



PERSPECTIVE (2)

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Abbreviations

BOET	Bureau of Education and Training
DOET	Department of Education and Training
EFA	Education for All
IRDS	Institute of Research and Design of Schools
JICA	Japan International Cooperation Agency
MOET	Ministry of Education and Training

Summary

Since its policy changes to Doi Moi in 1986, the Socialist Republic of Vietnam (hereinafter referred to as Vietnam; GDP per capita: US\$483; Population: 82.06 million in 2004) has been shifting to a market economy and widely opening itself up to the world. The country's Five-Year Plan for Socio-Economic Development 2001-2005 positioned the development and training of human resources as a very important issue. The Ministry of Education and Training (hereinafter referred to as MOET) developed the Education Development Strategic Plan 2001-2010 and the National Primary Education Development Program and has been working for improving the quality of primary education and educational facilities.

Under these situations, with the assistance of the World Bank and several other agencies, MOET has renovated and constructed educational facilities. Under the World Bank's Primary Education Project 1994-2002, MOET constructed about 7,500 classrooms in 36 provinces. Besides this, Vietnam also requested Grant Aid Assistance from Japan to construct primary educational facilities in those areas suffering from hurricanes and floods. In response to the request, the Japanese have been providing continuous assistance for the construction of educational facilities in 16 coastal provinces from 1994 to 1998.

However, the northern mountain region, the target area of this Project, is economically depressed and has been isolated from such development because of its geographical constraints. This large economic gap between the city area and the Project area strongly influences the educational environment, and has created an extremely severe shortage of classrooms. One of the major obstacles to the full-day schooling system, which has been introduced as a Vietnamese national goal, is classroom shortages; and this has forced many schools to operate under a double-shift teaching system. Accordingly, the quality and amount of education that can be provided to students varies between those schools with a full-day teaching system and those schools with a double-shift teaching system. Thus, it becomes more apparent that the educational opportunities are unequal. Moreover, because many of these school buildings are either temporary buildings without doors and windows or decrepit wooden buildings, they lack durability and functionality and do not function efficiently as educational facilities. Furthermore, because rural villages are widely scattered in the mountain areas and access roads have not been well maintained, students in such remote areas often find it very difficult to attend schools.

Based on this background, the Vietnamese government requested Grant Aid

Assistance from the Japanese government in 1998 to construct school buildings and procure related equipment for the improvement of primary school facilities in 8 provinces in the northern mountain region. The construction of school facilities was completed in 4 provinces of Ha Giang, Lai Chau, Cao Bang, and Bac Can by implementing Phase I of the Project, “the Improvement of Facilities of Primary Schools in the Northern Mountain Region” in 2002. For the remaining 4 provinces of Bac Giang, Thai Nguyen, Tuyen Quang, and Phu Tho, the Basic Design Study was conducted from July through September 2002 as Phase II of the Project. The school facilities in Bac Giang were completed as the first stage construction during 2005. Those in Thai Nguyen were completed as the second stage construction by March 2006. It was planned to construct the school facilities in Tuyen Quang and Phu Tho as the third stage construction during this year. However, due to certain budgetary situations, the Japanese government postponed the third stage construction until the next fiscal year and the Vietnamese government agreed with the postponement. Notwithstanding the postponement, the Vietnamese government has desired that Project construction be commenced as soon as possible. Thus, it was decided upon to prepare the detailed design that should be sufficient for the bidding of Project construction with the budgetary funds of Japan International Cooperation Agency (JICA) prior to the original schedule. Furthermore, in view of economic situations, such as the price hike of steel and crude oil worldwide, it is necessary to prepare the design after reinvestigating Project construction costs for appropriate Project implementation.

This Study has been made based on the results of the above-mentioned Basic Design Study for the purposes of conducting additional site surveys, detailed design preparation and the re-estimation of construction cost for the Project schools in the provinces that were included as the third stage construction plan.

The Design Study Team stayed in Vietnam for a period from 7 to 24 December 2005 and held meetings to discuss the contents of the Project with related officials and MOET that is the responsible agency of Project implementation. The Study Team also conducted site surveys at each Project school site and obtained necessary information and data. After returning to Japan, the Team examined the appropriateness, management and maintenance systems and effects of the Project based on the site survey results, then set up the appropriate facility components and scale, selected the necessary equipment and estimated a rough Project cost.

The scale of Project facilities for those 18 schools that were finally requested by the Vietnamese side were reexamined in accordance with the following policies that were agreed upon between the Study Team and the Vietnamese side:

- ① The arrangement and size of school buildings should be adjusted based on the changes in the conditions of existing buildings that were built by the Vietnamese side's self-help efforts and site conditions.
- ② Demolition of existing old and deteriorated buildings should be taken into consideration when evaluating the appropriateness of the contents of the request that was made by the Vietnamese side. Contents to be covered by this Project shall be finally decided upon by the Japanese side after evaluating the Project contents that were requested by the Vietnamese side.

As for facility size, the necessary number of classrooms was calculated based on the modified number of students in the 2006 school year and a premise that a full-time schooling system would be conducted accommodating 35 students in one classroom in accordance with the Vietnamese educational standard. The number of classrooms in shortage was obtained by subtracting the number of usable classrooms from the necessary number of classrooms. It was decided that those schools that lack only one or two classrooms be excluded from the Project and the Vietnamese side should develop necessary facilities by its own efforts.

Based on the above selection criteria and the results of facility size setup, 17 schools were finally selected as Project schools:

As MOET regards the Sample Design for Primary Schools as the design standards of primary school facilities in Vietnam, the Project used the design standards.

The Project components include classrooms, principal's rooms, teaching aid rooms and toilet facilities as the minimum necessities for the operation of schools. The Project facility components for each province are shown in Table-1.

Table-1 Projected Facility Components for each Province

Province	Number of Schools	Classrooms	Toilet Buildings	Principal's Rooms	Teaching Aid Rooms	Total Floor Area (m ²)
Tuyen Quang	9	53	9	2	3	4,203.79
Phu Tho	8	87	10	4	4	6,863.10
Total	17	140	19	6	7	11,066.89

Table-2 lists the educational furniture necessary for school operation that will be provided by the Project.

Table-2 Component of Educational Furniture

Room Name	Content of Furniture
Classroom	Desks for students (two-seated), chairs for students, desk for teachers, chairs for teachers, and blackboard
Principal's Room	Desk, chair, and cabinet for principal, and blackboard
Teaching Aid Room	Cabinet, meeting desks (two-seated) , chairs for teachers, and blackboard

As the related personnel at the Project schools lack sufficient knowledge for correct facility use and maintenance methods, proper maintenance activities have not been conducted. By taking this situation into consideration, the Project will introduce a software component in order that each Project school will utilize Project facilities in effective and sustainable ways by targeting those members of the school management committees at the Project schools as follows: 1) Conducting workshops to analyze current situations and problems related to maintenance activities at each school and to raise awareness among participants; 2) Formulating guidelines for the effective use and maintenance of school facilities and equipment; and 3) Conducting proper seminars and training related to activities specified in these guidelines.

The rough cost estimate for the Project is calculated to be 515 million Japanese Yen (510 million Japanese Yen to be borne by the Japanese side and 5 million Japanese Yen to be borne by the Vietnamese side). The total construction period is estimated as approximately 15 months including the detail design period.

As the result of the implementation of the Project, the following effects are expected:

【Direct Effect】

① Improvement of the Study Environment

Through the construction of 140 classrooms by the Project, the existing decrepit and wooden temporary classroom buildings, which are approximately 26% of all existing classrooms, will be rebuilt and the capacities of the Project schools will increase to accommodate a larger number of students. The number of students accommodated in one classroom will be reduced from 95 to 34¹ and the learning environment in the classrooms will be improved. In addition, each Project school will

¹ Number of Students per Classroom = Total Number of Students divided by Number of Usable Classrooms

have a principal's room and a teaching aid room. Classes will be conducted in a better learning and teaching environment.

② Implementation of the Full-day Schooling System

Because of the alleviation of classroom shortage situations as a result of the implementation of the Project, those schools that are obliged to conduct a double-shift teaching system will be able to carry out a full-day schooling system. Accordingly, the ratio ² of classrooms that can conduct a full-day teaching system will increase from 36% to 104 %.

③ Improvement of the Sanitary Environment

The Project will provide well-equipped toilet facilities of sufficient number and sizes that are set up based on the number of classrooms to be built. Thus, the shortage of toilet facilities, as well as the general sanitary environment, will be markedly improved.

④ Acquiring of Skills and Knowledge for Proper Facility Maintenance and Management

By introducing the Software Component, personnel of each Project school will understand the importance of the proper maintenance of facilities and acquire the basic skills and knowledge necessary for such maintenance. Furthermore, the appropriate implementation of the maintenance activities enables sustainable use of the existing facilities as well as the Project facilities, thereby decreasing the maintenance cost in the long run.

【Indirect Effect】

① Use of the Facilities by the Community

The Project facilities will be used not only for primary education but also for social educational activities, such as adult education or literacy education, as well as for non-educational purposes such as community activities. In these ways, the Project facilities will greatly contribute to the surrounding communities.

In conclusion, the Project is highly expected to achieve many positive benefits as

² Classroom Ratio capable of conducting a full-time teaching: Total number of classrooms divided by the appropriate number of classrooms.

Appropriate number of classrooms: Total number of students divided by 35 (person)

mentioned above, as well as to contribute to the improvement of Basic Human Needs of the society. Thus, the implementation of the Project through the Japanese grant aid scheme is deemed worthy and meaningful. As the Vietnamese side has a sufficient number of staff members and a sufficient amount of funds, it is believed that there will be no problems for the maintenance and operation of Project facilities. However, it would be necessary to consider the following items in order to achieve greater effects of the Project:

① Approach to the Full-day Schooling System

The current level of student attendance in the primary schools is quite high in Vietnam. However, after the adoption of the full-time schooling system, many students who are an important work force in the farming villages and lower income families may encounter difficulty attending school. This may cause serious concern as it might widen the gap of education-opportunity between the social classes. Thus, in order to prevent such problems, the Vietnamese side is well advised to effectively eliminate any possible negative effects that might be caused by the implementation of the full-time schooling system.

In order to smoothly introduce and make use the full-day schooling system in each Project school, it is necessary, in addition to the alleviation of classroom shortages by the Project, to make students, their parents and the community residents understand the purposes and goals of the full-day schooling system. At the provincial and school level, it would be necessary to develop organizations related to the introduction of the full-day schooling system by examining school operation and conducting publicity activities for all related people.

② Implementation of Proper Maintenance Activities

Currently, school maintenance activities are not carried out in an effective or systematic way, and also, proper preventative maintenance procedures for building facilities are not implemented in any periodic fashion. When problems do arise, it seems that only temporary measures are taken to solve them. However, for the continuous and permanent use of both existing and Project school facilities, it is absolutely essential that these kinds of activities be performed appropriately. In order to support such activities, the schools need to be well organized, the partnerships between the schools and their surrounding communities need to be promoted, and the awareness of all related people needs to be raised.

③ Concern Regarding the School Construction Carried out by Vietnam

Several efforts to construct classrooms and improve classroom shortages are being made by the local people in conjunction with the People's Committees. In order for the Vietnamese side to best implement school facility improvement work on its own, an accurate forecast and analysis needs to be made in regards to the number of students attending schools in the future. Moreover, the country of Vietnam needs to recognize and fully acknowledge such voluntary efforts by the local people and their communities as well as the close communication with the Bureau of Education and Training of each Ministry and the Department of Primary Education of each Province. In summary, the Vietnamese side needs to pay more attention to maintaining a high level of coordination with all school building construction projects that donors may provide, including this Project.

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Chapter 1 Background of the Project

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Since its policy changes to Doi Moi in 1986, the Socialist Republic of Vietnam (hereinafter referred to as Vietnam; GDP per capita: US\$483; Population: 82.06 million in 2004) has been shifting to a market economy and widely opening itself up to the world. The country's Five-Year Plan for Socio-Economic Development 2001-2005 positioned the development and training of human resources as a very important issue. The Ministry of Education and Training (hereinafter referred to as MOET) developed the Education Development Strategic Plan 2001-2010 and the National Primary Education Development Program and has been working for improving the quality of primary education and educational facilities.

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However, the northern mountain region, the target area of this Project, is economically depressed and has been isolated from such development because of its geographical constraints. This large economic gap between the city area and the Project area strongly influences the educational environment, and has created an extremely severe shortage of classrooms. One of the major obstacles to the full-day schooling system, which has been introduced as a Vietnamese national goal, is classroom shortages; and this has forced many schools to operate under a double-shift teaching system. Accordingly, the quality and amount of education that can be provided to students varies between those schools with a full-day teaching system and those schools with a double-shift teaching system. Thus, it becomes more apparent that the educational opportunities are unequal. Moreover, because many of these school buildings are either temporary buildings without doors and windows or decrepit wooden buildings, they lack durability and functionality and do not function efficiently as educational facilities. Furthermore, because rural villages are widely scattered in the mountain areas and access roads have not been well maintained, students in such remote areas often find it very difficult to attend schools.

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This Study has been made based on the results of the above-mentioned Basic Design Study for the purposes of conducting additional site surveys, detailed design preparation and the re-estimation of construction cost for the Project schools in the provinces that were included as the third stage construction plan.

Chapter 2 Contents of the Project

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2-1 Basic Concept of the Project

2-1-1 Overall Goal and Project Purpose

The net enrollment ratio of primary education in the Socialist Republic of Vietnam (hereinafter referred to as Vietnam) has reached almost 100%. This shows that access to primary education has rapidly improved. The Government of Vietnam has developed two priority plans, one is called the “Education Development Strategic Plan for 2001 - 2010,” which is for the entire education sector in general, and the other is the “National Primary Education Development Program,” which is similar but specifically emphasizes the primary education sector. These plans aim to improve the quality of education by reducing classroom shortages and gradually shifting to full-day schooling at the primary education level.

Although a high enrollment rate has been achieved in the Northern Mountain Region(the Project area), many schools are obliged to conduct classes in old wooden classrooms or in temporary classrooms without doors and windows. Therefore, an adequate learning environment has not been secured. Moreover, a shortage of classrooms in many schools has been one of the obstacles against introducing full-day schooling and the schools are obliged to conduct double-shift classes. In the present state of affairs, the differences in the educational quality between students who have to study with limited school curriculum under a double-shift system and students who can study in full-day schooling have been growing.

The purpose of the Project is to increase the number of classrooms that can conduct full- day classes by replacing the old temporary wooden classrooms with the construction of new classrooms, and building additional classrooms, thereby significantly improving the learning environment. The overall goal of the Project is to improve the quality of primary education in the Northern Mountain Region of Vietnam.

2-1-2 Outline of the Project

In order to achieve the project purpose, the Project intends to improve the learning environment by constructing classrooms and sanitary facilities for the 17 primary schools that were selected from the 18 candidate schools in the Tuyen Quang province

and Phu Tho province of the Northern Mountain Region that the Government of Vietnam originally requested aid for, and provide principal's and teaching aid rooms for those schools which do not have them.

In addition, for the effective and continuous use of these facilities for years to come, the Project will implement a software component program for the appropriate maintenance of facilities, not only for the newly constructed schools, but also for all other existing facilities at the Project schools.

2-2 Basic Design of the Requested Japanese Assistance

2-2-1 Design Policies

(1) Basic Policies

The Project schools shall be those that lack sufficient classrooms when a full-day schooling system is employed accommodating 35 students in one classroom in accordance with the Vietnamese standards. The schools should be selected from the 18 primary schools that were requested by the Vietnamese side. Those wooden temporary school buildings that are beyond repair and those brick school buildings that cannot be used in the future are deemed unusable and in need of replacement. The number of existing classrooms in those buildings should not be counted as usable classrooms. Therefore, the number of classrooms in shortage shall be calculated by subtracting the number of these classrooms that need to be demolished from the total number of "existing" classrooms. In addition, those schools that are lacking only one or two classrooms should be excluded from the Project and be improved by the Vietnamese side's self-help efforts. In the Basic Design of the Project, each Project school's number of classrooms and the sizes of the facilities to be built were calculated based on the forecasted number of students in the Vietnamese school year 2006 that was scheduled as the Project completion year. This Project will provide the number of classrooms in shortage calculated based on the modified number of students in the school year 2006 by taking into consideration the change in the number of students after the time when the Basic Design was prepared.

The facility components of the Project are those classrooms and toilets that are considered as "minimum necessary" for school operation. Principal's rooms and teaching aid rooms will be provided only to those Project schools that do not have these rooms.

In addition, blackboards, desks and chairs will be provided for those classrooms. Also, desks, chairs, and cabinets will be provided to the principal's rooms and teaching aid rooms.

(2) Policies Regarding the Conditions of Nature

The climate in the Northern Mountain Region varies in temperature throughout the year - hot in the summer and cool in the winter. The amount of annual rainfall is

high and it is concentrated during the rainy season. To meet these climatic conditions, the preparation of the Project facility designs shall take into consideration natural ventilation and heat insulation properties as well as minimizing the effects of rainfall, in order to create a good classroom environment. The safety of the land on which the Project sites are located has been generally confirmed as secure for construction. However, as some of the Project schools are located in flood-damaged areas, measures such as constructing high floors shall be considered when designing the school facilities for those Project schools.

As measures to protect against damage from hailstorms in the winter and tornadoes in some areas, strong and durable roof structures and materials shall be selected. Further, as termite damage was discovered at many Project school buildings during the site survey period, use of wood shall be avoided as much as possible.

(3) Policies Regarding the Socio-economic Conditions

1) Effective Use of the Land

The Project Areas are located both in mountainous areas and on flat land, and many Project sites are surrounded by rice paddies. Therefore, most of the Project sites are very small and do not have enough space for school grounds. Thus, for purposes of efficient use of the land, two-storied buildings shall be planned in the design of the schools, except for schools requiring only a small number of classrooms.

2) Reduction of Facility Maintenance Costs

The Project area, located in the Northern Mountain Region, is a relatively disadvantaged area in terms of economic development. Certain ethnic minority groups live in the region, and the percentage of families living in poverty is relatively high. During the Site Survey period at the Project schools, the Study Team learned that the poor conditions of the existing school facilities were due to inadequate maintenance procedures. Thus, the Project facilities, in order not to subject the schools to any additional or unnecessary financial burdens, shall be carefully designed so that future upkeep and maintenance costs can be kept at a minimum and be within the allowable budgetary fund limits.

(4) Policies Regarding Architectural Standards

The building standards by which all school facility construction in Vietnam is

guided, including school construction projects by MOET, can be found in The Design Standards, which is compiled and issued by the Vietnam Ministry of Construction. In general, the designs and construction of primary school facilities were completely left to the discretion of each district as long as they fell within these building codes. Each district used to prepare a new design for each project or pay a licensing fee and use the designs from other projects.

However, due to the recent approval of the new Sample Design for Primary Schools by the Prime Minister which was issued by the Ministry of Construction on March 28, 2003, the minimum requirements for all school construction projects shall, from that date on, be based on the specifications found in the above Sample Design document.

In addition, the Ministry of Construction set up the Building Codes of Vietnam that stipulates various facility construction regulations. Therefore, the designs and plans of the Project facilities shall be based on the Design Standards, the Building Codes of Vietnam and the Sample Design for Primary Schools.

(5) Policies Regarding the Use of Local Contractors and Construction Materials

1) Institute of Research and Design of Schools (IRDS)

The Institute of Research and Design of Schools (IRDS) works under MOET as a team of consultants and architects. It sets up standard designs for school facilities and conducts research activities regarding school facilities. It also works as a private consultant to design mainly secondary and upper secondary schools. For smooth Project implementation under the special circumstances mentioned earlier, it is considered most effective that the Project shall cooperate with MOET through IRDS, by entrusting IRDS with the assistant supervision work of the facility designs for the Project.

2) Local Contractors

The local contractors in Vietnam are composed of both government enterprises under the Ministry of Construction and small private enterprises that were established after the introduction of a market economy. Many of the local contractors have worked on school facility construction projects. Thus, under the guidance of the Japanese contractors, the construction skills possessed by these local contractor enterprises can be utilized to meet the requirements for Project implementation. To simultaneously conduct construction work at the many Project sites that are widely scattered over the two provinces of the Northern Mountain Region, it is

necessary to use more than one local contractor as the subcontractors. Also, it is very important to carefully select the subcontractors so that all the school facilities will have the same uniform quality of construction. Considering that the Project sites are relatively close to Hanoi, it is appropriate to choose subcontractors from Hanoi to ensure the consistent quality of construction.

3) Local Construction Materials

It is desirable to use local construction materials as much as possible for simplicity of operation and maintenance of the completed facilities as well as to keep these costs and expenses as low as possible. Since Vietnam adopted a market economy, it has become possible to procure basic construction materials of sufficient quality within the country, such as steel bars and cement. Thus, the facility designs and plans for the Project shall take into account the use of only local construction materials and equipment which will not require any special finishing materials or advanced construction methods, and will provide ease of operation and maintenance of facilities.

(6) Policies Regarding the Facility Operation and Maintenance Capability of the Project Implementing Agency

School facility operation and maintenance costs are financed with fees collected from the parents of students at each school by the People's Committee. The fee per student varies from school to school, but is in the range of 30,000 to 80,000 Vietnamese dong (240 to 650 Japanese yen) per year. Although the amount is small, the financial burden for each family is not low. In addition to the fee, parents of students and community residents provide the labor and materials for school facility operation and maintenance. Even so, the implementation of appropriate maintenance is not carried out. In view of the difficult financial situations of the schools, the facility designs for the Project buildings shall be prepared to use locally procured materials that will keep operation and maintenance costs to a minimum. In addition, the Project will make use of the software component to help promote the effective and continuous use of both new and existing school facilities. The proposal for the software component is described in Section 2-4-7.

(7) Policies Regarding the Grade of Facilities and Equipment

The grade of the Project facilities and equipment shall be of minimum quality, and shall be decided by taking the local specifications of school facilities into consideration, as long as they satisfy the above-mentioned natural and socioeconomic conditions. The size and specifications of primary schools constructed by other donors will be used as a reference for the Project facility designs; however, a specific design for the Project will be prepared from the Project's own viewpoint in terms of cost-reduction measures. In this project, the main components of the facilities will be basic classrooms. Other rooms or facilities shall be provided based on the minimum necessary. Further, the facility designs used for phase I of the Project shall be completely re-examined to satisfy the requirements for efficient and effective implementation plans, including further cost reductions, as laid out by the Japanese Grant Aid Cooperation. The facilities will be designed to maintain a certain level of quality, but reduce the costs of the construction.

(8) Policies Regarding Construction Schedules

The Project schools are widely scattered over the vast two provinces in the Northern Mountain Region, and the progress of Project construction will be more or less affected by the rainy season from June to September. During the rainy season, not only the local branch roads, but also the main road from Hanoi, are cut off several times a year by floods. In general, it is considered highly likely that the transportation of equipment and materials to Project sites will be interrupted by floods. However, the period when access roads are unusable is short and will not greatly affect the Project construction schedule.

In addition, the progress of work to be done by the Vietnamese side requires special attention and should be carefully monitored from the early design period stage. As construction cannot start until the Vietnamese side finishes the necessary demolition of existing buildings at certain Project sites, confirming that time schedules are being strictly adhered to is absolutely necessary.

The standard construction period shall be 8 months for single-story school buildings and 11 months for two-storied school buildings. By taking into consideration the efficiency and the capability of local subcontractors, the entire Project construction period shall be 12 months as the construction will be implemented by dividing the sites into several groups and staggering construction shifts of each group.

2-2-2 Basic Design

2-2-2-1 Setup of Project Schools and the Scale of Project Components

(1) Project Schools

The 18 primary schools requested by the Government of Vietnam should be examined by reflecting on changes that have occurred since the time the Basic Design of the Project was prepared. As a result, Project schools should be those requested schools that lack a sufficient number of classrooms when employing a full-day schooling system having 35 students in one class based on the Vietnamese standards.

(2) Calculation Method of the Number of Classrooms in Shortage

1) Number of Students

Although the number of students in those 18 schools requested by the Government of Vietnam had been decreasing in 2005, there are some deviations in the rate of decrease at some schools from the figures estimated in the Basic Design. Thus, the scale of Project components is to be examined based on the projected number of students in 2006 that is revised from the figures estimated in the Basic Design by taking into account the decrease rate by 2005.

The change in the number of students in each Project school is shown together with estimated figures in Fig. 2-1.

Table 2-1 Variation in the Number of Students in Each Project School and the Estimated Figures

No.	Name of School	97	98	99	00	01	02	03	04	05	Average Increase Rate	Actual Number of Students in 2005	Revised Number of Students in 2006	Estimated Number of Students in BD
Tuyen Quang Province														
TQ-2	Vinh Loc	821	830	776	697	619	568	509	466	534	-4.9%	534	508	438
TQ-3	Bac Muc	602	556	552	492	479	449	450	473	468	-3.0%	468	454	362
TQ-5s	Thuong Am (Sub school)	232	277	206	165	149	144	129	149	140	-5.0%	140	133	94
TQ-6	Phan Thiet	888	894	896	899	950	857	854	853	850	-0.5%	850	846	1,035
TQ-7	Thai Binh	266	252	240	230	197	167	151	155	158	-6.1%	158	148	137
TQ-8	Son Nam	711	701	691	621	625	524	540	486	416	-6.2%	416	390	534
TQ-10s	Xuan Quang (Sub school)	165	163	159	157	153	135	104	102	120	-3.3%	120	116	138
TQ-14	Phuc Thinh	515	448	388	350	403	372	325	305	291	-6.5%	291	272	308
TQ-17s	Dang Chau (Sub school)	142	121	116	102	115	136	128	96	100	-3.3%	100	97	91
Total in Province												3077	2964	3137
Phu Tho Province														
PT-4	Tieu Son	707	667	630	567	485	422	391	336	299	-10.1%	299	269	304
PT-5	Det	986	964	909	893	849	746	841	783	757	-3.0%	757	734	704
PT-6	Van Lung	789	732	812	811	792	740	740	737	732	-0.8%	732	726	802
PT-8	Co Tiet	738	631	602	560	543	535	476	439	426	-6.5%	426	398	372
PT-10	Dong Xuan	521	446	465	432	405	330	315	305	309	-6.1%	309	290	299
PT-11	Trung Nghia	527	520	515	503	505	359	322	291	290	-6.7%	290	271	480
PT-15	Vo Mieu 2	816	793	731	720	724	700	652	641	605	-3.6%	605	583	625
PT-16	Thanh Van	685	620	628	595	534	463	422	385	336	-8.4%	336	308	396
PT-20	Ha Thach	1260	1237	1197	1101	1056	964	912	902	905	-4.0%	905	869	848
Total in Province												4659	4448	4830

Note: BD means Basic Design.

2) Number of Students in Project Area

It is confirmed that practically 100% of school-age children attend schools in the Project Area. Thus, the change of the number of students in 2006 mentioned in 1) above is estimated based on the actual number of students in 2005.

3) Number of Usable Classrooms

Basic policies for the changes in existing facilities occurred after the Basic Design of the Project was prepared are set up as follows:

① Newly Constructed Classrooms:

Since the Basic Design of the Project was prepared, new classrooms were constructed at six schools. Those rooms that are considered to be sufficiently usable for a long period of time and that could be converted into ordinary classrooms are counted as usable classrooms. As for existing wooden temporary classrooms, they are either relocated buildings that existed in the school compounds or newly built buildings made of scrap wood. They cannot withstand long-term use and their sizes are also substandard. Thus, these are not included in the number of usable classrooms.

② Classrooms that cannot be used over a Long Period of Time:

Those classrooms that were either destroyed or regarded as dangerous to use because of the fear of possible collapse due to the structural damage caused by natural

calamities after the Basic Design of the Project are considered as impossible to use over a long period of time. They are not included in the number of usable classrooms.

③ Classrooms converted into Other Use:

Some classrooms were altered into special rooms for the purposes of school management or to correspond to the teaching curriculum after the Basic Design of the Project was prepared.

The necessity of a library and a teaching aid room is understandable because of the reasons that the Primary Education Development Program specifies the construction of libraries in particular and teaching aid rooms. The necessity of a computer room is also understandable because of the reason that the Primary Education Development Program has included information science classes in the school curriculum. It is difficult to return these already altered rooms into classrooms because of their presently used situations. Although the importance of these special rooms is fully understandable, the objective of the Project is the elimination of a two-shift teaching system that is being conducted at Project schools. For this reason, a priority should be given to the development of classrooms and these altered rooms are considered as usable classrooms when examining the scope of the Project.

The number of usable classrooms confirmed during the Basic Design preparation time and the site survey period for the Project is as shown in Table 2-2. Those schools whose existing facilities were changed after the Basic Design are described below:

Table 2-2 Change of the Number of Usable Classrooms

No.	Name of School	Number of Usable Classrooms during BD Period	Number of Usable Classrooms during Site Survey Period	Change Occurred after BD		Remarks (Basis for determining Usable Classrooms)
				Newly Built Rooms	Unusable Rooms	
Tuyen Quang Prvince						
TQ-2	Vinh Loc	8	8	0	0	
TQ-3	Bac Muc	0	2	2	0	Among 14 special rooms built by the school itself, the teaching aid room is included in the Vietnam standards. However, the history exhibition room is not included in the standards. Thus, it is regarded that two usable classrooms has increased.
TQ-5s	Thuong Am (Sub school)	0	0	0	0	
TQ-6	Phan Thiet	18	15	0	3	Because the danger of collapse of 3 classrooms has been increased by floods.
TQ-7	Thai Binh	0	0	0	0	
TQ-8	Son Nam	9	6	0	3	Roofs and walls of 3 classrooms weredamaged by storms.
TQ-10s	Xuan Quang (Sub school)	0	0	0	0	
TQ-14	Phuc Thinh	4	5	1	0	The reading room that was built by the school itself is regarded as a library and is considered that it can be converted into a classroom. One usable classroom increased.
TQ-17s	Dang Chau (Sub school)	0	0	0	0	
Phu Tho Province						
PT-4	Tieu Son	3.2	3.2	0	0	
PT-5	Det	8	8	0	0	
PT-6	Van Lung	13	6	0	7	Roofs and exterior walls of 7 classrooms were destroyed by storms.
PT-8	Co Tiet	0	0	0	0	
PT-10	Dong Xuan	0	0	0	0	
PT-11	Trung Nghia	9	3	0	6	Roofs and exterior walls of 6 classrooms were destroyed by storms.
PT-15	Vo Mieu 2	14	14	0	0	
PT-16	Thanh Van	9	8	0	1	Roofs and exterior walls of one classroom were destroyed by storms
PT-20	Ha Thach	0	0	0	0	

Note: BD stands for Basic Design.

TQ-2 Vinh Loc:

Land reclamation was conducted at part of the school site in order to make an access road from the existing road that is lower than the school site in front of the school. A temporary wooden building located at the reclamation site was relocated and has been used as a classroom. The building structure is old and is not suitable for long-term use. It is equipped neither with a lighting system nor ceiling fans. The room size is less than 30m² and is substandard. Thus, this room is not counted as a usable classroom.

TQ-3 Bac Muc:

The Basic Design of the Project originally planned to relocate this school to a new site and construct 11 classrooms, a principal's room and a teaching aid room. After the Basic Design was prepared, the school was designated as a standard school of Vietnam. In addition, it was planned to have classes for handicapped students from the 2003

school year. Thus, the school needs to have special rooms in addition to those classrooms that are to be constructed by this Project. As the school could not meet the Vietnamese standards for schools only with the classrooms that are to be constructed by this Project, it was decided to build special rooms and facilities for handicapped children and bright children who cannot receive adequate education in the rural areas by the finance of the Tuyen Quang Province. Construction began in the fall of 2004 and is now at the finishing stage. The facility is a two-storied building having 14 rooms. Their use purposes are as follows: ① teachers' meeting room, ② history exhibition room, ③ pioneer room, ④ book shelves, ⑤ reading room, ⑥ equipment storage, ⑦ vice principal and accountant's room, ⑧ music room, ⑨ art room, ⑩ computer room, ⑪ clinic, ⑫ handicapped students' classroom, ⑬ room for bright students from rural areas, and ⑭ dormitory for those students. These rooms are regarded as follows when examining the size of Project facilities:

- ① Teachers' Meeting Room: The Basic Design of the Project has planned, in addition to classrooms, a principal's room and a teaching aid room that will be used for the purpose of holding teachers' meetings. It is considered that this meeting room may be converted into an ordinary classroom by using the facility that will be built by the Project as a teachers' meeting room.
- ② History Exhibition Room: This room is not specified in the Vietnamese standards. It is considered that the room may be converted into an ordinary classroom when classrooms are in short supply.
- ③ Pioneer Room: This room is designated as a necessary room in the Vietnamese standards. It is specified that Ho Chi Minh Young Pioneers are to be organized in primary schools. A few model students are selected from each class of third to fifth graders and these students form a reading team. These students act as leaders for school's or national events and activities. The pioneer room is equipped with desks, chairs, bookshelves, cabinets, etc.
- ④ Bookshelves and ⑤ Reading Room: The Vietnamese standards specify providing shelves and a reading room in libraries.
- ⑥ Equipment Storage, ⑦ Vice Principal and Accountant's Room, ⑧ Music room,

⑨ Art Room, ⑩ Computer Room, and ⑪ Clinic: These rooms are required by the Vietnamese standards. It is considered that these rooms are necessary for school management functions.

⑫ Handicapped Students' Classrooms, ⑬ Room for Bright Students in Rural Areas, and ⑭ Dormitory for those students: These facilities are annexed to this Project school. The number of handicapped students and bright students in rural areas are not counted into the number of students in this Project school. These students will not affect the size of Project facilities.

Based on the above discussions, it is considered that the number of usable classrooms has increased by two since the Basic Design was prepared.

TQ-6 Phan Thiet:

This school's three brick classrooms were damaged by frequent floods and are in danger of possible collapse due to the increased structural damage. For this reason, the school decided to demolish these classrooms. The building was built approximately 35 years ago and the building structure is old. Because of floods, walls were damaged and partially collapsed and also cracks that had developed in walls were observed during the site survey period. It is judged that these classrooms cannot withstand long-term use. One classroom converted into a library is counted as a usable classroom when examining the size of Project facilities. Thus, it is regarded that the number of usable classrooms has been reduced by three since the Basic Design time.

TQ-8 Son Nam:

There were nine usable classrooms in this school when the Basic Design was prepared. The roofs and exterior walls of three of these nine classrooms were destroyed by storms and the classrooms became unusable. Although one classroom was converted into a meeting room, there was originally one meeting room. Thus, it is considered that the converted meeting room can be reconverted to a classroom when a classroom shortage occurs. Thus, it is regarded that the number of usable classrooms has been reduced by three since the Basic Design time.

TQ-14 Phuc Thinh:

A building for special rooms, such as a library, a reading room and a pioneer room, was built by the donation of area residents in 2004. The library and reading room are

temporarily being used as classrooms. The school set up a facility development plan to suit the facility standards of the country and is implementing the plan. This new building is considered as part of the plan. In view that the library and reading room are presently used as classrooms and that it would be possible to use available space in the library for reading space, it is regarded that the reading room may be converted into an ordinary classroom when a classroom shortage arises. As at the TQ-3 school, the pioneer room is a required room by the Vietnamese standards and is not used as a temporary classroom at present. Thus, it is considered that the number of usable classrooms has been increased by one since the Basic Design time.

PT-04 Tieu Son:

When a new clinic was built, a temporary wooden building that existed at the clinic site was relocated and has been used as a temporary classroom. It has no windows and no doors. Its structure is old and is unusable for a long period of time. Neither lighting fixtures nor ceiling fans are installed. The room size is less than 30m² and is substandard. For this reason, this room is not counted as a usable classroom.

PT-05 Det (Dinh Tien):

A building on the school land that had to be turned into a secondary school was disassembled and then reassembled into two classrooms at the northeastern corner of the present school site in 2005 by the donation of students' parents. These classrooms will be used as temporary classrooms until new classrooms are built by the Project. After new classrooms are built, these structures are planned to be used as preparation rooms. However, the original building was built as a warehouse with scrap wood, so its condition is not capable of withstanding long-term use as classrooms in view of the specifications. Thus, these two classrooms are not included in the count of usable classrooms.

PT-6 Van Lung:

Seven brick classrooms that were counted as usable at the Basic Design time have severely damaged roofs by storms. As a result leakage of rain has been caused. The school provided a temporary repair and these classrooms became able to withstand rainfall. However, damage inflicted to their structures has increased and they are in danger of collapse. The classroom building is about 45 years old. Some of the structural bricks have collapsed, parts of walls have fallen off and cracks have developed from the rainwater leaks. In addition, termite damage has progressed in the wooden structural

members. It is thought that these classrooms are dangerous to use. Two classrooms have been converted into a library and a teaching aid room. These rooms are counted as usable classrooms. As a result, seven usable classrooms have become unusable since the Basic Design of the Project was prepared.

PT-11 Trung Nghia:

The six brick-made classrooms that were counted as usable at Basic Design time were damaged by storms in the roofs and rain leakage occurs here and there. The school provided a temporary repair to the classroom building and these classrooms have become able to withstand rainfall. However, damage inflicted to their structures has increased and they are in danger of collapse. The building is approximately 40 years old and the brick structures are damaged by the rainwater leaks. Parts of the walls have fallen off and cracks have developed at various portions. Further, the wooden structural members in the roofs have been damaged by termites, and the floors have sunken here and there. It is judged as being very dangerous to use these classrooms. As a result, it is regarded that the number of usable classrooms has been decreased by six since the Basic Design was prepared.

PT-15 Vo Mieu 2:

Two wooden temporary buildings having a total of three classrooms have been built. However, neither windows nor doors are installed. Ropes are serving as walls. Neither lighting fixtures nor ceiling fans are installed. Facility specifications and indoor environment are extremely poor and these classrooms will not be able to stand long-term use. Thus, they are not counted as usable classrooms. Further, after the Basic Design was prepared, two classrooms were converted into a computer room and a teaching aid room. These rooms are regarded as usable classrooms for the examination of the sizes of Project facilities. For this reason, there is no change in the number of usable classrooms.

PT-16 Thanh Van 2:

The one damaged classroom that was being used after repair was counted as a usable classroom when the Basic Design was prepared. However, the roofs and walls of the classroom were further damaged by storms. The building is 28 years old and its foundation bricks have decayed and large cracks have developed in them. In addition, termite damage in the wooden roof structures has increased. It is judged as being dangerous to use the building any longer. The school decided to demolish the building

and demolishing work will begin soon. Although one classroom has been converted into a library and teaching aid room, this classroom is counted as a usable classroom.

In view of the above situation, it is regarded that the number of usable classrooms of this school has been reduced by one since the Basic Design was prepared.

④ Substandard Classrooms

Those classrooms that are still usable but that cannot satisfy MOET standards should be treated as below:

In accordance with the National Standards for Primary Education of MOET and the Design Standards of the Ministry of Construction of Vietnam, the number of students in one classroom should be 35 and the unit floor space per student should be 1.2m². A classroom that satisfies these standards is to be counted as a usable classroom. However, those usable classrooms that cannot satisfy these standards should be adjusted by multiplying the following coefficient:

$$\frac{(\text{Floor Space (m}^2\text{)})}{35 \text{ students}} \div 1.2 \text{ (m}^2\text{/student)}$$

4) Calculation Method of the Number of Lacking Classrooms

The average number of students in one class of Project schools is 25.9. This figure is smaller than the one specified in the Classroom Standards of Vietnam that is 35 students per class. A reason for this is that most of schools try to overcome classroom shortage problems not by putting more students in one classroom than the figure specified by the Standards but either by conducting a two-shift teaching system or by renting available rooms. As for the number of teachers, the average number of teachers in one class is 1.7 and a sufficient number of teachers are assigned to each school. As it is planned to introduce a full-time teaching system to practically all primary schools in Vietnam by 2010, the calculation of classrooms in shortage for the Project should be made based on the premise that each Project school conducts the full-time teaching system and that the number of students in each class is 35 in accordance with the following equation:

$$(\text{Estimated Number of Students in 2006}) \div 35 - \text{Number of Usable Classrooms}$$

(3) Project Schools and the Size of Facilities

By taking into consideration the changes in the number of students and the number of usable classrooms after the Basic Design for the Project was prepared, the number of classrooms necessary for each Project school was decided upon as shown in Table 2-3. The Project will provide the number of insufficient classrooms calculated by the above-mentioned method to those 18 schools requested by the Vietnam side. However, those schools that are lacking only one or two classrooms are to be eliminated from the Project.

Table 2-3 Number of Classrooms at Each Requested School

No.	Name of School	Number of Classrooms during the Basic Design Period			Number of Classrooms during the Site Survey Period			Number of Classrooms to be built by the Project
		Necessary Number	Usable Number	Planned Number	Necessary Number A	Usable Number B	A-B	
Tuyen Quang Province								
TQ-2	Vinh Loc	13	8	5	15	8	7	7
TQ-3	Bac Muc	11	0	11	13	2	11	11
TQ-5s	Thuong Am (Sub school)	3	0	3	4	0	4	4
TQ-6	Phan Thiet	30	18	12	25	15	10	10
TQ-7	Thai Binh	4	0	4	5	0	5	5
TQ-8	Son Nam	16	9	7	12	6	6	6
TQ-10s	Xuan Quang (Sub school)	4	0	4	4	0	4	4
TQ-14	Phuc Thinh	9	4	5	8	5	3	3
TQ-17s	Dang Chau (Sub school)	3	0	3	3	0	3	3
Total in Province				54			53	53
Phu Tho Province								
PT-4	Tieu Son	9	3.2	6	8	3	5	5
PT-5	Det	21	8	13	21	8	13	13
PT-6	Van Lung	23	13	10	21	6	15	15
PT-8	Co Tiet	11	0	11	12	0	12	12
PT-10	Dong Xuan	9	0	9	9	0	9	9
PT-11	Trung Nghia	14	9	5	8	3	5	5
PT-15	Vo Mieu 2	18	14	4	17	14	3	3
PT-16	Thanh Van	12	9	3	9	8	1	0
PT-20	Ha Thach	25	0	25	25	0	25	25
Total in Province				86			88	87
Grand Total				140			141	140

1) Determination of Other Facilities and Equipment

1. Other Facilities

Facilities other than classrooms that were requested by the Vietnamese side are principal's rooms, sanitary facilities, and teaching aid rooms. During the site survey, the Study Team confirmed that many Project schools already have rooms for the principals and teaching aids, although the room sizes and functions varied from school to school. For this reason, only those Project schools that do not have principal's rooms and teaching aid rooms shall be provided with them. However, PT-6 Van Lung School cannot build all the lacking number of classrooms because of

the size and shape of the school site. In the case of this school, the maximum number of classrooms that can be built on the site will be planned for the Project.

a) Principal's Rooms

According to the Design Standards of Vietnam, a principal's room should be 15 to 18 m². However, based on a premise that the principal's office will be also used as an administrative office, the office size should be one half of the size of a classroom, i.e. approximately 21 m².

b) Teaching Aid Rooms

Teaching aid rooms shall be planned not only for storing teaching materials and textbooks, but also for holding teachers meetings. As a space of 9 to 12 m² is required for storing teaching aid materials and text books, one half the size of a classroom (approximately 21 m²) will be provided for teaching aid rooms including a meeting space for about 8 people (approximately 12 m²) by the Project.

c) Sanitary Facilities

More than one half of the surveyed Project schools have toilets. However, most of them are simple outdoor-type toilets without treatment capabilities and are enclosed only with low walls. The average number of toilets is one or two per school. According to the Design Standards of Vietnam, one urinal and one toilet booth should be installed per 40 students. However, there is a large gap between the standards and the reality. To improve this situation, toilets shall be installed at all the Project schools. However, as an enormous number of toilet booths and urinals would be required to meet the needs of all the students at the Project schools, only the toilets for those numbers of students who can be accommodated in the new Project classrooms will be provided by the Project. The number of toilet booths and urinals to be provided by the Project based on the Design Standards of Vietnam is listed in Table2-4.

Table 2-4 Sanitary Facilities to be provided by the Project

Number of Classrooms	3~4	5~6	7~9	10~11	12~13	14~16	17~18	19~20	25
Urinals for Males	2	3	4	5	6	7	8	9	11
Toilet Booths for Males	2	3	4	5	6	7	8	9	11
Urinals for Females	2	3	4	5	6	7	8	9	11
Toilet Booths for Females	2	3	4	5	6	7	8	9	11
Washbasins for Males and Females	2	2	3	4	4	5	6	6	8

Both the urinals for males and the urinals for females shall be the ditch type of the local specifications, with the length to be decided by the layout of each sanitary facility. The number of washbasins shall be calculated based on the "maximum number of students" to be accommodated in the new classrooms to be built by the Project.

2. Equipment Plan

a) Educational Furniture

Based on the Basic Design, desks and chairs for students and teachers, storage shelves and blackboards will be provided by the Project as shown in Table 2-5.

Table 2-5 Educational Furniture for Each Room

Name of Room	Name of Item	Units per room
Classroom	Student's two-seater desk	18
	Student's chair	36
	Teacher's desk	1
	Teacher's chair	1
	Blackboard	1
Principal's room	Principal's desk	1
	Principal's chair	1
	Storage shelf	3
	Blackboard	1
Teaching aid room	Storage shelf	7
	Meeting table (for two persons)	4
	Teacher's chair	8
	Blackboard	1

b) Teaching Aids

Based on the Basic Design, no teaching aids will be provided by the Project.

4) Project Facility Types and Components

As for the number of classrooms that will be provided to one school, three is the minimum and 25 is the maximum. To efficiently construct a different number of classrooms at the various Project schools, various types of school buildings shall be planned, and then depending on the number of classroom in shortage, site conditions and other restrictions at each Project school, the most suitable building type should be selected. The following building types are being considered:

Classroom Buildings:

<u>Building Type</u>	<u>Type Symbol</u>
1. One-storied Building of 2 Classrooms:	2C
2. One-storied Building of 3 Classrooms:	3C
3. One-storied Building of 4 Classrooms:	4C
4. One-storied Building of 5 Classrooms:	5C
5. Two-storied Building of 4 Classrooms:	2-4C
6. Two-storied Building of 5 Classrooms:	2-5C
7. Two-storied Building of 6 Classrooms:	2-6C
8. Two-storied Building of 7 Classrooms:	2-7C
9. Two-storied Building of 9 Classrooms:	2-9C
10. Two-storied Building of 10 Classrooms:	2-10C
11. Two-storied Building of 11 Classrooms:	2-11C
12. Two-storied Building of 12 Classrooms:	2-12C

A classroom building having a principal's room and a teaching aid room should be designated by adding +P and +T to the above symbols respectively.

Sanitary Facilities:

<u>Building Type</u>	<u>Type Symbol</u>
1. Two Booths each for males and females:	S
2. Three Booths each for males and females:	M
3. Four Booths each for males and females:	L
4. Five Booths each for males and females:	XL
5. Six Booths each for males and females:	XXL

Facility components of each Project school are listed in Table 2-6.

Table 2-6 Facility Components to be provided to Each Project School

School ID	Name of School	Planned number of class-rooms	Principal's room	Teaching Aid room	Building Type	Toilet Type	School Area(m ²)	Floor Area		
								Classroom Building(m ²)	Toilet Building(m ²)	
Tuyen Quang Province										
1	TQ- 2	Vinh Loc	7		1	2C, 5C+T	L	510.07	441.75	68.32
2	TQ- 3	Bac Muc	11	1	1	2-11C+T+P	XL	942.24	863.46	78.78
3	TQ- 5s	Thuong Am (Sub School)	4			2-4C	S	348.19	299.92	48.27
4	TQ- 6	Phan Thiet	10			2-10C	XL	782.34	703.56	78.78
5	TQ- 7	Thai Binh	5	1	1	2-5C+T+P	M	475.73	417.72	58.01
6	TQ- 8	Son Nam	6			3C, 3C	M	411.41	353.40	58.01
8	TQ- 10s	Xuan Quang (Sub School)	4			4C	S	283.87	235.60	48.27
9	TQ- 14	Phuc Thinh	3			3C	S	224.97	176.70	48.27
10	TQ- 17s	Dang Chau (Sub School)	3			3C	S	224.97	176.70	48.27
Province Total		9 Schools	53	2	3			4,203.79	3,668.81	534.98
Phu Tho Province										
1	PT- 4	Tieu Son	5			5C	M	352.51	294.50	58.01
2	PT- 5	Det	13	1	1	3C+T+P, 2-10C	XXL	1,030.99	939.16	91.83
3	PT- 6	Van Lung	15			2-10C, 5C	S, XL	1,125.11	998.06	127.05
4	PT- 8	Co Tiet	12	1	1	2-9C+T+P, 3C	XXL	972.09	880.26	91.83
5	PT- 10	Dong Xuan(New Site)	9	1	1	2-9C+T+P	L	771.88	703.56	68.32
6	PT- 11	Trung Nghia	5			5C	M	352.51	294.50	58.01
7	PT- 15	Vo Mieu 2	3			3C	S	224.97	176.70	48.27
8	PT- 16	Thanh Van	0			-	-	-	-	-
9	PT- 20	Ha Thach	25	1	1	2-6C, 2-7C+T+P, 2-12C	XL,XXL	2,033.04	1,862.43	170.61
Province Total		8 Schools	87	4	4			6,863.10	6,149.17	713.93
Total Stage 3		17 Schools	140	6	7			11,066.89	9,817.98	1,248.91

2-2-2-2 School Sites and Facility Layout Plans

As the conditions of each construction site vary from school to school, the most suitable facility layout plan should be prepared for each Project school, by taking into account the natural conditions, site conditions, infrastructure installation conditions and the existing school facility arrangements. The main policies regarding the facility layout plans are as follows:

- 1) The layout of the new buildings shall be planned so that they will harmonize with the overall school site and the surrounding buildings;
- 2) The new school buildings shall be arranged on flat land as much as possible avoiding slopes and cliffs for ease of securing school site safety, and for minimizing the foundation work and lightening the burden of the land preparation work to be borne by the Vietnamese side;
- 3) The classroom buildings shall be laid out with sufficient clearance between them, and in such a way as to allow the wind to provide as much natural ventilation as possible by taking the predominant wind direction into account. Also, the sun

direction shall be taken into account for the purposes of lessening the exposure to sunlight from the west;

- 4) For schools located in flood-prone areas, the construction ground levels and building floor levels shall be carefully considered to avoid possible flooding;
- 5) Toilets shall be constructed in an independent building detached from the classroom buildings. In particular, the toilet buildings shall be located at a place where neither odor nor environmental problems will affect other facilities on the school grounds.

2-2-2-3 Architectural Plans and Designs

(1) Floor Plans

To take best advantage of the wind for natural ventilation and the sun for natural light going into the rooms, a single-loaded corridor shall be incorporated in the floor plans of the buildings. According to the Design Standards of Vietnam, the corridor width shall be 1.8m. These standards shall be applied to both single-storied buildings and two-storied buildings. The Project will also provide one or two stairways based on the Vietnamese standards in each two-storied building.

1) Classrooms

As for the size of classrooms, the number of students to be accommodated in one classroom should be 35 in accordance with the National Standards for Primary Education issued by MOET and the unit floor space per student should be 1.2m² based on the Design Standards of Vietnam. Thus, by taking the furniture layout into consideration, the size of the classroom was set up as 7.6m × 5.6m = 42.56 m²

2) Principal's Rooms

The construction of the principal's rooms shall use the same structural modules that are to be used for the classrooms and shall be one half the size of a classroom, i.e. 3.8m × 5.6m = 21.28 m².

3) Teaching Aid Rooms

The construction of the teaching aid rooms shall use the same-sized modules that are to be used for the classrooms and shall be one half the size of a classroom, that is 3.8m × 5.6m = 21.28 m².

4) Sanitary Facilities

From a viewpoint of foul odors and sanitary reasons, sanitary facilities shall be built separate from the classroom buildings. As for the number of toilet units and floor plans for the toilet facilities, several standard types should be set up and an appropriate one shall be selected to suit the needs of each Project school. A simple septic tank shall be constructed underneath the toilet building. Sewage treated by the septic tank shall be drained into the ground through an infiltration pit that is to be located outside the toilet buildings.

(2) Section Plans

To suit the strong sun and the hot and humid climate, the section plan of school buildings shall be prepared by taking into account natural ventilation and insulation against the strong radiant heat from the roof. The ceiling height of the buildings shall be 3.3m as stipulated in the Design Standards. The windows in the buildings shall be as large as possible. Also, to help prevent the rain from coming in during windy days and the strong sunlight from penetrating inside during the summer, eaves shall be provided over the windows. The buildings shall be provided with sloped metal roofs above concrete slabs that are to be the ceilings of the classrooms in order to create attic spaces for the reason that good ventilation of the attic spaces can prevent temperature rise in the rooms caused by radiant heat from the roof. Further, sheet-metal fabricated rain gutters shall be installed at the roof tips sticking out from the wall line. To prepare for the possibility of flooding, the building floor level shall be set 50cm higher than the ground level. At Project sites located in flood-prone areas, the design grade level shall be set higher than the flood level.

(3) Structural Plans

1) Structure Type

For both single- and two-storied buildings, reinforced concrete frame type structures, common in Vietnam, should be used. By making one unit of the frame structure as 3.8m × 5.6m (one half the classroom size), it may be possible to have smaller beams, thereby making a lighter load per column. For the roof structure, steel sloped beams shall be installed on reinforced concrete posts sitting on horizontal beams of a frame type structure. The exterior walls and interior partition walls shall be of bricks. The ground floor slab shall be of reinforced concrete. At those Project sites with good bearing ground, individual footing foundations shall be used

for single-storied buildings to make the total building weight as light as possible. Roof slab above the corridor will not be used to make the building weight lighter. The structure types for the Project are shown in the following table.

Table 2-7 Structure Types of the Project

Item	Specifications
1 . Structure Module	5,600mm×3,800mm (Width × Length)
2 . Ceiling Height	3.30m
3 . Main Structure	Reinforced Concrete Frame + Brick Walls
4 . Roof Structure System	Steel Sloped Beams on Posts sitting on Reinforced Concrete Beams
5 . Ground Floor	Concrete Slab
6 . Foundation Type	Reinforced Concrete Continuous and Independent Footing

2) Load and External Forces

The load condition for the structure design of Project facilities shall be in accordance with the Building Codes of Vietnam (BCV) and the Design Standards of Vietnam. Items that are not covered by these Codes and Standards shall be in accordance with the design standards of the Architectural Institute of Japan (AIJ) and the American Concrete Institute (ACI).

The design loads for Project facilities shall be as follows:

Live Load:	Roof:	30 kg/m ²
	Classroom Floor:	200 kg/m ²
	Corridor:	400 kg/m ²

Wind Load: $P = C_e \times Q_s \times C_q$

where, P is wind load per 1 m²

C_e: environmental coefficient

Q_s: velocity pressure: 65 kg/m² in Zone Ia.

C_q: wind force coefficient

BCV for wind load stipulates the design load and velocity pressure in the Project Area as (w_o=65kg/m² in Zone Ia). However, the BCV does not specify any wind force coefficients. Thus, the Japanese standards shall be used for the wind force coefficient.

Seismic Forces: $V = Z \times I \times C_o \times W$

where, W: building weight

Z : area coefficient

I : building use coefficient

Co: standard shear stress coefficient

There are no design standards regarding seismic forces in Vietnam and the BCV (III 3.6) suggests using foreign standards. Therefore, the Japanese "seismic level 5" (an acceleration of a minimum 80gal), which is equivalent to the coefficient in "shake zone levels 6 to 8" (MSK) shown in the seismic zoning map of the BCV, should be used. Thus, $C_o = 0.08$.

The design load bearing capacity of the ground should be 50kN/m^2 based on the plate loading tests conducted during the site survey period and the results of the boring tests conducted by the Government of Vietnam.

3) Building Materials

All building materials shall be procured in Vietnam. Below are the specifications for major materials and the allowable strengths:

Material Specifications: TCVN or JIS

Concrete: $F_c = 21\text{N/mm}^2$

Steel bar: $f_y = 295\text{N/mm}^2$ (SD2954A: D10 to D16, SD345: D19 to D25, SR295: R6 and R8)

Steel frame: $f_y = 240\text{N/mm}^2$ (SSC400 and SS400)

Brick: $F_c = 75\text{kg/cm}^2$

(4) Facility Plans

1) Electrical Facilities

Lighting fixtures shall be installed in the classrooms, principal's rooms, teaching aid rooms and sanitary facilities for the reason that classes may be held in the late afternoon when it's dark outside as it generally become dark earlier in the Northern Mountain Regions. In addition, outlets shall be installed to the classrooms, the principal's rooms and the teaching aid rooms. Also, to help alleviate the uncomfortable hot and humid room conditions during the summer, ceiling fans shall be provided in the classrooms, principal's rooms and teaching aid rooms.

As thunderstorms frequently occur in the Project Area, lightning rods shall be installed on all school buildings except for the toilet facilities.

2) Water Supply Facilities

A cistern shall be installed at an elevation of approximately 2m above the ground in order to supply water to toilets. The Vietnamese side shall provide the water supply system. For those Project schools that do not have a water supply system, steps shall be built up to the top of the cistern so that water can be hand-carried and poured into the tank.

3) Sewage System

Sewage from the toilets should be treated by the use of a simple septic tank with a settling chamber and a decomposition chamber. The treated sewage shall be drained into the ground through an infiltration pit outside the toilet buildings. The capacity of the septic tank shall be based on the amount of water used and on the planned sewage storage period of each toilet type. Some Project sites have a clay soil ground with a poor infiltration capability. In these sites and in areas with a high water table, trenches with perforated pipes should be installed instead of infiltration pits.

The water supply system and sewage system diagram are shown in Fig. 2-1

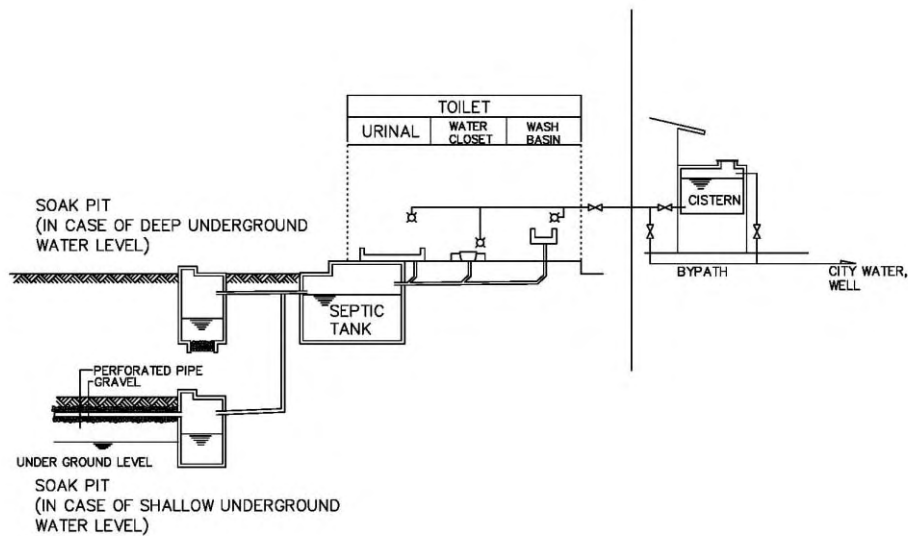


Fig. 2-1 Water Supply and Sewage Systems Diagram

(5) Building Materials Plan

In order to make the operation and maintenance of the completed facilities as simple as possible, building materials shall be selected with the natural weather conditions of the Project areas in mind and by taking into account the local construction methods.

1) Roofing Materials

In order to well prepare for the local tornadoes and hailstorms during the winter, strong and durable roofing and structural materials shall be selected.

2) Doors and Windows

Aluminum windows and wooden doors shall be used for easy maintenance and longer durability. Use of wood materials shall be minimized because of the possibility of termite damage. When using wood materials, they shall be treated with anti-termite chemicals.

3) Floor Materials

Mortar, ceramic tiles and cement tiles are the most commonly used materials in the existing buildings at the Project schools. Cast-in-place terrazzo finish that is commonly

used in Vietnam should be used for the Project school buildings for easy and simple maintenance as the same as Phase I of the Project.

4) Wall Materials

Brick walls shall be provided with paint finish on mortar base. This finishing method is the most common in Vietnam and is simple to maintain.

The local school building specifications and the specifications for the Project are compared with each other in Table 2-8.

Table 2-8 Comparison of Specifications

		Local Specifications	Specifications of this Project	Reason for Adoption
Structure and Building Type		Brick and Reinforced Concrete	Reinforced Concrete, Single and Two-storied	Strong and durable
Exterior Finishing	Roof	Roof tiles, asbestos sheets and corrugated steel sheets	Steel sheets above concrete slab	Strong against impacts, better heat insulation, simple and easy maintenance.
	Wall	Paint finish on mortar base on brick wall	Paint finish on mortar base on brick wall	Local method is selected for simple and easy maintenance
	Corridor Floor	Mortar, cast-in-place terrazzo, cement tiles, ceramic tiles	Cast-in-place terrazzo	Simple and easy maintenance
	Window	Wooden casement windows with glazed glass	Build-in frame with Aluminum jalousies	Better natural ventilation and lighting. Elimination of steel lattice and wooden material.
	Door	Wooden panel doors with glazed glass	Wooden framed doors with glazed glass	Simple and easy maintenance
Interior Finishing	Floor	Mortar, cast-in-place terrazzo, cement tiles, ceramic tiles	Cast-in-place terrazzo	Cost efficient, simple and easy maintenance
	Wall	Paint finish on mortar base on brick wall	Paint finish on mortar base on brick wall	Simple and easy maintenance due to use of local method
	Ceiling	No finishing or paint finish	Paint finish on mortar base	Simple and easy maintenance

2-2-3 Basic Design Drawing

The Basic Design Drawings are shown as follows.

【List of Basic Design Drawings】

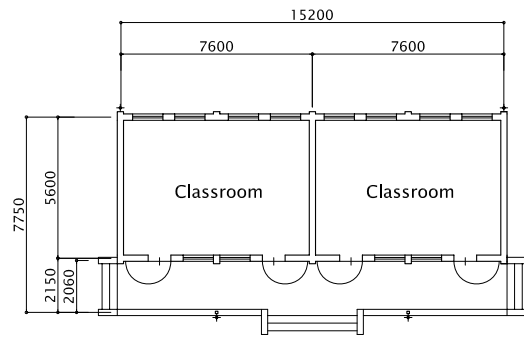
01: Single-story buildings and two-story building: floor plan, elevation , section plan

02: Two-story buildings: floor plan (1)

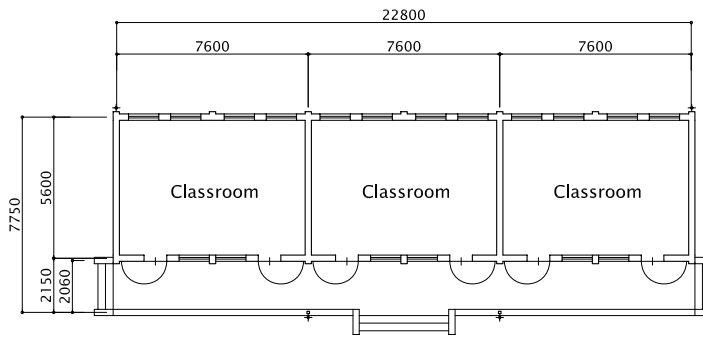
03: Two-story buildings: floor plan (2)

04: Toilets: floor plan, elevation plan, section plan

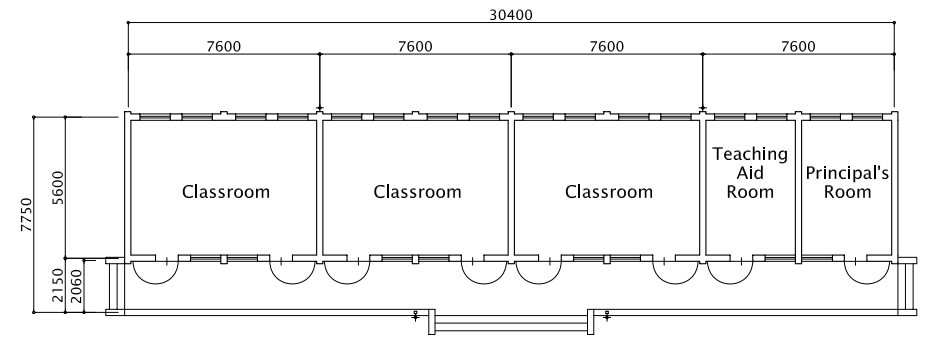
05: Furniture layout plan, furniture list



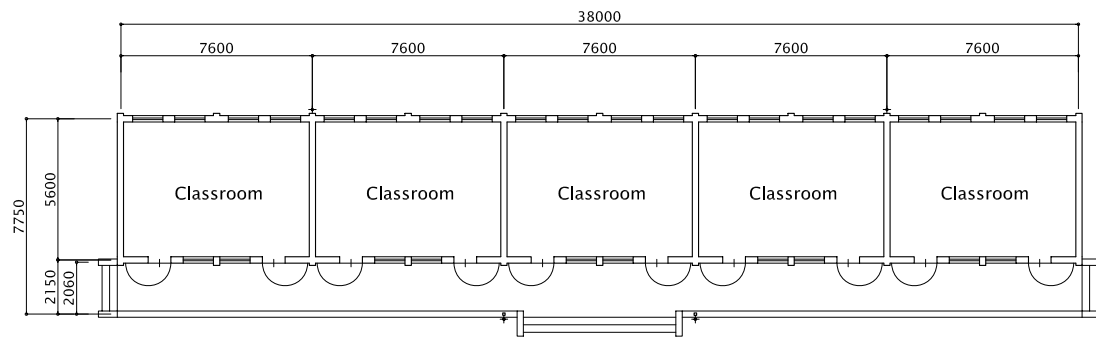
2C TYPE



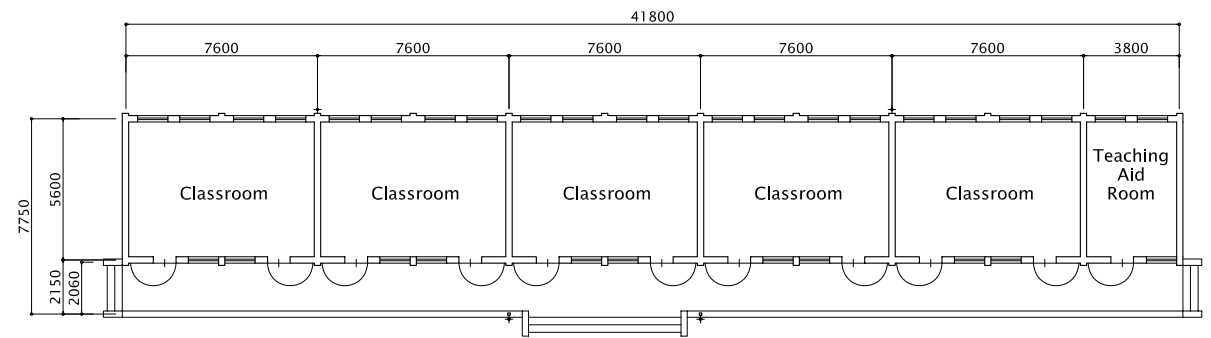
3C TYPE



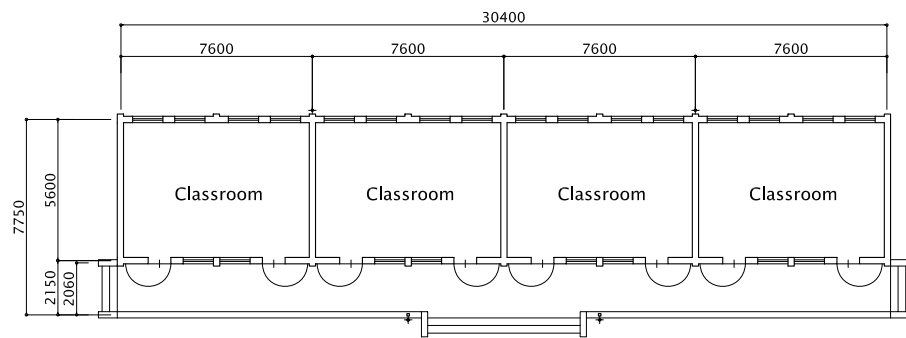
3C+T+P TYPE



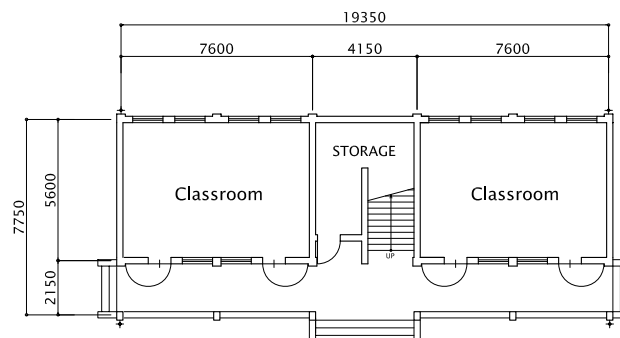
5C TYPE



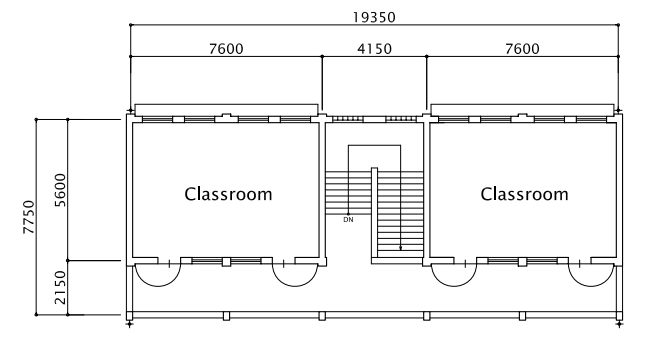
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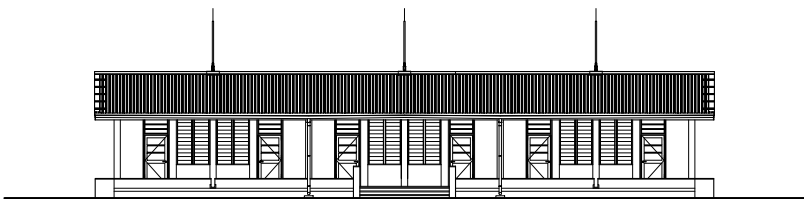
4C TYPE



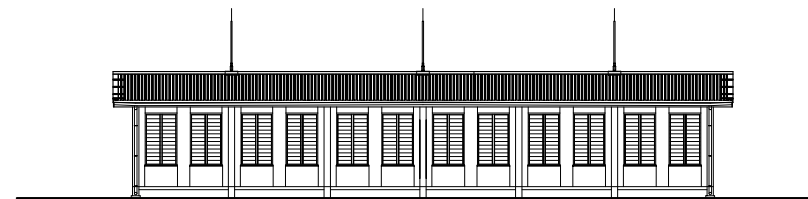
2-4C TYPE GROUND FLOOR PLAN



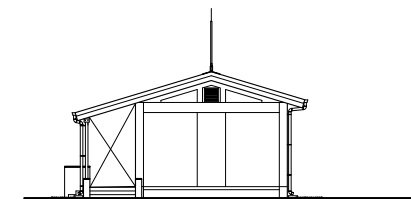
2-4C TYPE FIRST FLOOR PLAN



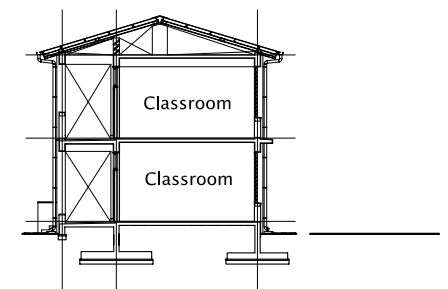
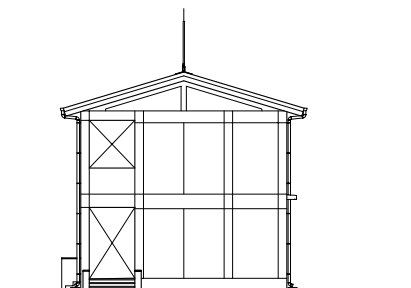
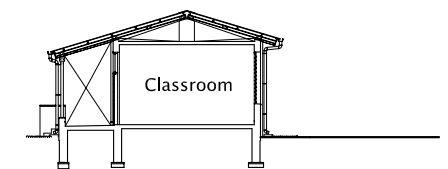
3C TYPE ELEVATIONS



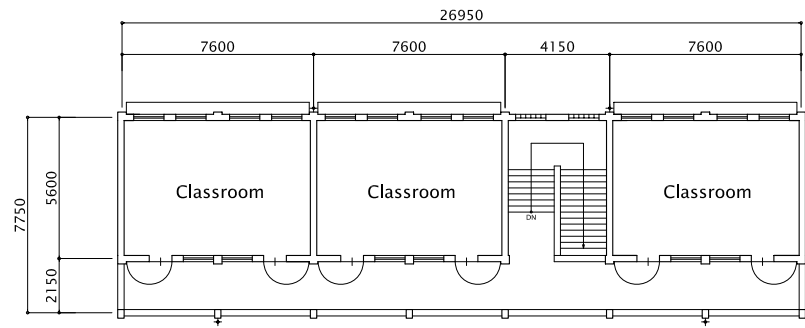
2-4C TYPE ELEVATIONS



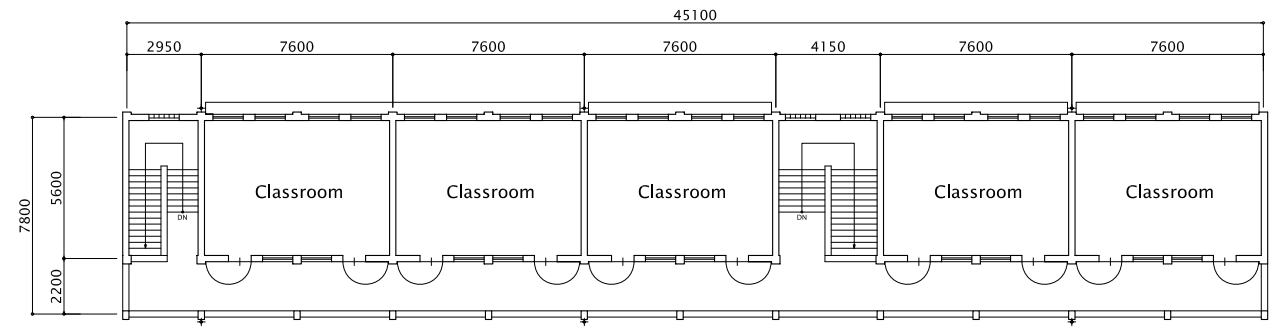
3C TYPE SECTION



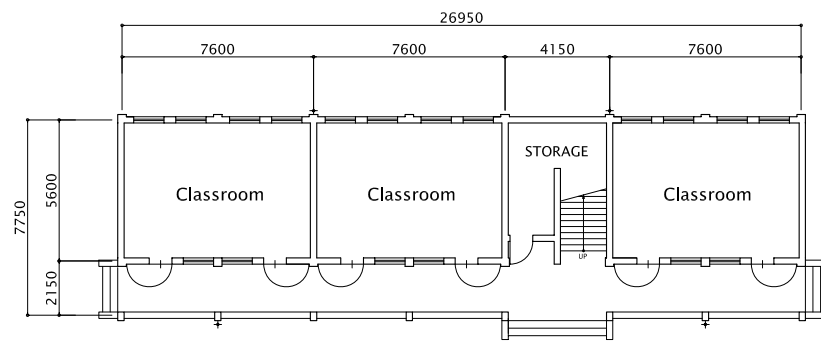
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FIRST FLOOR PLAN

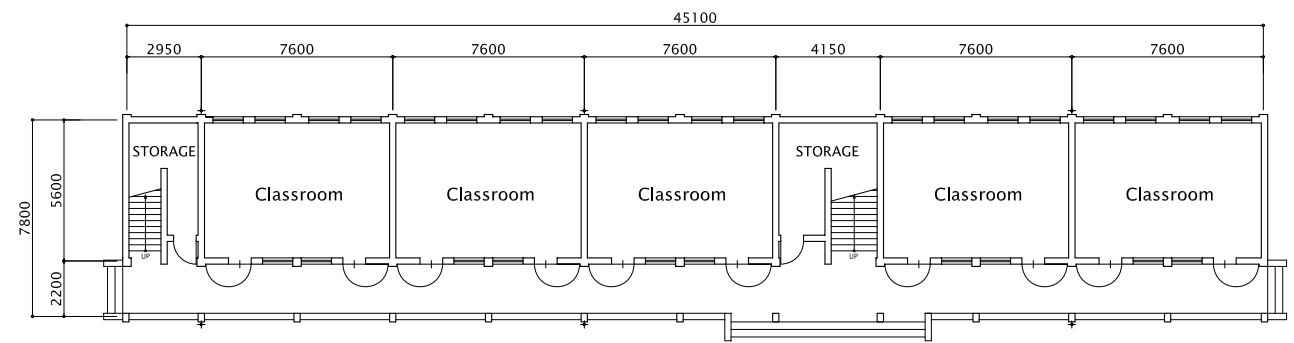


FIRST FLOOR PLAN



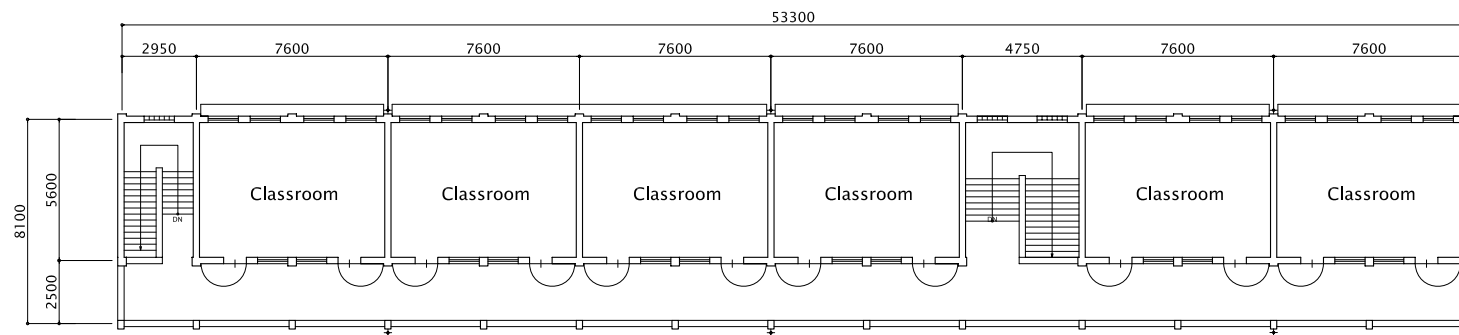
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2-6C TYPE

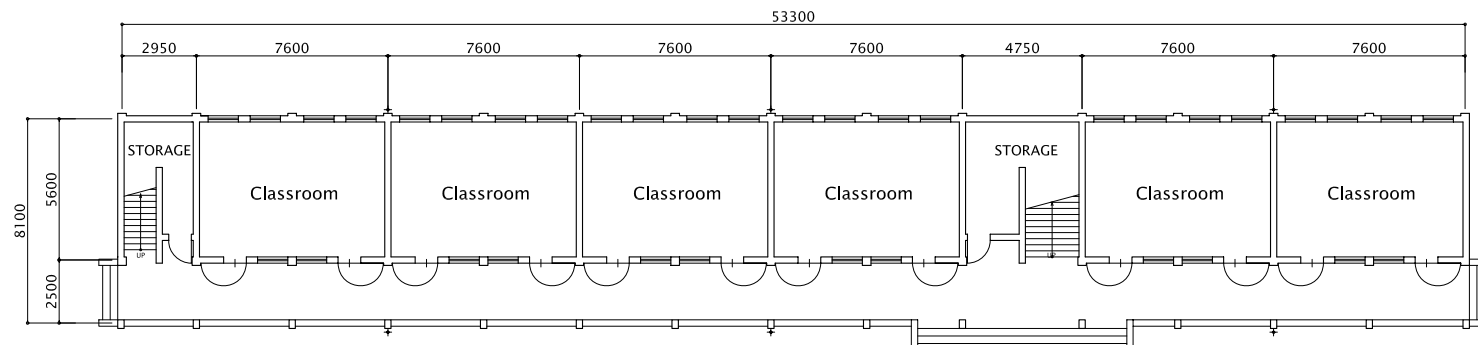


GROUND FLOOR PLAN

2-10C TYPE

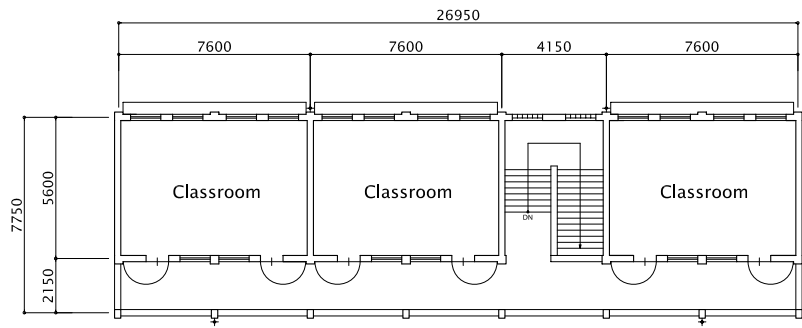


FIRST FLOOR PLAN

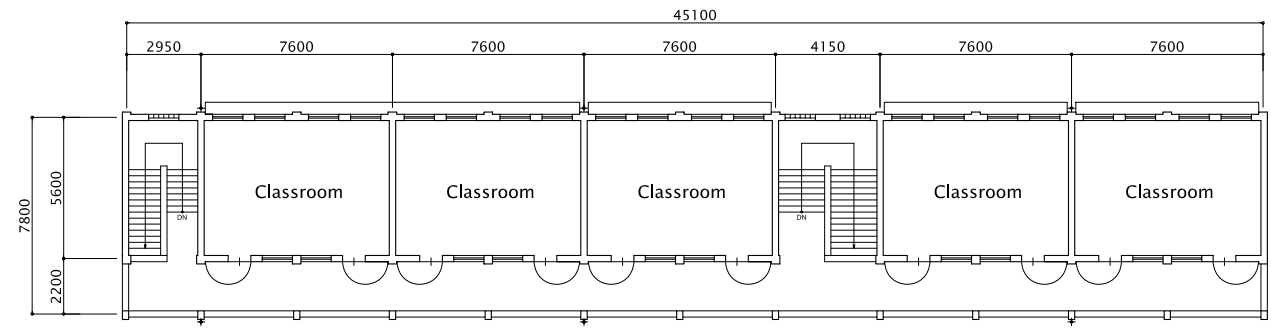


GROUND FLOOR PLAN

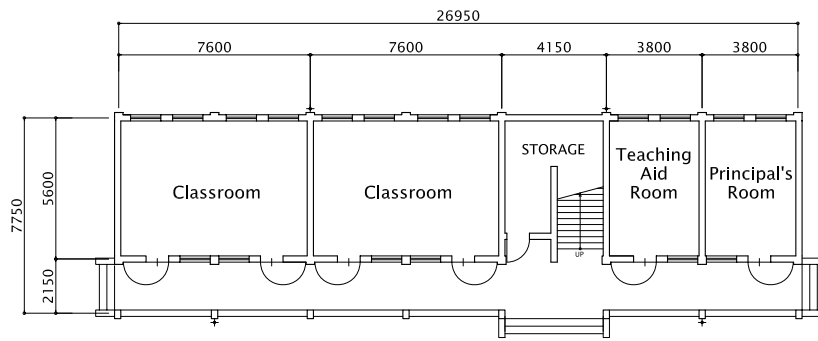
2-12C TYPE



FIRST FLOOR PLAN

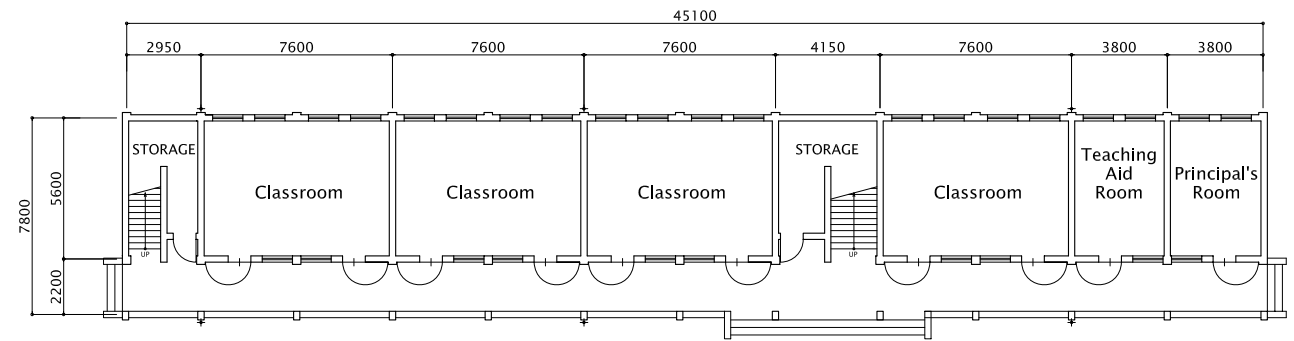


FIRST FLOOR PLAN



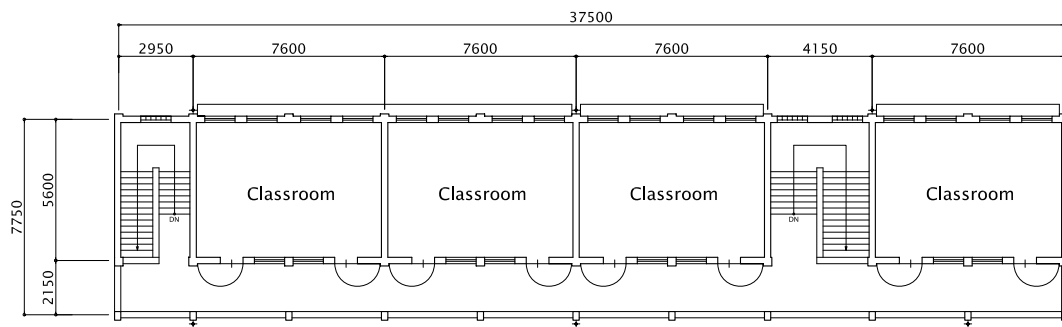
GROUND FLOOR PLAN

2-5C+T+P TYPE

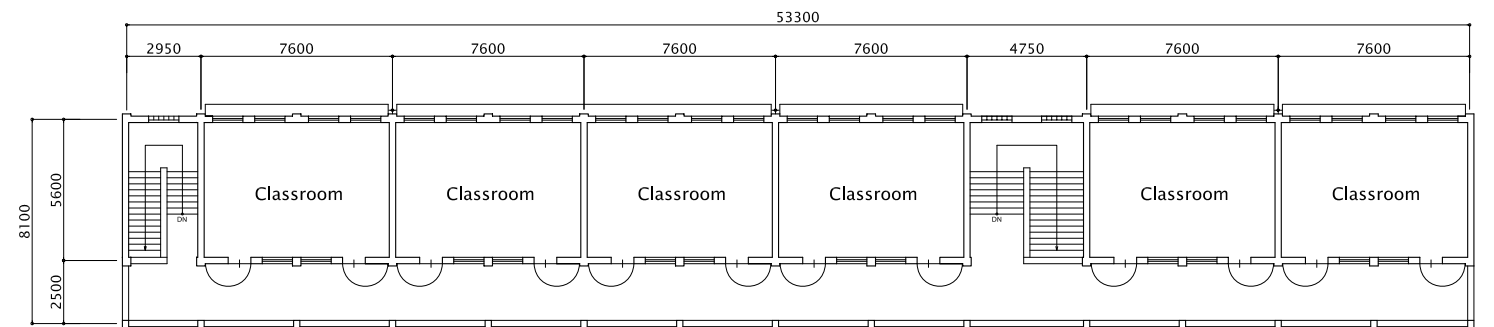


GROUND FLOOR PLAN

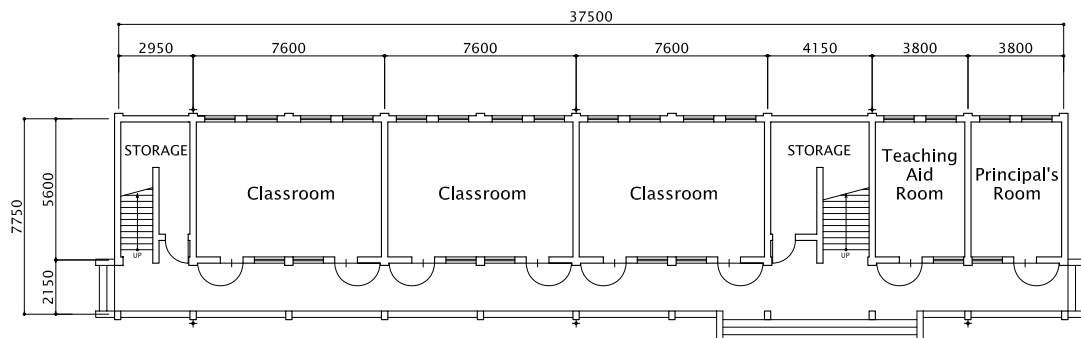
2-9C+T+P TYPE



FIRST FLOOR PLAN

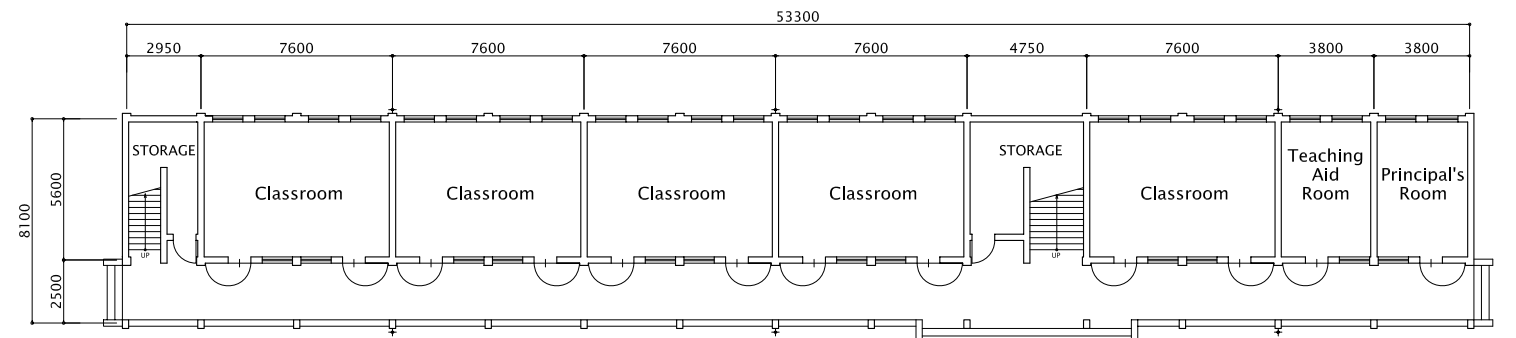


FIRST FLOOR PLAN



GROUND FLOOR PLAN

2-7C+T+P TYPE



GROUND FLOOR PLAN

2-11C+T+P TYPE