

## Chapter 2 Basic Concept of the Project

## **Chapter 2 Basic Concept of the Project**

### **2-1 Basic Concept of the Project**

#### **2-1-1 Overall Goal and Project Objectives**

Ethiopia is one of the least developed countries in the world, with a per capita GDP of US\$157 in 2005 and has attempted to reduce its level of poverty. To this end, the Government has emphasized the importance of education and implemented the Education Sector Development Program (ESDP), which was carried out from 1997 to 2001. As the result of the Program, its Gross Enrollment Ratio (GER) was remarkably improved from 34.7 % (1997) to 79.2% (2005).

However, the quality of education in the country has fallen even as the GER has improved. Crowded classrooms have been observed all over the country. Schools in rural areas have been operating under a severe lack of classrooms and textbooks. Some villages have no schools. The second cycles of the primary education (5-8<sup>th</sup> grade) or higher grades badly need more classrooms and qualified teachers. Thus the government is concerned about the quality side of the school education.

Moreover, some disparities have become apparent. The disparity in GER between boys and girls has widened. A regional gap in GER also has been observed. A high dropout rate and repetition rate are further difficult challenges. They have not yet to see marked improvement. Quality and efficiency in education still need to be improved.

In order to address the above-mentioned issues, the Ethiopian government launched the Education Sector Development Program phase II from 2002 to 2004 (ESDP-II), and ESDP-III from 2005 to 2009 with objectives to improve the quality of education, to increase the GER in remote areas, to utilize and expand alternative basic education, to develop the educational planning capacities as well as management capacity of district education officers while promoting the national policy of decentralization. The Government has thus begun to tackle the difficult problems that have not yet been improved.

Oromia Region, the largest region of all, is located in the center of the country, surrounding Addis Ababa. Due to these geographic reasons, cooperation in the region is highly effective in terms of scale and potential beneficial spillover effects to other regions. The Project, with its overall goal of improving the quality of primary education in the Oromia Region, aims to improve access to primary education as the Project objective, through constructing and expanding primary school facilities in the region

## 2-1-2 Outline of the Project

In order to achieve the above-mentioned goal, the Project aims to build school facilities consisting of classrooms for education, libraries, pedagogical centers, administrative rooms and latrines for a total of fifty-seven schools including existing schools and newly established school sites in three zones (Shawa North, Herarge West and Arsi East) of the Oromia Region. Also the Project implements a small-scale soft component related to maintenance of the school facilities constructed under the Project.

## 2-2 Outline Design of the Requested Japanese Assistance

### 2-2-1 Design Policies

The Project is implemented utilizing Japan's financial resource scheme of Grant Aid for Community Empowerment, in order to reduce the cost and to increase the efficiency of the Project compared with ones that utilize Japanese General Project Grant Aid scheme, through creating a competitive environment such as employing local specifications and design and utilizing local contractors as well as locally procured materials and equipment.

It should be noted that the requested construction sites might be changed as the result of sites survey at the time of the Detailed Design Stage of the Project. There will be technical assistance through a soft component scheme in order to improve the capacity of maintaining school facilities provided under the Project.

#### 2-2-1-1 Basic Policy

A priority schools list used for the Outline Design Study shall be set based on the school list in the final request letter by the government of Ethiopia. The Detailed Design Study shall verify the needs of classrooms by studying the number of students and existing and usable classrooms, and then finalize a list of the schools to be constructed within the Project. However, the sites that fall under the following conditions shall be eliminated from the priority school list.

- 1) Sites in areas where public security is not maintained (judged based on the latest information from the Embassy of Japan in Ethiopia as well as the JICA Ethiopia office)
- 2) Sites that are isolated, difficult to be grouped in a construction site lot and therefore not efficient and likely to be costly

#### 2-2-1-2 Policy for Natural Condition

##### (1) Policy for Climate Condition

Almost the entire area of the three requested zones belong to highlands more than 2,000

meters above the sea level, except some lower parts of Arsi that are located at the Great Rift Valley but are still more than about 1,600 meters above sea level. The zones also have comparatively less annual change in temperature, since the country is located at lower latitude. Although the people feel strong sunlight and ultraviolet rays during the daytime when it is fine weather, the temperature is not so high and it feels cool in the shade. Some houses are equipped with fireplaces, since it is cold at night time and early morning. Therefore it is necessary to take measures against cold in building design, but not a measure for high temperature in other lower latitude countries.

For the above-mentioned reason, the High Standard Design of MOE recommends using airtight glass windows with iron frames to prevent to give heat off from inside the classrooms. Also the standard recommends having ceilings in the classrooms. The ceilings for building are also needed, because the noise of heavy rain falling on the corrugated galvanized iron sheet roofing often disturbs the learning environment in the classrooms during the rainy season. Therefore, the Project shall adopt the recommendations made in the standard design for the windows and ceilings of the buildings.

### (2) Usage of Wood and Measures against Termites

In the project, eucalyptus logs shall be used for the structure of the trussed roof. There are two major reasons for this. In Ethiopia, it is conventional to use eucalyptus logs for trusses of a roof. The other reason is that the contractors are not familiar with using steel frame trusses for roof. Also the eucalyptus is fairly durable and less costly. Moreover, the usage of eucalyptus logs for the project will not cause the destruction of the forests. Eucalyptuses grow fast. Farmers usually grow eucalyptuses on their extra farmlands and cut them down within several years to sell them at the nearby market. Eucalyptus is a cash crop in Ethiopia. Thus, its usage is not related to any destructive forestry policy.

As for the matter of concern of termites, despite a few reports on termite damage below 2,000 meters above sea level, there is little information on termite damage in the project area, which is located at the areas more than 2,000 meters above sea level. For this reason, it is possible to cope with the termite damage only by applying anti-termite paint to the wooden building materials.

### (3) Earthquakes

The Ethiopian standard for structural design set a five scale to indicate the degree of earthquake danger from zone 0 to zone 4. The standard sets zone 4 for the African Great Rift Valley that expands belt like from the north to the south of the country. The further it is from this valley, the smaller the degree of danger becomes. Addis Ababa belongs to the zone 2 area, and almost all of the project areas belong to the range from zone 1 to zone 3. In fact, earthquakes only less than magnitude of 5 on the Richter scale have been reported during the last 100 years at the Great Rift Valley, having the highest scale for degree of danger. Moreover, there have been no reports of earthquake damage to the school facilities constructed using the

high MOE standard design.

Therefore, as for the structural design, it is concluded that there will not be earthquake damage when the Project adopts the high standard design that has been used for the primary school construction in the country.

### 2-2-1-3 Policy for Socio-Economic Conditions

#### (1) Religion

Ethiopia is a country where religious conflicts rarely take place though both Christian and Islamic people live together. It is usually observed that both Christian and Islamic children study together in the same classroom. Although the enrolment rate is relatively lower in the areas where more Islamic people live, this factor will not directly affect the building design. As a result, there is no religious influence on the building planning in this Project

#### (2) Gender issue

During the interview at the time of the field visit of the Outline Design Study, it is often pointed out that girls' dropout rate is high at the schools in which latrines are not available or only latrines that are commonly used by both boys and girls are available. Taking this point the MOE's high standard design of school facilities recommends having the latrine blocks for girls separated from the latrine blocks for boys. In other developing partner projects, girls' latrine is planned keeping some distance from boys' latrine. Therefore, the Project shall plan the latrine blocks for girls separated from the ones for boys. Also the latrine blocks for girls shall be located keeping some distance from the latrine blocks for boys to avoid the interference by each other.

### 2-2-1-4 Policy for Procurement of Construction Materials

The Project shall procure construction materials within the country. In Ethiopia, it is possible to procure all the construction materials needed for the Project, including imported materials, within the country. However, the price of major construction materials such as cement might be unstable, because recently, Addis Ababa is in a construction boom. Therefore it is recommended to collect the latest information on the prices of construction materials and to draw up an estimate for the total cost of the Project through the Outline Design Stage and the Detailed Design Stage.

### 2-2-1-5 Policy for taking Local Consultants for Detailed Design and Construction Supervision

The local consultants that have enough capacity for the Project have their offices in Addis Ababa. Consultants are usually categorized into five levels based on their capacity and business

scale. In Ethiopia the category of the consultants is generally decided based on the estimated construction cost. The consultants with category 3 and above have a sufficient number of staff with the desirable capacity for supervising the contractors and construction work.

There is one more factor to consider in setting the policy for taking local consultants for supervision and detail design. It is the construction boom in Addis Ababa. The boom is said to be heating up. For this reason it is anticipated that major consultant companies would not be interested in school construction projects in rural areas, and that the consultants would not take part in the bidding for the Project.

In order to invite consultants with category 3 and over, it is recommended to estimate the construction cost of each project site, to divide the sites into some lots and to make contracts with consultants based on each of the grouped lots. This will induce the consultants with category 3 and above (1-3) to participate in the tender for the Project.

#### 2-2-1-6 Policy for use of local contractors

The greater the contractors' business scale, the better their capacity of managing work process, quality control of construction and financial affairs. However, as mentioned before, since there is an unprecedented construction boom in Addis Ababa, it is anticipated that the major contractors would not be interested in construction of school classrooms in remote local areas and that only the contractors categorized 4 or 5 would participate in the bidding on the Project. Expecting that contractors categorized 4 or 5 take part in the bidding, it is necessary to group construction sites and set lots in many numbers, because in Ethiopia the contract amount each contractor can be awarded is limited, as the contract amount is capped according to category level. Consequently, it is advisable to group 4 -6 construction sites in one lot. The Procurement Management Agent need not go to the zones to hold the tenders for the construction work, since the public tenders commonly take place in Addis Ababa, because about 95% of contractors are based in or have branches in Addis Ababa.

#### 2-2-1-7 Policy for Procurement of Furniture

Since construction contractors are not qualified for procurement of furniture, it is necessary to have different contracts for construction and supplying of furniture. In general, since invitations for tenders are called in public newspapers with national circulation, the biddings are usually carried out at Addis Ababa. Thus, furniture suppliers in the rural area have an equal opportunity to get information on the invitation.

#### 2-2-1-8 Policy for Deciding Grade of Facilities and Furniture

OEB have its standard for facility design that is adopted through modifying MOE's high standard design for school facilities. The OEB's standard meets the latest construction situation

from the points of construction work, cost and durability of the buildings. Therefore it is concluded that the Project follow the OEB's standard for school facility construction. As for the furniture, the Project adopts the standard specification set by MOE.

#### 2-2-1-9 Policy for Quality Control

Regarding construction work on primary schools in Ethiopia, generally, quality is not very high as lower-categorized contractors do not have enough capacity to conduct quality control. Thus far, there was no such practice that consultants undertake construction supervision, either. In this Project, local consultants will be planned to supervise the entire process of the construction work. It is advisable to allocate a Japanese Engineering Staff to instruct the local consultants without any experience of the supervision for the primary school facilities in order to bring their ability into full play. Also it is necessary to transfer technical know-how to supervise the construction process. Possible methods to control the local consultants are listed below:

- Add in the TOR for selection of local consultants or in the contracts with the local consultants, the frequency of making site inspections, number of supervisors to make site inspections, and items to be checked for quality control of the construction work
- Prepare a checklist for supervising the construction work together with local consultants and the Japanese engineering staff. It is suggested to consult “the Checklist for Use by Building Construction Supervisors” issued by the Building and Transport Construction Design Authority as well as a checklist prepared by the local consultants themselves.
- Carry out training for all the local supervisors by using the above mentioned checklist before and during construction work in order to thoroughly and uniformly share the quality control method.

#### 2-2-1-10 Policy for Implementation Schedule

It is anticipated that the access to construction sites by construction vehicles will become difficult during the rainy season, since many requested schools are located on smaller byways from main highways. Construction work during the rainy season is often hampered by rain and insufficient cure and results in a lower quality of construction work, even though it is possible, according to local constructors, to precede with construction work even during the rainy season if construction materials are carried into the sites during the dry season. Therefore, it is recommended to plan an implementation schedule to avoid construction work during the rainy season as much as possible.

## 2-2-2 Outline Design

### 2-2-2-1 Contents of the Request

#### (1) Type of the requested facility

Ethiopian side requested standardized facilities as shown in Table 2-1.

Table 2-1 Types of the requested facilities and contents

Type	Description	Contents of the request
Type 1 (Upgrade)	Upgrade from first cycle schools (G1~G4) to complete schools (G1~G8)	4 Classrooms, Staff room, Store, Pedagogical Center, Library, Latrine (boys', girls' and staff)
Type 2 (Expansion)	Expansion at complete schools	8 Classrooms, Pedagogical Center, Library, Latrine (boys' and girls')
Type 3 (Establishment)	Establishment of new complete schools	8 Classrooms, Staff room, Director Room (including Secretary room), Store, Pedagogical Center, Library, Latrine (boys', girls' and staff)

#### (2) Requested school list from the Recipient Country

During the Outline Design Study, the Ethiopian side submitted the school list of 151 schools and during the Draft Report Explanation Study, the Ethiopian side replaced 7 schools in the original list with the new schools.

The table below shows the final 151-school list after the replacement.



Table 2-2 List of 151 requested schools

1. Shawa North Zone				
Priority	Request Year	Wareda	Kebele	School
<b>Type 1</b>				
1	1999 E.C.	Warra Jarsoo	Bobie Liban	Qacamme Liban
2	1999 E.C.	Giraar Jarso	Selmi	Silmii
3	1999 E.C.	Darraa	Iluu Goda Chafe	Daallee Tigil Firee
4	1999 E.C.	Kuyyuu	Bonde Gidabo	Laaftoo Gulantaa
5	1999 E.C.	Aleltu	Wara	Warra Colle
6	1999 E.C.	Kuyyuu	Wuye Gose	Gosee
7	1999 E.C.	Aleltu	Goraa	Lizzib Dingaayi
8	1999 E.C.	Wuchalee	Adaree Gordema	Adaree Gordomaa
9	1999 E.C.	Mulo	Mulo-Siro	Muuloo Siloo
10	1999 E.C.	Wuchalee	Hrkiso	Aarchoo
11	1999 E.C.	Sulultaa	Wale-Lube Akaken	Walee Lube Akaakoo
12	2000 E.C.	Debre Libanos	Bebre Siga Town	Shararoo
13	2000 E.C.	HibaduAbote	Ejere Town	Ejeree
14	2000 E.C.	Darraa	Mamo Bukene	Maammoo Buqnii
15	2000 E.C.	Darraa	Harebo Deso	Raachoo Gandoo
16	2000 E.C.	Sulultaa	Galero Sobora	Galano Sobora
17	2000 E.C.	Kimbibit	Adadi Falie	Adaadii
18	2000 E.C.	Kuyyuu	Dero Wulincho	Willincoo
19	2000 E.C.	HibaduAbote	Haro Chelenko	Haroo Calanqoo
20	2000 E.C.	Wuchalee	Wallansoo Arojii	Walaansoo
21	2000 E.C.	HibaduAbote	Alboch Kere	Ayiqochi Qarree
22	2000 E.C.	Aleltu	S/Sagada	Hurufa Labuu
23	2000 E.C.	Giraar Jarso	Addisge	Addisgee
24	2000 E.C.	Aleltu	W/Dara	Kaaraarbaa
25	2000 E.C.	HibaduAbote	Yaayaa Maryamii	Rayyaaqoratti
26	2000 E.C.	Warra Jarsoo	Fagii Ejersa	Fagii
27	2000 E.C.	Abbichuf Nya'a	Nasri Xiriny	Gaba Jimmata
28	2000 E.C.	Aleltu	G/lubbay	Gowaa
29	2000 E.C.	Darraa	Addis Alem Yayya	Yaayyaa
30	2000 E.C.	Fichee town	Fiiche	Boowwaa Sad.1ffaa
<b>Type 2</b>				
1	1999 E.C.	Sulultaa	Sululta	Sululta
2	1999 E.C.	Fichee town	Fichee	Abiyoot Firee
3	1999 E.C.	Warra Jarsoo	Tulu Milky	Tulluu Milkii
4	1999 E.C.	Wuchalee	Muketury	Mukaxurrii Sad. 1ffaa Lak
5	1999 E.C.	Fichee town	Fichee	Fiichee Lakk.Tikko
6	1999 E.C.	Mulo	Segno Gebeya	Sanyoo Gabaayaa
7	1999 E.C.	Kuyyuu	Dero Chengi	Daroo Daannisaa
8	1999 E.C.	Debre Libanos	Innaagotam Aanqii	Dahanaa
9	1999 E.C.	Debre Libanos	Dirree Jiboo	Dirree Jibboo
10	1999 E.C.	HibaduAbote	Gidabo Goregese	Gidaaboo Kiro
11	1999 E.C.	Sulultaa	Andawayizero	Mugar
12	2000 E.C.	Degem	Bonyyaa Afraami	Qurquraa
13	2000 E.C.	Abbichuuf Nya'Aa	Magaala Mandidaa 0	Mandiidaa 1Ffaa
14	2000 E.C.	Jiddaa	Qalate	Qalaaxee
15	2000 E.C.	Barrak	Bura Barak	Jafaara
16	2000 E.C.	Hidhabuu Abootee	Pea Mechera	Nya'Aa Machaaraa
17	2000 E.C.	Kuyyuu	Wuye Chebere	Karkarreessaa Cabare
18	2000 E.C.	Qimbibiiti	Godetina Dekabora	Dhakaboora
19	2000 E.C.	Jiddaa	Arabsa Chifara	Ayidaa Jaalataa
20	2000 E.C.	Jiddaa	Dabali Ganjo	Dabalii Guddaa
<b>Type 3</b>				
1		Mulo	Muloo Fallee	
2		Kuyyuu	Goraa	
3		Kuyyuu	Qiltuu Hinka	
4		Kuyyuu	Cilaaloo	
5		Hidhabuu Abotee	Nya'aa Machaaraa	
6		Warra Jaarsoo	Fajjii Ejersaa	
7	2000 E.C.	Kuyyuu	Koye Akale	
8	2000 E.C.	Kuyyuu	G/Guracha	
9	2000 E.C.	Kuyyuu	Liben Kura	
10	2000 E.C.	Warra Jarsoo	Jamo	
11	2000 E.C.	Warra Jarsoo	Tulu Milky	
12	2000 E.C.	HibaduAbote	Dera Bentu	
13	2000 E.C.	HibaduAbote	Yaayaa Dhakka Booru	

2. Herarge West Zone				
Priority	Request Year	Wareda	Kebele	School
<b>Type 1</b>				
1	1999 E.C.	Doba	Welkituma Hugi	Diigaagita
2	1999 E.C.	Gamachis	Hula kunni	Hulaa Qunnii
3	1999 E.C.	Chiro	Ligo Baches	Luugoo Baceessaa
4	1999 E.C.	Mieso	Burya tuqa	Buraaysaa Tuqaa
5	1999 E.C.	Chiro	Gara Nigus N	Gaaraa-Nugus Lakk.3
6	1999 E.C.	Mieso	hargitti	Haargittii
7	1999 E.C.	Gamachis	Ela Odaa	Hijaa Kukuriftuu
8	1999 E.C.	Chiro	Medico No2	Sheek Adam
9	1999 E.C.	Kuni	Goda Hora	Deenfoo
10	1999 E.C.	Mesela	Haadaqamaa	Haadaqamaa
11	1999 E.C.	Mieso	Malka Horaa	Husee Mandheeraa
12	1999 E.C.	Chiro Town	Araddaa 02	Ifaa Islaamaa
13	1999 E.C.	Kuni	Gooroo Meett	Gubbaa Guutuu
14	2000 E.C.	Hebro	Saxaan	Odaa
15	2000 E.C.	Hebro	Malkaa bal'oo	Malkaa Bal'Oo
16	2000 E.C.	Mieso	Ganna	Gorboo
17	2000 E.C.	Chiro	Wachu Eltoke	Waaccuu Eltokkee
18	2000 E.C.	Doba	Diree Nagaa	Dirree Nagayaa
19	2000 E.C.	Chiro	Hara	Laga-Arbaa Sadeen
20	2000 E.C.	Daro Labu	Qabaanaawwee	Daaroo Abboona
21	2000 E.C.	Mieso	adaa roobaa	Dibaalaa
22	2000 E.C.	Mesela	REHA	Maaramaa
23	2000 E.C.	Daro Labu	Kebele boundary not confirmed	Halloo-Goobaa
24	2000 E.C.	Boke	Yezelan meret	Sambaxii
25	2000 E.C.	Daro Labu		Bilika
26	2000 E.C.	Tulo		Hunde Misoma
<b>Type 2</b>				
1	1999 E.C.	Doba	Dire Bilo	Doobbaa
2	1999 E.C.	Gamachis	Kunni sagari	Qunnii
3	1999 E.C.	Mieso	asabat	Odaa Asabot
4	1999 E.C.	Mieso	mieessoo	Mi'Eessoo
5	1999 E.C.	Kuni	Sebale	Sabaallee
6	1999 E.C.	Chiro	Negabas	Gannoo
7	1999 E.C.	Tulo	Town	Hirnaa Lakk.1
8	1999 E.C.	Tulo	Burka-jalela	Caffee Gurraattii
9	1999 E.C.	Chiro	Tayfe	Teeyifee fi Ceekaa
10	1999 E.C.	Mesela	Araddaa rahaa	Waldiyaa
11	1999 E.C.	Mesela	Araddaa abaadir	Gooroo Re'Ee
12	1999 E.C.	Chiro	Wachu Gile	Waaccuu Giilleey
13	1999 E.C.	Kuni	Gebiba	Gabiibaa
14	1999 E.C.	Daro Labu	Michata N0.1	Michata N0.1
15	1999 E.C.	Tulo		Debeso
16	1999 E.C.	Anchar		Sakka
17	1999 E.C.	Beddesa	Bedesa 02 kebele	Bedesa primary school
<b>Type 3</b>				
1		Chiro Town	Ganda 01	
2	2000 E.C.	Mieso	Buraysaa Tuka	
3	2000 E.C.	Daro Labu	Billiqaa	
4		Daroo Labu	Araddaa Qabbanawaa	
5		Anchar	Waaccuu	
6	2000 E.C.	Anchar	Wedesa	
7	2000 E.C.	Daro Labu	Daro Guddo	
8	2000 E.C.	Kuni		

3. Arsi East Zone				
Priority	Request Year	Wareda	Kebele	School
<b>Type 1</b>				
1	1999 E.C.	Digelu Tijo	Sagure molie	Moollee
2	1999 E.C.	Guna	Ree Amba	Naanno Heechoo
3	1999 E.C.	Golocha	Tibii Sabata	Waraguu Sabbataa
4	1999 E.C.	Martii	Mollame Kersa	Mollamee Qarsaa
5	1999 E.C.	Digelu Tijo	Tulu kite	Tulluu Qixxee
6	1999 E.C.	Golocha	Daro Boonjaa	Daaroo Bonjaa
7	1999 E.C.	Golocha	Chululie Ejersa	Culul Cirriqsaa
8	1999 E.C.	Digelu Tijo	Mankula Nege	Dargoo Yaguugaa
9	1999 E.C.	ZuwaY Dugda	Boka	Booka
10	1999 E.C.	Guna	Xaalotaa	Nageelee o1
11	1999 E.C.	Digelu Tijo	Chafa Gugesa	Xamansaa
12	1999 E.C.	Digelu Tijo	Digalu bora	Odaa Daannisaa
13	1999 E.C.	Golocha	Dhummugaa Wa	Dhummugaa Qal' Aa
14	1999 E.C.	Robe	DoYo gora	Ataabaa DooYYoo
15	1999 E.C.	Seruu	Jida Jiru	Jiddaa Haliilaa
16	1999 E.C.	Lode Hitosa	Tulu Bego	Loodee Beegoo
17	1999 E.C.	Munessa	Odaa Leencaa	Odaa Leencaa
18	1999 E.C.	Robe	Sudie waltay	Sudee Sibixaa
19	1999 E.C.	Tiyoo	Katar Kote Bula	Aboosaraa
20	1999 E.C.	Balle Gasgar	Darolee	Kiilolaa
<b>Type 2</b>				
1	1999 E.C.	Bekoji		Boqqojjii Tigil Firee
2	1999 E.C.	Lode Hitosa	Horuta	Hurutaa
3	1999 E.C.	Munessa	Didibee Yadoola	Eegoo Lagadana J.G
4	1999 E.C.	Limu Bilobilo	Meraro Town	Bilbiloo Sad.1Ffaa
5	1999 E.C.	Digelu Tijo	Mankula Nege	Xiijoo Sad.1F J.G
6	1999 E.C.	Shirka	Waji Repesa	Gaadoo Gunaa
7	1999 E.C.	Digelu Tijo	Saagure town	Alaltuu Saguree
8	1999 E.C.	ZuwaY Dugda	Ubo Baricha	Uboo Weennii
9	1999 E.C.	Munessa	Gumgumaa	Gumgumaa
10	1999 E.C.	Guna	Andele Abajema	Andalee Baaduu
11	1999 E.C.	Tiyoo	Haro Bilalo	Waajii Billallo
12	1999 E.C.	Martii	Mollame Arjao	Mollamee Arja'oo
13	1999 E.C.	Dodota	Dhera Town	Argiitii Danabaa
<b>Type 3</b>				
1	1999 E.C.	Tena	Korooptaa	
2	1999 E.C.	Tena	Waadagoo Misoo	
3	1999 E.C.	Robe	Saddiqaa Atuudaa	
4	2000 E.C.	Tena	Azaazaraa Baredu	

## 2-2-2-2 Setting Priority School List

### (1) Preconditions for Setting Priority School List

#### 1) Site to be excluded from the list

- a. Exclude the 19 sites belonging to 4 Waredas located in the eastern part of Herarge West zone, due to the reasons of public security based on the latest information supplied by the Embassy of Japan in Ethiopia and the JICA Ethiopia Office.

Table 2-3 Schools eliminated for reasons of public security

Zone	Wareda	Kebele	School	Type		
				1	2	3
Herarge West	Mieso	Burya tuqa	Buraaysaa Tuqaa	1		
		hargitti	Haargittii	1		
		Malka Horaa	Husee Mandheeraa	1		
		Ganna	Gorboo	1		
		adaa roobaa	Dibaalaa	1		
		asabat	Odaa Asabot		1	
		mieessoo	Mi'Eessoo		1	
	Buraysaa Tuka	None			1	
	Doba	Welkituma Hugi	Diigaagita	1		
		Diree Nagaa	Dirree Nagayaa	1		
		Dire Bilo	Doobbaa		1	
	Mesela	Haadaqamaa	Haadaqamaa	1		
		REHA	Maaramaa	1		
		Araddaa rahaa	Waldiyaa		1	
		Araddaa abaadir	Gooroo Re'Ee		1	
	Tulo		Hunde Misoma	1		
		Town	Hirnaa Lakk.1		1	
		Burka-jalela	Caffee Gurraattii		1	
		Debeso		1		
Total				10	8	1

- b. Exclude the 7 sites located at the southern part of Herarge West Zone and the 4 sites at Arsi East Zone from the point of the inefficiency of the construction and supervision work, because it is difficult for these 11 sites to be included in any lot for construction work due to their geographical isolation from other sites in the list.

Table 2-4 Schools eliminated for geographical reasons

Zone	Wareda	Kebele	School	Type		
				1	2	3
Herarge West	Daro Labu	Qabaanaawwee	Daaroo Abboona	1		
			Halloo-Goobaa	1		
			Bilika	1		
		Billiqaa	None			1
		Daro Guddo	None			1
		Araddaa Qabbanawaa	None			1
	Boke	Yezelan meret	Sambaxii	1		
Arsi East	Bekoji		Boqqojjii Tigil Firee		1	
	Limu Bilobilo	Meraro Town	Bilbiloo Sad.1Ffaa		1	
	Shirka	Waji Repesa	Gaadoo Gunaa		1	
	Munessa	Gumgumaa	Gumgumaa		1	
Total				4	4	3

## 2) Data of Micro-Planning of SMAPP

The classification of access road is available in the school data prepared by each of the WEOs during the process of Micro-Planning of SMAPP. The final priority list will be confirmed by reviewing the condition of the access roads at the time of Detailed Design Study with the reference

of the school data mentioned above.

Although the Micro-Planning school data also indicates the necessary classrooms for each of the schools, the requested priority list will be reviewed at the time of the Detailed Design Study. At the time of the site survey of the Detailed Design Study, the existing usable classrooms will be confirmed with the reference of the school data. The number of classrooms to be constructed will be finalized using the formula mentioned in (3) of P. 2-19.

### 3) EMIS Data

Based on the calculation made using EMIS data for existing classrooms, the school list requested by OEB includes schools with the number of classrooms in shortage less than the number of classrooms planned to be constructed. Also the EMIS data for the existing schools does not include the condition of the facility such as its degree of dilapidation or danger. Therefore, it is recommended that the EMIS data for the existing schools not be used as the grounds to prepare the priority school list. The priority schools are confirmed by reviewing the existing school conditions at the time of the Detailed Design Study.

According to the EMIS data in 2005, most schools have a library and a pedagogical center. However, OEB pointed out that most of the libraries and pedagogical centers are not in appropriate condition, nor are they usable. For this reason, in the Outline Design Study, it is recommended to take the view that all libraries and pedagogical centers of existing schools are unusable, and that the final components be set by reviewing the condition of the library and pedagogical center of each of the schools at the time of the Detailed Design Study.

### 4) Schools to be newly established

For schools to be newly established, since school data by EMIS or SMAPP is not available, the number of necessary classrooms will be verified from the projection of school age population which shall be submitted by OEB. Based on the verification, schools that need more than 8 classrooms will be included in the priority school list.

### 5) Priority

It is decided to give high consideration to following the priority based on the zone- and type-wise school list requested by the Ethiopian side.

### 6) Land Secured Document

In Ethiopia, land ownership certificates are issued in urban areas, while such certificates are not available in rural areas. This custom originates from socialism, and even today, lands are owned by the state and personal ownership is not allowed. Hence, it is unrealistic to request the Government of Ethiopia to present land ownership certificates for all the Project sites. Regarding this matter, because lands are state-owned, the Ethiopian side explained that necessary evictions are to be carried out peacefully. Therefore, we do not request land ownership certificates for the existing schools. On the other hand, regarding the schools to be newly established, as school

compound boundaries and land locations are unclear, concerned parties in the Woreda and community will work together to prepare a land use agreement and present it to the Japanese side.

(2) Drawing up a list of priority schools

1) Setting priority schools for the Project

The final Project schools list is decided during the Detailed Design Study. However, it is necessary to set a draft construction work plan and select priority schools for this Project during the Outline Design Study in order to make a rough estimate for the Project. Making a rough calculation, 57 schools are estimated to be involved within the limited resources of the Project. Therefore, it is concluded to make the total Project cost estimation as well as the construction and procurement plans by taking 57 priority schools.

2) Criteria to Select Priority Schools for the Project

The priority schools are selected based on the criteria below that are requested by OEB.

- The ratio of the number of schools based on zone and type follows the ratio in the list of the Request Letter (151 schools are listed for the Project).
- The priority schools are selected from the top of the priority rank in the list.

3) Zone- and Type-Wise Priority Schools for the Project

Following the ratio of the schools zone-wise and type-wise requested by OEB, the number as well as the percent of the 57 priority schools by zone and type is shown in the table below.

Table 2-5 Zone- and type-wise priority school numbers and ratios

	Type 1		Type 2		Type3		Total	
	Number of schools	%	Number of schools	%	Number of schools	%	Number of schools	%
Shawa North	11	19%	8	14%	6	10%	25	43%
Herarge West	9	16%	7	12%	2	4%	18	32%
Arsi East	7	12%	6	11%	1	2%	14	25%
	27	47%	21	37%	9	16%	57	100%

4) Relevance of New Schools

OEB has presented the projection of school-aged children in villages where the new schools are to be constructed. Based on this projection, we have created Table 2-6 to indicate the number of necessary classrooms along with the projection of school-aged children. As the numbers of necessary classrooms of all the schools in Table 2-6 are greater than 8, those 9 schools shall be included in the priority schools. In addition, Woreda offices of the 9 schools have issued documents to prove that the school sites with sufficient areas are secured for school construction. Therefore, there will be no problem in securing lands for construction.

Table 2-6 Projection of school-aged children in villages where type-3 schools are requested and the calculated number of necessary classrooms

Zone	Priority	Wareda	Kebele	Projection of School-aged Children				Number of necessary classrooms
				2006/07 (At Present)	2007/08	2008/09	2009/10	
Shawa North	1	Mulo	Muloo Fallee	1,620	1,683	1,746	1,809	37
	2	Kuyyuu	Goraa	2,051	2,131	2,211	2,291	46
	3	Kuyyuu	Qiltuu Hinka	1,629	1,692	1,755	1,818	37
	4	Kuyyuu	Cilaaloo	1,420	1,475	1,530	1,585	32
	5	Hidhabuu Abote	Nya'aa Machaara	906	941	976	1,011	21
	6	Warra Jaarsoo	Fajjii Ejersaa	591	614	637	660	14
Herarge West	1	Chiro Town	Ganda 01	1,675	1,740	1,805	1,870	38
	2	Anchar	Waaccuu	830	862	894	926	19
Arsi East	1	Tena	Koroptaa	465	483	501	519	11

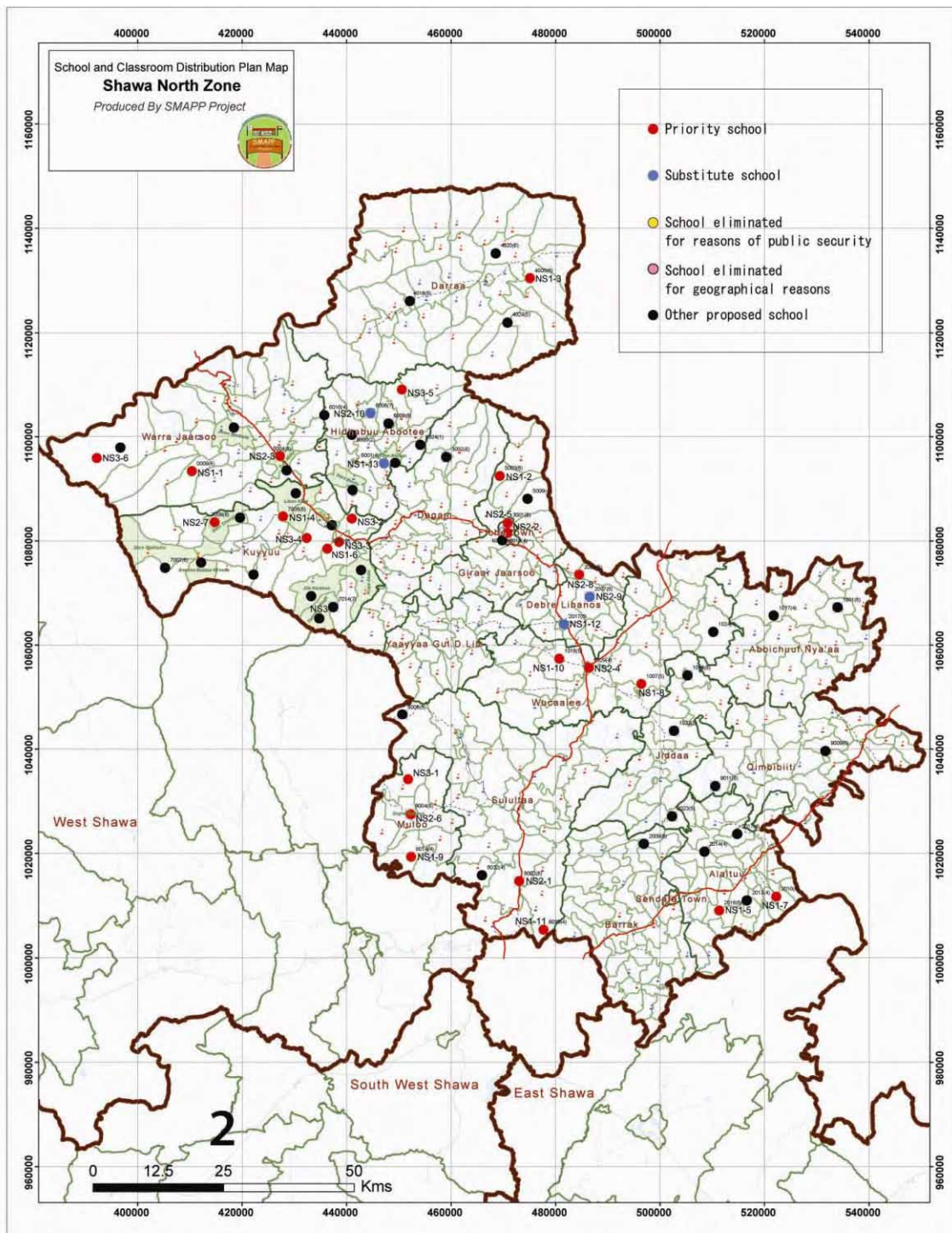
#### 5) Priority Schools for the Project

Taking the above said condition, the priority schools for the Project are shown in the table below. The locations of the 151 requested schools are indicated in the figure 2-1.

Table 2-7 Priority schools

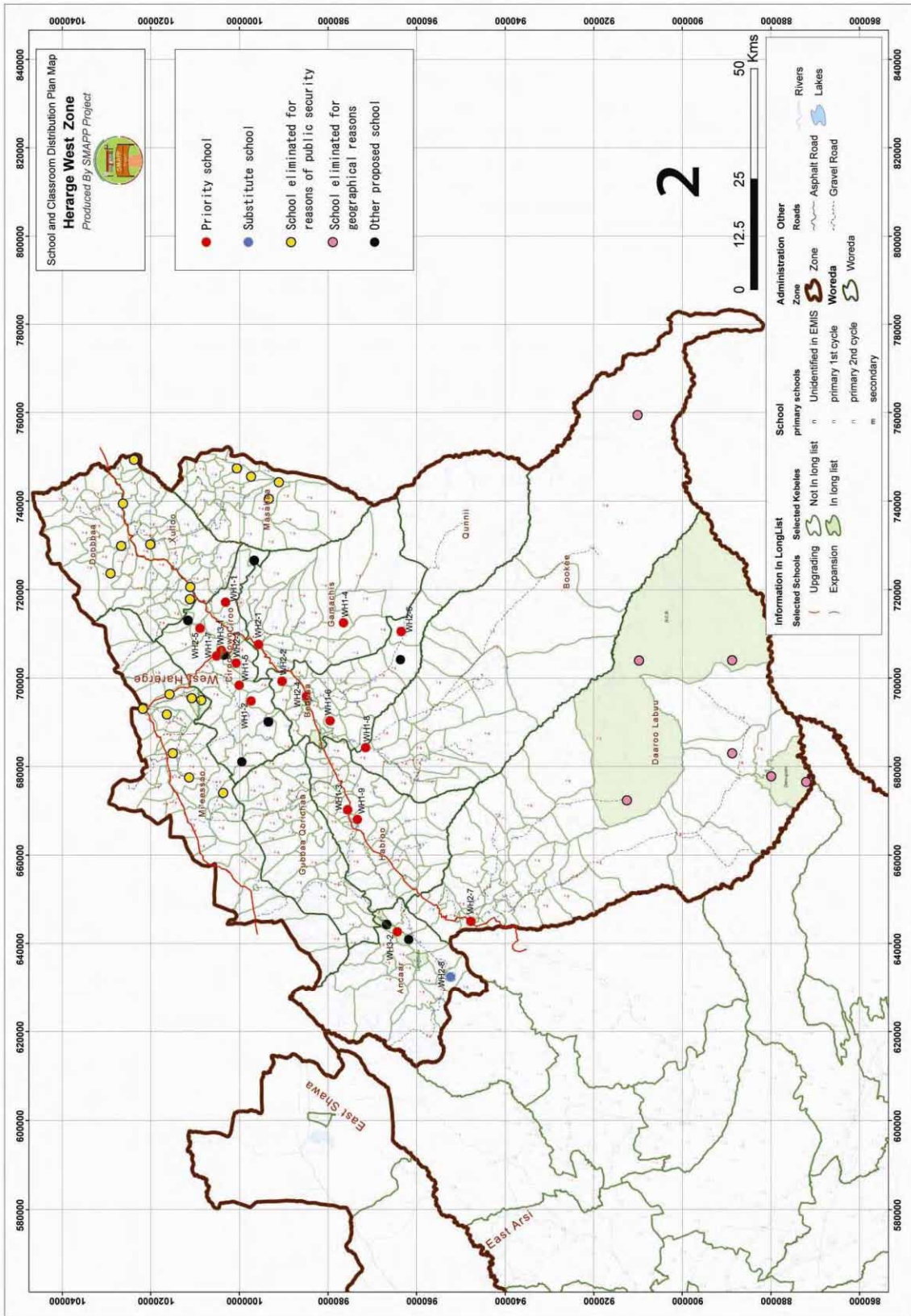
Zone	Type	Priority	School No.	Wareda	Kebele	School Name
Shawa North	1	1	NS1-1	Wara Jaarsoo	Bobie Liban	Qacamme Liban
		2	NS1-2	Giraar Jaarso	Selmii	Silmi
		3	NS1-3	Darraa	Iluu Godaa Chafee	Daallee Tigil Firee
		4	NS1-4	Kuyyuu	Bondee Gidaabo	Laaftoo Gulantaa
		5	NS1-5	Aleltuu	Warra	Warra Cholte
		6	NS1-6	Kuyyuu	Wuye Gose	Gosee
		7	NS1-7	Aleltuu	Goraa	Lizzib Dingaayi
		8	NS1-8	Wuchale	Adaree Gordema	Adaree Gordoma
		9	NS1-9	Mulo	Mulo-Siree	Muuloo Fallee
		10	NS1-10	Wuchale	Hirkiso	Aarchoo
		11	NS1-11	Sulultaa	Wale-Lube Akaken	Walee Lube Akaako
	2	1	NS2-1	Sulultaa	Sululta	Sulultaa
		2	NS2-2	Fiichee Town	Fichee	Abiyoot Firee
		3	NS2-3	Wara Jaarsoo	Tulu Milky	Tullu Milki
		4	NS2-4	Wuchale	Muketury	Mukaxurrii Sad. Iffaa
		5	NS2-5	Fiichee Town	Fichee	Fiichee Lakk. tokkoffaa
		6	NS2-6	Mulo	Sengo Gebeya	Sanyoo Gabaayaa
		7	NS2-7	Kuyyuu	Dero Chengi	Daroo Daanisaa
8		NS2-8	Debre Libanos	Innaagotam Aanqii	Dahanaa	
3	1	NS3-1	Mulo	Muloo Fallee		
	2	NS3-2	Kuyyuu	Goraa		
	3	NS3-3	Kuyyuu	Qiltuu Hinka		
	4	NS3-4	Kuyyuu	Cilaaloo		
	5	NS3-5	Hidhabuu Abotee	Nya'aa Machaaraa		
	6	NS3-6	Warra Jaarsoo	Fajjii Ejersaa		
Herarge West	1	1	WH1-1	Gammachis	Hula Kuni	Hulaa Qunnii
		2	WH1-2	Chiro	Ligo Baches	Luugoo Baccеessaa
		3	WH1-3	Habro	Malkaa Bal'oo	Malkaa Bal'oo
		4	WH1-4	Gammachis	Ela Oda	Hijjaa Kukuriftuu
		5	WH1-5	Chiro	Medicho No2	Sheek Adam
		6	WH1-6	Kuni	Goda Hora	Deenfoo
		7	WH1-7	Chiro Town	Araddaa 02	Iffaa Islaamaa
		8	WH1-8	Kuni	Goroo Meetti	Gubbaa Guutuu
		9	WH1-9	Habro	Saxaan	Odaa Ananii
	2	1	WH2-1	Gammachis	Kunnii Sagarii	Qunnii
		2	WH2-2	Kuni	Sebaalee	Saabaallee
		3	WH2-3	Chiro	Negabas	Gannoo
		4	WH2-4	Baddeessaa	Baddeessaa 02	Baddeessaa Primary School
		5	WH2-5	Chiro	Wachu Gile	Waaccuu Giilleeyi
		6	WH2-6	Kuni	Gabiibaa	Gabiibaa
7		WH2-7	Daroo Labuu	Michataa No.1	Michataa No.1	
3	1	WH3-1	Chiro Town	Ganda 01		
	2	WH3-2	Anchar	Waaccuu		
Arsi East	1	1	EA1-1	Digalu Tiijo	Sagure Molie	Moollee
		2	EA1-2	Guna	Ree Amba	Naannoo Heechaa
		3	EA1-3	Gololcha	Tibbii Sabbataa	Waraaguu Sabbataa
		4	EA1-4	Martii	Mollame Kersa	Mollamee Kersa
		5	EA1-5	Digalu Tiijo	Tullu Kite	Tulluu Qixxee
		6	EA1-6	Gololcha	Daro Bonjaa	Daaroo Bonjaa
		7	EA1-7	Gololcha	Chululie Ejersa	Culul Cirriqsa
	2	1	EA2-1	Lode Hitosa	Huruta	Hurrutaa
		2	EA2-2	Muneessaa	Diddibee Yaadolaa	Eegoo Lagadana (J/G)
		3	EA2-3	Digalu Tiijo	Mankula Nega	Xijjoo Sad. Iffaa
		4	EA2-4	Digalu Tiijo	Saaguree Town	Alaltuu Saguree
		5	EA2-5	Zuway Dugda	Ubbo Barichaa	Ubboo Weennii
		6	EA2-6	Guna	Andele Abajema	Andalee Baaduu
3	1	EA3-1	Tena	Koroptaa		



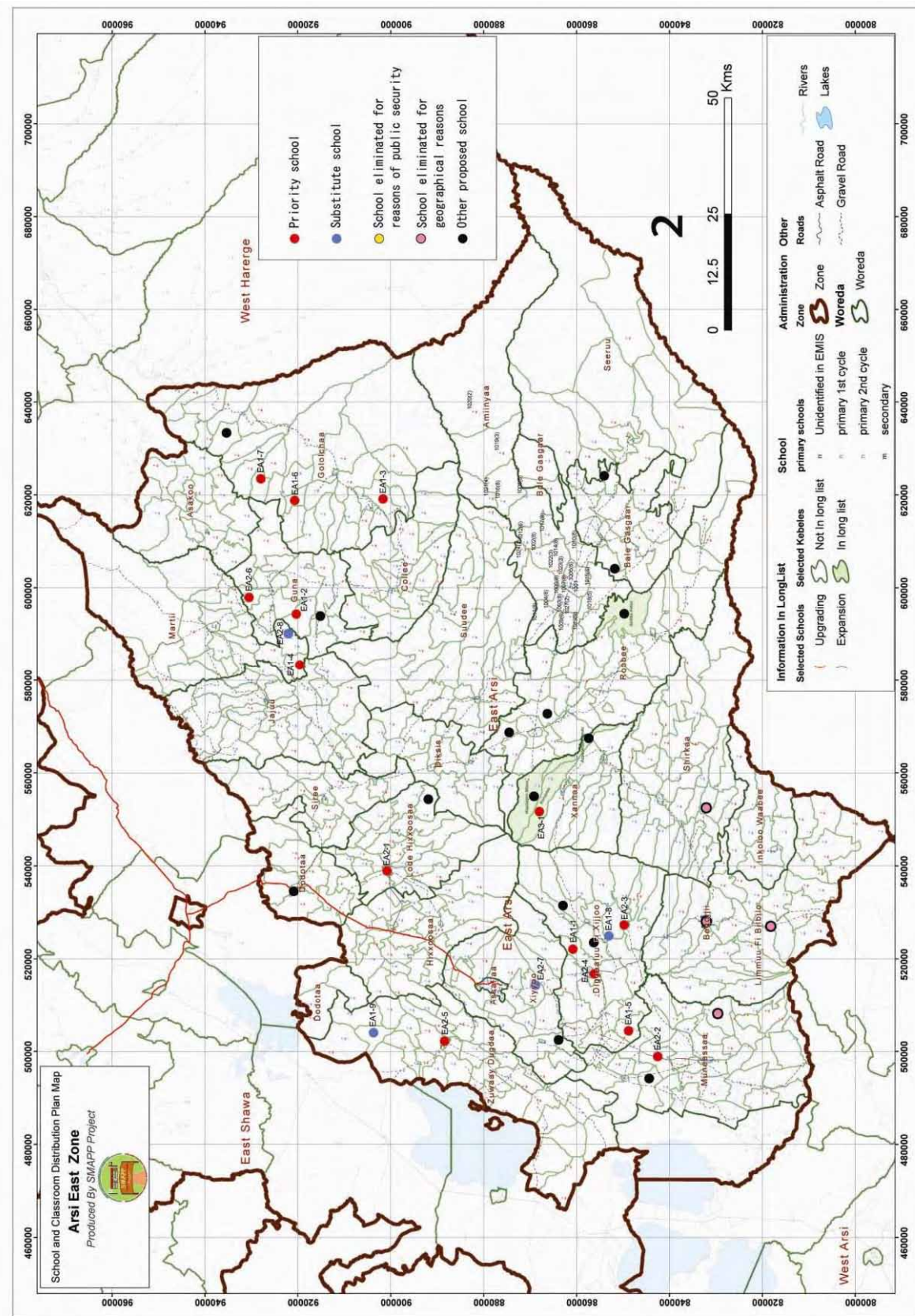


Information In LongList		School	Administration	Other
(	Selected Schools	primary schools	Zone	Roads
)	Upgrading	Unidentified in EMIS	Woreda	Rivers
)	Expansion	primary 1st cycle	Woreda	Asphalt Road
	Not In long list	primary 2nd cycle	Woreda	Gravel Road
	In long list	secondary		Lakes

Figure 2-1 The locations of the 151 requested schools (Shawa North)



(Herarge West)



(Arsi East)

(3) Review of the priority schools at the stage of Detailed Design.

Based on the result of the site survey conducted by local consultants at the time of the Detailed Design, such sites as mentioned below will be excluded from the priority school list for the Project. As the above mentioned schools are excluded from the list, the lower priority ranked schools move up one by one in the list.

- 1) Construction sites that are difficult to access even during dry season
- 2) Schools with the number of classrooms in shortage less than the number of classrooms to be constructed when calculated by using the following formula

Type 1 Schools to be upgraded

$$\frac{\text{The number of students}}{50} - \text{the number of usable classrooms} < 4$$

Type 2 Schools to be expanded

$$\frac{\text{The number of students}}{50} - \text{the number of usable classrooms} < 8$$

Note) “the number of students” means the number of students registered at the time of the Detailed Design Study. As for the type 3, schools to be newly established, the classroom shortage is not included in the criteria to review the list for the Detailed Design Study since the relevance to include in this project is verified above (2) 4).

- 3) The site where the land ownership dispute is taken place.
- 4) The site which has a program or plan for new/undergoing classroom construction by the Ministry of Education, local government, other donors, NGO and so forth.
- 5) Insufficient land space for construction.
- 6) Inappropriate ground condition such as a swampy place.
- 7) Public security instruction from the Embassy of Japan in Ethiopia, JICA Ethiopia Office or OEB.
- 8) Difficult to include in any lot, due to a very isolated site location.

### 2-2-2-3 Relevance for Each Component to be constructed

Considering that one of this Project’s objectives is to improve the access to primary education, it is needless to say that the construction of the classrooms receives high priority. It is also necessary to examine the relevance of other additional components requested by the Ethiopian side.

#### (1) Classrooms

Type 1 schools (schools to be upgraded) are mainly located in rural areas. The first cycle (1-4 grades) primary schools are to be upgraded to second cycle primary schools by adding four grades from the fifth grade to the eighth grade. Therefore, it is appropriate to construct four classrooms for the type 1 schools. Type 2 schools (schools to be expanded) are mainly located in the center of rural areas. Many type 2 schools with high priority in the requested list are mammoth schools in number of students with more than 2,000. These schools have a huge shortage of classrooms. Therefore it is relevant to construct 8 classrooms evenly for the listed type 2 schools. The type 3 schools (schools to be newly established) will be managed as the second cycle primary schools with grades from the first to eighth. Therefore, it is appropriate to construct 8 classrooms for the type 3 schools.

Regarding the size of the classrooms to be constructed, it is decided that the Project follows the Ethiopian standard size for the classrooms of the primary school. Other African countries' standard for classroom size is 63 m<sup>2</sup> in average, though Ethiopian standard is about 47 m<sup>2</sup> which is smaller than the average of the African standard. The following are the reasons why the Project follows the Ethiopian standard:

- Due to the severe classroom shortage, schools would accept pupils in one classroom more than the planned capacity of the classroom. Consequently, it is anticipated that the ratio of the number of pupils per teacher goes up, and that the learning environment for the pupils suffers.
- There will be more per-pupil floor area than before, because the standard number of pupils in one classroom was changed from 60 pupils to 50 pupils under the new five-year plan (ESDPIII).

#### (2) Directors' Room

It is appropriate to provide a directors' room based on the standard design, because it is often used for the daily duties of directors, for meeting with visitors and main members of the KETMB and PTA.

#### (3) Secretary Room

A secretary room is used for preparing various official documents, accounting, preparing and keeping school data & records and as a waiting room for visitors. The staff of a complete primary school will be three: one administration officer, one typist and one accountant. The requested area of 15.6 m<sup>2</sup> for one secretary room is appropriate, because it is standard to have 5-15 m<sup>2</sup> per person for an office room.

#### (4) Staff Room

In general, primary school teachers do not have desks for their own use in their staff room. They don't use the staff room for their office work but as a resting room or meeting room with teachers. When considering these uses for the room, 20 m<sup>2</sup> is sufficient space for a staff room, because about 12 staff including teachers and non-teaching staff are at a school with 8 classrooms.

However, after school or on holidays, a staff room is often used for meetings for KETMB, PTA, and school community people. A wider space is needed so that 25-30 people can have a meeting especially in complete primary schools playing very important role in the community. It is observed that some complete primary schools have a meeting room separated from their staff room, because KETMB, PTA and community are actively involved in primary school management in Ethiopia. Therefore, it is appropriate to have the requested area (31.2 m<sup>2</sup>) for a staff room in the Project which will not provide a separate meeting room.

#### (5) Store

The items below are assumed to be kept in the store.

- Textbooks for all grades (at the time of textbook revision, 2 editions of textbooks are kept including new and old textbooks.
- Materials supplied from Wareda education office (chalk, paper, stationery, ink and so on)
- Some tools for income-generating activities (farming appliances, temporarily kept cultivated grains)
- Construction tools used by community (construction materials, construction tools)
- Goods for physical education
- Furniture & tools under repair
- Cleaning and maintenance tools

It is confirmed, during the Outline Design Study, that the stores of visited schools are full of materials, tools and textbooks mentioned above. It is appropriate to provide a store that is 31.2 m<sup>2</sup> wide, considering the variety and number of items to be kept in these stores.

#### (6) Latrine

The Project follows the standard design for primary school latrines. The standard latrine is the ditch type (dry latrine) both for males and females. Also the standard provides separate blocks considering gender difference. The Project also follows the standard for the number of booths. That is, one booth per 25 pupils. The booths will be provided for the same number of classrooms for both the female and the male pupils, because the Project sets 50 pupils in one classroom.

Staff latrines are requested only for the schools to be newly established (type 3). The latrines will be used not only by staff but also by KETMB, PTA and community people when they come to the schools. There are 4 booths provided separately, two each for female and male staff by the standard design. In the Project, the female and male latrine will be in the same block in order to efficiently use its faucets and its water tank, though the standard suggests having the female latrine blocks separated from the ones for the male staff.

#### (7) Library

A library is one of the components set in the primary school standard design and at the time of the field survey of the outline design study, the libraries with the high standard design as well as with mud walls were observed. However, in the libraries, a few books are available. The furniture such as desks are smaller in number than the standard number of OEB. The libraries that are used as the OEB expected were not observed. Taking this observation, it is decided to have a half-size library as suggested in the standard design.

#### (8) Pedagogical Center

Almost all schools that were surveyed at the time of the Outline Design Study have a pedagogical center even though they were small in size. It is observed that the schools have high motivation to prepare teaching-learning materials by using locally available materials at the nearby market because of the budget shortage for teaching-learning materials. The standard design provides the pedagogical center with larger space, because MOE expects pupils to have practical

studies at the center when the pupils have the normal lessons. Also, the standard design provides for some working tables for 2 pupils, in addition to some working tables for 10 pupils. However, it was observed these larger tables were rarely provided, but that some smaller tables were provided. Therefore it is decided that the space of the pedagogical center be reduced to half the area of the standard design and that the centers be equipped with 5 working tables for 10 pupils each.

#### (9) Water Supply System

For sanitary purposes, a hand washing facility is provided at the latrines. At the sites where a public water supply system is available, the system is utilized. At the sites where a public water supply system is not available, a hand washing facility with a rainwater collection system is provided by the Project. Also at the sites with water sources such as wells, ponds or rivers, the hand washing facility is designed to be equipped with a cistern tank so that it is possible to carry water by using a bucket.

#### (10) Electric System

For the sites belonging to a town/village that are already equipped with an electric supply system at the time of the Detailed Design Study, electric system is to be provided by the Project.

#### (11) School Furniture

The Project will provide the furniture that is needed for the facility components.

#### (12) Basic Educational Materials

The Project will not provide the basic educational materials. The materials should be procured using the remaining budget of the Project at the implementation stage.

### 2-2-2-4 Type-Wise Components

Based on the above analysis, the Project plans components to be provided. Following the request by the Ethiopian government, the Project will basically provide a standardized component not based on the classroom shortage but based on the school type-wise. However, the library and pedagogical center for the type 2 schools, electric supply facilities and rainwater collection system for all types will be decided based on the site survey result at the time of Detailed Design Study. The table below shows the planned components

Table 2-8 Type-wise Planned Components

Type		1 Upgrade	2 Expansion	3 Newly construct
Facility	Classroom	4	8	8
	Admini strative Rooms	0	0	1
	Director's Room	0	0	1
	Secretarial Room	1	0	1
	Staff Room	1	0	1
Pedagogical Center	Store	1	0	1
		Approx. a half size of standard plan of MOE	Approx. a half size of standard plan of MOE (Necessity of the Pedagogical Center is decided at the time of Detailed Design)	Approx. a half size of standard plan of MOE
Library		A half size of standard plan of MOE	A half size of standard plan of MOE (Necessity of the Library is decided at the time of Detailed Design)	A half size of standard plan of MOE
Latrine		Girls': 4 holes Boys': 4 holes	Girls': 8 holes Boys': 8 holes	Girls': 8 holes Boys': 8 holes Staff: 4 holes
Mechanical & Electrical	Water Supply System	Faucets and water tank (Rain water collection system will be installed at the sites where no public water supply are available at the time of Detailed Design stage of the Project)		
	Electric System	Electric system will be included only if the town/village of the construction sites are electrified at the time of the Detailed Design stage of the Project		
School Furniture		Supplied according to the facility components		



## 2-2-2-5 Architectural Plan

### (1) Standard design set by the Ministry of Education

In Ethiopia, the MOE has decided to apply its policy of primary school standard design not only to government projects but also to all donors' projects. The OEB has adopted the basic components and classroom size of the standard design of the MOE, although the OEB made a small modification to the details of the standard design. The Projects of the African Development Bank as well as the Projects of the Grant Assistance for Grass-root Human Security of Japan follow the standard design of the MOE. Therefore, the Project shall basically follow the standard design of the MOE.

Standard design was prepared by contracting out to a private consultant company about ten years ago. Up to the present, the OEB made the following modifications to the standard design. The modifications are appropriate and practical since the modifications were carried out based on the points of the construction, procurement, supervision and maintenance situation.

- 1) Modification from the use of precast concrete to the use of the cast in place concrete for the building frame of columns and beams;  
This modification was decided due to the lack of a precast concrete factory. Local contractors had little experience and could not make the quality precast concrete products in a stable manner.
- 2) Modification from the use of precast concrete to the use of concrete hollow blocks for the walls;  
The reason for the modification is the same as 1).
- 3) Modification from the use of steel trusses or imported timber trusses to the use of a eucalyptus log trusses;  
There are two major reasons for this modification. One is that local small and medium sized contractors do not have much experience with structural steel works. The other is to reduce the construction cost.
- 4) Modification from the use of glass jalousies to the use of steel frame glass windows;  
The glass of jalousie window is easily breakable, but schools lack the budget and have difficulties to secure the budget.
- 5) Modification from use of concrete foundation to the use of local stone masonry in the site with red clay soil to cut down the construction cost.
- 6) Stop the use of columns for passages in order to cut down the construction cost.
- 7) Add a berm around a building in order to improve durability of the building by stopping water from soaking into the foundation of the buildings.
- 8) Abolish the standard design for lowland specifications;  
The standard design had two kinds of designs: for highlands (with ceilings) and for lowlands (without ceilings). At present, the standard design recommends to provide lowland schools with ceilings in order to reduce the radiant heat and rain noise from the roof of the buildings.

Therefore, at present there is one standard design for the entire region.

## (2) Improvement of Standard design

In addition to the above-mentioned modifications by the OEB, the Outline Design study recommends the following modifications.

- 1) Reduce the sizes of library and the pedagogical center;  
From the observation on how the rooms are used at the existing schools, it is recommended to reduce by half the standard size of the rooms.
- 2) Water supply system for hand washing;  
The standard design supplies water to the latrines by installing a cistern tank only for the sites where a public water supply system is available. But the Project provides a water supply system by collecting rainwater even for the sites where a public water supply system is not available. Also for the dry season, the Project recommends to install water tanks at low level so that water can be hand-carried and poured into the tanks by using buckets from the water source.
- 3) Installing a transom window over the entrance door of the classroom;  
When blocks are laid from the upper part of the door to the bottom of the beams, it will become structurally simpler by avoiding setting lintels if a transom window is installed.
- 4) Stopping the use of sunscreen louvers at the libraries and pedagogical centers;  
The standard design employs steel sunscreen louvers. However, from the point of cost effectiveness, it is recommended to end the use of the sunscreen louvers, since it is expected that there is not much negative effect to the libraries and pedagogical centers in terms of function.
- 5) An opening for a latrine block for ventilation purposes;  
The standard design recommends natural ventilation by having an opening at latrine blocks. However, since the opening is so small that it is difficult to have air circulation, it becomes stuffy inside the latrines. Therefore it is recommended to make longer and wider openings at the upper part of the latrine wall.

## (3) Design of each of the components

- 1) Classrooms and administrative rooms  
The Project follows the MOE's standard for the size of the classrooms. Since the standard number of pupils per class is 50, the Project provides 24 tables, each of which is for 2 pupils. The first reason for providing tables only for 48 pupils is that it is difficult to provide 25 tables due to the table arrangement plan. The second reason is that schools often adjust the number of pupils by putting 3 pupils per table though it is designed for 2 pupils.
- 2) Library and Pedagogical Centers  
The Project reduces the size of the rooms as mentioned before. The table below shows the

comparison between standard design and the Project's design in size and furniture.

Table 2-9 Comparison between standard design and the project's design

		Standard	This Project
Library	Area	131.25 m <sup>2</sup>	65.63 m <sup>2</sup>
	Main furniture	12 library tables for 6 pupils each (in total for 72 pupils), 10 library shelves, 2 periodical stands, etc.	6 library tables for 6 pupils each (in total for 36 pupils), 8 library shelves, 1 periodical stand, etc.
Pedagogical Center	Area	109.375 m <sup>2</sup>	65.63 m <sup>2</sup>
	Main furniture	25 workbenches for 2 pupils each, 5 workbenches for 10 pupils each, 50 stools, etc.	5 workbenches for 10 pupils each, 50 stools, etc.

### 3) Latrine block

In the Detailed Design, the girls' latrine blocks shall be located separately as far as possible from the boys' latrine blocks. Following the type of latrine provided by the standard design, a hole in the concrete slab on the top of a septic tank is planned so as to make the latrines usable without water. A manhole will be installed so that it becomes possible to regularly take away slag infiltrated and accumulated from the bottom of the septic tank.

### (4) Structural Plan

The structural plan of the high standard design follows the Ethiopia Building Code Standard (EBCS). The Project basically follows the structural plan of EBCS.

#### 1) Structure types

##### a) Foundation types: two types of foundations are employed

Red clay Soil : local stone masonry continuous footing

Black Cotton Soil : Reinforced Concrete independent footing

(In case of the proposed site ground is softer than the black cotton soil, for example a swampland, a marshy place or reclamation, the Project will request an alternative site. When any alternative site is not found, the site is to be excluded from the Project school list.)

##### b) Wall Structure: Concrete hollow block walls supported by reinforced concrete frame (columns and beams)

(Framed masonry structure)

##### c) Floor slab structure: Slab-on-earth with reinforcing bar (t=100mm)

##### d) Roofing materials: Trussed roof by eucalyptus logs ( $\phi$ 120mm and $\phi$ 80mm)

##### e) Walls for a septic tank of latrine blocks: local natural stone masonry

#### 2) Earthquake (based on EBCS-8)

The building code set the degree of danger on the scale of 5 from zone 0 to zone 4. The target 3 project zones belong to the zone 1 to the zone 3. The assumed maximum acceleration of

earthquake (gal) is shown in the table below.

Table 2-10 The assumed maximum acceleration of earthquake (gal)

Earthquake Zone	4	3	2	1	0
Maximum acceleration (gal)	100	70	50	30	0
Seismic intensity Scale of Japan Metrological Agency	5 lower	4 upper	4	4 lower	0

### 3) Structural Materials

#### a) Concrete: cast-in-place concrete

Foundations/columns/beams 25Mpa (250kg/cm<sup>2</sup>), Slab-on-earth 20Mpa (200kg/cm<sup>2</sup>), Lean concrete 7Mpa (70kg/cm<sup>2</sup>)

#### b) Reinforcing bar: Following EBCS-2

#### c) Concrete hollow blocks: Classified by strength on a scale of 5. The Project takes class B.

Table 2-11 Classification by strength of Concrete hollow blocks

Class	AAA	AA	A	B	C
Average strength of 6 blocks (kg/cm <sup>2</sup> )	70	50	42	35	20

### (5) Plumbing and Electrical Plan

#### 1) Plumbing Plan

A ready-made water supply tank (1 t type) will be installed for each latrine block. The water supply tank will be set on a platform approximately 60cm above the ground and connected to water taps for hand washing. At the sites where no public water supply system is available, the Project will install a gutter and drainpipe to collect rainwater falling on the roof of the latrines (see the drawing of the detail section of the proto type). At the site where a public water supply system is available, it is the obligation of the Ethiopian side to connect with the tanks.

#### 2) Electrical Plan

The Project will provide a main distributing board, fluorescent light fixtures and outlets to the sites of the area where electricity is available at the time of the Detailed Design Study. But the Project will not provide lighting fixtures in the latrines. It is the obligation of the Ethiopian side to make connections with the main distribution board, and for the Japan side to make connections with the main administration building to other buildings.

(6) List of finishes

Table 2-12 List of exterior finishes

Classroom, Library, Pedagogical Center	
Roof	Corrugated galvanized steel sheet t=0.4
Eave soffit	Galvanized steel sheet t=0.4
Exterior wall	Concrete hollow blocks facing
Exterior wall (Column, Beam)	Mortar finishes E.P
Berm	Local Stone (chopped face) t=150 weathering 2 %, Precast side groove $\phi$ 300
Foundation	Red clay Soil: local stone masonry continuous footing Black Cotton Soil: Reinforced Concrete independent footing
Latrine block	
Roof	Corrugated galvanized steel sheet t=0.4 Polyvinyl chloride rain collecting eaves gutter and downspout pipe $\phi$ 100
Eave soffit	None
Exterior wall	Concrete hollow blocks facing
Exterior wall (column, beam)	Mortar finishes E.P
Berm	Local Stone (chopped face) t=150 weathering 2 %, Precast side groove $\phi$ 300
Foundation	Reinforced concrete spread foundation
Septic tank	local stone masonry wall
Others	Polyethylene water supply tank (1t) Concrete platforms, taps

Table 2-13 List of Interior finishes

Classroom, Library, Pedagogical Center	
Ceiling	Wood ceiling board O.P
Wall	Mortar finishes E.P
Door & window	Steel door & window O.P., Glass window t=4
Baseboard	Cement tiles
Floor	Cement tiles 200×200×200, Setting bed mortar t=20
Latrine block	
Ceiling	None
Wall	Mortar finishes
Door & Windows	Steel made door & windows O.P.
Baseboard	Mortar finishes t=50, H=100
Floor	Mortar finishes t=50

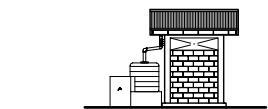
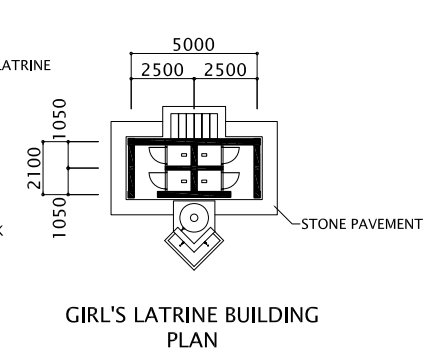
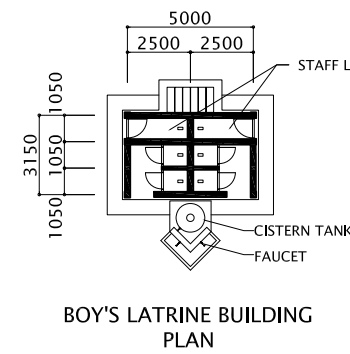
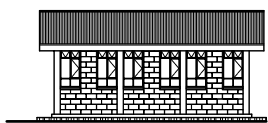
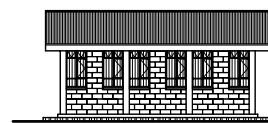
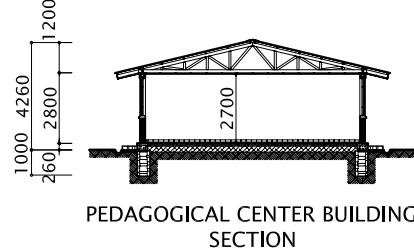
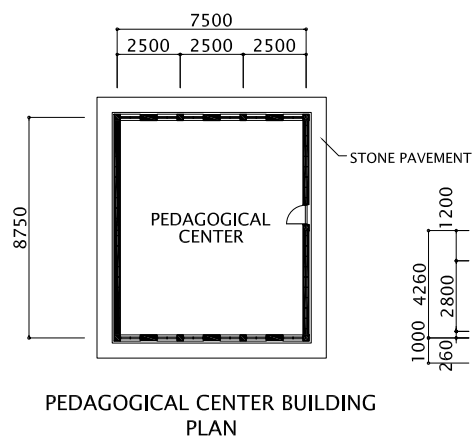
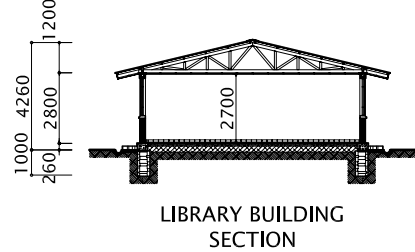
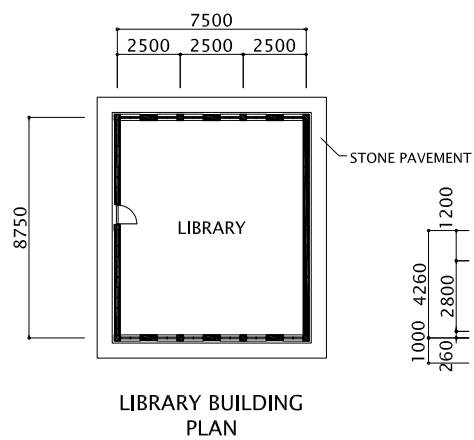
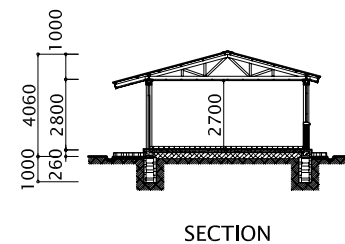
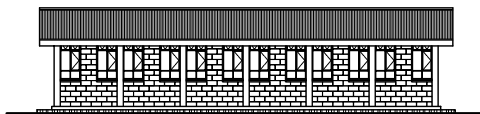
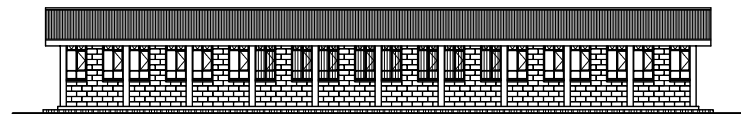
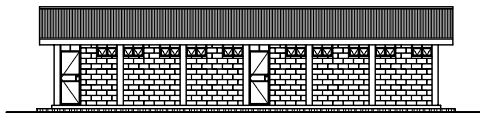
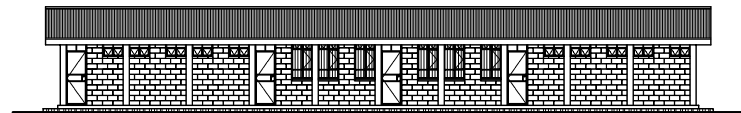
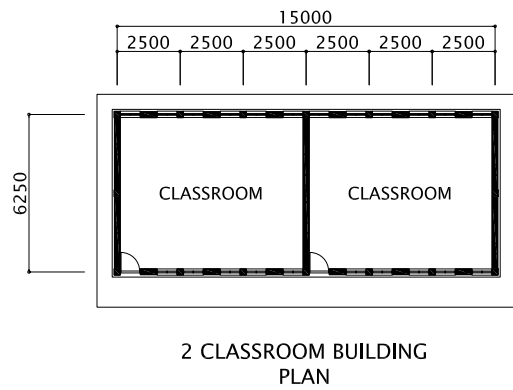
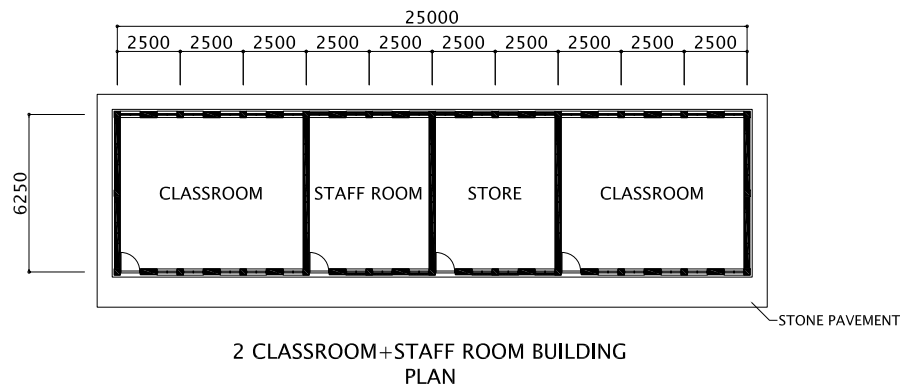
(7) Educational furniture

The OEB applies the standard design and specifications set by the MOE. The Project needs not to improve the standard and specifications, since the standard and specifications are not problematic from the point of the strength, quality and cost, as well as because furniture traders, who know best about school furniture supply, are familiar with the standard and specifications. A list for type-wise furniture is shown in the prototype drawing with the standard code number of the MOE. (P. 2-33 and 2-34)

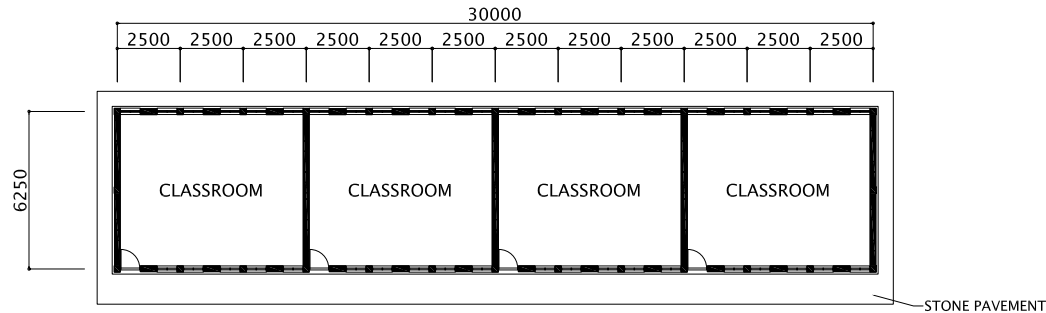
### 2-2-3 Outline Design Drawings

- Plans, Elevations and Sections (Type 1)
- Plans, Elevations and Sections (Type 2)
- Plans, Elevations and Sections (Type 3)
- Furniture Layout (Classroom, Staff room, Director's room/Secretary room, Store)
- Furniture Layout (Library, Pedagogical Center)

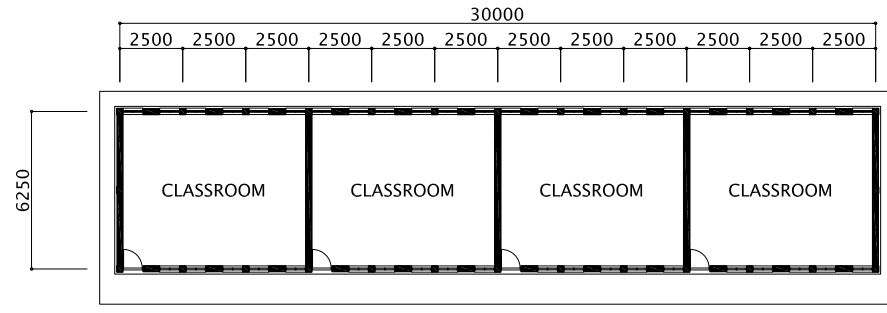
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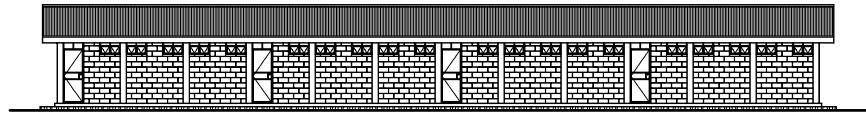
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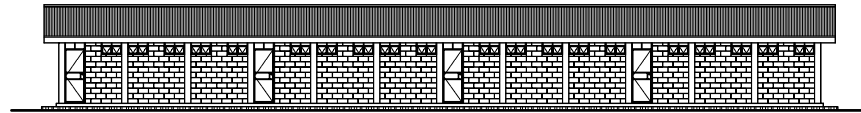
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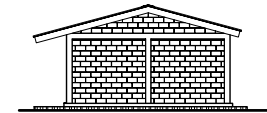
4 CLASSROOM BUILDING PLAN



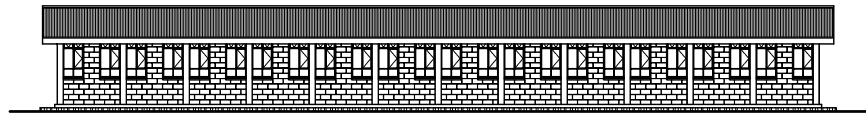
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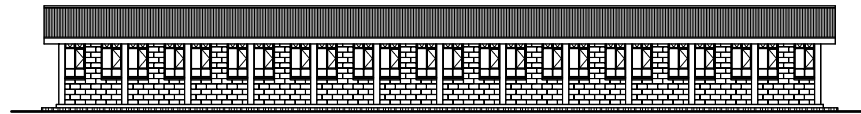
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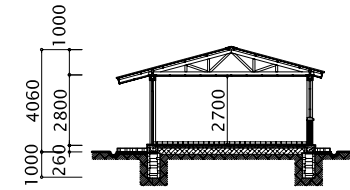
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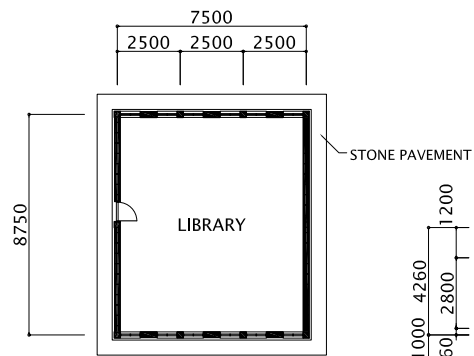
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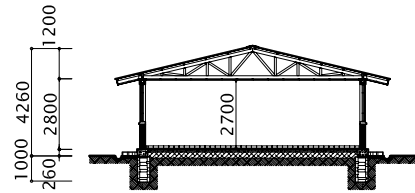
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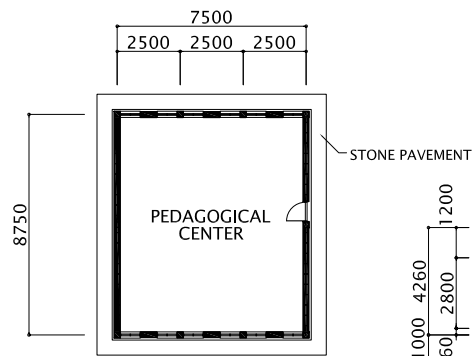
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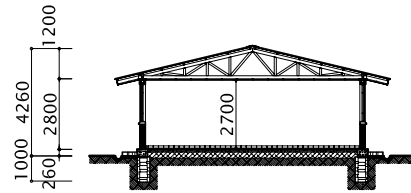
LIBRARY BUILDING PLAN



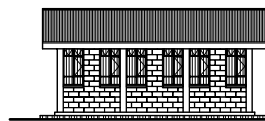
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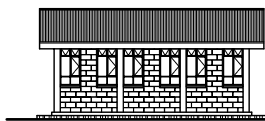
PEDAGOGICAL CENTER BUILDING PLAN



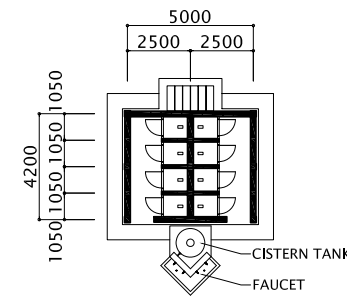
PEDAGOGICAL CENTER BUILDING SECTION



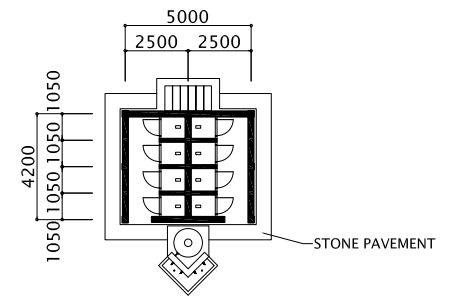
LIBRARY BUILDING ELEVATION



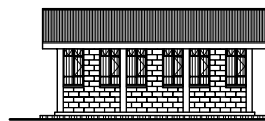
PEDAGOGICAL CENTER BUILDING ELEVATION



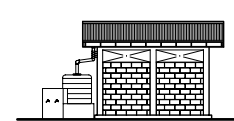
BOY'S LATRINE BUILDING PLAN



GIRL'S LATRINE BUILDING PLAN



BOY'S/GIRL'S LATRINE BUILDING ELEVATION

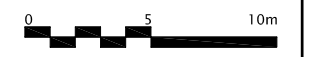
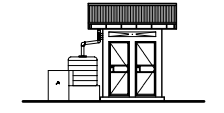
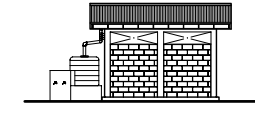
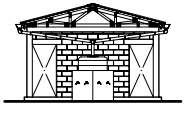
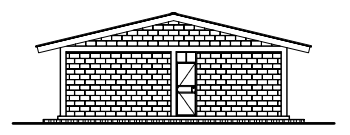
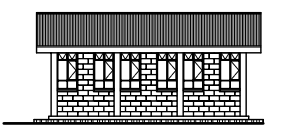
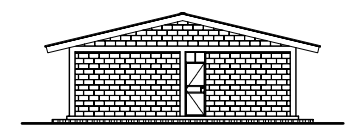
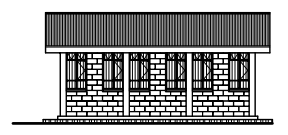
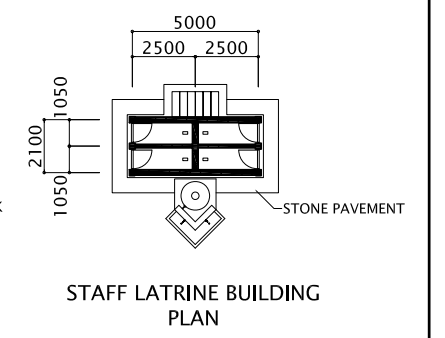
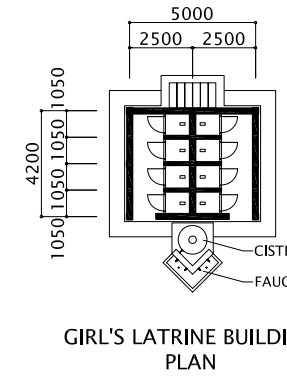
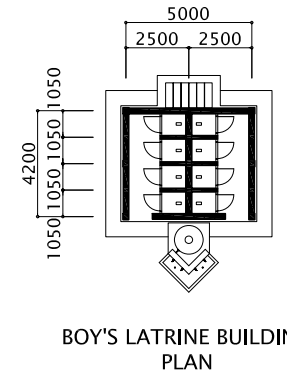
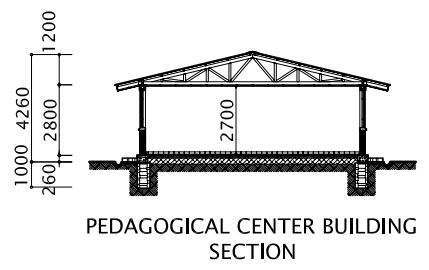
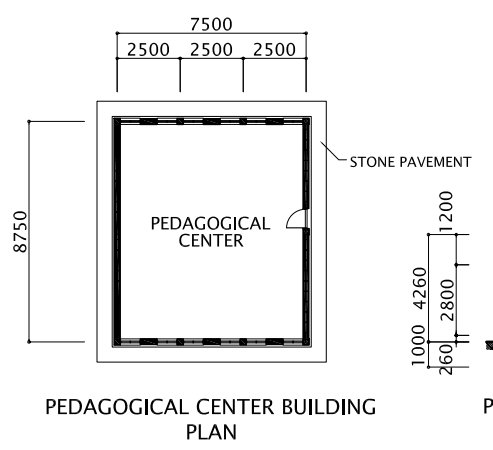
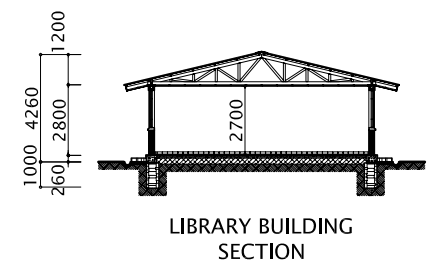
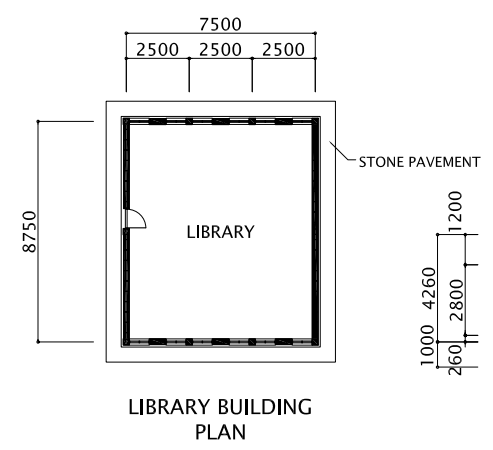
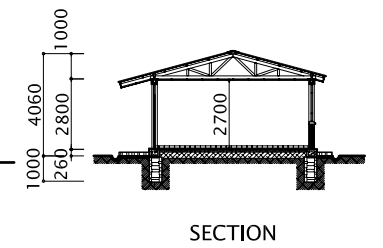
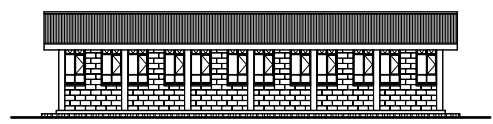
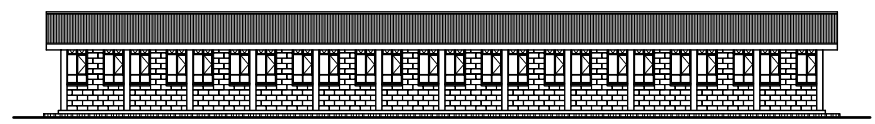
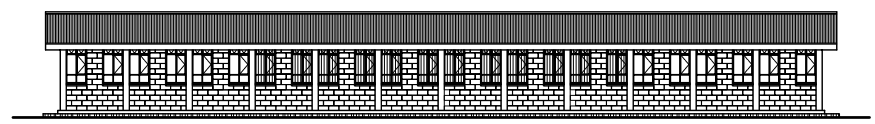
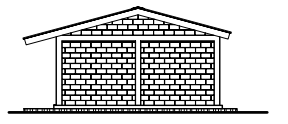
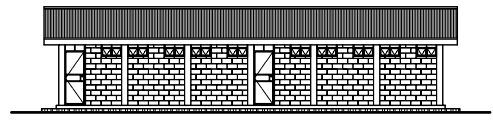
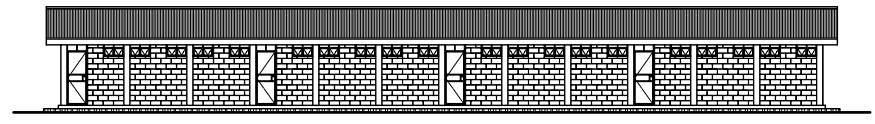
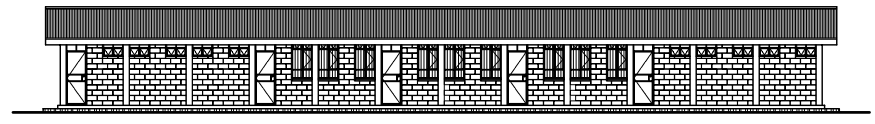
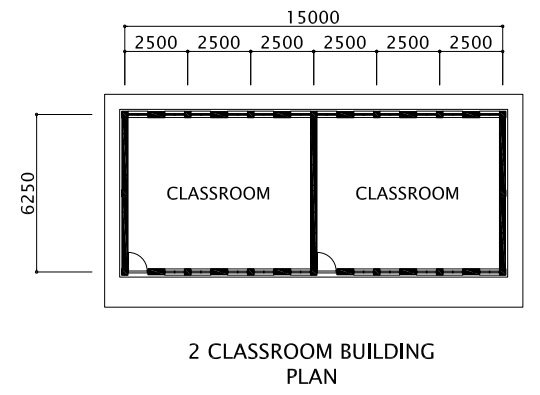
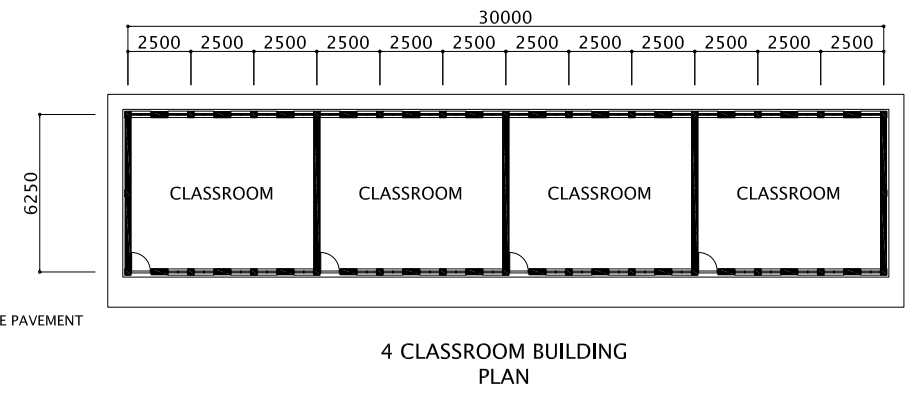
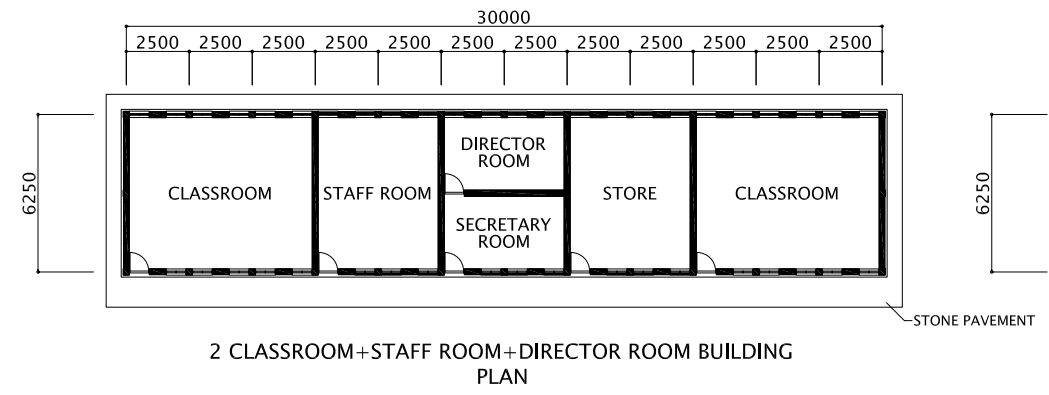


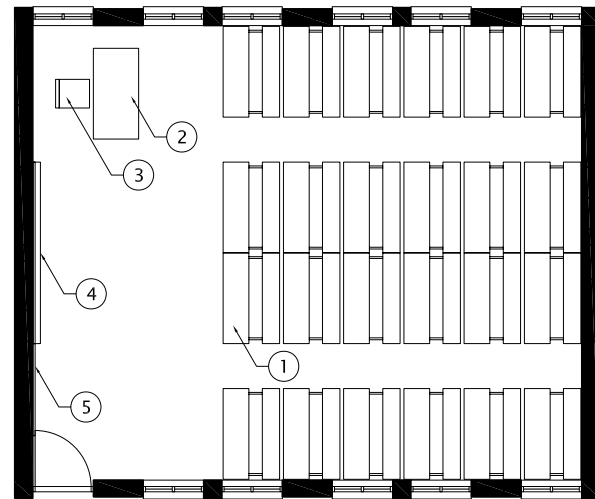
BOY'S/GIRL'S LATRINE BUILDING ELEVATION



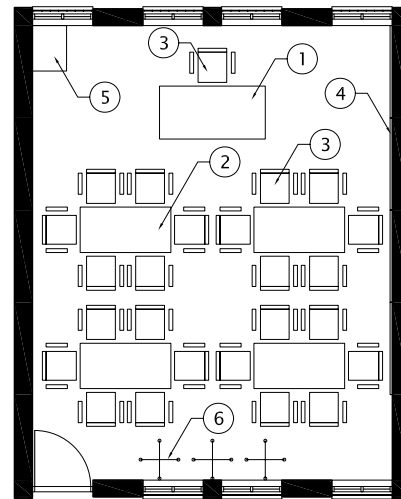


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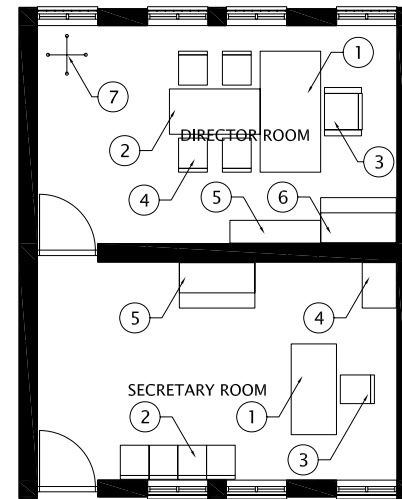




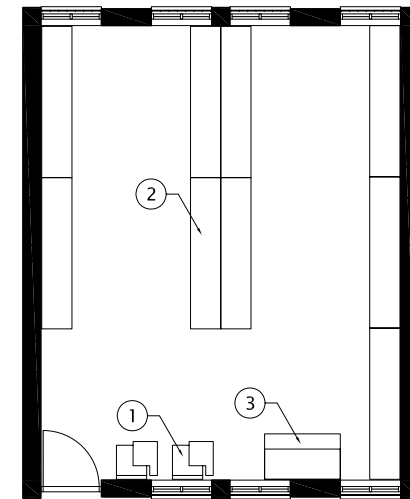
CLASSROOM



STAFF ROOM



DIRECTOR ROOM/SECRETARY ROOM



STORE

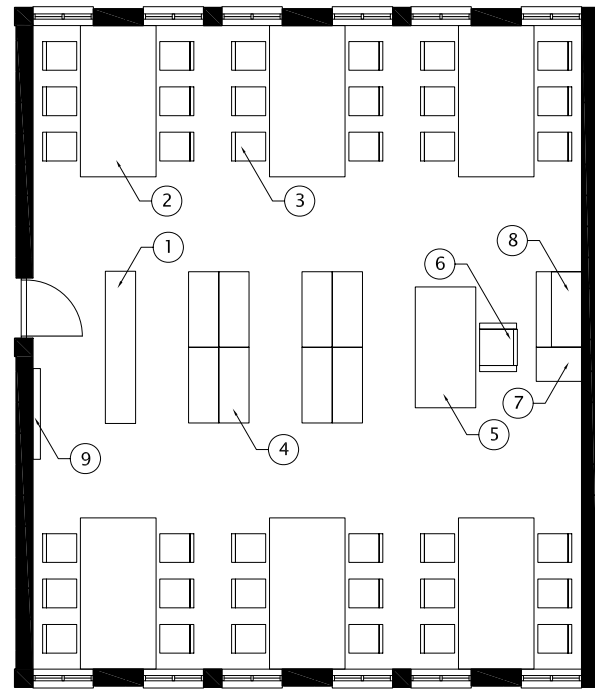
FURNITURE SCHEDULE

LOCATION	SYMBOL	CODE*	ITEM	DIMENSION (W×H×D)	QUANTITY	REMARKS
CLASSROOM	①	OSF1	COMBINED DESK	1200×700×747	24	BLOCKWOOD, STELL PIPE
	②	SF123	TEACHER'S TABLE	1200×750×600	1	CHIPWOOD, PLYWOOD, STELL PIPE
	③	SF132	TEACHER'S CHAIR	480×860×480	1	PLYWOOD, STELL PIPE
	④	OSF271	BLACK BOARD	2400×1200×100	1	HARDBOARD, PLYWOOD, WOOD FRAME
	⑤	SF143A	NOTICE BOARD	1220×620×30	1	SOFTBOARD, HARDBOARD
			DUSTER	160×50×80	1	WOOD BLOCK, RUG
			DUST BIN	φ270×H360	1	PLASTIC
STAFF ROOM	①	SF402	OFFICE TABLE	1400×750×700	1	CHIPWOOD, PLYWOOD, BLOCKWOOD, STELL PIPE
	②	SF123	TEACHER'S TABLE	1200×750×600	4	CHIPWOOD, PLYWOOD, STELL PIPE
	③	SF133	STAFF CHAIR	600×860×480	25	PLYWOOD, BLOCKWOOD STELL PIPE
	④	SF143A	NOTICE BOARD	1220×620×30	4	SOFTBOARD, HARDBOARD
	⑤	SF172	FILING CABINET	450×1440×600	1	PLYWOOD, HARDBOARD, BLOCKWOOD
	⑥		COAT HANGER		3	STELL PIPE

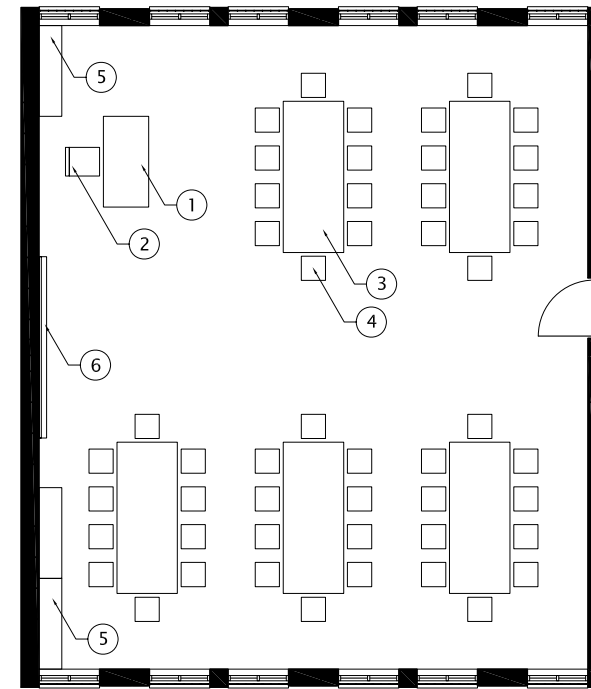
\*CODE: SCHOOL FURNITURE DESIGN CODE NUMBER OF MINISTRY OF EDUCATION.

LOCATION	SYMBOL	CODE*	ITEM	DIMENSION (W×H×D)	QUANTITY	REMARKS
DIRECTOR ROOM	①	SF401	OFFICE TABLE	1600×750×800	1	CHIPWOOD, PLYWOOD, BLOCKWOOD, STELL PIPE
	②	SF123	TEACHER'S TABLE	1200×750×600	1	CHIPWOOD, PLYWOOD, STELL PIPE
	③	SF136	ARMREST CHAIR	525×600×475	1	WOOD, CUSHION, STELL PIPE
	④	SF132	TEACHER'S CHAIR	480×860×480	4	PLYWOOD, STELL PIPE
	⑤	SF182A	SHELF	1200×800×300	1	PLYWOOD, HARDBOARD
	⑥	SF192	CUPBOARD	1000×2004×600	1	CHIPWOOD, PLYWOOD, GLASS HARDBOARD, BLOCKWOOD
	⑦		COAT HANGER		1	STELL PIPE
SECRETARY ROOM	①	SF411	TYPIST TABLE	1200×650×600	1	CHIPWOOD, PLYWOOD, BLOCKWOOD, STELL PIPE
	②	SF132	TEACHER'S CHAIR	480×860×480	4	PLYWOOD, STELL PIPE
	③	SF137	PADDED CHAIR	480×840×490	1	PLYWOOD, CUSHION, STELL PIPE
	④	SF172	FILING CABINET	450×1440×600	1	PLYWOOD, HARDBOARD, BLOCKWOOD
	⑤	SF192	CUPBOARD	1000×2004×600	1	CHIPWOOD, PLYWOOD, GLASS HARDBOARD, BLOCKWOOD
STORE	①	SF135	TABLET CHAIR	540×850×480	2	PLYWOOD, STELL PIPE
	②	SF264	STORE SHELF	2000×2000×400	9	BLOCKWOOD, CHIPWOOD, PLYWOOD, STELL PIPE
	③	SF192	CUPBOARD	1000×2004×600	1	CHIPWOOD, PLYWOOD, GLASS HARDBOARD, BLOCKWOOD

\*CODE: SCHOOL FURNITURE DESIGN CODE NUMBER OF MINISTRY OF EDUCATION.



LIBRARY



PEDAGOGICAL CENTER

FURNITURE SCHEDULE

LOCATION	SYMBOL	CODE*	ITEM	DIMENSION (W×H×D)	QUANTITY	REMARKS
LIBRARY	①	SF372	PERIODICAL STAND	2015×2030×400	1	CHIPWOOD, PLYWOOD, STELL PIPE
	②	SF302	LIBRARY TABLE	2000×750×1000	6	CHIPWOOD, PLYWOOD, STELL PIPE
	③	SF132	TEACHER'S CHAIR	480×860×480	36	PLYWOOD, STELL PIPE
	④	SF262	LIBRARY SHELF	1000×2022×400	8	CHIPWOOD, PLYWOOD, STELL PIPE
	⑤	SF401	OFFICE TABLE	1600×750×800	1	CHIPWOOD, PLYWOOD, BLOCKWOOD, STELL PIPE
	⑥	SF136	ARMREST CHAIR	525×600×475	1	WOOD, CUSHION, STELL PIPE
	⑦	SF172	FILING CABINET	450×1440×600	1	PLYWOOD, HARDBOARD, BLOCKWOOD
	⑧	SF192	CUPBOARD	1000×2004×600	1	CHIPWOOD, PLYWOOD, GLASS HARDBORD, BLOCKWOOD
	⑨	OSF5	SPECIAL NOTICE BOARD	1200×700×100	1	SOLID WOOD, PLYWOOD, DRY FORM, GLASS,

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LOCATION	SYMBOL	CODE*	ITEM	DIMENSION (W×H×D)	QUANTITY	REMARKS
PEDAGOGICAL CENTER	①	SF123	TEACHER'S TABLE	1200×750×600	1	CHIPWOOD, PLYWOOD, STELL PIPE
	②	SF132	TEACHER'S CHAIR	480×860×480	1	PLYWOOD, STELL PIPE
	③	SF232	WORK BENCH	2000×800×800	5	BLOCKWOOD, HARDBOARD, STELL PIPE
	④	SF252	STOOL	320×530×320	50	PLYWOOD, STELL PIPE
	⑤	SF182A	SHELF	1200×800×300	3	PLYWOOD, HARDBORD
	⑥	OSF271	BLACK BOARD	2400×1200×100	1	HARDBOARD, PLYWOOD, WOOD FRAME
			DUST BIN	φ270×H360	4	PLASTIC

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