CHAPTER 2. CONTENTS OF THE PROJECT

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2 - 1 Objectives of the Project

As a result of the long occupation, the basic education in this area has come to face various problems. In the Gaza Strip particularly, the unusual density and population growth in the limited area has caused a serious lack of basic education facilities as indicated by the fact that 90% of the low and high basic schools conduct a double shift system. The lack of facilities is creating overcrowded classrooms, long distance travelling and an unequal opportunity of access to school between boys and girls.
In order to improve the situation, MOE has included, among its four major items, the improving of the educational environment by the increase of school buildings and appropriate allocation of school sites. Under the assistance of various donors, it is actively pursuing the construction of school facilities. Along this line, the Project was formulated to construct 10 school buildings for basic education in the Gaza Strip and provide educational equipment, thereby improving the educational environment and contributing to the development of human resources.

2 - 2 Basic Concept of the Project

2 - 2 - 1 Evaluation of Request

(1) Necessity of the Project

As of January 1997, there are 167 public schools in the Gaza Strip including secondary schools, of which 117 are basic education schools that come under this Project. The total number of pupils is 100,716 and that of classes is 2,370. Thus, the average number of pupils in a class is 43. Since MOE tentatively adopts 40 pupils in a class, the present class overcrowding rate becomes 3 pupils in average. The number of existing classrooms is 1,210. This number together with the number of classes above, that is 2,370, derives the number of classrooms used for double shift system which is 1,160, and for single shift system which is 50 only.

Apart from the activities to improve the educational environment as mentioned above, MOE is also developing new Palestinian curricula for the basic and secondary education. In order to implement the new curriculum, the present school

hours shall be lengthened and the present double shift system shall be completely eliminated in the future. For these objectives and to solve the problem of overcrowding, the number of school buildings and classrooms need to be increased.

Boys and girls in this area are generally required to go to separate schools, and most of the high basic education schools in this area are that way. However, due to the difficulty in constructing two schools in the same place, there has developed or unequal capacity of schools educating boys and girls, causing some children to travel long distances. New school buildings are also necessary to solve these problems.

(2) Appropriateness of Project Site

1) Candidate Project Site and Facility

The candidate sites for the new school construction and outline of the proposed schools are as shown below:

Table 2-1 Candidate Project Sites and Requested School Size

Priority	Project Site	Sub-Directorate	Grade	Type	No. of Classes	No. of Pupils
No. 1	Mashrouh Ammer	Gaza	1 - 6	Co-ed	24	960
No. 2	El-Smeri, Deir El-Balah	Khan Yunis	1 - 6	Co-ed	24	960
No. 3	El-Sagera, Abasan	Khan Yunis	1 - 6	Co-ed	18	720
No. 4	El-Faloja, Jabalia	Gaza	1 - 6	Co-ed	24	960
No. 5	Ma'an	Khan Yunis	1 - 6	Co-ed	24	960
No. 6	El-Mozanar	Gaza	7 - 10	Boys	24	960
No. 7	El-Remal	Gaza	7 - 10	Boys	24	960
No. 8	Near Khan Yunis District Office	Khan Yunis	1 - 6	Co-ed	18	720
No. 9	Wadi El-Salga Deir El-Balah	Khan Yunis	1 - 6	Co-ed	18	720
No.10	Tambora, Beit Lahiya	Gaza	7 - 10	Girls	24	960

2) Evaluation of Site

In order to examine whether or not the sites are eligible as school construction sites under the Japanese Grant Aid Programme, the following criteria were established through discussions with the MOE and the results of the field survey on the candidate sites were examined:

a) Give priority to sites that need to alleviate overcrowding of the double shift operations.
b) Give priority to sites that need to relieve long distance traveling to schools which have unequal access for both boys and girls.
c) Sites where legal rights are secured by MOE.
d) Sites where the necessary number of pupils and teachers can be secured in the vicinity.
e) Sites where similar school construction plans by neither MOE nor any other donors exist.
f) Sites where proper access roads exist for the delivery of construction materials and equipment.
g) Sites unsuitable for construction such as steep land and swamps shall be eliminated.
h) Sites with foreseen natural, environmental or social hazards, endangering the workers' safety during the construction, shall be eliminated.

The results of the examination are as follows:

a) Alleviating of Overcrowding

All the project sites have schools of a double shift system with overcrowded classrooms and the situation will be improved through the implementation of the Project. However, as mentioned later No.2 El-Smeri and No.9 Wadi El-Salga in the vicinity of Deir El-Balah will only merit by the Project if they are considered as 10-year low and high basic schools, rather than just as low basic schools.

b) Relieving of Long Distance Traveling and Unequal Access for Both Boys and Girls

There are no existing schools within 1.5Km of No.1 Mashrouh Ammer, No.2 El-Smeri, Deir El Balah, No.3 El-Sagera, Abasan, No.5 Ma'an and No.9 Wadi El-Salga, Deir El-Balah. By the implementation of this Project, the problem of long distance traveling will be greatly relieved.

Gender separated schools are planned for No. 6 El-Mozanar, No.7 El-Remal, and No.10 Tambora. By the implementation of the Project, the unequal access for both boys and girls caused by the implementation of preceding projects by other donors will be relieved. However as mentioned later, it is necessary to have a boys high basic school instead of a girls high basic school in No. 10 Tambora.

c) Legal Rights for the Site

Apart from No.5 Ma'an, the other project sites are the property of MOE and the legal rights for the construction of buildings have been secured. No.5 Ma'an is on lease to MOE, therefore legal rights to all the sites have been secured.

d) Securing of Pupils and Teachers

The pupils and teachers for the new schools will be partly or mostly transferred from existing schools, therefore there is no problem in securing an adequate number. As for the new number of teachers that need to be secured, there should be no problems because there is still an adequate number of non-working people with teachers' licenses. Operation staff members needed to be newly recruited are mainly supporting staff members such as secretaries to headmasters, custody keepers, guards, and janitors. As the number is small and no qualification is required, no problem is seen to recruit them from the present labor market in the Gaza Strip.

e) Overlapping with Other Donors

It is confirmed that no projects by other donors are planned on any of the proposed sites.

f) Access Roads

Access to No.1 Mashrouh Ammer and No.5 Ma'an by four-wheelers is possible, however, it may be difficult for ordinary cars as neither site is connected to existing roads. Access to these sites also implies driving through other people's land. Thus, the construction of access roads is necessary.

At No.2 El-Smeri and Deir El-Balah, a new access road must be constructed.

g) Sites Unsuitable for Construction

Among ten candidate project sites, there is no site unsuitable for construction such as steep land and swamp. Rough ground levelling by cutting and banking soil is, however, required for Site No.1 Mashrouh Ammer and Site No.5 Ma'an because the land of each site has relatively large difference in elevation.

h) Safety during Construction

No danger can be foreseen for any of the Project sites.

3) Examination Results

As a result of the above examination, the proposed sites are divided into the following two groups:

a) Sites Selected without Particular Conditions:

The following proposed sites are selected as project sites without particular conditions:

1) No. 3 El-Sagera, Abasan
2) No. 4 El-Faloja, Jabalia
3) No. 6 El-Mozanar
4) No. 7 El-Remal
5) No. 8 Near Khan Yunis District Office
6) No. 9 Wadi El-Salga, Deir El-Balah
7) No. 10 Tambora, Beit Lahiya

b) Sites Selected with Conditions:

The following proposed sites will be selected as project sites if the respective works are done:

1) No. 1	Mashrouh Ammer	Construction of access roads, and rough ground levelling
2) No. 2	El-Smeri, Deir El-Balah	Construction of access roads
3) No. 5	Ma'an	Construction of access roads, and rough ground levelling

(3) Appropriateness of the Size and Type of School

1) Appropriateness of the School Size

Basically, 24 classes are proposed for each school although, for smaller sites, 18 classes are suggested. According to past experience in the Gaza Strip, 24 classes per school is thought to be the maximum and the most suitable number and this scale has been applied to recent school construction projects. Thus, it may be appropriate for the Project to adopt 24 classes per school. For smaller sites, 18 classes can be deemed as the minimum necessity, considering that the present average number of classes is 19 in the Gaza Strip.

2) Appropriateness of the School Type

Various types of schools are proposed according to the conditions of each site. In order to examine the appropriateness of the type of school, a study was made

on the classroom demand of the surrounding area of each proposed site, based on the school statistics compiled by MOE, Gaza in January 1997. The classroom needs were studied according to each school district or area to be affected by the Project. The results of the study are as follows:

a) **No. 1 Mashrouh Ammer Co-ed Low Basic School and No.4 El-Faloja, Jabalia Co-ed Low Basic School**

No.1 Mashrouh Ammer is located in the new development area planned in the northern part of Jabalia, which adjoins Gaza. No.4 El-Faloja is located in the urban area of Jabalia. The increase in population of this area has led to a lack of classrooms in the low and high basic schools. In low basic schools particularly, the problem is equally affecting both girls and boys, with a lack of nearly 90 classrooms. Therefore, there will still remain a shortage of 43 classrooms in the area even when 48 new classrooms are constructed through the Project. Thus, it is most appropriate to construct a co-ed low basic school of 24 classrooms in each proposed site in both site. Both sites can respectively accommodate a 24 classroom school.

b) **No. 2 El-Smeri Co-ed Low Basic School and No. 9 Wadi El-Salga Co-ed Low Basic School**

The sites are located at 2.5Km and 3.5Km from the center of Deir El-Balah respectively, surrounded by farming areas. Since the existing schools, both low and high basic schools, are located in the center of the town and there are no schools in the vicinity of the proposed site, the children have to travel long distances to the existing schools. Thus, schools need to be constructed in both sites. The demand for classrooms is relatively the same between boys and girls, therefore a co-ed school is appropriate for both sites. However, the proposed sizes of school, that is 24 classes for El Smeri and 18 for Wadi El-Salga, are too big compared to the actual classroom demands of low basic schools. The appropriate sizes should be 12 and 6 respectively, if low basic schools are to be constructed.

Looking at the high basic schools in this area, these schools are also facing a shortage of classrooms. The shortage of classrooms in low and high basic schools will reach total 44 in the near future. Thus, a low and high basic school of 10 grades should be constructed on both sites, with 18 and 24 classrooms respectively. This is to change school type without change of school size, which will result in solving the problems of the existing schools in the town center. If such a change is made, it will be possible to transfer

some of pupils from the existing high basic schools to the new schools and release a part of the existing facilities to low basic pupils living in the populated area of the town.

c) **El-Sagera, Abasan Co-Ed Low Basic School**

The surrounding area of the proposed site is the outskirts of Khan Yunis City, studded with residences. Since there is no school in Abasan Sagera town, the total lack of classrooms in the area, which may be affected by the Project, totals 63 classrooms with little difference between boys and girls. High basic schools, on the other hand show only a small lack of classrooms. Thus, the construction of a co-ed low basic school is appropriate for both sites.

d) **No. 5 Ma'an Co-Ed Low Basic School and No. 8 Near K. Y. District Office Co-Ed Low Basic School**

The site No.5 Ma'an is located in the residential area of Khan Yunis City and No.8 is in the center of the city adjacent to the office of Sub-Directorate Khan Yunis. As the existing schools are located comparatively near to each other, there are many schools to be affected by the Project. Thus, the demands for classrooms of both proposed school areas shall be examined by inspecting the demand for the whole city.

The lack of classrooms is noticeable in low basic schools, of which the total number amounts to 125 classrooms. Therefore, school construction is needed across the city including the two proposed areas. As the deviation of needs between boys and girls is little, co-ed schools are appropriate. The site No.5 can accommodate a 24 classroom school but at No.8 Near Khan Yunis District Office, only an 18 classroom school can be constructed due to the limit of the site size.

e) **No. 6 El-Mozanar Boys High Basic School and No. 7 El-Remal Boys High Basic School**

Both sites are located in the center of Gaza and are only 2Km apart. Although the area has many low and high basic schools, the population density is great, causing a serious shortage of classrooms. The shortage of classrooms in boys high basic schools comes to 50 classrooms and 23 classrooms for girls high basic schools. Two combined 10 grade basic schools for girls are under construction in this area through the assistance of the World Bank and China. The completion of these schools will solve the shortage of classrooms in girls high basic schools. Thus, the construction of

boys high basic schools on both sites is appropriate. Considering the size of the sites, a 24 classroom school will be possible for both sites. As a result the above, classroom demands will mostly be rectified by constructing a total of 48 classrooms.

f) Tambora, Beit Lahiya Girls High Basic School

The shortage of classrooms in low basic schools in the area totals 47 classrooms. That in boys high basic schools is 27 and 12 in girls high basic schools. A 10-grade girls basic school is presently under construction in the vicinity through the aid of the World Bank. Completion of this school will solve the shortage of girls high basic schools. Thus, the school that is planned for this area should be changed to a boys high basic school. The shortage of classrooms in boys high basic schools in this area total 27, therefore a 24 classroom school will be appropriate and possible.

3) Examination Results

As mentioned above, the contents of the Project are basically appropriate, however the following revisions are necessary:

a) Schools that need to revise the school class structure

1) No. 2 El-Smeri, Deir El-Balah	from 1-6 grade to 1-10 grade
2) No. 9 Wadi El-Salga, Deir El-Balah	from 1-6 grade to 1-10 grade

b) School that needs to change school gender

No. 10 Tambora, Beit Lahiya	from a girls school to a boys school

(4) Necessary Rooms and Appropriateness of Size

1) Requested Rooms

The following rooms are requested for a proposed school:

Table 2-2 Requested Rooms and Sizes

Name of Room	Size m²	No.	Note
Classroom	54.4	18 or 24	
Science Laboratory	108.8	1 or 2	Low basic 1, High basic 2
Library	108.8	1	
Art Room	54.4	1	
Computer Room	54.4	1	
Multipurpose Room	108.8	1	
Headmaster's Room	27.2	1	
Secretary's Room	13.6	1	
Teachers room	54.4	1 or 2	Separate men/women rooms in 24 class school. Same in 18 class school.
First Aid Room	13.6	1	
Social Worker's Room	13.6	1	
Staff Toilet	13.6	1	
Pupil Toilet	60.0	2	Independent building (2 buildings)
Guard Room	12.0	1	Independent building
Canteen	30.0	1	Independent building
Storage Room	80.0	1	

2) Necessity of Requested Rooms

The requested rooms will be evaluated from the following points:

1) Whether or not needed for the present school lessons.
2) Whether or not needed for the present school operations systems.
3) Whether or not effective use is expected, considering the number of lesson hours for each subject per week.

a) Classroom

There is no need to mention the necessity of classrooms. It is appropriate for a school to accommodate 18 or 24 classrooms as mentioned in the previous sub-section (3)-1).

b) Science Laboratory

As it is desirable for pupils to have great opportunities of observations and experiments during their science lessons, a special room, namely a science laboratory, is needed in both low and high basic schools. However, there is no need to conduct all the science lessons in the science laboratory.

Considering the effective use of the school facility, use of both the classroom and science laboratory is desirable. It is estimated that 1/3 of the lesson hours in low basic schools, and 1/2 of the lesson hours in high basic schools should be spent in the science laboratories. Thus, the number of science laboratories required has been calculated according to the present weekly school hour schedule below.

Table 2-3 Weekly School Hour for Each Subject

Unit: School hour

Subject	Low Basic												Total
	1	2	3	4	5	6	Total	7	8	9	10	Total	
Religion	3	3	3	3	3	3	18	2	2	2	2	8	26
Arabic	9	9	9	9	8	8	52	7	7	6	6	27	9
English					5	6	11	6	6	6	6	24	35
Math	6	6	6	6	6	6	36	5	5	6	5	21	57
Science	3	3	4	3	3	3	19	4	4	4	6	18	37
History				1	1	1	3	1	1	1	2	5	8
Geography				1	1	1	3	1	1	1	2	5	8
Nat'l Educ	2	2	2	2	2	2	12	2	2	2	1	7	19
P.E	2	2	2	2	2	2	12	2	2	2	2	8	20
Art	2	2	2	2	2	2	12	2	2	2	2	8	20
Farming (boys)			1	1	1	1	4	1	1	1		3	7
Home Econ. (girls)			1	1	2	2	6	2	2	2	2	8	14
Total Boys	27	27	29	30	34	35	182	33	34	34	34	134	316
Girls	27	27	29	30	35	36	184	34	34	36	36	139	323

Source:MOE

In a 24 classroom low basic school, the number of science laboratories required can be obtained by the following equation:

Weekly use of science laboratories = 19 hours x 4(class) x 1/3 = 25.3 hours

Average available hours for a room = 183 hours • grades/week ÷ 6 grades
= 30.5 hours/week

No. of science labs necessary = 25.3 hours ÷ 30.5 hours = 0.83 → 1 room

Based on the above calculation, the necessary number of science laboratories per type of school is as follows:

Low basic school	1
Low/High basic school	2
High basic school	2

c) Library

During occupation of the Gaza Strip, low and high basic education centered on lessons using Egyptian textbooks. As the education method does not meet the needs of the Palestinian society, an original curriculum is being developed with the aid of Italy and UNESCO. The new curriculum is planned to be introduced to grade 1 and grade 6 in low basic schools in September 2000. The objective of the new curriculum is to strengthen the ordination between subjects, diversity and harmony of knowledge and skills, and the human resource development to comply with international relationships.

Thus, education will become diversified for pupils in the near future, from a passive to an active learning. In such a situation, a library will be necessary in both low and high basic schools. Thus, it is appropriate to plan a library in each school, although the present number of book stocks of existing schools is very limited. Increasing of book stocks is not easy in a short period. In such circumstances it will not be appropriate to open the library to pupils for their free access. For the effective use of the library, it would be better to use it as a special study room for some lessons, such as arabic language study that may need dictionaries, social and natural science studies that may need pupils to refer to encyclopedias, and so on. This method is already applied to some existing schools in Gaza.

d) Art Room

The weekly art lesson hours for both low and high basic schools with 24 classes are 48. Art lessons do not necessarily require the use of special rooms. Due to noise problems, music lessons may require a special room, however if one out of two music lessons are conducted in the special rooms, it will only add up to 12 hours a week. The use rate will be 40% which does not justify having a special room. Thus, it is recommended to plan a multi-purpose room in each proposed school and to substitute it for the art room.

e) Computer Room

Computer lessons are being introduced to school education in the Gaza Strip. Most of the senior secondary schools are already incorporating them and some high basic schools, too. MOE hopes to introduce computer lesson to all high basic schools by the year 2000 and to all low basic schools by the year 2005. However, it is evident that introducing a computer lesson room to a low basic school is still too early, considering the present shortage of ordinary classrooms. Making computer lessons compulsory in high basic schools also leaves doubts as to its necessity and reality. Among 36 public high basic schools in the Gaza Strip, only 2 schools have computer lessons as of March 1997. Considering the above, it may not be appropriate to plan an independent room for the computer lesson at this stage. Leaving a possibility of introducing the computer lesson to the proposed high basic schools, it is recommended to use part of the library for the computer lesson. Thus, the library will be more effectively used and its necessity will be more justified by this joint use.

f) Multipurpose Room

As mentioned before, the multipurpose room is practical and may be used for classes such as art lessons, home economics and agriculture. It can also be used as a playroom during rainy weather and for various meetings and ceremonies. For these reasons, it is essential for each proposed school.

g) Headmaster's Room

All the present schools have a separate headmaster's room. The headmaster is in a position to supervise the entire teaching and supporting staff. A separate room is, therefore, necessary for meetings with parents, officers from the district office and teaching staff.

h) Secretary's Room

The headmaster's secretary is the only clerical staff in the school. Together with the headmaster, the secretary is responsible for all administrative and accounting matters. Thus, a room adjacent to the headmaster's room is necessary.

i) Teachers Room

For preparing educational materials, meeting and resting, a teachers room is necessary with desks and chairs for each staff member's use.

j) First Aid Room

There are no public schools at present with professional health staff. MOE has been requesting the Ministry of Health to provide a part-time nurse to cover several schools, however this request has not been met. Thus, MOE has given first aid training to science teachers, leaving them in charge of first aid, who also act as assistants during periodical medical check-ups by the Ministry of Health. First aid rooms are, therefore, necessary to give first aid to the pupils, and temporary rest to sick pupils, and for physical measurements and checkups. The first aid room will require a toilet, which should also be usable by physically handicapped persons.

k) Social Worker's Room

The mental care of children in the Gaza Strip is an important item. Due to the religious and conservative nature of the area, and the feelings of suppression and irritation brought about by long occupation, plus the feelings toward this modern world overflowing with information, many of children of this area suffer from mental weakness which requires particular care. MOE has employed counsellors to care for such children. A social worker's room has been requested for this reason, although a room solely for that purpose does not seem necessary. Considering the purpose of its use, joint use with the first aid room should be adequate.

l) Staff Toilets

It is necessary to separate toilets to be used by staff/visitors and pupils. The Facility Standard of MOE (hereinafter referred to as FSMOE) shows a men and women's joint use toilet which can be approached through the kitchenette. Therefore, the following modifications need to be made.

1) As there are both men and women teachers even in boys and girls schools, the toilets shall be separate.
2) The access to the toilet shall be separate from the kitchenet.

m) Pupils Toilets

In most of the schools in the Gaza Strip, pupils toilets are situated within the school grounds in a place which is clearly visible. This is appropriate from the view of hygiene and for pupil supervision. As a matter of course, girls and boys toilets in co-ed schools shall be separate into 2 buildings. A separate building system is usually recommended for gender separate schools, because more entrances are needed to comply with concentrations during breaks.

n) Guard Room

The opening and closing of the school gates are the responsibility of the school guard. In many of the present schools, the guard is positioned in a shaded area or in the corner of the corridor. For the appropriate schools operation, a guard room should be set up near the school gates.

o) Canteen

Most schools in the Gaza Strip have canteens to provide snacks and drinks to the pupils. The canteen is operated by outsiders or by the school itself. The sales profit is incorporated into the school account for operation and maintenance use. As pupils converge on the canteen during recess or after school, it is best to have the canteen located separately from the school building, near the entrance.

p) Storage Room

Storage rooms are indispensable for school operation to store physical education items, cleaning items and other miscellaneous items.

q) The Shed

The children of the Gaza Strip go to school early in the morning. Until classes begin, there needs to be a place where the children can wait in the shade. For shading purposes, a trellis may be possible, however, as it is also used as a play area in the wet winter season, a simple shed with a roof should be suitable. As with the canteen, it should be located near the school entrance.

3) Proper Size of Room

Size of the proposed rooms is determined based on the proposed classroom size of 54.40sq. m as a module. As a whole, the proposed room size is appropriate, but for some rooms the size shall be checked based upon the requirements for proper use of respective rooms. Thus, the appropriateness of room size shall be examined according to the following criteria:

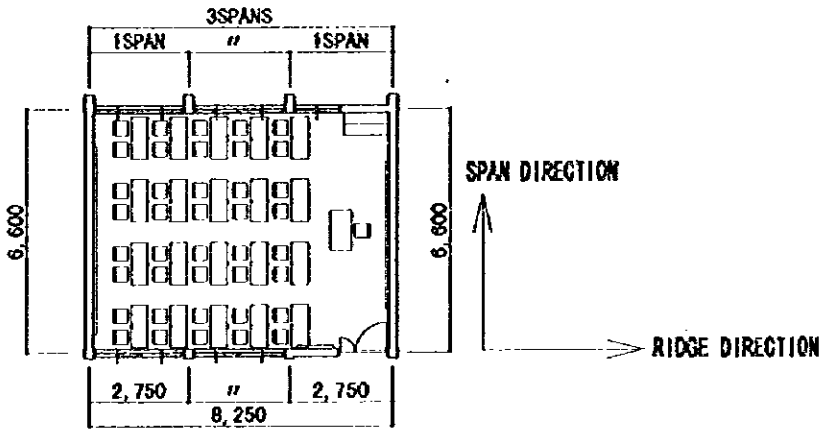
1) If the size of the rooms conforms to the facility standards of MOE.
2) If the size of the rooms conforms to the number of people using them and the method of use.

a) Classroom

If 40 children are placed in the 54.4 ㎡ classroom, the average space for one child will be 1.36 ㎡, which conforms to the standards of MOE. The number 54.4 ㎡ was supposedly obtained by 8.5m long x 6.4m wide, however, in order to keep flexibility in planning, a module of 2.75m is adopted for longitudinal unit span and the classroom is composed of 3 spans equivalent to 8.25m long. To meet the standard floor area of the classroom above the width may be increased to 6.6m from 6.4m. This width of 6.6m is more suitable to arrange 4 double seated desks of 1.1 meter wide sideways and 5 lengthways.

Accordingly, the unit size of the classroom should be 2.75m longitude and 6.60m crosswise and the floor area should be 2.75 x 3 x 6.6 = 54.45 ㎡.

Fig. 2-1 Proposed Classroom Plan



b) Science Laboratory

As the frequency of using science laboratories and the type of experiments to be conducted are different in low and high basic schools, the size of the room will also be different. FSMOE so far provides only the science laboratory for high basic schools and secondary schools. As science experiments are conducted frequently in high basic schools, the size of the laboratory should be twice the size of the standard classrooms (108.90 ㎡). However, science studies in low basic schools comprise of simple experiments and observation. As experiments are demonstrated mostly by teachers, the space required for each student may be small. Compared to high basic schools, the science

equipment in low basic schools is limited and the preparation room may also be small. Thus, the appropriate size of the science laboratories are as follows:

1) Low basic school:	Laboratory	4 span
	Preparation room	1/2 of a span
2) High basic school:	Laboratory	5 span
	Preparation room	1 span

c) Library

FSMOE shows that the size of the library should be double classrooms (6 span, 108.90 ㎡); the work room for repair work and storage of important documents should be 1 span; and the open-shelf reading room should be 5 span. Considering the fact that libraries in existing schools have only a small stock of books and the use by pupils is limited, the requested size of the library seems too big.

As mentioned in section 2) "The Necessity for the Rooms2, if the library were to be used as an overall information related practice room, the size of the library in low basic schools would be suffice if it were slightly larger than the standard classroom. Considering the use of computer lessons in high basic schools, a specific area will be provided in the library.

1) Low basic school :	Reading room	4 span
	Work room	1/2 of a span
2) High basic school :	Reading room	6 span (including computer corner)
	Work room	1 span

d) Multipurpose Room

The FSMOE provides 5 span to the multipurpose area and 1 span to the preparation room. This size is given on the assumption that 40 people will use the room for home economics lessons or as a substitute room for the science laboratory. In such a case, the size of the room is appropriate. However, if the room is to be used for meetings or ceremonies, the size of room may be too small, thus the meeting will need to be adjusted.

e) Headmaster's Room

Ordinarily, the size of the room is half the size of the classroom. Considering the layout of necessary furniture, the size seems almost appropriate.

f) Secretary's Room

The size is half the size of the headmaster's room. Considering the necessary furniture, the size of the room seems almost appropriate.

g) First Aid Room

The same size as for the social worker's room is requested, which is one fourth of the size of the classroom. As mentioned before, a toilet for physically handicapped will also be located therein, thus the size of the room should be a space of 2 span.

h) Teachers Room

The size of the teachers room should differ according to the number of teachers, which will vary in each type of school. The number of teaching staff per type of school will be estimated according to the weekly school hour schedule, and the size of the teachers room will be decided based on the estimated number and considering the layout of furniture. Gender separation must also be taken into consideration when the size is examined. The number of teachers and the size of the teachers room for the project schools are proposed as follows:

Table 2-4 Number of Teachers and Size of Teachers Rooms

Type of School	No. of Staff	Size of Room
Low basic (18 class)	22	Small (4 span)
" (24 class)	28	Medium (5 span)
Low/high basic (18 class)	28	Medium (5 span)
" (24 class)	35	Large (6 span)
High basic (24 class)	34	Large (6 span)

i) Staff Toilets

The proposed space for the staff toilet is one fourth of the size of the classroom, however in this case it is not possible to have a separate men and women's toilet. In order to have one Asian and one western type water closet for each toilet, a third of the size of the classroom is required to arrange a separate men and women's toilet. Apart from the toilets, 6 m^2 is also needed for the kitchenette.

j) Pupil Toilets

Regardless of the size of the school, the requested size of the toilet is 60 m^2 x 2, which is too large. The size should relate to the number of pupils. The suitable number of water closets will be different according to the climate, habits, use and frequency, however, in the case of low/high basic schools, one toilet for each class (one for 40 pupils) should be adequate. Thus, the size of the toilets for this Project will be as follows:

1) Toilets shall be designed according to facility standards.
2) The size shall be the same for boys and girls, there will be one toilet per class.
3) In boys toilets, half of the booth space calculated will be allocated to a urinal wall.

k) Guard Room

The requested size of 12 m^2 is too large and needs to reconsidered.

l) Canteen

The requested size of 30 m^2 is too large and needs to be reconsidered.

m) Storage Room

The requested size of 80 m^2 is 1.5 the size of the classroom. As this is too large, it needs to be reconsidered. It is possible to reduce the floor area of this rooms by reducing storage effectively.

n) The Shed

Based on examples of existing schools, the size will be determined in accordance with the number of pupils in each school.

4) Design Grade of Room

The grade of room requested by MOE is similar to the newly constructed UNRWA schools and the schools presently being constructed under the World Bank Project. All construction materials can be procured locally and may be constructed according to the most basic local standards. Thus, the grade requested is basically suitable.

(5) Appropriateness of Science Laboratory Equipment

1) Appropriateness of Items

a) Evaluation Standards

The criteria for examining the adequacy of science laboratory equipment are as follows:

1) As a the new curriculum has not yet been established, the equipment under the Project will be limited to such items as required for the lessons based on the present science textbooks.
2) Science studies in low and high basic schools differ greatly. High basic schools have teachers specialized in the subject, however low basic schools have normal class teachers teaching the subject. Taking this point into due consideration, necessary items will be selected.
3) Texts and other materials to be possessed individually will be omitted from this Project.
4) As chemical reagents tend to alter with time, these should be procured when needed. Thus, they will be omitted from this Project.
5) Videos and charts are effective in helping the children's understanding, however, due to language problems, they will be omitted from this Project.

b) Science Laboratory Equipment for Low Basic Schools

In spite of the importance of observations and experiments in science studies, it may be very difficult to expect these practical lessons in low basic schools, where class teachers teaching all subjects are also responsible for science study. Some class teachers may be strong in science but some others may not. There are obvious differences in capability. Therefore, it may be difficult to expect all teachers to handle all requested items of science laboratory equipment effectively. Even if all teachers can do so, it may be difficult for some of them to control 40 pupils, conducting experiments safely.

Hence, the science laboratory equipment for low basic schools shall be limited to only those items easily recognizable and usable by most teachers. In addition it is also taken into consideration that most of the experiment items will be demonstrated by the teacher and observed by pupils. Experiments using heat or chemicals should also be as such.

As a result, the following shall be omitted for the reasons mentioned above:

Table 2-5 Items to be Omitted from Low Basic School Science Laboratory Equipment

Item No.	Item	Reason
1	Filter paper	Filtering experiments are difficult for non-specialist teachers.
6	Crucible Tong	There are no experiments using crucibles in low basic schools.
7	Ball and ring	This appliance is to explain the meaning of expansion, by heating a metal ball with a burner. The expansion of spherical bodies is difficult to understand compared to linear bodies. Demonstration solely by a teacher is gives less effect.
15	Dissecting Set	It is difficult for a non-specialist teacher to do dissecting experiments.
16	Concave lens	Concave/convex lens are taught in high basic schools.
17	Tube-PVC and rubber	They are used in setting up experimental apparatus, which will be difficult for non specialist teachers.
19	Stoppers - Rubber	Same as above.
20	Mirror Concave	Concave/convex mirrors are taught in high basic schools.
21	Prism	Prisms are taught in high basic schools.
22	Tuning Forks on Resonance box	Tuning forks are taught in high basic schools.
23	Filter funnel-glass	Equipment for filtration is difficult for non-specialist teachers.
25	Liebege - condenser	Distillation experiments using this apparatus are conducted in senior high.
27	Balance double beam	Too precise for low basic school children. Ordinary balance is better. Teachers need not measure reagents.
28	Procelincne-Stand	Used for setting up apparatus, however too difficult for non-specialist teachers.
29	Glass reagent bottle	Necessary reagents should be supplied in bottles.
30	Glass bottles for powder	Same as above.
31	Needle Compass, Magnetic w/Stand	A non-specialist will find it difficult to handle.
33	Cork - Boring	No cork stoppers, therefore unnecessary. Cork stoppers may be replaced by rubber.
35	Burner - Gas	Same as alcohol, gas comes under the same group as reagents, thus to be omitted.
37	Glass tubes	Used in setting up apparatus, but difficult for a non-specialist.

Table 2-5 cont'd

Item No.	Item	Reason
38	Capillary tubes	Used to collect small amounts of liquid. No such experiments using this item will be conducted in low basic schools
39	Glass bell	Used together with vacuum plates and pumps to see effects of vacuum on objects. Studies on vacuum are conducted in senior high school.
40	Dissecting pans	It is difficult for a non-specialist to conduct dissecting experiments.

More than half of the items requested will be omitted by this arrangement. The following items should be included in the Project even if they have not been requested, because they are used with the requested items or they are easy to handle and useful in teaching.

Table 2-6 Items to be Added to Low Basic School Science Laboratory Equipment

Item	Use
1 Magnifier	Plant/animal observation. Study on lens structure.
2 Forceps	Plant/animal observation.
3 Sample slides	Observation of various items through a microscope.
4 Flat mirror	Study on reflection and solar energy.
5 Syringe	Experiment on air pressure.
6 School balance	Study on weights and equilibrium of forces.
7 Spring balance	Same as above.
8 Table scale	Study on weights.
9 Demonstration balance set	Study on the principles of the lever.
10 Mass set	Study on the function of the lever and equilibrium of forces.
11 Electricity circuit kit	Study on electricity.
12 Fahrenheit thermometer	Study on temperature.
13 Tripod for alcohol lamp	To heat beakers with alcohol lamps.
14 Lab. tong	To heat test tubes.
15 Medicine dropper	To collect liquid samples and reagents.
16 Glass bin/plate	To collect gases from water. Study on combustion.
17 Glass stirring rod	To mix liquids.
18 Spatula/scoop	To handle reagents.

c) Science Laboratory Equipment for High Basic Schools.

Based on the standards mentioned in a), the following items will be omitted for the reasons specified.

Table 2-7 Items to be Omitted from High Basic School Science Laboratory Equipment

Item No.	Item	Reason
9	Wall-weather station	It is able to automatically record weekly changes in atmospheric pressure. Without the use of other meteorographs, it will not be suitable for high basic schools.
12	Boil-Apparatus	Study conducted in senior secondary schools.
22	Buret	To drop a fixed amount of liquid. Precision is for senior secondary schools.
25	Kibb-App.	A complex glass apparatus, not used in high basic schools.
33	Density hygrometer	A hygrometer is better for measuring and studying humidity.
34	Hope's apparatus	Not ordinarily used in high basic schools.
37	Crucible Tong	There are no experiments in high basic schools requiring crucibles.
40	Liebeghe condenser	Distillation experiments are conducted in senior secondary schools.
44	Beehive-shelves	Not clear why this is necessary.
45	Glass bell	Used together with vacuum plates and pumps to see the effects of vacuum on an object. Study on vacuum is senior high level.
48	Burner gas	The same as alcohol, gas comes under the same group as reagents. Thus it will be omitted. However, gas supply system will be set up in the science laboratories.

In the existing high basic schools, the science lessons center on the teacher's lecture and demonstration while pupils rarely conduct their own experiments. However, this is mainly due to the lack of facilities and equipment. To conduct the lessons effectively, even if it is based on the present texts, the requested items are still insufficient. Thus, additional items must be added to the proposed items for this Project, as seen in the following table.

These items include those to be used together with the requested items, in addition to those easy to handle without any special training and very effective for lessons.

Table 2-8 Items to be Added to High Basic School Science Laboratory Equipment

Item	Use
1 Magnifier	Plant/animal observation. Study on lens structure.
2 Forceps	Plant/animal observation.
3 Microscope	Observation of microorganisms.
4 Cover glasses	To hold samples on slide glasses of microscopes.
5 School balance	Measuring weights. Equilibrium of forces.
6 Table scale	Measuring weights.
7 Helical spring	Study on the equilibrium of forces.
8 Mass set	Same as above.
9 Wheel and axle	Same as above.
10 Sheave pulley	Same as above.
11 Electric circuit kit	Study on electricity
12 Electric wires	Make electric circuits.
13 Alligator clip	Same as above. Experiments on electrolysis.
14 Bar magnet	Study on magnetism and magnetic fields.
15 Electromagnet	Same as above.
16 Steel bar	Study on magnetism and magnetic fields.
17 Fahrenheit thermometer	Measurement of temperature.
18 Anemoscope & Anemometer	Measurement of wind direction and velocity.
19 Hygrometer	Measurement of humidity.
20 Large syringe	Occurrence of clouds.
21 Beaker	Various experiments.
22 Round bottom flask	Same as above
23 Flat bottom flask	Same as above
24 Conical flask	Same as above
25 Distilling flask	Same as above
26 Round glass jar	Same as above
27 Test tube	Same as above
28 Test tube stand	Hold and dry test tubes.
29 Laboratory tong	Handling test tubes.
30 Test tube brush	Washing test tubes.
31 Clamp/Supporting ring	Part of experimental apparatus to support flasks etc.
32 Gas burner	For heating.
33 Alcohol lamp	For heating.

Table 2-8 cont'd

Item	Use
34 Tripod	To hold flasks for heating.
35 Wire gauze	Same as above.
36 Graduated cylinder	To measure liquids.
37 Medicine dropper	To collect and drop liquids.
38 Funnel stand	To hold funnels.
39 Filter paper	For liquid filtration.
40 Spatula	To collect and mix powder reagents.
41 Pinch clamp	Part of experimental apparatus. To close rubber tube.
42 PVC tube	Part of experimental apparatus. For connection purposes.
43 Rubber tube set	Same as above.
44 Glass bin	To collect gases. Gas experiments.
45 Evaporating dish	For evaporation experiments.

2) Appropriateness of Specifications of Equipment

a) Criteria for Evaluation

The appropriateness of the specifications for the science laboratory equipment will be evaluated as follows:

1) The grade of equipment will conform to the educational purpose in the present low and high basic schools. Those items of equipment used in higher education and for research purpose.
2) Considering expendable items and spare parts, the items will be those that can be procured locally.
3) Although some items may be of great educational use, those that require manuals and special training shall be omitted from this Project.

b) Appropriateness of Specifications

Considering the appropriateness of the requested items based on the above criteria, most of the requested items were selected from educational materials catalogues and thus their quality is mostly acceptable. Most of the items are selected from American products, however they have been ordered by MOE before through local suppliers. It seems that expendable supplies and spare parts may be obtained without any problems. Thus, the specifications for the science laboratory equipment for the Project will be decided according to the grade of educational materials available locally.

3) Appropriateness of Quantity

a) Criteria for Evaluation

The requested quantity will be evaluated as mentioned below.

1) The quantity shall conform to the method of use and be determined based on the group composition during experiments.
   - Most experiments in low basic schools are demonstrated by the teacher, however when the pupils participate, there will be 8 groups (5 pupils to a group).
   - Science experiments in high basic schools will consist of 10 groups (4 pupils to a group).
2) Expendable items should be procured regularly by MOE. Thus, the Project will prepare the minimum necessities required at the beginning.

b) Appropriateness of Quantity

Evaluation results show that the requested quantity is not a great amount, however there is a great variation in number. It is not clear how many groups will use each item or what method will be applied to experiments, Thus the project quantity will be determined as the total of the basic quantity and reserve quantity obtained by the following method:

1) Using the method stated in a)1, the basic quantity will be as follows:

In the case of a teacher's demonstration experiment	1
In the case of groups (low basic school)	8
In the case of groups (high basic school)	10
In the case of individuals	40

2) As there are breakable items such as glass apparatus and expendable items, the reserve quantity will be considered as follows:

Expendable items (test tubes, etc.)	100%
Breakable items (other glass items)	20%
Ordinary items (dissecting set, etc.)	10%
Non-breakable items (clamp stand)	0%
Expensive and valuable items (microscopes)	0%

(6) Appropriateness of School Furniture

1) Appropriateness of Items

a) Criteria for Evaluation

The appropriateness of the school furniture requested will be evaluated from the following points:

1) The necessary items will be selected according to the functions of each room determined by the architectural plan.
2) Based on the Grant Aid system, all furniture directly connected with school activities will be selected as the project items. Reception furniture such as sofas will not be included.

b) Appropriateness of Items

Evaluation results show that the requested items are the same items that will be delivered to the schools under the World Bank Project. The proposed rooms in the World Bank Project schools are similar to those of this project school and the necessary school furniture are mostly similar. However, as there are slight differences in the architectural plan between both, the following furniture are thought not to be necessary.

Table 2-9 Items to be Omitted from School Furniture

No.	Room	Item	Reason
1	Science lab.	Teacher's desk and chair	A teacher's lab. table will be set up, so a desk will not be necessary
2	Science lab.	Locker for science equipment. Metal 2door cabinet.	Not necessary as a built-in closet will be set up in the preparation room.
3	Multipurpose room	Plywood shelf	Not necessary as preparation room will have a built-in closet.
4	Multipurpose room	Chair with side table	Not necessary as work benches are provided.
5	Library	Computer table	The schools do not have librarians. Computers will not yet be used to keep data on the books.
6	Library	Table for copying machine	It may be placed on the counter in the preparation room.
7	Library	Bookshelves	Built-in bookshelves will be provided.
8	Library	Work bench	The reading desks will be the same as the desks in the classroom.Thus a work bench will be unnecessary.

Furniture for computer practice rooms requested for low basic schools will be omitted.

Although the following items were not requested, they are thought to be necessary in the operation of the school, thus they will be added.

Table 2-10 Items to be Added to School Furniture

No.	Room	Item	Reason
1	Library	Stools	One will be necessary for work in the preparation room.
2	Teachers room	Work bench (h=70)	Necessary for preparation of school materials. Quantity will depend on the size of the school.
3	Teachers room	Chair for bench	6 chairs will be necessary for 1 work bench, for meetings.
4	Headmaster's room	Teacher's chair	8 chairs are necessary for small meetings.
5	First Aid room	Medical couch	1 will be necessary for emergency cases.
6	Multipurpose room	Pupils chair	40 chairs will be necessary to substitute chairs with side table to be committed.

2) Appropriateness of Specifications

a) Criteria for Evaluation

The evaluation of the school furniture will be made according to the following:

1) The quality should be durable to withstand use by the pupils.

2) They should be repairable and easily obtainable.

b) Appropriateness of Specifications

The requested school furniture are made of steel, most of them being manufactured by manufacturers in the Gaza Strip according to the standard specification of the MOE. The metal parts are color powder coated and the desktops are made of plywood. As there are several manufacturers in the Gaza Strip, repairs and the obtaining of spare parts will be easy. Thus, Project items will be manufactured according to the same standard specifications.

3) Appropriateness of Quantity

a) Criteria for Evaluation

The quantity of each item requested is mostly appropriate, however the necessary quantity will be evaluated according to the standard below:

1) The quantity should conform to the number of people using the room and the method of use.
2) As replacements may be easily obtained, spares will not be considered.

b) Appropriateness of Quantity

1) The quantity of furniture in the teachers room shall be in proportion to the number of teachers in each school.
2) The number of pupils' reading desks in the library will be altered from 20 to 18, considering the rationality of the architectural plan. The number of chairs however shall be 40.

2- 2 - 2 Basic Policy of the Project

Based on the evaluation results mentioned in the previous section, the contents of the request will be revised to some extent and the basic design of the facility and selection of equipment will be made as follows:

(1) The ten (10) candidate project sites will be adopted as project sites and the following low basic schools, high basic schools or low/high combined basic schools will be constructed respectively.

Table 2-11 Proposed Sites and School Type and Size

No.	Project Site	Sub-Directorate	Grades	Type	Classes	Pupils
1	Mashrouh Anuner	Gaza	1 - 6	co-ed	24	960
2	El-Smeri, Deir El-Balah	Khan Yunis	1 - 10	co-ed	24	960
3	El-Sagera, Abasan	Khan Yunis	1 - 6	co-ed	18	720
4	El-Floja, Jabalia	Gaza	1 - 6	co-ed	24	960
5	Ma'an	Khan Yunis	1 - 6	co-ed	24	960
6	El-Mozanar	Gaza	7 - 10	boys	24	960
7	El-Remal	Gaza	7 - 10	boys	24	960
8	Near District Office	Khan Yunis	1 - 6	co-ed	18	720
9	Wadi El-Salga	Khan Yunis	1 - 10	co-ed	18	720
10	Tambora, Beit Lahiya	Gaza	7 - 10	boys	24	960

However, No. 1 Mashrouh Ammer and No. 5 Ma'an are subject to the rough ground levelling and access road construction and No.2 El-Smeri is subject to access road construction by the Palestinian Authority .

(2) The following buildings will be constructed for each site: School building 1, Student toilets 2, Shed 1, Canteen 1 and Guard room 1.
The size and grade of the proposed rooms will be determined according to the previously mentioned evaluation results.

(3) Necessary items of equipment for school operation include educational materials, furniture, appliances, office equipment, However, for this Project, the science laboratory equipment, and the school furniture and appliances will be included in the scope of project based on the request of the MOE. The items, specifications and quantity of equipment will be determined according to the previously mentioned evaluation results.

2 - 3 Basic Design

2 - 3 - 1 Design Concept

(1) Concept on the Natural Conditions

The Gaza Strip is an area of 45km long and 5 to 12km wide located on the east coast of the Mediterranean. The area has a warm and dry Mediterranean climate. The annual rainfall varies greatly according to the area and year, however, the average rainfall in the Gaza Strip is 400mm, centering on the winter season from November to March. Prevailing winds from the west and northwest come from the coast all the year around, however there are no records of storms or tornados. There are also no records of disasters from earthquakes. Thus, the Gaza Strip has excellent natural conditions, free of natural disasters. The following factors will be considered in the design of the buildings:

a) Due to the preventing westerly winds, the pupils' toilet shall be located on the eastern side of the site where possible.
b) Although there are no records of damage caused by earthquakes, earthquakes do occur. Thus, the buildings will be designed with 1/4 of seismic force calculated to Japanese Standards.

c) There are no records of storms or tornados, however the buildings will be designed with 1/2 of wind pressure calculated to Japanese Standards.

d) No heating or air-conditioning equipment will be installed.

(2) Concept on Social Conditions

1) Consideration of the Area's Religious Nature

The Gaza Strip is an Islamic society, with the religion having great influence on daily life. Custom is strict regarding men and women being in the same place, thus this must be taken into consideration when designing the buildings. Men and women's toilets shall of course be separate. Even the teachers room shall have a partition separating men from women.

2) Consideration of the Area's International Situation

The situation between the Gaza Strip and the West Bank in terms of international affairs may have effects on the Project. Whenever problems arise with Israel, the borders are closed. As most of materials for the Project are procured through Israel, the closure of the borders will affect the progress of construction work. The design and construction plan should be prepared with this matter in consideration.

3) Consideration for physically handicapped persons

Recently, public schools are placing more consideration on handicapped persons. Public schools need to take steps to accept handicapped persons, however it can be very costly. Accordingly, the Project will secure the minimum requirements, such as a slope to the ground floor level and a toilet for handicapped persons accessible by wheel chair.

(3) Policy Towards the Construction Environment

1) Building Codes and Standards

In the Gaza Strip, permission is necessary for any construction. The municipality concerned has to check the design drawings beforehand. There are no officialized technical standards for buildings, however the municipality is responsible for town planning and usually sets the following limits: building coverage maximum, number of floors and setback of wall.

The location of the buildings will be determined in accordance with the town

planning restrictions mentioned above and the building design will be based on the Japanese Building Standards in order to secure the children's safety.

2) Local Contractor

There are around 30 contractors of category A and B in the Gaza Strip who are capable of constructing school buildings. The construction plan will be prepared so as to fully utilize these local contractors' capability and to use the local construction methods.

3) Local Consultants

There are several competent consulting firms in the Gaza Strip working for such projects by UNRWA and the World Bank. In preparing the construction supervision plan, the cooperation of such a consultant knowledgeable in local affairs will be taken into consideration.

4) Construction Material

Most of the buildings in the Gaza Strip are made of reinforced concrete with walls of concrete blocks, finished with mortar paint. Materials necessary for construction such as ready mixed concrete, concrete blocks, metal/wooden fittings and terrazzo tiles are mostly manufactured in Gaza. Those construction materials that are not manufactured in Gaza, are still obtainable as far as they are the materials for constructing ordinary buildings such as apartments. As this Project concerns the construction of ordinary school buildings, the materials to be used should be 100% selected from those obtainable locally.

5) Labor

As economic activities are limited in the Gaza Strip, many workers with permits go to Israel every day to work. Basically, there is a surplus of construction workers, therefore there is no need to worry about securing labor for the Project.

(4) Policy Towards the Operation and Maintenance Capabilities of the Implementing Organization

The schools to be constructed under the Project are basically the same as the existing schools. As most of the headmasters and teachers will be transferred from the surrounding schools, there should be no problems in acquiring operation staff. As regards finance, there will not be a great increase in the burden of the implementing organization. However, new school buildings require additional

personnel other than teachers, thus a slight increase in personnel and energy costs may not be avoidable. Considering the fact that MOE is receiving support from EU and the World Bank for the recurrent cost, the design should be made so as to minimize the operation cost of the facilities.

(5) Policy for the Grade of Facility and Equipment

The basic design of the project facilities and selection of the equipment will be made according to the basic concepts and policies previously mentioned. Almost the same specifications as applied to UNRWA and World Bank projects will be applied to the design of the project facilities. The science laboratory equipment will be selected among such items which MOE easily procures through local agents, and educational furniture will be selected among such items as manufactured in the Gaza Strip.

(6) Policy for Construction Schedule

A total of 12 months will be required for the building construction and the equipment supply of the Project. Thus, it may possible to complete the construction of all 10 schools within a single fiscal year. However, some time must be considered for the construction of access roads and ground preparation by the Palestinian side.
Furthermore, the Project period must be planned with some time allowance considering the difficult social status of the Gaza Strip, The Project therefore, will be implemented in two phases of 1997 and 1998 fiscals as shown below:

Table 2-12 Project Phase

Stage	Site No.	Project Site	School	Type	Classes
Phase 1	2	El-Smeri, Deir El-Balah	low & high	co-ed	24
	3	El-Sagera, Abasan	low basic	co-ed	18
	4	El-Faloja, Jabalia	low basic	co-ed	24
	6	El-Mozanar	high basic	boys	24
	8	Near Khan Yunis District Office	low basic	co-ed	18
	9	Wadi El-Salga	low & high	co-ed	18
	10	Tambora, Beit Lahiya	high basic	boys	24
Phase 2	1	Mashrouh Ammer	low basic	co-ed	24
	5	Ma'an	low basic	co-ed	24
	7	El-Remal	high basic	boys	24

2 - 3 - 2 Basic Plan

(1) Site Plan

As the school buildings to be built under the Project are relatively large and fields are also necessary, the building sites in general should be flat. When schools are built in urban areas, retaining walls should be planned so that slopes are not left inside the sites and the effective land use of the site is maximized. All sites should be furnished with infrastructure lines necessary for the school operation. The outline of the required site preparation is as follows:

1) Ground Levelling

It is required for No.1 Mashrouh Ammer and No.5 Ma'an to be furnished with rough ground levelling prior to the commencement of the main construction works due to relatively large difference in site elevation. At No.1 Mashrouh Ammer, the land should be developed on two different levels to reduce the elevation difference between the planned road and the site.

At No.3 El-Sagera, Abasan, No.4 El-Faloja, and No.9 Near Khan Yunis District Office, the land is flat and no levelling is required. Although finish land levelling is required at all other sites, it should be more practical to implement the work in parallel with the earth work of the main school building construction.

2) Removal of Obstacles

At No.10 Tambora, the site was partially used for damping garbage. As it has not sufficiently been removed from the site so far, it is required to completely remove it and reclaim the land with sand before the commencement of the main construction work.

3) Access Road Construction

The sites of No.1 Mashrouh Ammer, No.2 El-Smeri, Deir El-Balah, and No.5 Ma'an are respectively located in planned development areas but no works including surrounding roads yet started. It is, therefore, required to construct access roads before the commencement of the main construction work. Before the access road construction it is required to determine the elevations of planned roads in consultation with the responsible agencies of the respective development plans, because the access roads should be located along the planned roads. They should at least be paved with gravel.

4) Connection with Utility Lines

It is required for all sites to be provided with power supply, telephone, and water supply. In addition, connection of sewage line to the final pit is also required at No.4 El-Faloja, No.6 Mozanar, and No.7 El-Remal. Power lines, telephone lines, and a water supply line should be connected from nearby existing supply sources at each site and a sewage pipe to nearby existing sewage line at each of the 3 sites above.

Table 2-13 Required site Preparation Works

Site No.	Project Site	A	B	C	D	E	F	G	H
1	Mashrouh Ammer	X	X		X	X	X	X	
2	El-Smeri, Deir El-Balah		X		X	X	X	X	
3	El-Sagera, Abasan					X	X	X	
4	El-Faloja					X	X	X	X
5	Ma'an	X	X		X	X	X	X	
6	El-Mozanar		X			X	X	X	X
7	El-Remal		X			X	X	X	X
8	Near K.Y. District Office					X	X	X	
9	Wadi El-Salga, Deir El-Balah		X			X	X	X	
10	Tambora		X	X		X	X	X	

A: Rough levelling B: Finish levelling C: Removal of obstacles
D: Access road construction E: Power line intake F: Telephone line intake
G: Water supply pipe intake H: Sewage line connection

(2) Building Layout Plan

1) Basic Policies for Building Layout Plan

The land shape, the orientation, road access, and infrastructure conditions vary between ten of the project school sites. Although facility arrangements for each site would be planned by taking into account the different site conditions, the following common principles should be applied to the planning of all sites:

a) As the size of every the project site is limited, priority should be given to making the school yard area as large as possible within the limits of the city planning regulations and to provide as much natural lighting as can be effectively obtained to the school building;

b) Normal classrooms should be arranged so that window openings face to the north or south in order to prevent direct sunlight;

c) Toilets for pupils shall be arranged at a location as east as possible in the site taking into account the predominant westerly winds, so that odours from the toilets will not reach the school building. In addition, in view of safety management, toilets should be visible from teacher rooms;

d) A school yard entrance shall be planned based on the following:
   1) Its width should be sufficient for vehicles;
   2) If a site is facing more than one road, the entrance should be arranged to the lighter traffic road side;
   3) If a site faces only one heavy traffic road, two entrances should be made: one for pupils and the other for vehicles. In the future, the road side in front of the pupil entrance should be provided with guard rails by the municipality.

e) A shed and canteen should be arranged near the school entrance for the convenience of pupils. Also, a guard room should be arranged near the entrance. If the project school is going to have two entrances, a guard room should be located at the vehicle entrance side for the convenience of vehicle management;

f) For the purpose of effective use of limited land space, school facilities should be arranged so that the school building and yard area will function as a single unit and the court yard surrounded by buildings may be used for various purposes. For this reason, no special entrance hall is planned in the school building so that approaching any room may be possible from the corridor and also, so pupils will be able to move freely in the yard. Facility arrangements should be based on this approaching system. Each school building should be connected by walkways paved with interlocking blocks, so that the soiling of building floors may be limited.

g) As the land of each project school is limited, parking lots should not specifically made in the school yard. However, car parking may be possible in the backyard.

2) Building Layout of Each the Project Site

a) No.1 Mashrouh Ammer: Co-ed. Low Basic School, 24 Classrooms

1) The site is located in a new housing development area and is facing two planned roads on both its east and south side. The existing city area has sprawled close to the site's north to northeast sides. As many people live in these areas, the school yard entrance should be arranged on its east side facing the eastern road. The eastern road is planned to have a pedestrian sidewalk. When housing development progresses and traffic volume increases, it will be necessary to build an additional entrance for pupils in the future. Thus, a shed and a canteen should be located near the future pupils' entrance taking this into consideration.
2) As the site is rectangular, the school building should be L-shaped. The longer side of the building should be arranged parallel to the western boundary, the opposite side of school entrance.
3) Toilets for pupils should be arranged along the eastern road, taking into account the effects of predominant west winds. Thus, the shorter side of the L-shaped school building should be arranged on the west side.
4) The yard surrounded by the building will have two levels. A basketball court will be arranged on the lower level and an assembly court will be arranged on the higher level.

b) No.2 El-Smeri Deir El-Balah: Co-ed. Low and High Basic School, 24 Classrooms

1) The site faces a planned road to its north. The school entrance shall be arranged at this side. This road is planned to have a pedestrian walkway. When area development progresses and traffic volume increases, an additional entrance for pupils shall be built in the future.
2) The site is almost square. Thus, a U-shaped building may be built. However, for efficient land use, an L-shaped building is recommended. By taking into account land dimensions, the shorter side of the L-shaped building should be arranged to the opposite side of school entrance and parallel to the southern boundary.
3) Toilets for pupils should be arranged along the eastern boundary, considering the effects of predominant westerly winds. Thus, the longer side of the L-shaped school building should be arranged parallel to the western boundary.
4) A shed and a canteen should be located parallel to the planned road so that

buildings will surround the yard where a basketball court and an assembly court will be arranged.

c) No.3 El-Sagera, Abasan: Co-ed. Low Basic School, 18 Classrooms

1) An entrance should be arranged at the center of the existing roadside boundary that passes at an angle to the axis of the site.
2) The shape of the site is trapezoid. To effectively utilize the land the school building should be L-shaped.
3) Toilets for pupils should be arranged on the eastern side of the site, taking into account the effects of predominant westerly winds. Thus, the longer side of the L-shaped building should be arranged facing west along the shorter side of the trapezoid.

d) No.4 El-Faloja: Co-ed. Low Basic School, 24 Classrooms

1) The construction site is part of the athletic field of the existing school that is situated west of the site. The northern boundary faces an existing road. Thus, an entrance should be arranged westward of the boundary.
2) As the land is a rectangular shape, an L-shaped building is suitable.
3) Toilets for pupils will be arranged along the eastern boundary. Therefore, the longer side of the L-shaped building will be arranged parallel to the western boundary.
4) A basketball court and an assembly court will be arranged in the yard, surrounded by buildings.

e) No.5 Man: Co-ed Low Basic School, 24 Classrooms

1) A part of the northwestern boundary adjoins a planned road. An entrance should be arranged at this point.
2) The shape of the land is rectangular. Thus, the school building should be L-shaped.
3) Toilets for pupils should be arranged closed to the eastern boundary. The longer side of the L-shaped building should be arranged parallel to the northwestern boundary.
4) A basketball court and an assembly court will be arranged in the yard, surrounded by buildings.

f) No.6 El-Mozanar: Boys' High Basic School, 24 Classrooms

1) The site is located in a new development area. It is completely surrounded by four roads; two existing and two planned. Forecasted future traffic

volumes are highest at the existing northwestern road followed by the southwestern road, northeastern road, and southeastern road. It would be best to provide an entrance to the northeastern road which has a relatively small forecasted traffic volume. The area situated in that direction will have housing development. However, it is not yet known when this road will be constructed. Thus, a school entrance will be arranged at the southwestern road. As the southwestern road is planned to have a pedestrian walkway, an additional entrance for pupils shall be installed in the future when area development progresses and future traffic volume increases.

2) The shape of the land is rectangular. The four corners of the land will be affected by road construction and it will be difficult to arrange an L-shaped building. Thus, a U-shaped building should be built. The bottom side of the U-shaped building should be arranged parallel to the northeastern road.
3) Toilets for pupils should be arranged close to the southeastern road, by taking into consideration the effects of predominant westerly winds.
4) As the yard surrounded by buildings is small, a combined use basketball and assembly court will be arranged in the yard.

g) No.7 El-Remal: Boys' High Basic School, 24 Classrooms

1) The site is bounded on the northwest by a road that is newly constructed. A school entrance should be arranged in this boundary.
2) As the site is rectangular, the school building should be L-shaped to effectively utilize the land. The longer side of the L-shaped building should be arranged to face the school entrance and parallel to the southeastern boundary. By this arrangement, the main corridors will face to the west and opened to windy rain in winter. To reduce the entering of rain into the corridors, the balustrades will be made of concrete blocs instead of steel rails and balusters.
3) Toilets for pupils should be arranged close to the southwestern boundary. The shorter side of the L-shaped building should be arranged parallel to the southwestern boundary.
4) A basketball court and an assembly court will be arranged in the yard, surrounded by buildings.

h) No.8 Near Khan Yunis District Office: Co-ed. Low Basic School, 18 Classrooms

1) The eastern side of the site faces an existing major road. An entrance should be arranged at this side. The road is planned to be 20m wide and

will include a pedestrian walkway. It will be necessary to build an additional entrance for pupils in the future when traffic volume increases.

2) The site is rectangular. Both longer sides of the land contact the existing road. The shape of the school building can only be I-shaped.
3) Toilets for pupils should be arranged parallel to the eastern road by taking into consideration the effects of predominant westerly winds.
4) As the size of the land is too small, it will be impossible to build a basketball court in the yard.

i) No.9 Wadi El-Salga, Deir El-Balah: Co-ed. Low Basic School, 18 Classrooms

1) As the site is located at the bottom of an exclusive approach road, the entrance should be arranged at the southwestern corner where the road is connected.
2) The site is rectangular. Thus, the building should be L-shaped. As a school entrance should be arranged towards the school building side, the building needs be arranged so that the corner of the L-shaped building suits the corner of the land that is on the opposite side of the entrance. By this arrangement, the main corridors will face to the west and opened to windy rain in winter. To reduce the entering of rain into the corridors, the balustrades will be made of concrete blocs instead of steel rails and balusters.
3) It is possible to arrange toilets for pupils either to the west or south side of the land. However, by taking into consideration effective land use and adequate toilet management, they should be arranged on the west side where a shed and a canteen will be located.
4) A basketball court and an assembly court will be arranged in the yard.

J) No.10 Tambora, Beit Lahiya: Boys' High Basic School, 24 Classrooms

1) The site is located in a city area and is bounded by a 12m wide road to the west and by an 8m wide road to the south. An entrance should be located on the 8m wide road side which has a lower traffic volume than the 12m wide road.
2) The land is almost square and it is difficult to arrange an L-shaped building on it. Thus, the plan of the building should be a deformed U-shape. The bottom side of the U-shaped building should be arranged along the main road.
3) The toilets will be arranged at the east side considering predominant

westerly winds.

4) A basketball court and an assembly court will be arranged in the yard.

(3) Architectural Plan

1) Floor Plan

a) Preparation of Standard Design

As the Project is to construct ten school facilities that have different site conditions and types, the floor plans should be made to suit the conditions of each school. However, as they are public schools having the same school curriculums and same management methods, it is required that each school be provided with rooms having common use purposes, sizes, and forms. Thus, the standard design is prepared for each type of room before preparing each school's building floor plan.

The design of each room of the main school building is prepared based on the following policies:

1) Each room's use purposes, size, and form shall conform to FSMOE as much as possible;
2) Basic floor module shall be 2.75m.x 6.60m.

The design of associated building is prepared based on the following policies:

1) The same type of canteen and guard room will be arranged in each school site.
2) Four types of toilets; two different size toilets respectively separate for boys and girls will be designed in order to arrange them according to school type and size.
3) Two different size shed will be designed in order to arrange them according to school

Each room's function, size and reason for determining the size are as listed in the following table:

b) Floor Plan of School Building

Floor plan for the project school buildings should be made based on the following conditions as a general principle:

1) The school buildings should be three storied.

2) There should be two stairways for 18 classroom school buildings and three for 24 classroom buildings. The width of the stairways should be 3.6m.
3) A corridor should be arranged in one side of the building. The corridor width should be 2.4m based on FSMOE.
4) The administrative department, such as the head master room, teacher room, and first aid room should be located on the first floor.
5) Normal classrooms should be arranged in groups as much as possible.
6) A low basic school's library should be arranged next to the science laboratory whose preparation room and work room have the same structural span length.

c) Floor Plan of Associated Buildings

1) Pupil's Toilets:

Toilets should be designed based on FSMOE. One toilet booth per classroom should be provided. Two different booth numbers for 18 classroom schools and 24 classroom schools, and two types separate for boys and girls, a total of four different types, should be provided.

2) Shed:

Two types of shed are designed with reference to the existing shed as shown in the following table;

Table 2-14

Structure Type	Steel structure	Steel structure
Size	126 m² or 96 m²	In the range of 50 to 144 m²
Roof	Galvanized steel corrugated sheet	Galvanized steel corrugated sheet or fiber cement corrugated board

3) Canteen

The same type of canteen should be provided for each project school. Although a 30 m² canteen was requested, it is planned to provide a 6m x 4m = 24 m² canteen for each school.

4) Guard House:

A guard house of the same size will be provided at every project school. Although a 12 m² size was requested, it is planned to provide a 2.4m x 3m guard house for each school.

d) Required Rooms and Designed Room Size

Each room's function, size and reason for determining the size are as listed in the following table:

Table 2-15 Proposed Rooms, Functions, and Sizes

Room Name	Use Purpose	Size (m2)	Reasoning for Determination	Requested Size(m2)
Normal classroom	Ordinary teaching	54.45	MOE's facility standards	54.40
Low basic's science laboratory	Science experiment	81.67	By reexamining teaching methods	108.80
High basic's science laboratory	Science experiment	108.90	MOE's facility standards	108.80
Low basic's library	Reading and material exhibition	81.67	By reexamining MOE's standards based on actual use conditions	108.80
High basic's library	Reading and material exhibition, meeting	135.63	Reexamination MOE's standards and taking account of actual computer workshop	163.20
Multipurpose room	Art, vocational workshop, meeting	108.90	MOE's facility standards	108.80
Head master room	Work and meeting with visitors	26.06	MOE's facility standards	27.20
Secretary room	Work	12.11	MOE's facility standards	13.60
First aid room	Caring of pupils and counselling	36.30	MOE's facility standards and adding a toilets for handicapped pupils	27.20
Teacher room in 18 classroom low basic school	Work, class preparation, and resting	72.60	By reexamining number of teachers for each school building type	58.40
Teacher room in 18 classroom low and high basic school	Work, class preparation, and resting	90.75	By considering coed. situation and furniture arrangement	-
Teacher room in 24 classroom low basic school	Work, class preparation, and resting	90.75	By considering coed. situation and furniture arrangement	108.80
Teacher room in 24 classroom low and high basic school	Work, class preparation, and resting	108.90		108.80
Teacher room in 24 classroom high basic school	Work, class preparation, and resting	108.00		108.80

Table 2-15 cont'd

Room Name	Use Purpose	Size (m2)	Reasoning for Determination	Requested Size(m2)
Teacher toilets	Toilet	18.15	By reexamining MOE's facility standards for male and female use	13.60
Kitchen	Hot water making	5.98	MOE's facility standards	6.48
Storage	Storage (27.56 to 63.86m2)	-	Use of excess span and dead space under a stairway	80.00
Equipment room	Pump room	13.75	Use of dead space under a stairway	-
Student toilets in 18 classroom school	Toilet	31.85	MOE's facility standards; one toilet bowl per classroom	60.00
Student toilets in 24 classroom school	Toilet	42.35	MOE's facility standards; one toilet bowl per classroom	60.00
Guard room	In and out control and security guard	7.20	Trial design	12.00
Canteen	Simple cooking and food store	24.00	Trial design by examining existing canteen	30.00
Shed in 18 classroom school	Waiting and playing on rainy days	126.00	By examining existing shed; 0.13m2	-
Shed in 24 classroom school	Waiting and playing on rainy days	96.00	By examining existing shed; 0.13m2	-

Note: When rooms are to be arranged at the corner portion of an L-shaped building, standard floor area will be increased at 8.58m2 as a result of design arrangement.

e) Designed School Size

Based on the above-mentioned basic design policies, building sizes for each project school are decided upon as listed in the following table:

Table 2-14 Proposed Building Size

Project School Name		Land Area (m2)	Total Floor Area (m2)					
			School building	Student toilets	Canteen	Shed	Guard Room	Total Floor Area
1	Mashrouh Ammer	4,914 29	2,815.80	84.70	24.00	128.00	7.20	3,059.70
2	El-Smeri	4,815.54	3,014.55	63.70	24.00	128.00	7.20	3,258.45
3	Abasan El-Sagera	2,988.66	2,249.10	84.70	24.00	96.00	7.20	2,440.00
4	El-Faloja	4,609.80	2,791.80	84.70	24.00	128.00	7.20	3,035.70
5	Ma'an	5,004.84	2,791.80	84.70	24.00	128.00	7.20	3,035.70
6	El-Mozanar	4,344.40	3,138.75	84.70	24.00	128.00	7.20	3,382.65
7	El-Remal	4,940.64	3,088.80	84.70	24.00	128.00	7.20	3,332.70
8	Near Kyan Younis Dist. Office	2,746.67	2,199.15	63.70	24.00	96.00	7.20	2,390.05
9	Wadi El-Salga	4,013.97	2,471.85	63.70	24.00	96.00	7.20	2,662.75
10	Tambora	5,018.20	3,138.75	84.70	24.00	128.00	7.20	3,382.65
Total			27,700.35	784.00	240.00	1,184.00	72.00	29,980.35

2) Cross Section Plan

Cross sections of the project school building will be similar to those of existing schools and the building shape will be a box-type.

In the Gaza Strip, the lowest winter temperatures are about 10℃. Thus, no heating system is necessary. Summer temperatures are not so high and the humidity is relatively low. Thus, if a high ceiling is provided to a school building, the summer temperatures are bearable without an air conditioning system.

The cross sectional plan of the Project school was prepared as follows by taking into account the above-mentioned conditions:

a) Roof Shape

The project area has a very small annual rainfall that is concentrated during 4 to 5 months in winter. Thus, a flat roof will be adopted for the Project schools.

b) Ceiling Height

Similar buildings existing in the Gaza Strip have ceilings of 3.3m to 3.5m high. Based on this fact, it is planned to provide the project schools with 3.5m high ceilings.

c) Slab Structure

A reinforced concrete joist slab with sandwiched concrete blocks is common for the roofs and floors in buildings. The thickness of the slabs is approximately 30cm including the finishing material. This type of slab is recommended in order to secure the insulation effects of the roof and the acoustic effects of the floors, to prevent sounds from the upper floor. It has been decided to adopt the same type slabs for the project schools.

d) Eaves

Natural lighting for classrooms will be mainly taken through the windows on the opposite side of the corridor. To prevent direct sun light, it is planned to provide the windows with eaves.

e) Ground Floor Height

In the winter season, rain is sometimes concentrated. In a poor drainage area, short time flooding occurs. To prevent from damage by such flooding, the ground floor height of the project schools is planned to be 45cm.

3) Structure Plan

a) Ground Conditions

1) Soil:

In the project area, the surface soil layer becomes sandy towards the coast. It is clayey in the inland areas. In most of the project school sites, it is observed either sand or sandy clay soil.

2) Ground Bearing Strength:

The results of the simple ground bearing tests conducted during the site survey by using a cone penetrometer reveal that the bearing capacity of soil at most of the project sites is about 20tons/m^2 at the ground surfaces. Thus, the bearing capacity of soil is assumed 15tons/m2 for the project school building design.

b) Structure of School Building

1) Foundation:

As the project sites have stable sand or sandy clay soil, relatively shallow foundations are possible. It is decided to adopt a continuous footing type foundation for the basic design study of the Project.

As it is necessary to build a foundation on the cut ground, the depth of the bearing ground is assumed to be -2m from the ground surface for the basic design. However, a boring test should be conducted at each the project school site for the detailed design. Based on the boring test result, the foundation type and the final bearing capacity of soil should be determined.

2) Major Structure:

The major structures of the project school buildings should be rigid frames composed of columns and beams on 2.75m. x 900m grids.

c) Structure Type of Associated Building

1) Student Toilets:

Based on the MOE's facility standards, student toilets should be a wall supported structure made of concrete blocks. A reinforced concrete septic tank should be built to treat toilet sewerage underneath. Thus, the tank will be the foundation to support the toilet.

2) Shed:

The shed should be a steel frame structure built on reinforced individual footings.

3) Canteen and Guard House:

The canteen and guard house should be a concrete block wall support structure. The foundation should be a reinforced concrete continuous footing.

d) Structure Design Standards

In the Gaza Strip, there are no existing official building codes. In the areas, European or American building standards are normally adopted. For the Project, the following Japanese building standards will be used for the design referring to the structure types and design drawings of existing similar buildings.

1) Building Low, its attached Ministerial Resolution, and Notifications of the

Ministry of Construction of Japan.

2) Guidelines for Structural Analysis and Calculation by Japan Institute of Architecture (JIA)
3) Reinforced Concrete Structure Design Standards (JIA)
4) Building Foundation Structure Design Standards (JIA)

e) Use Material and Strength

Project use reinforced concrete materials should be JIS (Japanese Industrial Standards) FC250 equivalent concrete, SD 295A (D10 - D13) and SD345 (D16 - D25) equivalent steel bars. Concrete blocks should be of 35kg/cm^2.

f) Loads and External Forces

1) Dead Loads:

Roof:	480kg/m^2	
Floor:	620kg/m^2	
Wall:	540kg/m^2	(t=200)
	430kg/m^2	(t=150)

2) Live Loads:

Roof:	90kg/m^2	(for slab and beam design)
	65kg/m^2	(for girder, column, foundation design)
	30kg/m^2	(for seismic force calculation)
Floor:	230kg/m^2	(for slab and beam design)
	210kg/m^2	(for girder, column, and foundation design)
	110kg/m^2	(for seismic force calculation)

3) Wind Load:

W = C x q x A kg/m2

where, C: wind pressure coefficient

q: wind speed force, to be one half of Japanese value;

$$q = H \times \sqrt{\ } 30kg/m^2$$

A: structure area

4) Seismic Force:

Q = Ci x W kg/m^2

where, Ci: seismic force coefficient, to be 1/4 of Japanese value;

Ci = 0.05Ai (Ai: coefficient for height)

(4) Building Utility Plan

1) Electrical Facility

Power is imported from Israel and supplied to the majority of the Gaza Strip. The high voltage power import and its distribution are under the direct control of the Palestinian Energy Authority (PEA). The low voltage power supply is under the control of local municipalities. As a power supply is available in each project site, electrical facilities for the Project should be designed based on the following policies:

a) Power Supply System

Low voltage power of 3 phase 4 wire 380/220 volts 50Hz will be received at the new poles installed, at each project site. Then, power will be transmitted through underground cables to a main distribution panel in the main building. From the main distribution panel, power will be distributed to each branch power panel.

b) Power Supply for Pump

As it is planned to provide an elevated water tank, 3 phase 380V power will be distributed to the control panel of the pump.

c) Lighting Fixtures

Although it is not planned to use the project schools during the night, fluorescent lamps should be installed as supporting facilities. By setting the design luminous intensity in the classrooms and teacher rooms to 300 luxes, two 40 watts fluorescent lamps should be installed in each 2.75m building frame span. In addition, two outlets will be installed in each classroom. The number of outlets in a teacher room, library, science laboratory, and multipurpose room should be decided upon based on the furniture arrangement.

d) Telephone Equipment

In areas where telephone lines are available, they will be connected from existing service lines to the terminal/safety device box on the intake poles on site. Underground wire conduits will be installed from the poles to connection boxes in the teacher rooms. One circuit per school will be initially installed; an additional circuit will be added in the future. Inter-translatable telephone units will be installed in the headmasters room, teachers room , secretarys room, and first aid room in each school.

e) Loudspeaker Announcing System

Two loudspeakers will be provided to each the project school for use at morning assemblies, special ceremonies, and outdoor meetings. They will be mounted on the exterior walls of school buildings. An amplifier unit will be located in the teacher room. A timer and chimes will be combined into the announcing system to indicate the hour.

2) Water Supply Facility

The majority of the Gaza Strip is provided with a public water supply system. The water sources are either 70m to 90m deep wells or piped water supplied from the Israeli water supply corporation. Management of the water supply is conducted by the local municipalities. As the public water supply system is available at project sites, the water supply system for each project school will be designed based on the following policies:

a) Water Supply System

City water will be received in a receiving tank and pumped up into an elevated water tank, then distributed to each serving point through gravity flow.

b) Receiving Tank

To prepare for low water supply pressure during the summer season, reinforced concrete underground tanks should be built. By taking into consideration the daytime water supply suspension, the tank capacity should store water sufficient to supply 50 liters per person per day.

c) Elevated Water Tank

Several ready-made plastic water tanks should be connected and mounted on a school building roof. The necessary number of tanks should be calculated based on the water equivalent to one quarter of daily use amount by taking into account the fact that water use is concentrated during class recess periods.

d) Piping Material

Polyvinyl chloride pipes that are common and easily obtainable in the area will be used for the Project.

3) Drainage Facility

The project sites are located either in a public sewer system provided area or a no public sewer system provided area. Thus, the drainage system for the Project varies depending on the location of each the project site. However, the drainage facility should be designed based on the following policies:

a) Draining System

A soil and waste separate type system should be adopted. Soiled water will be treated in septic tanks then combined with waste water in the final pit. Then, the combined sewerage will either be infiltrated into the ground through a seepage pit or discharged into a public sewer line. As seepage conditions in the Project area are very good, rainwater will infiltrate directly into the ground.

b) Sewage Treatment

In an area where a public sewer system is provided, sewerage from the project school should be discharged directly into the public sewer line. In an area where a public sewer system is not provided, sewerage should be treated by a simple septic tank then infiltrated into the ground. Sludge accumulated in the septic tank should be periodically removed by a vacuumed vehicle and taken to a public sewage treatment facility.

c) Septic Tank

The septic tank should be a reinforced concrete underground type. As it is planned to install one staff toilet and two toilets for pupils in each school, three septic tanks will be installed per school. The septic tank's capacity and structure should conform to the standards that are adopted by similar schools in the area.

d) Seepage Pit

Project use seepage pits should be made of reinforced concrete and concrete blocks based on standards adopted by similar schools in the area.

e) Water Closet

Asian type closets will be installed in student toilets. One Asian type closet and one western type closet will be installed in each male staff toilet and female staff toilet. In addition, one western type closet will be installed in first-aid room toilet for the use of handicapped.

f) Piping Material

Polyvinyl chloride pipes that are common and easily obtainable in the area will be used for the Project.

4) Other Facilities

a) Pipe supplied gas facilities will be installed in the multipurpose rooms and high basic school science laboratories.

b) Fire extinguishing units will be installed in important locations of the school buildings and canteens.

(5) Building Methods and Materials

The proposed building methods to be applied to and materials to be used for the construction of the project buildings will be the same as the local ones as much as possible. The following table shows the adopted building methods and materials.

Table 2-16 Adopted Building Methods and Materials

Building Portion		Adopted Method or Material	Reason for Adopting
Foundation		Reinforce concrete (RC)	Following to local method
Columns and Beams		Reinforce concrete (RC)	Ditto
Floor	Structure	RC joist slab	Ditto
	Finish	Terrazzo tile	Ditto
Wall	Structure	Reinforced concrete block	Reducing cracks
	Finish	Painting on mortar	Following to local method
Roof	Structure	RC joist slab	Ditto
	Finish	Asphalt water proofing exposed with joist slab	Ditto
Windows		Aluminum window frame	Ditto
Doors		Wooden flush door painted	Ditto

(6) Equipment Plan

1) Science Laboratory Equipment

Science laboratory equipment to be provided for the project schools is listed in the following tables:

Table 2-17 Science Laboratory Equipment for a Low Basic School

No.	Item	Specification	Number		Study Purpose
			Basis	No.	
1	Magnifier	Reading glass, 3x 2"dia.	1 pc / pupil	45	Observation of living organisms
2	Forceps	Nickel, straight 4 1/2"	1 pc / pupil	45	Ditto
3	Microscope	For student, 4x 10x 40x objectives	1 pc / class	1	Observation of microorganisms
4	Slide sets	Slides of animals, vegetables, minerals, insects, and common organisms in yard, pond and sea	1 set / class	1	Ditto
5	Thermometer	Glass clinic fever thermometer, dualscale (F and C)	1 pc / group	10	Measurement of temperature
6	Plate glass mirror	4"x6"	1 pc / group	10	Study of mirror reflections
7	Syringe	Plastic syringe 60ml	1 pc / group	9	Study of air pressure
8	School balance	Color coded plastic pan w/ easy pour corners, capacity : 2,000g(0.5g), with metric weight set 50gx1g	2 set / class	2	Study of weight and balance
9	Spring scale	Polystyrene housing, with ring at top and hook at bottom, 2000g x 25g	1 pc / teacher	1	Ditto
10	Table scale	2kg	2 set / class	2	Ditto
11	Mass set	Set of nine(9) hooked masses constructed of brass, 10g~1000g	1 pc / teacher	1	Ditto
12	Demonstration balance set	50cmwood stick w/ zero center, three knife-edge lever clamps, 50g and 100g masses, support base	1 pc / teacher	1	A principal of level
13	Electricity kit	simple electric circuit experiment set, peg board, bulb sockets w/ bulb, batteries, jiffy clip leads switch, etc.	1 pc / teacher	1	Study of electricity
14	Horseshoe magnet	Alnico, 2x 1 1/8" supplied with keeper	1 pc / group	9	Study of magnetic power
15	Bar magnet	Polished steel 6x3/4x1/4"	1 pc / group	9	Ditto

Table 2-17 cont'd

No.	Item	Specification	Number		Study Purpose
			Basis	No.	
16	Compass	12sets, 42mm dia.	1 pc / group	9	Measurement of direction
17	Thermometer	Etched stem 7-8mm, Mercury-filled, Celsius and Fahrenheit, -20C~110C	1 pc / group	9	Measurement of water temp.
18	Thermometer	Wall type, recessed tube, 1 3/4x 7 3/8" high	2 pc / class	2	Measurement of temp.
19	Max/Min thermometer	Push bar reset, F and C scales	2 pc / class	2	Ditto
20	Alcohol lamp	Ground glass cap, wick, wick holder and cork fitting, 2oz	2 pc / teacher	2	Heating
21	Tripod	Iron, h=6", ring ID= 1 3/4", OD=3 1/2"	1 pc / teacher	1	Supporting goods
22	Wire gauze	Ceramic fiber center, 4x4"	1 pc / teacher	2	Ditto
23	Beaker 250m	With graduation, 250ml,	1 set / group	10	Various experiment Study Purpose
24	Test tubes	With rim, 16x150mm, (72 tubes)	6 pc / group	2	Ditto
25	Test tube rack	6 holes, 25mm dia. in top plate, 6 vertical pins for drying	1 pc/ group	9	Ditto
26	Laboratory tongs	Nickel plated	1 pc / teacher	2	Ditto
27	Tube brush	3" long, 1/2" dia.	1 pc / teacher	9	Washing
28	Florence boiling flask	With flat bottom, 250ml	1 pc / teacher	10	Various experiment
29	Graduated cylinder 100ml,250ml	With pour out and base, 100ml, 250ml	1 set / group	10	Ditto
30	Medicine dropper	Plastic pipet w/ 1ml rubber nipple, length 3 2/1" 12/set	1 pc / group	10	Collection of liquid
31	Glass bin and plate	Wide mouth glass bin 120ml, glass plate 3x3"	1 pc / group	10	Collection of gas
32	Spatula / scoop	Stainless steel scoop w/ handle 6 1/2" long	6 pc / class	6	Collection of powder
33	Glass stirring rod	w/ rounded end, 3x125mm	2 pc / class	2	Stirring of liquid

Table 2-18 Science Laboratory Equipment for a High Basic School

No.	Item	Specification	Number		Study Purpose
			Reason	No.	
1	Magnifier	Reading glass, 3x2"dia.	1 pc / pupil	45	Observation of living organisms
2	Forceps	Nickel, straight 4 1/2"	1 pc / pupil	45	Ditto
3	Microscope	For student, 4x 10x 40x objectives	1 pc / group	11	Observation of microorganisms
4	Slide glass	3x1" 1.0-1.2mm 72 slides /1 box	1 set / group	11	Ditto
5	Cover glass	0.18-0.25mm, 22x22mm 18 /1 box	1 set / group	11	Ditto
6	Dissecting set	For student, 7 basic instruments w/ plastic case	1 set / group	11	Dissection
7	Dissecting pan	Aluminum pan w/ vinyl pad	1 pc / group	11	Ditto
8	Thermometer	Glass clinic fever thermometer, dualscale (F and C)	1 pc / group	11	Measurement of temp.
9	Concave lens	Glass, diameter 75mm, Focal length 20cm	1 set / group	11	Study of light
10	Convex lens	Glass, diameter 75mm, Focal length 20cm	1 set / group	11	Ditto
11	Optic bench set	Wood bench with all materials	1 pc / group	11	Ditto
12	Concave mirror set	Diameter 50mm, focal length 100mm	1 set / group	11	Ditto
13	Convex mirror set	Diameter 50mm, focal length 100mm	1 set / group	11	Ditto
14	Plate glass mirror	Glass, 4"x6"	1 pc / group	11	Ditto
15	Prism	Glass, 25x25mm	1 pc / group	22	Ditto
16	Glass block	Rectangular, 75x50x18mm	1 pc / group	11	Ditto
17	Double beam balance	200x10g, 10x0.1g	2 pc / class	2	Measurement of reagent
18	School balance	Color coded plastic pan w/ easy pour corners, capacity: 2,000g(0.5g), with metric weight set 50gx1g	1 pc / group	11	Measurement

Table 2-18 cont'd

No.	Item	Specification	Number		Study Purpose
			Reason	No.	
19	Table scale	2kg	2 pc / group	2	Ditto
20	Spring scale	Polystyrene housing, with ring at top and hooks at bottom, 2000g x 25g	1 pc / group	11	Study of balance
21	Helical spring set	Steel helical spring w/ weight of 500g,1000g	1 pc / group	11	Ditto
22	Mass set	Set of nine (9) hooked masses constructed of brass, 10g~1000g	1 set / group	11	Ditto
23	Wheel and axle	Ball-bearing plastic pulley w/ 4 dia. mounted on a single steel rod	1 pc / group	11	Ditto
24	Sheave pulley	Nylon single pulley, 50mm dia.	1 pc / group	11	Ditto
25	water pressure apparatus	Plastic cylinder (18" high; ID 2") w/ three holes on one side, rubber stopper, toothpicks 8mm plastic tubing 20" long	1 pc / group	11	Study of pressure
26	Ammeter	3 range type	1 pc / group	11	Study of electricity
27	Voltmeter	1 range type, 0-10V	1 pc / group	11	Ditto
28	Mortar generator kit	motor w/ handle, incandescent lamp and socket	1 pc / group	11	Ditto
29	Rheostat (A)	Resistors sliding contact, 8~2.3Amp	1 pc / group	11	Ditto
30	Rheostat (B)	Resistors sliding contact, 1.8~0.3Amp	1 pc / group	11	Ditto
31	Dynamo model	DC motor model, 1 1/2~3V	1 pc / group	11	Ditto
32	Galvanometer	Triple range, 500-0-500A,100-0-μA,5-0-5V	1 pc / group	11	Ditto
33	Electricity circuit kit	With peg board, bulb socket w/ bulb, batteries, jiffy clip leads switch steel wool, etc.	1 set / group	11	Ditto
34	Wire set	Set of bare copper, nichrome wire, PVC covered wire(18 gauge)	1 set / group	11	Assembling of electric experiment apparatus

Table 2-18 cont'd

No.	Item	Specification	Number		Study Purpose
			Reason	No.	
35	Soldering gun kit	Soldering gun w/ soldering tip, cutting tip, flux brush, rosin core solder, plastic case etc.	1 set / group	11	Ditto
36	Clip leads set	Packages of 10 leads(24" long), five red and five black, with alligator clips on both ends	1 set / group	11	Ditto
37	Bar magnet	Polished steel 6x3/4x1/4"	2 pc / group	22	Study of magnetic power
38	Electromagnet coil and steel bar set	With two(2) Gilley coils on plastic addle forms, round and square iron cores 5sets	1 set / group	11	Ditto
39	Magnetic needle compass	5 1/2"needle with stand	1 pc / group	11	Study of magnetic power
40	Compass	12 sets , 42mm dia.	1 pc / group	11	Direction
41	Medical thermometer	Etched stem 7-8mm, Mercury-filled, Celsius and Fahrenheit, -20C~110C	1 pc / group	11	general temp. measurement
42	Thermometer	Wall type, recessed tube, 1 3/4 x 7 3/8" higa	2 pc / class	2	Study of weather
43	Barometer	4" dia., wall mounts	1 pc / class	1	Ditto
44	Anemoscope & Anemometer	w/ portable handle	1 pc / class	1	Ditto
45	Hygrometer	-5~50 Celsius、20~120 Fahrenheit	1 pc / class	2	Ditto
46	Max & Min. Thermometer	C & F scale, push bar reset, w/ case	2 pc / class	2	Ditto
47	Syringe	Plastic, 60ml	2 pc / class	12	Apparatus for studying cloud
48	Xylopipes	20 xylophone pipe set	1 set / teacher	1	Study of sound
49	Tuning forks w/ resonator box	4 tuning fork set	1 set / teacher	1	Ditto
50	Calorimeter	Aluminum double wall container, 350ml	1 pc / group	11	Measurement of calorie

Table 2-18 cont'd

No.	Item	Specification	Number		Study Purpose
			Reason	No.	
51	Molecular model set	Colored wooden balls and springs	1 set / class	1	Study of molecule structure
52	Beaker 250ml,400ml	Glass, w/ graduation, 250ml, 400ml	1 set / group	12	Various experiment
53	Round bottom flask	Glass, 500ml, stopper # 6.5	1 pc / group	12	Ditto
54	Florence boiling flask	Glass, 250ml, stopper # 4	1 pc / group	12	Ditto
55	Conical flask	Glass, 250ml, stopper # 6.5	1 pc / group	12	Ditto
56	Distilling	Glass, w/ side tube, 200ml, stopper # 3	1 pc / group	12	Ditto
57	Round jar	Glass, 20cm dia., 10cm depth	1 pc / group	12	Ditto
58	Test tube	Glass, 16x150mm, 72 tubes /set	6 pc / group	1	Ditto
59	Test tube stand	6 holes - 25mm, 6 rods	1 pc / group	12	Support of test tube
60	Laboratory tong	Nickel plate	1 pc / group	12	Handling of test tube
61	Test tube brush	3" long, 1/2" dia.	1 pc / group	12	Washing
62	Petri dish	Glass, 60mm dia.x15mm depth	2 pc / group	22	Culture
63	Support stand	Table type, attached horizontally or vertically	1 pc / group	11	Various experiment
64	Clamp	Round jaws, adjustable from 4 1/4"-5"	1 pc / group	11	Supporting goods
65	Support ring	2" dia.	1 pc / group	11	Ditto
66	Gas burner	For use 1/2"tube, w/ frame adjustable	1 pc / group	11	Heating & burning
67	Alcohol lamp	Glass, 2oz capacity	1 pc / group	12	Ditto
68	Tripod	Steel, 6"high	1 pc/ group	12	Supporting
69	Wire gauze	Ceramic fiber center, 4x4"	1 pc / group	20	Supporting
70	Pipet	Glass, 10ml	1 pc / group	12	Measurement of liquid

Table 2-18 cont'd

No.	Item	Specification	Number		Study Purpose
			Reason	No.	
71	Graduated cylinder 100ml, 250ml	Glass, 100ml ,250ml	1 set / group	12	Ditto
72	Medicine Dropper	Plastic, 3 2/1" long, set of 12 pieces	1 pc / group	12	Ditto
73	Thistle funnel	Plastic, 29mm	1 pc / group	12	Filtration
74	Funnel	Glass, 50mm	1 pc / group	12	Ditto
75	Funnel support	Polyethylene, single hole, w/ base	1 pc / group	11	Supporting
76	Filter paper	White, open-textured paper, 100 circles	1 set / class	2	Filtration
77	Stirring rod	Glass, 3mm dia.x 125mm long	1 pc / group	12	Stirring of liquid
78	Deflagration spoon	dia.3/4"、15" long	1 pc / group	11	Burning chemicals
79	Spatula / Scoop	Stainless steel w/ wooden handle, 6 3/2"long	1 pc / group	11	Collection of powder
80	Mortar and pestle	160mm dia., 600ml	1 set / group	11	Grinding
81	Pinch clamp	Flat brass wire, for 2 1/2" tube	1 pc / group	11	Parts of experiment apparatus
82	PVC tube	Translucent PVC tube, 3/16" bore dia., 10m	1 pc / class	1	Ditto
83	Rubber tube	Robber, 3/16"bore dia., 10m long	1 pc / class	1	Ditto
84	Delivery tube set	Glass, 6mm dia. 4 kinds of tube set	1 set / group	11	Ditto
85	Rubber stopper set	1 hole, 2 holes, no hole of # 0, 3, 4, 6.5	1 set / group	11	Ditto
86	Glass bin and plate	Glass bin 120ml、glass plate 3x3"	1 pc / group	24	Collection of liquid
87	Evaporating dish	Porcelain, 70mm dia., 28mm height,	1 pc / group	12	Evaporation
88	Set of glass bottles for powder	Glass, w/ cap, 1, 2, 4, 8, 16, 32oz capacities /each	1 set / class	3	Storage of powder
89	Set of glass reagent bottles	Glass, w/ cap, 1, 2, 8, 16oz capacities/each	1 set / class	3	Storage of liquid

2) Furniture to be Provided to the Project Schools

Furniture units to be provided in each room of a project school are listed in the following tables:

Table 2-19 Furniture Units for a Low Basic School

Room	Item	Specification	No.
Classroom - Low grade	1-1 Pupil's desk	For 2 pupils, Low basic (H=58cm)	20
	2-1 Pupil's chair	For 1 pupil, Low basic (H=34cm)	40
	3 Teacher's desk	In classroom	1
	4 Teacher's chair	193x90x45cm	1
Classroom - High grade	1-2 Pupil's desk	For 2 pupils, Low basic (H=64cm)	20
	2-2 Pupil's chair	For 1 pupil, Low basic (H=38cm)	40
	3 Teacher's desk	In classroom	1
	4 Teacher's chair	193x90x45cm	1
Science laboratory & Prep. room	20 Stool chair	Chrome iron pipe, H=60cm	42
	21 Working table	H=80cm, 180x80cm top board	9
Multipurpose room & Prep. room	3 Teacher's desk	In class room	1
	4 Teacher's chair	In classroom	1
	11 Metal cabinet w/ 2doors	193x90x45cm	2
	12 Metal cabinet w/ 4doors	193x90x45cm	1
	13 Metal cabinet w/ 12 doors	193x90x45cm	1
	14 Wardrobe for sporting goods	185x120x45cm	2
	18 Multipurpose chair	Chrome iron pipe, H=80cm	40
	20 Stool chair	Chrome iron pipe, H=60cm	40
	26 Working table 2	H=70cm, 200x80cm top board	4
Library & Prep. room	1-2 Pupil's desk	For 2 pupils, Low basic (H=64cm)	18
	2-2 Pupil's chair	For 1 pupils, Low basic (H=38cm)	40
	3 Teacher's desk	In classroom	1
	4 Teacher's chair	In classroom	1
	11 Metal cabinet w/ 2 doors	193x90x45cm	1
	20 Stool chair	Chrome iron pipe, H=60cm	1
Teachers room	4 Teacher's chair	In classroom	28
	5 Teacher's desk	In staff room	22
	12 Metal cabinet w/ 4 doors	193x90x45cm	6
	17 Book shelves	Plywood, 193x90x30cm	2
	21 Working table	H=76cm, 180x80cm top board	1
Headmaster room	4 Teacher's chair	In classroom	8
	7 Headmaster desk	H=76cm, 150x70cm top board	1
	8 Headmaster chair	With elevation adjustment	1
	9 Metal file cabinet w/4 drawers	132.5x46x65cm	2
	11 Metal cabinet w/ 4 doors	193x90x45cm	2
	15 Metal file cabinet w/ 2 doors	193x90x45cm	1
	17 Book shelves	Plywood, 193x90x30cm	2
	22 Computer table	H=76cm, 110x60cm top board	1
	24 Meeting table	H=76cm, 160x80cm top board	2

Table 2-19 cont'd

Room	Item	Specification	No.
Secretary room	7 Headmaster desk	H=76cm, 150x70cm top board,	1
	9 Metal file cabinet w/4 drawers	132.5x46x65cm	2
	11 Metal cabinet w/ 2 doors	193x90x45cm	2
	15 Metal file cabinet w/ 2 doors	193x90x45cm	1
	19 Secretary chair	With elevation adjustment	1
	22 Computer table	H=76cm, 110x60cm top board	1
	23 Photo copy machine table	H=76cm, 110x80cm top board	1
First aid room	4 Teacher's chair	in classroom	1
	9 Metal file cabinet w/4 drawers	132.5x46x65cm	2
	10 Metal cabinet w/ 1 doors	193x90x45cm	2
	11 Metal cabinet w/ 2 doors	193x90x45cm	1
	16 Laboratories locker	193x90x40cm	1
	20 Stool chair	Chrome iron pipe, H=60cm	1
	22 Computer table	H=76cm, 110x60cm top board	1
	25 Consulting bed	For resting. 60x195cm	1
Guard room	3 Teacher's desk	In classroom	1
	4 Teacher's chair	In classroom	1
	10 Metal cabinet w/ 1 door	193x90x45cm	1

Table 2-20 Furniture Units for a High Basic School

Room	Item	Specification	No.
Classroom	1-3 Pupil's desk	For 2 pupils, High basic (H=70cm)	20
	2-3 Pupil's chair	For 1 pupil, High basic (H=42cm)	40
	3 Teacher's desk	In classroom	1
	4 Teacher's chair	193x90x45cm	1
Science lab. & Prep. room	20 Stool chair	Chrome iron pipe, H=60cm	42
	21 Working table	H=90cm, 180x80cm top board	11
Multipurpose room & Prep. room	3 Teacher's desk	In classroom	1
	4 Teacher's chair	In classroom	1
	11 Metal cabinet w / 2 doors	193x90x45cm	2
	12 Metal cabinet w / 4 doors	193x90x45cm	1
	13 Metal cabinet w/ 12 doors	193x90x45cm	1
	14 Wardrobe for sporting goods	185x120x45cm	2
	20 Stool chair	Chrome iron pipe, H=60cm	40
	18 Multipurpose chair	H=85cm, 180x80cm top board	40
	21 Working table 2	H=70cm, 200x80cm top board	4
Library & Prep. room	1-3 Pupil's desk	For 2 pupils, High basic (H=70cm)	18
	2-3 Pupil's chair	For 1 pupils, High basic (H=42cm)	40
	3 Teacher's desk	In classroom	1
	4 Teacher's chair	193x90x45cm	1
	11 Metal cabinet w/ 2 doors	Chrome iron pipe, H=60cm	1
	20 Stool chair	H=85cm, 180x80cm top board	41
	22 Computer table	H=76cm, 110x60cm top board	20

Table 2-20 cont'd

Room		Item	Specification	No.
Teachers room	4	Teacher's chair	In classroom	46
	5	Teacher's desk	In staff room	34
	12	Metal cabinet w/ 4 doors	193x90x45cm	9
	17	Book shelves	Plywood, 193x90x30cm	2
	21	Working table	H=76cm, 180x80cm top board	1
Headmaster room	4	Teacher's chair	In classroom	8
	7	Headmaster desk	H=76cm, 150x70cm top board,	1
	8	Headmaster chair	With elevation adjustment	1
	9	Metal file cabinet w/4 drawers	132.5x46x65cm	2
	11	Metal cabinet w/ 2 doors	193x90x45cm	2
	15	Metal file cabinet w/ 2 doors	193x90x45cm	1
	17	Book shelves	Plywood, 193x90x30cm	2
	22	Computer table	H=76cm, 110x60cm top board	1
	24	Meeting table	H=76cm, 160x80cm top board	2
Secretary room	7	Headmaster table	H=76cm, 150x70cm top board,	1
	9	Metal file cabinet w/4 drawers	132.5x46x65cm	2
	11	Metal cabinet w/ 2 doors	193x90x45cm	2
	15	Metal file cabinet w/ 2 doors	193x90x45cm	1
	19	Secretary chair	With elevation adjustment	1
	22	Computer table	H=76cm, 110x60cm top board	1
	23	Photo copy machine table	H=76cm, 110x80cm top board	1
First Aid	4	Teacher's chair	In classroom	1
	9	Metal file cabinet w/4 drawers	132.5x46x65cm	2
	10	Metal cabinet w/ 1 doors	193x90x45cm	2
	11	Metal cabinet w/ 2 doors	193x90x45cm	1
	16	Laboratories locker	193x90x40cm	1
	20	Stool chair	Chrome iron pipe, H=60cm	1
	22	Computer table	H=76cm, 110x60cm top board	1
	25	Consulting bed	For resting, 60x195cm	1
Guard	3	Teacher's desk	In classroom	1
	4	Teacher's chair	In classroom	1
	10	Metal cabinet w/ 1 door	193x90x45cm	1

Table 2-21 Furniture Units to be Provided under the Project

No.	Item		Specification	Location	Number		Total
					Phase 1	Phase 2	
1	Pupil's desk	1	For 2 pupils, Low basic (H=58cm)	Classroom	780	480	1,260
		2	For 2 pupils, Low basic (H=64cm)	Classroom, Library	870	516	1,386
		3	For 2 pupils, High basic (H=70cm)	Classroom, Library	1,476	498	1,974
2	Pupil's chair	1	For 1 pupil, Low basic (H=34cm)	Classroom	1,560	960	2,520
		2	For 1 pupil, Low basic (H=38cm)	Classroom, Library	1,760	1,040	2,800
		3	For 1 pupil, High basic (H=42cm)	Classroom, Library	2,960	1,000	3,960
3	Teacher's desk		H=78cm, 100x60cm top board	Classroom, Library, Multipurpose room, Guard room	171	81	252
4	Teacher's chair		Reinforced plastic seat and chair back	Classroom, Headmaster room, Classroom, Library, Multipurpose room, Guard, First aid	497	222	719
5	Teacher's desk (in staff room)		H=78cm, 100x60cm top board	Teachers room	203	90	291
6	Table arm chair		Reinforced plastic sheet and chair back	Multipurpose room	0	0	0
7	Headmaster table		H=78cm, 150x70cm top board	Headmaster & Secretary rooms	14	6	20
8	Headmaster chair		withe elevation adjustment	Headmaster room	7	3	10
9	Metal file cabinet (4) drawers		132.5x46x65cm	Headmaster & Secretary rooms, First aid	42	18	60
10	Metal cabinet with one door		193x90x45cm	Guard room, First aid	21	9	30

Table 2-21 cont'd

No.	Item	Specification	Location	Number		Total
				Phase 1	Phase 2	
11	Metal cabinet with two doors	193x90x45cm	Headmaster & Secretary rooms, First aid, Multipurpose room, Library prep. room	56	24	80
12	Metal cabinet with four doors	193x90x45cm	Teachers room, Multipurpose room	60	26	87
13	Metal cabinet with twelve doors	193x90x45cm	Multipurpose room	7	3	10
14	Wardrobe for sporting goods	185x120x45cm	Multipurpose room	14	6	20
15	Metal file cabinet two separated	193x90x45cm	Headmaster & Secretary room	14	6	20
16	Laboratories locker	193x90x45cm	First aid	7	3	10
17	Book shelves	Plywood, 193x90x45cm	Headmaster room, Teachers room	28	12	40
18	Multipurpose chair	Chrome iron pipe, H=80cm	Multipurpose room	280	120	400
19	Secretary chair	With elevation adjustment	Secretary room	7	3	10
20	Stool chair	Chrome iron pipe, H=60cm	Teachers room, Science lab., Library, Library prep. room, First aid	876	334	1,210
21	Working table	H=85cm, 180x80cm top board	Teachers room, Science lab.	121	44	14
22	Computer table	H=76cm, 110x60cm top board	Headmaster & Secretary rooms, Library, First aid.	81	29	110
23	Photo copy machine table	H=76cm, 110x60cm top board	Secretary room	7	3	10
24	Meeting table	H=76cm, 160x80cm top board	Headmaster room	14	6	20
25	Consulting bed	For resting, 60x195cm	First aid	7	3	10
26	Working table 2	H=70cm, 200x90cm top board	Multipurpose room	28	12	40

(7) Basic Design Drawings

NO1 MASHROUH AMMER (L/24)

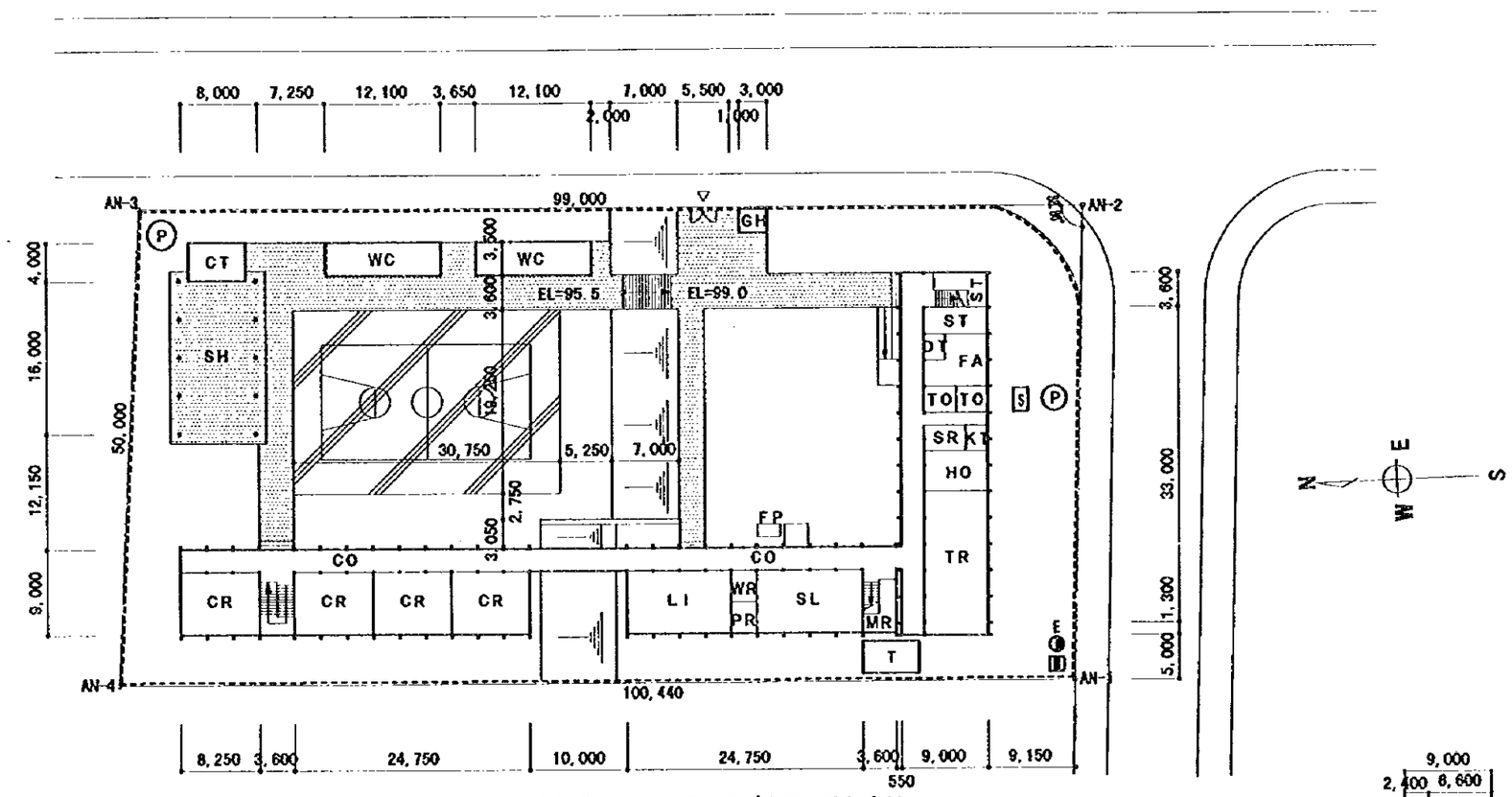
BUILDING LAYOUT/PLAN 1 : 6 0 0

(NOTES)

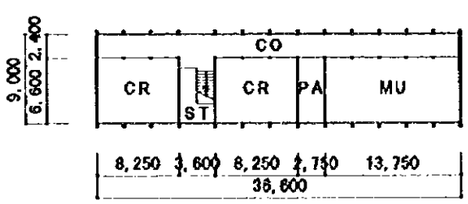
INTER LOCKING BLOCK PAVEMENT

CONCRETE PAVEMENT

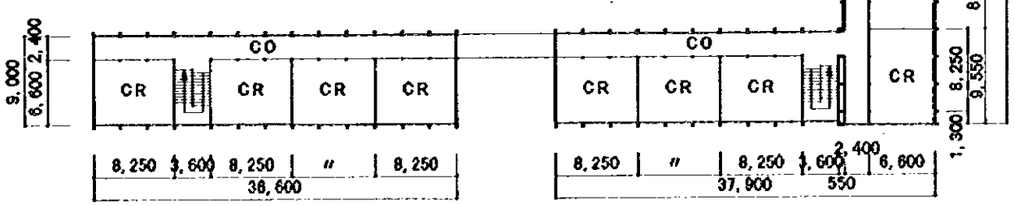
CR	-----	CLASSROOM	KT	-----	KITCHEN
SL	-----	SCIENCE LABORATORY	ST	-----	STORAGE
PR	-----	PREPARATORY ROOM	MR	-----	MACHINE ROOM
MU	-----	MULTIPURPOSE ROOM	CO	-----	CORRIDOR
LI	-----	LIBRARY	GH	-----	GUARD HOUSE
WR	-----	WORK ROOM	CT	-----	CANTEEN
HO	-----	HEADMASTER'S OFFICE	SH	-----	SHED
SR	-----	SECRETARY'S ROOM	TO	-----	STAFF TOILET
TR	-----	TEACHER'S ROOM	WC	-----	STUDENT TOILET
FA	-----	FIRST AID	DT	-----	DISABLED TOILET
FP	-----	FLAG POLE	P	-----	PIT
			M	-----	METER
			T	-----	WATER TANK
			S	-----	SEPTIC TANK
			E	-----	ELECTRIC & TELEPHONE POLE



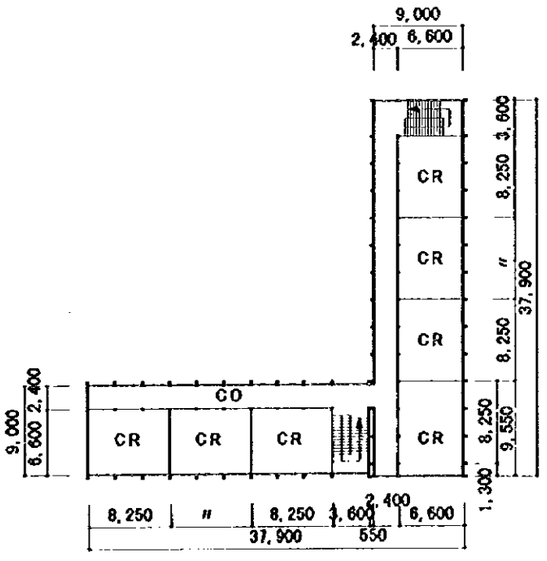
BUILDING LAYOUT/1F PLAN



B1F PLAN



2F PLAN



3F PLAN

N02 EL-SMERI (H-L/24)

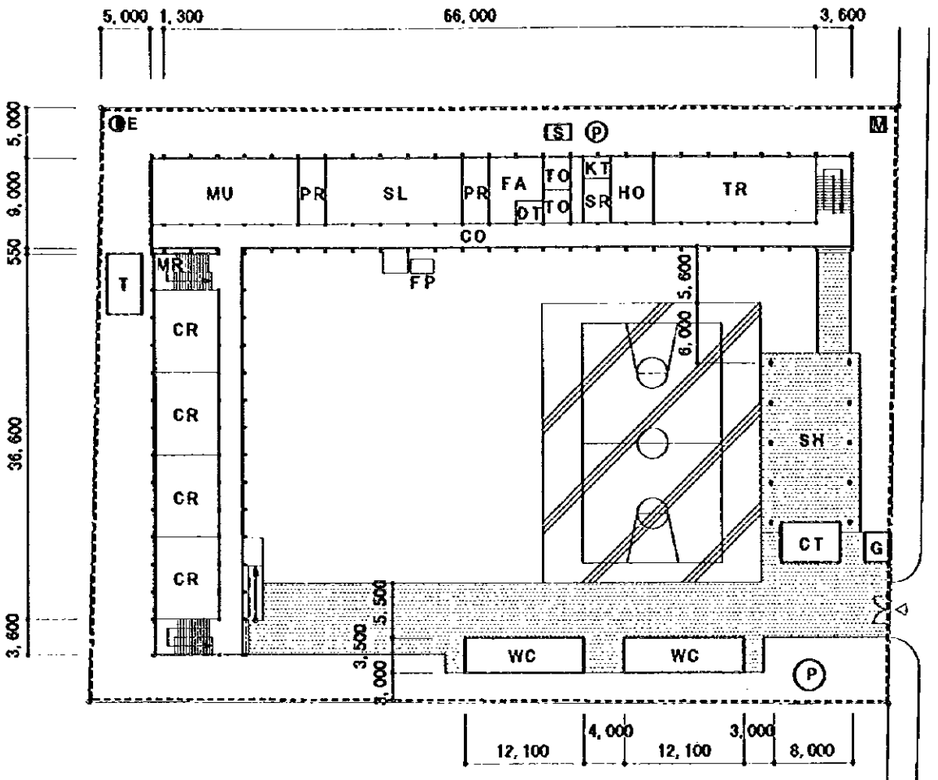
BUILDING LAYOUT/PLAN 1 : 600

(NOTES)

INTER LOCKING BLOCK PAVEMENT

CONCRETE PAVEMENT

CR	CLASSROOM		KT	KITCHEN	
SL	SCIENCE LABORATORY		ST	STORAGE	
PR	PREPARATORY ROOM		MR	MACHINE ROOM	
MU	MULTIPURPOSE ROOM		CO	CORRIDOR	
LI	LIBRARY		GH	GUARD HOUSE	
WR	WORK ROOM		CT	CANTEEN	
HO	HEADMASTER'S OFFICE		SH	SHED	
SR	SECRETARY'S ROOM		TO	STAFF TOILET	
TR	TEACHER'S ROOM		WC	STUDENT TOILET	
FA	FIRST AID		DH	DISABLED TOILET	
FP	FLAG POLE		P	PIT	
			M	METER	
			T	WATER TANK	
			S	SEPTIC TANK	
			E	ELECTRIC & TELEPHONE POLE	



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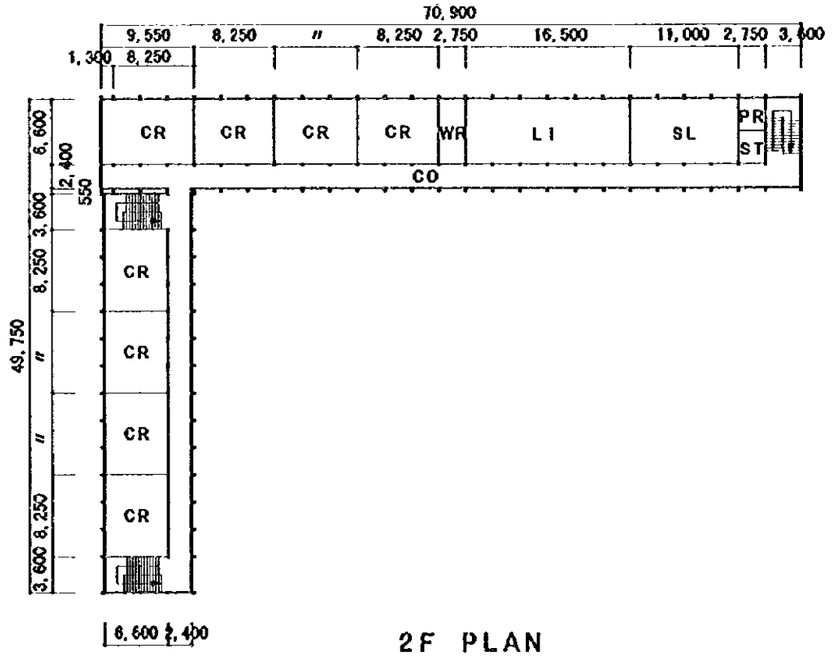
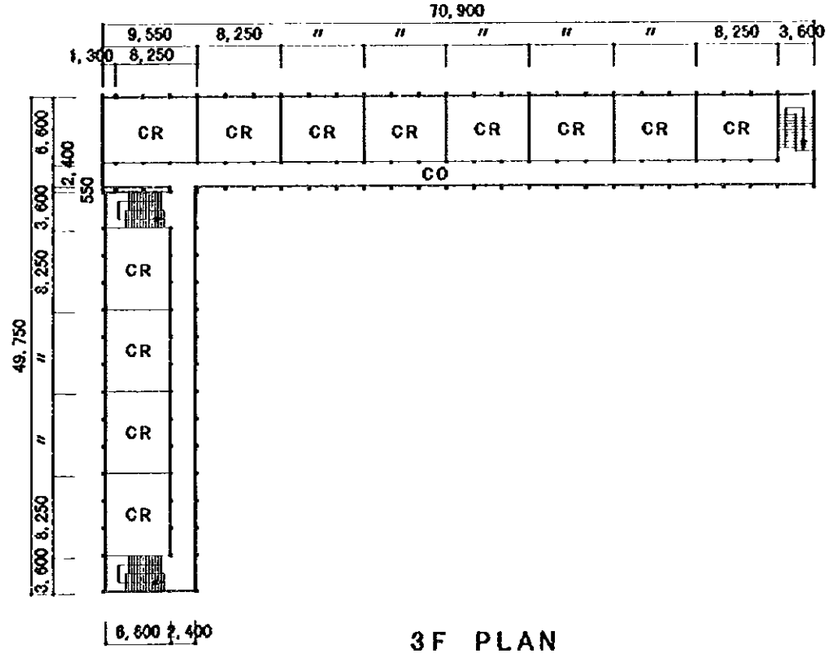


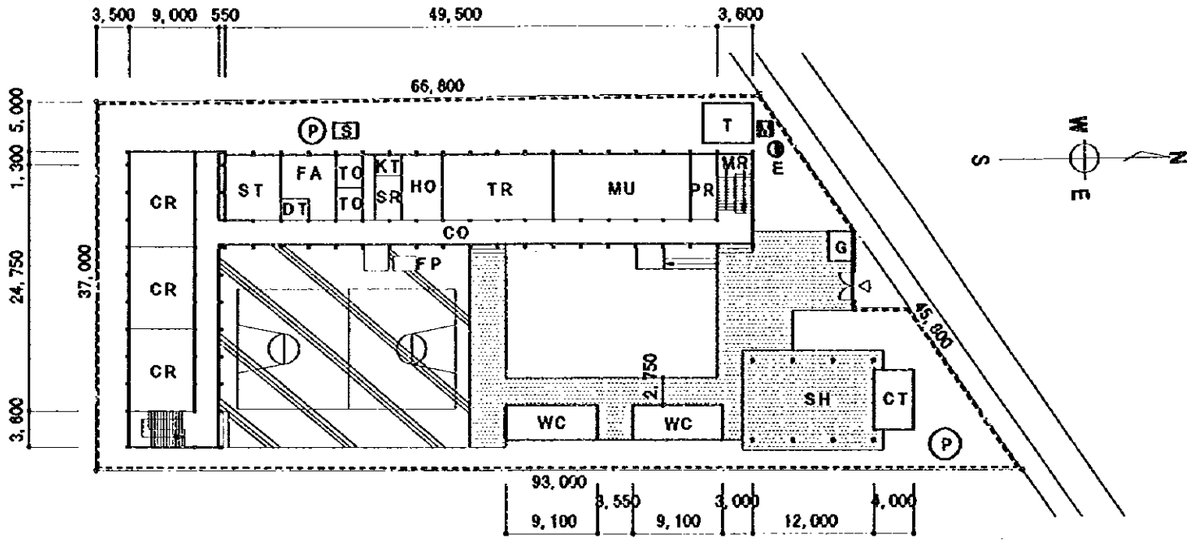
2F PLAN



3F PLAN

N03 ABASAN EL-SAGERA (L/18)

BUILDING LAYOUT/PLAN 1 : 600



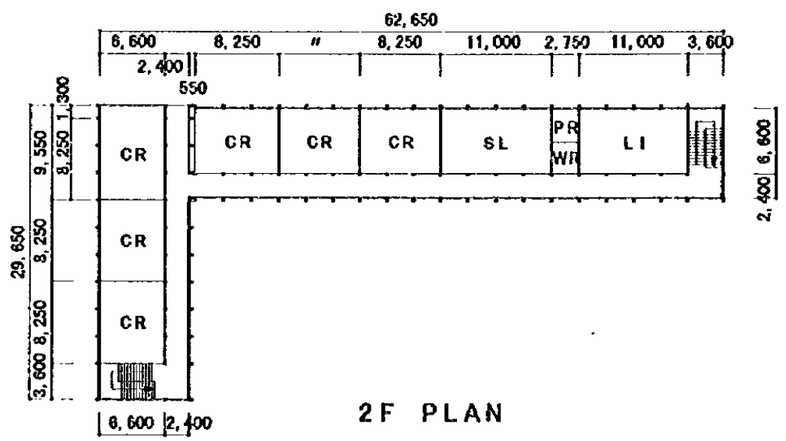
BUILDING LAYOUT/1F PLAN

(NOTES)

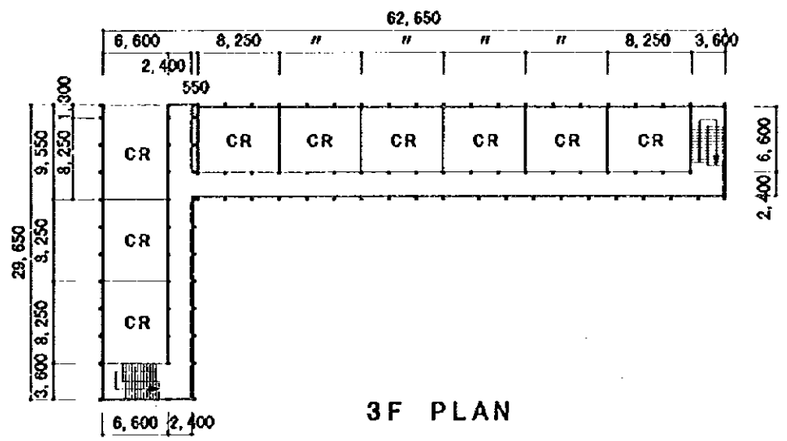
INTER LOCKING BLOCK PAVEMENT

CONCRETE PAVEMENT

CR	-----	CLASSROOM	KT	-----	KITCHEN
SL	-----	SCIENCE LABORATORY	ST	-----	STORAGE
PR	-----	PREPARATORY ROOM	MR	-----	MACHINE ROOM
MU	-----	MULTIPURPOSE ROOM	CO	-----	CORRIDOR
LI	-----	LIBRARY	GH	-----	GUARD HOUSE
WR	-----	WORK ROOM	CT	-----	CANTEEN
HO	-----	HEADMASTER'S OFFICE	SH	-----	SHED
SR	-----	SECRETARY'S ROOM	TO	-----	STAFF TOILET
TR	-----	TEACHER'S ROOM	WC	-----	STUDENT TOILET
FA	-----	FIRST AID	DT	-----	DISABLED TOILET
FP	-----	FLAG POLE	P	-----	PIT
			M	-----	METER
			T	-----	WATER TANK
			S	-----	SEPTIC TANK
			E	-----	ELECTRIC & TELEPHONE POLE



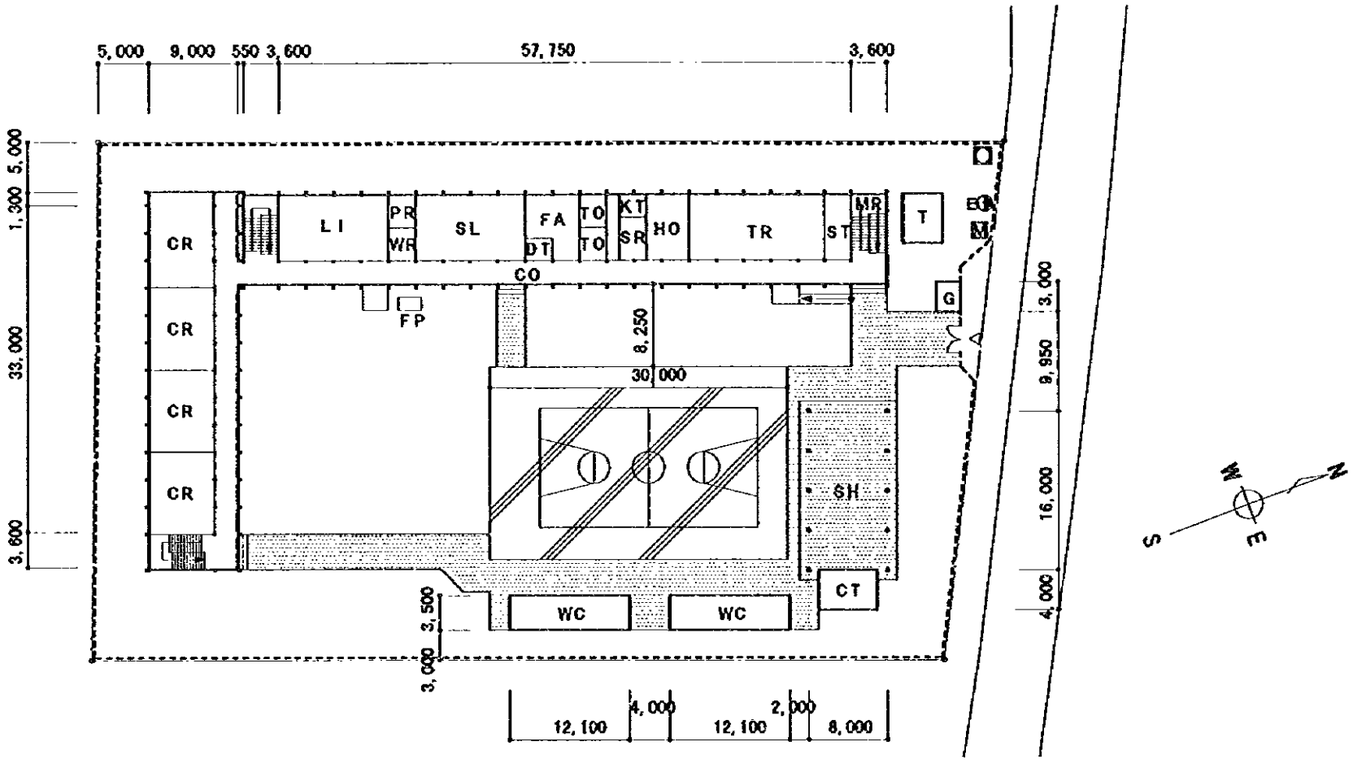
2F PLAN



3F PLAN

NO4 EL-FALOJA (L/24)

BUILDING LAYOUT/PLAN 1:600



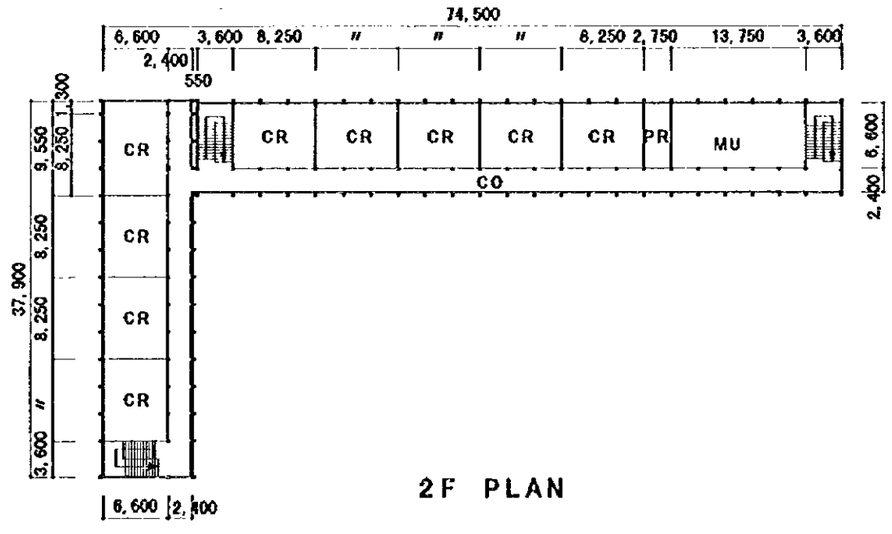
BUILDING LAYOUT/1F PLAN

(NOTES)

INTER LOCKING BLOCK PAVEMENT

CONCRETE PAVEMENT

CR	CLASSROOM	KT	KITCHEN		
SL	SCIENCE LABORATORY	ST	STORAGE		
PR	PREPARATORY ROOM	MR	MACHINE ROOM		
MU	MULTIPURPOSE ROOM	CO	CORRIDOR		
LI	LIBRARY	GH	GUARD HOUSE		
WR	WORK ROOM	CT	CANTEEN		
HO	HEADMASTER'S OFFICE	SH	SHED		
SR	SECRETARY'S ROOM	TO	STAFF TOILET		
TR	TEACHER'S ROOM	WC	STUDENT TOILET		
FA	FIRST AID	DT	DISABLED TOILET		
FP	FLAG POLE	P	PIT		
		M	METER		
		T	WATER TANK		
		S	SEPTIC TANK		
		E	ELECTRIC & TELEPHONE POLE		



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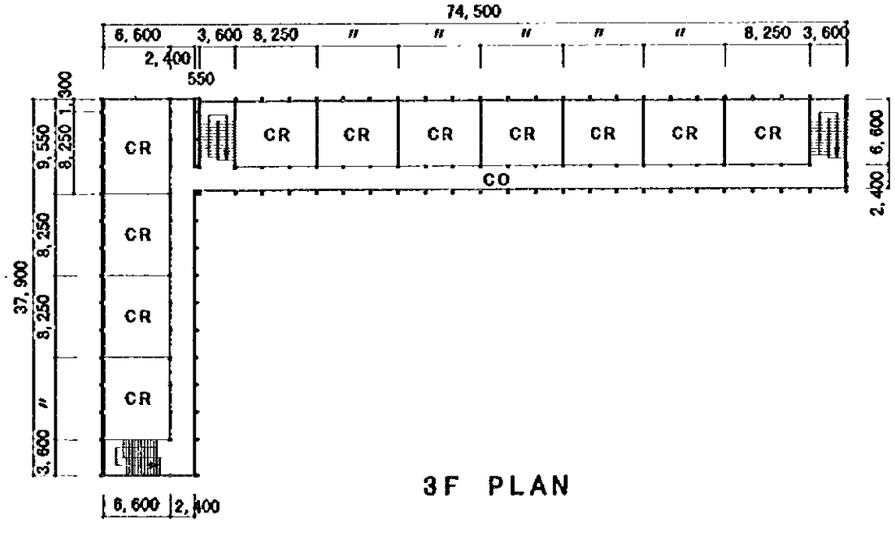
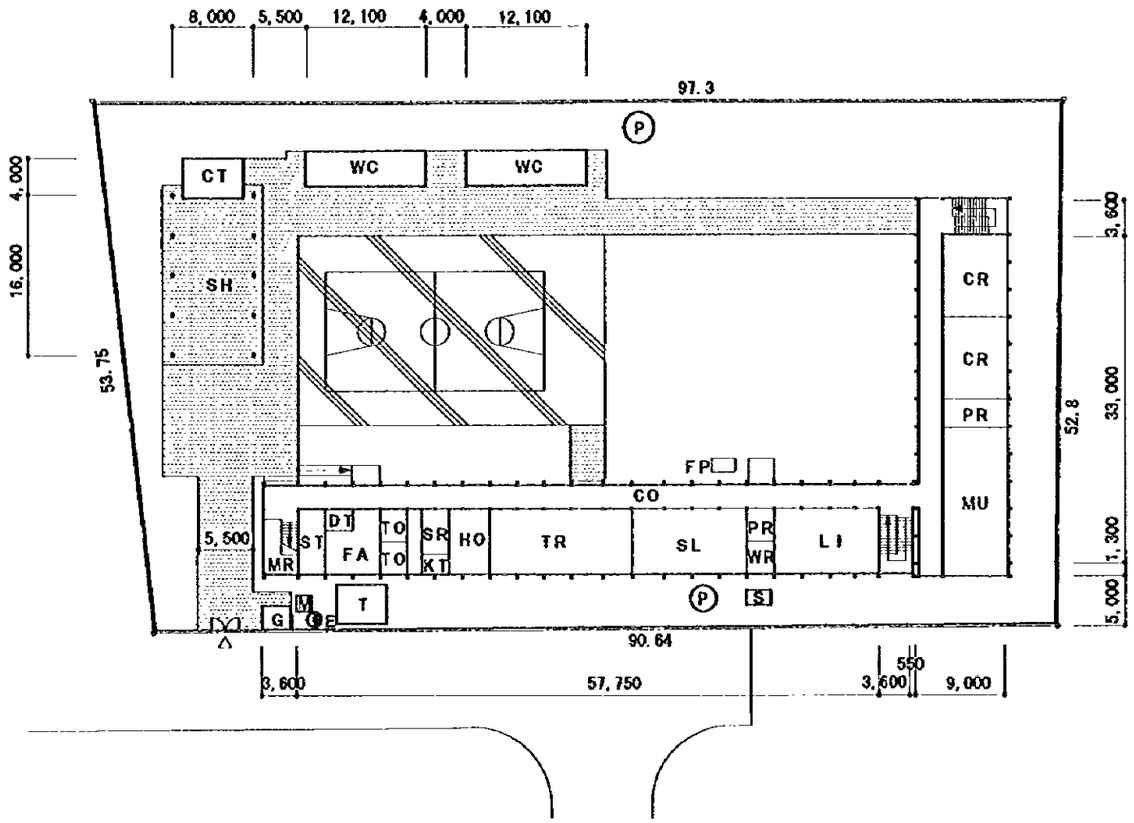


3F PLAN

N05 MA'AN (L/24)

BUIDING LAYOUT/PLAN 1 : 6 0 0



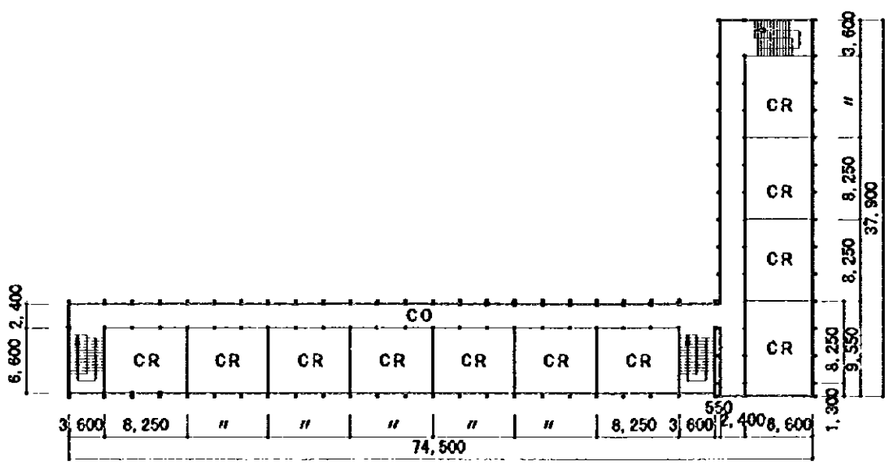
BUILDING LAYOUT/1F PLAN

(NOTES)

INTER LOCKING BLOCK PAVEMENT

CONCRETE PAVEMENT

CR	-----	CLASSROOM	KT	-----	KITCHEN
SL	-----	SCIENCE LABORATORY	ST	-----	STORAGE
PR	-----	PREPARATORY ROOM	MR	-----	MACHINE ROOM
MU	-----	MULTIPURPOSE ROOM	CO	-----	CORRIDOR
LI	-----	LIBRARY	GH	-----	GUARD HOUSE
WR	-----	WORK ROOM	CT	-----	CANTEEN
HO	-----	HEADMASTER'S OFFICE	SH	-----	SHED
SR	-----	SECRETARY'S ROOM	TO	-----	STAFF TOILET
TR	-----	TEACHER'S ROOM	WC	-----	STUDENT TOILET
FA	-----	FIRST AID	DT	-----	DISABLED TOILET
FP	-----	FLAG POLE	P	-----	PIT
			M	-----	METER
			T	-----	WATER TANK
			S	-----	SEPTIC TANK
			E	-----	ELECTRIC & TELEPHONE POLE



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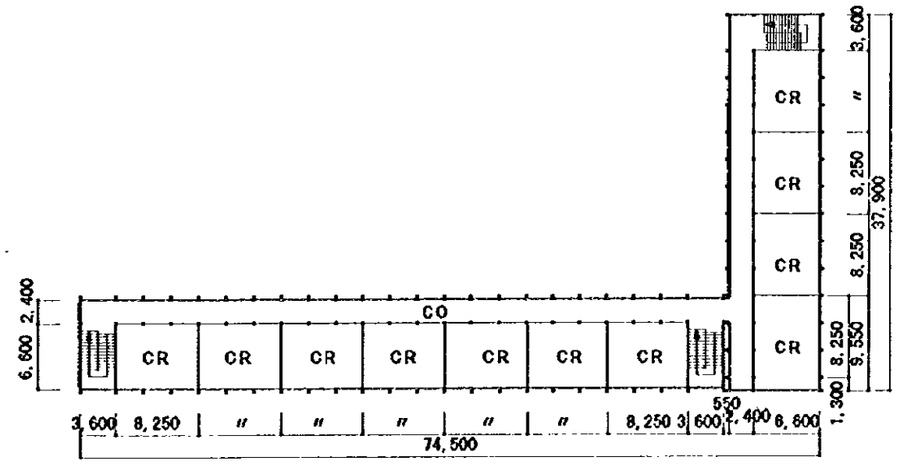


3F PLAN

NO6 EL-MOZANAR (H/24)

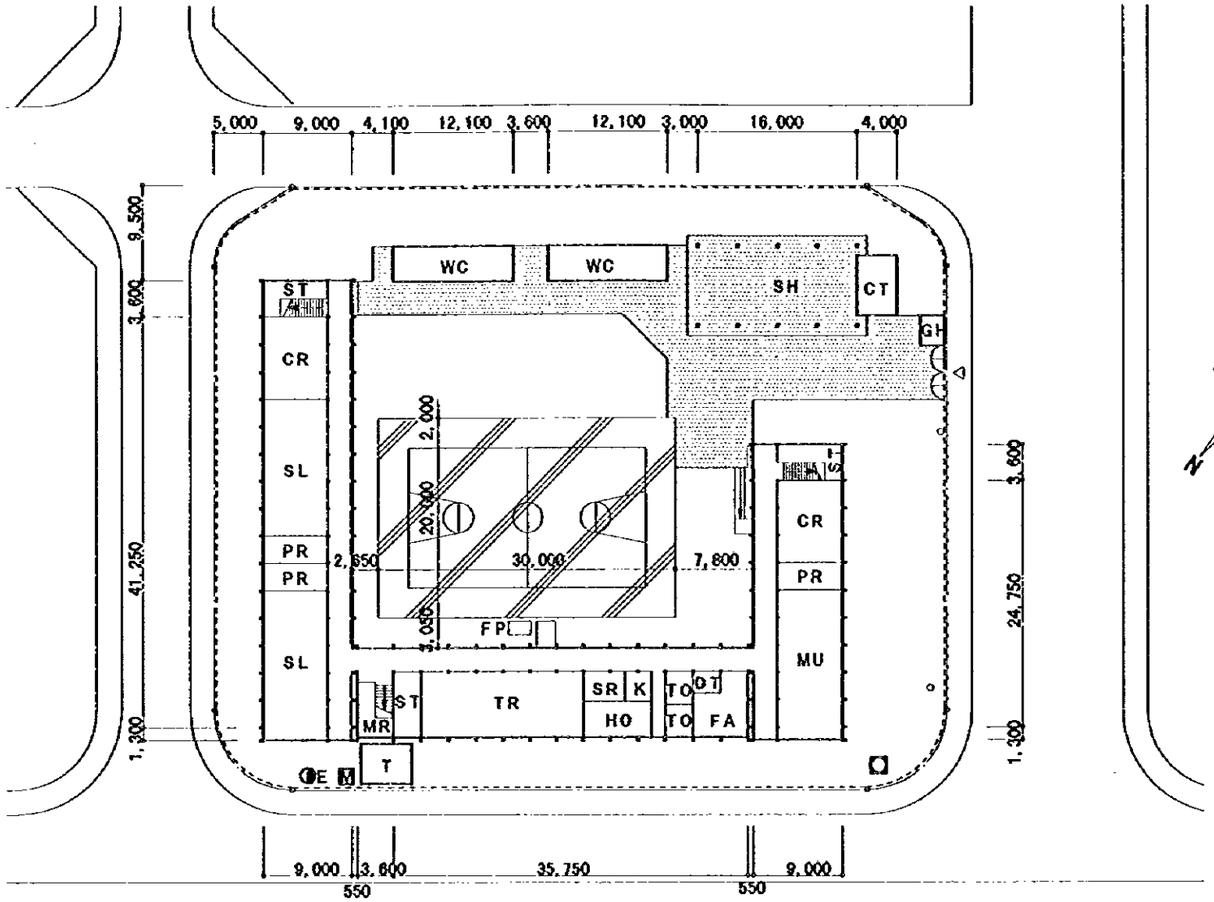
BUILDING LAYOUT/PLAN 1 : 600

(NOTES)

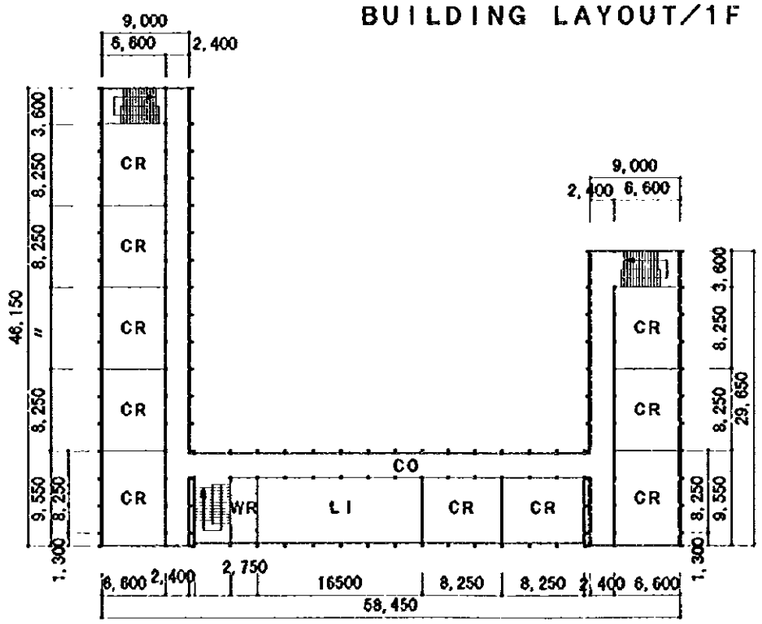
INTER LOCKING BLOCK PAVEMENT

CONCRETE PAVEMENT

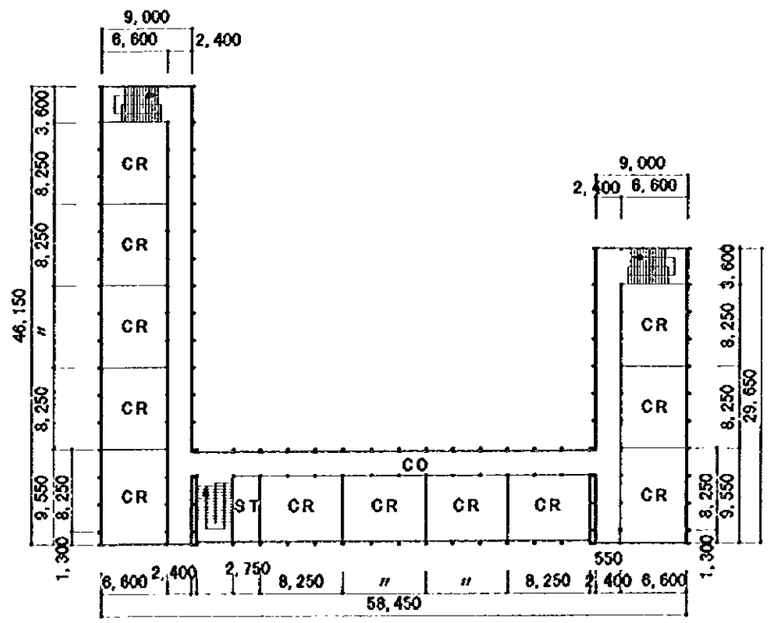
CR	-----	CLASSROOM	KT	-----	KITCHEN
SL	-----	SCIENCE LABORATORY	ST	-----	STORAGE
PR	-----	PREPARATORY ROOM	MR	-----	MACHINE ROOM
MU	-----	MULTIPURPOSE ROOM	CO	-----	CORRIDOR
LI	-----	LIBRARY	GH	-----	GUARD HOUSE
WR	-----	WORK ROOM	CT	-----	CANTEEN
HO	-----	HEADMASTER'S OFFICE	SH	-----	SHED
SR	-----	SECRETARY'S ROOM	TO	-----	STAFF TOILET
TR	-----	TEACHER'S ROOM	WC	-----	STUDENT TOILET
FA	-----	FIRST AID	DT	-----	DISABLED TOILET
FP	-----	FLAG POLE	P	-----	PIT
			M	-----	METER
			T	-----	WATER TANK
			S	-----	SEPTIC TANK
			E	-----	ELECTRIC & TELEPHONE POLE



BUILDING LAYOUT/1F PLAN



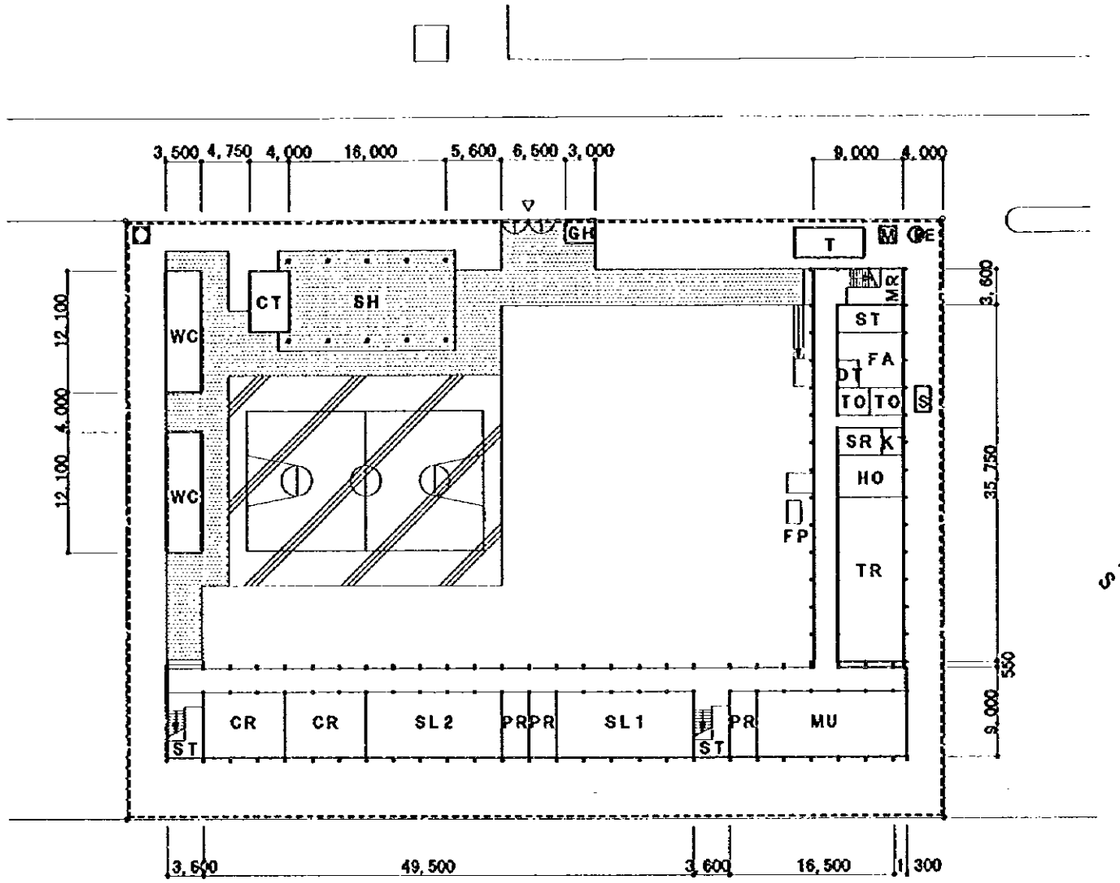
2F PLAN



3F PLAN

NO7 EL-REMAL (H/24)

BUILDING LAYOUT 1 : 600



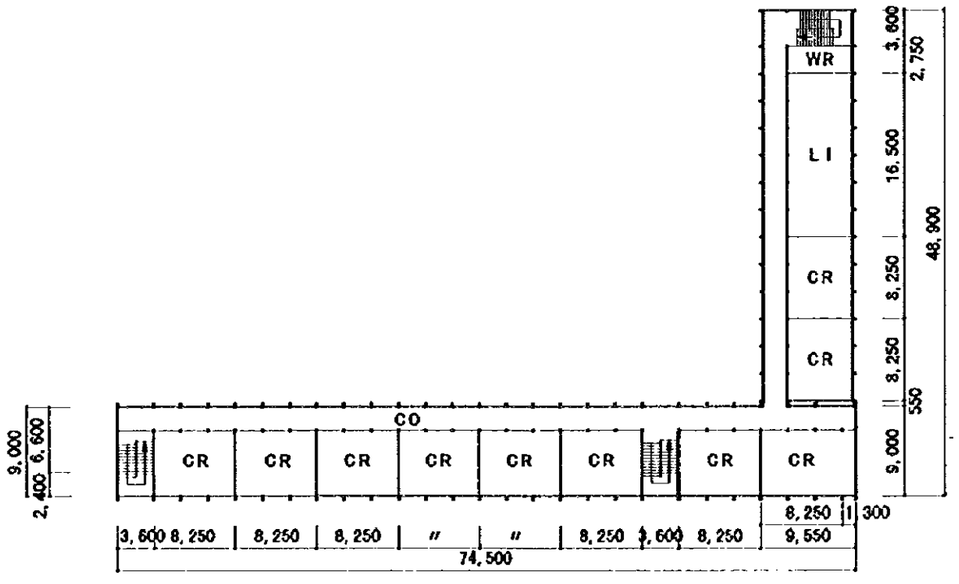
BUILDING LAYOUT/1F PLAN

(NOTES)

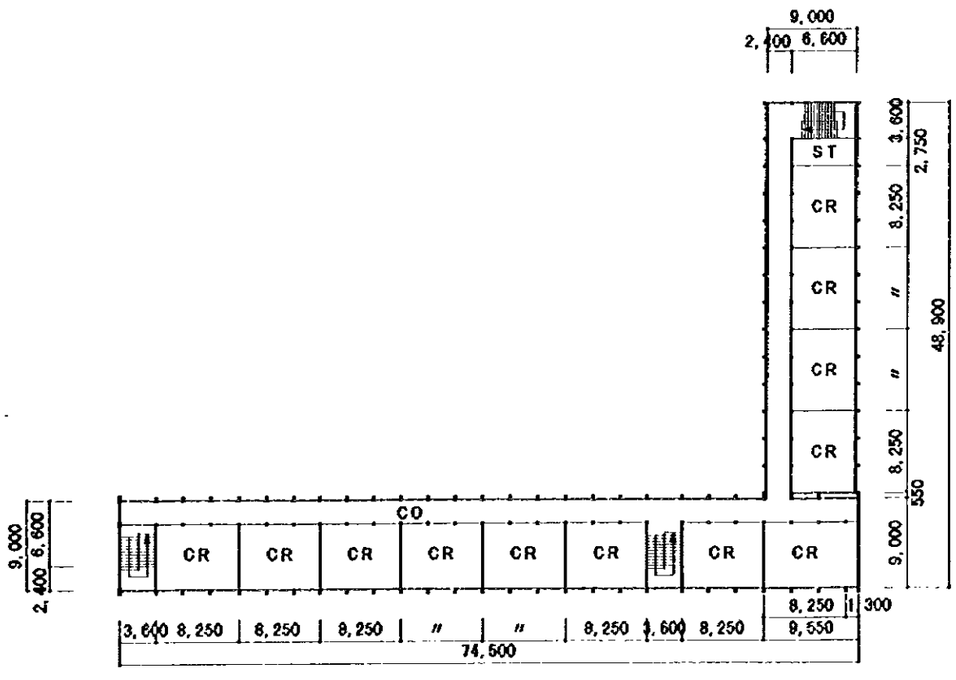
INTER LOCKING BLOCK PAVEMENT

CONCRETE PAVEMENT

CR	-----	CLASSROOM	KT	-----	KITCHEN
SL	-----	SCIENCE LABORATORY	ST	-----	STORAGE
PR	-----	PREPARATORY ROOM	MR	-----	MACHINE ROOM
MU	-----	MULTIPURPOSE ROOM	CO	-----	CORRIDOR
LI	-----	LIBRARY	GH	-----	GUARD HOUSE
WR	-----	WORK ROOM	CT	-----	CANTEEN
HO	-----	HEADMASTER'S OFFICE	SH	-----	SHED
SR	-----	SECRETARY'S ROOM	TO	-----	STAFF TOILET
TR	-----	TEACHER'S ROOM	WC	-----	STUDENT TOILET
FA	-----	FIRST AID	DT	-----	DISABLED TOILET
FP	-----	FLAG POLE	P	-----	PIT
			M	-----	METER
			T	-----	WATER TANK
			S	-----	SEPTIC TANK
			E	-----	ELECTRIC & TELEPHONE POLE



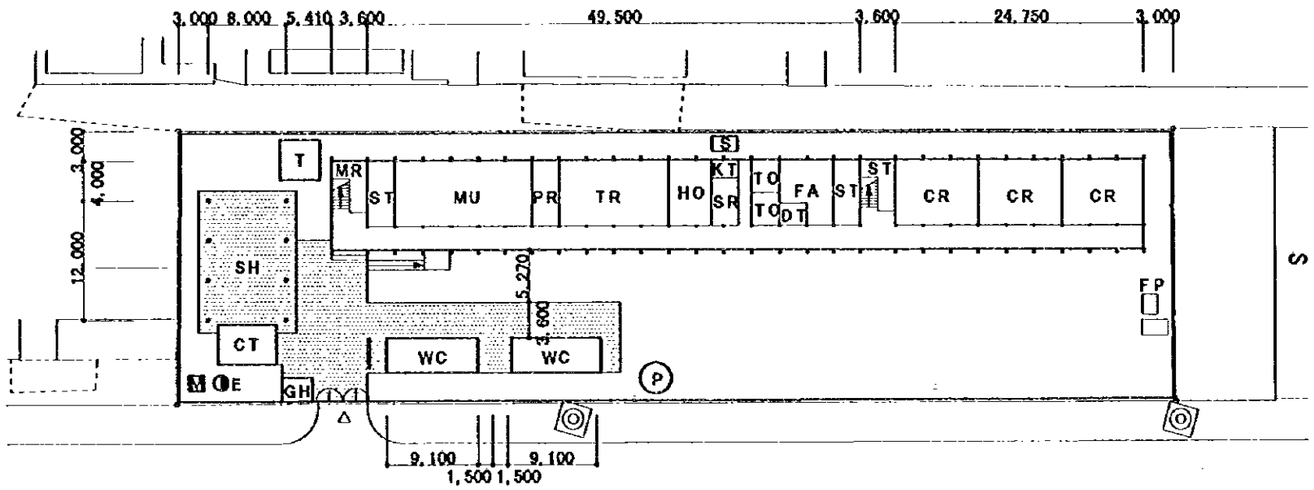
2F PLAN



3F PLAN

N08 NEAR K.Y. DISTRICT OFFICE (L/18)

BUILDING LAYOUT 1 : 600

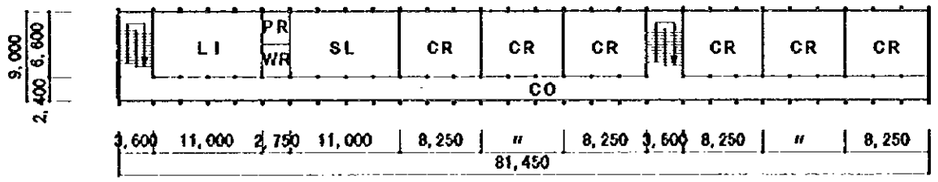


(NOTES)

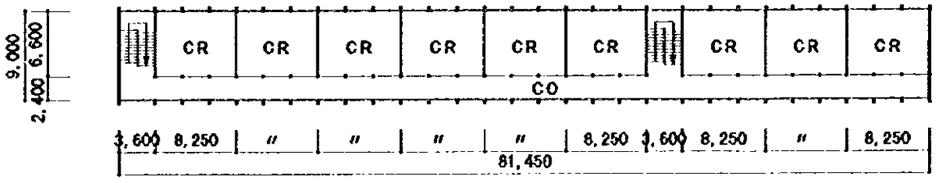
- INTER LOCKING BLOCK PAVEMENT
- CONCRETE PAVEMENT

CR	-----	CLASSROOM	KT	-----	KITCHEN
SL	-----	SCIENCE LABORATORY	ST	-----	STORAGE
PR	-----	PREPARATORY ROOM	MR	-----	MACHINE ROOM
MU	-----	MULTIPURPOSE ROOM	CO	-----	CORRIDOR
LI	-----	LIBRARY	GH	-----	GUARD HOUSE
WR	-----	WORK ROOM	CT	-----	CANTEEN
HO	-----	HEADMASTER'S OFFICE	SH	-----	SHED
SR	-----	SECRETARY'S ROOM	TO	-----	STAFF TOILET
TR	-----	TEACHER'S ROOM	WC	-----	STUDENT TOILET
FA	-----	FIRST AID	DT	-----	DISABLED TOILET
FP	-----	FLAG POLE	P	-----	PIT
			M	-----	METER
			T	-----	WATER TANK
			S	-----	SEPTIC TANK
			E	-----	ELECTRIC & TELEPHONE POLE

BUILDING LAYOUT/1F PLAN



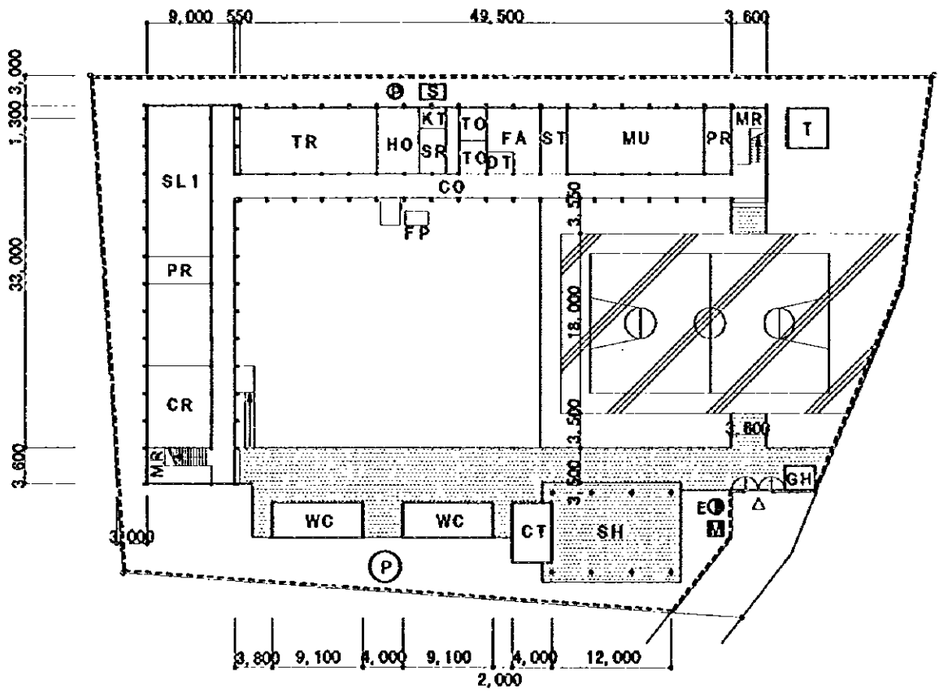
2F PLAN

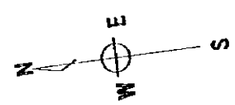


3F PLAN

NO9 WADI EL-SALGA (H-L/18)

BUILDING LAYOUT 1 : 600





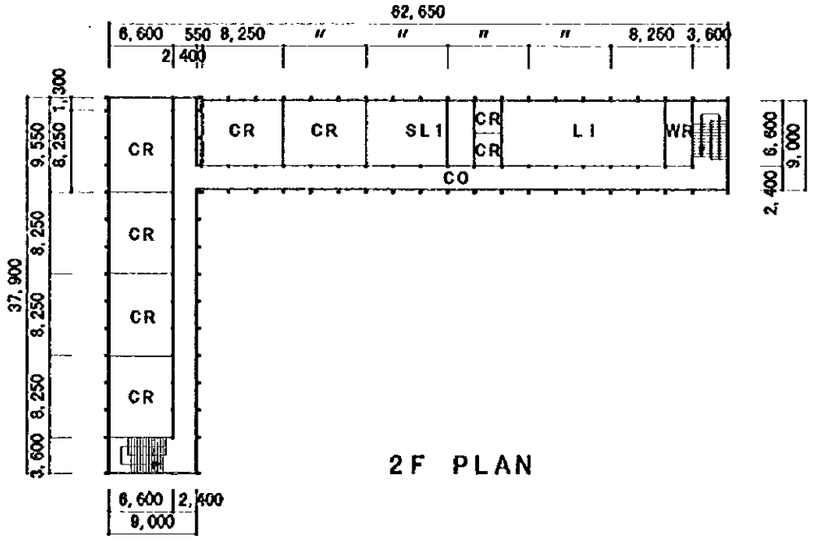
(NOTES)

INTER LOCKING BLOCK PAVEMENT

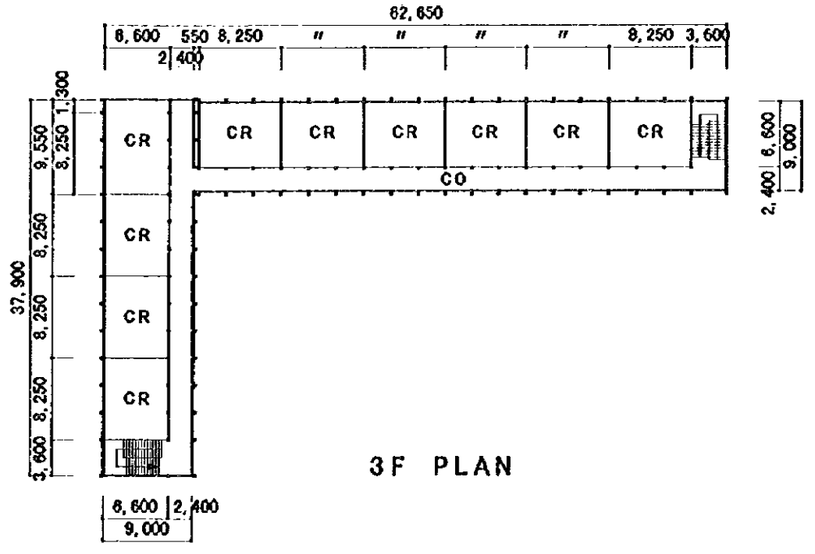
CONCRETE PAVEMENT

CR	-----	CLASSROOM	KT	-----	KITCHEN
SL	-----	SCIENCE LABORATORY	ST	-----	STORAGE
PR	-----	PREPARATORY ROOM	MR	-----	MACHINE ROOM
MU	-----	MULTIPURPOSE ROOM	CO	-----	CORRIDOR
LI	-----	LIBRARY	GH	-----	GUARD HOUSE
WR	-----	WORK ROOM	CT	-----	CANTEEN
HO	-----	HEADMASTER'S OFFICE	SH	-----	SHED
SR	-----	SECRETARY'S ROOM	TO	-----	STAFF TOILET
TR	-----	TEACHER'S ROOM	WC	-----	STUDENT TOILET
FA	-----	FIRST AID	DT	-----	DISABLED TOILET
FP	-----	FLAG POLE	P	-----	PIT
			M	-----	METER
			T	-----	WATER TANK
			S	-----	SEPTIC TANK
			E	-----	ELECTRIC & TELEPHONE POLE

BUILDING LAYOUT/1F PLAN



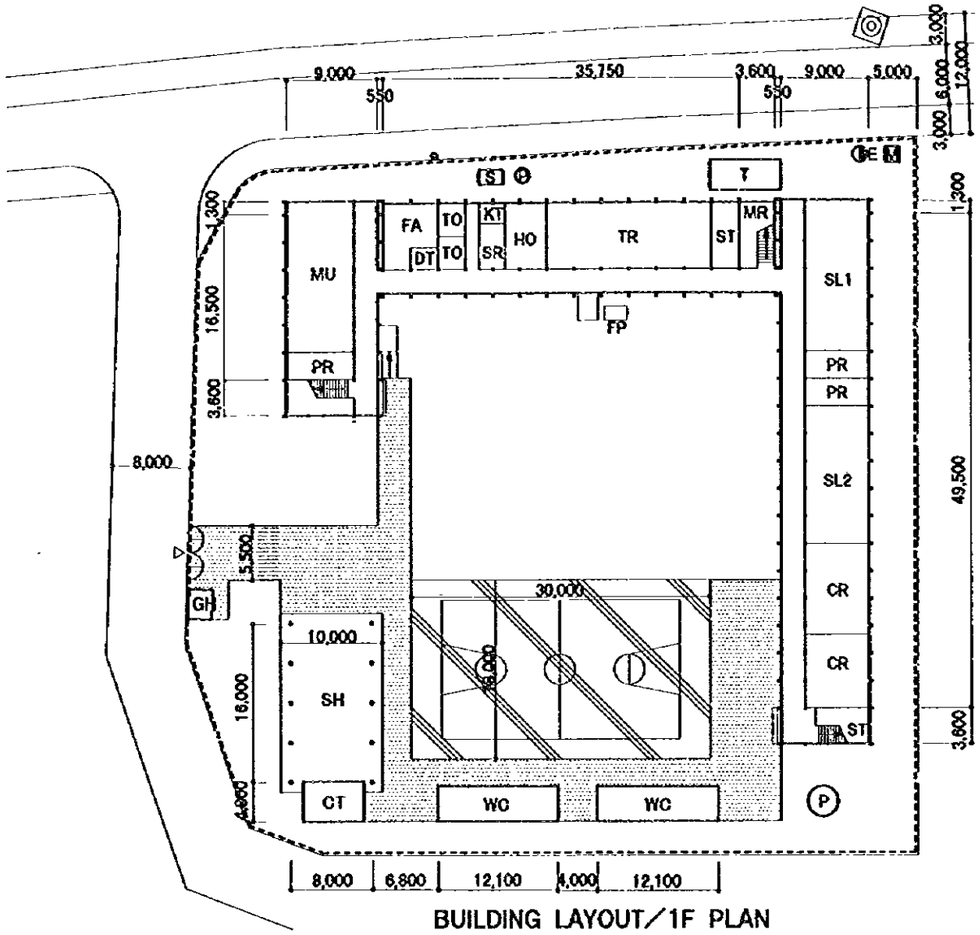
2F PLAN



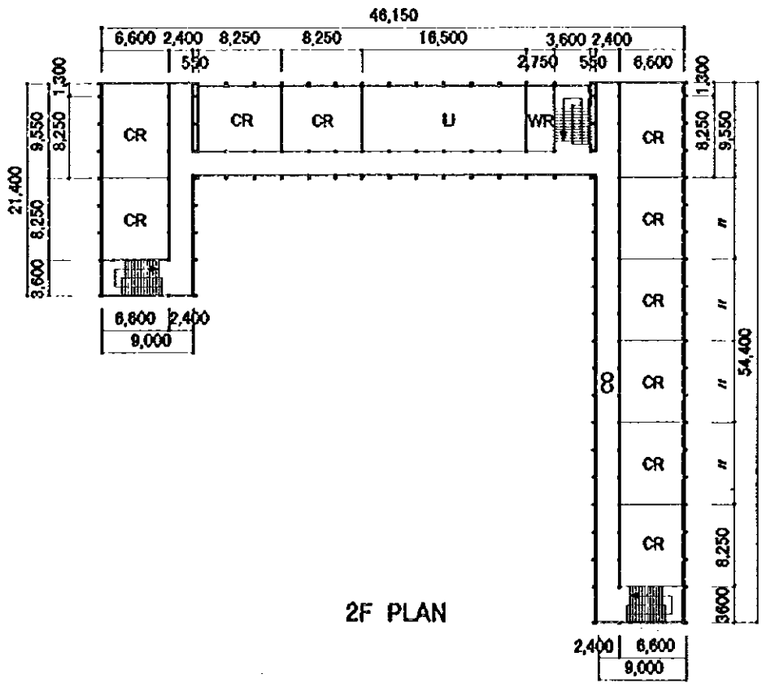
3F PLAN

NO10 TAMBORA (H-/24)

BUILDING LAYOUT／PLAN 1:600



BUILDING LAYOUT／1F PLAN



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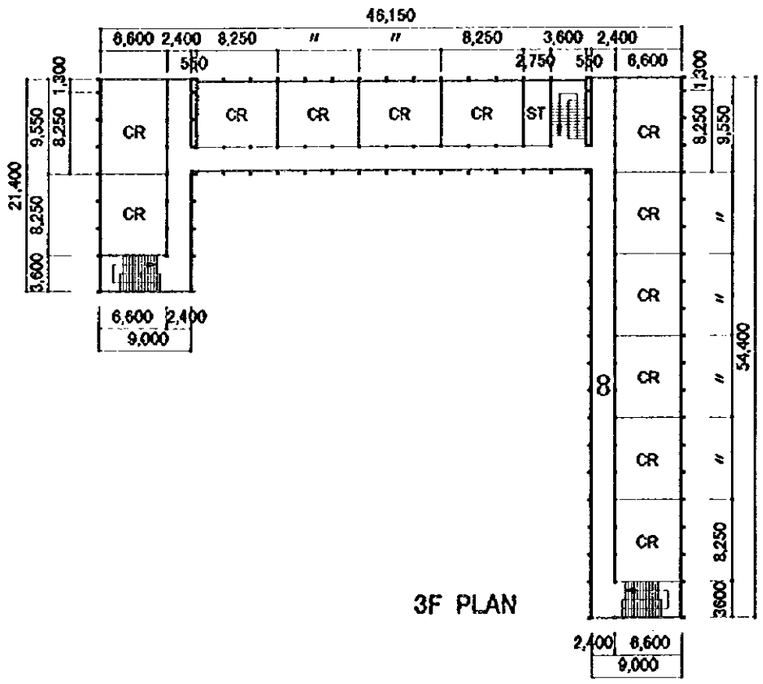


3F PLAN

(NOTES)

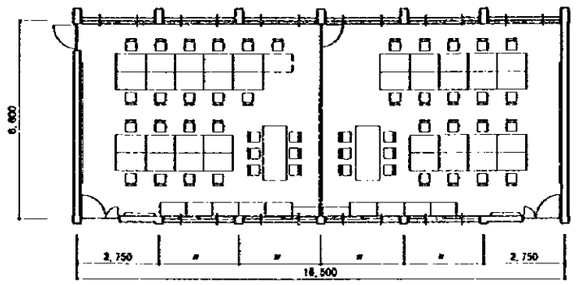
INTER LOCKING BLOCK PAVEMENT

CONCRETE PAVEMENT

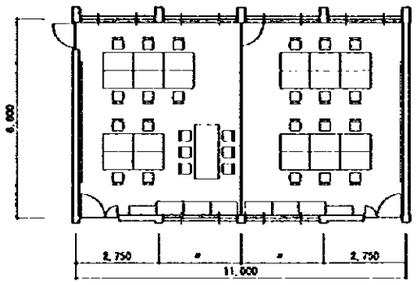
CR	CLASSROOM		KT	KITCHEN	
SL	SCIENCE LABORATORY		ST	STORAGE	
PR	PREPARATORY ROOM		MR	MACHINE ROOM	
MU	MULTIPURPOSE ROOM		CO	CORRIDOR	
LI	LIBRARY		GH	GUARD HOUSE	
WR	WORK ROOM		CT	CANTEEN	
HO	HEADMASTER'S OFFICE		SH	SHED	
SR	SECRETARY'S ROOM		TO	STAFF TOILET	
TR	TEACHER'S ROOM		WC	STUDENT TOILET	
FA	FIRST AID		DT	DISABLED TOILET	
FP	FLAG POLE		P	PIT	
			M	METER	
			T	WATER TANK	
			S	SEPTIC TANK	
			E	ELECTRIC & TELEPHONE POLE	

ROOM LAYOUT

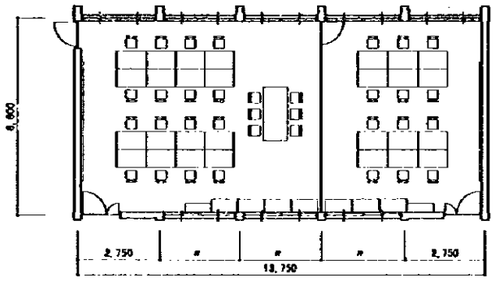
PLAN 1 : 200



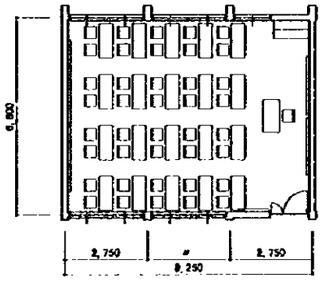
TEACHER'S ROOM (H/24,H-L/24) PLAN1



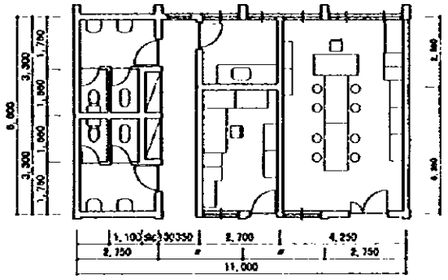
TEACHER'S ROOM (L/18) PLAN3



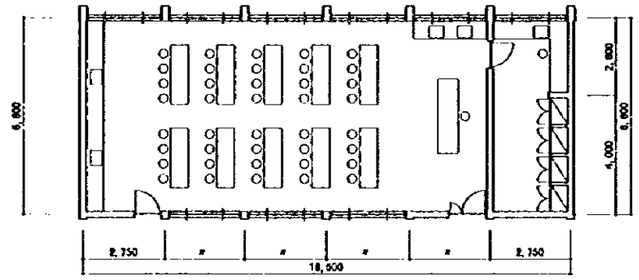
TEACHER'S ROOM (H-L/18,L/24) PLAN2



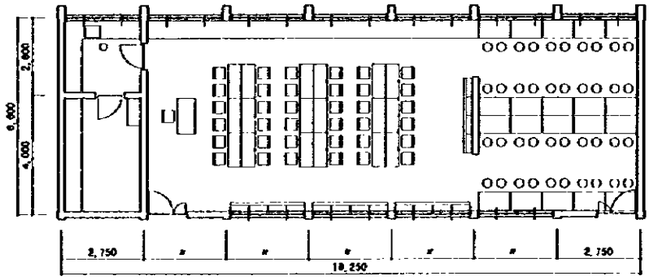
CLASSROOM PLAN



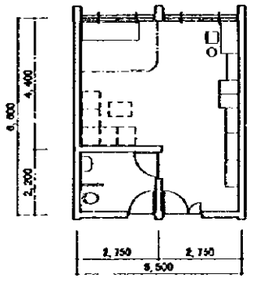
HEADMASTER'S ROOM PLAN
SECRETARY'S ROOM PLAN



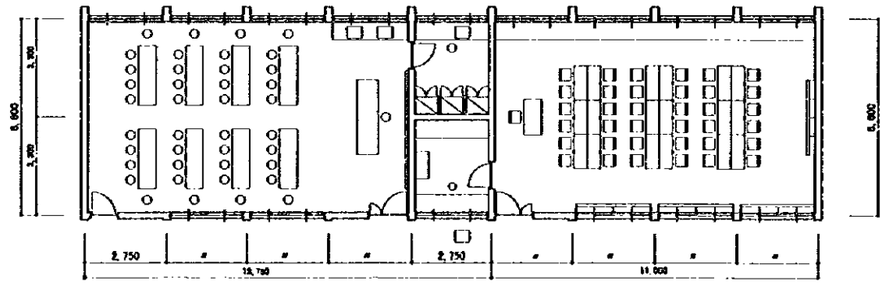
SCIENCE LABORATORY (HIGH BASIC) PLAN1



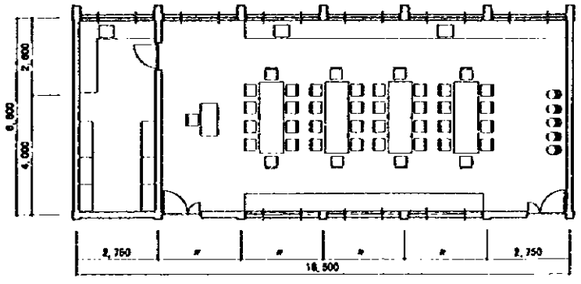
LIBRARY (HIGH BASIC) PLAN1



FIRST AID PLAN



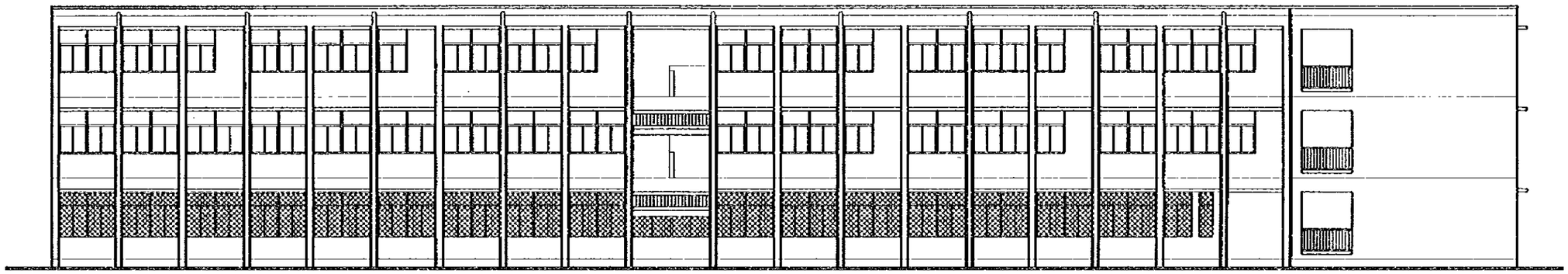
SCIENCE LABORATORY (LOW BASIC) PLAN2 LIBRARY (LOW BASIC) PLAN2



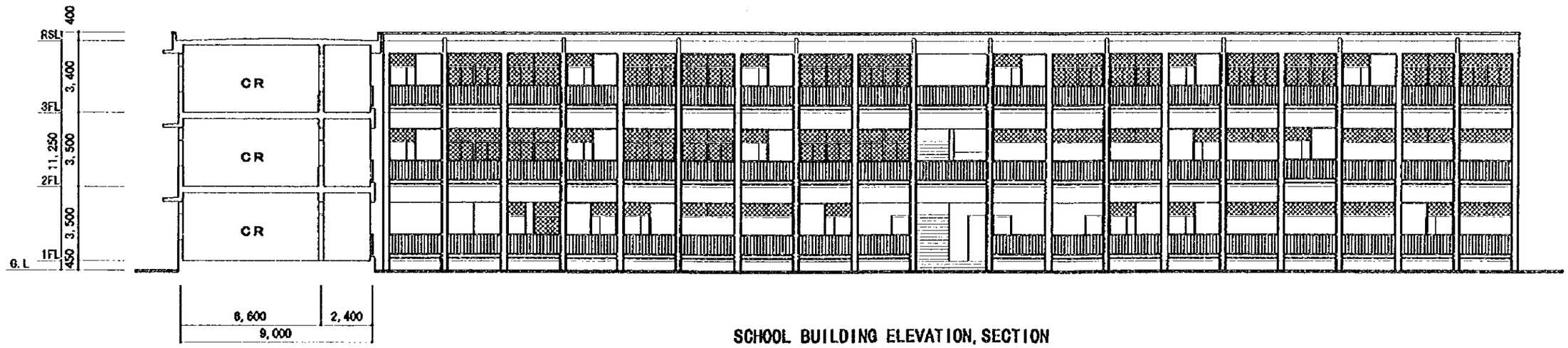
MULTIPURPOSE ROOM PLAN

SCHOOL BUILDING

ELEVATION/SECTION 1 : 200



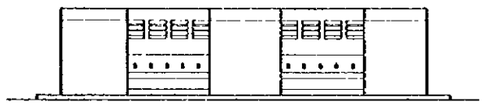
SCHOOL BUILDING ELEVATION



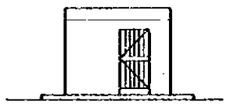
SCHOOL BUILDING ELEVATION, SECTION

STUDENT TOILET,CANTEEN,SHED
PLAN/ELEVATION/SECTION 1:200

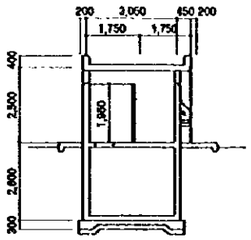
STUDENT TOILET



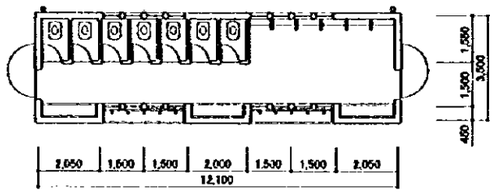
ELEVATION 1



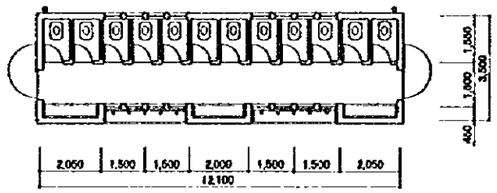
ELEVATION 2



SECTION

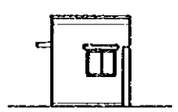


STUDENT TOILET(BOY)

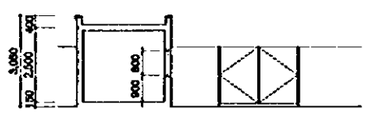


STUDENT TOILET(GIRL)

GUARD HOUSE



ELEVATION 1



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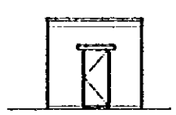

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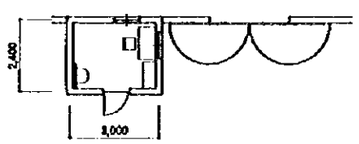
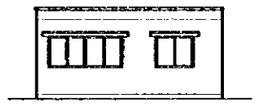
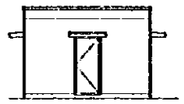


PLAN

CANTEEN



ELEVATION 1



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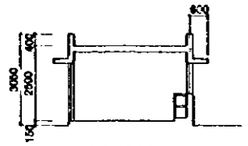
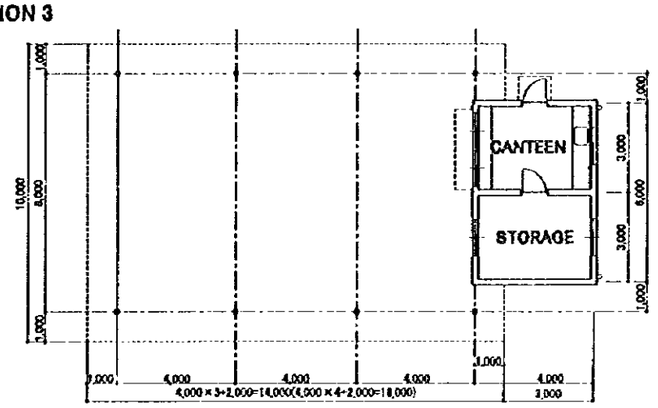


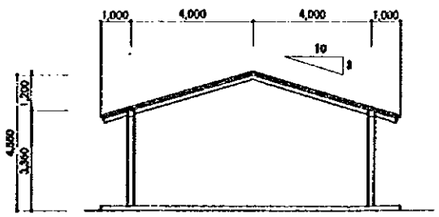
SECTION

ELEVATION 3

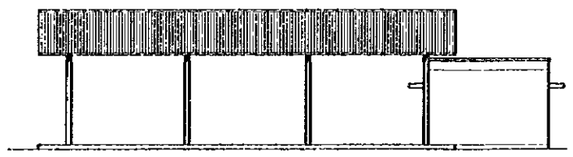


CANTEEN, SHED PLAN

SHED



SHED ELEVATION 1



SHED SECTION 2