1:1000

CROSS SECTION 1

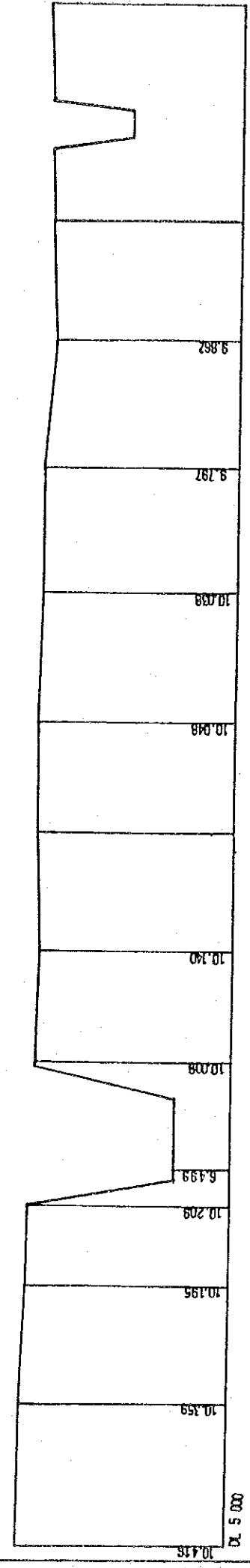


946

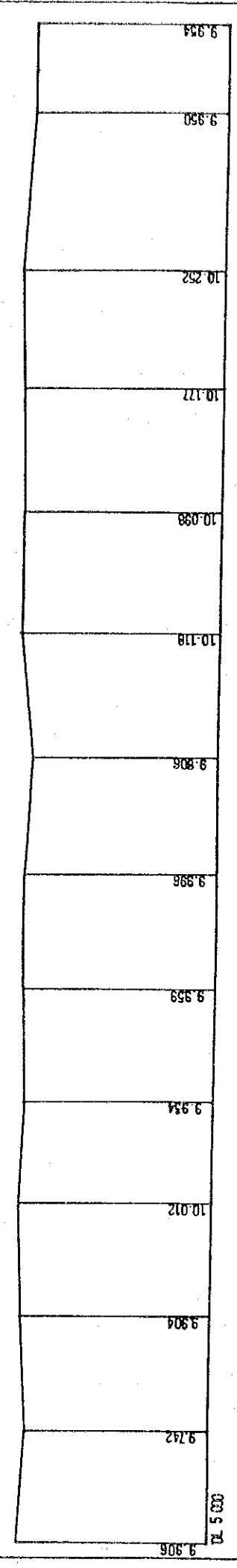
CROSS SECTION 2



CROSS SECTION 3



CROSS SECTION 4



LONGITUDINAL CROSS SECTION DRAWING