Chapter 2 Contents of the Project

Chapter 2　Contents of the Project

2-1.Basic Concept of the Project

2-1-1. Overall Goal and Project Purpose

In the “National Development Plan (hereinafter referred to as NDP)” formulated in May 2002, education is positioned as just an important field for national development as health or agriculture, and the "increase in access to education", "improvement of educational quality", and "rationalization of education provisions in relation to the varying needs of different areas" are set as targets towards "improvement of the education status of people in Timor-Leste" which is an educational development goal. In order to realize the above-mentioned objectives, the “achievement of a universal primary school education” as a long term (over a 5-10 year period) strategy, and the “rationalization of education provisions through building new schools, increasing school size, and closing redundant schools” as a short term (over a 2-3 year period) strategy are also set, to which this Project contributes.

Taking these policy frameworks into account, this Project plans to construct primary and junior secondary school facilities, with the aim of starting school operation of the EB and increasing the accommodating capacity of these basic educational facilities.

2-1-2. Outline of the Project

For the achievement of the Project purpose, the Project will construct a minimum number of classrooms, special classrooms, toilet facilities and teachers’ rooms necessary for school operations, and procure the necessary educational furniture at 6 EB, which were not covered by the FSQP, and 6 PS.

To fully accomplish the Project purpose and overall goal, the proper operation and maintenance of the schools is indispensable for long-term use of both the existing and newly constructed facilities by the Project. Considering this, the Project will, in parallel to construction, introduce a software component, which aims to motivate the schools to start appropriate maintenance and repair activities.

2-2 Basic Design of the Requested Japanese Assistance

2-2-1. Design Policy

2-2-1-1. Principles of the Project

The purpose of this Project is to select the schools to fund under the Grant Aid among a total of 18 candidate schools based on the request by the Government of Timor-Leste. They are 6 EB and 12 core schools of a cluster system[2] of PS. MECYS has adopted the basic school plan designed by FSQP as the standard school facility design (hereinafter referred to as Design Standard) in the country of Timor-Leste. Therefore, the Project will plan and design the schools in the Project according to the Design Standard. Both the country of Timor-Leste and the Basic Design Study Team of the Project agreed upon the "selection criteria" and the results of the Site Survey used for the selection. Components to be provided by the Grant Aid include the minimum facilities and educational furniture for the basic school operation and management of the selected EB and PS. Since there is no emergency need of other educational equipment, such as science equipment, and materials at this stage, educational equipment and materials are not included in the Project. The size and scale of each school building will be determined according to the number of current students in each project school, and those determinations will be compared to that of the existing usable school buildings so that facilities with shortages can be improved.

2-2-1-2. Policies Regarding Natural Conditions

(1) Climate Conditions

Considering the tropical climate, with its high temperature and humidity found in Timor-Leste, site planning, cross sectional planning, and the sizes and locations of openings will be thoroughly examined to find the most suitable types while keeping enough natural light and ventilation; heat radiant measures are taken for the best protection against the strong heat coming down from the roof; the depth of eaves

[2] "Cluster" is the basic concept of the "100 School Project" which UNICEF is carrying out, and means a geographically close school group. Each cluster is organized with one main core school and other satellite schools, which share facilities and human resources within the cluster. The "cluster system" attempts to achieve an efficient use of resources.

are considered to prevent the rain from blowing into the rooms during the rainy season and still allow enough morning and evening sunlight to come into the rooms. Although cyclone damage has not been recorded in the past 28 years, a building structure suitable to protect against strong winds is designed into each facility as considerably strong winds blow during the monsoon rains. Because of the rainy season from December to April, some of the outside construction work may run into difficulties, such as the transporting of materials, etc. Thus, a careful construction schedule shall be made. In addition, to prevent submersion of floors during severe rains, the finished floor levels of the buildings are set higher than the ground level if necessary.

(2) Termite Control

In order to avoid termite damage which occurs frequently in Timor-Leste, suitable termite control measures, the careful use of wood materials and those locations shall be taken into consideration.

(3) Earthquakes

Although the country of Timor-Leste does not keep exact records of earthquake activity, there have been several small earthquakes in the past. Therefore, seismic designs shall also be included in the structural system plans.

(4) Geological Conditions

Although the stratum of the Project sites shows clay, stone mixture clay, and massive base rocks under the ground, there are no foreseeable major problems for building construction. Often after rains, landslides happen in the mountain areas because of the high gravel content in the soil with low viscosity. Safety measures and the preparation and protection against many types of disasters at, especially, the sloped sites in mountain areas are necessary. Careful attention to the surrounding geology of the building facilities is crucial.

2-2-1-3. Policies Regarding Social Conditions

Because of the shortage of most public facilities, it is expected that people from the surrounding communities will use the Project schools for multiple purposes. The Project facilities shall be planned and designed for multi-functional uses. Moreover, since the core schools of the cluster system have been selected, the primary schools can use their facilities for teacher training, etc.

2-2-1-4. Policies Regarding Construction in Timor-Leste

(1) Construction Materials and Equipment

In the country of Timor-Leste, construction depends on the outside procurement of most construction materials, except aggregate and some others, from neighboring countries, including Indonesia. Therefore, the selection of construction materials and equipment, as well as the country of procurement, shall be carefully made based on the ease of the future maintenance of buildings and procurement.

(2) Labor

Although employment is in high demand, the finding of skilled local workers to hire is extremely difficult these days because many of the skilled workers have gone to foreign countries, including the territory of Indonesia, to escape past conflict in the country. For this reason, many local construction companies have established a system by which skilled foreign workers are hired for technically skilled positions, while the locals have to be content doing the unskilled labor. In this regard, the Project will hire foreigners for the skilled labor, but at the same time, try to maximize the use of local labor as much as possible through employing local people and through the transfer of construction techniques and technology to local workers, who in turn, can not only develop skills, but teach this information to others.

(3) Transportation

In general, except for some major highways in Timor-Leste, roads are narrow, unpaved, and in constant danger of being destroyed by floods or blocked by landslides; also, there are river crossings without bridges. For most of the Project sites trucks are probably the most practical means of transport. Selection of the construction materials and equipment shall be thoroughly examined to fit into 3-ton trucks for the best performance. Careful planning of construction schedule avoiding the rainy season also shall be made. Very careful thought must be exercised in considering this particular Project area.

The district of Oe-Cusse, in which one of the Project sites is located, is in a very remote area surrounded by the Indonesian border, which is difficult to cross. Thus, all the construction materials and equipment will be transported by ferries.

(4) Local Contractors

Even though there are construction companies in Timor-Leste, their number is limited. They are categorized as either local or foreign-affiliated companies, and their construction capabilities vary from firm to firm. Thus, the selection of local subcontractors requires careful screening to find the most capable ones; also, how to best utilize them to maintain strict scheduling, cost reduction and materials in quality construction must be considered.

(5) Local Consultants

Because the Project construction sites are scattered all over the country and access is difficult, the Project needs a few good local consultants and their assistants will be strategically positioned at multiple locations. However, there are few local consultants in Timor-Leste with the skills required of the Project. Most of those are already taken by other government organizations, assistance agencies or foreign-affiliated firms, so locating highly skilled people is quite difficult. Therefore, in addition to the local consultants, architects and engineers will be employed from the neighboring countries, and shall supervise the Project under the auspices of the Japanese consultant.

2-2-1-5. Policies Regarding Operation and Maintenance

Included as part of the Project is a detailed program plan that allows for the simple maintenance and repair of the facilities, and while aiming to be within administrative budget limitations, is also flexible enough to fit the individual conditions of each school. A software component will also be introduced so that maintenance and repair capabilities can be carried out, not only by the administrative persons from MECYS, but also by school officials and the PTA, which is the main school level organizer for these activities.

2-2-1-6. Policies Regarding the Quality of Facilities

According to FSQP design standard of the World Bank, the quality or grade of materials for the Project facilities shall be based on performance, durability and cost; of which, an effective cost reduction awareness, following the current trend for further cost efficiency of grant aid programs in general, will be implemented in the Project.

2-2-1-7. Policies Regarding Construction Schedule

In order to decide the most appropriate schedules and time periods regarding Project construction, the following details shall be carefully considered: Climate and the conditions or limitations that imposes on construction, road conditions, the efficiency and skill of the local contractors, the importing of skilled workers from other countries, the preparation and transportation for the importing of construction materials and equipment and cost impact effectiveness. All these have to be well thought out; and based on their detailed assessments, the most effective schedules and work periods shall be decided for the Project.

2-2-2. Basic Plan

2-2-2-1. Project School Selection

(1) Schools for Basic Design Study

Before the Basic Design Study Team was dispatched, a total of 26 schools, composed of 12 PS and 14 EB, were considered as candidate schools for the Project, according to the "Preparatory Study of the Project for Support of Reconstruction of Timor-Leste" in September, 2002, and the political negotiations in November, 2002. However, during the Basic Design Study 8 EB were deleted from the list of candidates for the following reasons: 1) A budget had already been made and the project has started on 4 EB by FSQP, 2) one has been planned as part of another project, 3) one requires only minor repairs, 4) one school site has geological problems, and 5) one is located on a detached island. Thus, these 8 EB were deleted from the list of candidates, but the other six EB schools were kept in consideration.

According to the decision to reintroduce the school cluster system by MECYS in December 2002, 14 PS proposed in the Preparatory Study were assigned as "core schools" of the cluster system. Finally, a total of 12 PS were requested, one in each district except the District of Dili.

Consequently, a total of 18 schools, composed of 6 EB and the 12 PS, became the final candidate schools for the Project study.

The candidate schools are listed in Table 2-1.

Table 2-1 List of the Candidate Schools

No.	School Name	District	Sub District
EB-1	EPS P 2 SUAI	COVALIMA	SUAI VILA
EB-2	EPP CABIRA OAN	VIQUEQUE	VIQUEQUE
EB-3	EPS P 3 VILA NOVA	BAUCAU	BAUCAU
EB-4	EPS P BALIBO NEGERI	BOBONARO	BALIBO
EB-5	EPS P VASCO DA GAMA	MANATUTO	MANATUTO
EB-6	EPS P OE-SILO	OE-CUSSE	OE-SILO
PS-1	LETEFOHO VILA	ERMERA	LETEFOHO
PS-2	MARKO	BOBONARO	CAILACO
PS-3	DAUDERE	LAUTEM	MORO
PS-4	LUCA	VIQUEQUE	VIQUEQUE
PS-5	REMEXIO	AILEU	REMEXIO
PS-6	TIBAR	LIQUICA	BAZARTETE
PS-7	LAISURULAI	BAUCAU	QUELICAI
PS-8	DOTIK	MANUFAHI	ALAS
PS-9	MAUBISSE	AINARO	MAUBISSE
PS-10	SAMORO	MANATUTO	SOIBADA
PS-11	BELULIK LETEN	COVALIMA	FATUMEAN
PS-12	FAOTBENA TAENO	OE-CUSSE	NITIBE

(2) Criteria for Project School Selection

Both the countries of Timor-Leste and Japan have agreed to follow the selection criteria shown below to select the final Project schools.

① Escolas Basicas and primary schools officially selected by MECYS.

② Urgently needs reconstruction of the existing buildings or construction of additional classrooms (due to over aging of the existing buildings, damage of the existing buildings, overcrowding, etc).

③ The present and future demand for basic education facilities is quantitatively estimated by a set of data such as the number of school-aged children, the rates of population growth, enrollment ratio, etc.

④ Sufficient teachers, budget allocation, and necessary cooperation from concerned people for the proper operation and maintenance of the facilities are secured.

⑤ Topographically safe and appropriate-sized land for construction is secured.

⑥ The ownership of land for construction is legally secured, and the evidence of land ownership will be provided to Japanese side by early July 2003.

⑦ Access road for the movement of materials and for the construction works is properly constructed.

⑧ No restriction on conducting necessary demolishing works for construction.

⑨ Allocation of necessary temporary classrooms during construction is secured.

⑩ No other program or plan for new/undergoing classroom construction by the MECYS, local government, other donors, NGOs and so forth.

⑪ No foreseen natural and environmental or social hazard.

(3) Selection of the Project Schools

As a result of the Basic Design Study site surveys, 12 schools were finally selected from the 18 candidate schools and 6 were disqualified. The disqualified schools are listed in Table 2-2.

Table 2-2 The List of Disqualified Schools

	No.	School Name	District	Reason of Disqualification
①	PS-7	Laisurulai	Baucau	No access to the site because of the route damage from a landslide
②	PS-12	Faotbena Taeno	Oe-Cusse	No access to the site because of an impossible river crossing according to the rise of river water by heavy rain
③	PS-2	Marko	Bobonaro	No need of facility because building repair has already been made by other donor
④	PS-4	Luca	Viqueque	The land is owned by the church, and the continuous use of the land cannot be guaranteed in the future
⑤	PS-8	Dotik	Manufahi	Poor effectiveness of facility expansion and teacher replacement because of the too little number of students
⑥	PS-10	Samoro	Manatuto	No available space for construction

2-2-2-2. Project Components

(1) Facility Components

Each request for a facility component is examined regarding its necessity to the project as shown below:

① Classrooms

Many of the Project schools are facing a shortage of classrooms and operating their programs by employing emergency measures, such as reuse of dilapidated classrooms and classrooms damaged by past conflicts, instruction in overcrowded lessons, and a further increase in a Double shift system of class scheduling. Implementation of the EB program will increase student transfer from neighboring

schools to the schools having no classroom shortage, so that an even more acute classroom shortage is a distinct possibility. Therefore, this Project will provide and improve the school facilities to counter the increased classroom shortage.

② Teachers' Rooms

Following the Design Standard, one teachers' room shall be provided for each school so that the teachers have a work space. In Timor-Leste, the primary schools operate under a "homeroom teaching" system, whereas the junior secondary schools have a "subject teaching" system. According to the Design Standard, a teachers' room shall be installed in the administration building of the junior secondary schools regardless of what the primary school buildings do about their teachers' rooms. In addition to a teachers' room, a principal's office and a small room for administrative staff (1 to 2 persons), a storage room, a service room and toilets for the teachers shall be installed in accordance with the Design Standard. However, since the teachers' room is assumed to be convertible to a reception area, a separate reception area will not be included in the Project buildings. In accordance with the Design Standard, a storage room shall also be installed in the teachers' room in the primary school buildings.

③ Special Classrooms (multi-purpose rooms, libraries, laboratories)

In the Design Standard for EB, a library, a laboratory, and a multi-purpose room shall be designed into the buildings as special classrooms which were also requested for inclusion in the Project as components of EB. Although the purpose and use of the library is clear, it was never made clear to the study team, during the Basic Design Study, how EB would manage and maintain their library book collections. A very limited collection of books that can be checked out is now available in the existing schools. In addition, although the function of school laboratories is quite clear, the science curriculum in Timor-Leste is still being developed, so an accurate description of applied methods and uses as well as the frequency of use of the laboratory is very difficult to conclude at this time. However, these rooms are proposed in the Design Standard, and a new curriculum is scheduled to come out in fiscal year 2004 with FSQP planning the "Escola Basica software support" component for EB. Considering these points, the expectations are high that an efficient management program will be developed and facilities such as laboratories will be highly utilized.

On the other hand, in regards to the use of multi-purpose room, the Timor-Leste side explained that the multi-purpose room will be used for: 1) student and community meetings, 2) non-formal education, such as adult and literacy education,

and 3) all other school events. However, even considering this probability, it is impractical for the Project to consider providing separate multi-purpose rooms that may not be wholly utilized. Thus, multi-purpose rooms assuming a primary use as a library and as a science laboratory will be prepared for EB. In addition, these multi-purpose rooms are planned to include a movable partition, which will allow each of the rooms to be used as two separate rooms, or as one combined room for large-scale meetings, if needed. A storage room shall be included for each multi-purpose room for keeping books, teaching equipment and materials, etc, in accordance with the Design Standard.

④ Student Toilets

There is a great shortage of toilets for students in both primary and junior secondary schools in Timor-Leste including in the Project schools, so the toilet facilities for students will be provided.

(2) Electrical Facilities

Since electric power is supplied to all 6 EB, and since electric devices, such as electric fan, are expected to be used by teachers as well as residents for nighttime community meetings, and others, lighting fixtures and electrical outlets shall be installed, in accordance with the Design Standard, in the teachers' rooms and in the multi-purpose rooms. However, electrical facilities shall not be installed in the general classrooms of EB nor in PS.

(3) Water Supply, Sewage Disposal and Sanitary Facilities

In order to improve the toilet facilities, the following plumbing system shall be installed in each Project school.

① One Water Supply Tank (combined use of rain water, city water and well water)
② One Water Tub next to the toilet bowl in each toilet stall
③ One Faucet for the water tub
④ One Septic Tank and a Percolation Trench

(4) Exterior Work

Gutter: A gutter will be installed for rainwater drainage at the necessary place.

Retaining Wall: PS-1 (Letefoho Vila), is located on a steeply sloped site. Therefore, erosion prevention shall be taken into consideration, and a retaining wall or riprap will be installed where such safety measures need to be taken.

(5) Educational Furniture

In the Project, basic educational furniture shown in table 2-3 will be supplied on the basis of "the necessary minimum" for efficient use of the facilities.

Table 2-3 The List of Furniture

	Room Name	Contents of Furniture
①	Classroom	Desks (one for two students) and Chairs for students, Desk and Chair for teachers, Blackboard, Bulletin Board
②	Multipurpose Room ① (also utilized as Library)	Desks (one for two students) and Chairs for students, Desk and Chair for a librarian, Bookshelf
③	Multipurpose Room ② (also utilized as Laboratory)	Desks (for two students) and Chairs for students, Desk and Chair for teachers, Blackboard, Bulletin Board, Experiment Sink (2)
④	Teachers' Room (EB)	Desk and Chair for principals (EB), Desk and Chair for staffs, Desk and Chair for teachers, Blackboard, Bulletin Board
⑤	Teachers' Room (PS)	Desk and Chair for teachers, Blackboard, Bulletin Board
⑥	Storage	Not Applicable

(6) Educational Equipment and Materials

The country of Timor-Leste requested that materials for science experiments be provided for the junior secondary education levels of 6 EB. However, science equipment and related materials are not included in the scope of this Project, and it is regarded as a responsibility of the recipient country's own efforts to attain those items, for the following reasons: 1) UNICEF is planning to develop a program for the maintenance of basic teaching materials for primary schools all over the country; 2) Although a teaching manual detailing the recycling of articles used in science experiments has been developed, the specific curriculum and syllabus regarding the requested equipment are still being developed; and 3) the concrete details of the relationship between the equipment & materials requested by the recipient country and their actual use in the application of scientific experiments is unclear and undefined.

2-2-2-3. Setting up of Component Sizes for the Project

(1) Classrooms

1) Prerequisites

The number of Project classrooms is calculated following the criteria of MECYS and FSQP, and the following assumptions:

- Number of Students per Classroom: 40 students maximum
- Class Shift System: Double-shift system maximum (however, PS-1 and PS-11 use a single-shift system[3])
- Appropriate number of classes: Based on 40 students per class, the total number of students divided by 40 calculates the number of classes (fractions rounded to the next highest integral number)
- Appropriate number of classrooms: Based on the 40 students per class, the appropriate number of class divided by the number of shifts held.(fractions rounded to the next highest integral number)
- The minimum number of required classrooms: EB: 9 classrooms, PS: 6 classrooms[4].
- The number of required classrooms: In the case of a discrepancy between the number of appropriate classrooms and the number of the minimum required classrooms, the larger of the two will be adopted as the required number.
- The number of Project classrooms to be built: The number of required classrooms minus the number of existing usable classrooms.

2) Projected Number of Students at Each Project School

The projected number of students at each Project school is based on the number of the students present at the time of the Basic Design Study, and the future increase of the student population is not taken into account, because the total number of students in both primary and junior secondary schools is assumed decreasing[5] in a long period according to the effect of future facility improvement, although the population of Timor-Leste is expected increasing from now on.

---

[3] Refer to the P2-11

[4] According to the Design Standard, minimum one classroom for each grade (9 classrooms for EB and 6 classrooms for PS) shall be required at each school.

[5] School Mapping Data, September 2001

Of 6 EB, only one, EB-3 (Vila Nova) has been operating both primary and junior secondary schools. The other five EB have either been running only a primary or only a junior secondary school or neither because the school sites were abandoned or are not being used. MECYS district offices of these five school jurisdictions are now planning to make these 6 schools expanding their operations to include both primary and junior secondary schools by having students from neighboring schools transferred to them. After the transfer of students, those neighboring schools will continue to operate. The number of students who will be transferred is based on the following:

① Those schools that are operating both primary and junior secondary schools will continue operation with all the students of both primary and junior secondary schools. (EB-3)
② A total of 120 junior secondary students (40 per classroom x 3 grades) from the neighboring schools are projected to be transferred into those schools that are now operating only primary classes. Thus, the Project bases the total number of students to be 120 plus the primary students already at those schools. (EB-2)
③ A total of 240 primary students (40 per classroom x 6 grades) from the neighboring schools are projected to be transferred into those schools that are now operating only junior secondary classes. Thus, the Project bases the total number of students to be 240 plus the junior secondary students already at those schools. (EB-4, EB-5, EB-6)
④ On the assumption that a total of 360 students(240 primary & 120 secondary) from the neighboring schools are projected to be transferred into those schools that are not currently operating, the Project bases the total number of students to be 360. (EB-1)

In addition, neighboring schools, which are planning to transfer students to the new schools, have a shortage of classrooms currently. Even after the student transfer to the Project schools is completed, these schools will not have any unused classrooms. The numbers of classroom shortage after the student transfer at neighboring schools of EB are as shown in table 2-4.

Table 2-4 Number of Classroom Shortage after the Student Transfer at Neighboring Schools of EB

School ID	Catchment Area	Scheduled Number of Transferring Student		Neighboring Schools in the Same Catchment Area							Number of Classroom Shortage after Student Transfer
				Number of School	Existing Number of Student	Number of Student after Transferred	Proper Number of Class	Number of Classroom			
								Existing	Ratio of Damaged Classroom	Usable	
EB-1	Camanasa	P	240	9	2,072	2,312	52	51	2%	50	2
		JS	120	2	810	930	21	20		20	1
EB-2	CarauBalu	P	-	-	-	-	-	-	0%	-	-
		JS	120	2	893	1,013	23	20		20	3
EB-3	Buibau	P	-	-	-	-	-	-	-	-	-
		JS	-	-	-	-	-	-		-	-
EB-4	Balibo	P	240	9	1,325	1,565	34	28	6%	26	8
		JS	-	-	-	-	-	-		-	-
EB-5	Aiteas	P	240	6	1,442	1,682	37	43	15%	35	2
		JS	-	-	-	-	-	-		-	-
EB-6	Bobometo	P	240	5	987	1,227	25	27	12%	24	1
		JS	-	-	-	-	-	-		-	-

P: Primary School, JS: junior Secondary School

Note 1: Number of neighboring schools, students and classrooms, and ratio of damage are based on the data of "School Mapping, 1991." Ratio of damaged classroom describes the percentage of Irrecovarable Classrooms among all existing classrooms set by each Sub-District. The number of classroom shortage after the student transfer is calculated on the basis of single shift program.

Note 2: As EB-3 (Vila Nova) is already operating both primary and junior secondary schools, there is no plan to transfer students

With the exception of one PS, all the PS are currently operating only primary school programs and no students are projected to transfer into them like EB. The one exception is the PS-5 (REMEXIO), which will accept all the students from the neighboring school of Saint Jose because the Government of Timor-Leste plans to convert the Saint Jose School to become a junior secondary school in 2004.

Projected number of students for each project school is shown in table 2-5.

Table 2-5 Projected Number of Students of Each Project School

No.	School Name	Number of Existing Students		Number of Transferring Students		Proposed Number of Students		
		P	JS	P	JS	P	JS	Total
EB-1	EPS P 2 SUAI	-	-	240	120	240	120	360
EB-2	EPP CABIRA OAN	352	-	-	120	352	120	472
EB-3	EPS P 3 VILA NOVA	822	420	-	-	822	420	1,242
EB-4	EPS P BALIBO NEGERI	-	240	240	-	240	240	480
EB-5	EPS P VASCO DA GAMA	-	514	240	-	240	514	754
EB-6	EPS P OE-SILO	-	438	240	-	240	438	678
PS-1	LETEFOHO VILA	502	-	-	-	502	-	502
PS-3	DAUDERE	265	-	-	-	265	-	265
PS-5	REMEXIO	334	-	204	-	538	-	538
PS-6	TIBAR	358	-	-	-	358	-	358
PS-9	MAUBISSE	766	-	-	-	766	-	766
PS-11	BELULIK LETEN	264	-	-	-	264	-	264

P: Primary School, JS: junior Secondary School

3) Number of Existing Usable Classrooms

The existing facilities of each school were classified into the following three categories:

① Buildings deemed unfit; continuous use is impossible.
The buildings with severe structural damage and/or defects caused by fire and/or structural decrepitude are judged to be impossible to use without major and expensive structural reconstruction.

② Buildings deemed fit; continuous use is possible with repairs.
The buildings with relatively stable structures and only minor damage are judged to be possible to use after minor repair.

③ Buildings deemed fit; continuous use is possible in their present condition.
The buildings can withstand continuous use without repair.

The calculation of existing classrooms includes all of the existing classrooms located in the buildings of the above categories ② and ③ as usable facilities.

There are several classrooms that are now being used as both a teachers' room and a library. These will possibly be returned to the use of general classrooms again after the Project. Thus, these converted teachers' rooms and libraries shall be considered as one of the categories mentioned in ② and ③ above.

4) Primary Schools with single shift program

PS-1(LETEFOHO VILA), and PS-11 (BELULIK LETEN), are located in mountains where a remarkable vertical drop exists. Moreover, the school explains that they have many students attending from a long distance[6] and have difficulty managing the schools on a double-shift program. These schools are currently operating under the single shift program. Therefore, the required number of classrooms shall be calculated based on a single-shift program, which is currently employed.

5) The Number of Project Classrooms.

The number of Project classrooms at each school is described in table 2-6.

Table 2-6 The Number of Classrooms

No.	School Name	Number of Scheduled Student	Appropriate Number of Class	Class Shift Type	Appropriate Number of Classroom	Minimum Number of Required Classroom	Required Number of Classroom	Number of Existing Usable Classroom	Number of Classroom to be Constructed
EB-1	EPS P 2 SUAI	360	9	2	5	9	9	0	9
EB-2	EPP CABIRA OAN	472	12	2	6	9	9	0	9
EB-3	EPS P 3 VILA NOVA	1,242	32	2	16	9	16	23	0
EB-4	EPS P BALIBO NEGERI	480	12	2	6	9	9	4	5
EB-5	EPS P VASCO DA GAMA	754	19	2	10	9	10	11	0
EB-6	EPS P OE-SILO	678	17	2	9	9	9	0	9
PS-1	LETEFOHO VILA	502	13	1	13	6	13	9	4
PS-3	DAUDERE	265	7	2	4	6	6	3	3
PS-5	REMEXIO	538	14	2	7	6	7	2	5
PS-6	TIBAR	358	9	2	5	6	6	4	2
PS-9	MAUBISSE	766	20	2	10	6	10	0	10
PS-11	BELULIK LETEN	264	7	1	7	6	7	0	7

In addition, the ratio of the number of classrooms for primary grades to the number for junior secondary grades is set according to a projected rate of students at

[6] Maximum schooling time, PS-1 LETEFOHO VILA: 2 hours, PS-11 BELULIK LETEN: 50 minutes

the primary and junior secondary level in each school.

The ratio of the number of classrooms for each EB is shown in table 2-7.

Table 2-7 Ratio in Classroom Number of Primary/ Junior Secondary Grades for Each EB

No.	Number of Students after the completion of the Project			Number of Classroom after the completion of the Project			Number of Existing Usable Classrooms	Number of Classrooms Provided by the Project	
	P	JS	Total	P	JS	Total		P	JS
EB-1	240	120	360	6	3	9	0	6	3
EB-2	352	120	472	7	2	9	0	7	2
EB-4	240	240	480	4*	5	9	4*	0	5
EB-6	240	438	678	3	6	9	0	3	6

P: Primary, JS: Junior Secondary
* All the existing usable classrooms at EB-4 are counted as classrooms for primary schools

(2) Teachers' Rooms

1) Number of Teachers to be Accommodated in Teachers' Room at Each Project School

In Timor-Leste, the primary schools use a homeroom teaching system and the junior secondary schools use a subject teaching system. Therefore, the teachers' room is provided separately for both the primary and junior secondary schools, and the size of teachers' room is planned individually on the basis of the proposed number of teachers at each school. The calculation of the number of teachers is based on one teacher per class (homeroom teaching system) at the primary schools, and two teachers per class (national average on school mapping) for junior secondary schools. This is because accurate criteria for the placement of teachers have not been enacted by the Government of Timor-Leste. Therefore, this can be the best ratio of teachers to classrooms based on information available regarding facility sizes and the number of students. Furthermore, even if a school changes over to a double shift system, the morning shift teachers share the teachers' room and desks with the afternoon shift teachers. Based on this premise, the primary schools have as many teachers as the number of classrooms, and the junior secondary schools have two times as many teachers as the number of classrooms.

The number of proposed teachers in the teachers' room at each school is shown in table 2-8.

Table 2-8 The Number of Teachers to be Accommodated in Teachers' Room

No.	School Name	Number of Classrooms after the Completion of the Project		Number of Required Teachers to be Accommodated in the Teachers' Room		
		P	JS	P	JS	Total
EB-1	EPS P 2 SUAI	6	3	6	6	12
EB-2	EPP CABIRA OAN	7	2	7	4	11
EB-3	EPS P 3 VILA NOVA	15	8	15	16	31
EB-4	EPS P BALIBO NEGERI	4	5	4	10	14
EB-5	EPS P VASCO DA GAMA	3	8	3	16	19
EB-6	EPS P OE-SILO	3	6	3	12	15
PS-1	LETEFOHO VILA	13	-	13	-	13
PS-3	DAUDERE	6	-	6	-	6
PS-5	REMEXIO	7	-	7	-	7
PS-6	TIBAR	6	-	6	-	6
PS-9	MAUBISSE	10	-	10	-	10
PS-11	BELULIK LETEN	7	-	7	-	7

P: Primary, JS: Junior Secondary

2) Incidental Facilities

Regardless of the number of teachers, a principal's office (for one person), a space for two administrators, a storage room, a service room, and toilets for teachers (one booth for each sex) are uniformly installed in the administration building at each EB as incidental facilities. One storage room is installed in the teachers' room of each PS uniformly.

(3) Multi-purpose Room

In each EB, two multi-purpose rooms capable of accommodating 40 people with a storage room each shall be installed.

(4) Toilets

Because the toilet facilities at each project school are currently very few, the toilet facilities shall be improved by the Project. The number of new toilet units to be installed to each school is calculated on the total number of units needed per school based on total student population minus the number of actually existing and usable number of toilets to arrive at the number of additional toilet units the Project will provide. Although some schools operate classes using the double shift system, the Project proposes that the maximum number of toilet units for all schools should be calculated on the basis of the single shift system. One toilet unit per 30 students is

Timor-Leste's local standard. Compared to the Japanese standard (urinal: one unit per 25 persons, male toilet bowl: one bowl per 50 persons, female toilet bowl: one bowl per 25 persons)[7], the standard of Timor-Leste is slightly less, but the project will adopt the local standard. Since urinals are not generally used in Timor-Leste, urinals will not be taken into consideration in the Project. An equal number of toilet bowls shall be installed for both males and females, and the planned number of bowls divided into halves and distributed equally between the males and females. If there is an odd number of toilet bowls, one additional toilet bowl will be provided to make an equal balance for both males and females. Moreover, following the Design Standard, one hand washing faucet for a sink is provided per two toilet units in each building with toilets.

The number of required toilet bowls and hand washing faucet in sink for each project school are shown in table 2-9.

Table 2-9 The Number of Toilet Bowls and Faucet for Each School

No.	School Name	Number of Existing Classroom	Proposed Number of Classroom	Total Number of Classroom after the Completion of the Project	Maximum Number of Student Held Simultaneously	Required Number of Toilet Bowl	Existing Number Toilet Bowl	Proposed Number of Toilet Bowl	Proposed Number of Hand Wash Faucet
EB-1	EPS P 2 SUAI	0	9	9	360	12	0	12	6
EB-2	EPP CABIRA OAN	0	9	9	360	12	0	12	6
EB-3	EPS P 3 VILA NOVA	23	0	23	920	31	20	12*	6
EB-4	EPS P BALIBO NEGERI	4	5	9	360	12	0	12	6
EB-5	EPS P VASCO DA GAMA	11	0	11	440	15	0	16*	8
EB-6	EPS P OE-SILO	0	9	9	360	12	0	12	6
PS-1	LETEFOHO VILA	9	4	13	520	18	0	18	9
PS-3	DAUDERE	3	3	6	240	8	4	4	2
PS-5	REMEXIO	2	5	7	280	10	2	8	4
PS-6	TIBAR	4	2	6	240	8	0	8	4
PS-9	MAUBISSE	0	10	10	400	14	0	14	7
PS-11	BELULIK LETEN	0	7	7	280	10	5	6*	3
Total		56	63	119	4760	162	31	134	67

Legend: * mark indicates the total with toilet bowl added because of an odd number.

[7] Data from School-Environmental-Health Criteria (Ministry of Education/Japan)

2-2-2-4. Floor Plans

(1) Classrooms

The Design Standard regarding floor areas of a classroom accommodating 40 students is 9.0m x 7.4m for EB and 7.6m x 7.0m for PS. The reason is that EB are calculated to hold a maximum of 50 students because of the future increases in student population. Moreover, it is because the junior secondary students are physically larger than primary students. With the number of classroom students set at 50 students per room for EB and 40 students per room for PS, the floor area comes out to 1.33 square meters per student. Compared with the UNESCO's standard of 1.3 square meters per student, it is considered that the calculated size is reasonable. Based on the above mentioned floor area and practice, the sizes of Project classrooms for each school are shown below:

① Classroom size for junior secondary schools : 9.0m x 7.4m

② Classroom size for primary schools : 7.6m x 7.0m

The buildings for PS are provided with 2 to 4 classrooms, and the buildings for junior secondary schools are provided with 2 or 3 classrooms. The appropriate types of classroom buildings, suitable for each school condition, shall be selected according to the number of proposed classrooms and site condition of each project school. Moreover, PS are provided with classroom buildings that include a teachers' room and toilets.

(2) Multi-purpose Room

The laboratory and library floor areas in the Design Standard are the same, a minimum of 7.4m x 9.0m = 66.6 square meters for 40 students. Although it is approximately three quarters of the Japanese standard of 84 square meters, the sizes of the laboratory and library for this project are set to the Design Standard of the Timor-Leste. The multi-purpose room mainly used as a laboratory is provided with a counter for experiments with two sinks on one side of the room and a storage room (4.8 square meters) based on the Design Standard. Two multi-purpose rooms are planned adjacent to each other, and a movable partition is set in a wall between these two rooms so that they can be connected and utilized in order to accommodate many people in, for instance meetings, if necessary.

(3) Teachers' Room

In the Design Standard, for EB, the teachers' rooms are not allocated in one place, but are dispersed in the administration building and classroom buildings. As

this is considered an inefficient use of space, all the teachers' rooms can be allocated in one place. Thus, teachers' rooms at EB shall be concentrated and installed as part of the administration building of the project. Teachers' rooms for PS shall also be consolidated and installed in one of the classroom buildings of each project school.

According to the dimensions of the structural modules of buildings, three sizes of the teachers' rooms are prepared to be installed in the administration building based on the number of teachers projected. Two types of the teachers' room for the classroom buildings are also designed for installation based on the number of teachers

Table 2-10 Types of Teachers' Room

	Structural Module Base	Type		Floor Area (㎡)	Max. Number of People Housed
EB	3.0×7.4m	L	LA	88.8 ㎡ (12.0×7.4 m)	32 (2.8 ㎡/Person)
		M	MA	66.6 ㎡ (9.0×7.4 m)	26 (2.6 ㎡/Person)
		S	SA	44.4 ㎡ (6.0×7.4 m)	14 (3.2 ㎡/Person)
PS	3.8×5.2m	L	LR	46.4 ㎡ (3.8×5.2 m + 3.8×7.0 m)	15 (3.1 ㎡/Person)
		S	R	19.8 ㎡ (3.8×5.2 m)	6 (3.3 ㎡/Person)

L: Large, M: Medium, S: Small, LA: Large Administration, MA: Medium Administration SA: Small Administration, LR: Large Room, R: Small Room

Table 2-11 Types of Teachers' Room Required for Each School

No.	School Name	No. of Teachers Housed			Type of Teachers' Room	
		P	J.S.	Total		
EB-1	EPS P 2 SUAI	6	6	12	S	SA
EB-2	EPP CABIRA OAN	7	4	11	S	SA
EB-3	EPS P 3 VILA NOVA	15	16	31	L	LA
EB-4	EPS P BALIBO NEGERI	4	10	14	S	SA
EB-5	EPS P VASCO DA GAMA	3	16	19	M	MA
EB-6	EPS P OE-SILO	3	12	15	M	MA
PS-1	LETEFOHO VILA	13	-	13	L	LR
PS-3	DAUDERE	6	-	6	S	R
PS-5	REMEXIO	7	-	7	L	LR
PS-6	TIBAR	6	-	6	S	R
PS-9	MAUBISSE	10	-	10	L	LR
PS-11	BELULIK LETEN	7	-	7	L	LR

J.S.: Junior Secondary School, P.: Primary School, L: Large, M: Medium, S: Small, LA: Large Administration, MA: Medium Administration, SA: Small Administration, LR: Large Room, R: Small Room

(4) Toilet Facilities

Two types of toilet buildings are provided in the project, one within the classroom buildings and the separate toilet building. The toilets will be provided within the classroom building of primary schools. Only for the school provided with only junior secondary classroom buildings (EB-4) or for schools with no classroom building provided (EB-3, EB-5), separate toilet buildings will be constructed. According to the number of required toilet units, toilet bowls are provided for each facility. The inside of each toilet facility will be divided by partitions and prepared with an individual water tub(for washing) and a toilet bowl for each stall. The size of the toilet booth is approximately 1.2×1.2m, according to the Design Standard. Although all PS toilets are equipped with Asian squat type toilet bowls, half of the toilets of EB are provided with Western type toilet units following the Design Standard[8].

(5) Corridors

An open corridor shall be installed on one side of each classroom building and each administration building. The width of corridor is 2.5m in the Design Standard, assuming that the students use the space for their activities. However, in this Project, the 2.0m width corridor is provided, setting its main use as the passage only, following the width of the corridors of existing school buildings.

(6) Types of School building

The above mentioned facility types are shown in table 2-12, and buildings are arranged according to the plan, the scale, and the site condition of each project school.

[8] According to FSQP, EB are arranged in urban areas, so half of the toilets are to be designed as western-style toilets. This is because western-style toilets are already commonly used in urban areas and also because of an expected increase in future demand for western-style toilets.

Table 2-12 Types of Facilities

	Building Type	Number of Classroom	Teachers' Room	Multi-purpose Room ①	Multi-purpose Room ②	Number of Toilet Units	Type ID	Floor Area(m^2)
EB	Administration Building	-	L	1	1	2(TT)	LA	275.40
		-	M	1	1	2(TT)	MA	253.20
		-	S	1	1	2(TT)	SA	231.00
	Classroom Building	2	-	-	-	-	S3	133.20
		3	-	-	-	-	S4	199.80
	Toilet Building	-	-	-	-	12	T12	56.16
		-	-	-	-	16	T16	68.64
PS	Classroom Building (Independent)	3	-	-	-	-	P3	159.60
		4	-	-	-	-	P4	212.80
	Classroom Building (with Teachers' Room)	4	L	-	-	-	P4+LR	268.28
	Classroom Building (with Toilet)	2	-	-	-	6	P2+T6	150.80
		3	-	-	-	4	P3+T4	187.32
		3	-	-	-	6	P3+T6	204.00
		3	-	-	-	12	P3+T12	213.36
	Classroom building (with Teachers' Room and Toilet)	2	S	-	-	8	P2+R+T8	179.68
		2	L	-	-	8	P2+LR+T8	206.28
		2	L	-	-	12	P2+LR+T12	216.64
		3	S	-	-	4	P3+R+T4	216.20
		3	L	-	-	10	P3+LR+T10	268.84

S: Small, M: Medium, L: Large TT: Toilet for Teachers, LA: Large Administration, MA: Medium Administration, SA: Small Administration, LR: Large Room, R: Small Room

2-2-2-5. Site and Layout Plans

In order to design site plans that will best match the particular conditions of each site, the surrounding nature, infrastructure and the arrangement of existing facilities will be taken into account. The concepts for site planning is shown below:

① To ensure an atmosphere of a sense of balance to the whole school by paying careful attention to the arrangement of the new Project buildings to the existing buildings;

② To arrange the Project buildings on flat ground for construction avoiding slopes as much as possible, in order to secure the safety of Project sites and to minimize the amount of reclamation work borne by the Timor-Leste side as well as reduce the size of foundations.

③ To ensure a sufficient amount of sunlight and natural ventilation by carefully positioning the buildings according to the wind direction and the distance to other buildings.
④ To elevate the level of the finished building floors above ground level in any Project site where possible floods are expected during heavy rains.
⑤ To locate the septic tank and percolation trench in an area where odor is minimum to the surrounding environment.
⑥ To locate the administration buildings of each EB at places convenient for the community and residents to use and have easy access to.

2-2-2-6. Cross Sectional Plans

(1) Number of Floors

All buildings are designed as single story buildings.

(2) Floor Levels

In order to avoid submersion from severe rains and flooding, the finished floor levels will be set 150mm above the ground level at the perimeter of each building. The finish level of interior floors will be set 30mm higher than the finish level of the corridors to guard against rain water blowing into the rooms.

(3) Building Height

The building height will be set 2.8m at the top of the bond beams according to the Design Standard.

(4) Roof Configuration

The project buildings are designed for a gable roof with a 3 to 10 pitched slope. The depth of eaves on the corridor side of the buildings will be 0.7m, and 1.4m on the other side of the buildings in order to help protect against the blowing rain and the strong sunlight. The ceilings shall be sloped with heat insulation and air space to help protect against the heat radiant from the roof surfaces. Moreover, the cross sections shall be designed to effectively ventilate the air at the ceiling toward the ridge.

2-2-2-7. Structural Design

(1) Structural System

It is common to use the reinforced concrete framing structure for school buildings in Timor-Leste. However, the reinforced concrete masonry unit system is adopted in the Design Standard instead. The comparison of the reinforced concrete framing structure (RC) and the reinforced concrete masonry unit system (CMU) is shown in table 2-13.

Table 2-13 Comparison of Concrete Masonry Unit and Reinforced Concrete Structural Systems

Items		CMU	RC
Floor Plan	Planning Flexibility	There is a limitation of floor plan due to the structural requirement of bearing wall length in both structural directions.	There is a high flexibility of floor plan.
Procurement of Materials	Cement	Import	Import
	Aggregate	Procured Locally	Procured Locally
	Reinforcing Bar	Import	Import
	Concrete Block	Produced locally with Uniform quality	-
	Wood	Import	Import
Level of Safety	Simple Structural Calculation	Structural calculation is not clearly defined due to the use of assumption on the structural analysis model.	The Structural analysis model is clear so that stress condition can be identified.
	Safety	In order to design the structural system safely, the Design Standard shall be improved.	The structural system can be designed safely.
	Durability	No problem found.	No problem rises if the structure was properly constructed.
Workability	Quality Control of Structure	The quality of structure is stable with minimum deviation on quality because of use of factory products. Quality control is relatively easy.	Quality control is very difficult due to the technicality of checks on concrete strength, placement, and reinforcing work.
	Construction Period	Construction time is relatively short compared to that of concrete.	Construction period generally takes a long time due to many types of work carried out.
	Construction Difficulty	Construction is easily performed because of uniform quality of material and simple labor task.	Technically difficult tasks are required in order to ensure the concrete with the required quality and strength.

In this project, the reinforced concrete masonry unit system will be adopted as well as the Design Standards, according to the results concerning workability in the comparison shown above. In this project, the following method for the improvement will be adopted compared with the reinforced concrete masonry unit system in the Design Standards, as shown in table 2-14.

Table 2-14 Improvement over the Design Standard

Part	Items to be improved	Method of improvement
Foundation	Depth of footing is 250mm below G.L with no base course aggregate	Deepen the bottom of base course to 400mm below G.L. and set over 50mm leveling concrete and 100mm base course aggregate.
Slab on Grade	100mm thick concrete slab with mesh reinforcement	Thicken the concrete slab to 120mm with reinforcement of R10 rebar @ 200 on center.
Bearing Wall	The amount of bearing wall in main span direction is sufficient, but is not in the other direction.	Add 400mm bearing wall on both sides of room separation walls to make them "H" shaped.
	No rebar for corners and opening of walls	Use Y12 rebar @ 800mm o.c. for all corners and openings of walls
	Grouting in hollow concrete block is only applied where the rebar is set at perimeter wall.	Fill all hollow concrete blocks at bearing walls with grout.
CMU Bond Beam	CMU bond beam is reinforced with single bar	Use reinforced concrete bond beam with double reinforcing bars. The metal plates to hold the ridge connection of rafters are provided to prevent loose joints.
Brace	Flat bars	As concrete bond beam is put in place, it minimizes structural movement, and deletes bracing.

(2) Design Load and External Forces

The design of the structures shall be based on the following factors:

① Live Load Roof: 250N/m²

② Wind Load Wind speed : 41 m/s .

③ Seismic Forces

The country of Timor-Leste does not have the criteria to set up a seismic force now. Moreover, although there is a record that indicates some earthquakes have hit in the past, it is insufficient to serve as an effective criterion for the structural designs. On the other hand, Indonesia has made an area classification map of seismic forces in 1981, and according to this, the country of Timor-Leste is located in Zones 2 and 3

as described below:

- Zone 2 : Earthquake Shear Coefficient Soft Soil: 0.09, hard Soil: 0.07
- Zone 3 : Earthquake Shear Coefficient Soft Soil: 0.07, hard Soil: 0.05

The ground of the Project sites shows a relatively hard soil condition, according to the results of the soil corn penetration test carried out by the Basic Design Study Team, and the range of the Earthquake Shear Coefficient is assumed to be 0.05～0.07. Therefore, the structural designs for the Project will apply the Earthquake Shear Coefficient of 0.07 (approximately one third of that of Japan), and it is still designed safe.

(3) Structural Materials

The specifications and strengths of the structural materials are described as follows:

①	Construction Materials	Based on the Australian Standards (AS) as well as the Design Standards.	
②	Concrete	Grade N25 (AS)	:Equivalent to Fc = 21N/mm2
③	Concrete Masonry Units	Grade15 (AS)	:Equivalent to JIS-B grade
		Grade250 (AS)	:Equivalent to SDR-245
⑤	Reinforcement	Grade400 (AS)	:Equivalent to SD390
⑥	Timber	F14 (AS)	:Equivalent or better than JASS grade A material, Class 1

2-2-2-8. Electrical Facility Plans

The electrical facilities in this Project include lighting fixtures and electrical outlets in each EB administration building.

(1) Power Receiving Facilities

Electricity is already supplied to all EB of the Project (3 phase 4 wires 400V/230V). A main distribution board (MDB) will be newly installed for each EB, and the power will be provided through a branch network for the existing facilities and the new facilities. From the MDB, the electrical power cable will be connected to a distribution board in the new administration building through an underground conduit.

(2) Lighting Fixtures and Outlets

The multi-purpose room and teachers' room are designed with 300 luxs of lighting intensity. Two 40 watt fluorescent lights will be installed in each structural bay. One 40 watt fluorescent light will be installed in the principal's office and the space for office workers. In addition, one 20 watt fluorescent light will be provided in each service room, storage room and toilet stall for teachers. Moreover, two electrical outlets will be installed in the multi-purpose room ①, ②, and the teachers' room of each administration building, as well as one outlet for the principal's office and the service room.

2-2-2-9. Water Supply, Sewage Disposal, and Sanitary Facility Plans

(1) Water Supply Facility

A water supply tank will be installed for the toilets. The water supply tank will be set on a platform approximately 2m above the ground, and works by gravity. Water to the tank will be supplied with rain water collected from the roof and by the existing city water. In addition, the Timor-Leste side will make the final connection for the city water. Water consumption per day is set as 75 liters per toilet on the basis of one toilet provided for 30 students and the water consumption per student is 2.5 liters a day. The schools, which have the city water supply in its property or around the site, will be provided with a water supply tank with a capacity able to support 2 days for each toilet facility. The schools without the city water supply shall have a water supply tank with a capacity able to support 3 days for each toilet facility. Regarding the toilet facilities for teachers of all EB, accommodation for the maximum number of 31 teachers will be used for the calculation of water consumption. The water consumption per teacher is assumed as 5.0 liters per person a day, and this gives a total of 0.16 ton of water consumption assuming 31 teachers. This calculation will be set for all teachers' toilet water consumption in each EB per day. In addition, the Project will prepare two types of water supply tanks, 2.4 ton and 1.2 ton, and select and install the most appropriate type according to the calculated capacity of each toilet facility.

(2) Sewage Disposal Facilities

Soiled water from toilets and hand wash sinks will be purified in a septic tank installed at each toilet facility. The septic tank will be the two-process type which consists of a precipitator room and a septic room. Treated water shall be drained and percolated into the ground through a connected percolation trench. The type of septic tank will be selected for each facility, either the 7.2 ton type or the 3.6 ton type, according to the needed capacity. The size of each septic tank will be chosen according to the calculations of the amount of water stored in the tank for seven days (actual active period is 6 days).

The types of water supply tank and septic tank for each Project school are shown in table 2-15, and the supply / waste water system is shown in figure 2-1.

Table 2-15 Types of Water Supply Tank and Septic Tank

No.	School Name	Toilet Type	Amount of Water used(ton)	Necessary Capacity (days)	Necessary Capacity (ton)	Size of Water Supply Tank	Amount of Water held (ton)	Type of Septic Tank
EB-1	EPS P 2 SUAI	T12	0.9	2	1.8	Large	5.4	Large
		TT	0.16		0.32	Small	0.96	Small
EB-2	EPP CABIRA OAN	T12	0.9	2	1.8	Large	5.4	Large
		TT	0.16		0.32	Small	0.96	Small
EB-3	EPS P 3 VILA NOVA	T12	0.9	2	1.8	Large	5.4	Large
		TT	0.16		0.32	Small	0.96	Small
EB-4	EPS P BALIBO NEGERI	T12	0.9	2	1.8	Large	5.4	Large
		TT	0.16		0.32	Small	0.96	Small
EB-5	EPS P VASCO DA GAMA	T16	1.2	2	2.4	Large	7.2	Large
		TT	0.16		0.32	Small	0.96	Small
EB-6	EPS P OE-SILO	T12	0.9	2	1.8	Large	5.4	Large
		TT	0.16		0.32	Small	0.96	Small
PS-1	LETEFOHO VILA	T12	0.9	2	1.8	Large	5.4	Large
		T6	0.45		0.9	Small	2.7	Small
PS-3	DAUDERE	T4	0.3	2	0.6	Small	1.8	Small
PS-5	REMEXIO	T8	0.6	2	1.2	Small	3.6	Small
PS-6	TIBAR*	T8	0.6	3	1.8	Large	3.6	Small
PS-9	MAUBISSE*	T10	0.75	3	2.25	Large	4.5	Large
		T4	0.3		0.9	Small	1.8	Small
PS-11	BELULIK LETEN*	T6	0.45	3	1.35	Large	2.7	Small

TT: Teachers' Toilet, *:Schools where no city water is supplied.

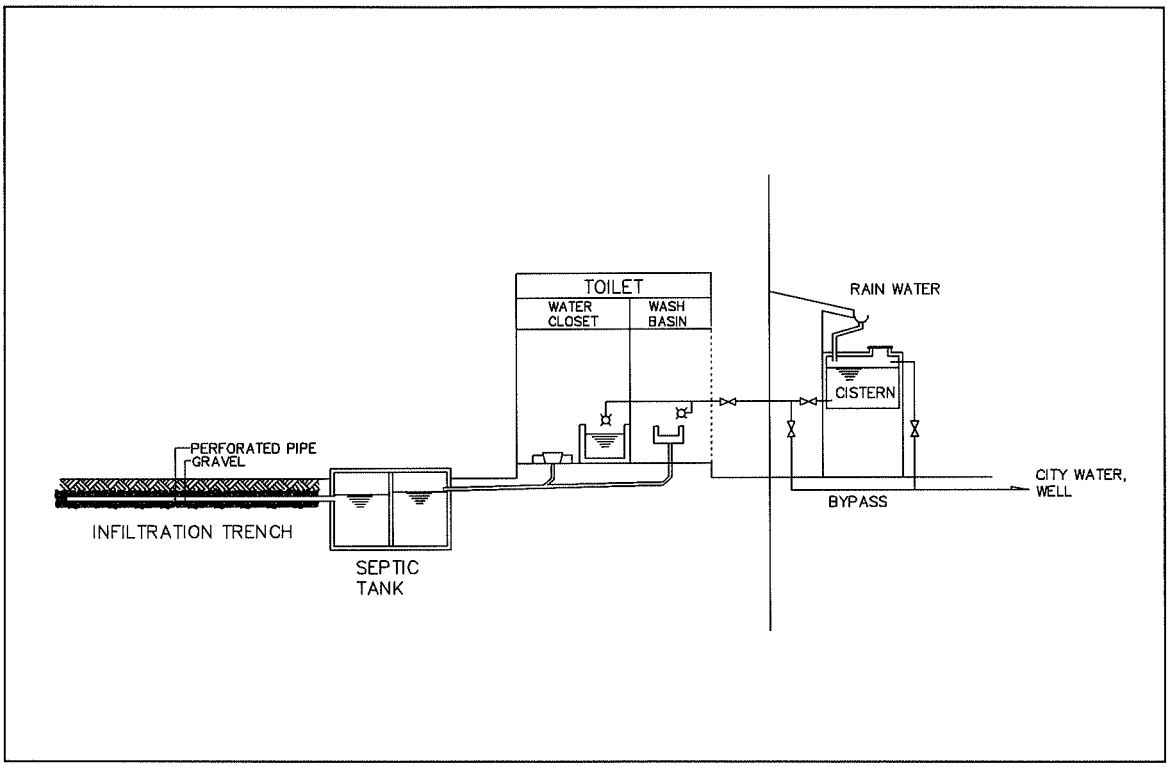


Figure 2-1 Supply / Waste System Diagram

2-2-2-10. Building Materials

The building materials used for the Project buildings basically correspond to the Design Standard. However, the lower section of walls, both interior and exterior, will be protected with a mortar plastering finish over the concrete blocks (hereinafter referred to as CHB) in order to avoid stains or any damage to the structures. The building materials for both the Design Standard and for the Project are shown in table 2-16.

Table 2-16 Building Materials

		Materials on Design Standard	Materials adopted by the Project
Structure Scale		Concrete Masonry Unit System Single Story	Ditto
Exterior Finish	Roof	Timber Framed Gable Zn-Al Corrugated Steel Sheet Roof	Ditto
	Wall	CHB Face Masonry Painted Finish	Ditto
	Lower Wall	CHB Face Masonry Painted Finish	Mortar Plastering over CHB Painted Finish
	Corridor	Concrete Brush Finish	Ditto
	Window	Alum. Jalousie with wooden Frame	Ditto
	Door	Wooden Flush with Wooden Frame	Ditto
Interior Finish	Floor	Concrete with Surface Hardener	Ditto
	Wall	CHB Face Masonry Painted Finish	Ditto
	Lower Wall	CHB Face Masonry Painted Finish	Mortar Plastering over CHB Painted Finish
	Ceiling	Plywood Board Painted Finish	Ditto
Electrical Equipment		Lighting Fixture & Outlet	Lighting Fixture & Outlet Only at Administration Building of EB

2-2-2-11. Educational Furniture

Educational furniture designs and standards do not exist in Timor-Leste now, so the Project will provide locally produced wooden furniture which is commonly used in the local primary schools and is easy to maintain and procure.

In this Project, children from ages 6 to 14 are the target, and they differ physically in size. For this reason, there are three types of chairs and desks proposed for the students: Large (for junior secondary students), Medium (for higher grades of primary students), and Small (for lower grades of primary students). The small type desks and chairs will be provided for half the number of classrooms in each primary school, the medium type for the other half, and the large type desks and chairs will be installed in the classrooms of each junior secondary school. In addition, following the local customs and practices, each chair will be designed for one student and the desk will be designed for two students. In one of the multi-purpose rooms intended to be used for library activities, seven bookshelves will be installed with the capacity for about 150 books each.

The list of educational furniture in this Project is shown in table 2-17.

Table 2-17 List of Furniture for Each Room

Room Name	Items		QTY	Size(mm)		
				W	D	H
Classroom	Student Desk (for 2)	Junior Secondary	20	1200	600	650
		Primary Grade 4-6	10	1100	450	590
		Primary Grade 1-3	10	1100	450	530
	Student Chair (for 1)	Junior Secondary	40	450	380	420
		Primary Grade 4-6	20	450	350	380
		Primary Grade 1-3	20	450	350	340
	Teacher Desk		1	1200	700	700
	Teacher Chair		1	450	380	420
	Black Board		1	3600	-	1200
	Bulletin Board	Junior Secondary	2	1750	-	1200
		Primary		1550	-	1200
Multi Purpose Room ①	Student Desk	For 2 Students	20	1200	500	650
	Student Chair	For 1 Students	40	450	380	420
	Reception Desk		1	1200	700	700
	Reception Chair		1	450	380	420
	Bookshelf		7	900	350	1800
Multi Purpose Room ②	Student Desk	For 2 Students	20	1200	500	650
	Student Chair	For 1 Students	40	450	380	420
	Teacher Desk		1	1200	700	700
	Teacher Chair		1	450	380	420
	Black Board		1	3600	-	1200
	Bulletin Board		2	1750	-	1200
Teachers' Room(EB)	Principal Desk		1	1800	750	700
	Principal Chair		1	450	380	420
	Office Desk		2	1200	700	700
	Office Chair		2	450	380	420
	Black Board		1	3600	-	1200
	Bulletin Board		1	1750	-	1200
	Teacher Desk	T.R. LA	32	1000	700	700
		T.R. MA	26			
		T.R. SA	14			
	Teacher Chair	T.R. LA	32	450	380	420
		T.R. MA	26			
		T.R. SA	14			
Teachers' Room (PS)	Black Board		1	3600	-	1200
	Bulletin Board		1	1550	-	1200
	Teacher Desk	T.R. LR	15	1000	700	700
		T.R. R	6			
	Teacher Chair	T.R. LR	15	450	380	420
		T.R. R	6			

T.R.: Teachers' Room, LA: Large Administration,
MA: Medium Administration, SA: Small Administration, LR: Large Room, R: Small Room

2-2-2-12. Facility Components

The facility components for each Project school are shown in table 2-18.

Table 2-18 The Facility Components for Each Project School (1)

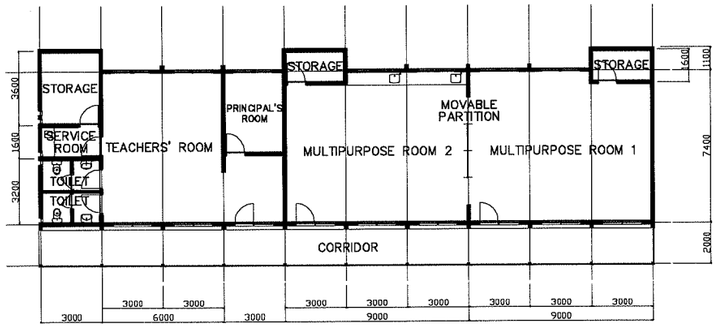
No.	School Name	Proposed Number of Student			Proposed Number of Classroom				Teachers' Room			Special Classroom		Toilet			Building Type	Floor Area (m^2)
		Primary School	Junior Secondary School	Total	Primary School	Junior Secondary School	Total	Classroom Type	No. of Teachers to be Accommodated	Size of Teachers' Room	Type of Teachers' Room	Number of Multi-Purpose Room ① (Library)	Number of Multi-Purpose Room ② (Laboratory)	Proposed No. Toilet Bowl	No. of Faucet	Toilet Type		
EB-1	EPS P 2 SUAI	240	120	360	6	3	9	P3+P3 S3	12	S	SA	1	1	12	6	T12 T.T.	SA, P3, P3+T12, S3	803.76
EB-2	EPP CABIRA OAN	352	120	472	7	2	9	P4+P3 S2	11	S	SA	1	1	12	6	T12 T.T.	SA, P4, P3+T12, S2	790.36
EB-3	EPS P 3 VILA NOVA	822	420	1,242	0	0	0	- -	31	L	LA	1	1	12	6	T12 T.T.	LA, T12	331.56
EB-4	EPS P BALIBO NEGERI	240	240	480	0	5	5	- S3+S2	14	S	SA	1	1	12	6	T12 T.T.	SA, S3, S2, T12	620.16
EB-5	EPS P VASCO DA GAMA	240	514	754	0	0	0	- -	19	M	MA	1	1	16	8	T16 T.T.	MA, T16	321.84
EB-6	EPS P OE-SILO	240	438	678	3	6	9	P3 S3+S3	15	M	MA	1	1	12	6	T12 T.T.	MA, P3+T12, S3, S3	866.16
PS-1	LETEFOHO VILA	502	-	502	4	0	4	P2+P2 -	13	L	LR	0	0	18	9	T12 T6	P2+T6, P2+LR+T12	366.44
PS-3	DAUDERE	265	-	265	3	0	3	P3 -	6	S	R	0	0	4	2	T4	P3+R+T4	216.2
PS-5	REMEXIO	538	-	538	5	0	5	P2+P3 -	7	L	LR	0	0	8	4	T8	P2+LR+T8, P3	365.88
PS-6	TIBAR	358	-	358	2	0	2	P2 -	6	S	R	0	0	8	4	T8	P2+R+T8	179.68
PS-9	MAUBISSE	766	-	766	10	0	10	P3+P3+P4 -	10	L	LR	0	0	14	7	T10 T4	P3+LR+T10, P3+T4, P4	668.96
PS-11	BELULIK LETEN	264	-	264	7	0	7	P3+P4 -	7	L	LR	0	0	6	3	T6	P3+T6, P4+LR	472.28
Total		4,827	1,852	6,679	47	16	63	-	151	-	-	6	6	134	67	-		6,003.28

Legend S: Small, M: Medium, L: Large, R: Small Room, LR: Large Room
SA: Small Administration., MA: Medium Administration, LA: Large Administration, T.T.: Teachers' Toilet

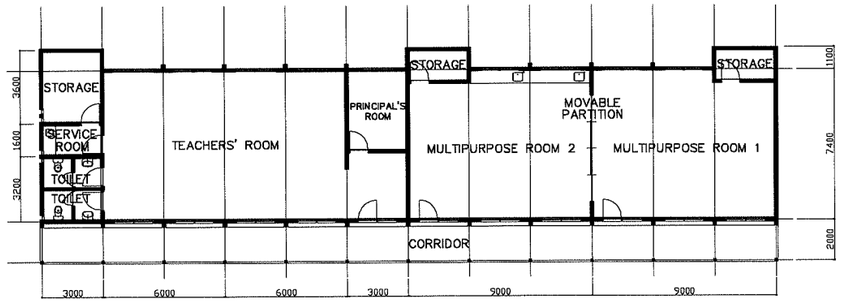
Table 2-18 The Facility Components for Each Project School (2)

No.	School Name	Water Supply, Sewage, Sanitary Facility						Furniture													
		Amount of Water to be used (ton)	Number of Days Water to be stored	Amount of Water to be stored (ton)	Type of Water Supply Tank	Amount of Water stored in Septic Tank (ton)	Type of Septic Tank	Student Desk (Large)	Student Chair (Large)	Student Desk (Medium)	Student Chair (Medium)	Student Desk (Small)	Student Chair (Small)	Blackboard	Bulletin Board (Large)	Bulletin Board (Small)	Office Desk (Large) 1400	Office Desk (Medium) 1200	Office Desk (Small) 1000	Office Chair	Book Shelf
EB-1	EPS P 2 SUAI	0.9	2	1.8	L	5.4	L	100	200	60	120	60	120	11	9	12	1	13	14	28	7
		0.2		0.3	S	1	S														
EB-2	EPP CABIRA OAN	0.9	2	1.8	L	5.4	L	80	160	70	140	70	140	11	7	14	1	13	14	28	7
		0.2		0.3	S	1	S														
EB-3	EPS P 3 VILA NOVA	0.9	2	1.8	L	5.4	L	40	80	0	0	0	0	2	3	0	1	4	32	37	7
		0.2		0.3	S	1	S														
EB-4	EPS P BALIBO NEGERI	0.9	2	1.8	L	5.4	L	140	280	0	0	0	0	7	13	0	1	9	14	24	7
		0.2		0.3	S	1	S														
EB-5	EPS P VASCO DA GAMA	1.2	2	2.4	L	7.2	L	40	80	0	0	0	0	2	3	0	1	4	26	31	7
		0.2		0.3	S	1	S														
EB-6	EPS P OE-SILO	0.9	2	1.8	L	5.4	L	160	320	30	60	30	60	11	15	6	1	13	26	40	7
		0.2		0.3	S	1	S														
PS-1	LETEFOHO VILA	0.9	2	1.8	L	5.4	L	0	0	40	80	40	80	5	0	9	0	4	15	19	0
		0.5		0.9	S	2.7	S														
PS-3	DAUDERE	0.3	2	0.6	S	1.8	S	0	0	30	60	30	60	4	0	7	0	3	6	9	0
PS-5	REMEXIO	0.6	2	1.2	S	3.6	S	0	0	50	100	50	100	6	0	11	0	5	15	20	0
PS-6	TIBAR	0.6	3	1.8	L	3.6	S	0	0	20	40	20	40	3	0	5	0	2	6	8	0
PS-9	MAUBISSE	0.8	3	1.5	L	3	L	0	0	100	200	100	200	11	0	21	0	10	15	25	0
		0.3		0.9	S	1.8	S														
PS-11	BELULIK LETEN	0.5	3	1.4	L	2.7	S	0	0	70	140	70	140	8	0	15	0	7	15	22	0
Total		-	-	-	-	-	-	560	1,120	470	940	470	940	81	50	100	6	87	198	291	42

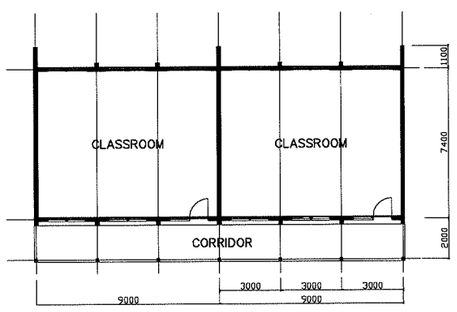
2-2-3. Basic Design Drawing



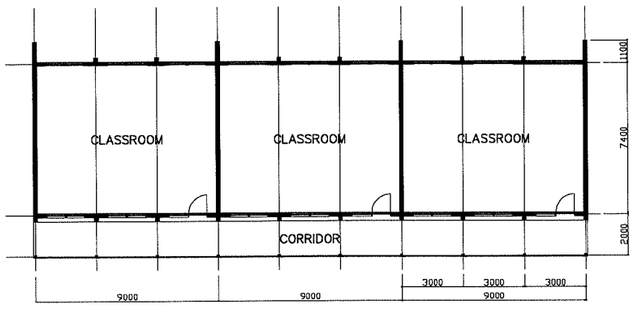
TYPE SA



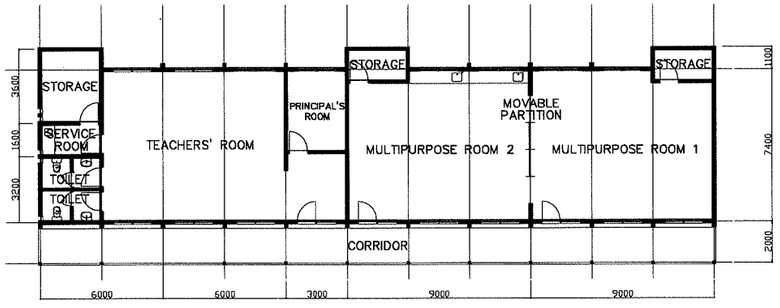
TYPE LA



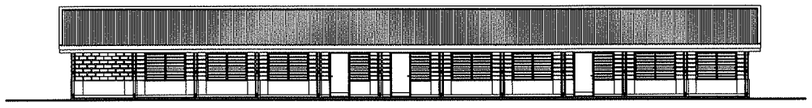
TYPE S2



TYPE S3

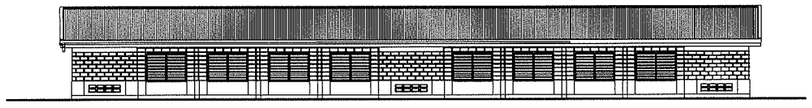


TYPE MA

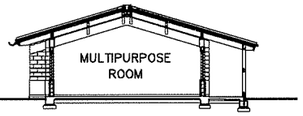


FRONT ELEVATION

LEFT SIDE ELEVATION

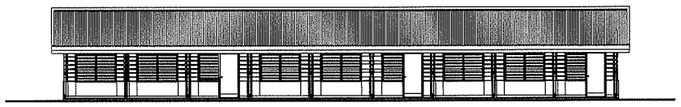


REAR ELEVATION

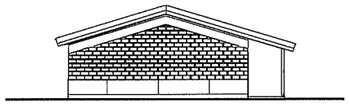


SECTIOIN

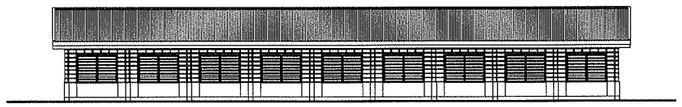
TYPE MA



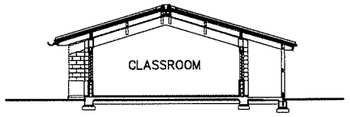
FRONT ELEVATION



LEFT SIDE ELEVATION

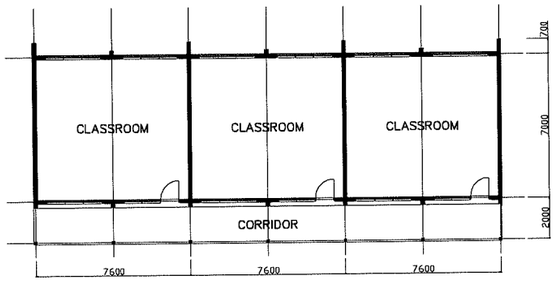


REAR ELEVATION

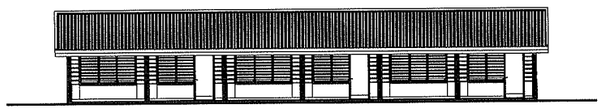


SECTIOIN

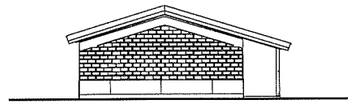
TYPE S3



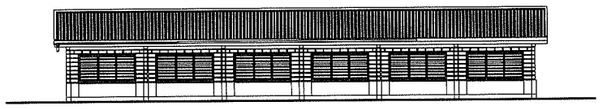
TYPE P3



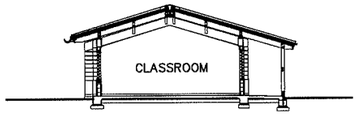
FRONT ELEVATION



LEFT SIDE ELEVATION

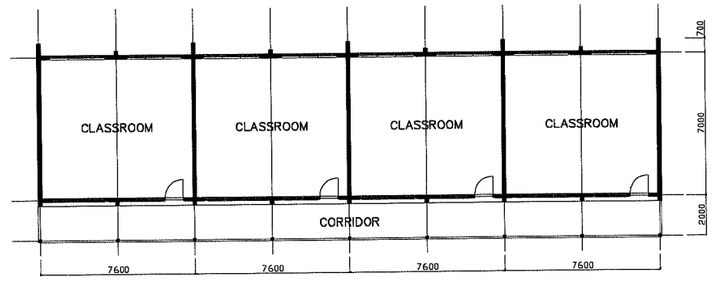


REAR ELEVATION

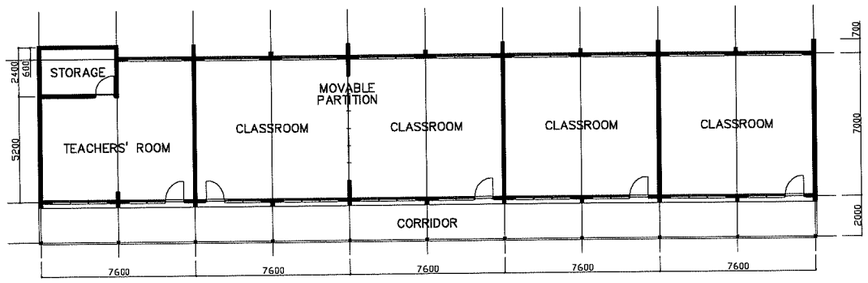


SECTION

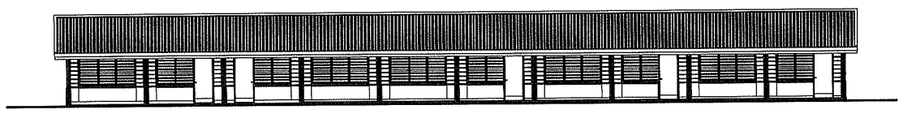
TYPE P3



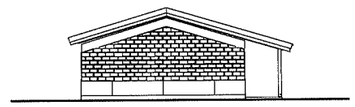
TYPE P4



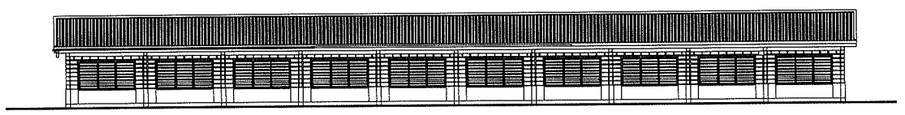
TYPE P4+LR



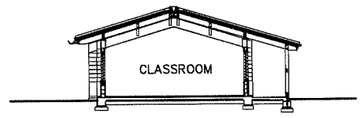
FRONT ELEVATION



LEFT SIDE ELEVATION

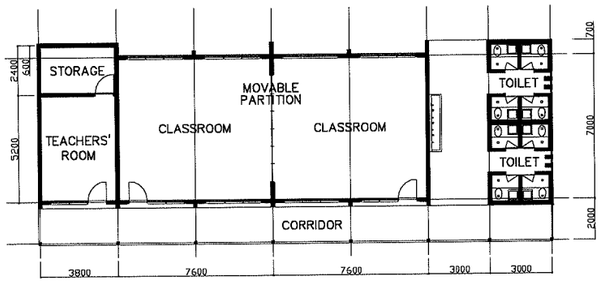


REAR ELEVATION

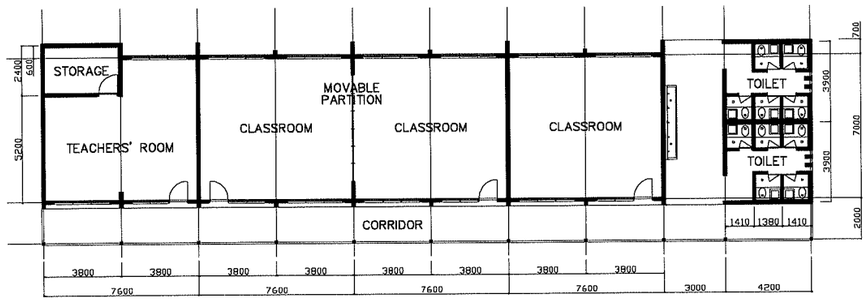


SECTION

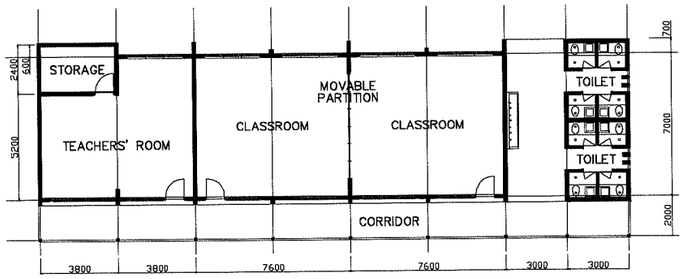
TYPE P4+LR



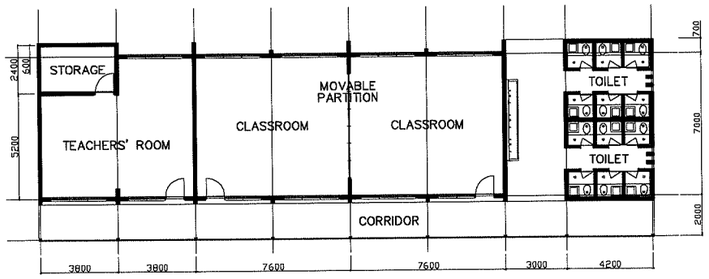
TYPE P2+R+T8



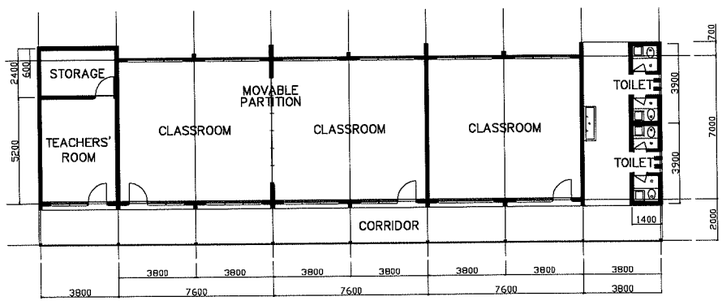
TYPE P3+LR+T10



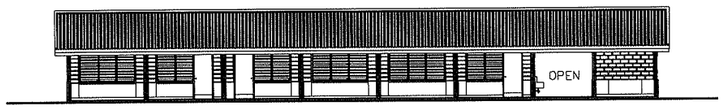
TYPE P2+LR+T8



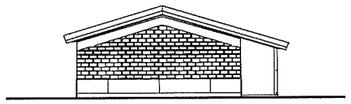
TYPE P2+LR+T12



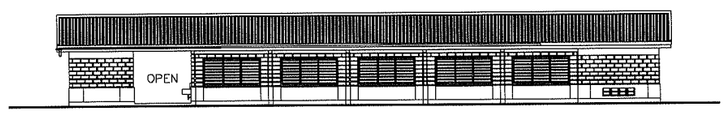
TYPE P3+R+T4



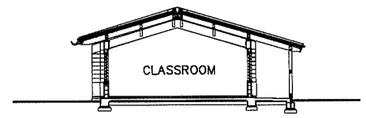
FRONT ELEVATION



LEFT SIDE ELEVATION

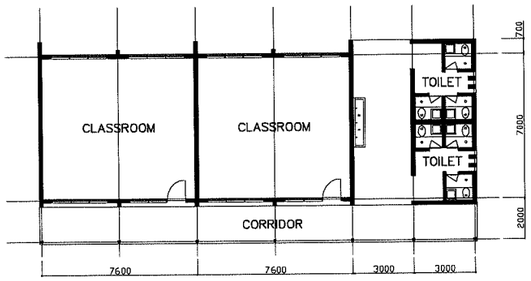


REAR ELEVATION

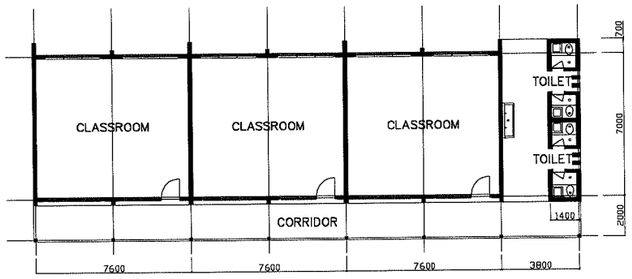


SECTION

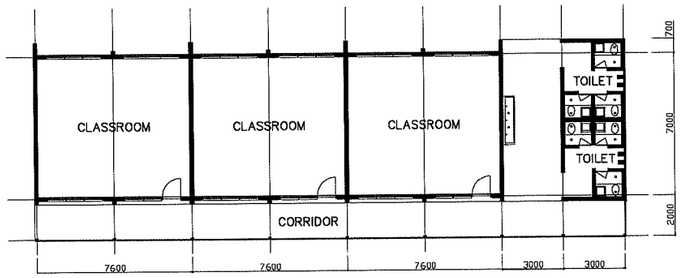
TYPE P2+LR+T8



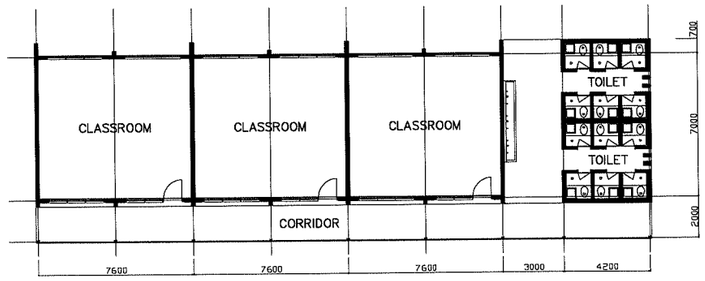
TYPE P2+T6



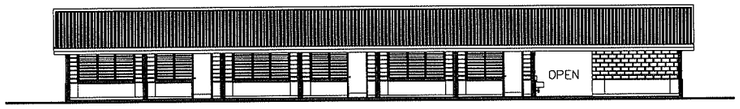
TYPE P3+T4



TYPE P3+T6

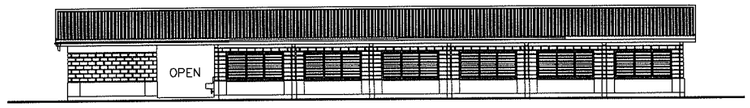


TYPE P3+T12

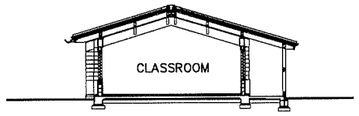


FRONT ELEVATION

LEFT SIDE ELEVATION

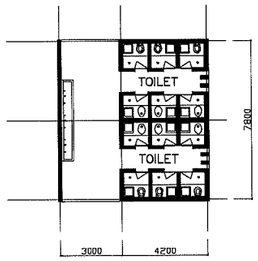


REAR ELEVATION

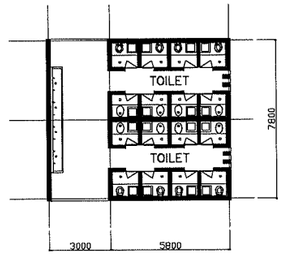


SECTION

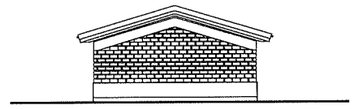
TYPE P3+T12



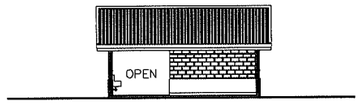
TYPE T12



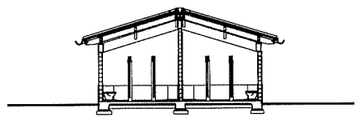
TYPE T16



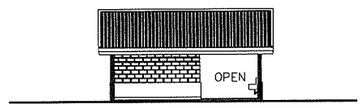
LEFT SIDE ELEVATION



FRONT ELEVATION

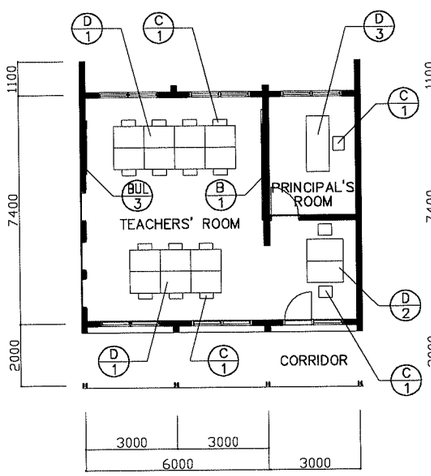


SECTION

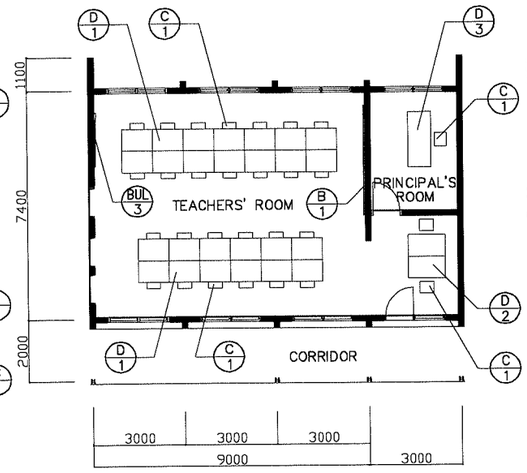


REAR ELEVATION

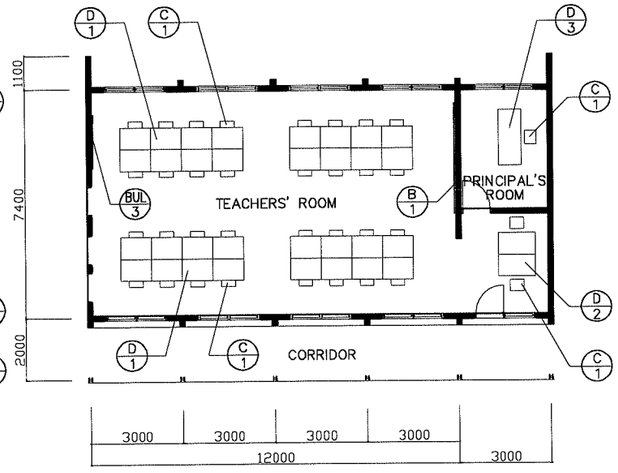
TYPE T12



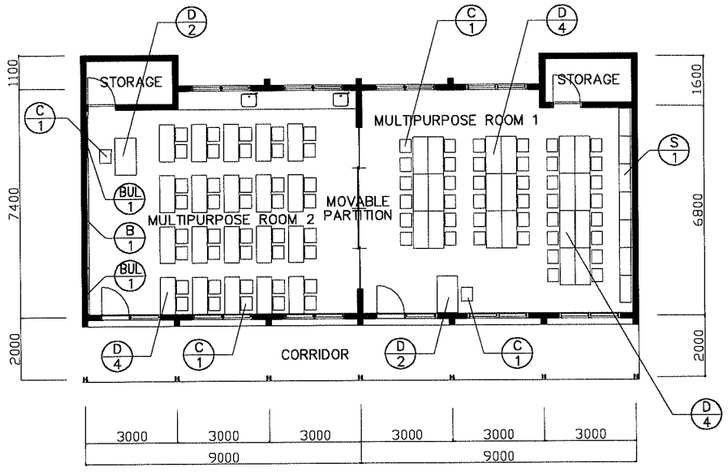
TEACHERS' ROOM (SA)



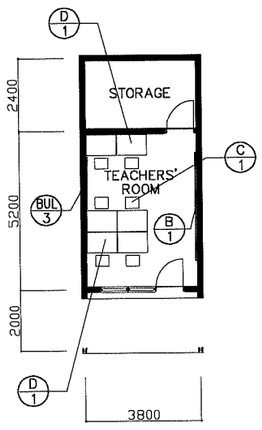
TEACHERS' ROOM (MA)



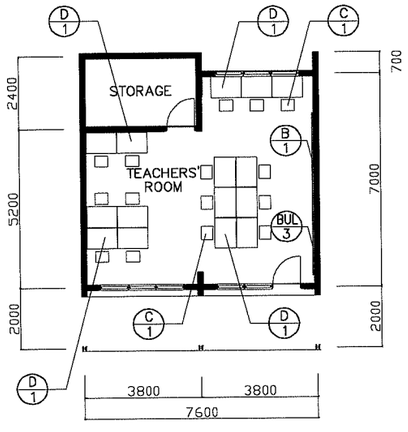
TEACHERS' ROOM (LA)



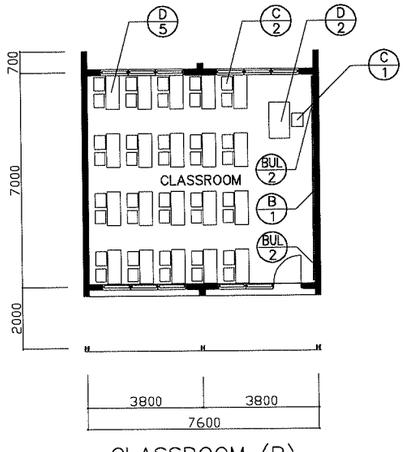
MULTIPURPOSE ROOM 1 AND 2



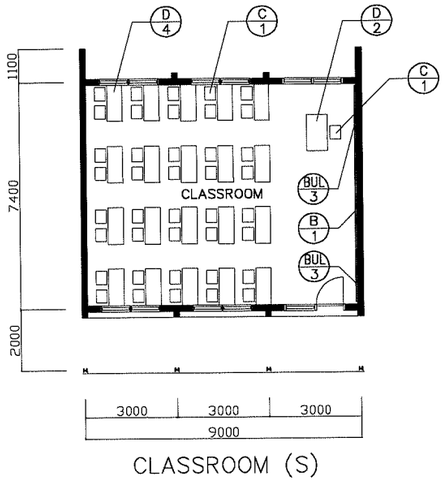
TEACHERS' ROOM (R)



TEACHERS' ROOM (LR)



CLASSROOM (P)



CLASSROOM (S)

SYMBOL	ITEM	DIMENSION	SYMBOL	ITEM	DIMENSION
D1	TEACHER'S DESK 1	W1000XD700XH700	C1	TEACHER'S CHAIR STUDENT'S CHAIR 1	W450XD380XH420
D2	TEACHER'S DESK 2	W1200XD700XH700	C2	STUDENT'S CHAIR 2	W450XD350XH380(340)
D3	PRINCIPAL'S DESK	W1800XD750XH700	S1	BOOK SHELF	W900XD350XH1800
D4	STUDENT'S DESK 1 (FOR 2 STUDENTS)	W1200XD500XH650	B1	BLACKBOARD	W3600XH1200
D5	STUDENT'S DESK 2 (FOR 2 STUDENTS)	W1100XD450XH590(530)	BUL1	BULLETIN BOARD 1	W1500XH1200
			BUL2	BULLETIN BOARD 2	W1550XH1200
			BUL3	BULLETIN BOARD 3	W1750XH1200

FURNITURE SCHEDULE	DESK								CHAIR			SHELF		BLACKBOARD/BULLETIN BOARD			
	D1	D2	D3	D4	D5				C1	C2		S1		B1	BUL1	BUL2	BUL3
ROOM TYPE																	
TEACHERS' ROOM (SA)	14	2	1						17					1			1
TEACHERS' ROOM (MA)	26	2	1						29					1			1
TEACHERS' ROOM (LA)	32	2	1						35					1			1
TEACHERS' ROOM (R)	6								6					1			1
TEACHERS' ROOM (LR)	15								15					1			1
CLASSROOM (P)		1			20				1	40				1		2	
CLASSROOM (S)		1		20					41					1			2
MULTIPURPOSE ROOM 1		1		20					41			7					
MULTIPURPOSE ROOM 2		1		20					41					1	2		

2-2-4. Implementation Plan

2-2-4-1. Implementation Policy

(1) Basic Matters for Project Implementation

Project will be carried out in accordance with the Basic Design. After the review of the Basic Design by Japanese agencies related to the Project, an approval by the Cabinet of the Government of Japan is required for the Project implementation. After the approval, both countries will sign the Exchange of Notes for the Project. Then the Project will begin in accordance with the following principles:

① The Project shall use the funds financed by the taxes of Japanese people and it will be implemented under the budgetary system of Japan.

② The Government of Timor-Leste signs a contract agreement with a Japanese national consulting firm and entrust the firm with preparing the detailed design of the Project based on this Basic Design, assisting the Timor-Leste side to select contractors for Project construction and conducting construction supervision for Project construction.

③ The Government of Timor-Leste selects a Japanese national prime contractor through competitive bidding with a pre-qualification evaluation process under the assistance of the above-mentioned Japanese consulting firm and sign a contract agreement with the contractor.

(2) Structure for the Project Implementation

For the Timor-Leste side, the responsible agency of the Project is MECYS, and the executing agency is Planning and Development Division of the MECYS. Planning and Development Division makes coordination with the related Ministry and agencies such as Ministry of Finance and Planning, Ministry of Transport, Communication, and Public Works, and District Superintendent of the districts which Project schools belong to.

(3) Use of Local Consultants and Contractors

Because Project school construction is scattered all over the 11 districts, the hire of local staff is essential to ensure that Project implementation goes smoothly and safely because they have a thorough knowledge of the local construction methods and various social circumstances. However, since such Timor-Lesteese engineers are very difficult to find, engineers will be supplied from neighboring countries. Furthermore,

for highly skilled work, it is necessary to utilize several subcontractors under the supervision of the Japanese contractor due to the large number of sites and the large scale of the Project. The capacity of one subcontractor is limited and relatively small.

(4) Implementation Plans

The Project aims to construct 12 schools located in 11 different districts that have no main roads connecting them. Therefore, the Project construction schedules will be determined utilizing the city of Dili and the capital city of each district as centers of construction activities.

① The construction plans should consider the availability of local laborers, construction methods and other related customs and practices of Timor-Leste;

② Since construction work will be held at several Project sites simultaneously, a construction implementation plan that will need no re-scheduling is a priority. This should be decided in advance of the start of construction as was agreed to at several meetings held with persons in charge of each school;

③ As construction work will proceed on existing school properties, the Project's impact on school activities, as well as the security of students, shall be sufficiently considered;

④ Adequate security against theft, etc shall be ensured at all the construction sites during the construction period;

⑤ Detailed implementation schedules as well as the Project's progress will be regularly reported to the JICA Timor-Leste office and the Embassy of Japan as well as to MECYS during the construction period to assure the smooth implementation of the Project.

2-2-4-2. Implementation Conditions

(1) General Local Construction Conditions

The country of Timor-Leste is in the process of economic and social development, so the construction industry, as well as the related construction-material industry, is also in the developing stage. Since most construction materials and equipment are imported, the procurement and delivery schedules must be well synchronized with the construction schedules, and the quality of construction materials and equipment shall also be maintained. Although in general, unskilled labor will be supplied from around each school site locally, skilled workers will be supplied from neighboring countries because of the shortage of skilled workers in Timor-Leste. Further, as construction will overlap at several sites under conditions of difficult access and within a limited construction period, it is important that the construction at the Project sites to be strictly supervised so that the same construction quality is equally maintained at all the sites. It is also important that a sufficient quantity of high quality skilled technical workers be maintained. Moreover, the prime consultant will introduce the systematic teaching and training of construction and management techniques to the local subcontractors.

(2) Quality Control and Schedule Management

Although the scale of the Project schools, classrooms and construction floor area are all large, the amount of work to be carried out simultaneously will be very limited due to the few number of trustworthy local construction companies. There are also time limits which must be considered for keeping skilled foreign craftsmen in Timor-Leste. The responsibilities for quality control supervision, performed by the Japanese management and local engineers, shall be strictly observed. As much as possible, careful attention shall be paid to ways of attaining efficiency in all areas, including the reducing of costs for temporary construction materials and equipment, labor expenses and the rotation of skilled workers, and others. In order to manage the construction efficiently, instead of simultaneous construction starts at all sites which should be avoided, the "overlapping time-delayed" construction starts should be utilized.

In addition, the following shall be considered in the developing of construction schedules:

① In the rainy season, from December through March, there is a high possibility of flooding or other damage that cuts off access roads to the sites creating unwanted

delays and unwanted drops in efficiency, schedules, etc;

② Since the Timor-Leste communication infrastructure is insufficient, any construction orders from Dili may not be delivered in a timely manner, or worse, such communications or construction materials sent from Dili could be returned without reaching the intended receiver of those remote sites;

③ Frequent replacement of local unskilled labor shall be maintained in order to provide an equal working opportunity for as many local people as possible. Moreover, the quality of local labor skills is relatively low and this shall be carefully considered in the quality control and schedule management.

④ The period of time needed for construction materials and equipment imports to clear customs, as well as the procedures and preparation for local employment, takes about two months.

Strict schedule control of work to be undertaken by the Timor-Leste side is key for smooth Project implementation. In particular, if site preparation work at a Project site is not adequately carried out on time, building construction cannot start. For this reason, it is absolutely necessary for the Timor-Leste side to understand that their part of the site preparation work must begin and complete without delay.

Strict quality control of concrete blocks and reinforced concrete, which serve as the main structures and can influence the quality of a building, is extremely important. Since concrete cannot be supplied directly from a batching plant, all concrete production shall be performed at each site. Thus, strict and intensive site supervision of the concrete mixing is significantly important and cannot be stressed enough.

(3) Customer Clearance and Tax Exemption of Construction Materials

In Timor-Leste, as a value added tax has not yet been implemented, taxation related to this Project amounts to a tariff on the imported construction materials. Between the Government of Japan and the Government of Timor-Leste, negotiations regarding the Agreement on Technical Cooperation are now in the final stage. The Government of Timor-Leste has assured the Government of Japan that when the Agreement is signed, a tax exemption will be applied to the grant aid assistance in accordance with the contents of the Agreement. A tax exemption was arranged for the "Project for Urgent Rehabilitation of the Faculty of East Timor National University" started in 2001 as an emergency grant by the Government of Japan. The procedure at that time was that the UNTAET, as the Client, had submitted a letter to notify of the

tax exemption, a list of shipping materials, and a letter of credit to the authorities for custom clearance. For this Project, it is expected that the same procedures will be necessary for the tax exemption after the Agreement is signed.

2-2-4-3. Scope of Works

Table 2-19 shows the division of work between the Timor-Leste and Japanese sides.

Table 2-19 Scope of Works

Work Item	Japanese side	Timor-Leste side
1. Site clearing, cut and fill, and retaining walls before school building construction takes place		○
2. Construction of retaining walls as safety measures at the Project sites and facilities	○	
3. Removal/demolition of existing facilities at school sites before school building construction takes place		○
4. Removal of rocks, obstructions, and trees at school sites before school building construction takes place		○
5. Associated exterior works such as landscaping, fencing, and school gates		○
6. Preparation of access roads to Project sites before school building construction takes place		○
7. Construction of classrooms and toilets	○	
8. Water supply work up to the cistern tanks (covered by Japanese side), if necessary		○
9. Electric power connection up to the integrating wattmeter		○

Figure 2-2 and 2-3 show boundary of works between the Timor-Leste side and the Japanese side for water supply work and electrical work respectively.

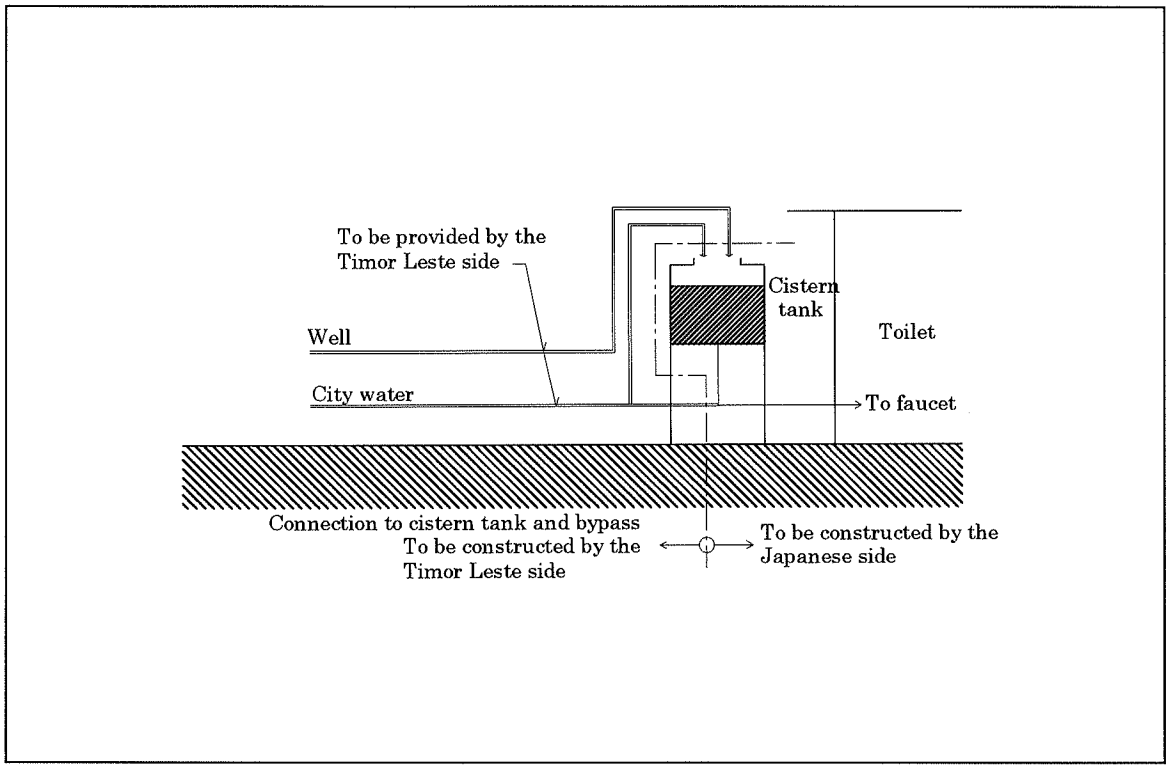


Figure 2-2 Boarder Line of Water Supply Work between Timor-Leste and Japanese Sides

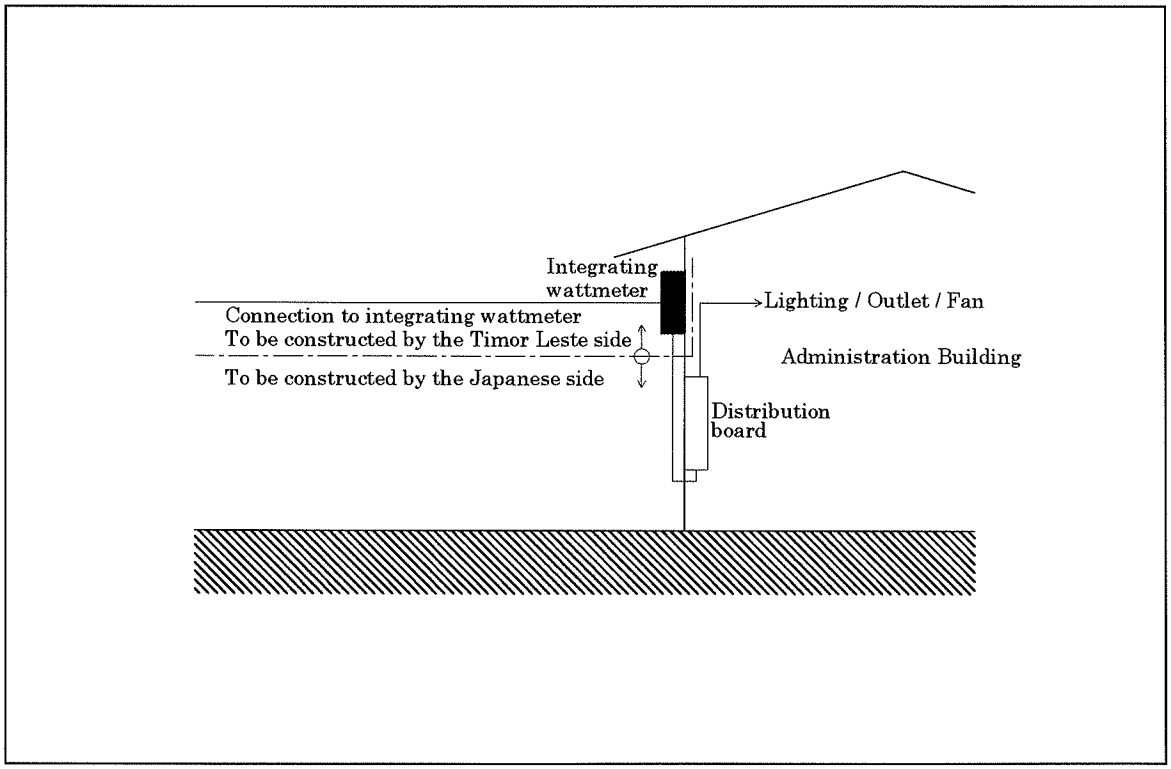


Figure 2-3 Scope of Electric works between Timor-Leste and Japanese sides

2-2-4-4. Consultant Supervision

The Project schools are distributed among the 11 districts, and access to these sites is difficult because of poor road conditions. Furthermore, many Project schools are located far from the district capital, and it takes a long travel time to reach those sites. The communication systems in the country are also not very well developed. Thus, for construction to stay on schedule and to keep the same uniform quality of work, two types of supervision shall be set up: 1) General supervision - to be carried out in Japan with periodic travel to Timor-Leste, and 2) Site supervision - to be carried out by the resident architects and/or engineers.

(1) General Supervision

The Japanese consultant will manage the general construction process and make all technical-related decisions. The same consultant will also assist the resident architects in any areas they are not familiar with or do not normally deal with.

(2) Supervision by the Resident Architect

A resident architect who conduct construction supervision in Timor-Leste will be selected from the consultants, and he will carry out the following tasks by instructing the local consultants: 1) Controlling the detailed construction schedule, 2) Attending the various tests such as slump tests, concrete compression tests, etc, 3) Checking of shop drawings, 4) Approving construction materials, 5) Examining construction methods, 6) Conducting mid-term and final inspection, 7) Gathering information related to construction, 8) Preparing monthly reports, 9) Reporting to the MECYS from time to time, 10) Conducting construction committee meetings, 11) Confirming the progress of work to be undertaken by the Timor-Leste side, 12) Reporting construction status to the Japanese Embassy and the JICA office in Dili, etc.

The local consultants will carry out their construction supervising work under the supervision of the resident Japanese architect. There will be one Japanese supervising consultant in the Project respectively. Foreign engineers will be employed in the Project as for the local consultants, so that the Project construction can be comprehensively managed by these engineers under the supervision of the Japanese consultant. The supervision main office of the consultant shall be located in Dili, as well as at the Baucau and Suai regional offices. The construction head office of the contractor will also be located in Dili because of the most convenient access and

transportation to all the Project construction sites in the 11 districts.

Figure 2-4 shows the organization charts of the consultant's construction supervision and the contractor's construction management.

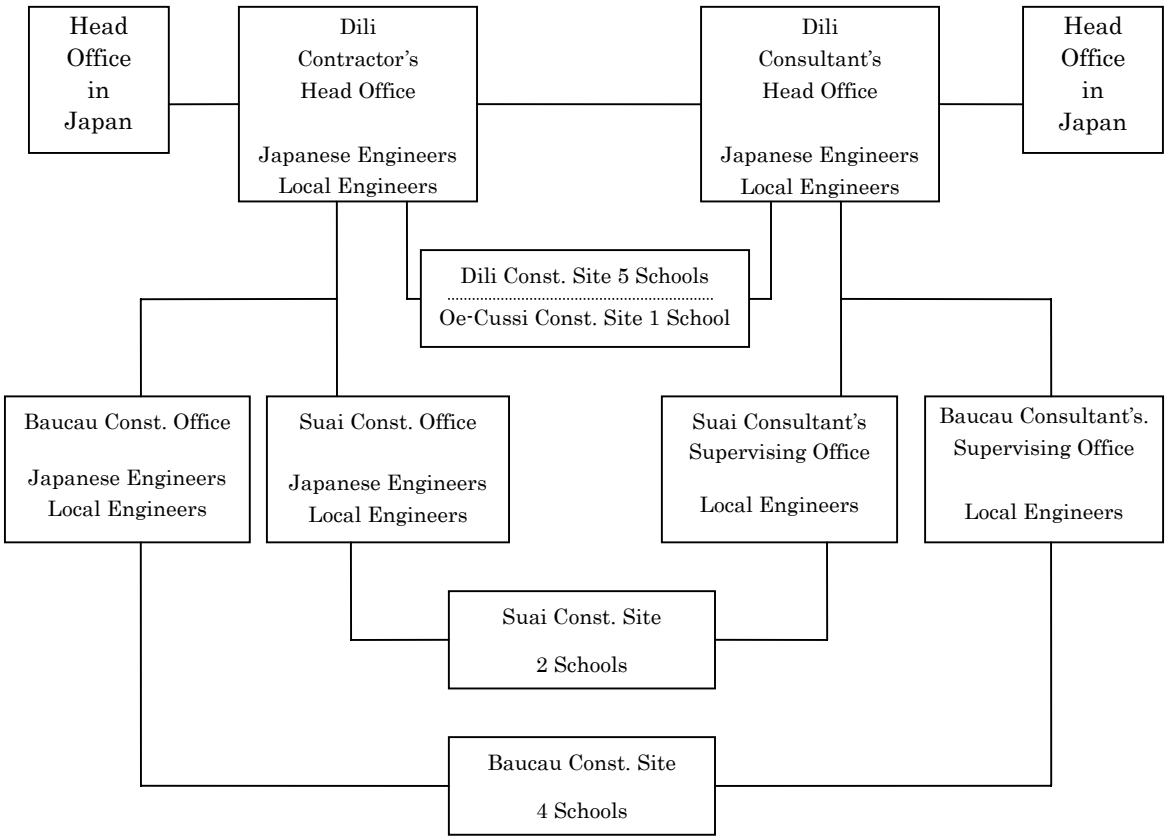


Figure 2-4 Project Construction Management Organization Chart

2-2-4-5. Quality Control Plan

As for quality control regarding Project construction, the Project's construction drawings, construction plans, and samples shall be confirmed, various tests shall be conducted at public laboratories, and construction sites shall be inspected. The quality control plan is in accordance with the quality control items specified in the design

documents and construction supervision plans.

The quality control plan of building construction is shown in Table 2-20.

Table 2-20 Major Quality Control Items During Structural Work Stage

Work	Quality Control Items	Method of Examination	Frequency of Examination
Earth Work	Confirmation of soil condition of finish grade	Observation	Once per site
Re-bar and Form Works	Re-bar material	Checking Mill sheets	Upon procurement
	Re-bar arrangement	Inspection for re-bar arrangement	Before concrete casting
	Form work	Inspection for form work	Before concrete casting
Concrete Work	Materials	Cement : Quality test results Aggregates : Sieve analysis test Water : Quality test result	At every batch plant
	Mixing	Trial mixing	At every batch plant
	Casting	Slump test, Concrete temperature measurement, Air content test, Chloride test	Upon concrete casting
	Concrete Strength	Compression test for test pieces	Once per concrete casting
Concrete Hollow Blocks	Materials and Capacity of factory	Factory inspection	Every factory
	Strength	Compression test	Every factory

As there are many tests in a large number of the Project sites, the highly-experienced Japanese architect may not be able to attend all of them. In such cases, the use of a checklist may be useful. A checklist for each job task, based on the construction supervision plan, should be prepared for each construction stage. For example, for the concrete works following checklists shall be provided;

① Confirming aggregates, cement, water quality and trial mixing tests either at a batch plant or at a construction site;

② Checklists for slump tests, air content tests, test piece sampling, chloride tests and temperature measuring during concrete placing work;

③ Checklists for the results of compression tests of test pieces at a public laboratory.

Either the consultants or contractors' site managers should make the rounds at the construction sites or manufacturing plants and complete the checklists according to the tasks and timetables set up. Through the use of this kind of checklist method, the quality of various materials for construction can be uniformly controlled. As mentioned earlier, it is very effective for good quality control to have all the local consultants and contractors trained at model schools or building mock-ups so that everyone possesses the same knowledge, techniques and skill levels.

2-2-4-6. Procurement Plan

(1) Material and Equipment Procurement

In this Project, all construction materials and educational furniture should be procured locally for cost reduction purposes and ease of maintenance of the Project facilities after the Project is completed.

(2) Transport of Materials and Storage Plans

Most of the construction materials will be procured and stored in the stockyard in Dili. Some of them will be transported to Stockyard in Baucau and Suai and they will be transported to each site by land transportation according to construction progress.

2-2-4-7. Software Component Program

In order that existing and newly constructed school facilities and equipment are effectively and continuously utilized, it is indispensable to carry out appropriate maintenance activities at the Project schools. Considering this, the introduction of a software component is proposed for those concerned at the school and ministry levels to acquire the necessary knowledge and skills regarding school facility maintenance. More details of the activities in the component will be given in "Basic Plan for Software Component Program" in Appendix 4.

2-2-4-8. Implementation Schedule

For smooth Project implementation, all proceedings and the division of work borne by the Timor-Leste and Japanese sides, within the framework of the Grant Aid system, shall be done without any delay. After the Exchange of Notes (E/N) is signed by the Governments of Timor-Leste and Japan, Project implementation will proceed with the Detailed Design stage, the tendering and signing of the contract stage, and the construction and procurement stage.

(1) Detailed Design

Based on the Basic Design of the Project, the tendering documents will be prepared. The documents include the Detailed Design drawings, the specifications and bills of quantity. During the Detailed Design stage, the consultant will hold discussions with the responsible agencies of the Government of Timor-Leste. After acquiring approval of all the tender documents, the tender will be conducted. It will take approximately 3 months for these procedures to take place and be completed.

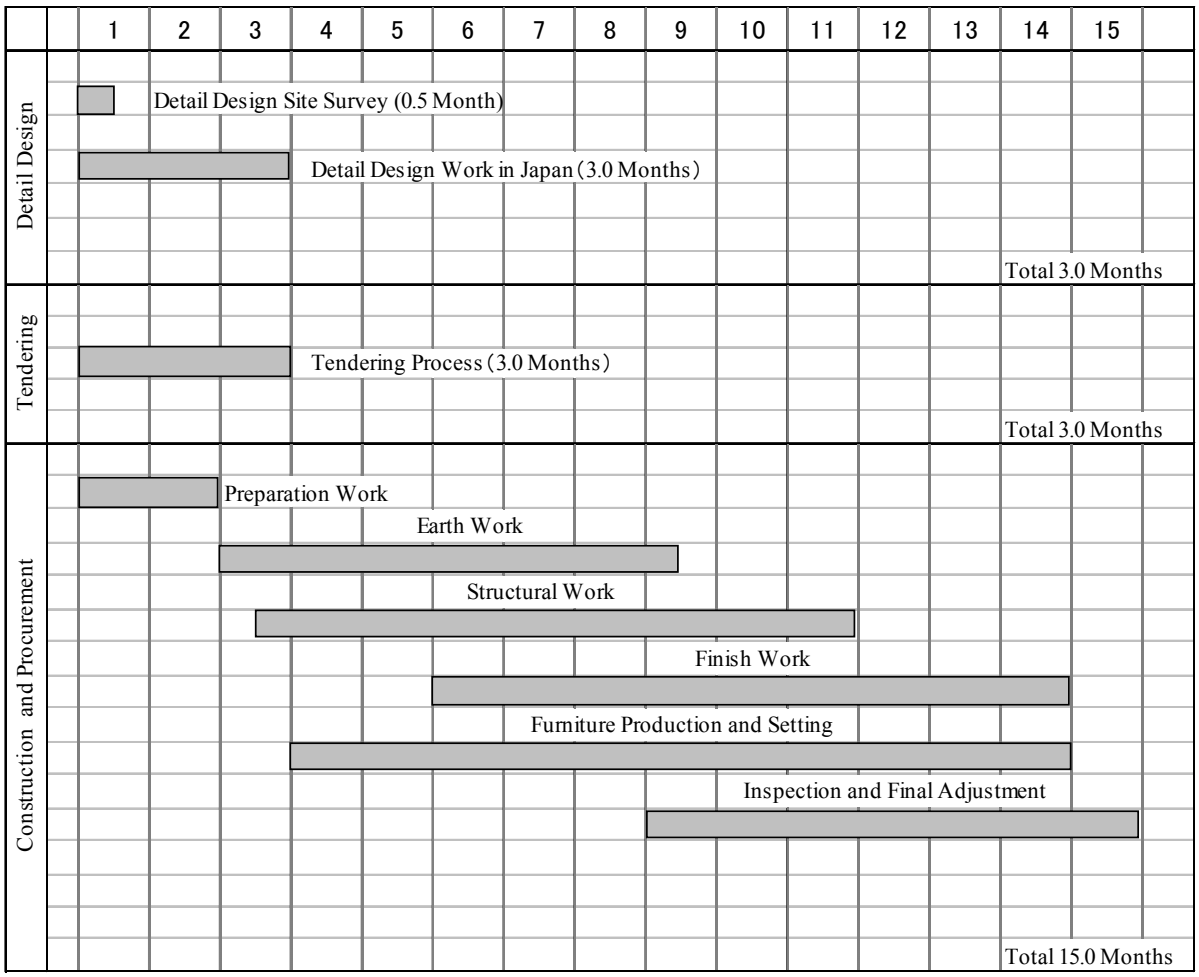
(2) Tendering and Signing of Contracts

After the Detailed Design, Pre-Qualification (P/Q) of the candidate contractors will be conducted in Japan. Based on the result of the Pre-Qualification, the MECYS as a Project implementing agency of Timor-Leste will call for the tendering of the Project which is witnessed by official personnel related to the Project. The lowest bidder will be further evaluated if the tendering contents are appropriate. After successful evaluation, a bidder will be selected as the contractor and will sign the Project construction contract(s) with the MECYS. It will take approximately 3 months for these procedures to take place and be completed.

(3) Building Construction

After the signing of the contract(s) and verification by the Government of Japan, the contractor will commence the construction work. When the obligations which shall be borne by the Timor-Leste side and procurement of the building materials and equipment are done without any delay, it will take 15 months to fully complete the entire construction work. The construction schedule is shown in Figure 2-6.

Figure 2-5 Construction Schedule



2-3 Obligations of Recipient Country

The purpose of Japanese Grant Aid is to provide financial assistance for countries making their own self-effort for development. As a basic principle, the Government of Japan requests recipient countries to share obligations of the Project, and this principle applies equally to any recipient country in the world.

Once the Government of Japan decides to provide Grant Aid for the implementation of the Project, the Government of Timor-Leste will undertake the following obligations:

① Provide the Japanese side with information and data pertinent to the Project:
② Prepare necessary land for the Project and obtain rights for MECYS to construct the Project facilities:
③ Secure the land; remove existing objects and trees, clear or reclaim land prior to the execution of construction.
- Cutting, filling and reclamation of land
  EB-3 : EPS P 3 VILA NOVA
  EB-4 : EPS P BALIBO NEGERI
  EB-5 : EPS P VASCO DA GAMA
  EB-6 : EPS P OE-SILO
  PS-11 : BELULIK LETEN
- Demolition of all concerned existing buildings in the proposed construction site (Structure: WD- Wood Frame, RC- Reinforced Concrete, S- Steel Frame)
  EB-1 : EPS P2 SUAI (RC: 1,533 ㎡)
  EB-2 : EPP CABIRA OAN (WD, RC: 1,264 ㎡)
  EB-4 : EPS P BALIBO NEGERI (RC, S: 858 ㎡)
  EB-5 : EPS P VASCO DA GAMA (RC: 1,030 ㎡)
  EB-6 : EPS P OE-SILO (RC, S: 1,034 ㎡)
  PS-1 : LETEFOHO VILA (WD: 60 ㎡)
  PS-3 : DAUDERE (RC: 227 ㎡)
  PS-5 : REMEXIO (RC: 216 ㎡)
  PS-11 : BELULIK LETEN (RC: 326 ㎡)
- Demolition of existing building foundations, concrete structures, pavement, and other structures.
  EB-1 : EPS P2 SUAI (Septic tank)
  EB-2 : EPP CABIRA OAN (Foundation)

EB-3 : EPS P 3 VILA NOVA (Foundation)

EB-4 : EPS P BALIBO NEGERI (Foundation, Septic Tank, Water Tank)

PS-5 : REMEXIO (Foundation)

PS-6 : TIBAR (Fence)

PS-11 : BELULIK LETEN (Fence, Water Tank)

- Demolition and removal of existing trees

  EB-4 : EPS P BALIBO NEGERI

  EB-5 : EPS P VASCO DA GAMA

  PS-3 : DAUDERE PS

  PS-5 : REMEXIO

  PS-6 : TIBAR

- Construction of riprap (retaining structure)

  EB-3 : EPS P 3 VILA NOVA

  EB-4 : EPS P BALIBO NEGERI

  EB-5 : EPS P VASCO DA GAMA

  EB-6 : EPS P OE-SILO

  PS-11 : BELULIK LETEN

- Construction of access road, gate, etc

  EB-5 : EPS P VASCO DA GAMA

- Others (Removal of mass base stone)

  PS-9 : MAUBISSE

④ Take necessary measures for the continuous classroom operation (ex. securing temporary classroom during the construction period) for the following schools where deteriorated classrooms presently in use will be removed for the construction of Project facilities.

EB-2 : EPP CABIRA OAN (all of the 7 classrooms in use will be removed)

EB-4 : EPS P BALIBO NEGERI (5 out of 7 total classrooms in use will be removed)

EB-6 : EPS P OE-SILO (6 out of 9 total classrooms in use will be removed)

PS-5 : REMEXIO (3 out of 5 total classrooms in use will be removed)

PS-11 : BELULIK LETEN (all of the 4 classrooms in use will be removed)

⑤ To connect the electric power up to the electric power pole provided by the Japanese side, and to provide and connect the water source to the toilet cistern tank before completion of construction. Also to provide of all necessary electric water pumps to the sites.

⑥ Undertake landscaping, construction of boundary walls, and other incidental outdoor work, if necessary

⑦ Secure teachers and administrative staff members; as well as a sufficient amount of funds necessary for operating and maintaining completed Project facilities; including equipment that are to be procured by the grant aid.

⑧ Bear commissions and/or fees for banking services based on the banking arrangement.

⑨ Ensure the expeditious unloading and prompt inland transportation of Project materials and equipment purchased by grant aid. Also, ensure all grant aid materials are exempt from taxes, customs clearance fees at the port of disembarkation.

⑩ Exempt all Japanese companies engaged in the Project from customs duties, domestic taxes, and other levies in the Timor-Leste that may be imposed on products and services which come under the verified contracts.

⑪ Provide every convenience to all Japanese nationals engaged in the Project when they enter into or stay in Timor-Leste to perform work which comes under the verified contracts.

⑫ Give permission, approval, and other authorization that may be necessary for the project implementation.

⑬ Adequately and effectively use and maintain the Project facilities under the responsibility of MECYS.

⑭ Bear all costs necessary for the implementation of the Project, including costs for land preparation, access road construction, infrastructure line connection, and other incidental work, but excluding those cost that are to be borne by the Japanese side.

⑮ Provide expeditious assistance, decisions, and judgment whenever requested by consultants for smooth project implementation.

2-4 Project Operation Plan

2-4-1. Operation Plan

(1) Transfer of Students

As shown in Table 2-21, 960 primary and 240 junior secondary students are planned to be transferred from neighboring schools to the 5 EB (EB-1, EB-2, EB-4, EB-5 and EB-6), and 204 primary students will be transferred to the PS-5 school. In addition, 127 senior secondary students are planned to be transferred from the EB-5 Vila Nova school to the other school. However, since a concrete transfer and replacement plan for students has not yet been made, especially for the EB, it is necessary to prepare an appropriate plan before the completion of Project construction and to promptly transfer the students after the completion.

Table 2-21 The Number of Students to Be Transferred

No.	Current No. of Students			No. of Transfers into Project School		No. of Transfers from Project School	Total
	Primary	Junior Secondary	Senior Secondary	Primary	Junior Secondary	Senior Secondary	
EB-1	-	-	-	240	120	-	360
EB-2	352	-	-	-	120	-	472
EB-3	822	420	-	-	-	-	1,242
EB-4	-	240	-	240	-	-	480
EB-5	-	514	127	240	-	127	754
EB-6	-	438	-	240	-	-	678
PS-1	502	-	-	-	-	-	502
PS-2	265	-	-	-	-	-	265
PS-5	334	-	-	204	-	-	538
PS-6	358	-	-	-	-	-	358
PS-9	766	-	-	-	-	-	766
PS-11	264	-	-	-	-	-	264

(2) Transfer of Teachers

A clear criteria for teacher allocation has not yet been established in Timor-Leste. However, on the assumption that one teacher is to be allocated per 40 students at primary schools and per 20 students at junior secondary schools, it is calculated that the number of teachers shown in Table 2-22 should be allocated to the newly constructed classrooms of the Project. In order to secure that number of teachers, such actions as replacement of teachers from other schools or new employment of teachers should be taken.

Table 2-22 The Number of Teachers in Shortage

No.	Planned Number of Students		Necessary Number of Teachers		Existing Number of Teachers		The Number of Teachers in Shortage	
	Primary	Junior Secondary	Primary	Junior Secondary	Primary	Junior Secondary	Primary	Junior Secondary
EB-1	240	120	6	6	0	0	6	6
EB-2	352	120	9	6	8	0	1	6
EB-3	822	420	21	21	22	17	-	4
EB-4	240	240	6	12	0	11	6	1
EB-5	240	514	6	26	0	20	6	6
EB-6	240	438	6	22	0	12	6	10
PS-1	502	-	13	-	15	-	-	-
PS-3	265	-	7	-	4	-	3	-
PS-5	538	-	13	-	15	-	-	-
PS-6	358	-	9	-	9	-	-	-
PS-9	766	-	19	-	10	-	9	-
PS-11	264	-	7	-	7	-	-	-
Total	4,827	1,852	122	93	90	60	37	33

(3) Operation of EB School

Since the introduction of the EB school system is new in Timor-Leste, a clear policy for operations has not yet been developed. However, it is planned that the FSQP will contribute to the policy development of the EB through the "Escola Basica Software Support" component, a policy the EB in the Project will follow.

2-4-2. Maintenance Plan

Although school facility maintenance at the primary and junior secondary levels is under the jurisdiction of the Department of Primary and Junior Secondary Education of MECYS, the actual maintenance activities are implemented at the school level. While cleaning activities are properly carried out in almost all schools, preventive activities or simple repairs are rarely done except some assisted by donors. It is difficult for the schools to cover maintenance expenses under the existing situation of school fees being collected from parents. Since there is no direct disbursement of education budgets from the government, this colleting is the only financial source to cover all the expenses for normal school operations.

In addition, specific budgets for “Maintenance of Equipment and Buildings” are too limited to cover proper implementation of activities for all the schools. Even though proposals for budgets were approved at some schools, the issue is problematic because the basic procedures for direct provision of materials and equipment take too much time. Thus, in order to carry out effective maintenance activities making the best use of human and material resources within a limited budget, the “software component program”, which aims to establish a proper maintenance system at the school levels, will be introduced.

2-5 Project Cost Estimation

2-5-1. Project Cost

The total amount of the project cost needed for implementing the Grant Aid Project is approximately 622 million Japanese Yen. According to the conditions of the cost estimate shown below in section (3), the previously mentioned details of expenses based on the respective shares borne by Japan and Timor-Leste are calculated as shown below. However, the following estimated project cost may not be considered the final Grant Aid project cost as that is limited based on the Exchange of Notes.

(1) Cost estimation borne by the Japanese side

Approx.602.15 Million Japanese Yen

6 EB Schools　32 Classrooms　(Total Floor Area 3,733.84 ㎡)

Item		Estimated Cost (Million Japanese Yen)	
Facility	Administration Building	130.53	312.11
	Classroom Building	127.14	
	Toilet Building	43.95	
	Furniture	10.49	
Detail Design / Const. Supervision / Technical Training			73.96

Estimated Project Cost (Subtotal)　Approx.386.67 M.J.Y.

6 PS Schools　31 Classrooms　(Total Floor Area 2,269.44 ㎡)

Item		Estimated Cost (Million Japanese Yen)	
Facility	Administration Building	-	171.13
	Classroom Building	164.20	
	Toilet Building	-	
	Furniture	6.93	
Detail Design / Const. Supervision / Technical Training			44.95

Estimated Project Cost (Subtotal)　Approx.216.08 M.J.Y.

2) Cost estimation borne by the Timor-Leste side:

163,053 US dollars (approx. 19.54 million Japanese yen) .

①	Cutting, filling and reclamation of land	14,440 US dollar	1.73 M.J.Y.
②	Demolition of all concerned existing buildings in the proposed construction site	69,737 US dollar	8.36 M.J.Y.
③	Demolition of existing building foundations, concrete structures, pavement, other structures, etc	13,573 US dollar	1.63 M.J.Y.
④	Demolition and removal of existing trees	385 US dollar	0.04 M.J.Y.
⑤	Construction of riprap (retaining structure)	35,130 US dollar	4.21 M.J.Y.
⑥	Construction of access road, gate, etc	500 US dollar	0.06 M.J.Y.
⑦	Others (Removal of massive stone)	1,500 US dollar	0.18 M.J.Y.
⑧	Electrical Connection Work	10,575 US dollar	1.27 M.J.Y.
⑨	Supply Water Connection Work	17,213 US dollar	2.06 M.J.Y.

The cost estimation borne by the Timor-Leste side is shown above. Budget for these costs are applied to the Ministry of Finance and Planning by the MECYS. According to the contents of the construction works and necessary period for the works, application will be made in December 2003 at the time of mid-year budget review for the fiscal year 2003 or after July 2004 for the budget of the following fiscal year.

(3) Condition of Cost Estimate

① Period of cost estimate: July, 2003

② Currency Exchange Rate: 1US$=119.82 Japanese Yen

③ Period of Execution: The project construction will be implemented within the budget arranged by the Type B national bond, and the periods of detailed design, bidding process and construction work are set as shown in the project execution schedule.

④ Others: This Project shall be carried out under the system of the Grant Aid of the Japanese government.

2-5-2. Operation and Maintenance Costs

After completion of the project, the new school costs will be applied and categorized as maintenance costs and operating costs. Each cost is calculated according to the following methods.

(1) Maintenance Costs

The maintenance costs include periodical expenses, such as paint for walls, and there are some irregularly charged repair costs for minor failures, such as damage to jalousie windows and wooden doors. The facility maintenance costs for one year are generally assumed to be 0.6 ～ 1.4% of the construction costs (direct costs). However, the newly designed and constructed buildings of the project have a simple structural system and facility layouts so that these are fully functional with a minimum expense for maintenance. Therefore, the expected annual maintenance costs are only 0.1% of the direct construction costs.

The increment of the administrative and maintenance expenses = approximately 3 million US dollars (direct construction cost) x 0.1% (per year) = approximately 3,000 dollars (per year)

(2) Operating Costs

The operating costs, such as labor costs (wages), electrical costs, water supply and sewage disposal costs, and miscellaneous costs, shall be calculated according to the following methods.

1) Labor Costs

The numbers of additional teachers needed for the project school operation total 37 for the primary schools and 33 for the junior secondary schools. It is assumed that half of the required additional teachers will be newly employed while the other half will be the teachers relocated from other schools. The salary for a primary school teacher is 123 dollars per month, and that for a junior secondary school teacher is 155 dollars per month. Therefore, the total incremental labor costs due to employment of new teachers are calculated and shown below.

Primary School: 19 teachers x 123 dollar x 12 month = 28,044 dollars

Junior Secondary School: 17 teachers x 155 dollar x 12 month = 31,620 dollars

Total: 59,664 US dollars

2) Costs for Electricity, Water Supply and Sewage, etc

① Electrical Costs

The electrical system installation of the project includes the lighting fixtures and electrical outlets for the administration buildings of EB, and the cost incurred from usage of electricity will arise. The electrical costs are based on the meter rate system

and the amount of electricity used differs depending on the size of the buildings. The monthly electrical costs are calculated by multiplying the estimated monthly electricity consumption by the average electricity rate.

Table 2-23 Usage of Electricity by EB Administration Building

Type of Administration Building	Usage (Kw)	Number of Building	Total Amount of Usage (Kw)
SA	3,608	3	10,824
MA	3,878	2	7,756
LA	4,042	1	4,042
Total			22,622

22,622kw×3 hours/day×20 days/Month×0.24dollar/kwh≒325 dollar/Month

325 dollar×12 Months ＝3,900 dollar/Year

② Water Supply Costs

The public water is supplied to eight of the proposed project school sites. However, there is no charge for usage of the water supply, so the water supply cost is not applicable to the project.

③ Sewage Disposal Costs

Since no project school is connected to the public sewer system, the sewage disposal cost is not applicable to the project.

3) Miscellaneous Costs

Within the category of school operating costs, there are miscellaneous expenses for examinations and expendable supplies, such as stationery and chemicals for science equipment. However, as these costs are relatively small compared to the overall maintenance costs, they will not be taken into account in the calculation.

(3) Total Maintenance and Operating Costs

The MECYS's educational budget in 2003 and the additional facility maintenance and operating costs after the implementation of the project are shown in table 2-24. The additional maintenance costs account for approximately 0.8%, and operating costs approximately 0.5 % after the project. Therefore, the estimated costs are considered reasonable to be budgeted after the project.

Table 2-24 Annual Educational budget and additional cost after the Project implementation

Items		Increased Costs after the Project per Year (US Dollar)	Educational Budget for 2003 thru. 2004 (US Dollar)	Increase Rate (%)
Facility Maintenance Costs		3,000	377,000	0.80
Management Cost	(Labor)	59,664	12,034,000	0.52
	(Electricity)	3,900		
	(Water)	0		
	Sub Total	63,564		
Total		130,128	12,411,000	1.05