

CHAPTER 4. BASIC DESIGN OF THE FACILITIES

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4.1 OUTLINE OF PROJECT SITES

4.1.1 Location and Present Circumstances of site

1. Baghdad

The projected site of buildings for the Vocational Training Center at Baghdad is situated in Zafarania district, about 30 minutes' drive to the southwest from the center of the City of Baghdad. The site is conveniently situated, being close to trunk roads as well as to the nearest bus-stop. Any part of the land of about 20 ha owned by the Ministry of Finance can be selected for the projected site. The Foundation of Technical Institute is quite near, and the Staff Development Center is adjacent to the site. Although its neighborhood is occupied by residential areas, it will be an appropriate site for the projected Center, if an access road is constructed. Land of 98,600 m² will be used for the site of the Center itself, and the remaining land is to be used for the construction works. The site seems to have been used as agricultural land in the past, judging from the existence of an irrigation channel along the site. There is also a large embankment in the east along a tributary of the Tigris.

2. Mosul

The projected site of buildings for the Vocational Training Center at Mosul is situated at about 30 minutes' drive to the west from the center of the City of Mosul. The site faces a trunk road and is close to the nearest bus-stop, thus commanding good facilities for communication. Any part of the land of about 50 ha owned by the Ministry of Finance can be selected for the projected site. The Vocational Training Center managed by the Ministry of Labor is situated in the neighborhood, and the site is adjacent to the building site for a housing development project by the State Organization of Housing (SOH) involving 400 apartment houses.

About one half of the development has been finished, and some of the tenants are moving in. Although the land opposite to the site of the housing development project is now desert, it is expected that the site will be surrounded by residential areas in the future, as a result of the extension of the suburban residential areas of Mosul. The site has a difference in level of about 5 meters and the part of the site facing the road, being low ground, has been filled up with junk for construction works, etc. The solid ground situated about 200 meters from the road was selected for the actual site of the building, rather than the low ground. The site occupies sufficient area including ground for provisional facilities for construction works.

2) Access Road

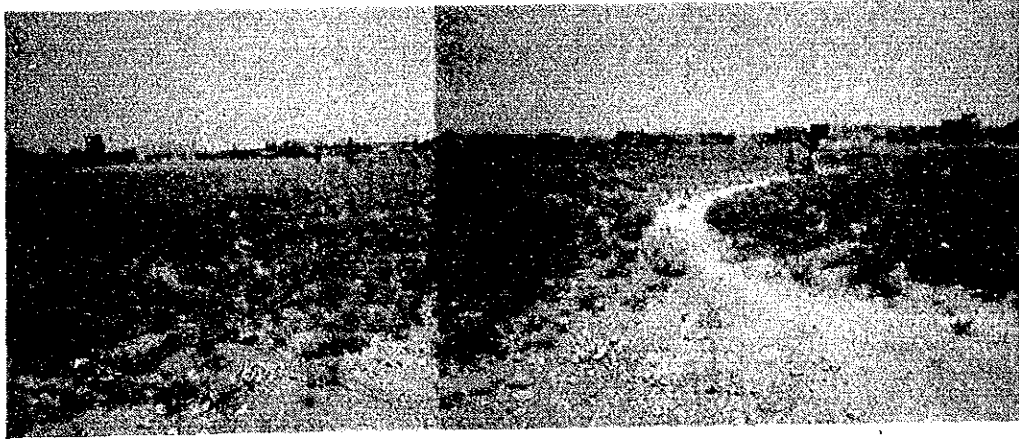
1. Baghdad

We will ask parties concerned in Iraq to build an Access Road using a strip of vacant land of about 50 meters wide lying to the north of the site through the residential area between the site and the trunk road.

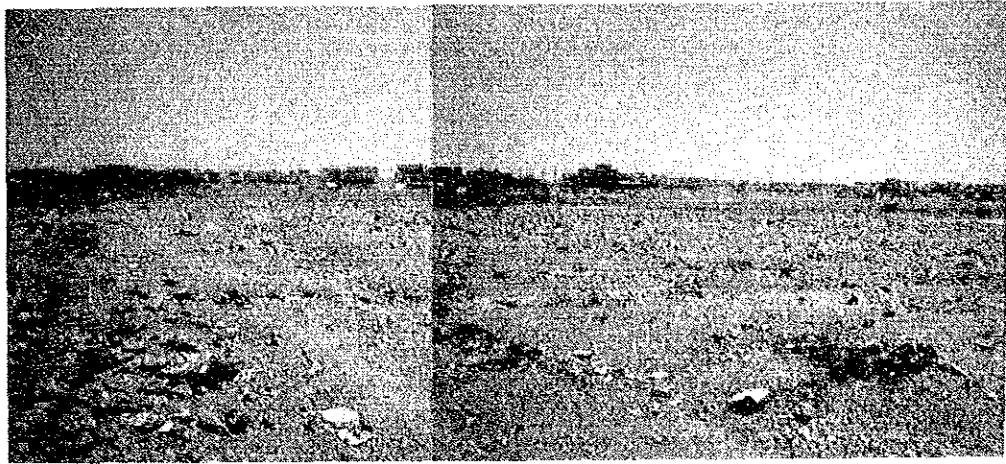
2. Mosul

We propose to include the construction of an Access Road into this project, since the site directly faces the trunk road.

BAGHDAD SITE



Instructors Training Center, Western part of the Site

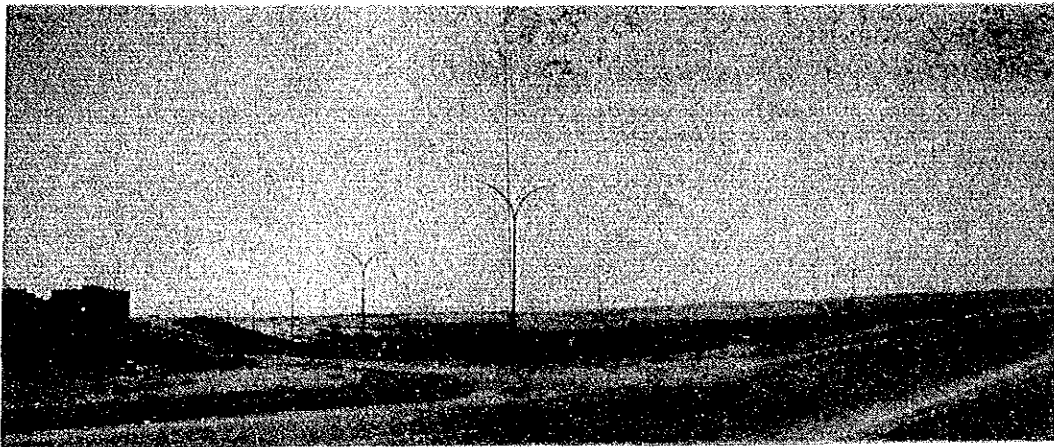


Residential area at the North of the Site

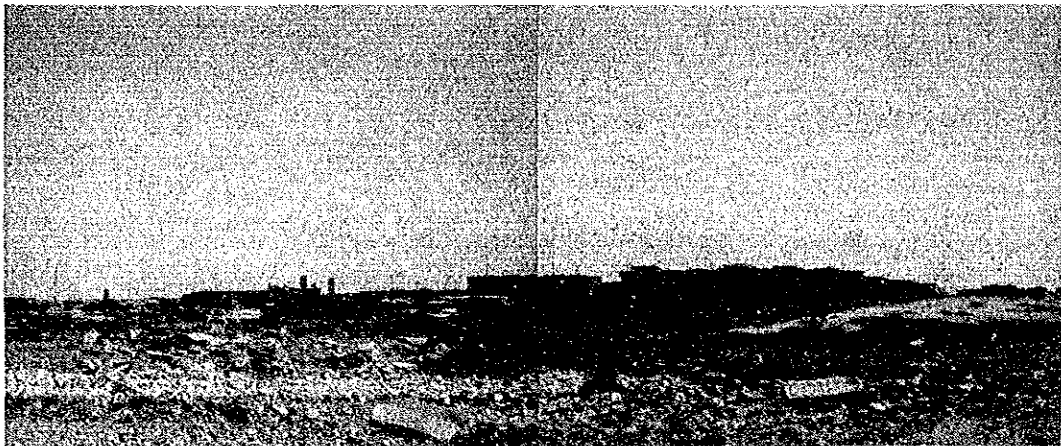


Irrigation canal and the Site

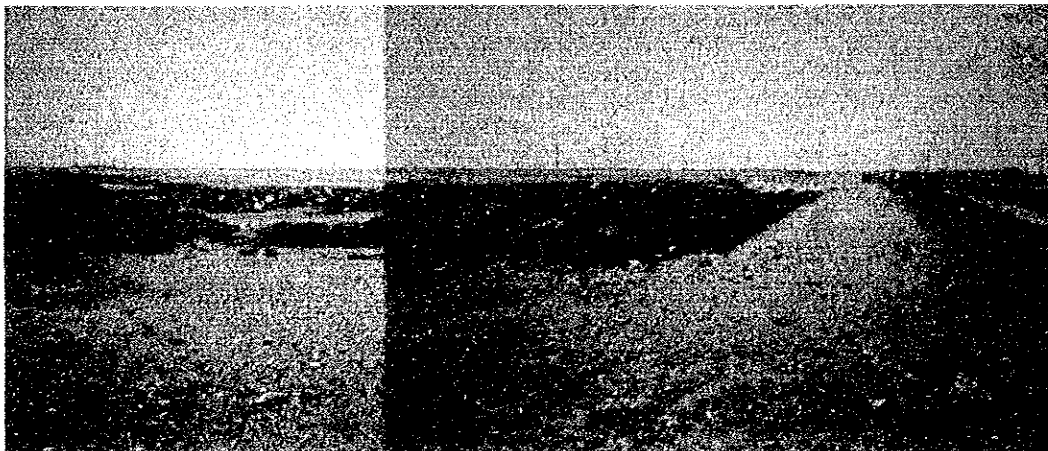
MOSUL SITE



Whole view from the north

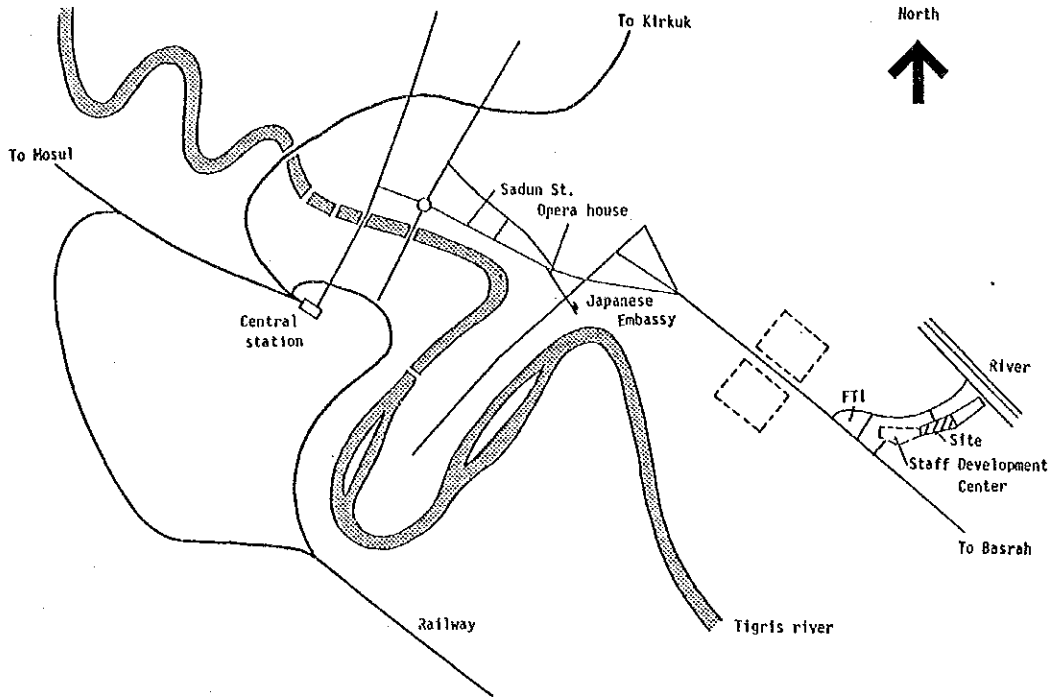


SOH Housing Project

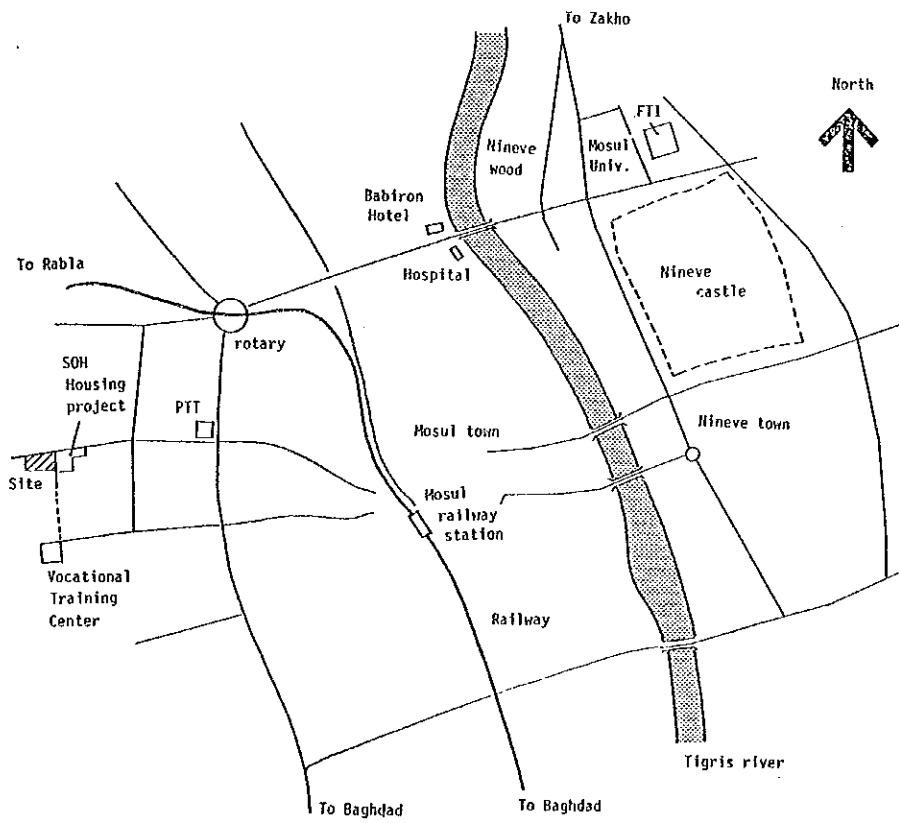


Low level area

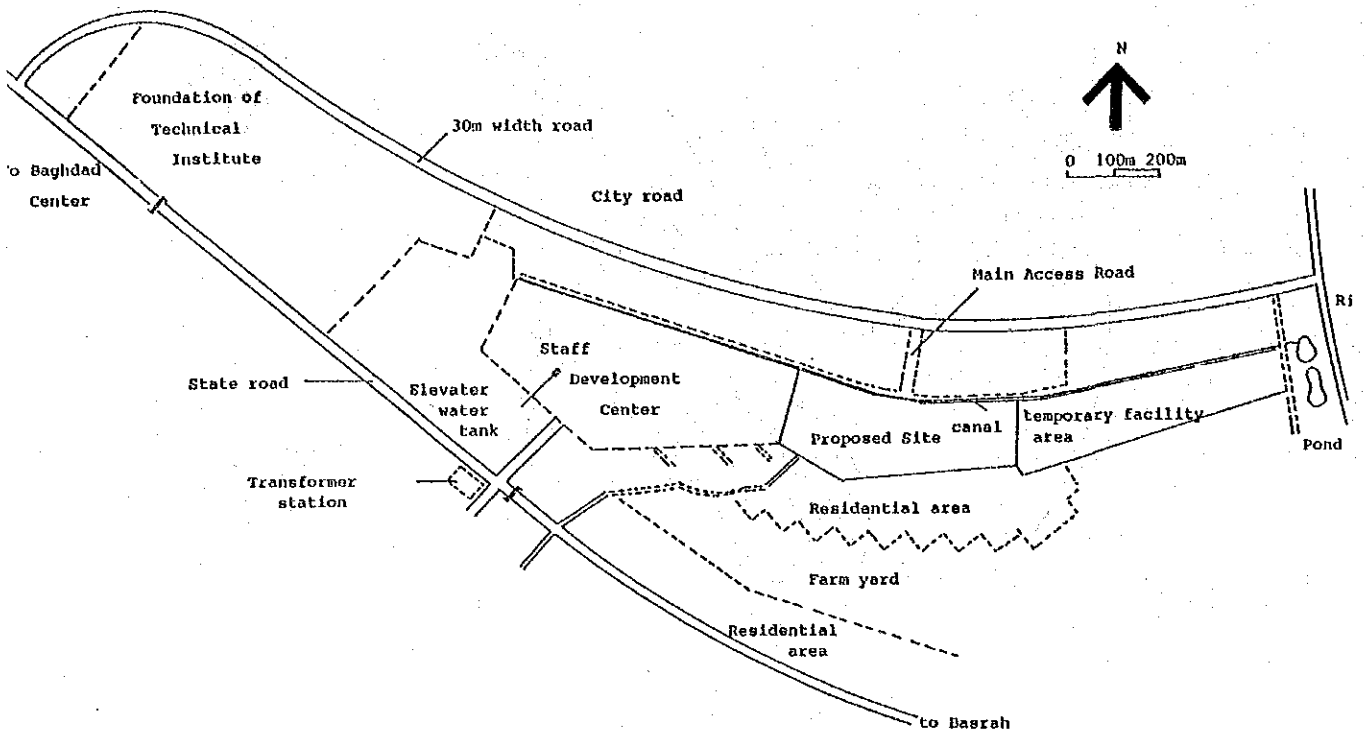
Baghdad Construction Site Location Map



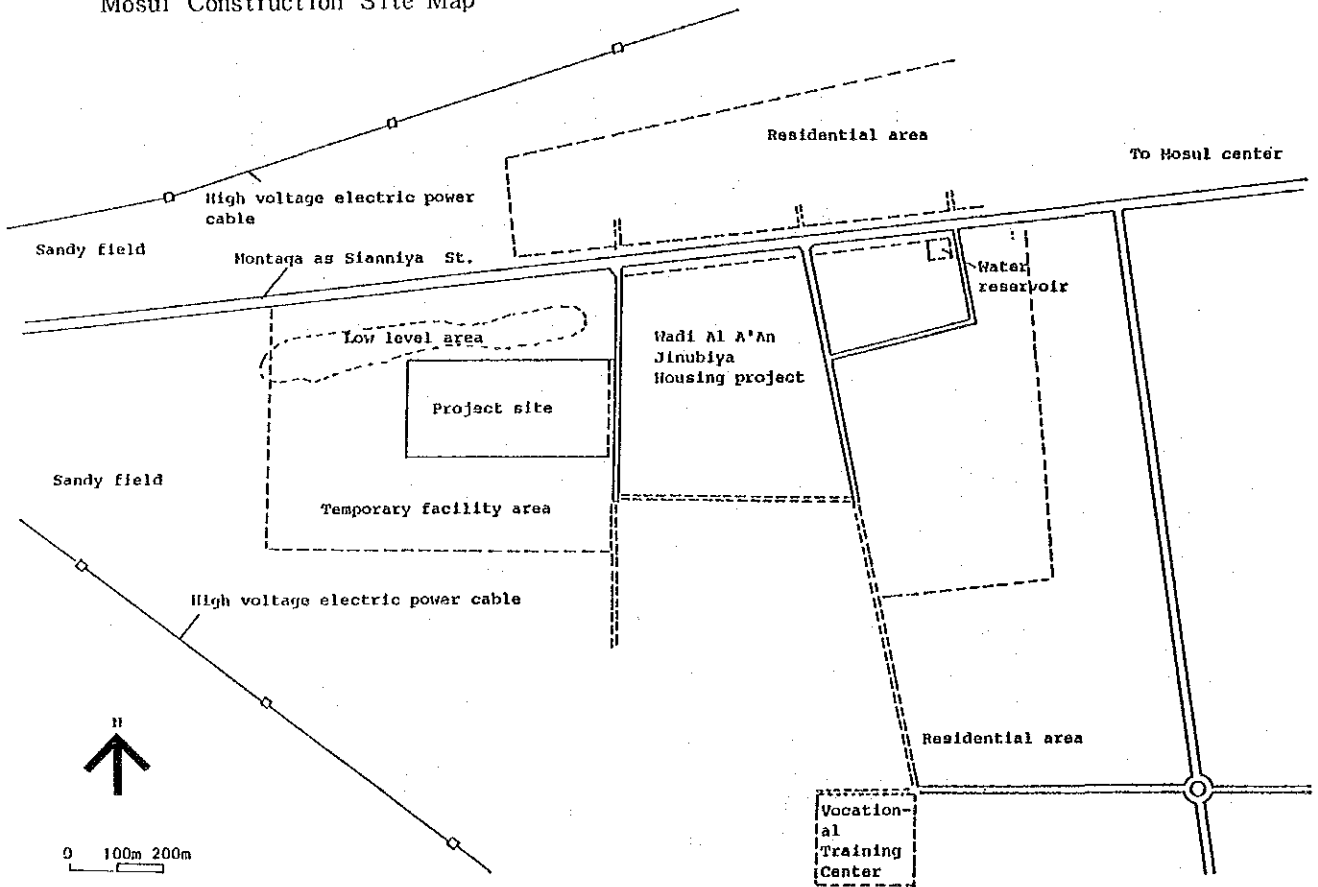
Mosul Construction Site Location Map



Baghdad Construction Site Map



Mosul Construction Site Map



3) Geological Features and Conditions of Ground

The upper layer of the ground of the site in Baghdad is formed by diluvial clay formations prevailing in this area with different degrees of concretion from one place to another. Geologically speaking, the ground consists of clay with several percent of sand. The N value of the upper layer is around 5 to 10, sometimes 20 or more. Most of the low-storied buildings in the city are designed with reinforced concrete spread footing with bearing load of about 10 t/m^2 , and we presume that we can adopt independent foundation or continuous foundation with bearing capacity of $12 - 15 \text{ t/m}^2$ in our design for this Project. In Mosul, on the other hand, the upper layer with thickness of about 5 meters consists of highland clay formations and beneath this layer the land is made of terrace conglomerate formations or upper Fars formations. Generally speaking, allowable soil pressure is higher than that in Baghdad, and we consider that design is possible with soil bearing capacity of 15 t/m^2 to 20 t/m^2 .

4) Earthquake

There is no specific regulation enforcing considerations against earthquake in construction designs, and we presume that no special design is necessary. However, earthquakes of magnitude VII on the Modified Mercalli Scale have been recorded in the past, so we consider it appropriate to adopt the earthquake-proof design aimed at in the United States U.B.C. Zone 3.

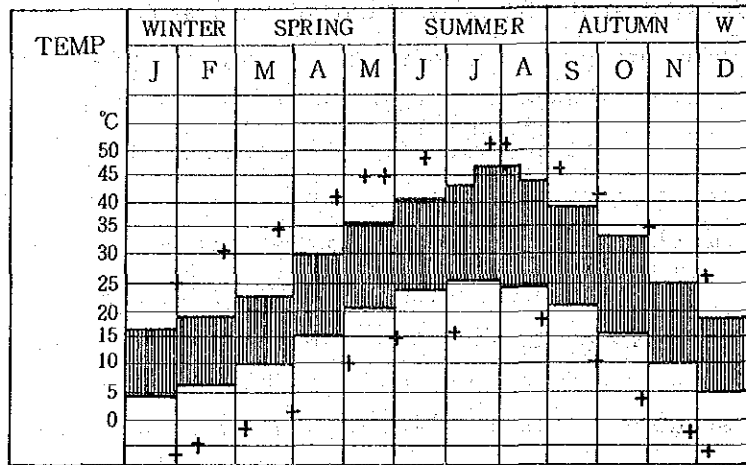
5) Meteorological Features

Only the meteorological data of Baghdad are indicated below, since those of Mosul are not available. The meteorological features deduced from these data can be summarized as follows:

- (1) During the six months of May through October, daytime temperature remains above 30°C and, for four months thereof, constitutes the dry season without any rainfall. In summer, daytime temperature continues to be as high as 46°C or higher.

- (2) Winter is the rainy season with monthly rainfall of about 25 mm, and the temperature goes down almost to zero.
- (3) Northern or north-western winds prevail throughout the year.

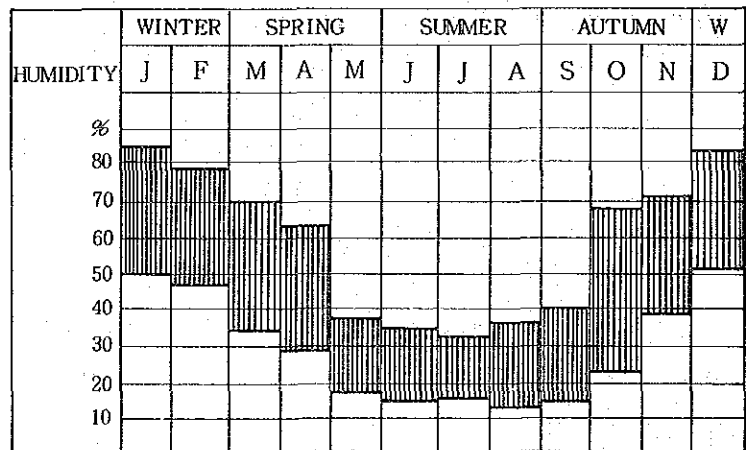
Max., Min. Temperature Chart



MAX. MIN & RECORD TEMP. CHART

BAGHDAD

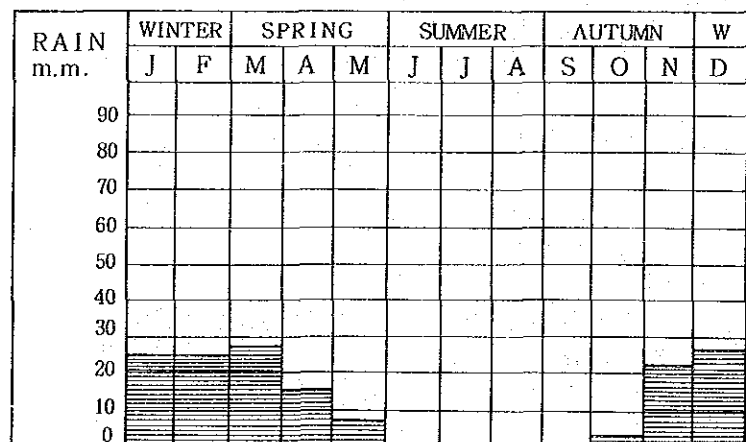
Relative Humidity Chart



RELATIVE HUMIDITY

BAGHDAD

Average Rainfall Chart



AVERAGE RAINFALL

BAGHDAD

6) Land Survey and Boring Survey

The Basic Design Survey Team executed a land survey and geological boring survey of the projected site in Baghdad, while a land survey in Mosul was carried out by the Government of Iraq. A report of the survey results is attached at the end of this Volume.

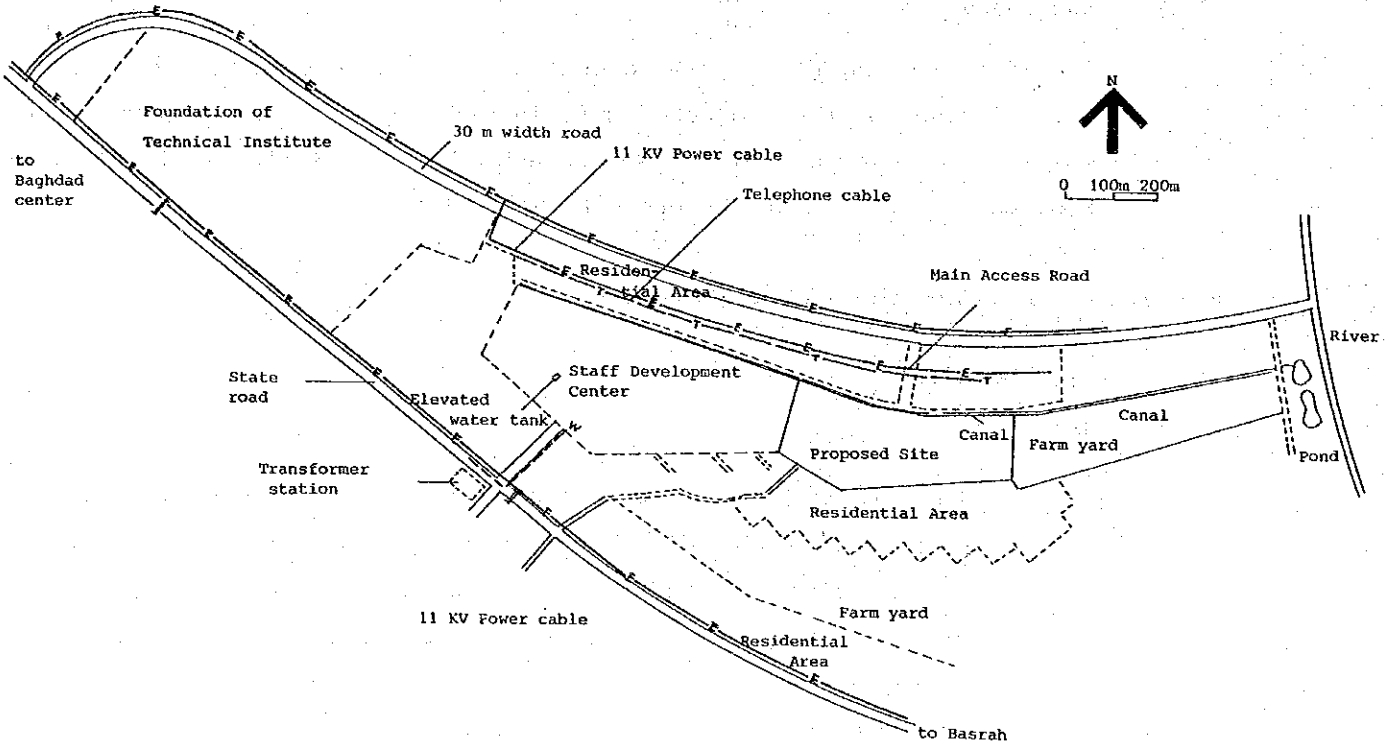
4.1.2 Utility Services around Project Sites

1. Baghdad

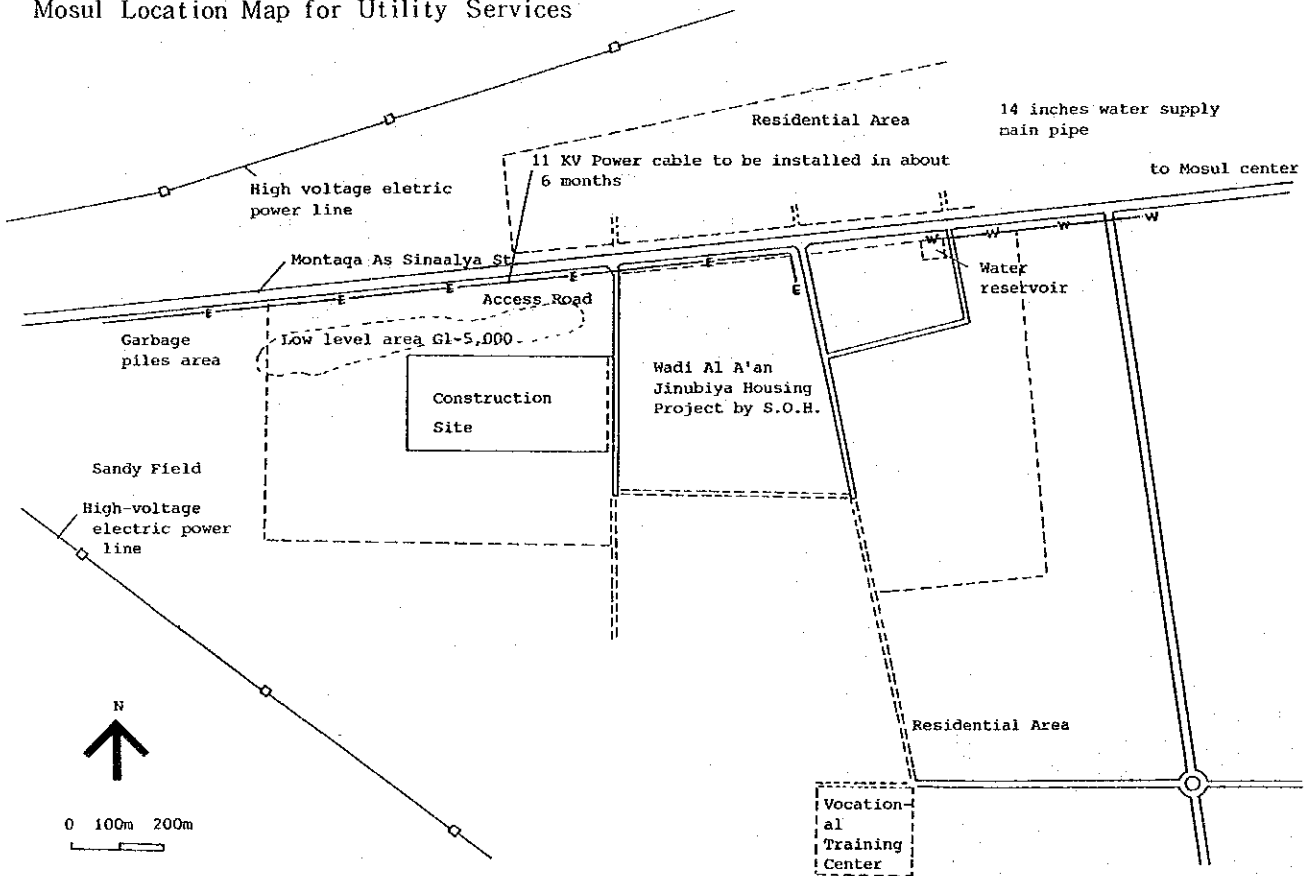
(1) Electricity

Since there is an Instructors' Training Center supplied with sufficient electricity built by a Japanese construction company next to the projected site, we expect that electricity will be easily supplied to the buildings of this project. A high-voltage cable of 11 KV runs overhead along the road to the north of the site in the direction of the east and west. Low-voltage electricity is supplied to private houses situated between the road and the site through overhead transformers. Electricity will be drawn into the projected site from the road in the north into the electricity room by way of a two-way switch room in the site. The State Organization for Electricity(SOE) will execute the wiring works for electricity cable as far as to the primary side of the two-way switch and the consumer will carry on the remaining works after the two-way switch.

Baghdad Location Map for Utility Services



Mosul Location Map for Utility Services



(2) Telephone

Telephone cable is installed overhead sharing the same utility poles with electricity along the road between the site and the road in the north, and it is expected that telephone cable will be drawn into the buildings of this project from the above-mentioned road. Private houses situated in the south of the site are also being supplied with telephone circuits.

(3) City Water

City water is expected to be easily supplied to the site of this project, since the Instructors' Training Center adjoining the site is being supplied with sufficient water. Water is supplied by using the force of gravity, a method commonly used in Iraq, leading water from main pipes of city water as far as to the taps by way of receptacle tanks and elevated tank. Drinking water and water for lavatories will be supplied through different systems.

(4) Sewer System

The municipal sewer system in the neighborhood of the site is still incomplete. Therefore, the miscellaneous waste water and soil water, after being treated in a compact septic tank, will be drained into the irrigation canal.

(5) Gas

City gas is not available in the neighborhood of the site. Gas will be supplied by means of gas cylinders. Gas is also available in bulk tanks of 2 tons capacity. These tanks can be refueled by gas tankers.

(6) Garbage

In Iraq, garbage is generally disposed of after being collected by the municipal garbage gathering trucks. The above method will probably be adopted for garbage disposal for this project.

(7) Television

Two channels are available for TV broadcasting reception in Baghdad including at the site of this project. TV programs are broadcast in VHF.

2. Mosul

(1) Electricity

A housing development project by the State Organization for Housing with housing capacity for about 900 families is currently under construction, adjoining the site on its eastern side. A transformer substation of 312,000 KVA is also under construction for the sake of the above project, at a location about 4 km to the west from the site. The installation of electricity cable starting from this substation along the road is expected to be finished in about six months' time. Electricity can be easily drawn into the site of this project from the above electricity cable which is to run along the main road adjoining the northern side of the site. As present, low voltage electricity is being supplied to an electricity facility provisionally constructed in the housing development project and to several private houses situated to the north of the site. There is a special high voltage transformer substation with a large capacity of about 500 m to the north of the site.

(2) Telephone

Telephone cable is being supplied to the houses and buildings in the district southeast of the site. A telephone circuit is installed along Baghdad Street, about 1 km to the east from the site, so telephone cable will be supplied to the site of this project from the areas in the east or southeast.

(3) City Water

A main water pipe with a diameter of 14 inches is installed along the northern main road from the center of Mosul city for the sake of the housing development project to the east of the site. A water pipe with a diameter of 8 inches is expected to be branched off from the main water pipe. The distance between the 14 inch main water pipe and the site is about 600 m.

(4) Sewer System

The municipal sewer system is not available in the area surrounding the site. The adjoining housing development project divided its site into 9 blocks and installed a compact septic tank in each block. Soil water, after being thus treated, is collected and transported to other places and discharged by municipal trucks. The project will not adopt the same purification method as the housing development project, but the soil water will be treated and connected to the sewage main pipe of the housing project.

(5) Gas

City gas facility is not available in Mosul. Gas will be supplied by means of gas cylinders.

(6) Garbage

Garbage, after being gathered within the site, will be collected by the municipal garbage gathering trucks and disposed of, in the same way as that in Baghdad.

(7) Television

One channel is available for TV broadcasting reception in Mosul.

4.2 DESIGN PRINCIPLES

4.2.1 Basic Design Policies

The Survey Team will draw up a basic design governed by the following design principles:

- 1) The facilities should be designed to conform to the training programs.
- 2) A compact design should be adopted to guard the equipment against local climatic conditions characterized by low humidity and high temperature in summer, and dusty air.
- 3) The materials and methods of construction in Iraq should be taken into account. Facilities easy to maintain should be designed, based on a thorough study on how they will be used.
- 4) The facilities should be characterized by adaptability and flexibility, with space to accommodate future changes according to the progress and development of training activities.

4.2.2 Outline of Project

1) Location of the Project

The location sites of the Project are at Baghdad and Mosul in Iraq. The site area will be 98,600 m² at Baghdad and 100,400 m² at Mosul.

2) Outline of Facilities

Center Building

1. Administration Building : Administration Sector and Media Center

2. Workshop Building
(Elevator Course) : Provided only in Baghdad.
2 classes, 60 students

3. Elevator Tower, Water Tank : Elevator Tower in Baghdad,
Water Tank in Mosul
4. Workshop Building : Provided both in Baghdad and Mosul.
(TV, VTR Course) 3 classes, 90 trainees, each
5. Workshop Building : Baghdad : 2 classes, 60 trainees
(Air-Conditioner Course) Mosul : 3 classes, 90 trainees
6. Workshop Building : Baghdad : 3 classes, 90 trainees
(Automobile Course) Mosul : 4 classes, 120 trainees
7. Small Gymnasium : Mainly for Karate and Judo.
To be also used as a Mosque.
8. Student Dormitory : Accommodating 100; 2 trainees per room.
9. Cafeteria : 150 seats for trainees
50 seats for staff
10. Student Plaza : To be used as multifunctional plaza.
Equipped with an outdoor auditorium
accommodating 300.
11. Connecting Corridor : To be used for connecting facilities
with each other.

Staff Accommodation

1. Single Staff Accommodation : 54 rooms for Baghdad site
46 rooms for Mosul site
An individual room with bathroom and
lavatory will be provided for each
staff member.

2. Married Staff Accommodation : 30 housing units, available in 2LDK type or 3LDK type.

Auxiliary Facilities

1. Substation : Facilities for receiving and transforming electricity, and Water Tank
2. Guard House : Located in one place. (Gate House)
3. Garage A : Space for one car for official use and 26 cars for staff. Equipped with an Anteroom for driver.
4. Garage B (Automobile Course) : To accommodate 4 buses and 8 micro-buses, with accompanying Oil Storage and Gasoline Station.
5. Swimming Pool for Students : 25 m x 15 m, with dressing rooms.
6. Swimming Pool for Staff : 20 m x 10 m, with swimming pool for infants.
No dressing room.

3) Floor Area of Facilities

The following floor areas necessary for each facility were established according to the results of the discussions and surveys held in Iraq, with additional studies on how the facilities will be used, and comparison with similar facilities within Iraq.

	<u>Baghdad</u>	<u>Mosul</u>
Administration Building	3,449	3,545
Elv. Course	2,455	-
Elv. Tower, Water Tower	330	199
TV, VTR Course	1,772	1,771
Air-Conditioner Course	1,990	2,209
Automobile Course	2,796	3,355
Small Gymnasium	644	644
Cafeteria	1,080	1,080
Student Dormitory	2,146	2,146
Student Plaza (including Covered Corridor)	2,268	2,259
Single Staff Accommodation	2,181	2,073
Married Staff Accommodation	4,033	4,032
Pool (in two places)	1,660	1,660
Substation	480	480
Garage	540	540
Garage (accompanying Automobile Course)	297	297
Guard House	24	24
Total Floor Area	28,143 m ²	26,314 m ²
Total Floor Area of Baghdad and Mosul Centers	54,457 m ²	

Floor Area on Baghdad Site

	<u>ground floor</u>	<u>1st floor</u>	<u>total area</u>
Center Building			
Administration Building	1,893	1,556	3,449
Workshop Building (Elv. Course)	2,004	451	2,455
Elevator Tower	-	-	330
Workshop Building (TV, VTR Course)	1,473	299	1,772
Workshop Building (Air-Conditioner Course)	1,654	336	1,990
Workshop Building (Automobile Course)	2,276	520	2,796
Small Gymnasium	644	-	644
Cafeteria	1,080	-	1,080
Student Dormitory	1,073	1,073	2,146
Student Plaza	2,268		2,268
sub-total	14,365	14,235	18,930
Staff Accommodation			
Single Staff Accommodation	961	1,220	2,181
Married Staff Accommodation			4,032
sub-total			6,212
Auxiliary Facilities			
Substation			480
Guard House			24
Swimming Pools			1,660
Garage A			540
Garage B (accompanying Automobile Course)			297
sub-total			3,001
<u>Total Floor Area</u>			28,143 m ²
(cf: Building Area 22,359 m ²)			

Floor Area on Mosul Site

	<u>ground floor</u>	<u>1st floor</u>	<u>total area</u>
Center Building			
Administration Building	1,736	1,809	3,548
Workshop Building(TV /VTR Course)	1,472	299	1,771
Workshop Building(Air-Conditioner Course)	1,836	373	2,209
Workshop Building(Automobile Course)	2,650	705	3,355
Small Gymnasium	644	-	644
Cafeteria	1,080	-	1,080
Student Dormitory	1,073	1,073	2,146
Student Plaza	2,259	-	2,259
sub-total	12,750	4,259	17,009
Staff Accommodation			
Single Staff Accommodation	907	1,166	2,073
Married Staff Accommodation			4,032
sub-total			6,105
Auxiliary Facilities			
Substation			480
Water Tank			199
Guard House			24
Swimming Pools			1,660
Garage A			540
Garage B(accompanying Automobile Course)			297
sub-total			3,200

Total Floor Area 26,314 m²

(cf: Building Area 20,889 m²)

4.3 BASIC DESIGN

4.3.1 Block Layout Plan

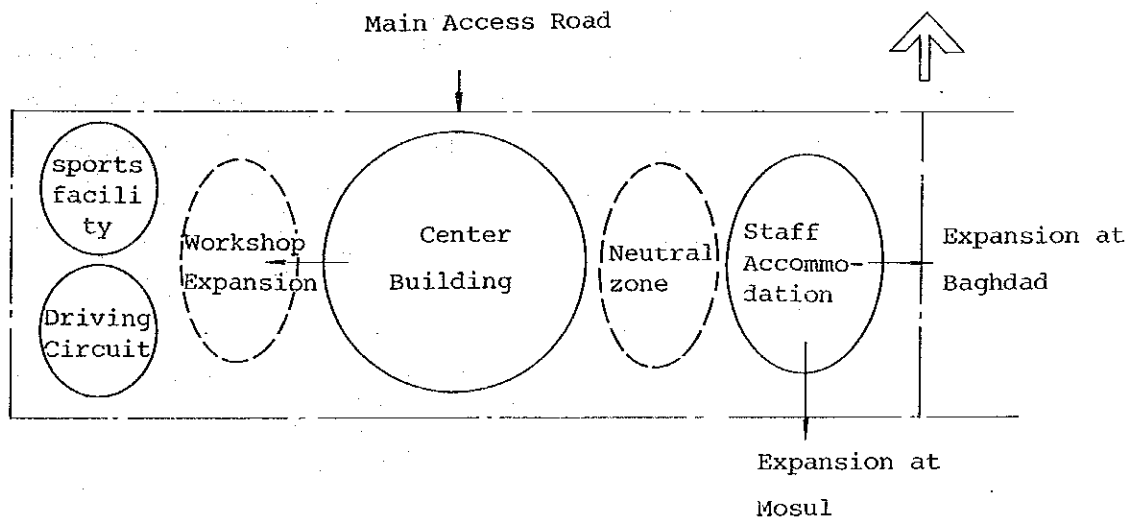
1) Selection of Sites

1. The site in Baghdad provided by the Government of Iraq is a long strip of land of 210 m to 150 m wide extending along the west-east axis. The site is surrounded by newly-developed housing areas and is adjacent to the Instructor Training Center on its western side. The ideal location for the facilities of the Project to be selected from the entire 20 ha site seems to be the area with comparatively large width in the direction of the Instructor Training Center near the city of Baghdad. There is sufficient space for providing an access road leading approximately to the center of the site, and the access road can be connected to the bus road extending from Baghdad.

2. The site in Mosul provided by the Government of Iraq is vast but uneven in ground level. Since the construction site should be of appropriate ground level and close to the city center, a limited area can be utilized as the facility site. A bus road extending from the city will be connected to the northern side of the site, as was the case in Baghdad, so it seems appropriate to adopt the same layout as in Baghdad by situating the site in a long strip of land extending on the west-east axis and providing an access road which runs to the center of the site. The vacant lot between the site and access road shall be backfilled and prepared for future use as park or playing courts.

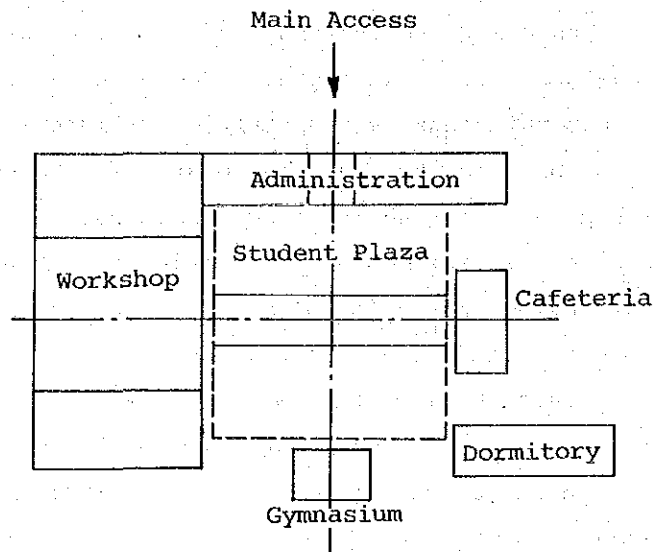
2) Location of Facilities

A layout conforming to the shape of the site extending in the east-west axis shall be adopted. The main facilities consisting of Workshop Buildings, Administration Building and various buildings for students shall be located in the central part, to which an access road is to be connected. The western part of the site will accommodate facilities for dynamic activities such as Playing Courts for Students and Driving Circuit, while the eastern part of the site will be allocated for facilities like the Staff Accommodation which require a quiet environment. An open space is prepared between the Workshop Buildings and Playing courts to facilitate future expansion of the Workshops, and facilities functioning as a neutral zone are also located between the Cafeteria and Dormitory and Staff Accommodations.



The eastern part of the Baghdad site will be allocated for future expansion of Staff Accommodations, whereas the Southern part of the Mosul site will serve the same purpose.

3) Layout of Building Blocks



The facility plan of the Project pays due regard to the main axis, which has traditionally been an important factor in facility planning in Iraq. As a result, the facilities will be arranged around an axis starting from the main access road, continuing through the entrance of the Administration Building to the Student Plaza and leading to the Small Gymnasium. The facilities will be located to surround the Student Plaza, with the Administration Building nearest to the main access road, the Workshop Buildings to the west of the Plaza and the Cafeteria and Single Staff Accommodation to the east of the Plaza, so that the facilities will be utilized en bloc. The Student Plaza positioned as the center of the group of buildings will provide multifunctional space in semi open-air.

4.3.2 Architectural Design

1) Architectural Plan of each Facility

1. Workshop Building

A simplified traffic line for a functional use of space and compact form for guarding training equipment against dust will be adopted in the architectural plan of the Workshop Buildings.

To simplify the traffic line for educational and training activities, Workshops in each building will be assembled on the ground floor as a rule, while the first floor will accommodate Staff Room, Locker Rooms and Passages for visitors. Classrooms and other small rooms will be united with the Workshops and clustered on the corridor side of the floor, while a major space will be allocated for the Training Workshops so that visitors will be able to observe the training process from their passage upstairs. The Workshops are to be arranged in a layout to accommodate future expansion to the western direction, with sufficient space provided between them to guard against disturbing noise.

No columns will be used as a rule in the Workshop Buildings so as not to interfere with the location of training equipment or interrupt observation of the training process. Electric wiring works, etc. will be taken out from the floor without disturbing the training activities.

The Elevator Tower will be built separately from the Workshop building for the Elevator Course, but a corridor on the first floor will connect the two buildings together.

As to the TV, VTR Course which deals with electronic apparatus highly sensitive to dust, high-power air-conditioning equipment will be installed in the Workshop for this course.

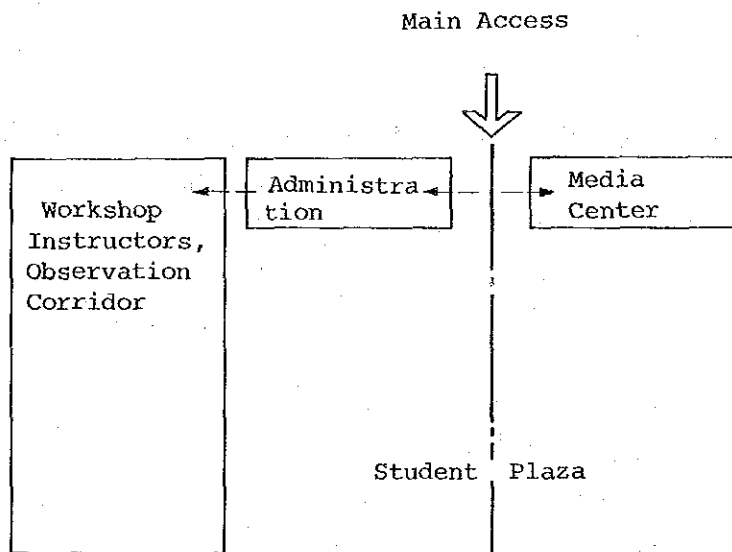
The traffic lines for entrance and exit of automobiles from the outside were taken into account for the Automobile Course, and a gateway will be provided on both ends of the longer sides of the Workshop. A Garage to accommodate 4 large and 8 small cars, Oil Storage and Gasoline Station will be built separately.

2. Administration Building

The plan to locate the Administration Building nearest to the Main Entrance was adopted, with due regard to the function of the building which conducts general administration over other facilities, and that its entrance more or less determines the impression of the remaining facilities.

The Main Entrance will therefore be located in a position overlooking the Student Plaza in the center of the facilities, and will serve as an entrance from the Administration Sector to Media Center or vice versa.

Because of the relation between the Instructors Room on the first floor of the Workshops, the main rooms consisting of Administration Office, Director's Room, etc, will be located on the 1st floor of the Administration Sector, whereas service-oriented rooms closely related to other buildings will be provided on the ground floor. The 1st floor of the Media Center will accommodate libraries and other rooms that require a quiet atmosphere, while the ground floor will hold a studio dealing with major equipment and a hall to accommodate a large number of people.



3. Student Plaza/ Courtyard/ Corridor

A courtyard surrounded by a covered corridor located in the center of the group of buildings will provide a space for taking a rest between the busy training sessions. A paved section called the Student Plaza is situated in the center of the Courtyard; a semi open-air space topped with a space frame. A fountain creating a peaceful atmosphere is placed in the middle, flanked with an outdoor auditorium accommodating 300 people on one side, and a level multifunctional plaza on the other. The covered corridor will make it easier for people to move from one building to another in the hot climate.

4. Small Gymnasium

A Small Gymnasium will be built as a hall for such extra-curricular activities as karate and judo. A symbolic design is adopted for this facility, which is to serve as an emblem for spiritual education, so that it can also be used as a Mosque. The facilities are to be accompanied by their own storerooms.

5. Cafeteria

A Cafeteria will be built opposite to the Workshop Buildings from the Student Plaza. It will be built in a location with sufficient proximity from each facility and close to the Student Plaza. The facility is to be divided into a Cafeteria for Students seating 150 (2 rotations will accommodate 300), and a Dining Room for Staff seating 50. The Dining Room will be located on the side facing the Student Plaza, and a Kitchen will be provided on the eastern part of the building with due regard to the traffic line for delivering food and other goods.

6. Dormitory

A Dormitory for 100 students will be built. It will be a 2-story building with 50 rooms, each accommodating 2 students. The floor height of the ground floor will be 60 cm higher than that of other buildings to create comfortable living conditions.

The building will be located close to the Cafeteria, where the students will have their meals.

7. Single Staff Accommodation

Individual rooms will be provided for each Single Staff; 54 rooms in Baghdad and 46 rooms in Mosul. The building will be of 2 stories, with the floor height of the ground floor 60 cm higher than that of other buildings to create comfortable living conditions.

8. Married Staff Accommodation

As few partitions as possible will be used for the ground floor of the Married Staff Accommodation so that it can be used as a wide space accommodating a large number of people for parties and other gatherings. The Living Room, Dining Room and Kitchen will be provided on the ground floor, whereas the first floor will accommodate Bedrooms, Children's Room and Bathroom. The floor height of this building is also raised 60 cm higher than that of other buildings.

9. Other Facilities

Swimming Pool, Tennis Court, etc. will be provided as facilities for entertaining the staff, and separate Swimming Pool, Basketball Court and Football Court will be prepared for students. A Guard House will be provided in one place, at the Main Entrance, and a Substation and Water Tank facility will be built at the site boundary. The garage accommodating 26 cars will be equipped with an Anteroom for Drivers, and the Administration Building and the Anteroom for Drivers will be connected by the intercom system.

2) Landscaping Plan

1. Site Road and Exterior Facilities

Only one in-coming road into the site will be constructed on the northern side for the sake of management and crime prevention. Fences will be constructed around the entire construction site and also around the Staff Accommodation areas. The Site Road will be 6 m wide, and will be equipped with traffic indicators, lampposts and other attachments. A controlling pond will be provided on the site in Baghdad lest the irrigation waterway should flood the site in the rainy season.

2. Parking Lot

A Parking Lot for visitors accommodating 26 small cars will be provided in the shade of buildings, in addition to the Garages.

3. Shrubbery and Gardens

Soil in Iraq is acid soil, and maintenance of shrubberies and gardens in the hot and arid climate is not an easy task.

Gardens will therefore be prepared only in the central part of the facility, in a small area easy to take care of. Trees will be planted near buildings or facilities. Turf and flower beds will cover an area of 10,000m², and about 200 saplings will be planted as shrubbery.

3) Sectional Plan

1. Story Height and Ceiling Height of each floor

Large scale equipment will be used in each Training Course, so the minimum required ceiling height is 3m for small rooms and 6 m for Workshops. Floor Height of 4m on the ground floor and around 3.6 m on the first floor is necessary, with respect to the space for ventilating ducts and electric cables.

2. Design of Elements

A steelframe structure is adopted for the Workshop Buildings to support beams of around 30 m without columns. Lightweight roofs are desirable, and steel containing highly insulated materials will be used. Precast concrete is to be used for walls to maintain harmony with the design of other facilities and also for insulating purposes. Openings on the exterior walls will be minimized to protect the building interiors from the severe heat and dust. Other facilities will have more partitions and reinforced concrete block structure will therefore be adopted, with brick walls surround the buildings to insulate the exterior walls. The roof will be concrete topped with insulating material and the concrete block will also serve for insulation.

Concrete block structure will be mainly used for inner walls.

4) Finishing Plan

Local construction situations, site conditions of the facilities, the surrounding environment and the usage/function of each building and room should be considered for selecting the exterior finishing materials. Easy maintenance should also be taken into account and durability, easy maintenance and industrialized products should be valued above all for training facilities, in particular.

1. Exterior Plan

roof: steel and insulation board, concrete

exterior wall: precast concrete panel w/ sand blast finish for
Workshop Buildings

Other facilities : Facebrick in Baghdad

Local stone in Mosul

sash : steel door

aluminium sash window

Student Plaza roof: space frame

2. Interior Finish

The following are the Interior Finish Schedule of the main rooms.

Name of Room	Floor	Skirting	Wall	Ceiling
Administration Office	Rubber tile	Vinyl	Plywood, painted	Acoustic board
Director General	Carpet	Vinyl	Wall cloth	Acoustic board
Administration Building Corridor	Rubber tile	Vinyl	Wall cloth	Rockwool
Auditorium	Carpet	Vinyl	Steel rockwool	Steel panel
Library	Carpet	Vinyl	Steel rockwool	Acoustic board
Studio	Rubber tile	Vinyl	Steel rockwool	Rockwool
Editorial Room	Rubber tile	Vinyl	Steel rockwool	Acoustic board
Workshop (Elv. Air-Conditioner, Automobile)	Paint on Concrete	Paint on Concrete	Concrete	Rockwool
Classroom	Rubber tile	Vinyl	Concrete block, painted	Acoustic board
TV,VTR Workshop	Rubber tile	Vinyl	Plywood, painted	Acoustic board
Tool Rm.	Paint on concrete	Paint on concrete	Concrete block, painted	Rockwool
Small Gymnasium	Wood Flooring	Wood	Flooring	Rockwool
Shower Rm.	Ceramic tile	Ceramic tile	Ceramic tile	Asbestos cement board, painted
Lavatory	Ceramic tile	Ceramic tile	Ceramic tile	Asbestos cement board, painted
Instructors Room	Carpet	Vinyl	Concrete block, painted	Rockwool
Cafeteria	Terrazzo tile	Terrazzo tile	Facebrick	Rockwool
Kitchen	Ceramic tile	Ceramic tile	Ceramic tile	Asbestos cement board, painted

Name of Room	Floor	Skirting	Wall	Ceiling
Student Dormitory Bedroom	Rubber tile	Vinyl	Waterproof plywood, painted	Sprayed plaster
Student Dormitory Corridor	Rubber tile	Vinyl	Waterproof plywood, painted	Sprayed plaster
Staff Accommodation Living Room	Carpet	Vinyl	Waterproof plywood, painted	Sprayed plaster
Staff Accommodation Kitchen	Terrazzo tile	Terrazzo tile	Terrazzo tile	Asbestos cement board, painted
Staff Accommodation	Ceramic tile	Ceramic tile	Ceramic tile	Asbestos cement board, painted
Single Staff Accommodation Bedroom	Carpet	Vinyl	Waterproof plywood, painted	Sprayed plaster
Single Staff Accommodation Dining Room	Carpet	Vinyl	Waterproof plywood, painted	Acoustic board

Interior : Steel light door, aluminium sash for Workshop
Buildings
Wooden doors and aluminium sash windows for
Staff Accommodations

5) Furniture, Curtains and Kitchen Equipment

Furniture will be selected with regard to the function of the rooms in which they will be installed.

Particularly durable furniture shall be chosen.

Curtains will be hung in Administration Building, Student Dormitory and Staff Accommodations, whereas blinds will be provided in Workshop Buildings.

Kitchen equipment for cooking only Arabian dishes will be installed in the Cafeteria, whereas kitchen equipment for an international variety of cooking will be provided in the Staff Accommodations.

4.3.3 Structural Design

1) Basic Policies

- (1) To select and adopt materials and construction techniques that conform to normal practice in the Republic of Iraq.
- (2) To adopt a structural plan that provides all the necessary functions of a professional training center.
- (3) To adopt the most cost-effective and time-saving construction techniques, in view of the short construction period for the Project.

2) Basic Standards

The following standards and criteria should be adopted for structural materials calculation, such as the calculation for external force and loads imposed on the buildings, allowable unit stress of construction material, etc.

- | | | |
|--------------|----------|----------|
| (1) JIS, AIJ | (4) AISC | (7) ASTM |
| (2) BIS | (5) ANCI | |
| (3) ACI | (6) UBC | |

3) Design Loads

1. Dead Loads

- | | |
|-------------------------|-----------------------|
| (1) reinforced concrete | 2.3 t/m ³ |
| (2) structural steel | 7.85 t/m ³ |
| (3) bricks & blocks | 1.9 t/m ³ |

(2) Live Loads

(1)	roof	60 kg/m ²
(2)	administration office	259 kg/m ²
(3)	workshop	500 kg/m ²

(3) Wind Loads

- (1) Effective wind pressure 'q' will be computed in accordance with the following formula.

$$q = C q_0$$

where

q = Effective wind pressure (kg/m²)

c = Wind pressure coefficient

q₀ = Basic wind pressure (kg/m²)

q₀ = K V_s² (Kg/m²)

K : 0.0625

V_s : design wind speed (= 40 m/sec.)

$$\begin{aligned} q_0 &= 0.0625 \times 40^2 \\ &= 100 \text{ Kg/m}^2 \end{aligned}$$

4) Structure

Steel structure for Workshops, and reinforced concrete structure or masonry structure for other facilities. Anti-termite liquid such as chlorodone should be used in all concrete works in contact with soil above water level.

5) Foundation

Foundation of reinforced concrete spread footings based on allowable soil pressure of 12 t/m² will be used.

Allowable design loads will be determined according to the results of a soil load test.

4.3.4 Electrical Work Design

Basic Design Policies

- (1) Simple and easy systems for operation, maintenance and replacement.
- (2) Reliable and stable systems
- (3) Energy saving systems
- (4) Economical systems
- (5) Systems with equipment and materials suited to the local climatic conditions

1) General Provisions

1. Applied Regulations and Codes for electrical equipment, accessories, fittings and cables.

- | | |
|--|-------------------------------|
| (1) Low Voltage Wiring within Building | : IEE Wiring Regulations (UK) |
| (2) Lightning Protection | : BS. CP 326 (UK) |
| (3) Illuminance | : IES Recommendations (UK) |
| (4) Fire Detection and Alarms | : BS. 5839 (UK) |

2. Applied Standards for all materials used in electrical installations :

- | | |
|---|---|
| (1) Substation Equipment | : IEC |
| (2) Generator/Engine | : BSS/JIS |
| (3) Conduits | : BSS for up to 32 mm diameter
JIS for larger diameter |
| (4) Cables | : BSS/IEC |
| (5) Molded Case Circuit Breaker
Electric Leakage Circuit Breaker | : BSS/IEC |
| (6) Wiring accessories | : BSS |

3. Temperature Conditions for continuous operation:

(1) Interior

- General : 40°C
- Switch Room : 45°C
- Transformer Room : 45°C
- Engine Room : 50°C

(2) Exterior

- In shade (6 hr/day) : 50°C
- Under sunshine : 80°C
- Underground : 40°C

4. Design and Manufacturing Conditions of all electrical equipment and fittings

- (1) Dust proofing against violent sand storms and fine dust suspended in the air

(2) Voltage (50 Hz)

- a. 11 KV primary voltage : 11 KV \pm 10%
- b. Secondary voltage of transformer : 415 V/240 V, solidly earthed neutral
- c. Service intake voltage : 380V/220V (nominal)
400V/231V (+6% -10%)
- d. Final point voltage : 370V/215V, minimum
(2/5% drop to nominal voltage)

(3) Short Fault Level

- a. 11 KV receiving point : 16 KA (IEC 12 KV base)
- b. MSB (Main Switchboard) : 25 KA
- c. SDS (Submain Distribution Board) : 20 KA, minimum
- d. MCC (Motor Control Center) : 20 KA, minimum
- d. FDB (Final Distribution Board) : 3 KA, minimum

(4) Earthing System

a. IEC 364-4 (TC 64)

5. Derating Factor "K" for carrying current capacity of cable laid directly underground

$$K = K1 \times K2 \times K3 \times K4 \text{ (ERA report 69-30, 1970 UK)}$$

K1 : Depth of laying	= 0.98
K2 : Thermal resistivity of soil	= 0.96
K3 : Grouping	= 0.92
K4 : Soil Temperature	= 0.87

$$K = 0.75$$

2) Scope of Electrical Work

1. BAGHDAD

- (1) Power Supply System
- (2) Power Generation System
- (3) Power Distribution System
- (4) Earthing System
- (5) Lighting System
- (6) Socket Outlet System
- (7) Communication System
 - a. Telephone Conduit System
 - b. Community Antenna TV Distribution System
 - c. CCTV Wiring System
 - d. Clock System
 - e. Public Address System
 - f. Intercommunication System
- (8) Fire Detection and Alarm System
- (9) Lightning Protection System

2. MOSUL

Same as Baghdad.

3) Basic Plan

1. Power Supply System

- (1) Incoming power : 3 phase 11KV 50Hz
- (2) Transformer : 3 phase 11KV/414V-240V
- (3) Secondary Power : 3 phase 4 wires 380V/220V
- (4) Incoming cable to the Substation : To be provided by the SOE
- (5) System consist of :
 - a. High tension panelboards
 - b. Transformers
 - c. Low voltage panelboards
 - d. Power factor controller
 - e. DC battery for operating circuit breakers
 - f. Others
- (6) Panelboards and transformers : To be installed in the Substation Bldg.

2. Power Generation System

In case of power failure and emergency:

One diesel engine generating set will be provided to supply power for the following loads:

- (1) Emergency loads:
 - a. Lift pump, fire pump, sewage pump, etc.
 - b. Lighting in administration building (50% of total).
 - c. Lighting and socket outlet in staff accommodation.
 - d. Refrigerator and freezer in cafeteria.

(2) System consists of :

- a. Diesel engine
- b. Generator
- c. Control panel
- d. Fuel tank
- e. Silencer
- f. Exhaust pipe
- g. Battery charger

(3) Diesel engine generator set : To be installed in
Substation bldg.

3. Power Distribution System

From the low voltage distribution panelboards in the Substation to the final distribution boards in the rooms.

(1) System consists of :

- a. Power mains (PCV, CV, XLPE, MICC, etc.)
- b. Conduits, cable racks, etc.
- c. Distribution boards

5. Earthing System

(1) Earthing System will be installed for equipment in the Substation, panelboards, lighting fixtures, socket outlet, etc.

(2) System consists of :

- a. Various classes of earthing

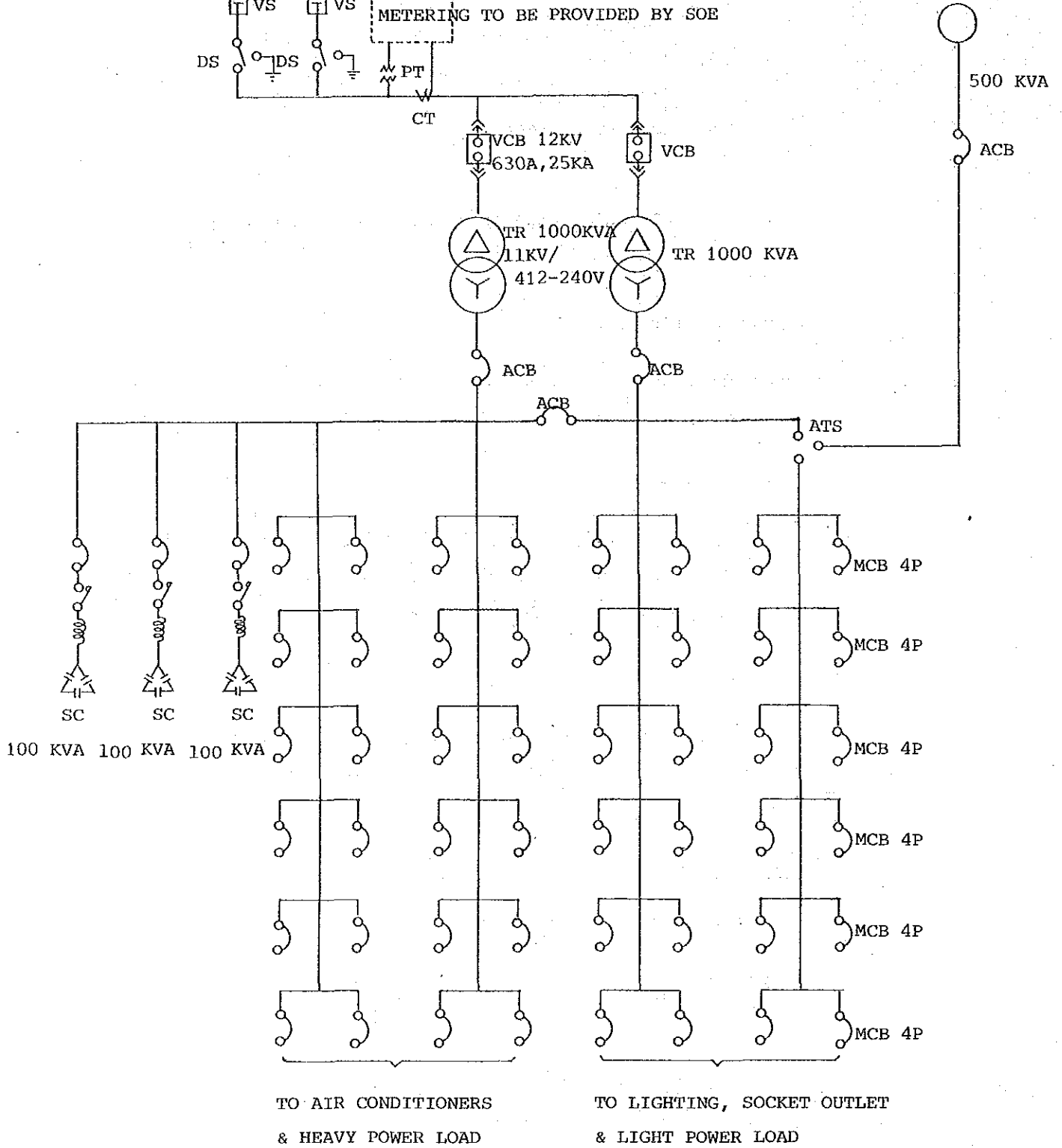
3 ϕ 3W 11KV

50 Hz

NO.1 FEEDER NO.2 FEEDER

DIESEL ENGINE GENERATOR

3 ϕ 4W 415V/240V



TYPICAL SINGLE LINE DIAGRAM OF POWER SUPPLY

6. Lighting System

- (1) In general, fluorescent lamp fixtures will be installed in each room.
- (2) Incandescent lamp fixtures and mercury vapour lamp fixtures will be installed in several rooms.
- (3) Multi-halogen lamps will be used for Workshops
- (4) The average illumination levels and lighting fixtures in the major rooms will be as follows:

Location	Illumination level (lux)	Typical fittings
<u>a. Workshops</u>		
TV, VTR Repair Course	500	Multi-Halogen w/louver
Air-Conditioner Repair C.	300	Ditto
Elevator Repair & Maintenance C.	300	Ditto
Automobile Repair & Maintenance C.	300	Ditto
Ordinary Classroom	300	Fluorescent w/louver-cover
Staff Room	400	Ditto
Corridor	100	Fluorescent w/prismatic cover
<u>b. Cafeteria</u>	200	Fluorescent w/prismatic cover and Incandescent w/glass cover
<u>c. Administration Bldg.</u>		
Director Room	500	Fluorescent w/prismatic cover
General Office	500	Fluorescent w/prismatic cover
Lecture Hall	300	Fluorescent w/louver-cover Special lighting
Studio	500	Special lighting
Entrance Hall	250	Fluorescent w/prismatic cover

- (5) Exterior lighting : Mercury vapour lamp will be mainly used.
- (6) Emergency lighting : Exit sign light with battery and emergency lighting will be installed in the major rooms.

7. Socket Outlet System

- (1) General socket outlets : installed in each room
- (2) Socket outlets for training equipment : installed in each Workshop of Air-Conditioner Course, TV-VTR Course, Automobile Course and Elevator Course

(3) Outlets consist of :

- a. Single phase 220V w/earthing
- b. 3 phase 380 v w/earthing

(4) Type :

- a. Wall mounted outlet
- b. Laboratory table mounted outlet
- c. Floor outlet

8. Communication System

8 - 1 Telephone Conduit System

- (1) Telephone outlet : installed in the major rooms
- (2) Telephone conduit : from main distribution frame (MDF) in the administration building to the terminal boards and from the terminal boards to each telephone outlet.
- (3) Telephone exchange equipment : To be provided by the PTT.

8 - 2 Community Antenna TV Distribution System

- (1) TV outlets : installed in main rooms
- (2) System consists of
 - a. Antenna
 - b. Booster amplifier
 - c. Coaxial cable

8 - 3 CCTV Wiring System

- (1) CCTV wiring and conduit : installed in Studio and workshops for each Course
- (2) CCTV equipment : to be provided in Training Equipment works

8 - 4 Clock System

- (1) Central clock system : installed in the main rooms
- (2) System consists of
 - a. Master clock
 - b. Slave clock

8 - 5 Public Address System

- (1) Central public address system : installed in the main rooms
- (2) Local public address system : installed in Lecture Hall, Cafeteria and Staff Accommodations
- (3) System consists of
 - a. Power amplifier
 - b. Loudspeakers
 - c. Microphones
- (4) Functions
 - a. Music
 - b. Announcements
 - c. Time signals

8 - 6 Intercommunication System

- (1) Intercommunication system : installed in administration office, instructor rooms and other major rooms
- (2) Intercom sets : Mutual Communication Type
- (3) System consists of
 - a. Intercom sets
 - b. Power source unit

8 - 7 Door Chime System

- (1) Door chimes : installed in married staff accommodations
- (2) System consists of
 - a. Door chime
 - b. Power source unit

9. Fire Detection and Alarm System

- (1) Place of installation
 - a. Receiver : control room
 - b. Transmitter/ Alarm bell : corridors, workshops for each course
 - c. Detectors : administration office and other major rooms

10. Lightning Protection System

- (1) Place of installation : on the rooftop of elevated water tank building

4) Works to be done by the Iraqi side

1. The 11 KV power service intake cables and termination at the first load break switches of the Substation (Metering Station).
2. The primary telephone cables and terminations at the main distribution frame, excluding underground conduits for cable entry within the site.
3. Supply and installation of telephone exchange equipment excluding batteries, automatic charger, attendant console, handsets, etc.

I. SCHEDULE OF ELECTRICAL SERVICES FOR BUILDING COMPONENTS

ITEM	BLDG.												
	ADMIN. & MEDICAL CENTER	AIR-CONDITIONER C.	TV. VTR. C.	AUTOMOBILE C.	ELEVATOR C.	ELEVATOR TOWER	CAFETERIA	SMALL GYMNASIUM	MARRIED STAFF	SINGLE STAFF	STUDENTS DORMITORY	SUBSTATION & MECH. ROOM	OUTDOORS
	WORKSHOP BLDG.						ACCOMMODATION						
1) 11KV Ring Main Unit & Trans. Substation												*	
2) L.T. Main Distribution Station												*	
3) L.T. Cable Network													*
4) L.T. Power & Distribution and Control System	*	*	*	*	*	*	*	*	*	*	*	*	*
5) Standby Generator												*	
6) Exterior Lighting													*
7) General Elec. Installation	*	*	*	*	*	*	*	*	*	*	*	*	*
8) Telephone Conduit	*	*	*	*	*		*	*	*	*	*	*	*
9) Fire Detection and Alarm System	*	*	*	*	*	*	*	*		*	*	*	
10) TV Communal Antenna System	*	*	*	*	*		*		*	*	*		
11) Wiring for CCTV System	*	*	*	*	*								
12) Clock System	*	*	*	*	*	*	*	*		*	*	*	
13) Central PA System	*	*	*	*	*	*	*	*				*	*
14) Local PA System	*						*			*	*		
15) Intercom System	*	*	*	*	*	*	*	*		*		*	
16) Door Chime System									*				
17) Earthing System	*	*	*	*	*	*	*	*	*	*	*	*	*
18) Lightning Protection						*							

Items marked * to be installed in respective buildings.

II.

1. SCHEDULE OF ELECTRICAL SERVICES FOR ROOMS

SERVICE	Lighting	Socket outlet	Lab. supply	Exit sign	Emergency lighting	Telephone outlet	Fire alarm	TV outlet	Central PA	Local PA	Intercom	CCTV Outlet	Door chime	Clock
	A	B	C	D	E	F	G	H	I	J	K	L	M	N

1. ADMINISTRATION AND MEDICAL CENTER

Director Rm.	*	*			*	*	*	*	*		*	*		*
Secretary	*	*			*	*	*	*	*		*	*		*
Administration Office	*	*			*	*	*	*	*		*	*		*
Liaison Officer's Rm.	*	*			*	*	*	*	*		*	*		*
Conference Rm.	*	*	*		*	*	*	*	*		*	*		*
Meeting Rm.	*	*	*		*	*	*	*	*		*	*		*
Hall	*	*			*	*	*	*	*		*	*		*
Reception	*	*			*	*	*	*	*		*	*		*
Library	*	*			*	*	*	*	*		*	*		*
Video Library	*	*	*		*	*	*	*	*		*	*		*
Lecture hall	*	*		*	*		*	*		*		*		*
Studio	*	*			*		*	*		*	*	*		*
Editing Rm.			*		*	*	*	*	*	*	*	*		*
WC	*													
Kitchenette	*	*					*							
Dispensary	*	*			*	*	*		*		*			*

2. AIR-CONDITIONER REPAIR C.

Classroom	*	*	*				*	*	*		*	*		*
Workshop	*	*	*				*	*	*		*	*		*
Instructor Rm.	*	*				*	*	*	*		*	*		*
Meeting Rm.	*	*	*			*	*	*	*		*	*		*
Locker Rm.	*	*					*		*					*
Corridor	*	*					*		*					
Store	*	*					*							

Items marked * to be installed in respective rooms.

2. SCHEDULE OF ELECTRICAL SERVICES FOR ROOMS

ROOM	SERVICE													
	: Lighting	: Socket outlet	: Lab. supply	: Exit sign	: Emergency lighting	: Telephone Outlet	: Fire alarm	: TV Outlet	: Central PA	: Local PA	: Intercom	: CCTV Outlet	: Door chime	: Clock
	A	B	C	D	E	F	G	H	I	J	K	L	M	N

3. TV. VTR REPAIR C.

Classroom	*	*	*				*	*	*		*	*		*
Workshop	*	*	*				*	*	*		*	*		*
Instructor Rm.	*	*	*			*	*	*	*		*	*		*
Maintenance Rm.	*	*	*				*	*	*		*	*		*
Meeting Rm.	*	*	*			*	*	*	*		*	*		*
Corridor	*	*					*		*					

4. AUTOMOBILE REPAIR AND MAINTENANCE C.

Classroom	*	*	*				*	*	*		*	*		*
Workshop	*	*	*				*	*	*		*	*		*
Storage	*	*					*							
Instructor Rm.	*	*	*			*	*	*	*		*	*		*
Meeting Rm.	*	*	*			*	*	*	*		*	*		*
Corridor	*	*					*		*					

5. ELEVATOR REPAIR AND MAINTENANCE C.

Classroom	*	*	*				*	*	*		*	*		*
Workshop	*	*	*				*	*	*		*	*		*
Storage	*	*					*							
Instructor Rm.	*	*	*			*	*	*	*		*	*		*
Meeting Rm.	*	*	*			*	*	*	*		*	*		*
Corridor	*	*					*		*					

6. CAFETERIA

Cafeteria	*	*				*	*	*	*	*				*
Dining Rm.	*	*				*	*	*	*	*				*
Kitchen and Pantry	*	*				*	*		*					*
Office	*	*				*	*		*	*				*

Items marked * to be installed in respective rooms.

3. SCHEDULE OF ELECTRICAL SERVICES FOR ROOMS

ROOM	SERVICE													
	Lighting	Socket outlet	Lab. supply	Exit sign	Emergency lighting	Telephone Outlet	Fire alarm	TV Outlet	Central PA	Local PA	Intercom	CCTV Outlet	Door chime	Clock
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
7. SMALL GYMNASIUM														
Small hall	*	*					*	*	*			*		*
Staff Rm,	*	*				*	*	*	*		*	*		*
Shower Rm.	*	*					*		*					
Corridor	*	*					*		*					
8. MARRIED STAFF ACCOMMODATION														
Entrance	*	*											*	
Living & Dining	*	*				*		*						
Bed Rm.	*	*				*								
9. SINGLE STAFF ACCOMMODATION														
Entrance hall	*	*				*	*			*				*
Lounge	*	*				*	*	*		*	*			*
Dining	*	*					*	*	*		*			*
Kitchen	*	*				*	*				*			
Bed Rm.	*	*					*	*			*			
Office	*	*				*	*	*		*	*			*
Corridor	*	*					*			*				
10. STUDENT DORMITORY														
Lounge	*	*				*	*			*				*
Meeting Rm.	*	*					*			*				*
TV Rm.	*	*					*	*		*				*
Laundry	*	*					*							
Bed Rm.	*	*					*							
Supervisor's Room	*	*				*	*	*		*				
Office	*	*				*	*	*		*				*
Corridor	*	*					*			*				

Items marked * to be installed in respective rooms.

5) Spare parts and replacement materials for Electrical System
(for five years)

1. For power supply system

- | | |
|---------------------------------|----------------------------|
| 1) Lamps | 50% of actual installation |
| 2) Fuses | 50% of actual installation |
| 3) Molded case circuit breakers | 25% of actual installation |
| 4) Auxilliary relays | 25% of actual installation |
| 5) Meters | 25% of actual installation |
| 6) Installation bolts and nuts | 50% of actual installation |
| 7) Switches on the panelboards | 25% of actual installation |

2. For power generation system

- | | |
|---------------------------------|------------------------------|
| 1) Lamps | } Same percentage as item 1. |
| 2) Fuses | |
| 3) Molded case circuit breakers | |
| 4) Auxilliary relays | |
| 5) Meters | |
| 6) Installation bolts and nuts | |
| 7) Switches on the panelboards | |

3. For power distribution system (for power control boards)

- | | |
|---------------------------------|------------------------------|
| 1) Lamps | } Same percentage as item 1. |
| 2) Fuses | |
| 3) Molded case circuit breakers | |
| 4) Auxilliary relays | |
| 5) Meters | |
| 6) Connection terminals | |
| 7) Installation bolts and nuts | |
| 8) Switches on the panelboards | |

4. For lighting system
 - 1) Fluorescent lamps 25% of actual installation
 - 2) Incandescent lamps 25% of actual installation
 - 3) Multi-halogen lamps 25% of actual installation
 - 4) Mercury vapour lamps 25% of actual installation
 - 5) Ballasts for discharge lamp 10% of actual installation
 - 6) Switches and wiring devices 10% of actual installation
 - 7) Lamps, fuses and related parts of lighting panelboards Same as item 3.

5. For socket outlet system
 - 1) Socket outlets 10% of actual installation
 - 2) Other wiring devices 10% of actual installation

6. For communication systems
 - 1) Telephone outlets and plates 10% of actual installation
 - 2) TV outlets and plates 10% of actual installation
 - 3) TV antennas and booster amplifiers 2 sets
 - 4) Slave clocks 10 sets
 - 5) Power amplifiers (60w) 2 sets
 - 6) Loud speakers 10% of actual installations
 - 7) Microphones 5 sets
 - 8) Intercoms 10% of actual installations
 - 9) Door chimes 3 sets
 - 10) Lamps, fuses for communication fittings 50%

7. For fire detection and alarm system
 - 1) Lamps, fuses, relays for fire alarm panels 50% of actual installations
 - 2) Fire detectors 5% of actual installations
 - 3) Bells 5% of actual installations
 - 4) Transmitters 5% of actual installations

8. For lightning protection system
 - 1) Lightning preventor 1 set

4.3.5 Mechanical Work Design

1) General Design Conditions

1. Mechanical Work will be designed in accordance with the ASHRAE (U.S.A.) allowing for the local conditions.
2. All materials for the Mechanical Work will be in compliance with American Standards, and Japanese Standards.
3. Economical system with low running cost will be adopted for the utility charges.
4. Design Conditions

(1) Temperature and humidity

a) Indoor

	<u>Summer</u>	<u>Winter</u>
Temperature:	25°C + 1°C DB	22°C + 1°C DB

b) Outdoor

	<u>Summer</u>	<u>Winter</u>
Temperature:	46°C DB	0.5°C DB
Humidity:	13% RH	80° RH

- (2) Fresh Air Requirements: 20 m³/hr/person
- (3) Ventilation Requirements: Kitchen 70 m³/hr.m²
Toilet 45 m³/hr.m²
- (4) Spot cooling and spot heating will be provided at Workshops.

This system will be more energy saving than Full air conditioning system, and more effective for protecting Workshops from outdoor dust than Evaporating cooling system.

	<u>Summer</u>	<u>Winter</u>
Indoor Temperature	27°C + 2°C DB	20°C + 2°C DB

2) Scope of Mechanical (HVAC) System Design

I. BAGHDAD

- 1) Air-Conditioning System
- 2) Ventilating and Exhaust Fan System
- 3) Piping
- 4) Duct Work
- 5) Automatic Control System

II. MOSUL

Same as BAGHDAD.

3) Description of Basic Design

1. Basic Design Policy

- (1) Simple and easy systems for operation, maintenance and replacement.
- (2) Reliable and stable systems
- (3) Energy saving systems
- (4) Economical systems
- (5) Systems equipment and materials suited to the local climate conditions.

2. Air Conditioning System (Ref. to Table - 1)

- (1) Air cooled water chilling units for supplying cold water to fancoil units.
- (2) Electric boiler for supplying hot water to fancoil units
- (3) Pumps
- (4) Packaged Air Conditioners
- (5) Fancoil Units
- (6) Sand Separator for outdoor air intake

3. Ventilating and Exhaust Fan System (Ref. to Table - 1).

4. Automatic Control System

- (1) Water chiller
- (2) Electric boiler
- (3) Air-Conditioner

5. Piping Materials

- (1) Water Supply Piping : Galvanized Steel Pipe
(Inside Buildings)
Galvanized Steel Pipe with anti-corrosion tape (Utility tunnel)
P.V.C. Pipe
(Underground, 65 mm or smaller)
- (2) Chilled Water and Hot Water Supply Piping : Black Steel Pipe
(Medium weight seamless conforming to JIS 3454 or US ASTM. S 40)

6. Pipe Supports

All pipes will be properly supported to withstand weight, stresses and external forces due to earthquakes and winds. Such supports will be provided in such a manner that they will not adversely effect the expansion and contraction of pipes due to temperature fluctuations.

7. Sheet Metal Work

The gauge of sheet metal in rectangular duct work will be determined by the larger dimensions as follows:

<u>Larger Dimension</u>	<u>Thickness</u>	<u>(Gage No.)</u>
Up to 300 mm	0.5 mm	(26)
to 750 mm	0.6 mm	(24)
to 1350 mm	0.8 mm	(22)
to 2150 mm	1.0 mm	(20)
over 2150 mm	1.2 mm	(18)

8. Duct Supports

All ductwork will be supported rigidly at centres to prevent sagging and vibration on purpose-made hangers, supports and cantilever brackets.

Each length of duct will be supported separately at centres not greater than 2700 mm. Duct supports will consist of mild steel angle iron bearers of similar size to that used for bracing that section of ductwork with mild steel rods not less than 9 mm dia. or mild steel flats of 25 mm by 3 mm thick.

9. Insulation

- (1) All supply and return duct work for Air-Conditioning will be insulated with fiberglass.
- (2) Duct insulation thickness will be at least 25 mm of fiber glass (Density 24 kg/m³) with aluminium foil facing.
- (3) Pipe insulation will be normally 48 kg/m³ thickness as per pipe dia.

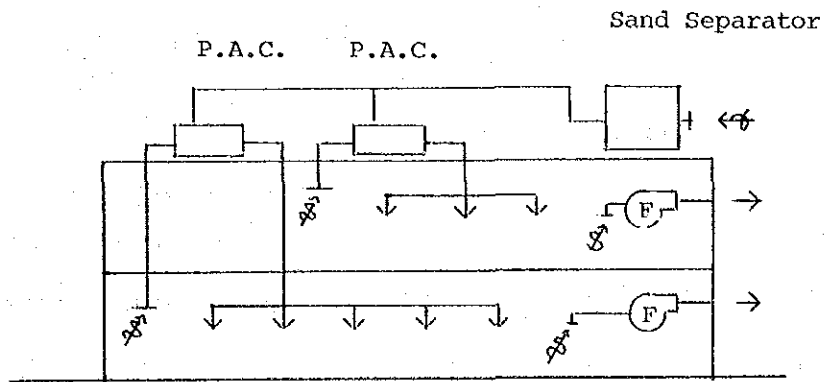
<u>Pipe dia.</u>	<u>Thickness</u>
15 - 80 mm	25 mm
100 - 150 mm	40 mm

- (4) Pipes in the Mechanical rooms will be provided with metal cladding.
- (5) All insulated pipes subject to outside weather will be waterproofed.

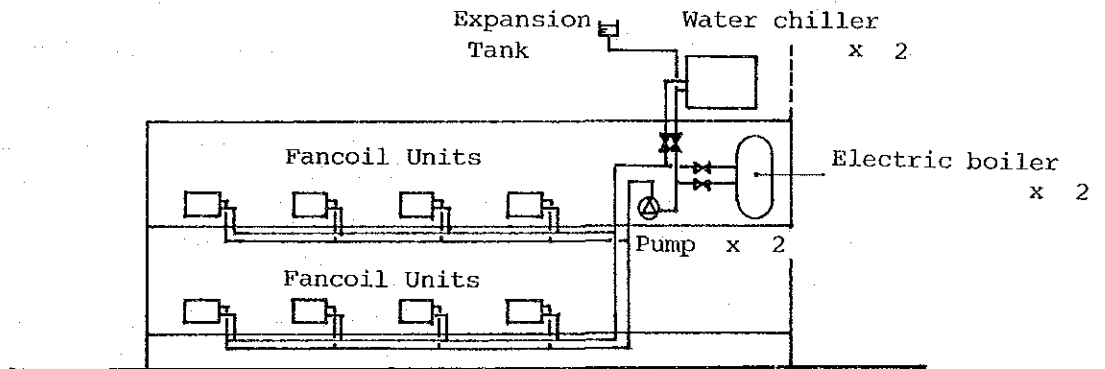
Table - 1 AIR-CONDITIONING SYSTEM FOR EACH BUILDING

ITEM	BLDG.
Roof Top Type Packaged Air Conditioner System	Administration Office * Air Conditioner Repair C. * TV/VTR. Repair C. * Automobile Repair and Maintenance C. * Elevator Repair and Maintenance C. * Cafeteria * Small Gymnasium * Married Staff Accommodation * Single Staff Accommodation * Students Dormitory * Substation * Machine RM for Pool *
Fancoil Unit System	* *
Split Type Packaged Air Conditioner System	*
Ventilation and Exhaust System	* * * * * * * * * * * *

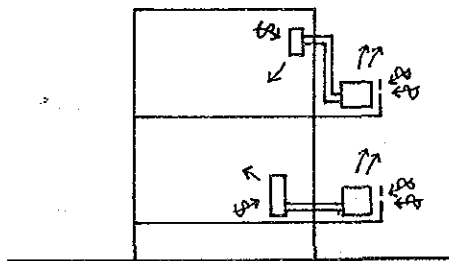
Items marked * to be installed in respective buildings.



Roof Top Type Packaged Air Conditioner System Diagram
P.A.C. : Packaged Air Conditioner



Fancoil Unit System Diagram



Split Type Packaged Air-Conditioner (Room Air-Conditioner) System Diagram

AIR-CONDITIONING SYSTEM DIAGRAMS

4) Spare parts and replacement materials for Mechanical Work (For five years)

1. Air-Cooled Water Chiller

Compressor	15% of actual installation
Fan motor	30% of actual installation
Mag. contactor for comp.	75% of actual installation
Mag. contactor for fan	75% of actual installation
O.C.R. for comp.	75% of actual installation
O.C.R. for fan	75% of actual installation
Aux. relay	75% of actual installation
Time relay	75% of actual installation
Solenoid valve	75% of actual installation
Oil heater	75% of actual installation
Pressure S.W.	75% of actual installation
Operation S.W.	75% of actual installation
Thermostat	100% of actual installation
Fuse	100% of actual installation
Oil protection S.W.	100% of actual installation
Snap S.W.	100% of actual installation
Fusible plug	100% of actual installation
Exp. valve	75% of actual installation
Safety valve	75% of actual installation
Stop valve for discharge	75% of actual installation
Strainer or dryer	75% of actual installation
Check valve	75% of actual installation
Propeller fan	15% of actual installation
Sight glass	75% of actual installation

2. Electric Boiler

Heater	75% of actual installation
Anode bar	100% of actual installation
Relief valve	75% of actual installation
Temperature S.W.	75% of actual installation

Low water S.W.	75% of actual installation
Thermostat	75% of actual installation
Temperature gauge	75% of actual installation
E.L.B.	30% of actual installation
Mag. S.W.	30% of actual installation
Transformer	30% of actual installation
Relay	30% of actual installation
Buzzer	30% of actual installation
Fuse	100% of actual installation
Lamp	100% of actual installation

3. Packaged Air Conditioner

Pressure S.W.	50% of actual installation
Operation S.W.	50% of actual installation
Thermostat	100% of actual installation
Fuse	100% of actual installation
Pilot lamp	100% of actual installation
Snap S.W.	100% of actual installation
Fusible plug	100% of actual installation
Exp. valve	100% of actual installation
Stop valve	75% of actual installation
Strainer or dryer	100% of actual installation
Air filter	100% of actual installation
Vibration absorber	30% of actual installation
Bearing	100% of actual installation
Fan runner	30% of actual installation
V-belt	100% of actual installation
Sight glass	100% of actual installation
Fan shaft	30% of actual installation
Compressor	15% of actual installation
Fan motor	15% of actual installation
Mag. contactor for comp.	75% of actual installation
Mag. contactor for evapo. fan	75% of actual installation
Mag. contactor for cond. fan	75% of actual installation

Resister	75% of actual installation
Aux. relay	75% of actual installation
Time relay	75% of actual installation
Oil heater	75% of actual installation
Propeller fan	15% of actual installation
Fan motor	30% of actual installation
4. Room Air Conditioner	
Compressor	15% of actual installation
Fan motor	30% of actual installation
Rotary S.W.	75% of actual installation
Thermostat	75% of actual installation
Air filter	100% of actual installation
Capacitor	75% of actual installation
5. Fan Coil Unit	
Motor	5% of actual installation
S.W.	10% of actual installation
Air filter	10% of actual installation
6. Fan	
V-Belt	100% of actual installation
Bearing	100% of actual installation
7. Pump	
Grand Packing or Mech. Seal	100% of actual installation
Bearing	100% of actual installation
O-ring	100% of actual installation
Coupling	100% of actual installation
Complete Gasket Kit	100% of actual installation
8. Others	
Amper meter	1 set
Vaccum pump	1 set
Charging cylinder	1 set
Gauge manihold	1 set
Temperature gauge	1 set
Mechanical tool set	1 set

4.3.6 Plumbing Work Design

1) General Design Conditions

1. Design and materials for Plumbing Work will be in accordance with British Standards, National Plumbing Code (U.S.A.), or Japanese Industrial Standards, when it is compatible with B.S. and N.P.C., allowing for the local conditions.
2. All the work will preferably be carried out using goods and products prevailing and available in Iraq if they meet the Specifications and Technical Requirements of the Works.

2) Scope of Plumbing System Design

1. BAGHDAD

- (1) Water Supply System
- (2) Hot Water Supply System
- (3) Drainage and Venting System
- (4) Plumbing Fixtures and Accessories
- (5) Sewage Treatment System
- (6) Storm Water Drainage System
- (7) Fire Protection System
- (8) Irrigation System
- (9) Swimming Pool Filtration System
- (10) Gas Supply System

2. MOSUL

Same as BAGHDAD

3) Description of Basic Design

1. Basic Design Policy

- (1) Simple and easy system for operation, maintenance and replacement
- (2) Reliable and stable systems
- (3) Energy saving systems
- (4) Economic systems
- (5) Systems equipment and materials suited to the local climate conditions

2. Water Supply

Water for water cooler and kitchen will be connected to the city water directly, water for the other use will be supplied by gravity system with an elevated water tank, pumps and a water reservoir.

The water reservoir will be separated into two or three parts.

BAGHDAD

Water reservoir tank	56 m ³	(city water)
Water reservoir tank	110 m ³	(canal water) *
Elevated water tank	9 m ³	(city water)

* Canal water will be supplied for the irrigation by pumps directly.

MOSUL

Water reservoir tank	166 m ³	(city water)
Elevated water tank	25 m ³	(city water)

3. Hot Water Supply

Hot water will be supplied from electric hot water (H.W.) storage tanks to kitchen sink, shower, wash basin and bidet.

4. Drainage and Venting System

- (1) Drainage system will be one pipe system with venting.
- (2) Storm water from building roofs and paved areas will be discharged into storm water network.

5. Plumbing Fixtures

- (1) Fixtures to be made of white glazed or colored vitreous china.
- (2) Accessories to consist of a toilet paper holder, soap holder, mirror and fixture accessories.
- (3) Oriental water closet to be equipped with a 15 mm chromium-plated water tap.

6. Sewage Treatment System

- (1) Sewage from each building will be collected through a sewage network to sewage treatment tank.
- (2) The processing capacity of the sewage treatment plant is 110 m³ per day, and the quality of water after treatment will be BOD 20 ppm, SS 30 ppm. (Refer to the SYSTEM FLOW DIAGRAM)
- (3) Sewage system will conform to the environmental conditions of the Iraqi Government.

7. Fire Protection System

Fire protection will be installed as in the following schedule below and specifications will be in accordance with N.F.P.A. (National Fire Protection Association Code, U.S.A.) The suitable fire protection system will be adopted at the electrical room.

Fire Protection System	Location
Exterior fire hydrant	Site
Fire hydrant	Inside buildings
Fire extinguisher	Inside buildings

8. Irrigation System

Irrigation system will consist of irrigation taps (127 sets) and piping network.

9. Swimming Pool Filtration System

Swimming pool filtration system will consist of water filter, circulating pump and balancing tank.

10. Gas Supply System

L.P.G. will be supplied to the Cafeteria, the Single Staff Accommodation and the Married Staff Accommodation from each cylinder station.

11. Piping Materials

- (1) Water Supply Piping : Galvanized Steel Pipe
(Inside buildings)
- Galvanized Steel Pipe with
anti-corrosion tape (Utility tunnel)
- P.V.C. Pipe (except drink)
(Underground, 65 mm or smaller)
- (2) Hot Water Supply Piping : Galvanized Steel Pipe
- (3) Drainage Piping : P.V.C. Pipe
(Underground of outside buildings)
- Cast Iron Pipe
(Underground of inside buildings)
- Galvanized Steel Pipe
(Up to 65 mm inside buildings)
- Cast Iron Pipe
(Above 75 mm inside buildings)
- (4) Vent Pipe : Galvanized Steel Pipe

- (5) Fire Protection Piping : Galvanized Steel Pipe
(Inside bldg., and utility tunnels,
underground piping with anti-
corrosion tape)
- (6) Irrigation Piping : Galvanized Steel Pipe with
anti-corrosion tape
(Inside buildings and utility tunnels)
- P.V.C. Pipe
(Underground 65 mm or smaller)
- (7) Swimming Pool Filtration Piping: Vinyl Lined Steel Pipe
- (8) Compressed Air Piping : Galvanized Steel Pipe
- (9) Gas Piping : Galvanized Steel Pipe

12. Insulation

- (1) Water supply pipes exposed to the sun and hot water supply pipes
will be insulated.
- (2) Material : Fiberglass
- (3) Density of Fiberglass = 48 kg/m^3
- (4) Insulation thickness:

Pipe insulation will be normally 48 kg/m^3 thickness as per pipe dia.

<u>Pipe dia.</u>	<u>Thickness</u>
15 - 80 mm	25 mm
100 - 150 mm	40 mm

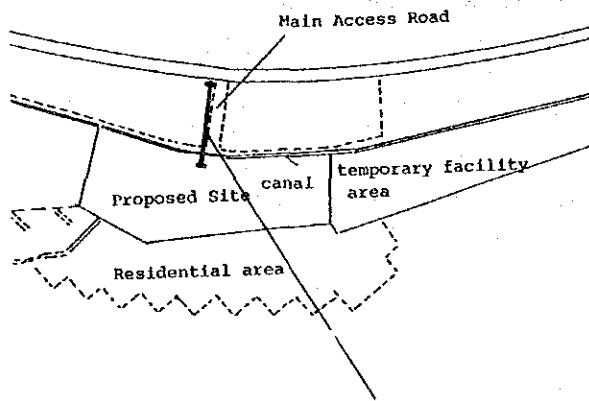
- (5) Insulated piping exposed to the sun and in the mechanical room
will be covered with Galvanized Sheet Metal.

4) Works to be Done by the Client

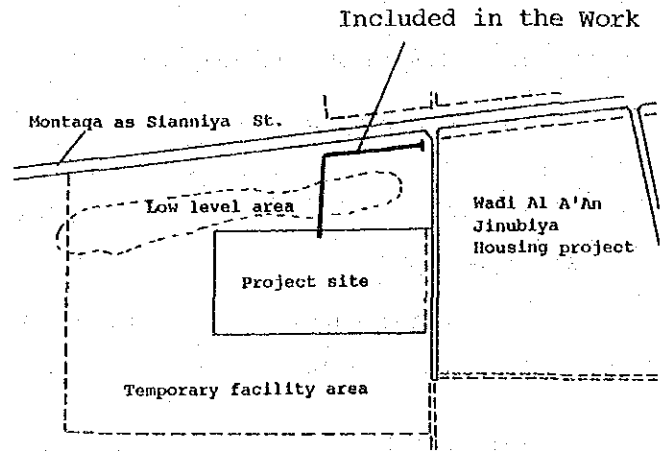
1. Connection to the city water in Baghdad and the connection to the city water and sewage mains in Mosul at the site boundary will be done by the client. (Refer to the Site Map below)

Site Maps

Baghdad



Mosul



Included in the Work

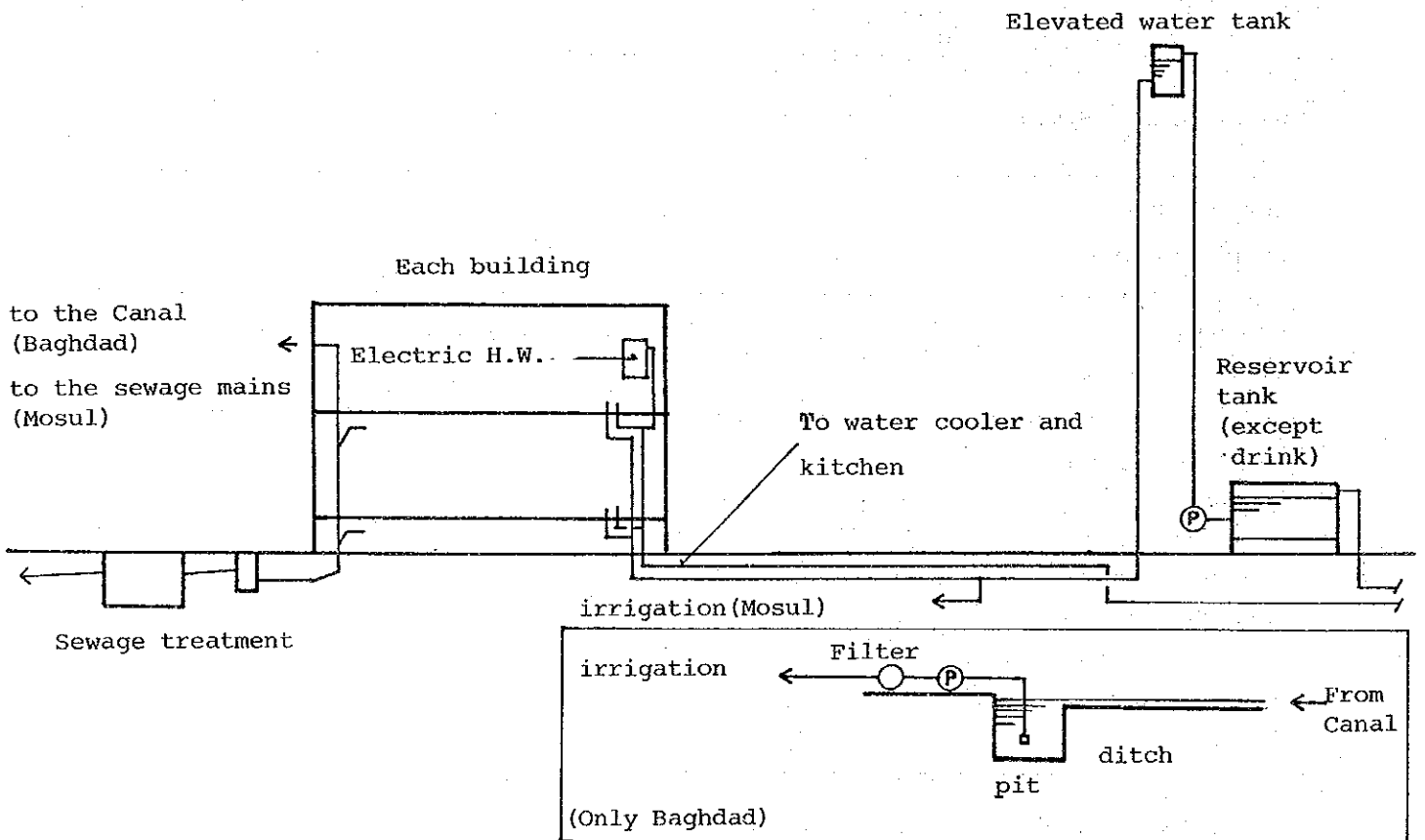
Iraqi Government work

Table - 2

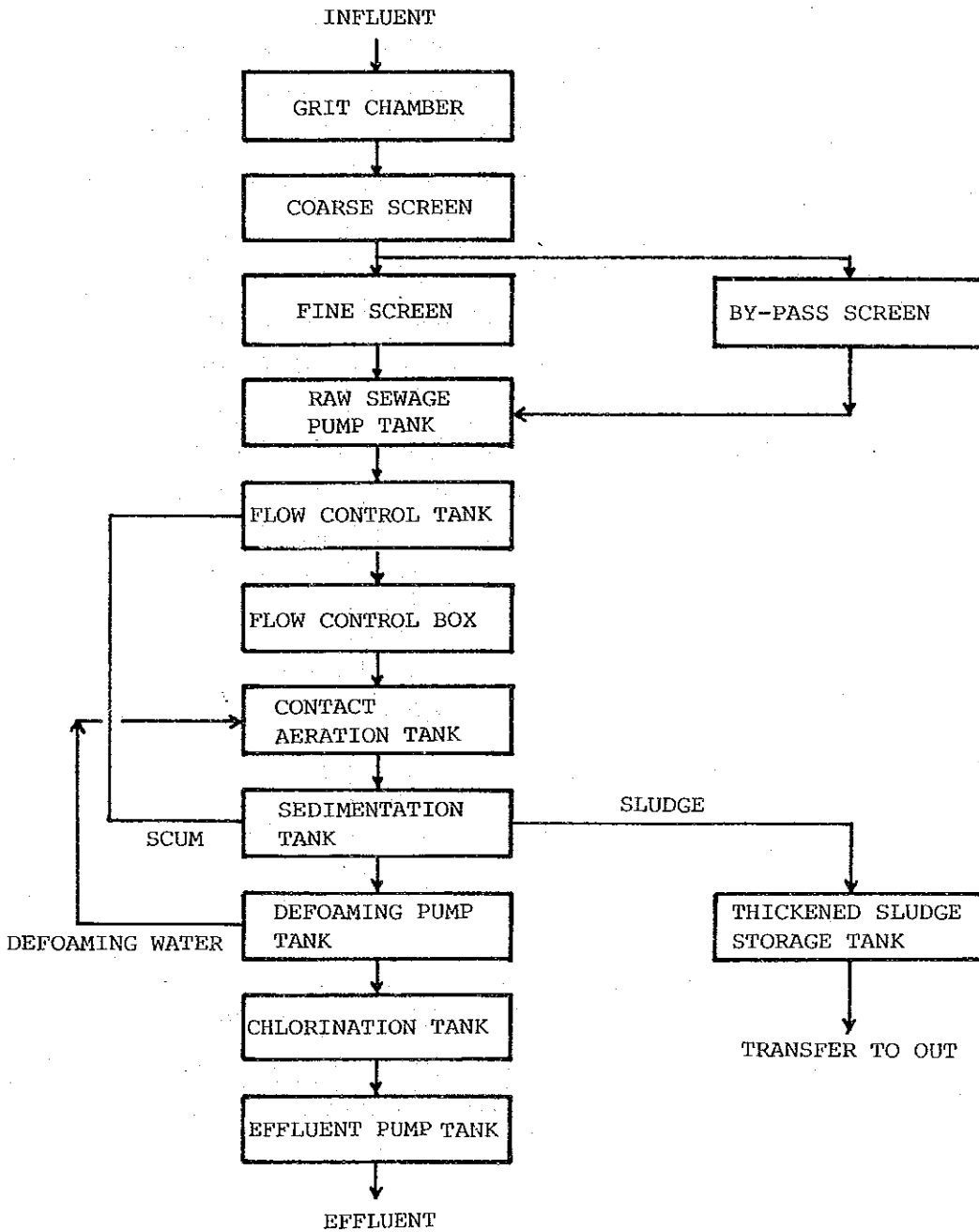
PLUMBING WORK FOR EACH BUILDING

ITEM	BLDG.	Administration Office	Air Conditioner Repair C.	TV. VTR. Repair C.	Automobile Repair and Maintenance C.	Elevator Repair and Maintenance C.	Cafeteria	Small Gymnasium	Married Staff	Single Staff	Students Dormitory	Substation	Machine RM for Pool	Site
Water Supply System		*	*	*	*	*	*	*	*	*	*	*	*	*
Hot Water Supply System		*	*	*	*	*	*	*	*	*	*		*	
Drainage and Venting System		*	*	*	*	*	*	*	*	*	*	*	*	*
Plumbing Fixtures and Accessories		*	*	*	*	*	*	*	*	*	*	*	*	
Sewage Treatment System														*
Fire Protection System		*	*	*	*	*	*	*	*	*	*	*	*	*
Irrigation System														*
Swimming Pool Filtration System													*	
Gas Supply System							*		*	*				

Items marked * to be installed in respective buildings.



WATER SUPPLY, HOT WATER SUPPLY AND SEWAGE SYSTEM DIAGRAM



SEWAGE TREATMENT SYSTEM FLOW DIAGRAM

5) Spare parts and replacement materials for Plumbing Work (For five years)

1. Pump

Grand packing or Mech. seal	100% of actual installation
Bearing	100% of actual installation
O-ring	100% of actual installation
Coupling	100% of actual installation
Complete Gasket Kit	100% of actual installation

2. Electric Water Heater

Heater	20% of actual installation
Thermo-stat	20% of actual installation
Lamp	20% of actual installation
Temp. gauge	20% of actual installation
Level gauge	20% of actual installation
Boil float valve	20% of actual installation
Faucet	20% of actual installation
Thermal cut off	20% of actual installation

3. Water Closet

Flush valve's piston valve	10% of actual installation
Seat packing	30% of actual installation
Seat and cover	3% of actual installation

4. Eastern Water Closet (High Tank Type)

Ball tap's seat packing	60% of actual installation
Siphon valve	10% of actual installation
Ball tap	10% of actual installation
Pull chain	20% of actual installation

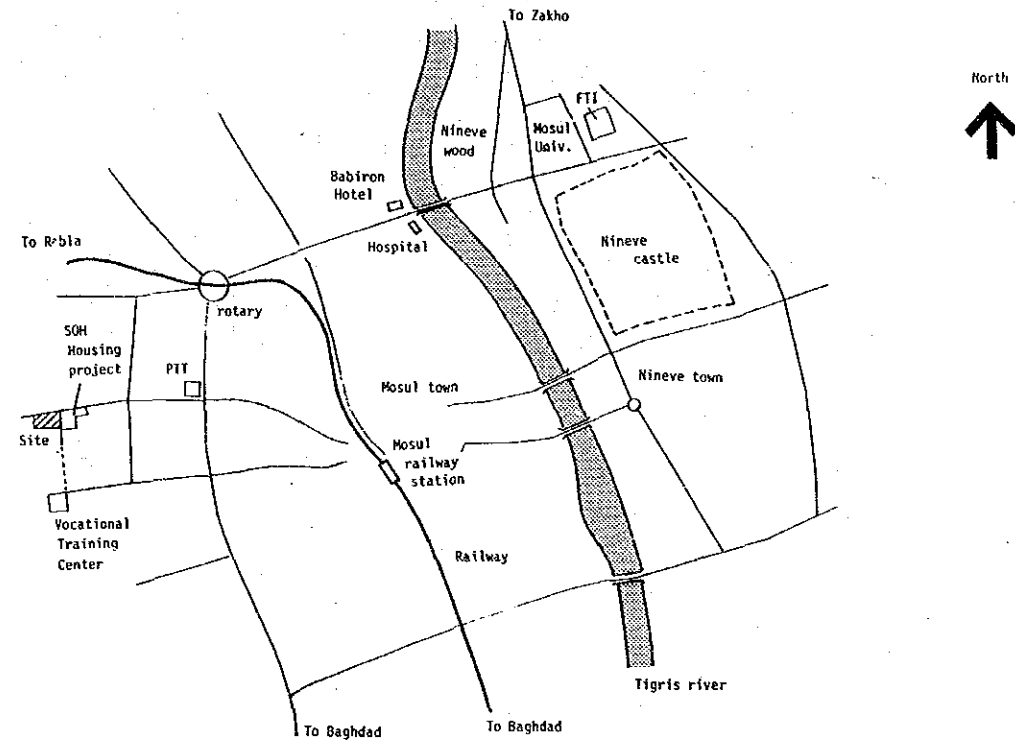
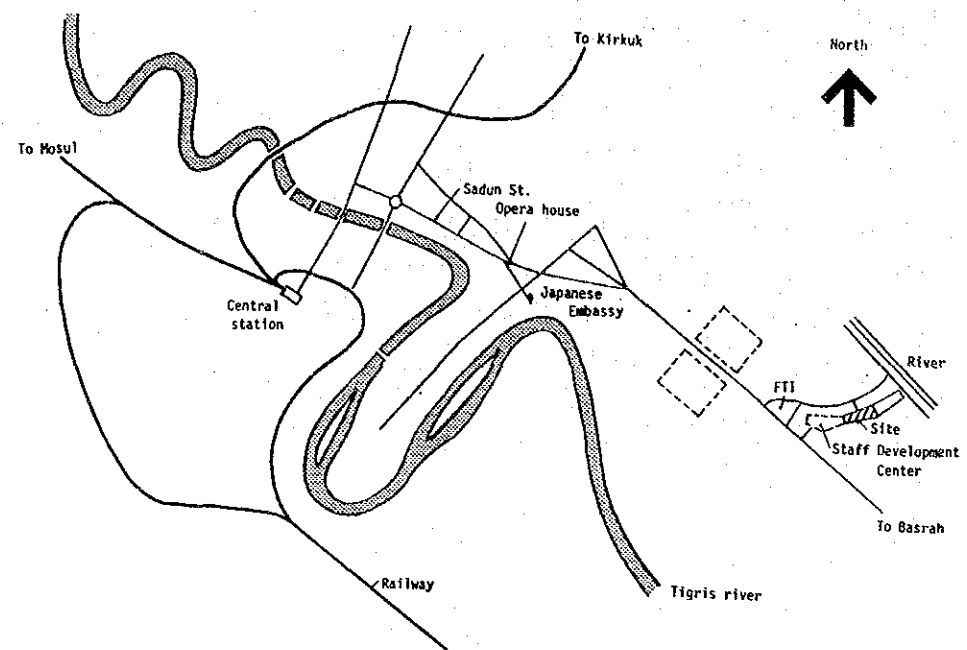
5. Urinal

Flush valve's piston valve	10% of actual installation
Piston valve's seat packing	60% of actual installation

6. Bidet	
Mixing valve's seat packing	60% of actual installation
Control element for single-lever	10% of actual installation
7. Lavatory	
Faucet's seat packing	60% of actual installation
Pop-up rod or plug's chain	5% of actual installation
8. Shower	
Hose of hand shower	20% of actual installation
Mixing valve's seat packing	60% of actual installation
Control element for single-lever	10% of actual installation
9. Faucets	
Seat packing	60% of actual installation
Swivel spout	10% of actual installation
10. Indoor Hydrant	
Valve	10% of actual installation
Hose	10% of actual installation
Nozzle	10% of actual installation
Gasket	20% of actual installation
11. Out Door Hydrant	
Valve	10% of actual installation
Hose	10% of actual installation
Nozzle	10% of actual installation
Gasket	20% of actual installation
12. Others	
Mechanic Tool set	1 set

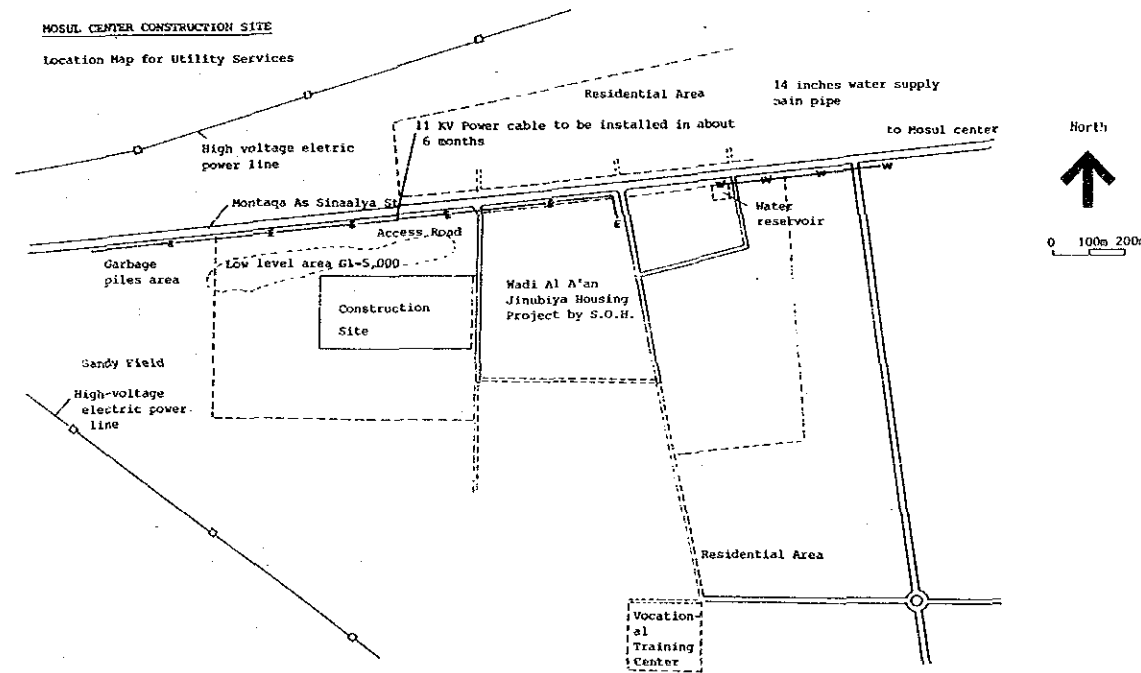
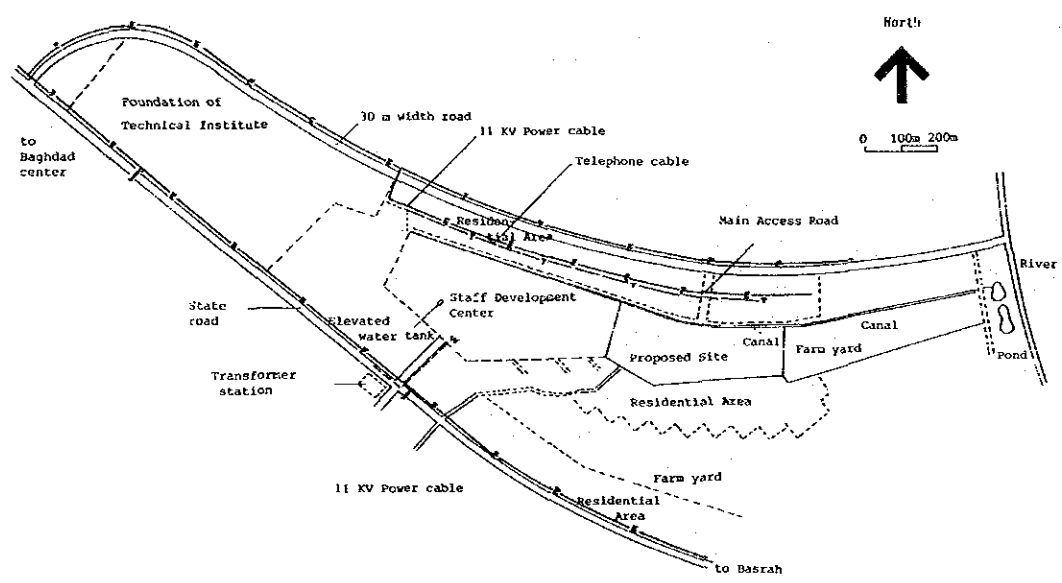
4.4 BASIC DESIGN DRAWINGS

1. Location Map
2. Baghdad Center Site Plan
3. Baghdad Center Building Ground Floor Plan
4. Baghdad Center Building First Floor Plan
5. Baghdad Center Building Elevations
6. Baghdad Center Building Sections
7. Mosul Center Site Plan
8. Mosul Center Building Ground Floor Plan
9. Mosul Center Building First Floor Plan
10. Single Staff Accommodation, Married Staff Accommodation
11. Ancillary Building Plans Elevations and Sections



BAGHDAD CENTER CONSTRUCTION SITE
Location Map for Utility Services

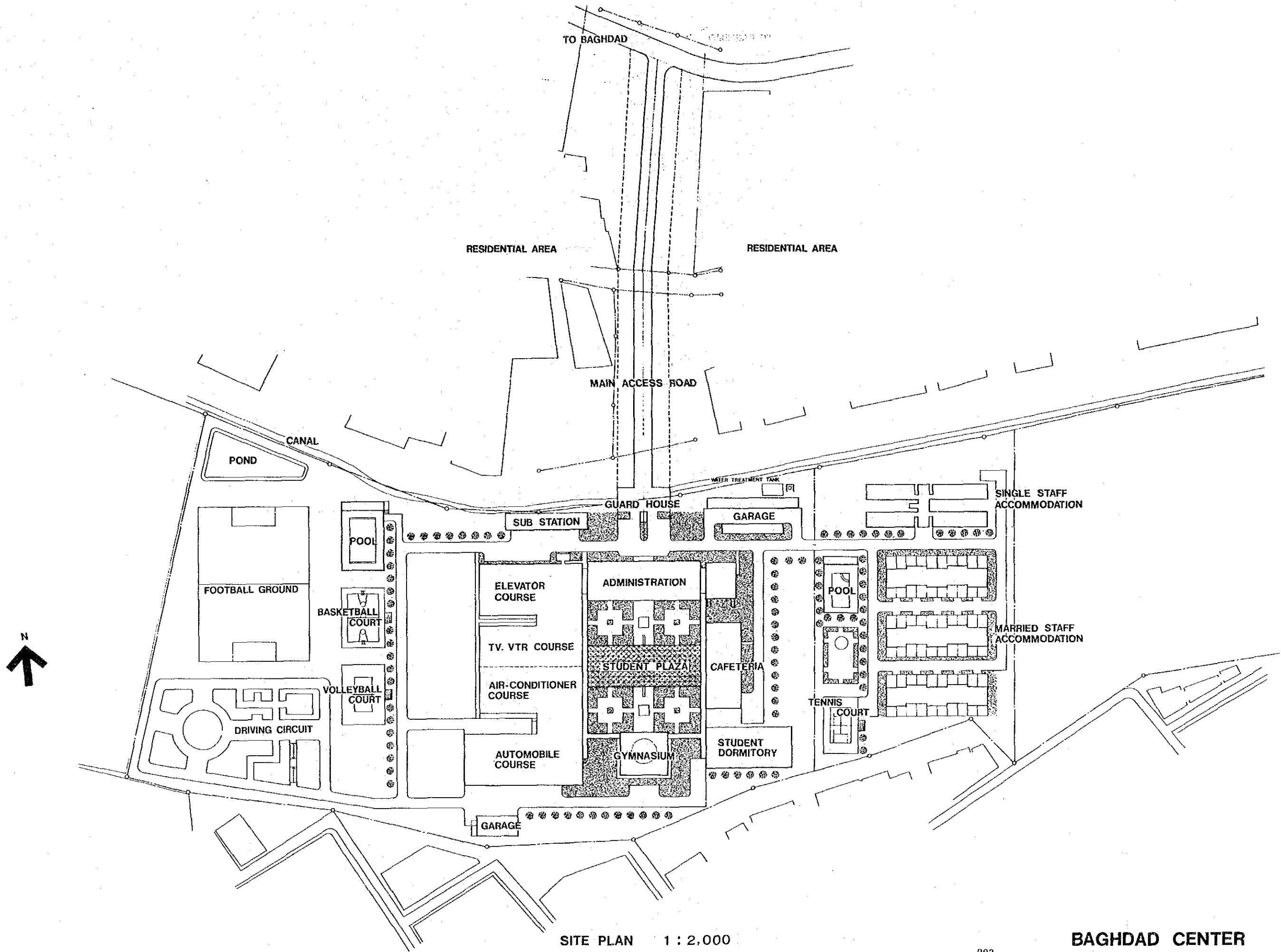
MOSUL CENTER CONSTRUCTION SITE
Location Map for Utility Services



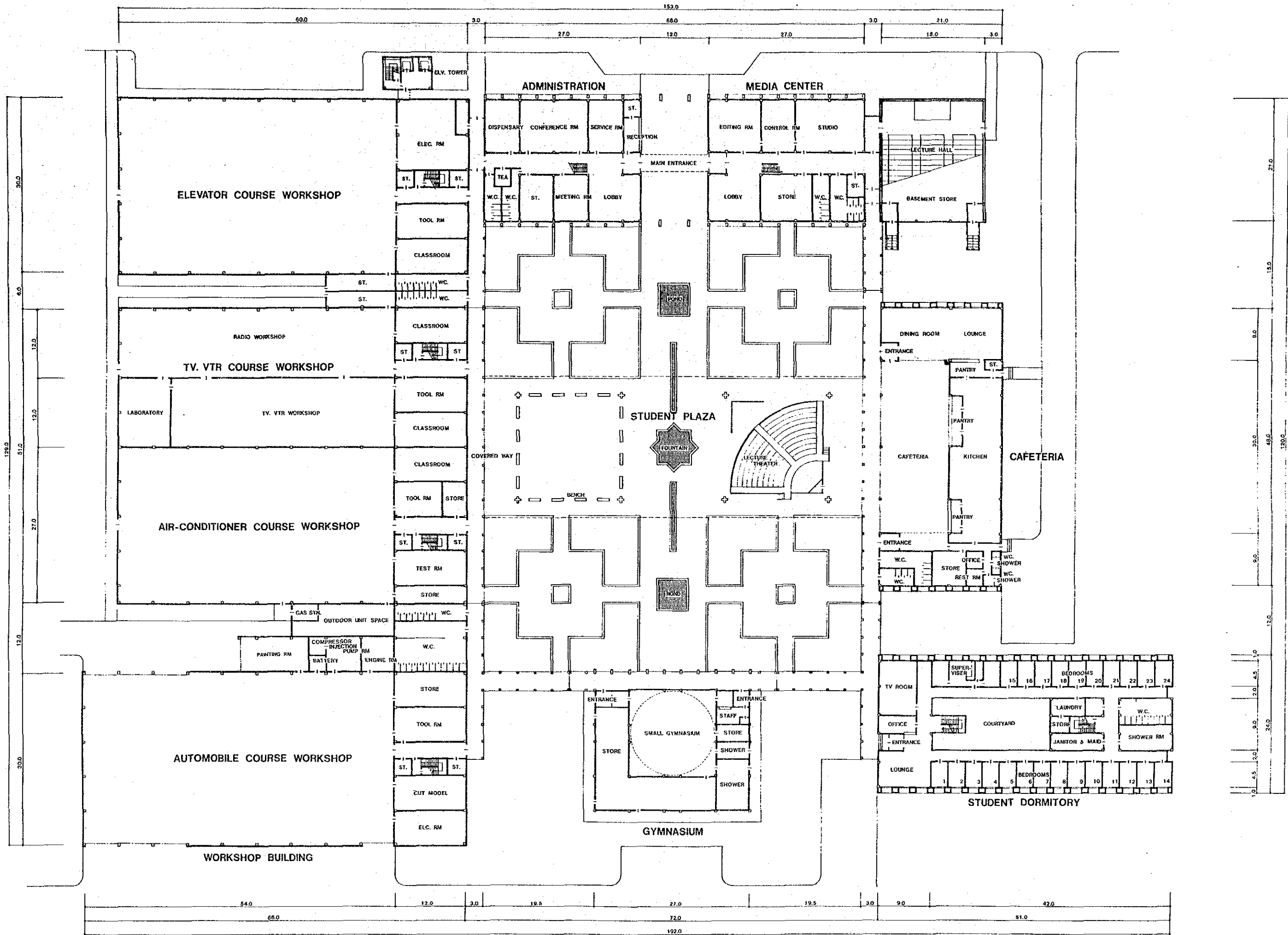
BAGHDAD CENTER

MOSUL CENTER

**VOCATIONAL TRAINING CENTER
LOCATION MAP**

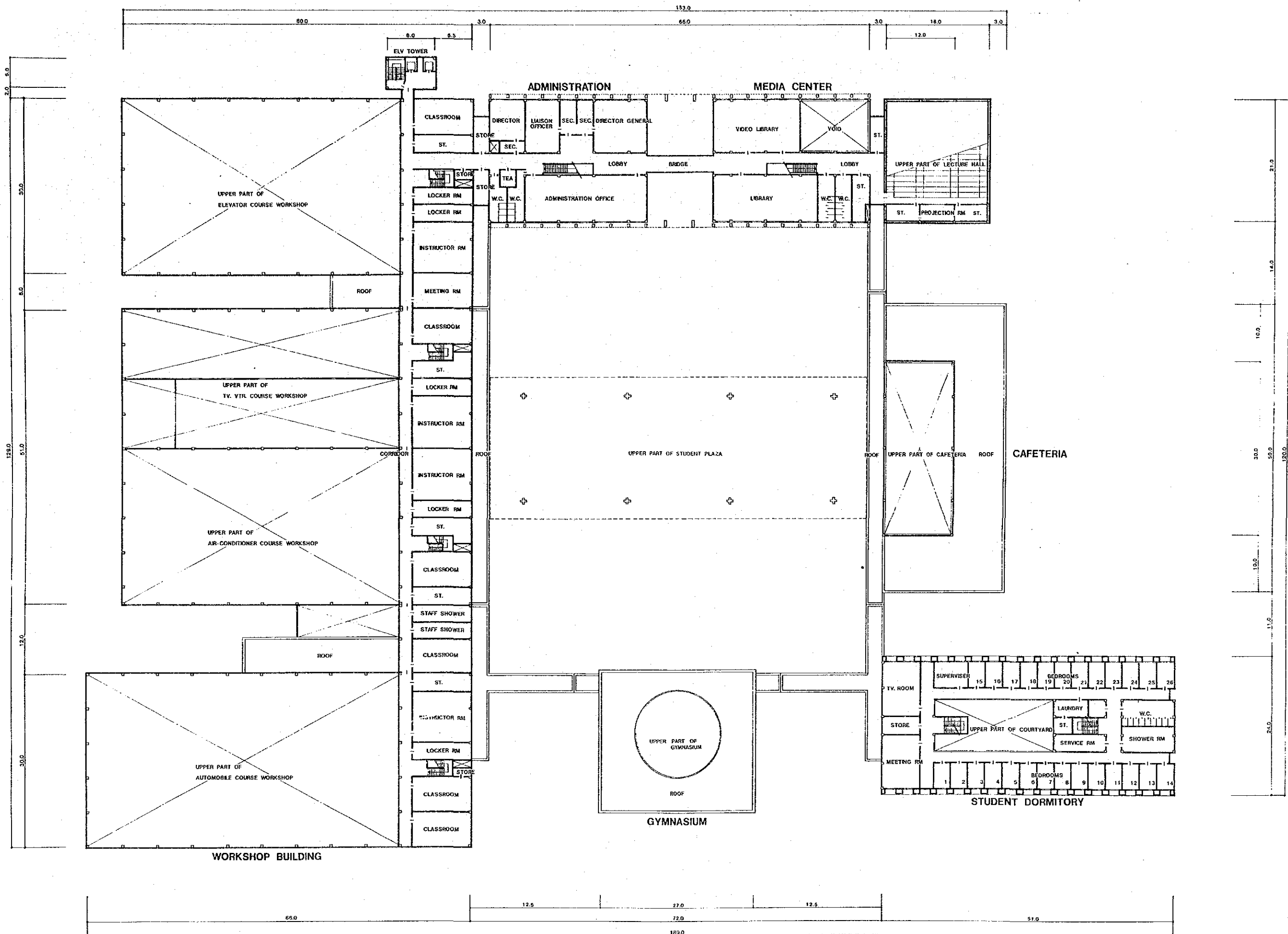


SITE PLAN 1 : 2,000



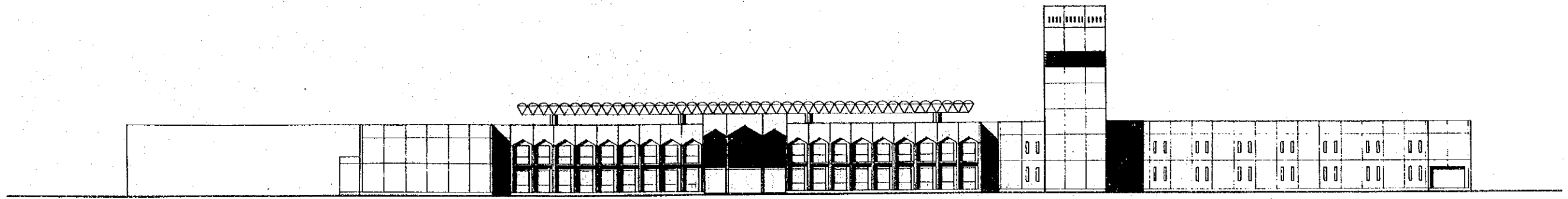
CENTER BUILDING GROUND FLOOR PLAN 1 : 600

BAGHDAD CENTER BUILDING GROUND FLOOR PLAN

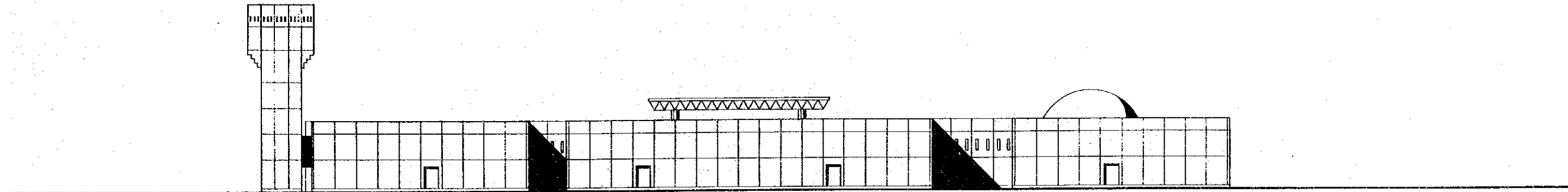


CENTER BUILDING FIRST FLOOR PLAN 1 : 600

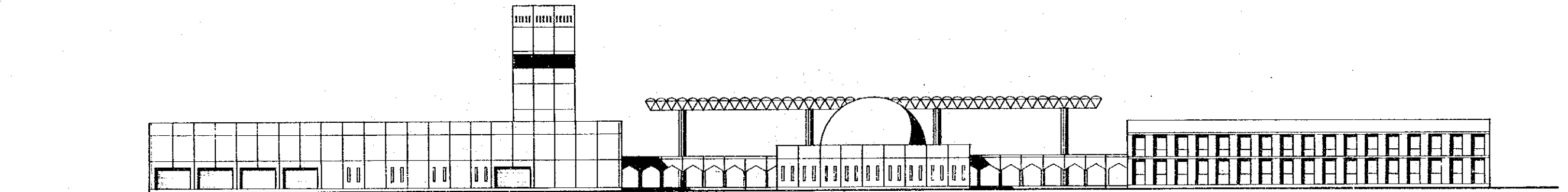
BAGHDAD CENTER BUILDING FIRST FLOOR PLAN



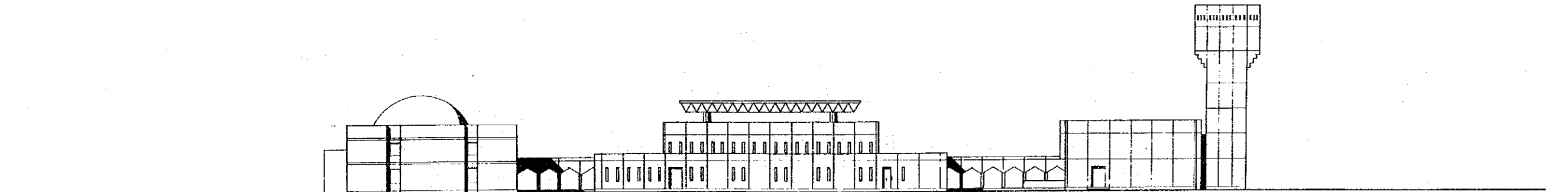
NORTH ELEVATION 1 : 600



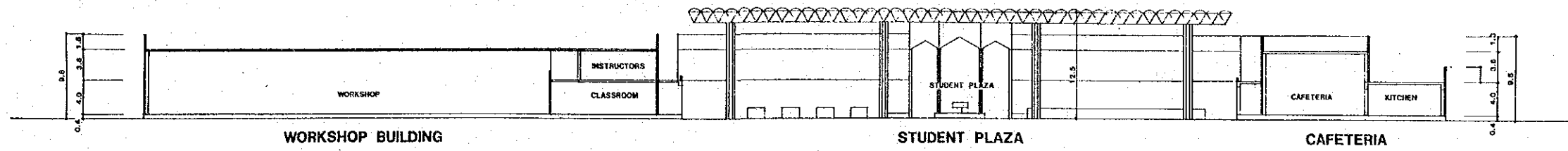
WEST ELEVATION 1 : 600



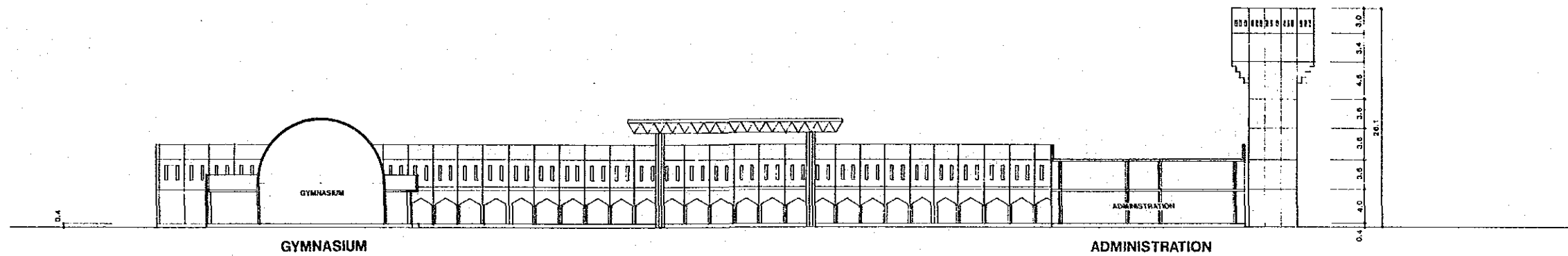
SOUTH ELEVATION 1 : 600



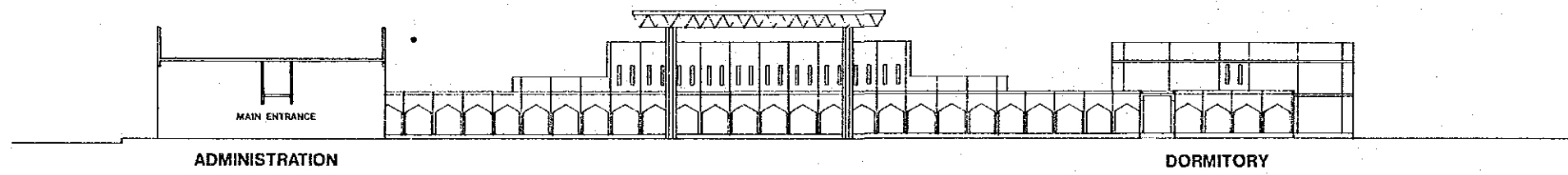
EAST ELEVATION 1 : 600



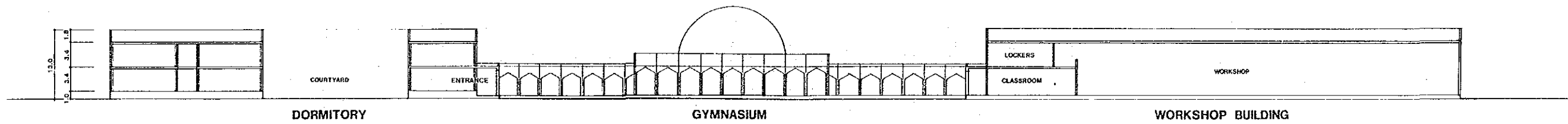
SECTION 1 : 600



SECTION 1 : 600

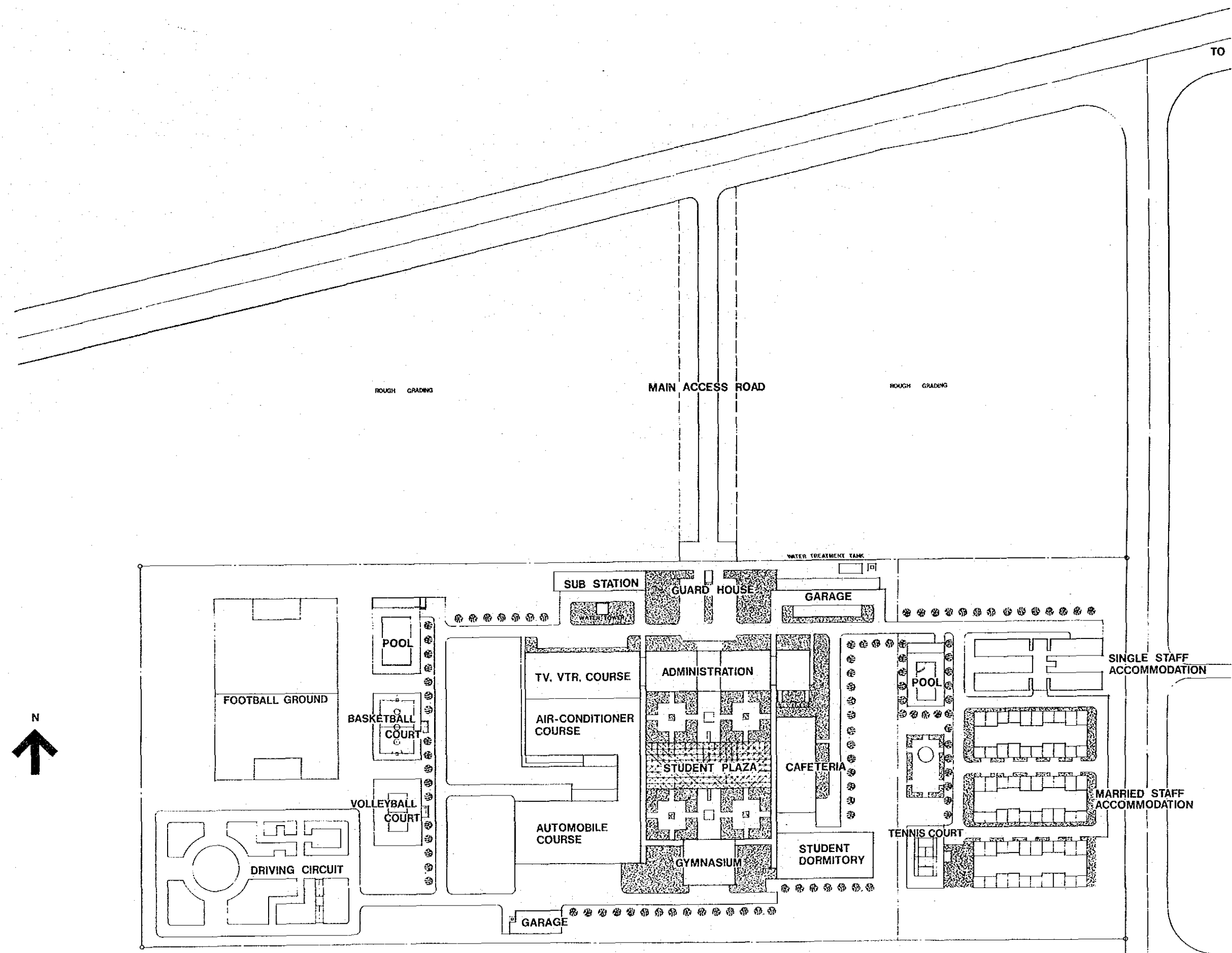


SECTION 1 : 600

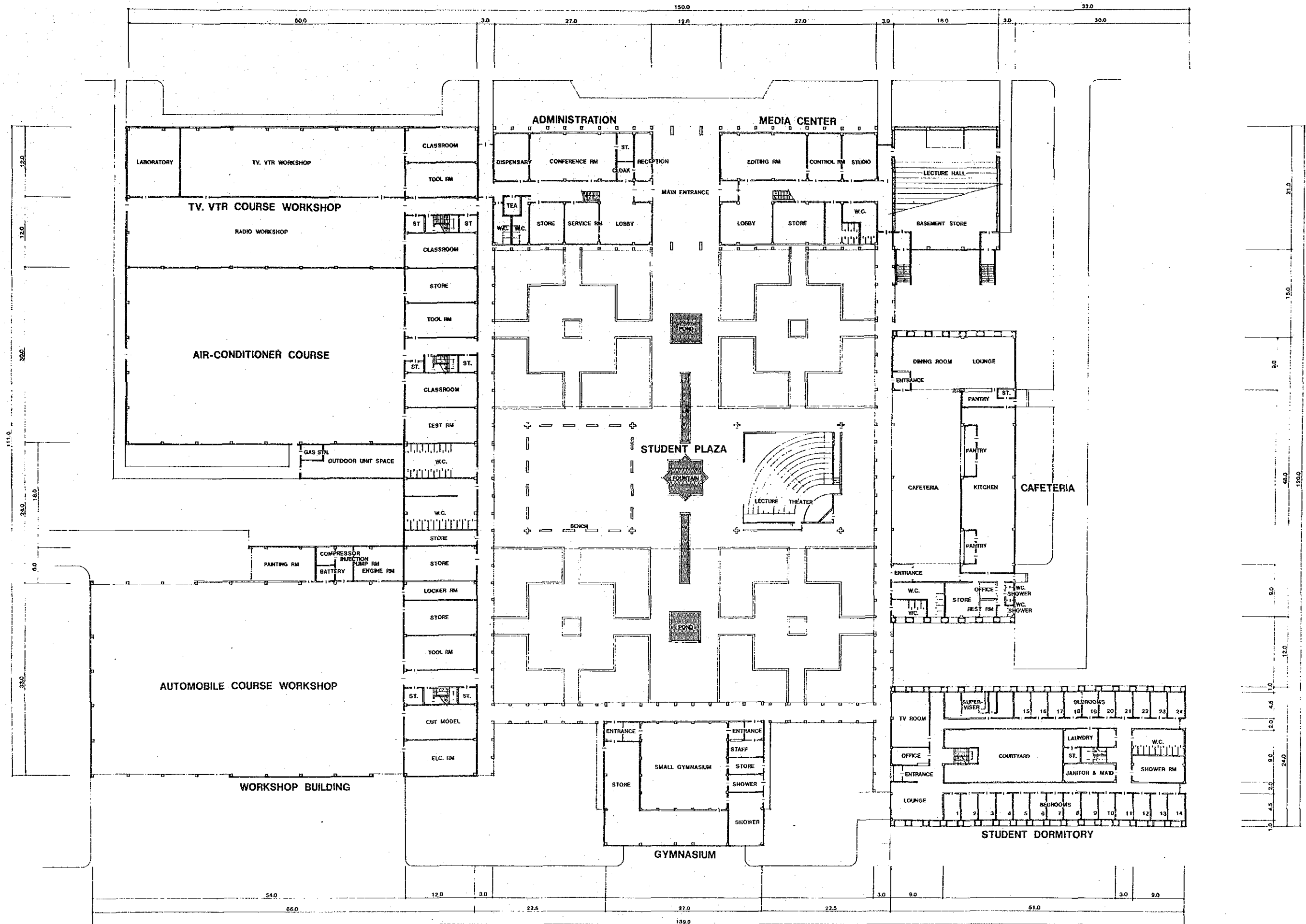


SECTION 1 : 600

TO MOSUL

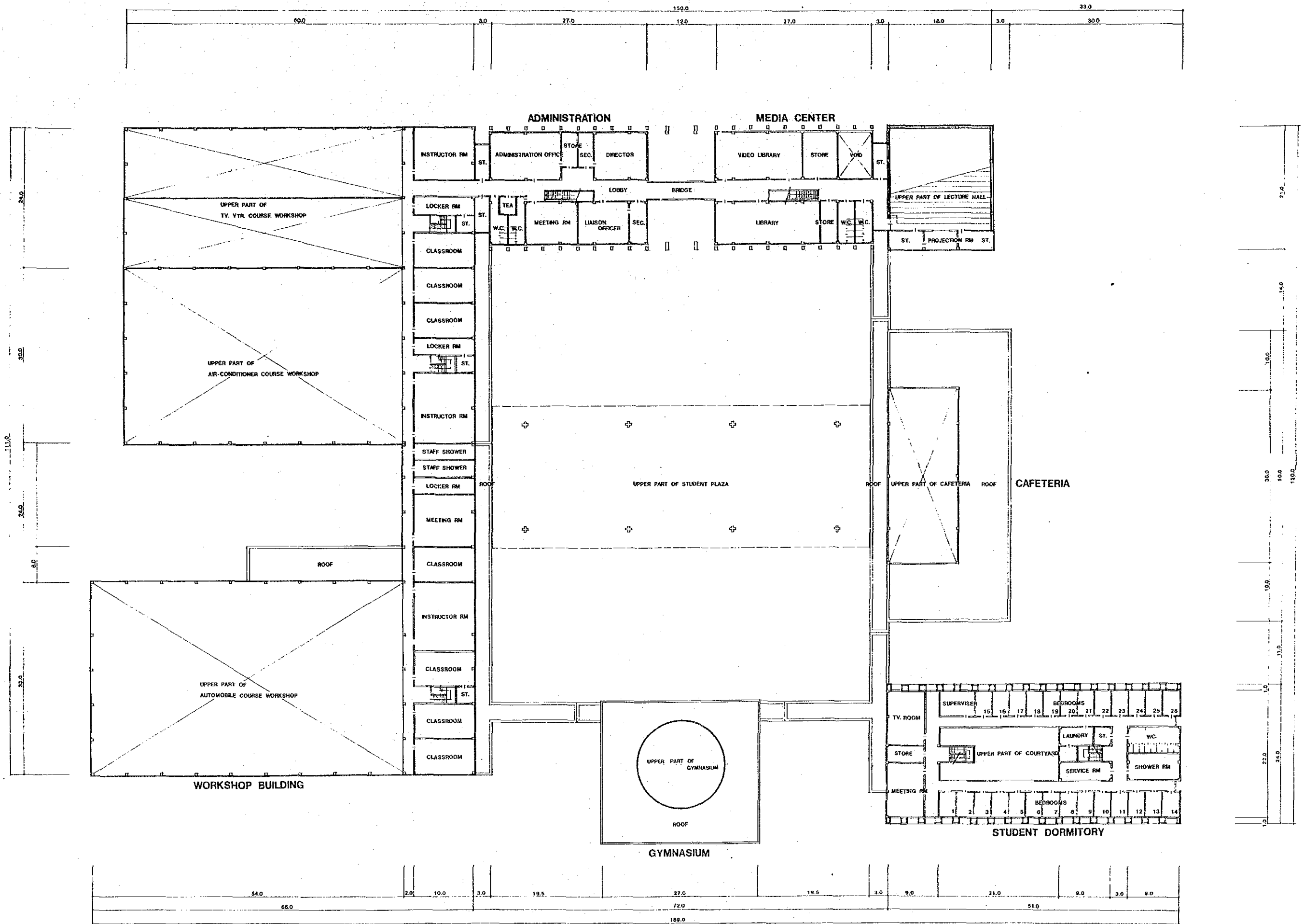


SITE PLAN 1 : 2,000



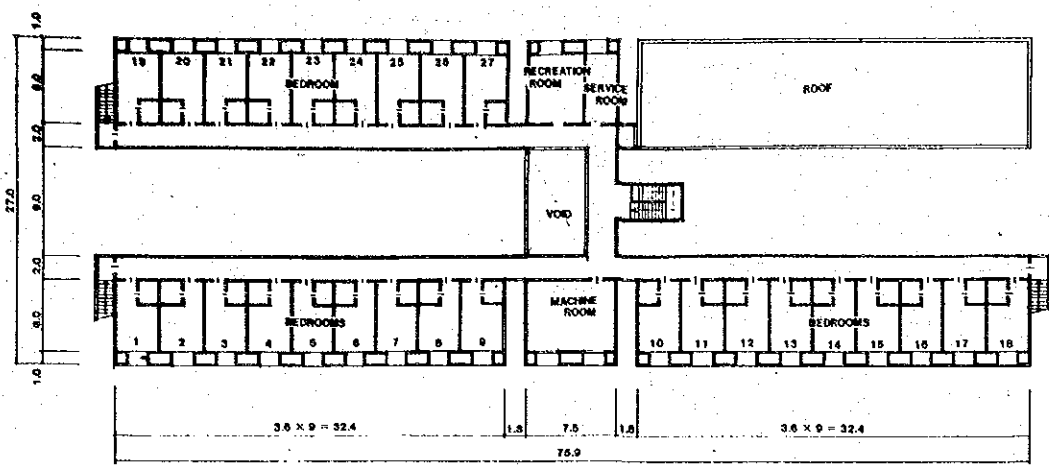
CENTER BUILDING GROUND FLOOR PLAN 1 : 600

MOSUL CENTER BUILDING GROUND FLOOR PLAN

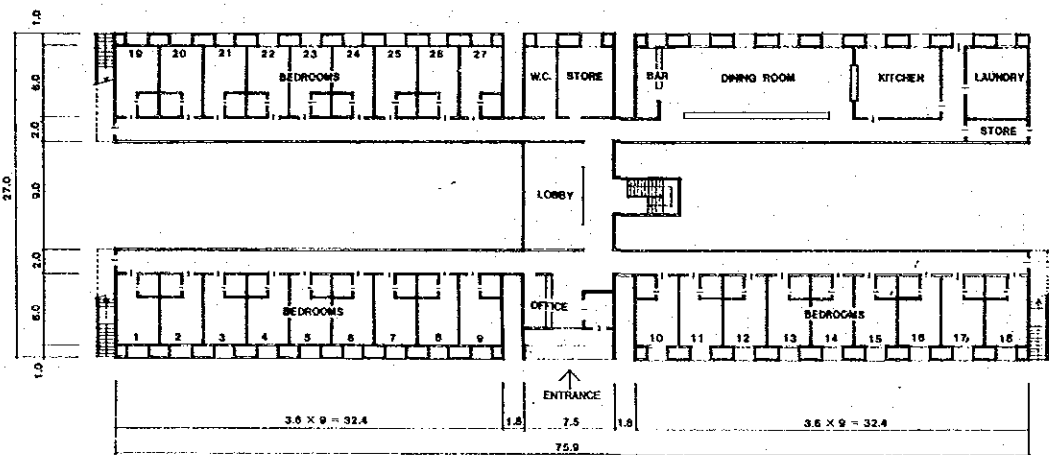


CENTER BUILDING FIRST FLOOR PLAN 1 : 600

- 237 - MOSUL CENTER BUILDING
FIRST FLOOR PLAN



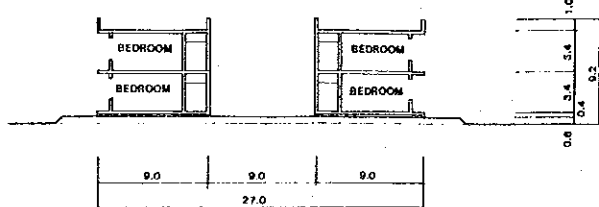
FIRST FLOOR PLAN 1 : 600



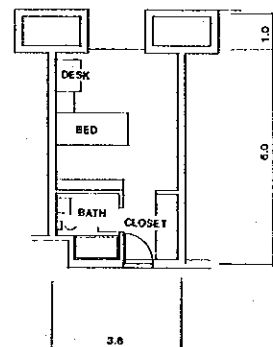
GROUND FLOOR PLAN 1 : 600



ELEVATION 1 : 600

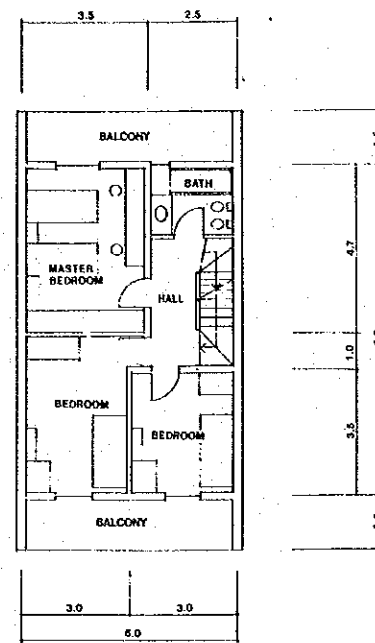


SECTION 1 : 600

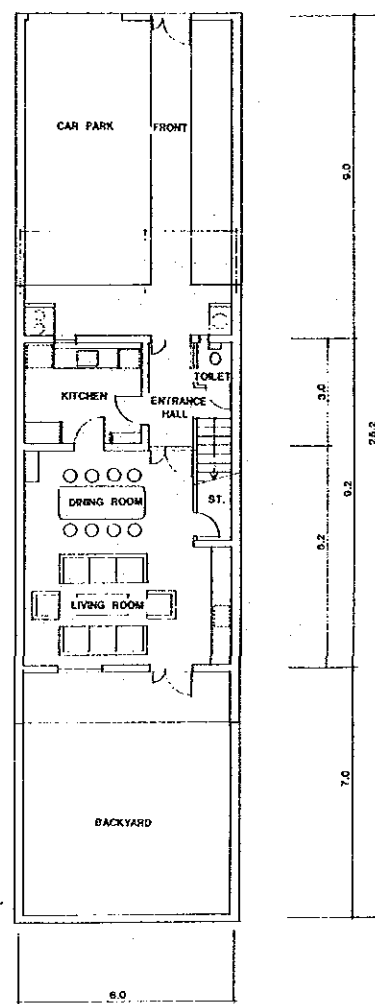


BEDROOM PLAN 1 : 200

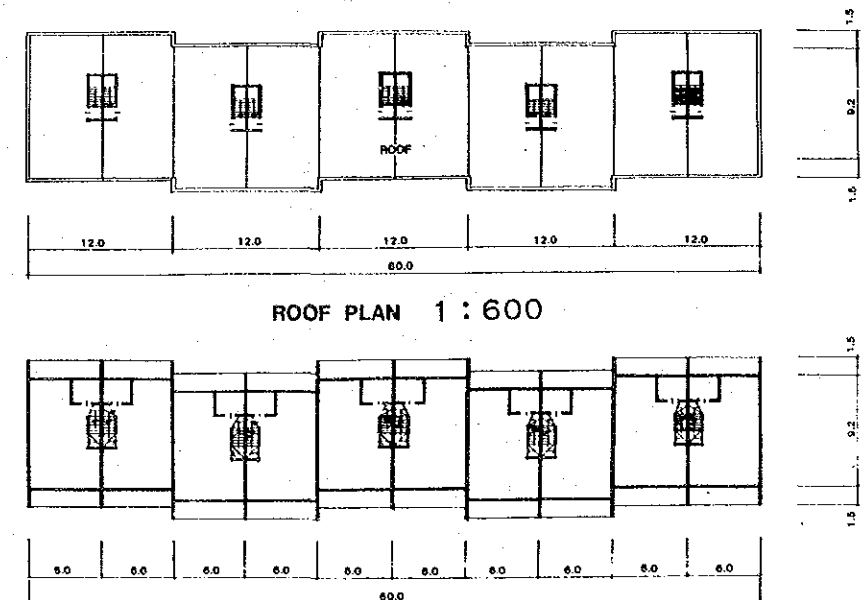
SINGLE STAFF ACCOMMODATION



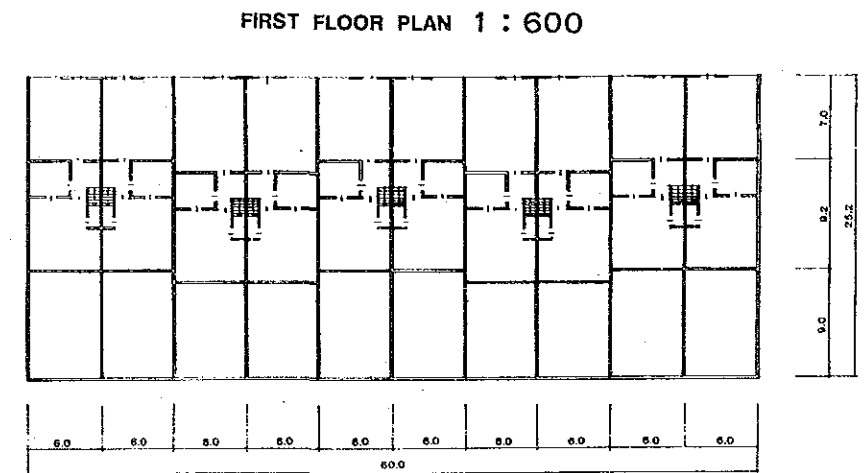
FIRST FLOOR PLAN 1 : 200



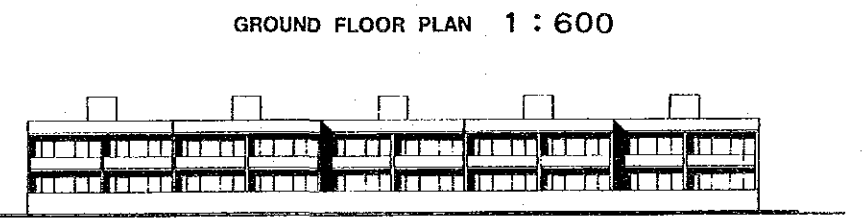
GROUND FLOOR PLAN 1 : 200



ROOF PLAN 1 : 600



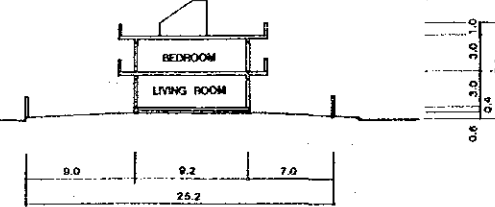
FIRST FLOOR PLAN 1 : 600



GROUND FLOOR PLAN 1 : 600



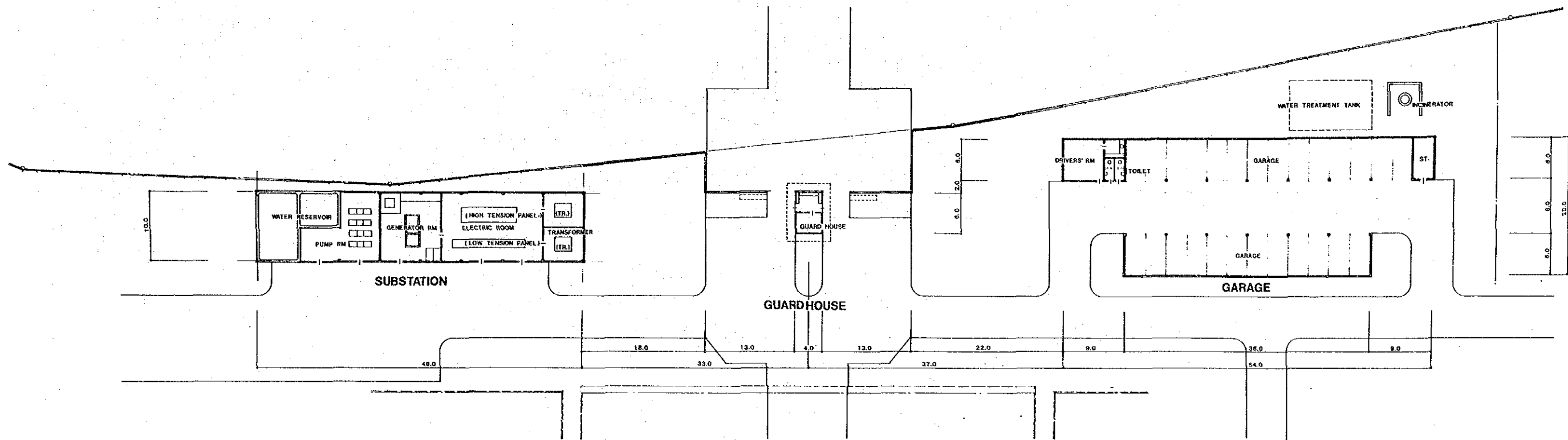
ELEVATION 1 : 600



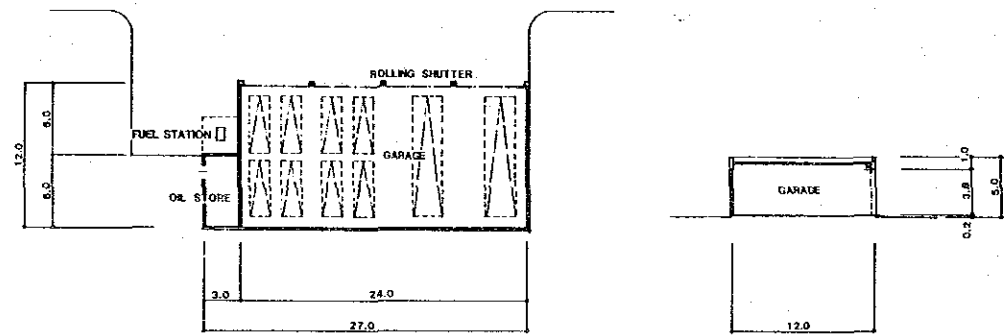
SECTION 1 : 600

MARRIED STAFF ACCOMMODATION

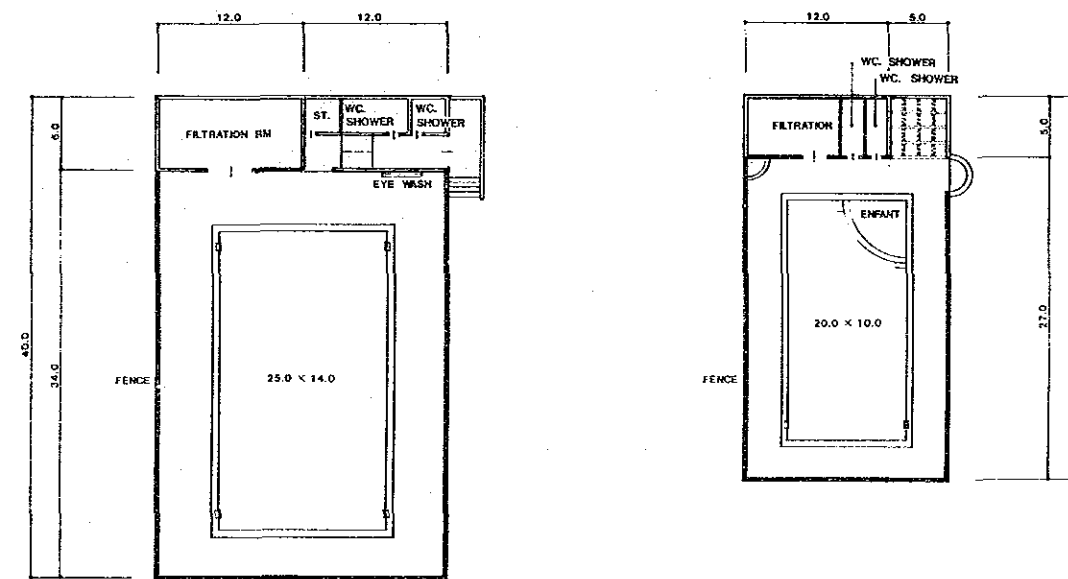
SINGLE STAFF ACCOMMODATION
MARRIED STAFF ACCOMMODATION



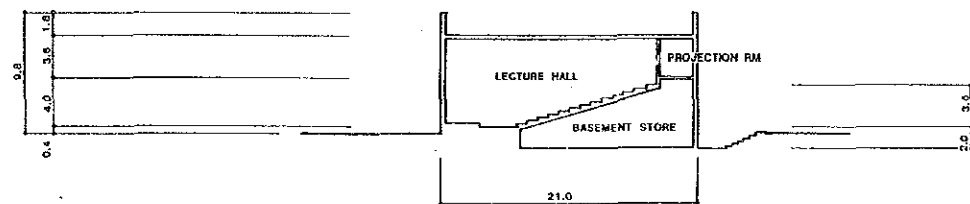
GARAGE GUARDHOUSE SUBSTATION 1 : 600



GARAGE (AUTOMOBILE COURSE) PLAN SECTION 1 : 600



POOL FOR STUDENTS PLAN SECTION 1 : 600 POOL FOR STAFF PLAN SECTION 1 : 600



LECTURE HALL SECTION 1 : 600



CHAPTER 5. VOCATIONAL TRAINING CENTER MANAGEMENT

CHAPTER 5: VOCATIONAL TRAINING CENTER MANAGEMENT

5.1 PRINCIPLES OF VOCATIONAL TRAINING CENTER ADMINISTRATION

- (1) As stated in the Iraqi proposal, one of the objective of the Project is to transfer modern Japanese vocational training procedures to Iraqi. It is recognized that the Japanese technology or skills and the Japanese management system are closely related each other and it cannot be separated. In this respect, the total transfer of Japanese vocational training center management, not limited only to the transfer of technology, is considered important.
- (2) In order to materialize smooth transfer of the said know-how, it is recommended that the proposed Training Centers have sufficient number of well experienced Japanese instructors. At the same time, it is also suggested that the Centers must be under the direct supervision of a well experienced Japanese manager.
- (3) Training of English speaking Iraqi instructors and administration staff should be well arranged even from the beginning of the Project and should be more emphasized in the latter. The management of the Centers should be turned over to the Iraqi authority after the complete arrangements in technology and management are organized.
- (4) For the the promotion of smooth communication and better understanding among the Japanese and Iraqi staff, employment of English speaking Arabians as technicians and supporting staff is highly advised.
- (5) Aside from skills training, it is recommended to offer sporting activities to the trainees to improve their physical fitness.

5.2 MAINTENANCE AND MANAGEMENT PLAN OF THE FACILITIES

1. Guarding and Cleaning System

An around-the-clock security system is suggested to be adopted for the prevention of burglary of the Training Center. To use the services of a security guard is considered most suitable for this purpose.

For cleaning of workshops, voluntary cleaning by trainees within the workshop premises should be included in the training program. However, it is recommended to make use of janitors for daily cleaning and utility work in the administration building.

2. Maintenance of Facilities and Buildings

Maintenance of training equipment and facilities is forecast to become one of the major problems since availability of spare parts is limited. In this sense, the Center must be equipped with sufficient supply of spare parts for maintenance of installed equipment. Even though, as described and shown in the list of major training equipment, Tables 3.5 to 3.11, both Centers are designed to store spare parts good for five years, special consideration should be arranged for the procurement of spare parts in the regular budget.

Proper maintenance procedures for training equipment should also be taught to the Iraqi instructors and technicians by the Japanese instructors even from the beginning of the Project.

For the maintenance of the buildings, inspection and repair by experts should be programmed at least once a year and major repair should be suggested to be done in a semester break. Similar to the case of spare parts of training equipment, proper budgetary arrangements should be made to meet the needs of repair.

5.3 PERSONNEL PLAN

5.3.1 Management and Training Personnel Plan (Japanese and international staff)

For the smooth implementation of the proposed Vocational Training Centers, the personnel plan and organization chart shown in Fig.5.1 is recommended. Ideal personnel plan and Project Manpower Chart of Japanese and international staff are also shown in Tables 5.1, 5.2 and 5.3.

Table 5.1

Personnel Plan, Japanese and International Staff Baghdad Center

1. Training Center Management

1) Director General	1
2) Executive Director	1

2. Administrative Staff

1) Director, Administration	1
2) Chief Accountant	1
3) Assistant to the Director General	1
4) Maintenance Engineer	3
5) Other Specialist	2

3. Technical Staff

1) Director, Engineering	1
2) Training Supervisors	4
1. TV/Video, Tape Recorder and Radio Repair Course	(1)
2. Automobile Repair Course	(1)
3. Air-Conditioner Repair Course	(1)
4. Elevator Repair and Maintenance Course	(1)
3) Instructors	30
1. TV/Video, Tape Recorder and Radio Repair Course	(9)
2. Automobile Repair Course	(9)
3. Air-Conditioner Repair Course	(6)
4. Elevator Repair and Maintenance Course	(6)
4) AV Engineer	1
	<hr/>
	Total 46

Table 5.2

**Personnel Plan, Japanese and International Staff
Mosul Center**

1. Training Center Management

1) Director General,
(Based in Baghdad)

2) Executive Director 1

2. Administrative Staff

1) Director, Administration 1

2) Chief Accountant 1

3) Maintenance Engineer 3

4) Other Specialists 2

3. Technical Staff

1) Training Supervisors	3
1. TV/Video, Tape Recorder and Radio Repair Course	(1)
2. Automobile Repair Course	(1)
3. Air-Conditioner Repair Course	(1)
2) Instructors	30
1. TV/Video, Tape Recorder and Radio Repair Course	(9)
2. Automobile Repair Course	(12)
3. Air-Conditioner Repair Course	(9)
3) AV Engineer	1

Total 42

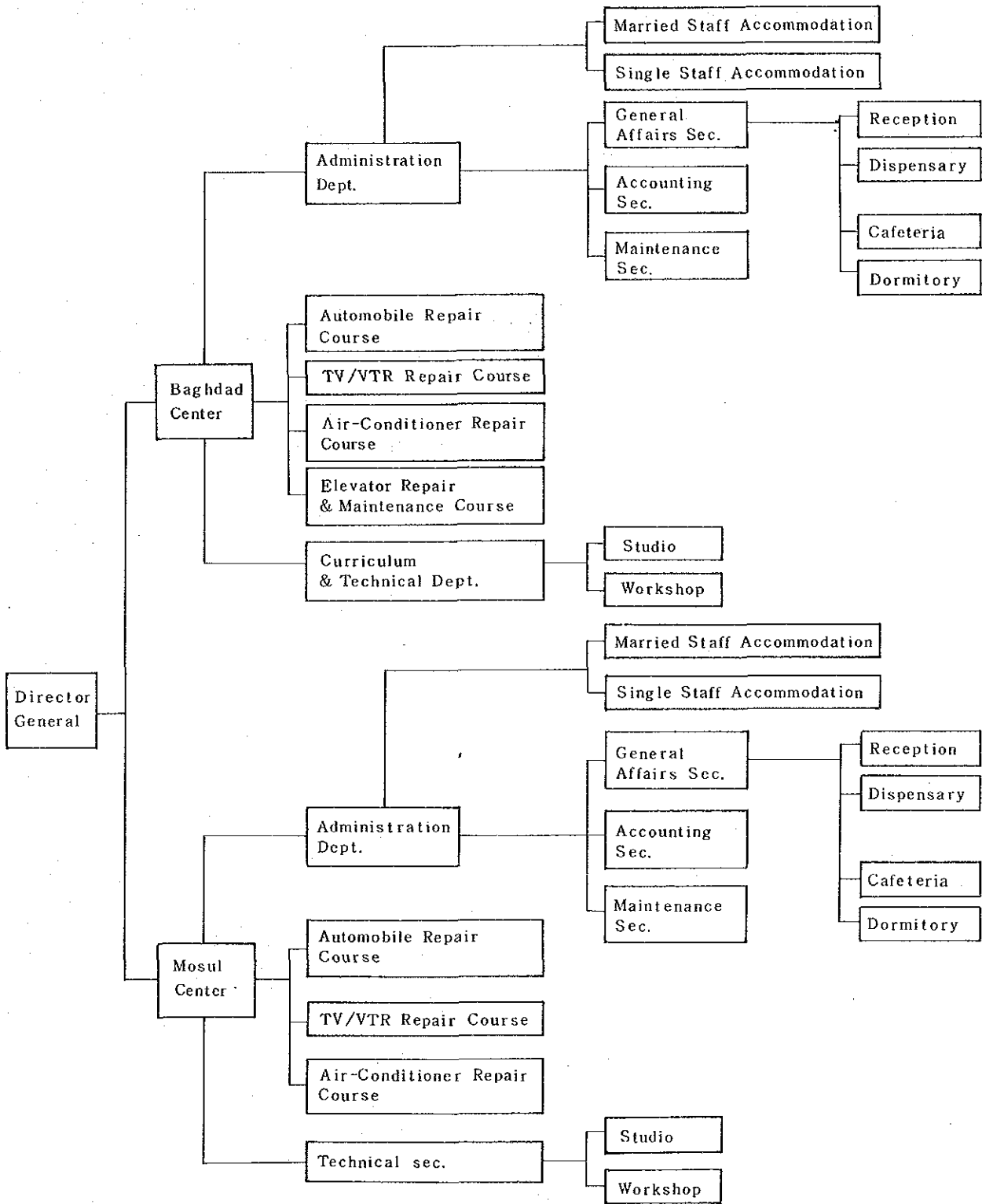
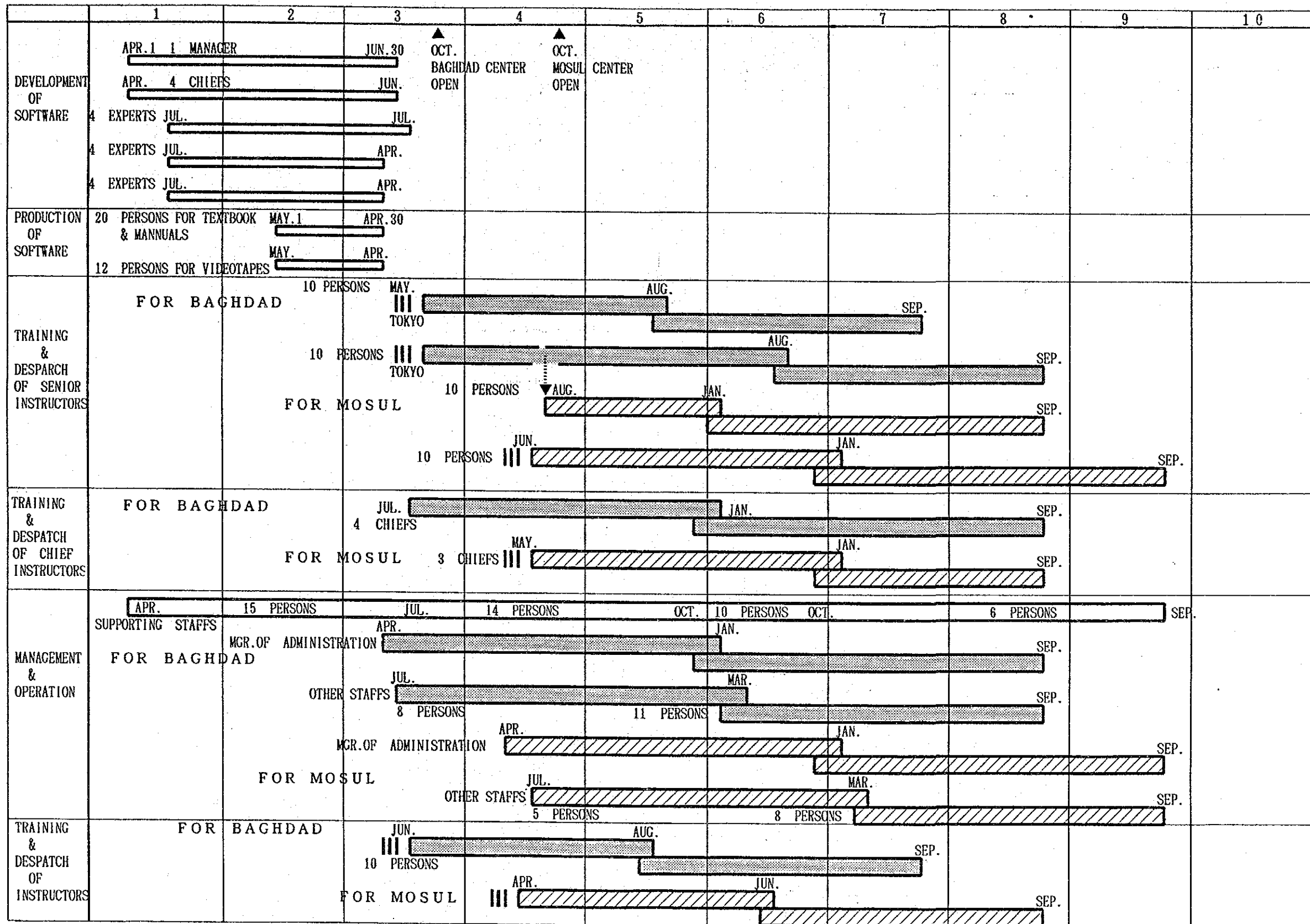


Fig 5.1 Organization Chart of Vocational Training Centers

Table 5.3 VOCATIONAL TRAINING CENTERS IN BAGHDAD & MOSUL
M A N P O W E R C H A R T

▨ : Baghdad Center
▩ : Mosul Center



5.3.2 Administration and Maintenance Personnel Plan (Iraqi staff)

As explained in the previous chapter, and most of the training and management work is executed by Japanese staff, however the assistance of quality Iraqi staff will greatly help smooth implementation of the Project. Considering the size of the buildings and operation, the following administration, technical as well as utility staff shown in Tables 5.4 and 5.5 are recommended to be employed in the proposed training centers.

Table 5.4
Personnel Plan
 (Iraqi staff, Baghdad)

Administration

1) Administrative Staff	20
2) Driver, security guard, etc	15
3) Canteen staff	15
4) Dormitory staff	3
5) Janitor and other utility staff	30

Technical

1) Interpreter instructor	30
2) AV and curriculum development assistant	12
3) Technician and tool keeper	8
4) Clerk	4
5) Janitor and other utility staff	8

Total 145

Table 5.5

Personnel Plan

(Iraqi staff, Mosul)

Administration

1) Administration Staff	20
2) Driver, security guard, etc	15
3) Canteen staff	15
4) Dormitory staff	3
5) Janitor and other utility staff	30

Technical

1) Interpreter instructor	30
2) AV technician	4
3) Technician and tool keeper	8
4) Clerk	4
5) Janitor and other utility staff	8

Total 137

CHAPTER 6. IMPLEMENTATION OF THE PROJECT

CHAPTER 6: IMPLEMENTATION OF THE PROJECT

6.1 CLIENT

The Foreign Economic Relations Committee will act as the executing agency for the Implementation of the Project. The State Organization of Buildings, National Center for Engineering and Architectural Consultancy will participate in the Project as a technical advisor to the FERC in technical matters. The Ministry of Labour and Social Affairs and the Ministry of Higher Education and Scientific Research will participate in the Project as a technical advisor to the FERC in educational and administrative matters.

6.2 CONSTRUCTION SCHEDULE PLAN

The new school terms starts in October in Iraq, so it seems appropriate to set the opening time for this Project in October. In view of the preparation of teaching materials and operations, it seems appropriate to open one of the two schools in Baghdad and Mosul first, and then open the other the following year. We consider it better to open the school in Baghdad first, followed by the school in Mosul, for the sake of operation and management of the Project. It therefore appears proper, in the progress of the works, to draw up a detailed design for the Baghdad site first, and then move on to the design for the Mosul site.

The term of the construction works, covering the time from the start of the work to completion, until the turning over of the facilities, was estimated with respect to the scale of facilities, detailed contents and local situation of construction, and for reviewing the term for each aspect of the construction work. Six months from contract to detailed design, twenty-two months for construction works, and at least one month for preparatory term from turning over to inauguration, are the results of our estimation.

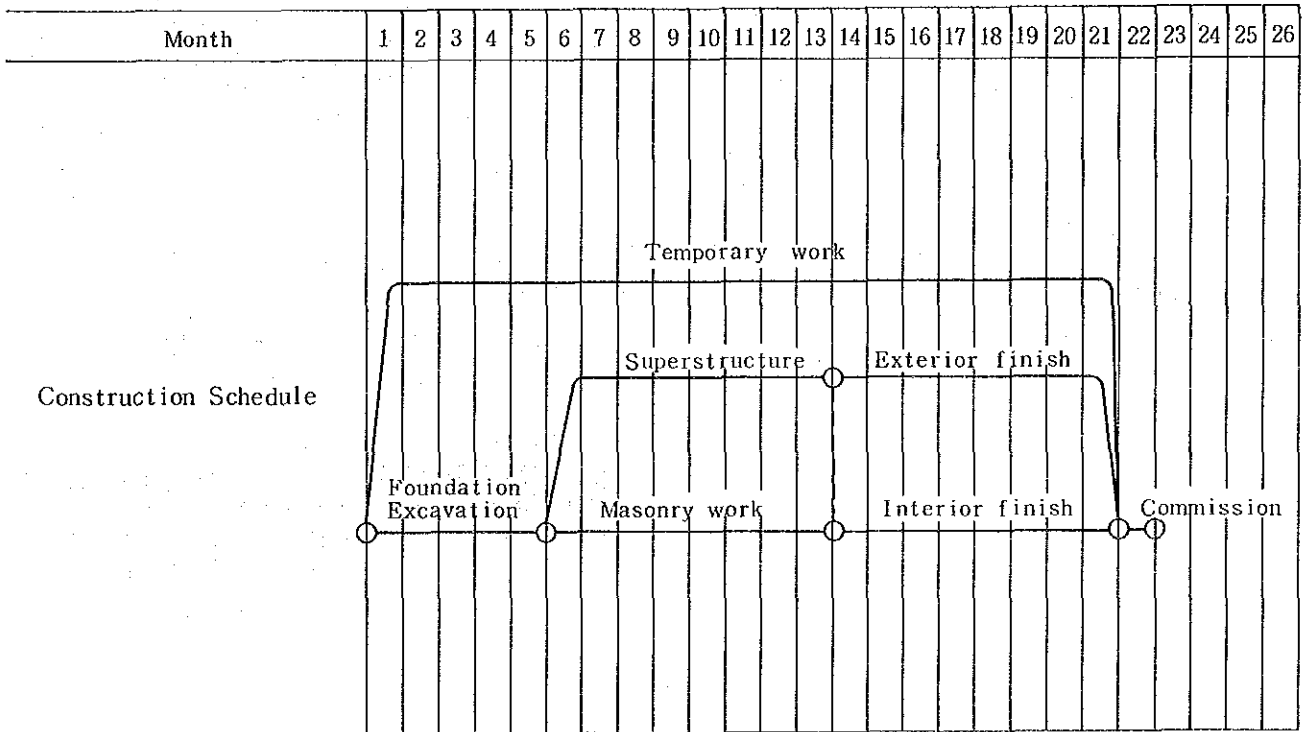
6.3 CONSTRUCTION PLAN

There is a shortage of skilled laborers in Iraq, and procurement of equipment and materials mainly depends on foreign imports because of an unstable domestic supply, so a temporary construction site in addition to the construction site is necessary in many cases.

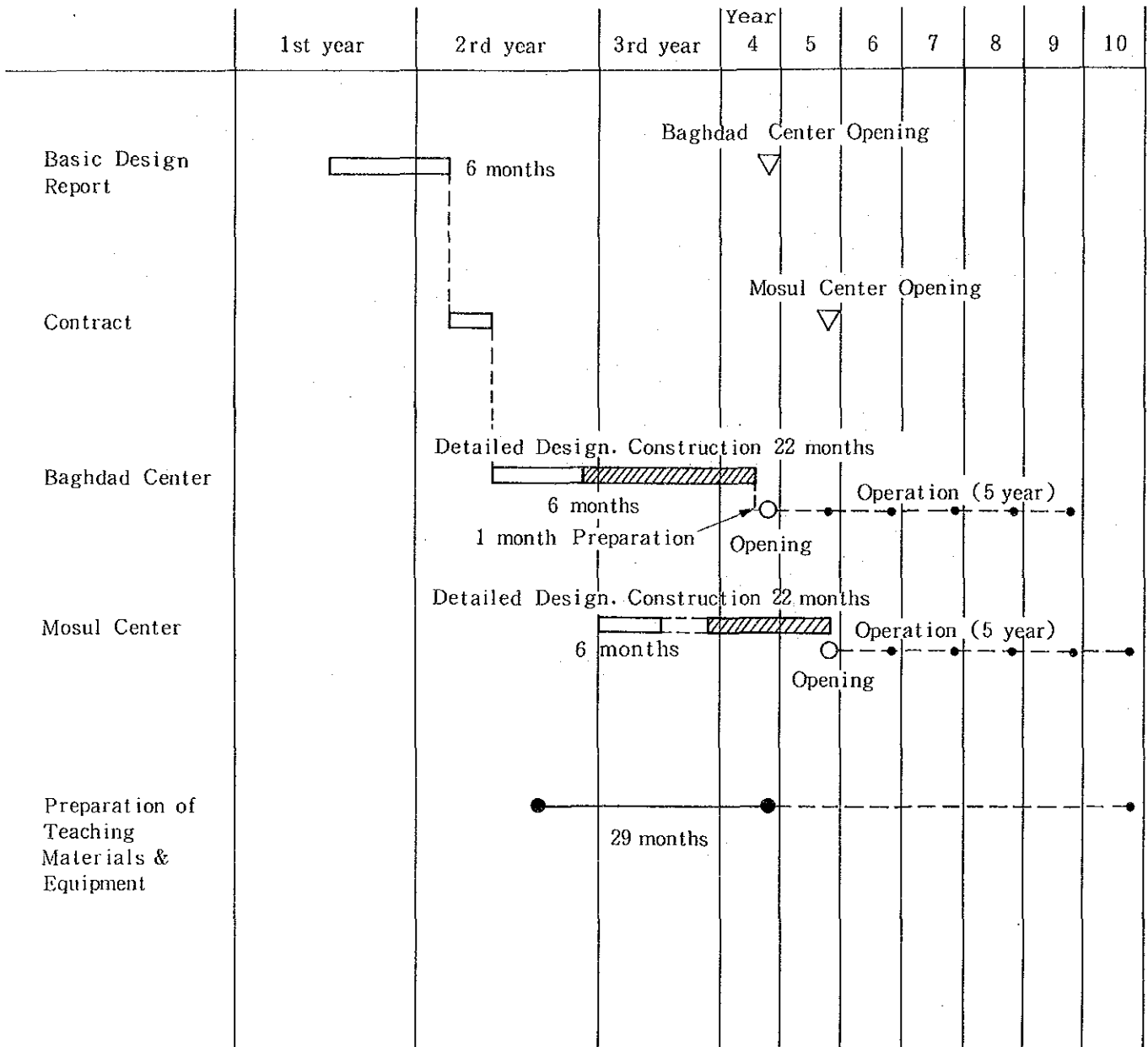
Since the construction sites in both Baghdad and Mosul fortunately have sufficient room, an area of about 100,000 m² is to be used for stockpiling equipment and materials and providing housing for laborers on both sites. Labor force will be procured mainly from neighboring countries in Asia, while construction equipment and materials are expected to be supplied mainly from Japan. Japanese specialists will be in charge of supervision of the construction works, mainly engaged in the guidance of construction procedures, building techniques and procurement of materials,

Adjustments and coordination for interconnecting various construction works including those of the Government of Iraq such as infrastructural works are imperative for promoting smooth implementation of the general construction works on the site. Supervision of the progress of construction works, work quality and functions should also be duly performed in accordance with the design specifications. For this purpose, a Construction Progress Meeting presided over by a Resident Engineer dispatched by the Government of Iraq with members consisting of parties involved with the construction work is to be held every month to confirm the progress of the construction works.

CONSTRUCTION SCHEDULE



6.4 TENTATIVE OVERALL SCHEDULE



CHAPTER 7. PROJECT COST ESTIMATION

CHAPTER 7: PROJECT COST ESTIMATION

7.1 TOTAL PROJECT COST

The total project costs of construction, training equipment and facilities, training materials development, management and maintenance are estimated as follows:

1. Construction Costs

			Total
Baghdad	\$ 35,990,475	ID 1,465,243 (\$ 4,701,773)	\$ 40,692,248
Mosul	\$ 34,949,158	ID 1,438,954 (\$ 4,617,443)	\$ 39,566,601

2. Training Equipment and Training Facilities Cost

Baghdad	\$ 10,867,748	NIL	\$ 10,867,748
Mosul	\$ 7,852,707	NIL	\$ 7,852,707

3. Training Materials Development, Management and Maintenance Costs

Baghdad	\$ 36,012,508	NIL	\$ 36,012,508
Mosul	\$ 18,208,236	NIL	\$ 18,208,236

SUB TOTAL	\$ 143,880,832	ID 2,904,197 (\$ 9,319,216)	\$ 153,200,048

		Grand Total	\$ 153,200,048

Conversion rate: 1 ID = 3.208889 US\$

7.2 CONSTRUCTION COST

1. Construction Cost for Baghdad

1. Construction Cost

Portion in each currency	\$	ID
1) Direct cost		
a) Building work	12,677,575	993,041
b) Elec. Mech. work	9,438,366	-
c) Site work	1,541,441	272,559
d) Furniture, Curtain, Kitchen	752,121	-
2) Transportation	3,178,314	-
3) Preliminaries	2,309,225	108,466
4) Site expenses	1,713,938	80,518
5) General expenses	2,190,321	-
6) Cost escalation	236,174	10,650
 Total	 \$34,037,475	 ID: 1,465,234 (12.46%)
	(ID:10,607,245)	(\$:4,701,773)
 TOTAL	 \$=38,739,248	 (ID = 12,072,479)

2. Detail Design and Consultant Fee

\$1,953,000 (ID:608,270)

3. Total cost

\$35,990,475 (ID: 11,215,867)

ID 1,465,234 (\$: 4,701,773)

Total \$40,692,248 (ID: 12,681,101)

() indicates equivalent currency.

2. Construction Cost for Mosul

1. Construction Cost

Portion in each currency	\$	ID
1) Direct cost		
a) Building work	12,551,999	936,106
b) Elec. Mech. work	9,093,574	-
c) Site work	1,732,055	306,263
d) Furniture, Curtain, Kitchen	745,177	-
2) Transportation	2,950,326	-
3) Preliminaries	2,142,706	98,016
4) Site expenses	1,585,258	74,473
5) General expenses	2,168,972	-
6) Cost escalation	463,344	24,096
 Total	 \$33,433,411	 ID: 1,438,954 (12.46%)
	(ID:10,418,998)	(\$: 4,617,443)

Total \$38,050,854 (ID:11,857,952)

2. Detail Design and Consultant Fee

\$1,515,747 (ID : 472,358)

3. Total cost

\$ 34,949,158 (ID : 10,891,357)
 ID 1,438,954 (\$: 4,617,443)
 Total \$: 39,566,601 (ID : 12,330,311)

7.3 TRAINING EQUIPMENT AND FACILITIES COST

(Unit: United States Dollars)

	Baghdad	Mosul
Training Equipment and Facilities	10,388,802	7,368,227
Training Equipment		
(Delivery at site including installation)		
1) TV/Video, Tape Recorder and Radio Repair Course		
2) Automobile Repair Course		
3) Air-Conditioner and Electric Appliance Repair Course		
4) Elevator Repair and Maintenance Course		
Audio Visual and Video Equipment		
(Delivery at site including installation)		
Vehicles and Office Equipment	478,946	484,480
1) School bus and official car for Japanese staff		
2) Stationery and office equipment		

7.4 TRAINING MATERIALS DEVELOPMENT, MANAGEMENT, MAINTENANCE COST

(Unit: United States Dollars)

Training Curriculum and Training Materials Development	11,415,223	
1) Text Book, Drill Book Training Manual, Instructors Guide Arabic, 10 Textbooks average per course		
2) Printing Arabic, English		
3) Instruction Video Tape and Colour Slide Production Arabic, 200 tapes average per course		
	Baghdad	Mosul
Personnel Cost, Japanese and International Staff	12,151,439	10,412,148
1) Director General		
2) Executive Director		
3) Director, Administration		
4) Director, Engineering		
5) Chief Accountant		
6) Training Supervisors		
7) Instructors		
8) Maintenance Engineer		
9) Others		

(Unit: United States Dollars)

	Baghdad	Mosul
Preparation Cost for Opening Training Center and Fellowship Expenses	2,574,978	1,912,213
Training Equipment and Training Materials Enrichment	1,179,029	835,942
Maintenance Cost	1,192,545	1,195,723
1) Building		
2) Building Facilities		
3) Office Equipment		
Administration Expenses	7,499,294	3,852,210

7.5 SCOPE OF THE PROJECT

These are examples of some of the costs excluded from the Project.

- 1) Salaries, wages, social security payments and costs of fringe benefits for all Iraqi employees, including but not limited to interpreters and dormitory superintendents.
- 2) Costs of third party liability insurance against losses and damages resulting from acts of the Iraqi employees and the Trainees.
- 3) Costs of insurance against death and/or injury of the Trainees by accident within the premises of the Center.
- 4) All utility charges, including but not limited to electricity, water, gas, fuel oil, gasoline, telephone and telex charges other than those used for the construction work.
- 5) Any and all taxes imposed on the Vocational Training Centers, their operation and/or their operators.
- 6) Costs of fire insurance, property and automobile damage insurance with respect to the buildings and the machines and equipment installed therein which may accrue after their handing over to the Iraqi side.
- 7) Other miscellaneous management and maintenance costs.
- 8) Costs to secure the lands for the Vocational Training Centers and for temporary facilities for the construction.
- 9) Costs to construct the paved main access road to the project site.
- 10) 11 KV service intake power cables and termination at the first load break switch of the metering system excluding underground conduits for cable entry within the site.
- 11) The primary telephone cables and termination at the main distribution frame, excluding underground conduits for cable entry within the site.
- 12) The telephone exchange equipment (PABX) including batteries, automatic charger, attendant console and handsets, excluding within the site.
- 13) Connection to the city water mains and the sewage mains at the site boundary.

7.6 RELATED COST

Aside from the Project Cost Estimation, the following major items of related costs mentioned above under Scope of the Project, are roughly estimated for the construction and management of the proposed Vocational Training Centers.

(unit: Iraqi Dinar)

Building Infrastructural Works	124,000
1) Access road	
2) Power lines extension	
3) Telephone lines extension	
4) Water pipes extension	
5) Sewage pipes connection	
Personnel Cost, Iraqi Staff	4,140,000
(For five years)	
Administration	(2,125,200)
1) Administration Staff	
2) Driver, security guard	
3) Canteen staff	
4) Dormitory staff	
5) Janitors and other utility staff	
6) Others	

Technical (2,014,800)

- 1) Interpreter instructor
- 2) AV and Curriculum development assistant
- 3) Technician and tool keeper
- 4) Clerk
- 5) Janitors and other utility staff
- 6) Others

Utility Expenses 974,000

(For five years)

Electricity, gas, water, telephone,
telex, etc

Training Allowance 621,000

(For five years)

Grand Total 5,859,000

(Unit: Iraqi Dinar)

CHAPTER 8. PROJECT APPRAISAL

CHAPTER 8: PROJECT APPRAISAL

The focal point of evaluation of this Project lies in determination of whether the Project is reasonable and will be really effective for improving upon the present shortage of maintenance technicians for durable consumer products which have been imported in the process of national industrialization of the Republic of Iraq.

Besides, it is very important to determine whether the following points in the Project are reasonably appropriate from the viewpoint of the social, economic, labour, training and technical situations of the Republic of Iraq:

1. The training software such as training plan, training material development plan and the plan of training facilities.
2. Architectural prospects regarding building of the training center and accompanying facilities.
3. Management policy of the Center.

As it is inherently difficult to evaluate the training project quantitatively, the assessment of the present project has to be conducted qualitatively.

As stated in Chapter 2, the Government of Iraq imported a great volume of durable consumer products to improve its living standard along with promotion of national industrialization in the latter part of the 1970's. These durable consumer products, however, are not being fully utilized due to the reason that most of them are facing the deteriorating period of their life cycle and they are not being properly maintained.

The government of the Republic of Iraq has made a series of efforts to overcome the said circumstances and organized accelerated training centers under the Ministry of Labour and Social Affairs and other Ministries. However, the shortage of maintenance technicians still remains unsolved and, therefore, the present project has been proposed with a top priority.

The study team carried out a survey of the current situation of educational and vocational training in the Republic of Iraq, together with the study of the social and economic conditions in order to seek a methodology which would enable trainees of the proposed Training Centers to become employable as semi-skilled workers immediately after the one year training. As a result of the survey and analysis, it has been confirmed that the introduction of modern vocational training with the use of audio visual technology such as instruction using video tape is considered most effective and suitable for improving the present circumstances of vocational training in the Republic of Iraq.

As stated in Chapter 5, since the primary objective of the Centers is to transfer the know-how of modern Japanese vocational training, not only limited to the technology, but also administration and operation, it is recommended to operate the said Centers under the leadership of a well-experienced Japanese manager for a considerable period. Evaluating other similar projects in other countries, a duration of five year management is considered appropriate and expected to produce effective results.

In the case of the facilities, careful study on the buildings and their auxiliary facilities has been made and suitable scale, materials and construction procedures have been decided. Considering the severe summer heat and dusty weather, the architectural plan of the buildings differs from other Iraqi vocational training centers of which the buildings of each training course were scattered from place to place. The new architectural plan of the buildings is considered

more efficient and appropriate from the viewpoints of air-conditioning, movement lines of instructors and trainees, construction period and future expansion of the Training Centers.

As mentioned, their activities at the proposed Training Centers are, for the meantime, concentrated on the training of intermediate school graduates to become a semi-skilled workers for the maintenance of durable consumer products, however other training courses such as skills upgrading can also be conducted in the future when the primary objectives of the proposed Training Centers are fully satisfied.

Conclusively, the graduates of the proposed Training Centers can play a very important role in promoting the industrialization policy of the Republic of Iraq.

CHAPTER 9. CONCLUSION

CHAPTER 9: CONCLUSION

As stated in the previous chapter, establishment of Vocational Training Centers is a project given top priority in the Republic of Iraq. At the same time, considering the latent demand for training in skills upgrading and training for better-job-seekers, the proposed Training Centers are expected to play a very important role in the socio-industrial development of the Republic of Iraq.

Considering the above, it is concluded that the proposed Vocational Training Centers Project have a valid basis and prompt action is highly recommended.

APPENDICES

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(1) Basic Design Survey Team (July 27 - Aug. 29, 1984) Member List

Team Leader	Mr. Kimio ONO	OVTA
Expert on vocational training (Air-Conditioning)	Mr. Toshio SARASHINA	OVTA
Expert on vocational training (Automotive)	Mr. Tadao IWAKI	OVTA
Expert on vocational training (Radio-TV)	Mr. Ryozo KOBAYASHI	OVTA
Expert on vocational training (Elevator)	Mr. Toshio SHINKO	OVTA
Planner Structural Engineer	Mr. Hiroki KAWAI	Nikken Sekkei Ltd
Architect	Mr. Mitsuo NAKAMURA	Nikken Sekkei Ltd
Elect. & Mech. Engineer	Mr. Koichi SUZUKI	Nikken Sekkei Ltd
Cost Estimator	Mr. Shozo BABA	Nikken Sekkei Ltd

Note:

1. Advisory group to the Study Team

Mr. Jun-ichiro YAGI
Chief Trade Skill Test Supervisor
Trade Skill Test Division
Vocational Training Bureau
Ministry of Labour

Mr. Hiroshi MURAKAMI
Social Development Cooperation Dept.
Japan International Cooperation Agency

2. OVTA: Overseas Vocational Training Association, Inc.

(2) Interim Report Explanation (Oct. 12 - 22, 1984) Member List

Team Leader	Mr. Kimio ONO	OVTA
Planner Structural Engineer	Mr. Hiroki KAWAI	Nikken Sekkei Ltd
Cost Estimator	Mr. Shozo BABA	Nikken Sekkei Ltd
Expert on vocational training (Radio-TV)	Mr. Ryozo KOBAYASHI	OVTA

Note:

1. Advisory group to the Study Team

Mr. Jun-ichiro YAGI
Chief Trade Skill Test Supervisor
Trade Skill Test Division
Vocational Training Bureau
Ministry of Labour

Mr. Hideki KOMATSU
Social Development Cooperation Dept.
Japan International Cooperation Agency

2. OVTA: Overseas Vocational Training Association, Inc.

(3) Draft Final Report Explanation (Nov. 30 - Dec. 10, 1984) Member List

Team Leader	Mr. Kimio ONO	OVTA
Planner Structural Engineer	Mr. Hiroki KAWAI	Nikken Sekkei Ltd
Cost Estimator	Mr. Shozo BABA	Nikken Sekkei Ltd
Expert on vocational training (Radio-TV)	Mr. Ryoza KOBAYASHI	OVTA

Note:

1. Advisory group to the Study Team

Mr. Jun-ichiro YAGI
Chief Trade Skill Test Supervisor
Trade Skill Test Division
Vocational Training Bureau
Ministry of Labour

Mr. Hiroshi MURAKAMI
Social Development Cooperation Dept.
Japan International Cooperation Agency

2. OVTA : Overseas Vocational Training Association, Inc.

(4) Iraqi Government Officials Concerned

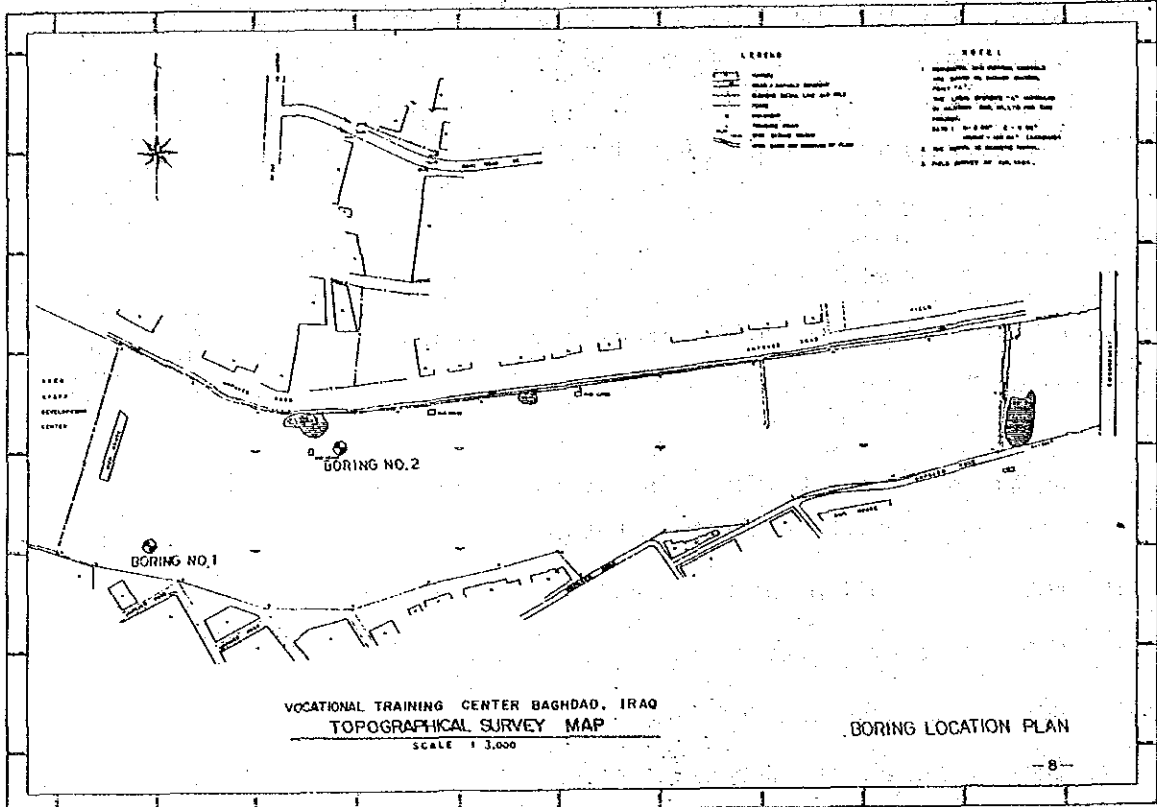
1. FERC: Foreign Economic Relations Committee
Manager : Mr. Manaf Al-Damluji
2. SOB: State Organization of Buildings,
Ministry of Housing and Construction
Mr. Aziz Nour Kareem
3. VTC: Vocational Training Centre,
Ministry of Labour and Social Affairs
Director General : Mr. Jabir Hussain Daoud
Mr. Abdul Aziz Hamid
Mr. Ali Al-Hamdi
4. FTI: Foundation of Technical Institutes
Ministry of Higher Education and Scientific Research
President : Dr. Barak S Yehya
: Dr. Fuad Al-Moner
Manager : Mr. Ronald George White
Mr. Saad Younis Jasim
5. NCEAC: National Center for Engineering and Architectural Consultancy
Ministry of Housing and Construction
Chief Architect : Mr. Nabil Thwainy
Chief Structural Engineer : Mr. Al-Chalabi, Jwan
Chief Mechanical Engineer : Mr. Husein Najj
Chief Electrical Engineer : Mr. Hildmal A Bihnam
Chief Plumbing Engineer : Mr. Hashim Y. Kaddouri
6. BM: Baghdad Municipality
Dr. Sabah Al-Azzawi
7. ETI (JICA) : Electric Training Institute
Manager : Dr. Adnam Hakki Shehab
Mr. Abdu Ghulam Hussein
8. VTC (AL-KARK) : Vocational Training Center
Director : Mr. Abdul Baki Alkazaz
9. FTI (Mosul) Foundation of Technical Institute
Director : Mr. Akran Handoor
10. VTC (Mosul) Vocational Training Center
Director : Mr. Muhana Yehya Younis

11. AHI: Al Hilal Industrial Co. SA.,
Engineer : Ali Abdul Mahmoud
 : Samir Yousif
12. VTC (Waziriya) : Vocational Training Center

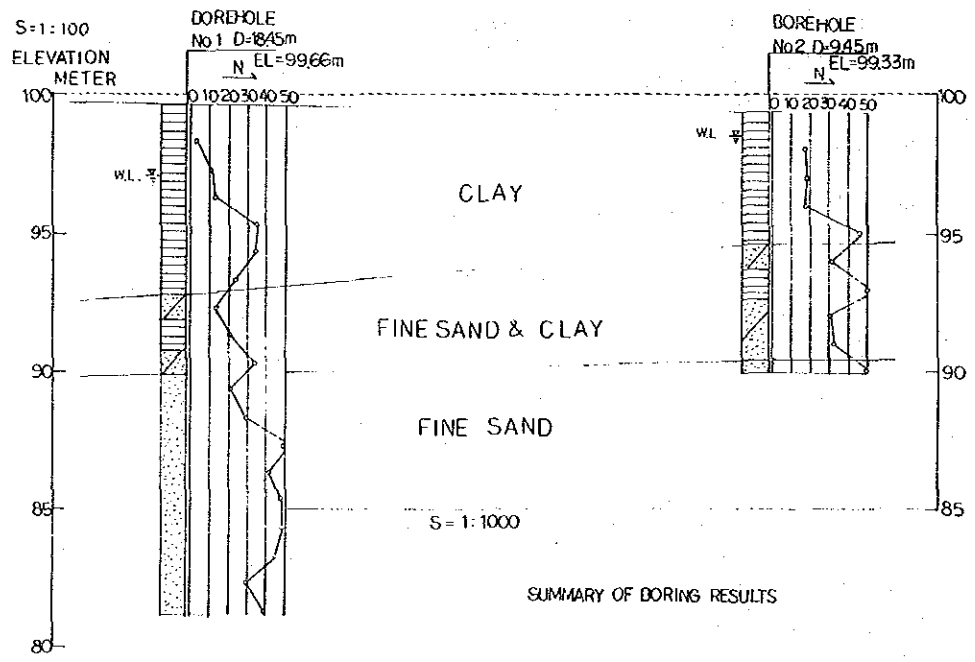
 Mr. Wpie Abod
 Mr. Ahmad Taha
 Mr. Sawasn Aly
13. DW-ITC: Daudi Workshop - Iraqi Trade Company

 Mr. Sami Fargi Hamd
 Mr. Khalid Fayadh
14. NCCL: National Center Construction Laboratory
 Steel, Concrete Test Labo.
15. EOB: Establishment of Building
16. CSO: Central Statistical Organization
17. EU: Engineering Union
18. SRC: Scientific Research Center
19. Amanat Al Assima (Baghdad Municipality)
20. SOE: State Organization of Electricity
 Electricity Power Supply Authority
21. PTT: Public Telephone and Telecommunications
 Telephone Supply Authority
22. AAA: Water Supply Authority
23. Baghdad Sewage Authority
24. Baghdad Firebrigade Authority

(5) Site Survey and Boring Data of the Project Site



(5) - 1 Site Survey Map at Baghdad



(5) - 2 Boring Data of Baghdad

SUBSURFACE EXPLORATION RECORD

BORING NO. 1 SHEET 1 OF 1

JOB NO. _____ JOB TITLE VOCATIONAL TRAINING CENTER IN BAGHDAD DATE AUGUST 23-24, 84
 LOCATION N = 7 E = 92 SURFACE ELEV. 99.66 DATUM _____
 DRILLING RIG ORV - 100 Rotary DRILLER Miroshi Kishimoto INSPECTOR Katsumi Uno
 DRIVE SAMPLING S.P.T., 51mm O.D. Split-barrel sampler, 63.5kg wt hammer, 75cm free drop
 UNDISTURBED SAMPLING Disturbed sample only

REMARKS :

DEPTH IN METERS (ELEVATION)	GROUP SYMBOL OF SOIL IN U.S.C.S.	DESCRIPTION OF MATERIAL	CASING	DEPTH OF WATER LEVEL	UNDISTURBED SAMPLE DEPTH AND NO.	STANDARD PENETRATION TEST					SUMMARY OF LAB TEST RESULTS							
						DEPTH AND BLOW RECORD	RELATION DIAGRAM BETWEEN NO. OF BLOWS PER 30CM AND DEPTH					W _n	W _L	L _p	G _s	q _u	P _c	
						10	20	30	40	50	%	%	%		kg/cm ²	kg/cm ²		
0																		
1		Brownish gray medium to hard CLAY, containing decayed vegetation. Around 3m, presents damp and includes fine sand.		2.85m ▽		1.15												
2					1.45													
3					2.15													
4					2.45													
5					3.15													
6					3.45													
6.80			4.15															
7		Brownish gray medium fine SAND with clay.				4.45												
7.70			4.45			4.45												
8		Brownish gray stiff CLAY.				5.15												
8.80			5.15			5.45												
9		Brownish gray dense fine SAND with clay.				6.15												
9.70			6.15			6.45												
10		Dark brownish gray medium to dense fine SAND, locally includes mica.				6.45												
11				6.45			7.15											
12				7.15			7.45											
13				7.45			8.15											
14				8.15			8.45											
15				8.45			9.15											
16				9.15			9.45											
17				9.45			10.15											
18				10.15			10.45											
18.45				10.45			11.15											
				11.15			11.45											
				11.45			12.15											
			12.15			12.29												
			12.29			13.15												
			13.15			13.45												
			13.45			14.15												
			14.15			14.45												
			14.45			15.15												
			15.15			15.45												
			15.45			16.15												
			16.15			16.45												
			16.45			17.15												
			17.15			17.45												
			17.45			18.15												
			18.15			18.45												
			18.45															
		END OF BOREHOLE																

BORING NO. 1

SUBSURFACE EXPLORATION RECORD

BORING NO. 2 SHEET 1 OF 1

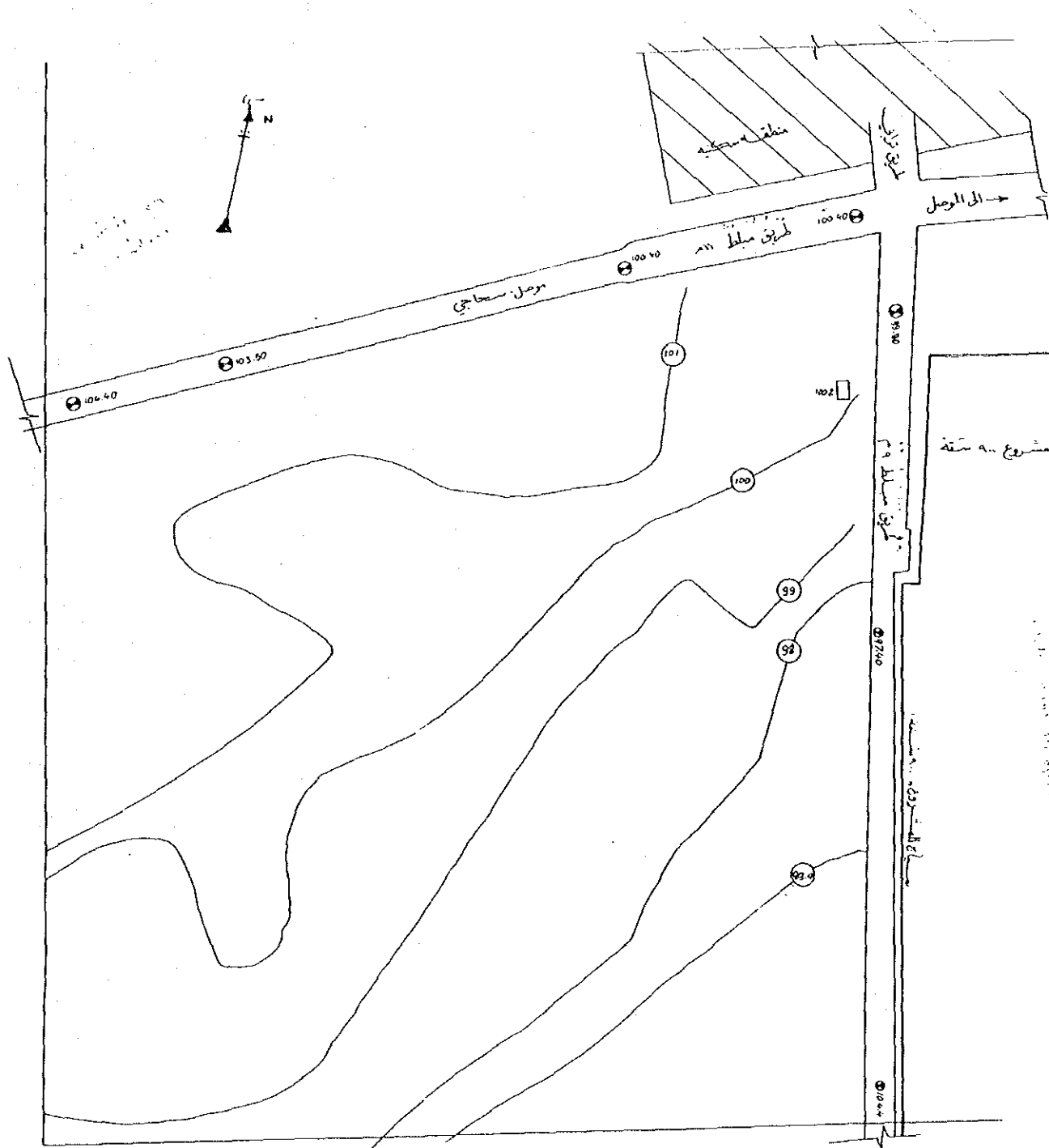
JOB NO. _____ JOB TITLE VOCATIONAL TRAINING CENTER IN BAGHDAD DATE AUGUST 22, 84
 LOCATION N=104, E=282 SURFACE ELEV. 99.33 DATUM _____
 DRILLING RIG OUV - 100 Rotary DRILLER Hiroshi Kishimoto INSPECTOR Katsumi Uno
 DRIVE SAMPLING S.P.T. : 51mm O.D. Split-barrel sampler, 63.5kg wt hammer, 75cm free drop
 UNDISTURBED SAMPLING Disturbed sample only

REMARKS :

DEPTH IN METERS (ELEVATION)	GROUP SYMBOL OF SOIL IN U.S.C.S.	DESCRIPTION OF MATERIAL	CASING	DEPTH OF WATER LEVEL	UNDISTURBED SAMPLE DEPTH AND NO.	STANDARD PENETRATION TEST					SUMMARY OF LAB TEST RESULTS								
						DEPTH AND BLOW RECORD	RELATION DIAGRAM BETWEEN NO. OF BLOWS PER 30CM AND DEPTH					W _n %	W _L %	I _p %	G _s	e _u 1/2 cm	P _c 10/2 cm		
0				0.85m															
1		Brownish gray stiff CLAY, containing decayed vegetation.				1.15													
1.45						N=18	(4, 4, 8)												
2.15																			
2.45							N=19	(6, 4, 7)											
3.15							N=18	(5, 5, 8)											
3.45																			
4.15							(12, 15, 19)	N=46											
4.45		Brownish gray dense fine SAND with clay.																	
5.15								(10, 10, 11)	N=31										
5.45		Brownish gray hard CLAY.																	
6.15							(20, 25, 5/2)	N=50/22											
6.37																			
7.15		Brownish gray dense fine SAND with clay.																	
7.45								(9, 10, 12)	N=31										
8.15																			
8.45																			
8.45		Dark brownish gray dense fine SAND.																	
9.15								(15, 10, 11/4)	N=50/24										
9.39		END OF BOREHOLE																	

BORING NO. 2

(5) - 5 Site Survey Map at Mosul



رقم النقطه ٢٦
مقياس الرسم ١:٥٠٠
داره الهندسه الجيوديسيه

الموقع المقترح لمشروع مركز التدريب المهني

مقياس الرسم ١:٥٠٠

JICA