

**BASIC DESIGN STUDY REPORT
ON
THE PROJECT FOR CONSTRUCTION
OF
PRIMARY AND SECONDARY SCHOOLS
IN LIMPOPO PROVINCE
IN
THE REPUBLIC OF SOUTH AFRICA**

FEBRUARY, 2003

**JAPAN INTERNATIONAL COOPERATION AGENCY
MATSUDA CONSULTANTS INTERNATIONAL CO., LTD.**

GR1
CR (1)
03-035

PREFACE

In response to a request by the Government of South Africa, the Government of Japan decided to conduct the Basic Design Study for the Project for Construction of Primary and Secondary Schools in Limpopo Province in the Republic of South Africa and entrusted the Study to the Japan International Cooperation Agency (JICA).

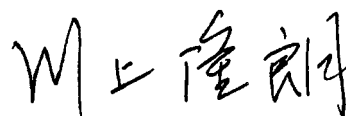
The JICA sent a study team to South Africa from 7th July to 10th August, 2002.

The study team held discussions with the officials concerned of the Government of South Africa and conducted a field survey in the study area. Following the study team's return to Japan, further studies were conducted. A mission was then sent to South Africa to discuss the Draft Summary for the Basic Design Study. This was followed by more detailed design and estimation work in Japan and the Draft Summary for the Findings of the Basic Design Study was subsequently prepared and was explained to the South African side from 2nd to 8th February, 2003, leading to the compilation of the present Final Report.

I hope that this Report will contribute to the promotion of the Project and to the enhancement of friendly relations between our two countries.

I would like to express my sincere appreciation to the officials concerned of the Government of South Africa for their close cooperation extended to the study team.

February, 2003

Handwritten signature in black ink, reading '川上隆明' (Takao Kawakami).

Takao Kawakami

President

Japan International Cooperation Agency

February, 2003

LETTER OF TRANSMITTAL

We are pleased to submit to you the basic design study report on the Project for Construction of Primary and Secondary Schools in Limpopo Province in the Republic of South Africa.

This study was conducted by Matsuda Consultants International Co., Ltd., under a contract to JICA, during the period from June, 2002 to February, 2003. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of the South Africa and formulated the most appropriate basic design for the project.

Finally, we hope that this report will contribute to further promotion of the project.

Very truly yours,

A handwritten signature in black ink, appearing to be 'Taizo Shishido', written in a cursive style.

Taizo Shishido
Project manager,
Basic design study team on
the Project for Construction of Primary and
Secondary Schools in Limpopo Province
Matsuda Consultants International Co., Ltd.

□ Location Map - 1 South Africa

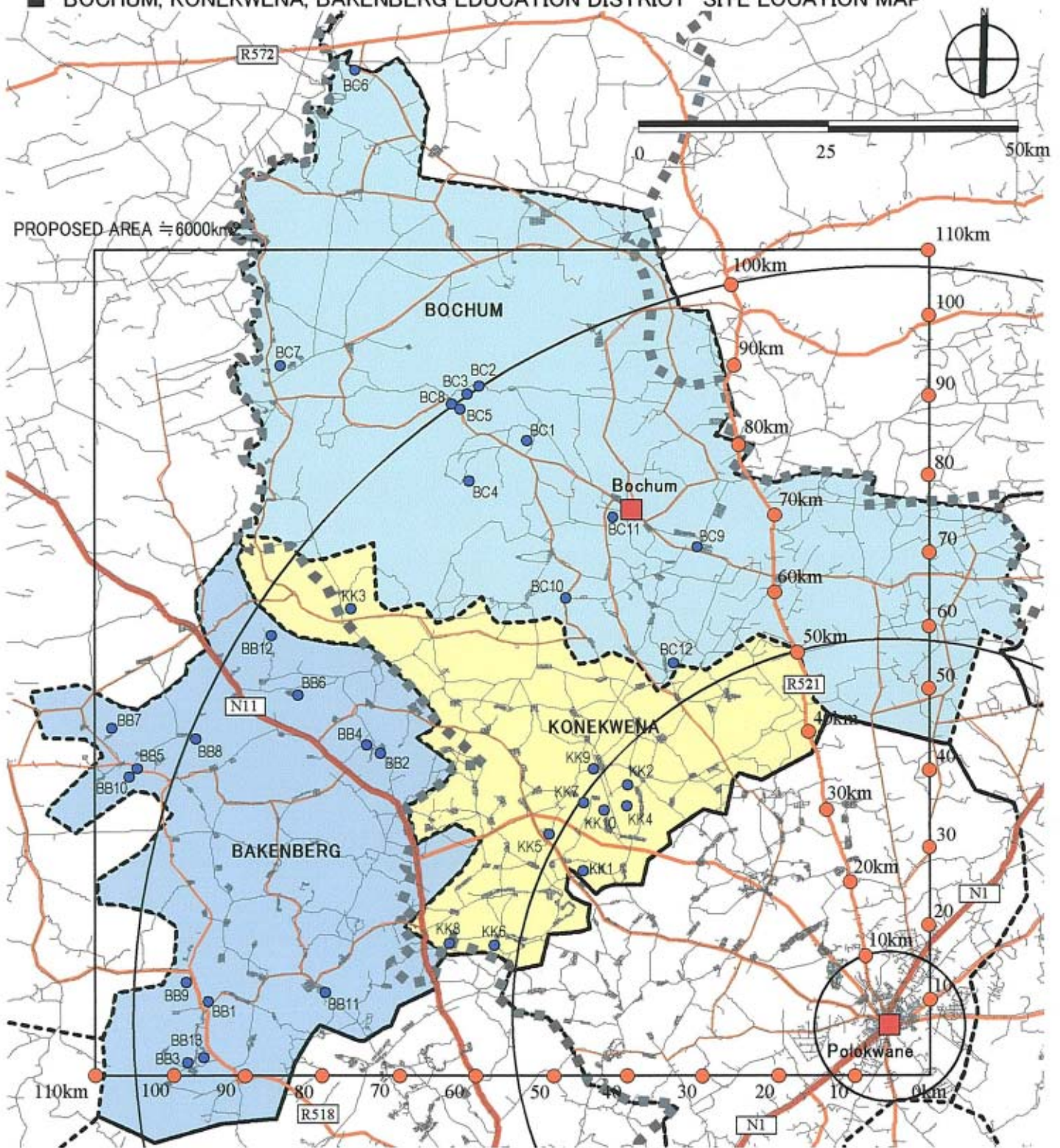


SOUTH AFRICA



□ Location Map - 2 Limpopo Province

■ BOCHUM, KONEKWENA, BAKENBERG EDUCATION DISTRICT SITE LOCATION MAP



LIST OF PROPOSED SCHOOLS

BOCHUM DIST.

- BC 1 DINOKO PS
- BC 2 KGOPUDI SS
- BC 3 MAKGOTLHO PS
- BC 4 MAPOTLA PS
- BC 5 MATJEKETLANE PS
- BC 6 NGOAKWANA SS
- BC 7 RAPETSOA SS
- BC 9 RAPOHO PS
- BC10 KODUMELA PS
- BC11 BOTHANANG PS
- BC12 SEKURURWE CS

KONEKWEWENA DIST.

- KK 1 KWENA A PEU SS
- KK 2 RAMERLOANA LPS
- KK 4 MAHLABELA SS
- KK 5 IKAGELENG PS
- KK 6 PULA SEOPA PS
- KK 7 SEFATALADI PS
- KK 8 TLOU SS
- KK 9 RAPITSI PS
- KK10 KGABO PS

BAKENBERG DIST.

- BB 1 BASTERPAD PS
- BB 2 KGAKGATHU SS
- BB 4 KGOTSORO PS
- BB 5 MATLOU
- MEMORIAL PS
- BB 6 MOROBA PS
- BB 7 MUSHI PS
- BB 8 NKIDIKITLANA PS
- BB 9 NKONTLHA PS
- BB10 NTEBELELENG PS
- BB11 THUTLANE LPS
- BB12 TLHAKO PS
- BB13 SESHOATLHA SS

- N1 — NATIONAL ROAD
- R521 — MAIN ROAD
- ROAD
- ADM. BOUNDARY
- - - EDUCATION DIST. BOUNDARY
- PROPOSED SCHOOL
- LPS LOWER PRIMARY SCHOOL
- PS PRIMARY SCHOOL
- SS SECONDARY SCHOOL
- CS COMBINED SCHOOL

Perspective View



LIST OF FIGURES & TABLES

Fig. 2-1	Calculation Flow for Existing Usable Classrooms for Target Grades	30
Fig. 2-2	Calculation Flow for Design Number of Classrooms (Primary Schools).....	32
Fig. 2-3	Calculation Flow for Design Number of Classrooms (Secondary Schools).....	33
Fig. 2-4	Calculation Flow for Design Number of Classrooms (Combined Schools).....	33
Fig. 2-5	Outline of Enviro-Loo System.....	49
Fig. 2-6	Project Implementation Framework	103
Fig. 2-7	Work Management Regime	104
Table 2-1	Finalised List of Requested Sites.....	8
Table 2-2	Site Evaluation and Prioritisation	14
Table 2-3	Evaluation Criteria for Usability of Existing Facilities	15
Table 2-4	Situation of Nearby Schools to Bothanang Primary School and Estimated Number of Pupils Moving to the New School.....	18
Table 2-5	List of Existing Facilities and Situation of School Operation (1/2).....	19
Table 2-6	Breakdown of Use of Existing Usable Classrooms	31
Table 2-7	Calculation Results for Required Number of Classrooms	36
Table 2-8	Comparison of Design Components Between the Project and Others.....	43
Table 2-9	Standard-Type Facilities	44
Table 2-10	Planned Facilities and Floor Area by Site.....	45
Table 2-11	List of Furniture	50
Table 2-12	Comparison of Specifications	51
Table 2-13	Project Implementation Schedule	111
Table 2-14	Contents of Work to be Undertaken by South African Side	113
Table 2-15	Norms & Standards Allocation (Section 20).....	116
Table 2-16	Calculation of Required Number of Teachers.....	119
Table 2-17	Teacher Indicators in Limpopo Province.....	120
Table 2-18	Estimation of Operation Cost for Target Schools	122
Table 2-19	Estimation of Maintenance Cost.....	123
Table 2-20	Ratio of Required Annual Reserve for Facility Maintenance at Target Schools.....	124

ABBREVIATIONS

ABET	Adult Basic Education and Training
CEM	Council of Education Ministers
DOE	National Department of Education
ECD	Early Childhood Development
EMIS	Education Management Information System
FET	Further Education and Training
FETC	Further Education and Training Certificate
GEAR	Growth, Employment and Redistribution :A Macro-Economic Strategy
GET	General Education and Training
GETC	General Education and Training Certificate
GR	Reception Year
HE	Higher Education
HEDCOM	Heads of Education Departments Committee
HOD	Head of Department
ICT	Information / Communication Technology
INSET	In-service Teacher Training
NQF	National Qualification Framework
LDE	Limpopo Department of Education
MEC	Member of Executive Council on Education
MLA	Monitoring Learning Achievement Project
MSSI	Mpumalanga Secondary Science Initiative
MTEF	Medium-Term Expenditure Framework
NPDE	National Professional Diploma in Education
OBE	Outcomes-based education
PRP	Physical Resource Planner
QS	Quantity Surveyer
RDP	Reconstruction and Development Programme
SABS	South African Bureau of Standards
SADC	Southern African Development Community
SGB	School Governing Body
SRN	National School Register of Needs Survey

SUMMARY

Since its establishment in 1994, the Government of National Unity in South Africa has been earnestly implementing wide-ranging reforms based on the Reconstruction and Development Programme (RDP) with the aid of redressing the disparities between races and regions and of achieving national reconciliation. In the educational sector, a number of reforms are being implemented to provide equal services without racial as well as regional disparities and to improve the quality of education to meet the social needs in the 21st Century. However, the negative legacy of apartheid is still felt in the form of many imbalances in South African society and the correction of such imbalances poses a major challenge for the Government of National Unity.

Limpopo Province, which is the subject area of the requested Japanese assistance, includes three former homelands occupying 30% of the total provincial area and is considered to be one of the poorest provinces in South Africa. The ratio of adults with no education of 36.9% (1996) is the lowest among South Africa's nine provinces, indicating the lagging development in the educational sector in the province. Even though the net enrolment ratio of primary education is 83.2% (1997), the conditions of educational facilities are very poor. As of 2000, there was a shortage of 9,071 classrooms and the classroom shortage rate of 2.12 classrooms/school was the second highest in the country. Many of the existing facilities were constructed by local people and their shortcomings and deterioration are highly noticeable. Moreover, the deterioration or destruction of school facilities by cyclones appears to be accelerating the classroom shortage.

Upholding the elimination of the shortage of basic educational facilities as a priority task, the provincial government calls for the reform of schools to create high quality educational facilities which can play a central function for local communities and has commenced the necessary actions to construct some 1,000 classrooms a year as a target of its Medium-Term Strategic Plan 2002 – 2005. However, given the limited size of the available budget for facilities improvement, the provincial government is finding it difficult to deal with the degradation of facilities on its own.

Under these circumstances, the Government of South Africa requested the Government of Japan's provision of grant aid for a project to construct primary and secondary schools in three educational districts (Bochum, Konekwena, Bekenberg) situated in former homelands where the development of school facilities has been the slowest in the central and western region of Limpopo Province (the Project).

In response, the Government of Japan decided to conduct the Basic Design Study and the Japan International Cooperation Agency sent the Basic Design Study Team to Limpopo Province from 7th July to 10th August, 2002. This Study Team consulted with the project-related South African

organizations, including the Department of Education of the national government and the Limpopo Department of Education, and also conducted a site survey after confirming the finalized contents of the request. Based on the field survey findings, the Study Team examined the relevance of the Project, the project implementation system, the operation and maintenance system of the recipient country and the cooperation effects, etc., determined the appropriate contents and scale of the facilities, prepared the Summary for the Basic Design and explained this Summary to the South African side in South Africa from 24th November to 11th December, 2002. Subsequently, the Study Team conducted detailed level of design and estimation work and explained the Draft Summary of the Basic Design Study Findings to the South African side in South Africa from 2nd to 8th February, 2003.

The Basic Design Study has evaluated geographic features, administrative performance of existing facilities, situation of classroom overcrowding, conditions of existing facilities, and the scale of the classroom shortage etc. in a comprehensive manner to establish a detailed picture of the facilities and their operation at the originally requested 35 sites in three educational districts. The evaluation results suggest that the effects of the cooperation will be low at three sites where the scale of the classroom shortage is less than two classrooms. Both sides have agreed that these sites will be removed from the scope of the cooperation, leaving 32 sites for calculation of the required scale of facilities based on the current school enrolment needs.

In connection with the target grades for cooperation, the highest priority is given to the improvement of facilities for G1 through G9 which comprise compulsory education. Both sides have further agreed that GR, i.e. preparatory education for primary school, and G10 through G12 which constitute the second part of secondary education will be removed from the scope of the Project. It has been decided that the existing classrooms at the target schools which are judged to be usable will be allocated in a preferential manner as facilities to serve the existing GR and G10 – G12 at the target schools. Both sides have agreed that the Government of South Africa will undertake the work to repair and/or improve the existing facilities to serve GR and G10 through G12 at the target schools if needed.

For setting up the design number of pupils for each target grades which will be concerned with the design number of classrooms, the current number of pupils will be applied due to the best reflection of the current enrolment need in the relevant catchment area. In the case of incomplete schools, the additional number of pupils is calculated on the basis that the average number of pupils per grade at present constitutes the number of pupils per new grade to be introduced to make these schools complete schools. The number of pupils at the new school is estimated on the basis of the planned number of pupils to be transferred from nearby schools and the estimated number of pupils attending the new school from outside its catchment area. (10% of transferred pupils from nearby schools).

For the calculation of the design number of classrooms for the set up design number of pupils, the adequate number of classrooms is firstly calculated based on the full-time day school system and the national standards of South Africa for the class size, i.e. 40 pupils/classroom for primary schools and 35 pupils/classroom for secondary schools. Adjustment is then made so that each grade has at least one classroom. When some of the existing classrooms at the existing schools are found to be usable by a target grade(s), the design number of classrooms is accordingly reduced to establish the final design number of classrooms. Based on the above calculations, 236 classrooms (204 classrooms and 32 administration rooms) for the 32 schools is judged to be the appropriate number of design classrooms for the Project.

In regard to the types of facilities, priority is given to establishing the minimum necessary functions as school facilities and the construction of classrooms, administration rooms, toilet facilities and water tanks and the procurement of the necessary school furniture have been decided. In regard to special classrooms for secondary schools which were included in the original request, both sides have agreed that these will be removed from the scope of the Project because of their infrequent use and the priority of constructing ordinary classrooms. However, when existing schools have special classrooms, library and/or storage room, these facilities will be kept as a matter of priority given their functions as part of school operation provided that there are usable facilities for these purposes. Educational equipment has been omitted from the scope of the Project in view of the fact that the new curriculum is in the process of development.

The specifications and grades of the facilities are determined to ensure the low cost and durability of the facilities based on the Physical Resources Planning Manual and the Provincial Standard Design with additional improvements being made in view of the natural conditions and social environment of the project sites. Because of the sufficient availability of land, all of the facilities are designed to have a single storey and the common construction method in Limpopo Province will be employed to facilitate their maintenance by local people and to keep the financial burden of the maintenance cost on local people as low as possible.

In regard to building services, given the current situation where school facilities are extensively (or often) used as public facilities for regional community, it has been decided to install lighting fixtures (in the administration room and one classroom) as well as receptacles. In regard to water supply, an elevated water tank and outdoor water taps will be introduced at all of the sites because of the unstable water pressure except at one site where municipal water supply is available. For drainage from toilets, it has been decided to use improved latrine (Enviro loo) capable of drying foul water except at one site where the sewage system is available.

For the basic design of equipment, it has been decided to provide basic furniture which is required for school operation. The desks and chairs for classrooms will be easily movable because of the need to respond to diverse teaching styles under the new curriculum. In addition, chalkboards, pin boards (notice boards), teacher's desks and chairs and cabinets are also planned. The cabinets for the administration room are designed to allow their use as partitions for principal's office. The types and scale of the planned facilities under the Project are shown in the following table.

No.	School Code	Name P: Primary LP: Pre-Primary S: Secondary C: Complete	Grades	Planned Facilities			
				Classrooms	Administration Room	Toilet Cubicles (Pupils/Teachers)	Total Floor Area (m ²)
1	BC1	Dinoko P	G1-G7	3	1	5/1	302.20
2	BC2	Kgopudi S	G8-G9	5	1	9/1	459.84
3	BC3	Makgotlho P	G1-G7	7	1	10/2	604.40
4	BC4	Mapotla P	G1-G7	3	1	6/1	308.73
5	BC5	Matijeketlane P	G1-G7	5	1	9/1	459.84
6	BC6	Ngoakwana S	G8-G9	4	1	6/1	377.75
7	BC7	Rapetsoa S	G8-G9	2	1	5/1	233.19
8	BC9	Rapoho P	G1-G7	10	1	15/2	837.58
9	BC10	Kodumela P	G1-G7	3	1	5/1	302.20
10	BC11	Bothanang P	G1-G7	14	1	18/2	1,126.72
11	BC12	Sekururwe C	G1-G9	10	1	12/2	824.51
12	KK1	Kwena A Peu S	G7-G8	3	1	5/1	302.20
13	KK2	Rametloana LP	G1-G4	7	1	9/1	597.86
14	KK4	Mahlabela S	G8-G9	2	1	5/1	233.19
15	KK5	Ikageleng P	G1-G7	7	1	10/2	604.40
16	KK6	Pula Seopa P	G1-G7	12	1	18/2	988.68
17	KK7	Sefataladi P	G1-G7	11	1	15/2	906.60
18	KK8	Thou S	G8-G9	3	1	5/1	302.20
19	KK9	Rapitsi P	G1-G7	5	1	9/1	459.84
20	KK10	Kgabo P	G1-G7	4	1	6/1	377.75
21	BB1	Basterpad P	G1-G7	4	1	6/1	377.75
22	BB2	Kgakgathu S	G8-G9	7	1	10/2	604.39
23	BB4	Kgotsoro P	G1-G7	7	1	9/1	597.87
24	BB5	Matlou M P	G1-G7	6	1	10/2	535.38
25	BB6	Moroba P	G1-G7	7	1	9/1	597.86
26	BB7	Mushi P	G1-G7	9	1	12/2	755.50
27	BB8	Nkidikitlana P	G1-G7	9	1	12/2	755.50
28	BB9	Nkontlha P	G1-G7	5	1	9/1	459.84
29	BB10	Ntebeleleng P	G1-G7	4	1	6/1	377.75
30	BB11	Thutlane LP	G1-G4	12	1	18/2	988.69
31	BB12	Tlhako P	G1-G7	7	1	9/1	597.86
32	BB13	Seshoatlha S	G8-G9	7	1	10/2	604.39
Total				204	32	302/45	17,862.41

The government office in charge of the Project on the South African side is the National Department of Education (DOE) and the Limpopo Department of Education (LOE) is the implementation organization. The schools to be constructed under the Project will be placed under the jurisdiction of the LDE and a School Governing Body (SGB) of each school will be responsible for everyday operation and management. No special skills will be required for the maintenance of the planned facilities and the organizations in South Africa can fully deal with the required work. The size of the necessary maintenance cost will be easily met within the framework of the school operation budget of the LDE and the school fund. With the implementation of the Project, one principal and 60 teachers will be newly required. Given the sufficient number of teachers in the province, it is entirely feasible that these new positions at the target schools can be filled through the appropriate distribution of teachers.

Fifteen (15) months will be required for the implementation of the Project, consisting of three months for the tender and 12 months for the construction work.

The implementation of the Project is expected to have the following effects.

- Improvement of classroom shortage and overcrowding

With the implementation of the Project, the number of classrooms at the target schools will be increased by 76, i.e. 11% of the overall classroom shortage of 710 of primary and secondary schools in the three target educational districts. As a result, the classroom shortage per school will improve from 1.54 classrooms to 1.37 classrooms. With the establishment of one new school, 517 pupils, i.e. 21% of the existing pupils in the target catchment area, will move to the new school and the number of pupils per classroom at the three nearby schools will be reduced from 77.9 pupils to 53.6 pupils.

- Elimination of inappropriate classrooms, such as temporary, borrowed and dilapidated classrooms

With the implementation of the Project, 32 existing temporary or borrowed classrooms out of the 327 existing classrooms will be eliminated and 160 classrooms, i.e. 55% of the remaining 295 classrooms, will be rebuilt. As a result, the conditions of the educational facilities will be improved for 11,673 pupils, i.e. 7.4% of the total number of pupils enrolled in the three target educational districts.

- Improvement of conditions for school operation with the introduction of an administration room

Many of the target schools currently use an ordinary classroom as an administration room. However, most of these rooms lack sufficient furniture and fixtures. With the implementation of

the Project, all of the 32 target schools will be equipped with an administration room and the necessary furniture and fixtures, achieving the basis for school management.

- Improvement of sanitation conditions with the construction of toilet facilities

Many of the schools in the three educational districts have only simple dug toilets of a temporary nature with a small number of cubicles. Under the Project, 45 toilet buildings with 347 cubicles will be constructed at the target schools and the booth to classroom ratio will increase from 0.47 cubicles to 1.31 cubicles, greatly improving the sanitation conditions. The installation of a water tank and taps will provide the basis for improved habits to maintain a sanitary environment.

- Improved access to education

With the establishment of one new school and the upgrading of two schools to complete schools, access to education will be improved for an estimated 4,695 school-age children of local communities who have been forced to travel a long distance.

- Increase of school enrolment opportunities

With the improved access to education and improved school facilities, the educational cost for parents will be reduced to increase the school enrolment opportunities for children of poor families.

- Increased opportunities for communal activities

Schools in South Africa have been considered as providing key facilities for local communities. The implementation of the Project will establish school facilities which can be used in the evening because of the existence of a lighting unit and power receptacles in three educational districts which has so far lacked permanent facilities for communal use. Consequently, it is expected that communal activities will be further intensified.

- Transfer of technologies at construction sites

As the construction work under the Project is planned to take place simultaneously at many sites situated in a wide area, many local construction companies will be used as subcontractors. Construction technologies will be transferred to these subcontractors under the guidance of Japanese engineers, further improving the construction technologies and skills in the local construction sector.

Given the expected effects described above together with the contribution to improving the educational environment for poor residents of former homelands through improvement of the facilities

for primary and secondary education in Limpopo Province, the implementation of the Project with grant aid provided by the Government of Japan is judged to be fully appropriate.

The South African side is capable of continually conducting the post-project operation and maintenance of the new school facilities in terms of staff assignment, technical ability and budgetary appropriation. However, the following requirements must be met for the smooth and effective implementation of the Project.

- Site preparation, access road improvement, removal of existing buildings and extension of the water and electricity supplies should be conducted without delay at each site by the South African side to fulfil its obligations. In addition, the perimeter fencing and gate should be properly in place.
- The South African side should repair and improve the existing facilities at its own expense without fail in view of the fact that these facilities have been judged usable and will be used to house the existing GR, G10 through G12, which are omitted from the scope of the Project, as well as the target grades.
- The necessary assignment (relocation) of teachers should be arranged without delay.
- The School Governing Body (SGB), the establishment of which is a compulsory requirement for every school under the law, should be managed in an appropriate manner and the budgetary appropriation required for regular maintenance should be conducted without delay by the provincial government.
- In view of the fact that the provincial government is implementing a programme to enhance the abilities of the principals, teachers and SGB to run schools and classrooms properly with the assistance of another donor, the participation and collaboration of the target schools of the Project with this programme is highly desirable to enhance the expected effects of the Project.

In order to make the Project much more effective, it is important for the provincial government to continue its efforts to improve school facilities to eliminate the classroom shortage in the province and to make a steady commitment to “the provision of equal and high quality education for all”.

CONTENTS

Preface	
Letter of Transmittal	
List of Figures & Tables	
Abbreviations	
Summary	
Chapter 1 Background of the Project	1
Chapter 2 Contents of the project.....	5
2.1 Basic Concept of the Project.....	5
2.2 Basic Design of the Requested Japanese Assistance	6
2.2.1 Design Policy	6
2.2.2 Basic Plan	41
2.2.3 Basic Design Drawings.....	53
2.2.4 Implementation Plan and Procurement Plan.....	97
2.2.4.1 Implementation Policy.....	97
2.2.4.2 Implementation Conditions.....	99
2.2.4.3 Scope of Work	101
2.2.4.4 Consultant Supervision	102
2.2.4.5 Quality Control Plan	104
2.2.4.6 Procurement Plan.....	107
2.2.4.7 Implementation Schedule	110
2.3 Obligations of the Recipient Country	111
2.4 Project Operation plan	114
2.5 Other Relevant Issues	125
Chapter 3 Project Evaluation and Recommendations	127
3.1 Project Effects.....	127
3.2 Recommendations.....	131
APPENDIX	
1. Member List of the Study Team	
2. Study Schedule	
3. List of Parties Concerned in the Recipient Country	
4. Minutes of Discussions	
5. Cost Estimation Borne by the Recipient Country	
6. Photographs showing concrete examples of Evaluation Criteria for Usability of Existing Facilities	
7. References	

CHAPTER 1 BACKGROUND OF THE PROJECT

CHAPTER 1 BACKGROUND OF THE PROJECT

The Government of National Unity in South Africa which was born in April, 1994 through a democratic election in which all races participated has been earnestly implementing wide-ranging reforms based on the Reconstruction and Development Programme (RDP) with the aim of redressing the socioeconomic disparities between races and regions which had been generated under the apartheid regime. Human resources development, including education, is upheld as one of the five priority areas by the RDP and the “White Paper on Education and Training” and the “South African School Act” have been introduced to provide equal opportunities without segregation or disparity and to establish a unified system to achieve such a target. Moreover, a series of educational reforms have been in progress, including the introduction of free compulsory education for nine years and the New Curriculum, based on the achievement principles under the newly established National Qualification Certification Framework (NQF) aimed at unifying education and vocational training and offering diverse educational opportunities.

Limpopo Province, which is the subject of the requested Japanese assistance, includes three former homeland areas and is considered to be one of the poorest provinces in South Africa. The 1966 Census put both the ratio of indigenous Africans (96.7%) and the ratio of rural population (89%) as the highest in the country. Its unique situation, inheriting the legacy of apartheid even today, is illustrated by the fact that 90% of the provincial population lives in former homeland areas which account for only 30% of the total land area of the province. People in rural areas of former homelands are forced to live on poor land where even self-sustaining farming is difficult and their living conditions are quite harsh with few employment opportunities. Even though the adult literacy rate in the province is said to be 77.7%, the ratio of adults with no education of 36.9% is the highest in the country, indicating the slow progress of the education sector.

Major disparities exist in terms of the educational facilities. According to the School Register of Needs Survey in 2000 (SRN 2000), more than half of the some 4,200 primary and secondary schools in Limpopo Province were experiencing a classroom shortage (total shortage: 9,071 classrooms). The classroom shortage rate of 2.12 classrooms/school is the second highest after Mpumalanga Province, illustrating the presence of a regional gap in terms of educational facilities. In the former homeland areas where 90% of the provincial population live, many classrooms are highly dilapidated due to the inadequate building structure which reflects the practice in these areas where schools have historically been built by local communities. The SRN 2000 judges that only 22.5% of the schools are good, 40.3% are in need of repair, 28.5% are poor and 8.3% are extremely poor, suggesting that some three-quarters of all schools require facility improvement. The number of pupils per classroom which indicates the situation of over-crowding was 40.0 in 2000, showing a temporary improvement from 48.6 pupils in 1996. However, the latest Snap Survey 2002 (on publicly-run primary and secondary

schools only) reports a deterioration of the situation with the number of pupils per classroom increasing to 44.52 and the classroom shortage also increasing to 12,287. The collapse of or severe damage to classrooms due to the progressive deterioration of already old classrooms has been a major factor for the decline of the available classrooms and pupils are forced to study in small, over-crowded temporary classrooms, temporary tents or outdoors.

Under these circumstances, the provincial government upholds the fulfilment of the need for basic educational facilities as one of its priority tasks. In its Medium-Term Strategic Targets 2002 – 2005 which is based on its own growth and development strategy, the provincial government calls for the reform of schools to create high quality educational facilities which can play a central function for local communities and has commenced the necessary actions. To be more precise, the construction of some 1,000 classrooms a year is planned based on the prepared priority ranking and taking the socioeconomic conditions and demand for educational facilities in the province into consideration. Even though the educational budget of the provincial government is as high as more than 40% of the total budget, however, 90% of this budget goes to meeting the personnel cost. As a result, the size of the available budget for investment in facility development to reduce the acute classroom shortage is quite limited and the provincial government is finding it difficult to improve the classroom shortage situation on its own.

To improve the situation, the Government of South Africa formulated the Project involving the construction of 245 classrooms and the provision of equipment at 35 primary and secondary schools in three educational districts in the central and western region of Limpopo Province and requested the Government of Japan's provision of grant aid for the Project in October, 1999. In response, the Government of Japan decided to conduct the Basic Design Study for the Project and sent the Basic Design Study Team to South Africa from 7th July to 10th August, 2002. The Study Team held discussions with the National Department of Education and the Limpopo Department of Education, which is the project implementation organization, and the following contents of the Project regarding the study sites, facilities and equipment were finally agreed.

(1) Study Sites

- 23 primary schools, 1 combined school and 11 secondary schools: total of 35 sites

(Geographical breakdown)

Central Region :	Bochum Educational District	: 12 sites
	Konekwena Educational District	: 10 sites
Western Region:	Bekensberg Educational District	: 13 sites

(2) Facilities

Primary school : classrooms; administration room; toilets

Secondary school : classrooms; administration room; toilets

Equipment : electrical installation; water supply and drainage systems

(3) Equipment

Furniture : pupils' desks and chairs; teachers' desks and chairs; chalkboards; pin (notice) boards; cabinets

Out of the originally requested 35 schools, three schools were dropped because of their completed construction together with two more schools for which the construction budget had been appropriated. These schools were replaced by other schools in the same educational districts where the dropped schools were located based on their priority ranking. It was agreed that educational equipment included in the original request would be removed from the scope of the Project because of likely changes of the required equipment when the New Curriculum is fully implemented. In regard to special classrooms (for mathematics, science and home science) at secondary schools, it was agreed that the suitability of their inclusion in the scope of the Project would be examined based on the findings of the site survey and analysis in Japan.

CHAPTER 2 CONTENTS OF THE PROJECT

CHAPTER 2 CONTENTS OF THE PROJECT

2.1 Basic Concept of the Project

Limpopo Province, which is the subject of the requested Japanese assistance, includes three former homeland areas and is considered to be one of the poorest provinces in South Africa. The 1966 census put both the ratio of indigenous Africans (96.7%) and the ratio of rural population (89.0%) to be the highest in the country. People in rural former homeland areas are forced to live on poor land where even self-sustaining farming is difficult and their living conditions are quite harsh with few employment opportunities. In regard to the situation of education, both the adult literacy rate at 77.7% and the ratio of adults with no education at 36.9% are very low, indicating the lagging development in the education sector.

Major disparities exist in terms of the educational facilities. According to the School Register of Needs Survey in 2000 (SRN 2000), there is a total shortage of 9,071 classrooms at the primary and secondary schools in the province. The classroom shortage rate of 2.12 classrooms/school is the second highest after Mpumalanga Province. More than 80% of the school facilities were constructed by local people and the SRN 2000 judges that some three-quarters of all schools require facility improvement. The latest Snap Survey 2002 (tallied up only public primary and secondary schools) reports a deterioration of the situation with a shortage of 12,493 classrooms and the classroom shortage rate increasing to 3.01 classrooms/school. The collapse of or severe damage to classrooms due to the cyclone which hit the area in 2000 and the progressive deterioration of already old classrooms has been a major factor for the decline of the available classrooms. In its Medium-Term Strategic Targets 2002 – 2005, the provincial government calls for the reform of schools to create high quality educational facilities which can play a central function for local communities and has commenced the necessary actions to construct some 1,000 classrooms a year as a target. However, given the limited size of the available budget for investment in facility development to reduce the acute classroom shortage, the provincial government is finding it difficult to improve the classroom shortage situation on its own.

It is against this background that the Project has been formulated to rebuild severely deteriorated classrooms and also to construct new classrooms to alleviate the classroom shortage in primary and secondary schools for compulsory education (G1 – G9) in three education districts (Bochum, Konekwena and Bakengerg) with a high level of demand for such facilities in former homelands in the central and western region of Limpopo Province. The requested Japanese assistance consists of the construction of classrooms, toilet facilities and administration rooms and the provision of school furniture and fixtures, all of which are the minimum requirements for school operation. With the implementation of the Project, it is hoped that the classroom shortage in the target districts will be alleviated to materialise a proper environment for education, in turn contributing to the improvement of regional as well as racial disparities in the educational sector.

2.2 Basic Design of the Requested Japanese Assistance

2.2.1 Design Policy

(1) Examination Regarding the Selection of Target Schools

1) Target Educational Districts and Target Sites

As a result of consultations on the target educational districts and target sites of the Study, it was agreed by both sides that three educational districts and 35 sites would be studied. While the three districts were those originally requested, five school sites listed in the original request were replaced by other sites with a higher priority for the construction of school facilities because of the facts that school facilities are already being constructed (three sites) and that the budget for construction is already in place (two sites). The target sites were selected from a priority list prepared based on the request from each educational district and the school conditions at each site. As all of the sites are located in former homeland areas where the development of school facilities has lagged behind other areas, their selection is in line with the objectives of the Project. In regard to the consultations, the following target school selection criteria were presented and their appropriateness was confirmed by representatives of each education office.

<Selection Criteria for Target Schools>

- Sites which satisfy the following conditions through a site survey and analysis in Japan will be targeted.
 - ① There shall be sufficient population of the target ages in the target area (community).
 - ② Sufficient provision of teachers, staff and funds to the school shall be secured by the authority to run and maintain the school properly.
 - ③ A proper access road must be available to allow transportation of construction materials and equipment to the site.
 - ④ The legal land rights for using the site for the Project are clearly established by the authority.
 - ⑤ The site is of sufficient size for the envisaged facilities.
 - ⑥ Topography and shape of the site shall be appropriate for the construction.
 - ⑦ The sites where school construction or similar projects are planned either by the National/Provincial government, NGOs, or other donors will be eliminated from consideration.

- Sites which satisfy the above conditions are then ranked in terms of priority based on the following criteria.
 - ① Priority will be given to the sites, which urgently require reconstruction due to the deterioration and/or damage of the existing buildings.
 - ② Priority will be given to the sites, which urgently require expansion/increasing of the number of classrooms due to overcrowding of existing classrooms.
 - ③ In case of new schools, priority will be given to the site where no schools is established in the community, or the overcrowding of schools in the community warrants that, an extension of existing schools is inappropriate due to size of existing schools, distance to them, land availability, etc.
 - ④ Principally, 'overcrowding' shall be evaluated by the (average) number of students per classroom, taking into account the number of unusable/temporary classrooms and the future increase of students projected.

- The contents of the facilities to be constructed under the Project are determined based on the following principles.
 - ① In principle, accommodation of the subject schools for the cooperation shall be aligned with the NQF (National Qualification Framework) phases.
 - ② Priority will be given to the cooperation to the GET (General Education and Training) phase, that is, Primary and Secondary phases (G1-G9)
 - ③ Contents of facilities to be constructed in the scope of Japanese cooperation are, in principle, classrooms, administration rooms (principal's room, educators' room, store room) and sanitary buildings. South African side shall undertake incidental works not included in Japanese cooperation, such as gate and fencing.
 - ④ In case of secondary schools, special rooms (laboratories) might be included in the scope of the cooperation according the result of the field survey and the post-study analysis in Japan.

Table 2-1 shows the list of finally agreed sites based on the selection criteria and the present scope of teaching (grades) at each site.

Table 2-1 Finalised List of Requested Sites

Name of School	Grades	Remarks
Bochum (12 schools)		
1. Dinoko Primary	G1 – G5	Incomplete school
2. Kgopudi Secondary	G8 – G12	
3. Makgotlho Primary	GR – G7	
4. Mapotla Primary	GR – G7	
5. Majeketlane Primary	GR – G7	
6. Ngoakwana Secondary	G8 – G12	
7. Rapetsoa Secondary	G8 – G12	
8. Rasekgala Secondary	G8 – G12	
9. Rapoho Primary	GR – G7	Change from Sekekeka Primary
10. Kodumela Primary	G1 – G7	
11. Bothanang Primary	GR – G7	New school
12. Sekururwe Combined	GR – G10	
Konekwena District (10 schools)		
13. Kwena A Peu Secondary	G8 – G12	Change from Kubushe Primary
14. Rametloana Lower Primary	GR – G4	Change from Botsholla Secondary
15. Alapha Secondary	G8 – G12	
16. Mahlabela Secondary	G8 – G12	
17. Ikageleng Primary	GR – G7	Change from Mashiane Secondary
18. Pula Seopa Primary	GR – G7	
19. Sefataladi Primary	GR – G7	
20. Tlou Secondary	G8 – G12	
21. Rapitsi Primary	GR – G7	
22. Kgabo Primary	GR – G4	Change from Tshebedi Secondary/incomplete school
Bakenberg (13 schools)		
23. Basterpad Primary	GR – G7	
24. Kgakgathu Secondary	G8 – G12	
25. Kgaubohlale Secondary	G8 – G12	
26. Kgostsoro Primary	GR – G7	
27. Matlou Memorial Primary	GR – G7	
28. Moroba Primary	GR – G7	
29. Mushi Primary	GR – G7	
30. Nkidikitlana Primary	GR – G7	
31. Nkontlha Primary	GR – G7	
32. Ntebeleleng Primary	GR – G7	
33. Thutlane Lower Primary	GR – G4	Transfer to a new site was requested at the time of the field survey
34. Tlhako Primary	G1 – G7	
35. Seshoatlha Secondary	G8 – G12	

2) Target Site Selection Principles

The selection of the target sites is based on (i) the selection criteria described above and (ii) the evaluation results of the findings of the site survey on the following items.

<Site Conditions>

- ① Accessibility of work vehicles during implementation
 - Sites to which vehicles can gain access throughout the year : A
 - Sites to which vehicles can gain access throughout the year on the condition that some sections are improved : B
 - Sites to which vehicle access is difficult : C
 - ② Establishment of land rights to use the site for the construction of school facilities
 - Sites where the rights of use are established : A
 - Sites where the rights of use are scheduled to be established before implementation : B
 - Sites where establishment of the rights of use is difficult : C
 - ③ Site topography and shape with respect to school facility construction
 - Sites where the land size, shape and terrain present no problems for the construction of the planned facilities : A
 - Sites where the project scale is restricted by the land size, shape and terrain : B
 - Sites where the construction of the planned facilities is difficult regardless of their scale : C
- * Sites where the space considered necessary for facility construction (100 m x 100 m) can be secured and where the gradient is generally 4% or less shall be A; sites with an area of 0.5 ha or less and a gradient of more than 7% shall be C; other sites shall be B.

Sites that are ranked C for any of the above items will be omitted from consideration as a target site. In regard to other sites, selection and prioritisation will be conducted based on evaluation of the school facilities and operating conditions from the viewpoint of the necessity and effectiveness of cooperation.

<School Facilities and Operating Conditions>

① Level of Classroom Over-Crowding

The level of classroom over-crowding is classified into the following priority ranks based on (i) the standard number of pupils per classroom (40 for primary schools and 35 for secondary schools) set as the government target and (ii) the maximum number of classroom furniture (50 seats for primary schools and 42 seats for secondary schools) for the classroom size stipulated by the Provincial Standard Design (7.22 m x 7.72 m). For existing schools, the relevant calculation is conducted based on the number of enrolled pupils and the number of classrooms which are evaluated as usable by the Study. In the case of a new school, this calculation (and evaluation) is based on the total number of enrolled pupils of a nearby school(s) in the Snap Survey 2002 and the number of existing classrooms.

- More than 50 pupils for a primary school and more than 42 pupils for a secondary school : A
- 40 – 50 pupils for a primary school and 35 – 42 pupils for a secondary school : B
- Less than 40 pupils for a primary school and less than 35 pupils for a secondary school : C

According to the SRN Survey 2000, the national average number of pupils per classroom is 37.7. The same survey puts the average number of pupils of public schools in Limpopo Province at 40.4. The Snap Survey 2000, however, puts the provincial average at 44.52 (45.64 for primary schools, 36.42 for combined schools and 43.02 for secondary schools). For the present evaluation purposes, those classrooms where the number of pupils exceeds 50 for primary schools or 42 for secondary schools set by the Provincial Standard Design as the maximum capacity to adequately accommodate desks and chairs are ranked A. Similarly, classrooms where the number of pupils exceeds the government target of 40 for primary schools and 35 for secondary schools but which do not fall under Category A are ranked B.

② Conditions of Existing Facilities (Urgency of Replacement)

The degree of necessity for urgent facility improvement at the existing schools is evaluated from the viewpoint of safety and adequate operation using the following criteria.

- Schools where the urgent improvement of the existing facilities is judged to be necessary due to the structural risk posed by deterioration and damage to a majority of the existing facilities (existing school buildings and old prefabricated structures) of where there is an absence of the necessary learning environment because of temporary or leased facilities : A
- Schools where improvement of the facilities is judged to be necessary because of structural risk or temporary nature as in the case of the above although a majority of the existing facilities are in good order : B
- Schools where all of the existing facilities are judged to be permanent facilities : C

③ Necessity to Change to Complete School

The suitability of changing the school status to a complete school is evaluated based on the distribution of nearby schools and the demographic trend of school-age children.

- Cases where there is no complete school and there is a sufficient number of school-age children in the community : A
- Cases where there is no complete school in the community and there has been a significant increase of the number of school-age children near the school site due to residential development or other reasons : B
- Cases where there is a complete school in the community and children can attend the said school : C

④ Necessity for New School

The suitability of introducing a new school is evaluated based on the distribution and feasibility of expansion of nearby schools and the demographic trend of school-age children.

- Cases where there is no school of the required level in the community, forcing pupils to travel a long distance despite a sufficient number of school-age children near the site : A

- Cases where there is a school of the required level in the community but expansion is inappropriate given its size and site conditions, resulting in over-crowding due to a large number of school-age children : B
- Cases where there is a school of the required level in the community and its size and site conditions allow expansion in line with the demographic trend of school-age children. : C

The expansion of an existing school is judged to be inappropriate when the current number of pupils exceeds 960 for primary schools and 1,200 for secondary schools which is determined to be the maximum size by the Physical Resource Planning Manual.

⑤ Evaluation Regarding Classroom Shortage

The classroom shortage at each site is evaluated. Here, the classroom shortage corresponds to the number of planned classrooms which is calculated in accordance with the flow for examination of the project scale in (2) below. At small-scale construction sites where the classroom shortage is less than two classrooms, the cost-benefit of the implementation of the Project is judged to be low. Accordingly, the scale of the classroom shortage at each site is evaluated based on the following ranking.

- Shortage of 8 – 14 classrooms : A
- Shortage of 2 – 7 classrooms : B
- Shortage of less than 2 classrooms : C

⑥ Priority Based on Cooperation Effects

The priority based on the cooperation effects is judged in terms of three ranks for three types of schools, i.e. existing schools, incomplete schools and new schools. This judgement is made in an integral manner using some of the evaluation items described above.

Existing school : judged on the basis of three items: ① classroom over-crowding, ② conditions of existing facilities and ③ classroom shortage

Incomplete school : judged on the basis of four items: ① classroom over-crowding, ② conditions of existing facilities, ③ necessity to change to a complete school and ⑤ classroom shortage

New school : judged on the basis of three items: ① classroom over-crowding, ④ necessity for a new school and ⑤ classroom shortage

Type of School	Evaluated Rank	Overall Judgement	Overall Priority
Existing School	Either ① or ② is A; ⑤ is A or B	High level of urgency; strong cooperation effects are expected	A
	Either ① or ② is B; ⑤ is A or B	Sufficient cooperation effected are expected	B
	Other cases	Low cooperation effects	C
Incomplete Schools	① , ② or ③ is A; ⑤ is A or B	High level of urgency; strong cooperation effects are expected	A
	① , ② or ③ is B; ⑤ is A or B	Sufficient cooperation effects are expected	B
	Other cases	Weak cooperation effects	C
New Schools	Either ① or ④ is A; ⑤ is A or B ^(Note)	High level of urgency; strong cooperation effects are expected	A
	Either ① or ④ is B; ⑤ is A or B ^(Note)	Sufficient cooperation effects are expected	B
	Other cases	Weak cooperation effects	C

Note: In the case that the evaluated grade for ④ in the above evaluation of a proposed new school being C, as extension of the existing school should be sufficient, the school in question will not be considered for the introduction of a new school.

While the evaluation results (Table 2-2) indicate that the site conditions are satisfactory at all of the sites, the overall priority judgement puts 32 sites at Rank A or Rank B and three sites at Rank C. At those sites ranked A, the urgency and necessity of facility construction are both high and strong cooperation effects are expected. Those sites ranked B also promise sufficient cooperation effects with appropriate planning. In contrast, the three sites ranked C are characterised by a low level of classroom over-crowding and classroom shortage of less than two classrooms (BC8: 1 classroom, KK3: 0 classrooms, BB3: 0 classrooms), suggesting weak cooperation effects. Accordingly, it is judged appropriate to make 32 sites, i.e. excluding the three ranked C sites from the originally requested 35 sites, the targets for cooperation.

Table 2-2 Site Evaluation and Prioritisation

		Evaluation Items										Overall Priority
		Site Conditions					School Conditions					
		Site Access	Land Use Certificate	Shape and Topography	Judgement	Pupil-Classroom Ratio	Classroom Over-Crowd	Conditions of Existing Fac.	Change to Complete Sch.	Necessity for New School	Classroom Shortage	
Bochom District												
BC1	Dinoko Primary (Incomplete)	A	A	A		42.0	B	B	A		B	A
BC2	Kgopudi Secondary	B	A	A		46.8	A	C			B	A
BC3	Makgotlho Primary	B	A	A		102.0	A	B			B	A
BC4	Mapotla Primary	A	A	A		51.6	A	C			B	A
BC5	Matjeketlane Primary	B	A	A		81.0	A	B			B	A
BC6	Ngoakwana Secondary	A	A	A		60.3	A	C			B	A
BC7	Rapetsoa Secondary	A	A	A		41.8	B	B			B	B
BC8	Rasekgala Secondary	A	A	A		32.9	C	B			C	C
BC9	Rapoho Primary	A	A	A		89.1	A	B			A	A
BC10	Kodumela Primary	A	A	A		41.8	B	B			B	B
BC11	Bothanang Primary (New)	A	A	A		(78.1)	A	-		B	A	A
BC12	Sekuruwe Combined (Integrated)	A	A	A		130.8	A	A			A	A
Konekwena District												
KK1	Kwena A Peu Secondary	A	A	B		55.3	A	B			B	A
KK2	Rametloana L-Primary (Lower Grades Only)	A	A	A		128.3	A	A			B	A
KK3	Alapha Secondary	A	A	A		29.0	C	C			C	C
KK4	Mahlabela Secondary	A	A	A		37.4	B	B			B	B
KK5	Ikageleng Primary	A	A	A		82.2	A	B			B	A
KK6	Pula Seopa Primary	A	A	A		181.7	B	A			A	A
KK7	Sfataladi Primary	A	A	A		164.0	B	A			A	A
KK8	Tlou Secondary	A	A	A		35.4	B	B			B	B
KK9	Rapitsi Primary	A	A	A		59.9	A	B			B	A
KK10	Kgabo Primary (Incomplete)	A	A	A		27.3	C	C	B		B	B
Bakenberg District												
BB1	Basterpad Primary	A	A	A		58.5	A	B			B	A
BB2	Kgakgathu Secondary	A	A	A		73.0	A	B			B	A
BB3	Kgaubohlale Secondary	A	A	A		23.4	C	B			C	C
BB4	Kgotsoro Primary	A	A	B		(269)	A	A			B	A
BB5	Matlou Memorial Primary	A	A	A		83.3	A	A			B	A
BB6	Moroba Primary	A	A	A		(291)	A	A			B	A
BB7	Mushi Primary	A	A	A		114.0	A	A			A	A
BB8	Nkidikitlana Primary	A	A	A		140.7	A	A			A	A
BB9	Nkontlha Primary	A	A	A		101.7	A	A			B	A
BB10	Ntebeleleng Primary	A	A	A		61.0	A	A			B	A
BB11	Thutlane L-Primary (Lower Grades Only)	A	A	B		89.5	A	A			A	A
BB12	Tlhako Primary	A	A	A		(243)	A	A			B	A
BB13	Seshoatla Secondary	A	A	A		45.3	A	A			B	A

:Satisfactory

- * Pupil-Classroom Ratio: The Figure in brackets was calculated based on the number of pupils and the number of classrooms at three existing nearby schools as the school in question was newly established.
- * Pupil-Classroom Ratio: The figure in double brackets shows the total number of existing enrolled pupils as the number of existing usable classrooms is evaluated to be zero.
- * Although BB11 is to move to a new site, the evaluation was conducted on the existing facilities at the present site.
- * The evaluation results for classroom over-crowding, conditions of existing facilities and classroom shortage are based on Table 2-5 List of Existing Facilities and Situation of School Operation.

3) Important Points for Evaluation of Target Sites

① Evaluation Criteria for Usability of Existing Facilities

As the target sites have many existing facilities, their usability has been evaluated. The main specifications for the existing facilities are classified into four categories, i.e. (i) standard durable brick building with four classrooms constructed by the provincial government, (ii) conventional brick building constructed by the local community, (iii) old prefabricated structure with a light steel frame housing three classrooms and introduced by the provincial government as an emergency measure and (iv) simple temporary shelter or tent prepared by the local community as an emergency measure. The evaluation of the usability of these facilities for the Project is based on the criteria listed in Table 2-3. (Photographs showing concrete examples of these facilities are included in the Appendix.)

Table 2-3 Evaluation Criteria for Usability of Existing Facilities

(1) School buildings judged to be usable	<p>Standard school buildings constructed in line with the Provincial Standard Design: those judged to be durable buildings because they are constructed of bricks on concrete foundations</p> <p>Usable conventional buildings with some repair: those judged to be continually usable as permanent facilities as the foundations have no defects and the damage found is of a minor nature, including hairline cracks and exfoliation of the floor mortar due to secular deterioration</p>
(2) School buildings judged to be unusable	<p>School buildings judged to pose a safety problem due to significant structural damage: those judged to be unsuitable for continued use because of (i) many structural cracks on the walls and floor due to uneven subsidence and other causes due to defective foundations and (ii) difficulty of repair</p> <p>Old prefabricated school buildings judged to pose a problem of durability: prefabricated structures judged to be unsuitable for continued use because of (i) passing of the design life, (ii) general structural distortion due to the lack of a brace structure and (iii) difficulty of repair</p> <p>Temporary school buildings in the form of a barracks or tent, etc: those judged to be unsuitable for continued use because of poor conditions typified by a wooden structure and galvanised iron sheeting roof</p> <p>Borrowed school buildings: community facilities (church or meeting room) borrowed for school use</p>

② Existing Usable Classrooms

The evaluation results for the existing facilities based on the criteria listed in Table 2-3 are shown in Table 2-5. 162 classrooms or some 45% of the existing classrooms are evaluated as being existing usable classrooms for all of the requested schools. These 162 classrooms consist of 84 in standard classroom buildings and 78 in conventional classroom buildings (including 18 which require partial repair). The evaluation of ① classroom over-crowding, ② conditions of existing facilities and ⑤ classroom shortage is based on the existing usable classroom to assess the situation at each school.

③ Calculation Results for Classroom Shortage Based on Analysis in Japan

The calculation results for the classroom shortage based on the analysis in Japan as shown in Table 2-5 correspond to the design number of classrooms determined by the flow explained later in (2) – Project Scale.

These results are based on a series of analyses conducted in Japan, commencing with (i) examination of the target grades to (ii) setting up of the design number of pupils and (iii) calculation of the required number of classrooms and design number of classrooms.

④ Examination and Evaluation of Incomplete Schools and New Schools

• Incomplete School: Dinoko Primary School (BC1)

This school consists of one 4-classroom type building which was constructed in 1997 by the provincial government as the only school in the community (Brodi Hill). The school currently caters for G1 through G5 with a total of 168 pupils and the pupil-classroom ratio, i.e. classroom over-crowding factor, is 42.0. The construction of one temporary classroom has been halted midway through for a long time due to a funding shortage and the absolute classroom shortage means the pupils in G6 or higher grades have to travel to distant schools (4 – 5 km). According to the Provincial Statistical Division, the estimated population of this community was 2,019 in 2000, of which 462 were children of primary school age, indicating a total demand for a complete school for 300 – 400 pupils. Accordingly, the necessity to change this school to a complete school is ranked as A.

• Incomplete School: Kgabo Primary School (KK10)

This school also consists of one 4-classroom type building which was constructed by the provincial government in 2001 as the only school in the community (Kgabo Park). This community has seen its development as a new residential area with 400 households (estimated population in 2000) and there has been a noticeable increase of school-age children. At present, the school caters for G1 through G4 with a total of 109 pupils. The pupil-classroom ratio is 27.3. Because of the growing demand for pre-school education, the school has made an effort to introduce a temporary ECD classroom on the premises. However, the absolute shortage of classrooms means that pupils of G5 and higher grades have to move to distant schools. Because of the significant increase of the number of school-age children based on the above analysis results, the necessity to change this school to a complete school is ranked as B.

- New School: Bothanang Primary School (BC11)

Out of the 35 target schools, this school is the only new school requested. The proposed new site is located in Bochum Township and Senwabarwana Primary School (4 km northwest of the proposed new school site) is located in the new school's catchment area as a school of the same level. However, the latter has a total of 1,806 pupils, including GR pupils, far exceeding the school size standard, and its expansion is inappropriate. In addition, there are two nearby schools within a radius of 3 – 5 km of the proposed site and school-age children near the proposed site currently have to attend of these three schools. The field survey results on these three nearby schools are shown in Table 2-4 and it is estimated that some 517 pupils will move to the new school. As Senwabarwana Primary School and Kgebeti Primary School are both over-crowded, the introduction of a new school will mitigate the state of classroom over-crowding at these schools. Meanwhile, 99 pupils or some 40% of the pupils at Kgebeti Primary School are expected to move to the new school, suggesting a substantial decrease of the number of enrolled pupils. This school is rather small with one classroom for each grade. Although the number of pupils per classroom will drop to some 20, this drop will not cause any major disruption to school operation. The 99 pupils hoping to move to the new school are currently forced to use a bus because the walking distance to Kgebeti Primary School is more than 7 km. This means that these 99 pupils are, in fact, in the catchment area of the new school and their move to the new school is judged to be appropriate to reduce the burden of the travelling cost on their parents. According to the interview survey results, the population growth rate in the area is slightly higher than the provincial average of approximately 2% a year and the average number of pupils per classroom at three existing schools nearby is as high as 77.8, indicating a high level of over-crowding even by the provincial standard. Accordingly, the necessity for this new school is ranked as B.

Table 2-4 Situation of Nearby Schools to Bothanang Primary School and
Estimated Number of Pupils Moving to the New School

Name of School		GR	G1	G2	G3	G4	G5	G6	G7	Total
Senwabarwana Primary (4 km Radius)	Enrolled Pupils	124	252	269	241	245	230	226	219	1,806
	No. of Classes	1	2	2	2	2	2	2	2	15
	No. of Pupils Wanting to Move	21	45	47	40	47	41	50	44	335
Nanedi Primary (3 km Radius)	Enrolled Pupils	51	60	38	40	52	42	42	32	360
	No. of Classes	1	1	1	1	1	1	1	1	8
	No. of Pupils Wanting to Move	13	8	8	10	15	9	10	10	83
Kgebeti Primary (5 km Radius)	Enrolled Pupils	27	27	34	31	37	33	26	35	248
	No. of Classes	1	1	1	1	1	1	1	1	8
	No. of Pupils Wanting to Move	12	14	15	11	11	10	11	11	99
Estimated Total No. of Pupils Moving From Three Schools		46	67	70	65	73	60	71	65	517
Population of Communities in Catchment Area		Total population of 9 communities: 11,036 Total number of primary school-age children: 2,422 Number of pupils per classroom in 3 existing schools nearby = $2,413 \div 31$ classrooms = 77.8 pupils/classroom								

Table 2-5 List of Existing Facilities and Situation of School Operation (1/2)

Bochum Educational District																																																																
No.	Code	School Name	Number of Pupils by Grade												Total Enrolment				Exist. Teachers	Pupil/Class	Pupil/Teacher	Exist. Building & Exist. Classroom Units						Unusable Classroom Units [DU]				Usable Classroom Units [UU]				Pupil/Classroom	Ratio of Usable Units [UU] / [EU]	Breakdown of usable classrooms [UU]										No. of required classrooms for target grades [NR]	No. of Newly Required Classrooms based on analysis in Japan [SR] = [NR] - [UR]	Request ed No. of Classrooms by LED	Remarks													
			(Upper Column: No. of Classes)												(No. of Classes)							Exist. Buildings - (): Exist. Units [EU]						Conventional Bldg.	Old Prefab Bldg.	Temporary Bldg.	Borrowed Bldg.	Total [DU]	Standard Bldg.	Conventional Bldg.	Repair required Bldg.			Total [UU]	[AL] / [UU]	[UU] / [EU]	Rooms outside the scope of cooperation [NA]						Exist. Usable classrooms for target grades [UR] = [UU] - [NA]																	
			GR	G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12	GR	G1-9	G10-12				Total [AL]	Standar Bldg.	Conventional Bldg.	Old Prefab Bldg.	Temporary Bldg.	Borrowed Bldg.														Total [EU]	Conventional Bldg.	Old Prefab Bldg.	Temporary Bldg.	Borrowed Bldg.	Total [DU]						Standard Bldg.	Conventional Bldg.	Repair required Bldg.	Total [UU]	GR	G10	G11	G12	Exist. Special Classroom	Exist. Library/Storage	Total [NA]		
1	BC1	Dinoko		1	1	1	1	1						0	5	0	5	0	168	0	168	5	33.6	33.6	(4)			(1)		(5)					1	1			1	42.0	80.0%							0	4	7	3	5	The principal's office shares a classroom											
2	BC2	Kgopudi							1	1	1	1	1	0	2	3	5					11	74.8	34.0	(4)	(4)				(8)					(4)				(8)	46.8	100.0%		3	3	1	1			8	0	5	5	6	Two classrooms are used for optional classes; extremely over-crowded classrooms.										
3	BC3	Makgolloho	(1)	1	2	2	2	1	1	1	1			1	10	0	11	(42)	41	71	62	59	45	43	45	42	366	0	408	10	37.1	40.8	(4)			(4)		(8)					(4)				(4)	102.0	50.0%	1						1	3	10	7	6	GR-G3 use a church hall; over-crowded classrooms for the lower grades.			
4	BC4	Mapola	(1)	1	1	1	1	1	1	1	1	1		1	7	0	8	(35)	61	44	43	57	73	55	45	35	378	0	413	9	51.6	45.9	(4)	(4)				(8)			1	1			(4)	(4)		(8)	51.6	100.0%	1						1	7	10	3	6	Generally over-crowded		
5	BC5	Majeketane	(1)	1	1	1	1	1	1	1	1	1	1	1	7	0	8	(35)	47	27	28	50	43	39	55	35	289	0	324	8	40.5	40.5	(4)	(2)		(1)	1	(7)	(2)				(1)	(3)	(4)		(4)	81.0	57.1%	1						1	3	8	5	6	Multi-grade classes for G1/G2 and G3/G4; an uncompleted building exists			
6	BC6	Ngoakwana						1	1	1	1	1	1	0	2	3	5					6	48.2	40.2	(4)					(4)					(4)				(4)	60.3	100.0%		1	1	1				3	1	5	4	6	An open air classroom for G8 and G9										
7	BC7	Rapeboa						1	2	2	1	1	1	0	3	4	7					6	23.9	27.8	(4)			(1)		(5)					(1)				(4)	41.8	80.0%		1	1	1				3	1	3	2	4	One open air class										
8	BC8	Rasekgala						1	1	1	1	1	1	0	2	3	5					7	52.6	37.6	(4)	(4)	(3)			(11)		(3)				(4)	(4)		(8)	32.9	72.7%		2	2	1			1	6	(2Classrooms)	(3Classrooms)	(shortage 1)	8			Conventional building under rehabilitation work								
9	BC9	Rapoho	(1)	1	2	2	1	1	1	1	1	1		1	9	0	10	(90)	73	115	113	92	83	61	86	90	623	0	713	12	71.3	59.4	(8)		(6)	(1)		(15)		(6)	(1)		(7)	(8)			(8)	89.1	53.3%	2						2	6	16	10	14	Over-crowding for all grades			
10	BC10	Kodumela		1	1	1	1	1	1	1	1	1	1	0	7	0	7	(0)	27	24	23	23	28	22	20	0	167	0	167	6	23.9	27.8	(4)	(7)				(11)	(7)				(7)	(4)			(4)	41.8	57.1%							0	4	7	3	8	Multi-grade class for G2/G3			
11	BC11	Bohanang												0	0	0	0																															0				Newly created school												
12	BC12	Sekururwe	(1)	1	1	2	1	1	1	1	1	1	1	1	9	1	11	(50)	42	52	77	50	59	33	39	44	50	27	50	446	27	523	14	47.5	37.4	(4)	(10)				(14)	(10)				(10)	(4)			(4)	130.8	28.6%	1	1					2	2	12	10	8	One classroom is not used because of damage; over-crowding for G3.
		Total-1												5	63	14	82		252	2,926	583	3,761	94	45.9	40.0	(48)	(31)	(9)	(3)	(5)	(96)	(19)	(9)	(3)	(5)	(36)	(48)	(8)	(4)	(60)	62.7	62.5%	6	8	7	4	1	1	27	33	100	67	89											
		Total-1 (Target School)												5	61	11	77		252	2,826	420	3,498	87	45.4	40.2	(44)	(27)	(6)	(3)	(5)	(85)	(19)	(6)	(3)	(5)	(33)	(44)	(4)	(4)	(52)	67.3	61.2%	6	6	5	3	1	0	21	31	97	66	81											
Konekwen Educational District																																																																
No.	Code	School Name	Number of Pupils by Grade												Total Enrolment				Exist. Teachers	Pupil/Class	Pupil/Teacher	Exist. Building & Exist. Classroom Units						Unusable Classroom Units [DU]				Usable Classroom Units [UU]				Pupil/Classroom	Ratio of Usable Units [UU] / [EU]	Breakdown of usable classrooms [UU]										No. of required classrooms for target grades [NR]	No. of Newly Required Classrooms based on analysis in Japan [SR] = [NR] - [UR]	Request ed No. of Classrooms by LED	Remarks													
			(Upper Column: No. of Classes)												(No. of Classes)							Exist. Buildings - (): Exist. Units [EU]						Conventional Bldg.	Old Prefab Bldg.	Temporary Bldg.	Borrowed Bldg.	Total [DU]	Standard Bldg.	Conventional Bldg.	Repair required Bldg.			Total [UU]	[AL] / [UU]	[UU] / [EU]	Rooms outside the scope of cooperation [NA]						Exist. Usable classrooms for target grades [UR] = [UU] - [NA]																	
			GR	G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12	GR	G1-9	G10-12				Total [AL]	Standar Bldg.	Conventional Bldg.	Old Prefab Bldg.	Temporary Bldg.	Borrowed Bldg.														Total [EU]	Conventional Bldg.	Old Prefab Bldg.	Temporary Bldg.	Borrowed Bldg.	Total [DU]						Standard Bldg.	Conventional Bldg.	Repair required Bldg.	Total [UU]	GR	G10	G11	G12	Exist. Special Classroom	Exist. Library/Storage	Total [NA]		
13	KK1	Kwena A Peu						1	1	1	1	1	1	0	2	3	5					9	44.2	24.6	(4)			(1)		(5)					(1)	1			1	55.3	80.0%		1	1	2				4	0	3	3	4	The principal's office shares a classroom G12; over-crowding for all grades										
14	KK2	Rameloaana	(1)	2	2	2	2							1	8	0	9	(53)	70	113	62	87				53	332	0	385	10	42.8	38.5			(11)		(1)	(12)	(8)				(1)	(9)			(3)	128.3	25.0%	1						1	2	9	7	8	G4 borrows a church hall as two classrooms are damaged beyond use			
15	KK3	Alapha						1	1	1	1	1	1	0	2	3	5					6	34.8	180.0	(4)	(2)				(6)		(4)		(2)	(6)				(6)	29.0	100.0%		1	1	1				3	(3classrooms)	(3classrooms)	(shortage 0)	4			Conventional building is incomplete but two classrooms are in use								
16	KK4	Mahlabela						1	1	1	1	1	1	0	2	3	5					9	52.4	29.1	(4)	(3)	(3)	(3)		(13)		(3)	(3)		(6)	(4)	(3)		(7)	37.4	53.8%		2	1	1	1			5	2	4	2	4	An old prefabricated building and temporary building are both unused due to damage										
17	KK5	Ikageleng	(1)	1	1	1	1	1	1	1	1	1	1	1	7	0	8	(51)	70	45	62	73	64	72	56	51	442	0	493	9	61.6	54.8			(6)		(3)	(9)					(3)	(3)			(6)	82.2	66.7%	1						1	5	12	7	8	Three classrooms are borrowed from the community(church)			
18	KK6	Pula Seopa	(1)	1	1	2	2	2	2	2	2	2		1	12	0	13	(62)	60	65	51	84	81	70	72	62	483	0	545	14	41.9	38.9			(13)	(1)		(14)	(10)		(1)		(11)		(3)		(3)	181.7	21.4%	2						2	1	13	12	4	All facilities are highly deteriorated; over-crowding for all grades.			
19	KK7	Sefatladladi	(1)	2	1	1	2	2	2	2	1			1	11	0	12	(46)	74	40	54	71	77	67	63	46	446	0	492	15	41.0	32.8			(12)	(3)		(15)	(9)	(3)			(12)		(3)		(3)	164.0	20.0%	1						1	2	1	12	11	4	All facilities are highly deteriorated; over-crowding for all grades.		
20	KK8	Tlou						1	1	1	1	1	1	0	2	3	5					9	49.6	27.6	(4)	(3)	(3)			(10)		(3)			(3)	(4)	(3)		(7)	35.4	70.0%		2	1	1	1	1	1	6	1	4	3	4	One classroom in an old prefabricated building; consideration deterioration										
21	KK9	Rapisi		2	2	2	2	1	1	1	1	1		0	11	0	11	(0)	90	77	75	84	71	74	68	0	539	0	539	13	49.0	41.5			(9)	(2)		(11)		(2)			(2)		(9)		(9)	59.9	81.8%							0	9	14	5	4	Good maintenance situation but over-crowding for all grades.			
22	KK10	Kgabo	(1)	1	1	1	1							1	4	0	5	(22)	25	14	19	29	0	0	0	22	87	0	109	4	21.8	27.3	(4)					(4)					(4)				(4)	27.3	100.0%	1						1	3	7	4	4	An incomplete school; multi-grade class for GR/G1; temporary ECD building exists.			
		Total-2												5	61	12	78		234	2,771	463	3,468	98	44.5	35.4	(20)	(59)	(9)	(7)	(4)	(99)	(27)	(9)	(7)	(4)	(47)	(20)	(24)	(8)	(52)	66.7	52.5%	6	6	4	5	2	2	25	27	81	54	48											
		Total-2 (Target School)												5	59	9	73		234	2,690	370	3,294	92	45.1	35.8	(16)	(57)	(9)	(7)	(4)	(93)	(27)	(9)	(7)	(4)	(47)	(16)	(24)	(6)	(46)	71.6	49.5%	6	5	3	4	2	2	22	24	78	54	44											

(2) Examination of Project Scale

For the examination of the required number of classrooms which determines the scale of the Project, the target grades and the target number of pupils are determined and the required number of classrooms is then calculated based on these Figures.

1) Examination of Target Grades

The field investigation of the 35 requested sites (23 primary schools, 11 secondary schools and one combined school) confirmed that all of the 34 existing schools are run on the basis of the old system. In addition, it was found that 18 of the 23 existing schools (22 primary schools and one combined school) have a GR class (reception grade). Based on the above situation, the target grades are determined while clarifying the status of schools under the old system and the GR class under the Project.

① Status of Schools Under Old System in National Qualification Framework (NQF)

The NQF sets forth the new framework for national qualification for each of the following educational phases.

- i) General education and training (NQF: Level 1) (GET: G1 – G9; ABT: L1 – L4) (compulsory education)
- ii) Further education and training (NQF: Level 2/4) (FET: G10 – G12; colleges and vocational training schools, etc.)
- iii) Higher education (NQF: Level 5/8) (HE: universities and polytechnics)

Compulsory education corresponds to the general education/training period (GET: G1 – G9) which is classified as NQF: Level 1 and GET is divided into three phases: elementary phase (G1 – G3), intermediate phase (G4 – G6) and advanced phase (G7 – G9).

The educational system in South Africa is still in the midst of a series of restructuring. Despite the introduction of the NQF, most schools are run in line with the old system. Most schools are primary schools (seven grades from G1 to G7) and secondary schools (five grades from G8 to G12) under the old system, accounting for 72% of all schools. In Limpopo Province, 3,854 schools (2,505 primary schools, 81 combined schools and 1,268 secondary schools) or 92.9% of the 4,148 public schools (2,675 primary schools, 81 combined schools and 1,392 secondary schools) are based on the old system, leaving a mere 149 schools or 3.6% under the new system (Snap Survey 2002).

The Physical Resource Planning Manual compiled by the national government in November, 2001 classifies schools in terms of the type of basic facilities listed below and permits the running of a school under either the old system or new system. It does not have specific rules for the restructuring of schools to adapt to the new system.

- i) Ordinary school corresponding to the old system
: primary school (G1 – G7)
- ii) Ordinary school corresponding to the new system
: junior secondary school (G7 – G9)
- iii) Ordinary school corresponding to the old system
: secondary school (G8 – G12)
- iv) School for further education and training corresponding to the new system
: FET School (G10 – G12)

The national government does not currently emphasise the restructuring of ordinary schools in line with the NQF. Instead, emphasis is placed on the restructuring of colleges and vocational training schools to promote the granting of FET certification by schools. Following the lead of the national government, the Limpopo provincial government includes the improvement of FET-related technical education/training in its Development Programme 2002 – 2005, promoting the integration/abolition of FET facilities. The restructuring of ordinary schools faces many difficult problems. Such problems as the adjustment of the existing school governing body (SGB), relocation of teachers and securing of the necessary resources for the redevelopment of facilities pose difficult hurdles which cannot be quickly solved. As a result, most newly constructed schools inherit the old system because of the dominance of this system among nearby schools. The provincial government has already judged that planning based on the current school system, i.e. the old system, is appropriate for the Project given the situation of nearby schools.

Following the above analysis, the policy for the target grades under the Project is to give planning priority to general education/training (GET) grades G1 through G9 as expressed in the Minutes, recognising the currently prevalent school system (old system). In regard to G10 through G12 which are outside the scope of cooperation, the use of the existing facilities is examined in view of the need for the mitigation of classroom over-crowding and appropriate school operation. It is hoped that the repair or rehabilitation of the existing facilities which is required for these facilities to be used will be dealt with by the Government of South Africa.

② Status and Handling of GR

The reception grade (GR) as part of the early childhood development (ECD) constitutes part of the long-term target of “providing high quality 10 year (GR – G9) general education for all children” as stated in the Education White Paper (1995). It aims at providing 10 year long compulsory education for children reaching the school age of six years old. However, Section 3) of the South African School Act (SASA) enforced in 1996 stipulates that “compulsory education is for children of seven years of age through 15 years of age” (or until the completion of G9) and that the GR is not yet part of the statutory compulsory education. Accordingly, the handling of the GR is left to each provincial government at present.

(*According to a government announcement reported by a newspaper, there is a policy of lowering the age for both the GR and G1 by one year from January, 2003. This revision will make children reaching the age of 5 or the age of 6 before 30th June each academic year eligible for the GR and G1 respectively: *The Citizen*, 7th August, 2002.)

The national educational statistics for 2000 put the total number of ECD pupils at approximately 270,000 nationwide. Some 220,000 pupils or more than 80% of the total number of ECD pupils are enrolled in the GR, the integration of which to compulsory education is being sought. However, the ratio of GR pupils to G1 pupils is approximately 21.5% (Limpopo Province has an exceptionally high ratio of more than 56% compared to other provinces), indicating a still low GR enrolment rate nationwide. The Education White Paper No. 5 on the ECD which was released in May, 2001 points out that as the reform of ECD education will form the basis for comprehensive educational development, both the national and provincial governments should uphold the ECD as a high priority issue. This White Paper went on to say that the development of high quality ECD based on the Curriculum 2005 and the promotion of GR as part of compulsory education will be essential. The White Paper also proposed the medium-term target (up to 2010) of enrolling 85% (approximately 810,000) of five or six year olds in GR classes attached to public schools along with proposals for further curriculum development and the training of teachers specialising in ECD.

Meanwhile, the Provincial Development Programme 2002/05 adopts such medium-term targets as (i) the development of provincial ECD development measures, (ii) the training of teachers specialising in multi-subject education in response to the Curriculum 2005 and (iii) the development of evaluation items for the establishment of the basic stage of education. The section relating to the expansion of ECD facilities in the Provincial Budget Achievement Indexing Programme 10 for 2002/03 puts forward

such concrete numerical targets as the expansion of facilities from the current 472 to 708 and of instructors from the current 472 to 708 (Northern Province Budget Statement 2002 – 2003).

The Snap Survey 2002 for Limpopo Province puts the number of schools with a GR class(es) at 1,769 (85,945 pupils which is equivalent to some 56% of G1 pupils). This represents more than 60% of the 2,757 primary and combined schools in the province. As such, many schools in Limpopo Province already have a GR, illustrating the advanced state of GR education in the province. The provincial government has been making conscious efforts to spread the GR as part of ECD education and to increase the number of public schools with a GR class(es) in consideration of communities struggling with poverty and also has a policy of paying the salaries for GR teachers from the government budget.

The site survey for the requested schools confirmed the enrolment of all pupils, equivalent to 70.2% of the 1,155 G1 pupils, at 18 schools out of the 23 existing primary or combined schools. The field visit to these schools revealed the facts that many GR classrooms are temporary and wooden structures with a galvanised iron sheet roof and a dark interior with no desks or chairs. The classrooms are very small, forcing the pupils to sit shoulder to shoulder. There is, therefore, a great need for the improvement of such a poor environment.

Based on the above analysis, GR classrooms are not considered to be a priority for cooperation in view of the facts that ECD is still at the initial development stage and that the facility standards for the GR as part of ECD education have not yet been set. However, noting the urgent need for improvement of the existing GR classrooms, the current conditions of which are very poor, the appropriate use of the existing facilities is examined as part of the Project and it is judged suitable for the Government of South Africa to deal with the repair or rehabilitation of the existing facilities as necessitated by the findings of such examination.

③ Target Grades

Based on the results of the foregoing examination, the composition of the target grades under the Project is determined as follows.

- i) Existing primary school (GR/G1 – G7)
: G1 through G7 are targeted

- ii) Existing lower primary school (GR/G1 – G4)
: G1 through G4 are targeted
- iii) Existing combined school (GR/G1 – G10)
: G1 through G9 are targeted
- iv) Existing secondary school (G8 – G12)
: G8 and G9 are targeted
- v) New primary school (BC11)
: planned as a primary school and G1 through G7 are targeted
- vi) Existing incomplete schools (BC1: G1 – G5, KK10: GR/G1 – G4)
: planned to become complete primary schools and G1 through G7 are targeted

2) Setting-Up of Design Number of Pupils

From the macroscopic point of view, the population of Limpopo Province steadily increased in the period from 1996 to 2001 at an average annual rate of 2.06% which was in line with the national average (Development Information Data Base Northern Province 2001). Meanwhile, the number of pupils enrolled at primary and secondary schools in the province recorded an average annual growth rate of –1.21% for G1 through G7 and 0.02% for G8 through G12 in the period from 1997 to 2002. The decline of G1 through G7 pupils indicates the effects of restrictions on the fresh enrolment rate and the permissible length of repeat learning in one grade which were introduced in 1998. Since 2001, however, the total number of primary and secondary school pupils has recorded an annual growth rate of 1.5% (calculated based on statistics of the Central Department of Education, the Annual Survey 2001 and the Snap Survey 2002).

Although the number of pupils of an inappropriate age for their respective grade is still as high as 33.5% for primary schools and 56.9% for secondary schools (Annual Survey 2001) in the province, the ratio of newly enrolled G1 pupils of an appropriate age is as high as 90.7%. The ratio of repeaters has shown a declining trend in general, from 9.4% in 2001 to 8.5% in 2002 for G1 – G7 pupils and from 27.9% in 2001 to 23.8% in 2002 for G8 – G12 pupils. Accordingly, the total number of pupils in the Project Area is expected to show minor changes reflecting the trend of growth of the school-age population in the coming years (approximately 1 – 2%/year) and improvement of the internal efficiency. In short, it is judged that there will not be any major change of the number of enrolled pupils in the next 10 years. In regard to the school commuting zones identified by the Study, 90.8% of pupils attending the target schools live within a radius of a walking distance of up to 30 minutes (2 km) while others use bicycle and bus, etc. from their homes within a radius of 4 – 6 km. There is no official catchment area for each school in South Africa and, therefore, the areas

in which pupils live do not necessarily coincide with the administrative areas. The survey on the population in the target areas and the attempt to estimate the population of a community (communities) in the commuting zone, both of which were conducted as part of the field survey, failed to establish reliable data. The data produced by the National Census 2000 (by new administrative areas and by major communities) has not yet been officially announced as it is still in the process of compilation.

Given the above examination results, it has been decided to use the current number of pupils which is believed to represent the school enrolment need at the time of the Study most accurately as the basis for determining the design number of pupils while disregarding future fluctuations of the number of pupils. In the case of the new school, however, the necessary examination will be conducted based on (i) the results of interviews on the number of pupils planning to move to the new school and (ii) the forecasted number of pupils to be enrolled at the new school from outside the likely commuting zone with a view to confirming or correcting the design number of pupils for the new school.

① Calculation of Design Number of Pupils for Existing Schools

For existing schools, the design number of pupils for the target grades is set based on the current number of pupils which is believed to directly represent the present enrolment need in the commuting zone. In the case of the two incomplete schools where not all of the target grades are available, the average number of pupils per grade is calculated based on the current number of pupils and this Figure is used for the newly introduced grades.

<Calculation basis for design number of pupils for existing schools>

- Primary school: current number of G1 – G7 grades
- Incomplete school: average number of pupils per grade x number of target grades (G1 – G7)
- Lower primary school: current number of G1 – G4 pupils
- Combined school: current number of G1 – G9 pupils
- Secondary school: current number of G8 and G9 pupils

② Calculation of Design Number of Pupils for New School

In the case of Bothanang Primary School (BC11) to be newly created, the pupils will basically consist of those moving from nearby schools which are currently attended. As part of the Study, an interview survey was, therefore, conducted on the number of

pupils likely to move to the new school from the three existing schools nearby. As a result, the likelihood of 471 pupils in G1 through G7 (314 from Snwabarwana, 98 for Kgebeti and 70 from Nanedi) moving to the new school was confirmed. For calculation of the design number of pupils for this school, the enrolment of children living outside the likely commuting zone as determined by the survey on the 35 target schools (generally some 10% of the total enrolment size) is assumed in addition to those likely to move from their present schools.

<Calculation formula for design number of pupils for the new school (BC11)>

Expected number of G1 – G7 pupils moving to the new school (based on the interview survey results) ÷ 0.9 (ratio of pupils living in the commuting zone)

3) Calculation of Required Number of Classrooms and Design Number of Classrooms

The required number of classrooms is calculated based on the following criteria/conditions using the design number of pupils.

① Class Size

A class size of 40 pupils for primary schools (G1 – G7) and 35 for secondary schools (G8 and G9) which are the national standards as well as target Figures for facility improvement are adopted for the Project. The LDE uses the same class size for calculation of the classroom shortage.

② Multiple Shift Schooling System

In Limpopo Province, a tiny proportion of such schools as former farm schools employ a two shift system and it has been confirmed that all of the target schools are full-time day schools. Although the number of lessons a day slightly varies from one school to another, most primary schools provide 5 – 7 lessons. The full-time day school system is appropriate from the viewpoint of the current curriculum and, therefore, this system is adopted for the present calculation purposes. Combined classes (multi-grade classes) are employed at two schools: Matjeketlane Primary School (BC5: 27 pupils in G2 and 28 pupils in G3) and Rapetsoa Secondary School (BC7: 33 pupils in G8 and 39 pupils in G9). All classes at the target schools have a minimum of 20 pupils. This suggests that the classroom shortage is the main reason for combined classes at the target schools and, therefore, combined classes are not considered in the scope of the Project.

③ Special Classrooms (Laboratories, etc.) at Secondary Schools

The Physical Resource Planning Manual of the government stipulates the introduction of science laboratories and a domestic science room at secondary schools (G8 – G12). Hardly any of the target secondary schools have such facilities and it is judged that the urgent issues for these schools are the elimination of deteriorated/ over-crowded classroom and the securing of classrooms for optional subjects (natural science as well as human science subjects) corresponding to the curriculum for G10 – G12. However, the target G8 and G9 of the Project do not have many natural and domestic science lessons (some 10 – 15% of all lessons) and it is possible to conduct these lessons in an ordinary classroom with teaching kits instead of in specific laboratories. It is, therefore, judged that the priority lies with the introduction of new ordinary classrooms to eliminate over-crowding and the classroom shortage rather than the provision of science laboratories and a domestic science room of which the frequency of use is not intense.

Accordingly, the facility plan for G8 and G9 will not include science laboratories or a domestic science room. Given the fact that there are no optional subjects which divide a class in the current curriculum, special classrooms for optional subjects will not be included in the Project except at those schools which currently have special classrooms for optional subjects for G10 – G12. In the case of these schools, such special classrooms will be planned as long as the existing usable classrooms can be used. It is hoped that the government will implement the necessary measures to conduct any repair or rehabilitation work to make these special classrooms available.

④ Administration Rooms

Although administration rooms play essential functions for school operation, almost all of the requested schools lack these facilities to perform such functions. At present, the construction of schools by the provincial government is focusing on the elimination of the classroom shortage and improvement of the sanitation conditions, falling short of the construction of an administration block. It has been confirmed that newly constructed classrooms are used as or shared by administration rooms at most schools. In view of this situation, it is planned under the Project to introduce space equivalent to one classroom in the classroom block to accommodate a principal's office, staff space and teaching aid/document storage space, all of which are deemed essential for school operation. The necessary desks, chairs and cabinets for this space will also be provided. This space will not have permanent brick partitions so that it can be converted into a single classroom or a special classroom (laboratory, etc.) at the time of the construction of an administration block by the provincial government in the future. Instead, the

cabinets to be provided for this space will be laid out in such a manner as to function as temporary partitions.

⑤ Existing Usable Classrooms

If repair or rehabilitation of the existing usable classrooms is required, the necessary work will be conducted by the Government of South Africa. These rooms will be preferentially used to improve the facilities for the GR and G10 – G12, to mitigate the classroom over-crowding and to ensure appropriate school operation.

i) Securing of Required Facilities for Non-Target Grades

In principle, the required classrooms for the GR and G10 – G12 will be secured based on the following calculations to mitigate the classroom over-crowding of these grades. Any fraction of the calculation results will be rounded up to a unit so that at least one classroom is secured for each grade.

GR classrooms : existing number of GR pupils ÷ 50
(maximum limit based on the furniture layout)

G10 – G12 classrooms : existing number of G10 – G12 pupils ÷ 35
(government standard)

In regard to classrooms for optional subjects, special classrooms (science laboratories and CPU room, etc.) and library/storage room, those of the present scale will be introduced at schools which currently have such facilities. If the calculated number of these rooms cannot be secured, the shortage should, in principle, be solved by the Government of South Africa.

ii) Existing Usable Classrooms for Target Grades

In principle, after deducting the classrooms required for the non-target grades and for other purposes outside the scope of cooperation as priorities from the existing usable classrooms, the remaining usable classrooms will be incorporated in the Project as existing usable classrooms for the target grades. The calculation flow for existing usable classrooms for the target grades is shown below.

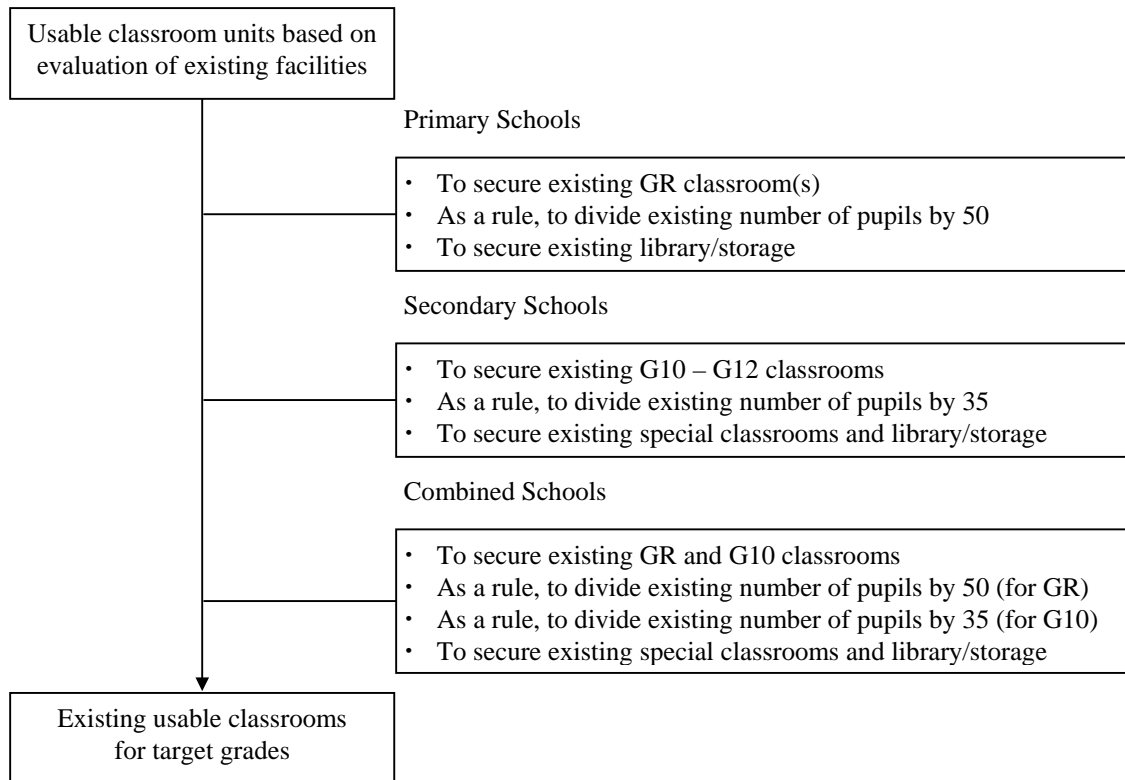


Fig. 2-1 Calculation Flow for Existing Usable Classrooms for Target Grades

iii) Breakdown of Existing Usable Classrooms

Table 2-6 shows the planned use of the existing usable classrooms at each site and a total of 68 classrooms are available as “existing usable classrooms for the target grades (G1 – G9)” at 32 secondary schools.

Table 2-6 Breakdown of Use of Existing Usable Classrooms

Name			Usable Classroom Units	Breakdown of Use of Existing Usable Classrooms									
				Target Grades	Facilities Outside the Scope of Cooperation							Total	
					GR	G10	G11	G12	Special Classrooms	Library /Storage			
Bochum District	1	BC-1	Dinoko P	4	4								
	2	BC-2	Kgopudi S	8	0		3	3	1	1			8
	3	BC-3	Makgotlho P	4	3	1							1
	4	BC-4	Mapotla P	8	7	1							1
	5	BC-5	Matjeketlane P	4	3	1							1
	6	BC-6	Ngoakwana S	4	1		1	1	1				3
	7	BC-7	Rapetsoa S	4	1		1	1	1				3
	8	BC-8	Rasekgala S	8	2		2	2	1		1		6
	9	BC-9	Rapoho P	8	6	2							2
	10	BC-10	Kodumela P	4	4								
	11	BC-11	Bothanang P		0								
	12	BC-12	Sekururwe C	4	2	1	1						2
Bochum Total			60	33	6	8	7	4	1	1		27	
Konekwenena District	13	KK-1	Kwena A Peu	4	0		1	1	2				4
	14	KK-2	Rametloana LP	3	2	1							1
	15	KK-3	Alapha S	6	3		1	1	1				3
	16	KK-4	Mahlabela S	7	2		2	1	1	1			5
	17	KK-5	Ikageleng P	6	5	1							1
	18	KK-6	Pula Seopa P	3	1	2							2
	19	KK-7	Sefataladi P	3	1	1					1		2
	20	KK-8	Tlou S	7	1		2	1	1	1	1		6
	21	KK-9	Rapitsi P	9	9								
	22	KK-10	Kgabo P	4	3	1							
Konekwenena Total			52	27	6	6	4	5	2	2		25	
Bakenberg District	23	BB-1	Basterpad P	4	3	1							
	24	BB-2	Kgakgathu S	6	0		2	2	1	1			6
	25	BB-3	Kgaubohlale S	7	4		1	1	1				3
	26	BB-4	Kgotso P	0	0								
	27	BB-5	Matlou M. P	4	2	1					1		2
	28	BB-6	Moroba P	0	0								
	29	BB-7	Mushi P	4	2	1					1		2
	30	BB-8	Nkidikitlana P	3	1	1					1		2
	31	BB-9	Nkontlha P	3	2	1							1
	32	BB-10	Ntebeleleng P	4	3	1							1
	33	BB-11	Thutlane LP	0	0								
	34	BB-12	Tlhako P	0	0								
	35	BB-13	Seshoatlha S	9	0		3	1	2	2	1		9
Bakenberg Total			44	17	6	6	4	4	3	4		27	
Grand Total			156	77	18	20	15	13	6	7		79	
Total of 32 Target Schools			135	68	18	16	11	10	6	6		67	

⑥ Calculation of Required Number of Classrooms

For the calculation of the required number of classrooms, the following calculation formulas are used depending on the school type. Any fraction below the decimal point is rounded up to a unit and also at least one classroom is allocated to each grade.

Primary school : design number of G1 – G7 pupils ÷ 40

Lower primary school : design number of G1 – G4 pupils ÷ 40

Combined school : design number of G1 – G7 pupils ÷ 40 + design number of G8 and G9 pupils ÷ 35

Secondary school : design number of G8 and G9 pupils ÷ 35

⑦ Calculation of Design Number of Classrooms

The calculation of the design number of classrooms is based on the following flow.

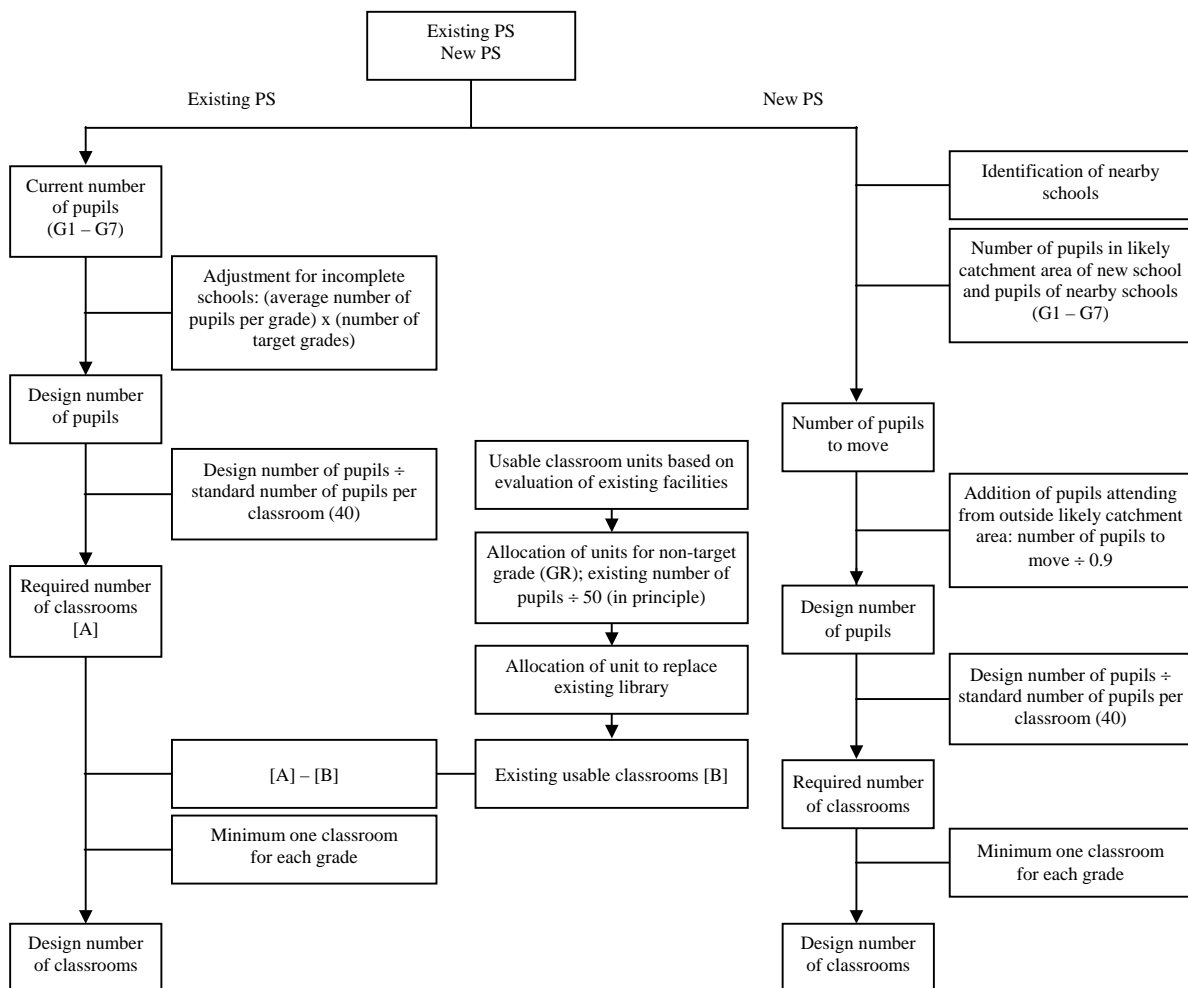


Fig. 2-2 Calculation Flow for Design Number of Classrooms (Primary Schools)

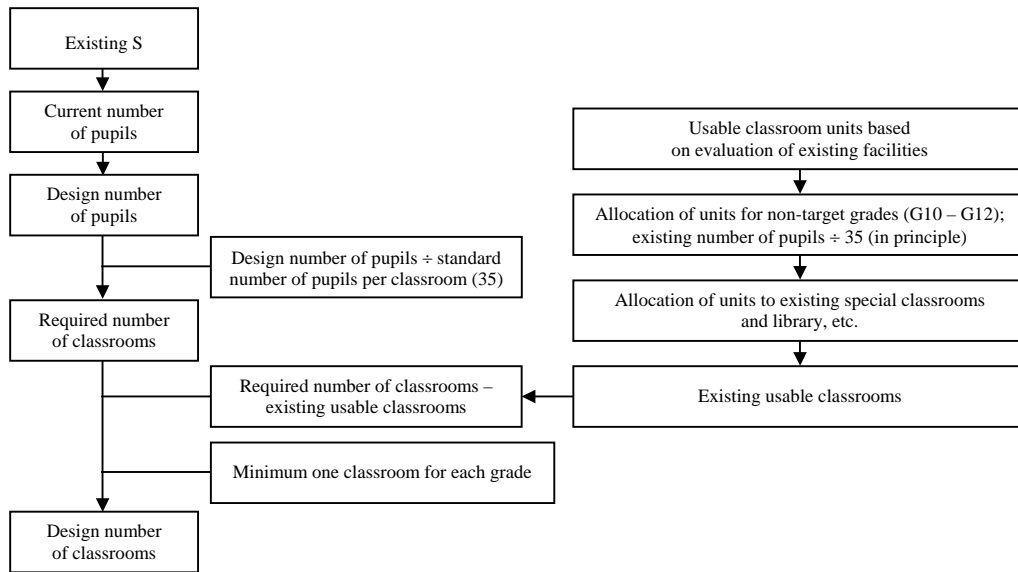


Fig. 2-3 Calculation Flow for Design Number of Classrooms (Secondary Schools)

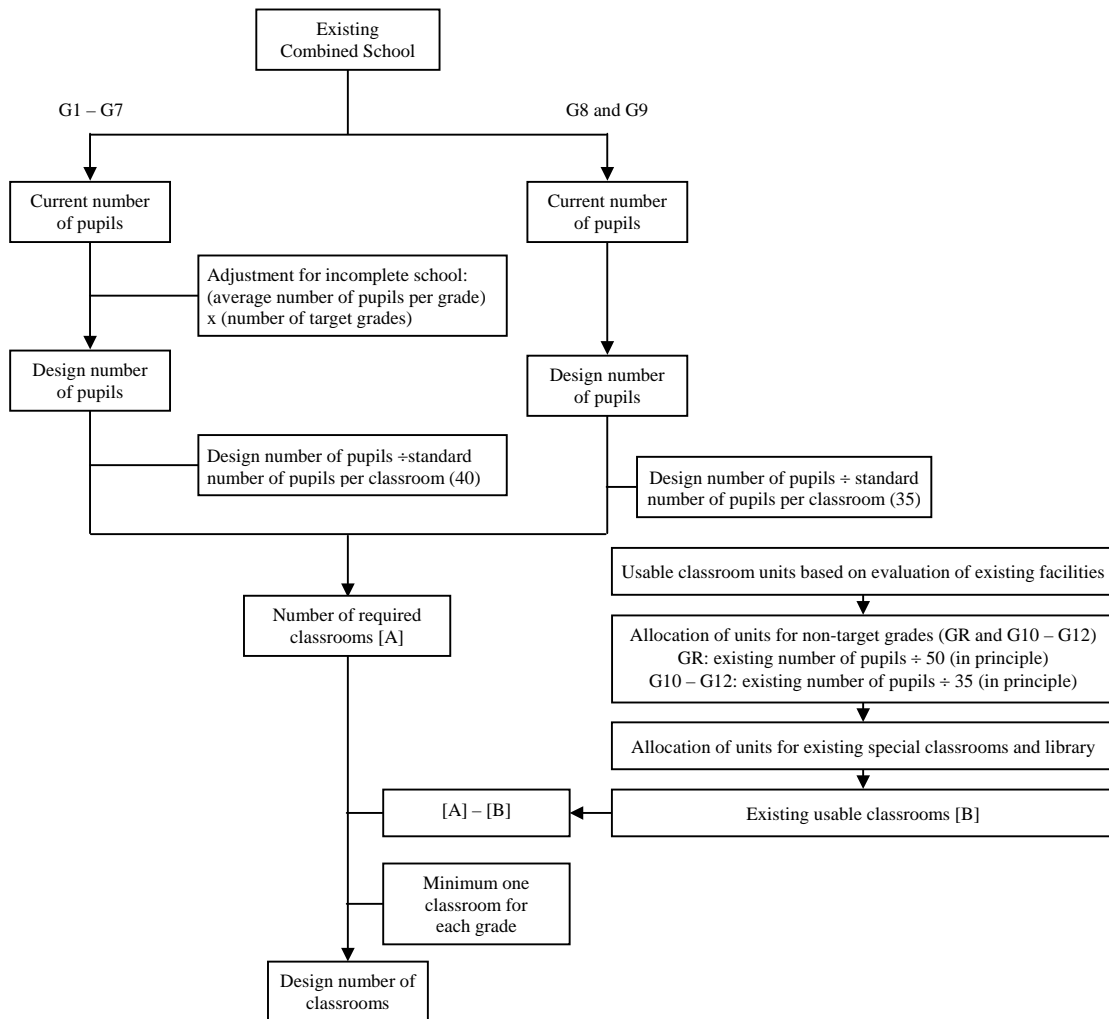


Fig. 2-4 Calculation Flow for Design Number of Classrooms (Combined Schools)

4) Calculation Examples of Design Number of Classrooms

Examples of calculating the design number of classrooms based on the flows described above are given below.

① Example 1: BC1 Dinoko Primary School (Incomplete School)

- i) Current number of pupils (G1 – G5) = 168
- ii) Adjustment for incomplete school = $\{168 \div 5 \text{ (average number of pupils per grade)} \times 7 \text{ (number of target grades)}\} = 235$
- iii) Design number of pupils = 235 (adjusted figure for this incomplete school)
- iv) Required number of classrooms = $235 \text{ (design number of pupils)} \div 40 \text{ (standard number of pupils per classroom)} = 5.88 \rightarrow 6$
- v) Existing usable classrooms = 4 (see Table 2-5 and Table 2-6; no GR or facilities outside the scope of cooperation)
- vi) Required number of classrooms – existing usable classrooms = $iv) - v) = 6 - 4 = 2$
- vii) Minimum one classroom for each grade = $7 \text{ grades} - \text{required number of classrooms} = 7 - iv) = 7 - 6 = 1$
- viii) Design number of classrooms = $vi) + vii) = 3 \text{ Classrooms}$

② Example 2: BC11 Bothanang Primary School (New School)

- i) Number of pupils to move from nearby schools (G1 – G7) = 471
- ii) Adjustment to include pupils from outside likely catchment area = $471 \div 0.9 = 523$
- iii) Design number of pupils = 523 (number of pupils, including those from outside likely catchment area)
- iv) Required number of classrooms = $523 \text{ (design number of pupils)} \div 40 \text{ (standard number of pupils per classroom)} = 13.08 \rightarrow 14$
- v) Minimum one classroom for each grade: no need for adjustment ($14 > 7$)
- vi) Design number of classrooms = $iv) = 14 \text{ Classrooms}$

③ Example 3: BC12 Sekuruwe Combined School

- i) Current number of pupils = (G1 – G7) = 352, (G8 and G9) = 94, GR = 50, G10 = 27
- ii) Design number of pupils = $i) \text{ current number of pupils} = (G1 - G7) = 352, (G8 \text{ and } G9) = 94$
- iii) Required number of classrooms = $352 \div 40 + 94 \div 35 = 11.49 \rightarrow 12$
- iv) Existing usable classrooms = 2 (see Table 2-5 and Table 2-6; 2 classrooms for existing GR and G10)
- v) Required number of classrooms – existing usable rooms = $iii) - iv) = 12 - 2 = 10$
- vi) Minimum one classroom for each grade: no need for adjustment ($14 > 9$)
- vii) Design number of classrooms = $v) = 10 \text{ Classrooms}$

④ Example 4: KK7 Sefataladi Primary School

- i) Current number of pupils (G1 – G7) = 446, GR = 46
- ii) Design number of pupils = $i) \text{ current number of pupils} = 446$
- iii) Required number of classrooms = $446 \text{ (design number of pupils)} \div 40 \text{ (standard number of pupils per classroom)} = 11.15 \rightarrow 12$
- iv) Existing usable classrooms = 1 (see Table 2-5 and Table 2-6; 1 for existing GR and 1 for library/storage)
- v) Required number of classrooms – existing usable classrooms = $iii) - iv) = 12 - 1 = 11$

- vi) Minimum one classroom for each grade: no need for adjustment ($12 > 7$)
- vii) Design number of classrooms = v) = 11 Classrooms

⑤ Example 5: BB2 Kgakgathu Secondary School

- i) Current number of pupils = (G8 and G9) = 213, (G10 – G12) = 225
- ii) Design number of pupils = i) current number of pupils = (G8 and G9) = 213, (G10 – G12) = 225
- iii) Required number of classrooms = $213 \div 35 = 6.09 \rightarrow 7$
- iv) Existing usable classrooms = 0 (see Table 2-5 and Table 2-6, 5 classrooms for untargeted G10 – G12 and 1 classroom for existing special classroom: although 7 classrooms are required, $225 \div 35 = 6.43 \rightarrow 7$, 5 classrooms are adopted because of the limitation of usable classroom units)
- v) Required number of classrooms – existing usable classrooms = iii) – iv) = $7 - 0 = 7$
- vi) Minimum one classroom for each grade: no need for adjustment ($7 > 2$)
- vii) Design number of classrooms = v) = 7 Classrooms

5) Calculation Results

The required number of classrooms, design number of classrooms and their calculation basis are shown in Table 2-7.

Table 2-7 Calculation Results for Required Number of Classrooms

Educational District	School Name	Nearby Schools	Breakdown of Pupils by Grade at Time of Study													Average No. of Pupils per Grade	Adjustment for Incomplete/New school	No. of Non-target Pupils			Design No. of Pupils			Calculation of Required No. of Classrooms	Finalized Required No. of Classrooms	Usable Classrooms for Target Grades	Design No. of Classrooms [PR]=	Design No. of Administration Room	Requested No. of Classrooms by LDE			
			GR	G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12			Total	GR	G10-12	Total	G1-G7	G8-G9							Total	[P]/40+[S]/35	[NR]
Bochum District	1 BC-1 Dinoko P	1997	(0)	32	40	37	25	34	0	0					168	34	* 235				235	[S]	[P] + [S]	235	5.88	6	4	** 3	1	5		
	2 BC-2 Kgopudi S	1995													374									152	4.34	5	0	5	1	6		
	3 BC-3 Makgotho P	1994	(42)	41	71	62	59	45	43	45					366						42			366	9.15	10	3	7	1	6		
	4 BC-4 Mapotla P	1995	(35)	61	44	43	57	73	55	45					378						35			378	9.45	10	7	3	1	6		
	5 BC-5 Matjeketlane P	1997	(35)	47	27	28	50	43	39	55					289						35			289	7.23	8	3	5	1	6		
	6 BC-6 Ngoakwana S	1995													241									76	4.71	5	1	4	1	6		
	7 BC-7 Rapetsoa S	1995													167									33	2.06	3	1	2	1	4		
	8 BC-8 Rasekagla S	1997	(Non - Target)												263									(100)	(100)	(Cal.=2.85)	3classrooms	2classrooms	(Shortage=1)		8	
	9 BC-9 Rapoho P	1994		(90)	73	115	113	92	83	61	86					623						90			623	15.58	16	6	10	1	14	
	10 BC-10 Kodumela P	1935		(0)	27	24	23	23	28	22	20					167		167							167	4.18	5	4	** 3	1	8	
	11 BC-11 Bothanang P	New		(46)	67	70	65	73	60	71	65					471		*** 523	46						523	13.08	14	0	14	1	12	
			Nanedi P	(13)	8	8	10	15	9	10	10					70																
		Kgebelli P	(12)	14	15	15	11	10	11	11					87																	
		Senwabarwana P	(21)	45	47	40	47	41	50	44					314																	
12 BC-12 Sekururwe C	1960		(50)	42	52	77	50	59	33	39	44	50	27	473							50	27		352	94	446	11.49	12	2	10	1	8
			(50)	42	52	77	50	59	33	39					352																	
											44	50	27	121																		
Komekwenya District	13 KK-1 Kwena A Peu S	1996												221									129		92	2.63	3	0	3	1	4	
	14 KK-2 Rametloana LP	1947	(53)	70	113	62	87							332						53				332	8.30	9	2	7	1	8		
	15 KK-3 Alapha S	1995	(Non - Target)											174										(81)	(81)	(Cal.=2.31)	3classrooms	3classrooms	(Shortage=0)		4	
	16 KK-4 Mahabela S	1995												262									128		134	3.83	4	2	2	1	4	
	17 KK-5 Ikageleng P	1991	(51)	70	45	62	73	64	72	56					442						51			442	11.05	12	5	7	1	8		
	18 KK-6 Pula Seopa P	1969	(62)	60	65	51	84	81	70	72					483						62			483	12.08	13	1	12	1	4		
	18 KK-7 Sefataladi P	1969	(46)	74	40	54	71	77	67	63					446						46			446	11.15	12	1	11	1	4		
	20 KK-8 Tlou S	1992												248									113		135	3.86	4	1	3	1	4	
	21 KK-9 Rapitsi P	1995	(0)	90	77	75	84	71	74	68					539									539	13.48	14	9	5	1	4		
	22 KK-10 Kgabo P	2001	(22)	25	14	19	29	0	0	0					87	22	* 152	22						152	3.81	4	3	** 4	1	4		
Bakenberg District	23 BB-1 Basterpad P	1945	(19)	25	37	40	26	38	23	26					215						19			215	5.375	6	3	** 4	1	9		
	24 BB-2 Kgagathu S	1980												438									225		213	6.09	7	0	7	1	10	
	25 BB-3 Kgaubohale S	1993	(Non - Target)											164										(80)	(80)	(Cal.=2.29)	3classrooms	4classrooms	(Shortage=0)		6	
	26 BB-4 Kgotso P	1952	(0)	46	31	37	34	45	39	37					269									269	6.73	7	0	7	1	12		
	27 BB-5 Matlou Memorial P	1947	(35)	42	34	33	42	65	48	34					298						35			298	7.45	8	2	6	1	12		
	28 BB-6 Moroba P	1961	(23)	37	41	36	37	45	30	42					268						23			268	6.70	7	0	7	1	12		
	29 BB-7 Mushi P	1946	(45)	55	52	42	65	81	57	59					411						45			411	10.28	11	2	9	1	5		
	30 BB-8 Nkikililana P	1946	(40)	51	53	34	46	85	48	65					382						40			382	9.55	10	1	9	1	5		
	31 BB-9 Nkontlha P	1984	(39)	34	38	32	32	53	47	30					266						39			266	6.65	7	2	5	1	9		
	32 BB-10 Ntebelele P	1985	(30)	30	28	30	28	31	35	32					214						30			214	5.35	6	3	** 4	1	6		
	33 BB-11 Thutlani LP	1928	(94)	87	101	125	130								443						94			443	11.08	12	0	12	1	9		
	34 BB-12 Tlhako P	1948	(0)	36	37	36	24	45	42	23					243									243	6.08	7	0	7	1	9		
	35 BB-13 Seshoatla S	1973												408									180		228	228	6.51	7	0	7	1	13
																	857	1,195	2,052	8,336	1,285	9,621	264	68	204	32	254					

* The adjustment for incomplete schools in terms of the design number of pupils uses the calculation formula, i.e. design number of pupils = current number of pupils/existing number of grades x number of target grades.

** When the required number of classrooms falls short of the number of target grades, adjustment is made by providing at least one classroom for each grade.

*** For calculation of the design number of pupils for the new school, the design number of pupils consists of those expected to move from nearby schools and those coming from outside the likely catchment area (10%). As a result, adjustment is made by dividing

(3) Design Principles Regarding Requested Auxiliary Facilities, Building Service Systems, Furniture and Fixtures

1) Toilets

In view of the inadequacy of the toilet facilities in terms of both the quality and quantity at the requested schools in addition to the shortage of toilets for teachers, the construction of a toilet block of an appropriate size for the number of classrooms at each school (approximately 1.5 cubicles/classroom) is planned under the Project to improve the sanitation conditions. These toilets will be divided into those for boys and girls. In addition, toilet facilities for teachers as stipulated by the Physical Resource Planning Manual will be attached to the block.

2) Water Supply Facilities

As water supply facilities are essential for public hygiene, a water tank (capacity of 2.5 – 5 tons) and a number of taps suitable for the school size are planned in suitable places at all of the sites. At 10 sites where there is currently no access to water supply, a feasible method of ensuring water supply such as extension of the community's existing water supply system, construction of a borehole and/or regular water supply from an adjacent area will be planned and implemented at the expense of the South African side.

3) Electrical Installations

In regard to electricity supply, as the introduction of electrical installations at schools under the National Schools and Clinics Electrification Strategy, etc. is in progress, the necessary equipment will be installed in view of the use of schools as community facilities in the evening and the use of educational equipment requiring electricity. In principle, lighting fixtures will be installed in the administration rooms and one classroom and a receptacle unit will be installed in two places in each of the other classrooms. At sites where access to electricity supply is not guaranteed, no electrical installations are planned under the Project.

4) Furniture and Fixtures

In addition to desks and chairs for the pupils and teacher and a chalkboard, a pinboard which is useful for displaying hand-made teaching aids by the teacher and pupils and a cabinet to store teaching aids, etc. will be provided for each classroom. In the administration room of one classroom size where the principal's office, space of teachers' meetings and teaching aids/documents storage space are located, desks and chairs for the principal and teachers' meetings will be provided together with a chalkboard and a pinboard. Storage cabinets will be placed in an appropriate manner so that they can function as partitions between the spaces for different intended uses.

(4) Design Principles Regarding Natural Conditions

1) Climate

It is necessary to take localized downpours due to cyclones into consideration in the planning of the Project and careful attention must be paid to the location and layout of the buildings. Planning will be based on natural lighting and natural ventilation and the design will take the local climate at each site into consideration which may be characterised by severely cold winters or strong wind, etc. Special attention will be paid to the roof design as roof damage due to strong winds has been recorded in the Project Area.

2) Topography and Geology

All of the target sites are situated on either flat land or gently sloping land. While the soil type varies from one site to another, many of the sites are dominated by laterite or a gravel layer with sufficient bearing capacity to support single storey buildings. At many sites, the planned supporting ground (-1 m) contains gravel. The presence of bedrock is confirmed at some sites. As all of the sites have ample space, all of the planned buildings will be single storey buildings with a realistic design which is appropriate for the specific topographical and ground conditions.

(5) Design Principles Regarding Socioeconomic Conditions

There is a strong sense of participation in school operation among local people in the Project Area as they have traditionally conducted the construction and operation of schools themselves. This sense of participation is further encouraged by the recent government policy of allowing the extensive autonomy of schools. Institutionally, the local community has also been responsible for the routine repair and maintenance of facilities and has provided funds for school operation in the form of a school fee. However, this school fee is a heavy burden for many parents as the area is marred by a high unemployment rate and poverty. The emphasis of planning will, therefore, be placed on the use of local technologies and materials to allow maintenance work to be conducted using local labour in addition to a durable design to reduce the maintenance cost burden.

Public order in the province is relatively good although theft from and damage to school facilities by vandalism is not unusual. The existing schools have introduced various security measures, including perimeter fencing, doors and windows protected by (steel) grilles and night guards. Under the Project, the necessary measures will be introduced in consideration of their effects and cost. As far as fencing is concerned, the erection of fencing by the South African side will be checked.

(6) Design Principles for Use of Local Construction Companies and Local Materials

The LDE has been constructing some 250 schools (each consisting of a four classroom block and a toilet block) a year since 1996 up to the present and there are many local construction companies with experience of school construction in Limpopo Province and also in neighbouring Mpumalanga Province. Judging from their number of employees, annual turnover and actual work results, however, there are not many local companies which are capable of conducting construction work at multiple sites over a wide area. Accordingly, a regime to divide the work into each district and to control the number of local companies in each district will be considered. Although most of the construction materials required for the construction of schools can be procured in Limpopo Province, cement and roofing material factories are located near Pretoria. In order to reduce the construction cost, direct procurement from these factories will be considered for cement and roofing materials in order to utilise the scale merit of the Project.

(7) Design Principles Regarding Operation and Maintenance Capability of the Project Implementation Organization

The roles of each organization concerning the operation and maintenance of school facilities are stipulated by the South African School Act and other legislation and actual operation is roughly in line with the statutory requirements. The local community is responsible for the water and lighting costs as well as for cleaning and minor repairs. Apart from voluntary labour and donations by local people, the necessary payments are made by the school fund which pools the school fees paid by parents and other revenue. The LDE appropriates the necessary funds to cover other operation and maintenance expenses in the form of three types of budgets: (i) budget allocated to schools for operation and management to cover office supplies (stationary, etc.), utility charges and others, (ii) ad hoc budget to meet the facility maintenance cost, etc. when ever the need for such budget arises and (iii) investment budget for major rehabilitation work. Special care will be taken under the Project to design durable and maintenance-free facilities to mitigate the financial burden on the local community and the LDE. Moreover, local materials and labour will be used as much as possible so that local people can conduct the maintenance of the new facilities themselves.

(8) Design Principles Regarding Building Criteria and Standards

In South Africa, the SABS provide general standards which conform to BS (British Standards) and which set forth the standards for building-related main materials, construction methods and building design. The technical details of the National Building Regulations are also set forth in SABS-0400 which the project design refers to. In regard to school facilities, the Physical Resource Planning Manual sets forth the standards for school facilities, planning processes and roles of various organizations, such as the Department of Public Works and private consultants.

The Standard Design in Limpopo Province does not necessarily meet the standards set forth by the Physical Resource Planning Manual and, therefore, the suitability of each design item for the Project will be determined with reference to the Standard Design and other relevant criteria/standards.

(9) Design Principles Regarding Facility and Material Grades

In principle, the school facilities recently constructed by the LDE are in line with the Provincial Standard Design and have achieved certain levels in terms of the specifications, performance, work quality and maintenance conditions. These facilities have been constructed with locally procurable materials by locally-based consultants and construction companies and are judged to be reasonable buildings in terms of the cost and ease of maintenance. The school facilities to be constructed under the Project will basically follow these facilities and the basic plan for the Project will be formulated incorporating structural and functional improvements as deemed necessary by the site survey.

(10) Design Principles Regarding Construction Methods and Schedule

The Project plans the construction of school facilities at 32 sites dispersed in three educational districts in the central and western region of Limpopo Province and assumes the construction of single storey buildings using conventional technologies and construction methods. The actual construction work will be conducted by multiple local subcontractors under the supervision of the Japanese main contractor. The construction of public buildings in Limpopo Province has been conducted by local construction companies in the province as well as those based in neighbouring provinces, including adjacent Mpumalanga Province. For the implementation of the Project, the establishment of several work blocks corresponding to the abilities of local construction companies is judged to be appropriate to ensure the smooth progress of the construction work.

The construction of a single storey building usually takes 7 – 8 months in the Project Area. However, it must be noted that a delay of the work may occur if the earth work and foundation work periods fall in the rainy season from October to March. Because of the need to supervise 32 sites in three educational districts, it is more realistic to slightly shift the construction for each site so that the necessary inspection and other work can be smoothly conducted. For this purpose, the suitable work implementation period is 12 months, including one month each for preparation and inspection/handing over and two months to accommodate any possible delay of the work at some sites.

Judging from the capability of the LDE as the project implementation organization and that of local construction companies, the planned construction of 236 rooms (204 classrooms and 32 administration rooms) at 32 sites can be conducted in one fiscal year. From the viewpoint of the

construction schedule, the completion of the work in one year is justified and, therefore, the Project will be implemented in one fiscal year.

2.2.2 Basic Plan

(1) Site Use and Facility Layout Plan

When planning the layout of the facilities, the conditions of the site and its surroundings, layout of existing facilities and temporary installation plan, etc. will be taken into consideration. The optimum plan for each site will be finalised on the basis of a comprehensive judgement based on the following criteria.

- In principle, the buildings will be positioned parallel to the east-west axis to avoid direct sunlight in the morning and evening.
- The buildings will be positioned in line with the site gradient to minimise cutting and banking.
- The layout plan will ensure ample playground space, taking the layout of existing facilities into consideration.
- The necessary distance will be provided between the buildings to ensure good natural ventilation and lighting.

(2) Building Plan

1) Floor Plan and Setting of Room Sizes

For the floor plan and setting of the room sizes, the Provincial Standard Design is used as the base. The optimal plan will be formulated taking the room sizes adopted by past USAID and Japanese grassroots grant aid projects in the province and the corresponding plan contents under a fore-running Japanese grant aid project in another province into consideration.

① Classrooms

Although the standard classroom size stipulated by the Physical Resources Planning Manual is 60 m², the Project adopts 55.73 m² (7.72 m x 7.22 m) of the Provincial Standard Design. The design classroom capacity is 40 pupils for primary schools and 35 pupils for secondary schools. The maximum capacity with the use of standard furniture is 50 pupils for primary schools and 42 pupils for secondary schools. Accordingly, the classroom area per pupil is 1.39 m² for primary schools and 1.59 m² for secondary schools with the design number of pupils and 1.11 m² for primary schools and 1.32 m² for secondary schools with the maximum capacity. In South Africa,

various forms of teaching (group learning, etc.) and furniture layouts have been in use since the introduction of the new curriculum. The classroom size based on the Provincial Standard Design is judged to be appropriate as past USAID and Japanese grassroots grant aid projects in the province have adopted a classroom size of 55.73 m² based on the said Design.

② Administration Rooms

As the minimum requirements for adequate school management, a principal's office, staff space and storage space for textbooks and documents are planned. In order to enable these rooms to be converted to classroom use in the event of an administration building with full specifications being constructed in the future, the overall size of these facilities will be equivalent to one classroom (55.73 m²). The principal's office and staff space will be separated by storage cabinets which will act as a temporary partition. The principal's office will have a floor area of 15.10 m² with a desk, chair and shelves for document storage. The staff space will have a floor area of 31.73 m² with meeting tables, chairs and notice board. Some shelves will also be provided in view of the use of part of this space for storing books. The storage space will have a floor area of 8.90 m² with shelves to store textbooks, teaching aids and stationary.

③ Toilets

The Physical Resources Planning Manual states that the standard requirement is one toilet per 25 pupils for primary schools and one toilet per 20 pupils for secondary schools. Meanwhile, the provincial policy target is two toilets per classroom. As many sites already have classrooms and toilets, the construction of toilets at a rate of roughly 1.5 toilets per classroom to be newly constructed is planned under the Project. One-third of the new toilets will be allocated to boys and the boys' toilets will be provided with continuous urinals. The Provincial Standard Design stipulates that toilet facilities for teachers must be provided in the administration block. Under the Project, however, one toilet cubicle with its own entrance will be introduced for the use of teachers in the toilet block.

Comparison of design components between the project and others is shown in Table 2-8.

Table 2-8 Comparison of Design Components Between the Project and Others

		Project	Provincial Standard Design	Mpumalanga Province
Classrooms	Area per Classroom	55.73 m ²	56 m ²	56 m ²
	Pupils per Classroom	40	40	40
	(Standard)	35	35	35
	Classroom Area per Pupil	1.39 m ²	1.4 m ²	1.4 m ²
		1.59 m ²	1.6 m ²	1.6 m ²
Administration Rooms	Type of Facilities	Attached to classroom block	Separate block	Attached to classroom block
	Total Area	55.73 m ²	190 – 320 m ² (ref.case of 258 m ²)	56 m ²
	Principal's Office	15.10 m ²	26 m ²	13 m ²
	Vice-Principal's Office	None	15 m ²	None
	Staff Room	31.73 m ²	73 m ²	30 m ²
	Office	None	25.5 m ²	None
	Store Room	8.90 m ²	14 m ²	13 m ²
	Strong Room	None	5.5 m ²	None
	Sick Room	None	16 m ²	None
	Print Room	None	6.5 m ²	None
	Staff Toilets	Attached to toilet block	22.5 m ²	Attached to toilet block
	Reception Hall/Corridors	None	46 m ²	None
	Kitchen	None	8 m ²	None
Toilets	Number of Toilet	1.5/classroom	2/classroom	Max. 50 persons / toilet

2) Standard-Type Facilities

The Project aims at achieving the cost reduction and efficiency of construction work by standardizing the facilities at all of the sites as much as possible. The standard-type facilities shown in Table 2-9 will be adopted for application to each site depending on the planned number of classrooms.

Table 2-9 Standard-Type Facilities

Classroom Block		
Facility Type	Contents	Floor Area (m ²)
2CA	2 classrooms + administration rooms	207.05
3C	3 classrooms	207.05
3CA	3 classrooms + administration rooms	276.06
4C	4 classrooms	276.06
4CA	4 classrooms + administration rooms	345.08
5C	5 classrooms	345.08
Toilet Block		
Facility Type	Contents	Floor Area (m ²)
A	5 cubicles + one staff cubicle + continuous urinals	26.13
B	6 cubicles + one staff cubicle + continuous urinals	32.67
C	9 cubicles + one staff cubicle + continuous urinals	45.73

3) Type of Facilities by Site

The type of facilities planned for each site is shown in Table 2-10.

Table 2-10 Planned Facilities and Floor Area by Site

Ed. District	B		Design No. of Pupils	No. of Rooms Required		Type of Classroom Block (m ²)	2CA	3C	3CA	4C	4CA	5C	Classroom Block Floor Area (m ²)	Toilet Type (m ²)	A	B	C	Total Floor Area (m ²)
				Classrooms	Admini.Rooms		207.05	207.05	276.06	276.06	345.08	345.08			26.136	32.67	45.738	
BOCHUMDISTRICT	BC1	DINOKO PS	235	3	1	3CA			1				276.06	1A	1			302.20
	BC2	KGOPUDI SS	152	5	1	2CA+3C	1	1					414.10	1C			1	459.84
	BC3	MAKGOTLHO PS	366	7	1	2CA+5C	1					1	552.13	2A	2			604.40
	BC4	MAPOTLA PS	378	3	1	3CA			1				276.06	1B		1		308.73
	BC5	MATJEKELANE PS	289	5	1	2CA+3C	1	1					414.10	1C			1	459.84
	BC6	NGOAKWANA SS	165	4	1	4CA					1		345.08	1B		1		377.75
	BC7	RAPETSOA SS	72	2	1	2CA	1						207.05	1A	1			233.19
	BC8	RASEKGALA SS																
	BC9	RAPOHO PS	623	10	1	2CA+2x4C	1			2			759.17	1B+1C		1	1	837.58
	BC10	KODUMELA PS	167	3	1	3CA			1				276.06	1A	1			302.20
	BC11	BOTHANANG PS	523	14	1	4CA+2x3C+4C		2		1	1		1,035.24	2C			2	1,126.72
	BC12	SEKURURWE COMBINED	446	10	1	3CA+3C+4C		1	1	1			759.17	2B		2		824.51
		SUBTOTAL		3,416	66	11		5	5	4	4	2	1	5,314.22		5	5	5
KONEKWENA DISTRICT	KK1	KWENA A PEU SS	92	3	1	3CA			1				276.06	1A	1			302.20
	KK2	RAMETLOANA LPS	332	7	1	3CA+4C			1	1			552.12	1C			1	597.86
	KK3	ALAPHA SS																
	KK4	MAHLABELA SS	134	2	1	2CA	1						207.05	1A	1			233.19
	KK5	IKAGELENG MAKOBE PS	442	7	1	4CA+3C		1			1		552.13	2A	2			604.40
	KK6	PULA SEOPA PS	483	12	1	4CA+2x4C				2	1		897.20	2C			2	988.68
	KK7	SEFATALADI PS	446	11	1	3CA+3C+5C		1	1			1	828.19	1B+1C		1	1	906.60
	KK8	TLOU SS	135	3	1	3CA			1				276.06	1A	1			302.20
	KK9	RAPITSI PS	539	5	1	2CA+3C	1	1					414.10	1C			1	459.84
	KK10	KGABO PS	152	4	1	4CA					1		345.08	1B		1		377.75
		SUBTOTAL		2,755	54	9		2	3	4	3	3	1	4,347.99		5	2	5
BAKENBERG DISTRICT	BB1	BASTERPAD PS	215	4	1	4CA					1		345.08	1B		1		377.75
	BB2	KGAKATHU SS	213	7	1	3CA+4C			1	1			552.12	2A	2			604.39
	BB3	KGAUBOHLALE SS																
	BB4	KGOTOSORO PS	269	7	1	2CA+5C	1					1	552.13	1C			1	597.87
	BB5	MATLOU MEMORIAL PS	298	6	1	2CA+4C	1			1			483.11	2A	2			535.38
	BB6	MOROBA PS	268	7	1	3CA+4C			1	1			552.12	1C			1	597.86
	BB7	MUSHI PS	411	9	1	4CA+5C					1	1	690.16	2B		2		755.50
	BB8	NKIDIKITLANA PS	382	9	1	2CA+3C+4C	1	1		1			690.16	2B		2		755.50
	BB9	NKONTLHA PS	266	5	1	2CA+3C	1	1					414.10	1C			1	459.84
	BB10	NTEBELELENG PS	214	4	1	4CA					1		345.08	1B		1		377.75
	BB11	THUTLANE LPS	443	12	1	3CA+3x3C		3	1				897.21	2C			2	988.69
	BB12	TLHAKO PS	243	7	1	3CA+4C			1	1			552.12	1C			1	597.86
	BB13	SESHOATLHA SS	228	7	1	3CA+4C			1	1			552.12	2A	2			604.39
		SUBTOTAL		3,450	84	12		4	5	5	6	3	2	6,625.51		6	6	6
GROUND TOTAL			9,621	204	32		11	13	13	13	8	4	16,287.72		16	13	16	17,862.41

Classroom Block

A: Administration Rooms

C: Classrooms

(3) Cross-Section and Elevation Plan

The cross-section and elevation plan will take natural ventilation and lighting into consideration. Following the Provincial Standard Design, a ceiling height of 2.805 m will be employed for the Project. The roof will have a wooden truss with a gradient of 18% and a suspended ceiling will be fitted to secure stable indoor thermal conditions. Two sides-hung opening windows will be fitted to encourage natural lighting and ventilation in the classrooms.

Given the fact that inclusive education, i.e. integration of some types of special education to ordinary education, is being promoted in Limpopo Province as part of the priority policies of the province, special consideration will be given to ensuring the safe access of handicapped pupils, including the elimination of different floor levels as already observed at school facilities constructed by the USAID. There is no record of flooding at any of the sites and a standard floor height of 320 mm above ground level will be adopted. Slopes will be introduced at one side of the corridors.

(4) Structural Plan

1) Type of Structure

The masonry brick wall structure adopted by the Provincial Standard Design will be selected as the type of structure for the planned facilities. This method will allow general cost reduction as it not only enables the full use of local materials, labour and accumulated technical expertise but also uses such readily available materials in the local market as iron fittings, reinforcing materials and PC lintels, etc.

RC continuous footing foundations using ground at a depth of GL -0.6 m or more as the supporting ground will be employed as the simplified geological survey results using test pits at the time of the field survey found that sufficient soil bearing capacity is available at most of the sites. The design allowable soil bearing capacity of the supporting ground will be 10 tons/m^2 . At a small number of sites where a relatively soft clay layer is observed, the design allowable soil bearing capacity will be 5 tons/m^2 and the soil bearing capacity at these sites will be checked again prior to the commencement of the construction work.

The floors will be slab-on-grade concrete floors. As the popular local floor structure consists of some 75 mm thick non-reinforced concrete, it is liable to such defects as uneven floors and cracks in the finishing mortar, etc. Under the Project, the floors will be 100 mm thick concrete floors reinforced by 6 mm bars to prevent cracks and to ensure a durable performance. The type of finish will be a trowel finish with 10 mm thick concrete.

The roof structure will consist of a wooden roof truss and wooden purlines which is the most popular local roof structure and for which the necessary materials are widely available. The field survey team frequently found damage to roofing materials and joints due to strong wind. RC beams will, therefore, be introduced in the upper part of the masonry brick walls and the wooden truss materials will be tied to these beams. The end section of the roof over the corridor will protrude from the building proper. This section will be given extra strength as it will be tied to the connecting beam supported by steel pipe pillars of 75φ.

2) Design Loads and External Forces

In principle, the design loads and external forces will be based on South African Standards (SABS 0160-1989) and the following values will be adopted.

- Fixed load: as follows in accordance with the relevant SABS
 - Concrete : 2,300 kg/m³
 - Reinforced concrete : 2,400 kg/m³
 - Bricks : solid type 260 kg/m² (W = 120)
 - Timber : structural timber 500 kg/m³ up to Grade 6
700 kg/m³ for Grade 7 or higher
 - Mortar : 2,300 kg/m³
- Live load: as follows in accordance with the relevant SABS
 - Classrooms : 2.0 kN/m²
 - Corridors : 5.0 kN/m²
 - Offices : 2.5 kN/m²
- Seismic force: not considered as none of the project sites are included in a seismic zone
- Wind force: in accordance with the relevant SABS, the wind force will be calculated assuming a maximum instantaneous wind velocity of 40 m/sec at 10 m above the ground

3) Structural Materials and Allowable Stress

In regard to the main structural materials, such as concrete, reinforcing bars, structural bricks and structural timber, those conforming to the relevant SABS will be used. Suitable materials and their strength are listed below. The allowable stress levels will be calculated in accordance with the relevant SABS.

- Concrete	: Grade 20	fcu = 20 Mpa
- Reinforcing bars	: hot rolled mild steel	fy = 250 Mpa
- Timber	: SA pine Grade 6	Pb = 6.0 Mpa

(5) Building Services Plan

1) Electrical Installations

Electrical appliances will be introduced at all of the sites under the Project. This equipment will consist of lighting fixtures and receptacles in the administration rooms and classrooms. In the case of classrooms, the maximum use of natural lighting will be planned to reduce the operation and maintenance cost. Many schools are used for adult literacy education and/or community activities in the evening and government policy encourages such use. Lighting equipment will, therefore, be installed in one of the new classrooms as the minimum requirement. In addition, two receptacle units will be installed in each classroom in view of the active promotion of distance education using television and education using ICT (information communication technology) and their wide extension in the future.

2) Plumbing

The field survey concluded that the use of a local water supply system or groundwater from a well will be possible at all except 10 of the sites. As water supply based on these sources is intermittent and the regular supply of water is not guaranteed, the introduction of an elevated water tank is planned to ensure a constant supply of water. The installation of taps to supply water for hand washing, cooking and cleaning is also planned in view of the wide spread of the free school meal scheme and regular cleaning of the school facilities by pupils in Limpopo Province. At those sites where water supply from a local water supply system or well cannot be anticipated, the construction of a surface water storage tank is planned to enable regular water supply from an adjacent area.

In regard to the discharge of sewage, flush toilets will be installed at one site where the public sewerage system can be used and foul water will be discharged to this system. At all other sites where no such system is available, the Enviro-Loo system will be introduced instead of flush toilets for the dipping up of night soil. With the Enviro-Loo system, excrement is separated into solids and water. The solids are dipped up following the evaporation of the water. The Provincial Department of Education currently encourages the use of the Enviro-Loo system rather than the direct infiltration system without purification included in the Provincial Standard Design because of environmental considerations. The Enviro-Loo system has already been employed by many existing schools in the province.

While rainwater will be allowed to infiltrate into the ground, concrete apron will be installed around the building to protect the foundations and to prevent soil loss around the building.

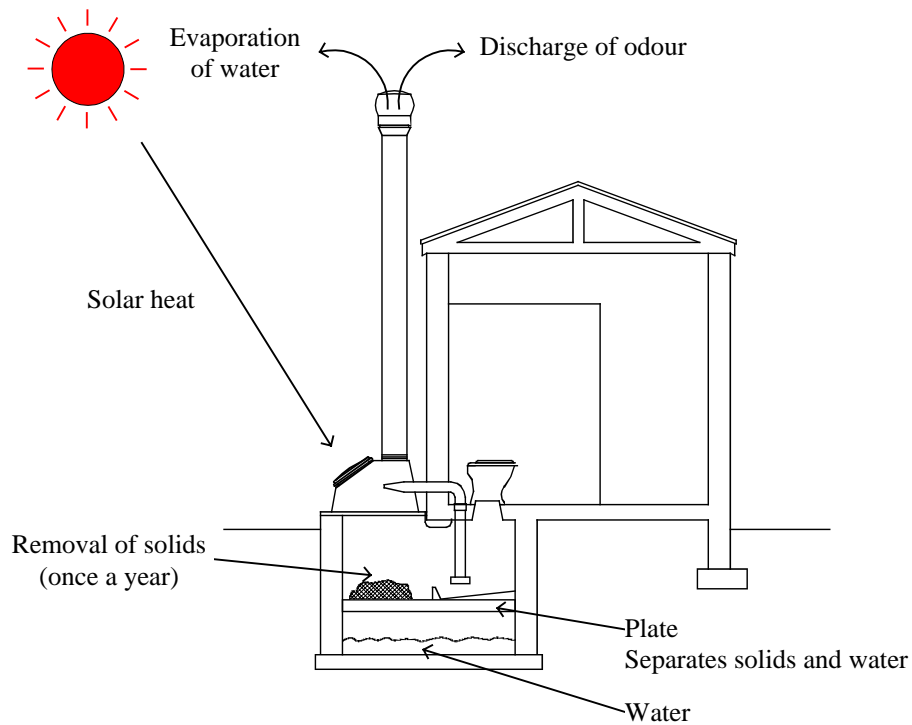


Fig. 2-5 Outline of Enviro-Loo System

(6) Equipment Plan

Although textbooks, etc. will not be provided under the Project, the basic school furniture listed in Table 2-11 will be provided. The standard classroom furniture in Limpopo Province are two seater desks and individual chairs for primary schools and individual desks and chairs for secondary schools. The specifications of the furniture should satisfy special needs, such as frequent changes of the desk layout in accordance with the new curriculum and stacking during regular cleaning. Desks and chairs will be selected from among locally available products. The actual contents of the school furniture are listed in Table 2-11.

Table 2-11 List of Furniture

Room Type	Item	Quantity (per room)		Remarks
		Primary (G1 – G7)	Secondary (G8 – G9)	
Classrooms	Pupils' Desks (Two Seater)	20		Two sizes serving lower and higher grades
	Pupils' Desks (Single Seater)		35	
	Pupils' Chairs	40	35	
	Teacher's Desk	1	1	
	Teacher's Chair	1	1	
	Chalkboard	1	1	
	Pinboards	2	2	
	Steel Cabinets	2	2	With door and lock
Administration Rooms	Principal's Desk	1	1	
	Principal's Chair	1	1	
	Tables (Two Seater)	6	6	
	Chairs	12	12	
	Shelves/Book Shelves (Large)	5	5	
	Shelves/Book Shelves (Small)	4	4	
	Chalkboard	1	1	
	Pinboard	1	1	
	Steel Cabinets	2	2	With door and lock

(7) Building Materials Plan

The specifications for each part of the planned facilities will be based on the Provincial Standard Design set by the Limpopo Provincial Department of Education and any necessary improvement will be made based on comprehensive consideration of the durability, workability, ease of maintenance and cost efficiency, etc. In principle, specifications which allow the minimisation of the construction, operation and maintenance costs while meeting the quality expected of school facilities will be selected. The materials to be used will be those which can be locally procured and priority will be given to those specifications which reflect conventional technologies and construction methods in view of utilising the local workforce to the maximum extent. Table 2-12 shows the planned performance and specifications for each part of the planned facilities.

Table 2-12 Comparison of Specifications

Part		Project	Provincial Standard Design	Mpumalanga Province	Reasons for Selection
Roof	Structure	Ready-made wooden truss: 18% gradient	Ready-made wooden truss: 18% gradient	Ready-made wooden truss: 15% gradient	Most popular method locally and abundance of ready-made products
	Roofing Materials	Galvanised iron sheeting	Galvanised corrugated iron sheeting	Galvanised corrugated coloured iron sheeting	Better workability of galvanised iron sheeting than corrugated sheeting when attached to the truss
Walls	Structure	Clay brick masonry	Clay brick masonry	Clay brick masonry	Easy to procure factory products of uniform quality in the province; good weatherability
	Finish	None	None for classrooms; plaster and paint finish for administration rooms	None	Cost efficiency due to being maintenance-free
Openings	Windows	Ready-made steel-frame glass windows	Ready-made steel-frame glass windows	Ready-made steel-frame glass windows	Aluminium frames are expensive; various types of steel-frame glass windows are available due to their popular use
	Doors	Steel-frame wooden doors with paint finish	Steel-frame wooden doors with paint finish	Wooden doors with paint finish	The Standard Design poses no problems in terms of the cost or specifications
	Security Grills	Steel-grill door for toilet and administration blocks; security bars for windows		Steel-grill door for administration office	The Standard Design poses no problems in terms of the cost or specifications
Interior Finish	Ceilings	Plaster board with paint finish; cement board with paint finish for corridors	Plaster board with paint finish; cement board with paint finish for corridors	Cement board with paint finish	The Standard Design poses no problems in terms of the cost or specifications
	Floors	Concrete with trowel finish	Concrete with trowel finish	Plastic tiles; concrete for corridors	The Standard Design poses no problems in terms of the cost or specifications

2.2.3 Basic Design Drawings

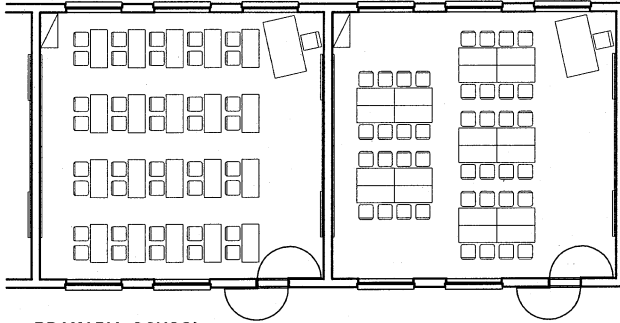
- (1) Unit Plan Schedule
- (2) Furniture Layout Plan
- (3) Classroom Building
- (4) Sanitary Building (Type A)
- (5) Elevated Water Tank
- (6) Site Plan

(1) UNIT PLAN SCHEDULE S=1/750

<p>2CA</p>		<p>CLASSROOM = 7.220 x 15.440 = 111.4788 ADMINISTRATION = 7.220 x 7.220 = 55.7384 CORRIDOR = 1.720 x 23.160 = 39.8352 TOTAL = 207.0504m²</p>
<p>3C</p>		<p>CLASSROOM = 7.220 x 23.160 = 167.2152 CORRIDOR = 1.720 x 23.160 = 39.8352 TOTAL = 207.0504</p>
<p>3CA</p>		<p>CLASSROOM = 7.220 x 23.160 = 167.2152 ADMINISTRATION = 7.220 x 7.220 = 55.7384 CORRIDOR = 1.720 x 30.880 = 53.1136 TOTAL = 276.0672m²</p>
<p>4C</p>		<p>CLASSROOM = 7.220 x 30.880 = 222.9536 CORRIDOR = 1.720 x 30.880 = 53.1136 TOTAL = 276.0672m²</p>
<p>4CA</p>		<p>CLASSROOM = 7.220 x 30.880 = 222.9536 ADMINISTRATION = 7.220 x 7.220 = 55.7384 CORRIDOR = 1.720 x 38.600 = 66.3920 TOTAL = 345.0840m²</p>
<p>5C</p>		<p>CLASSROOM = 7.220 x 38.600 = 278.6920 CORRIDOR = 1.720 x 38.600 = 66.3920 TOTAL = 345.0840m²</p>
<p>A</p>		<p>A TYPE (5+1booths) = 2.970 x 8.800 = 26.136</p>
<p>B</p>		<p>B TYPE (6+1booths) = 2.970 x 11.000 = 32.670m²</p>
<p>C / C'</p>		<p>C TYPE (9+1booths) = 2.970 x 15.400 = 45.738 C' TYPE (9+1booths) = 2.970 x 18.400 = 45.738</p>

(2) FURNITURE LAYOUT PLAN S=1/200

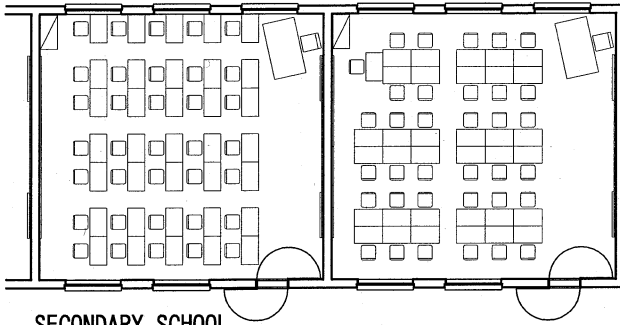
CLASSROOM FURNITURE LAYOUT PLAN



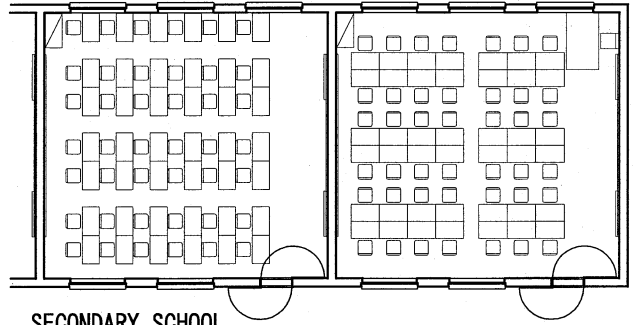
PRIMARY SCHOOL
(NORMAL STRENGTH : 40 STUDENTS)



PRIMARY SCHOOL
(LARGEST STRENGTH : 50 STUDENTS)

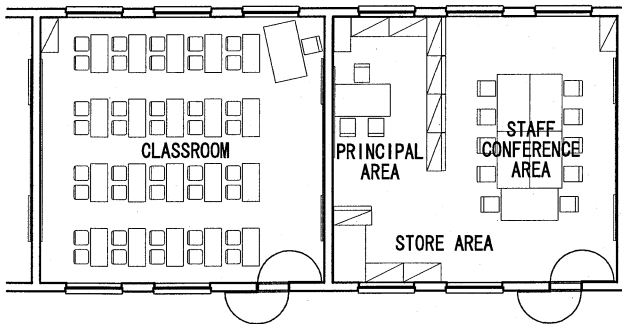


SECONDARY SCHOOL
(NORMAL STRENGTH : 35 STUDENTS)



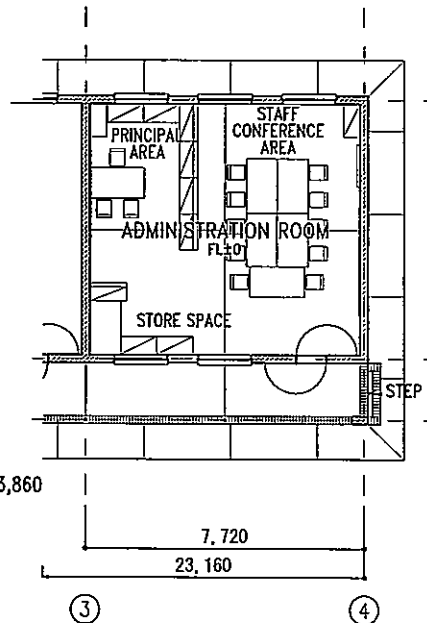
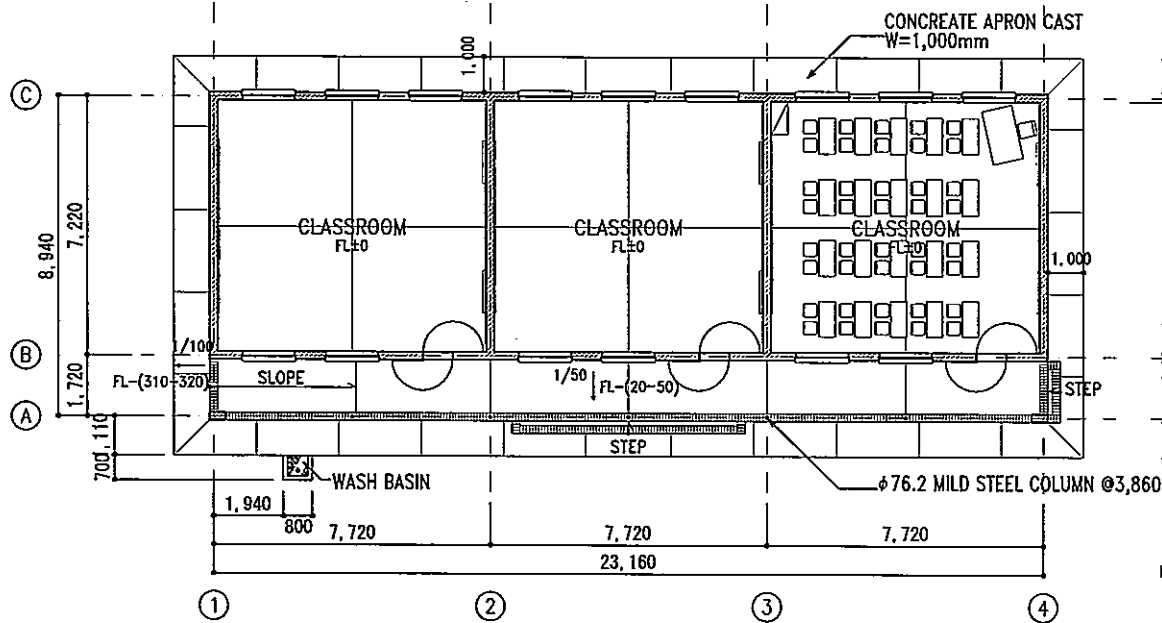
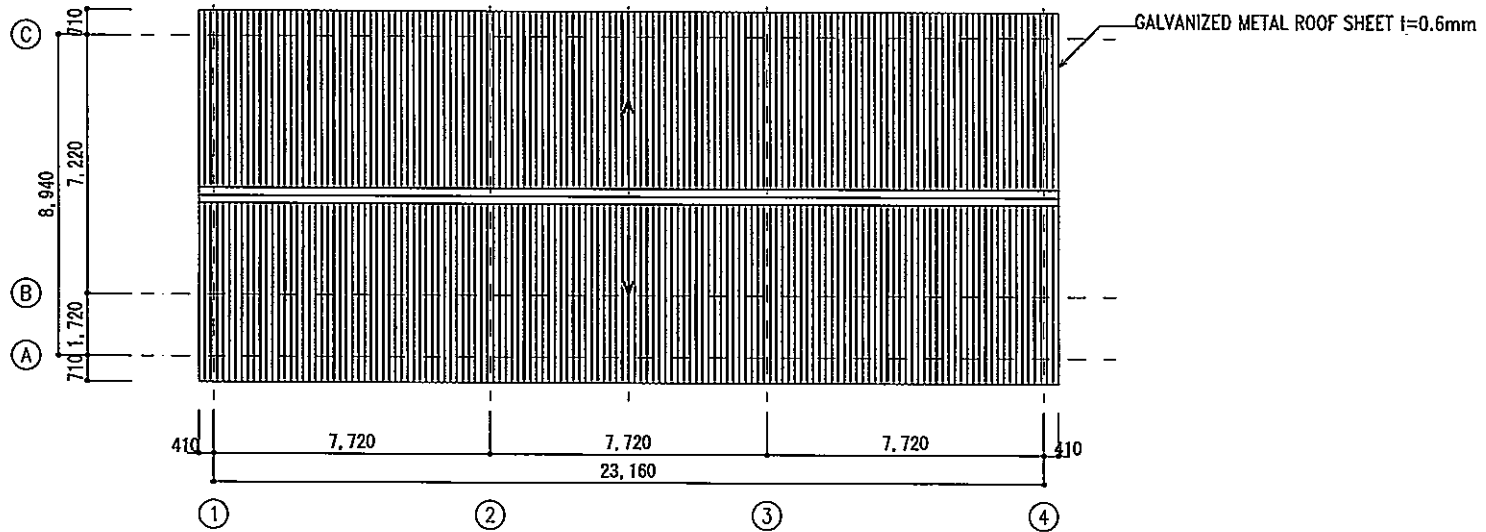
SECONDARY SCHOOL
(LARGEST STRENGTH : 42 STUDENTS)

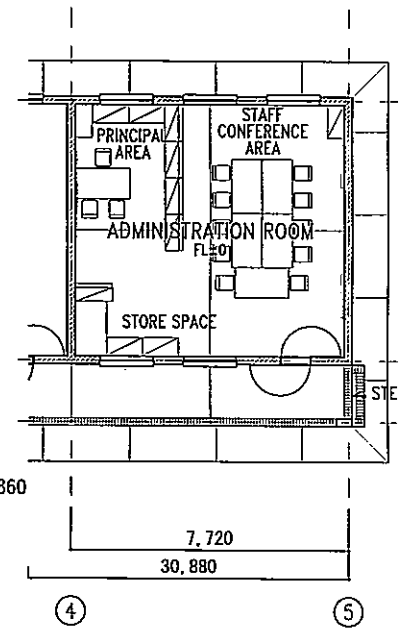
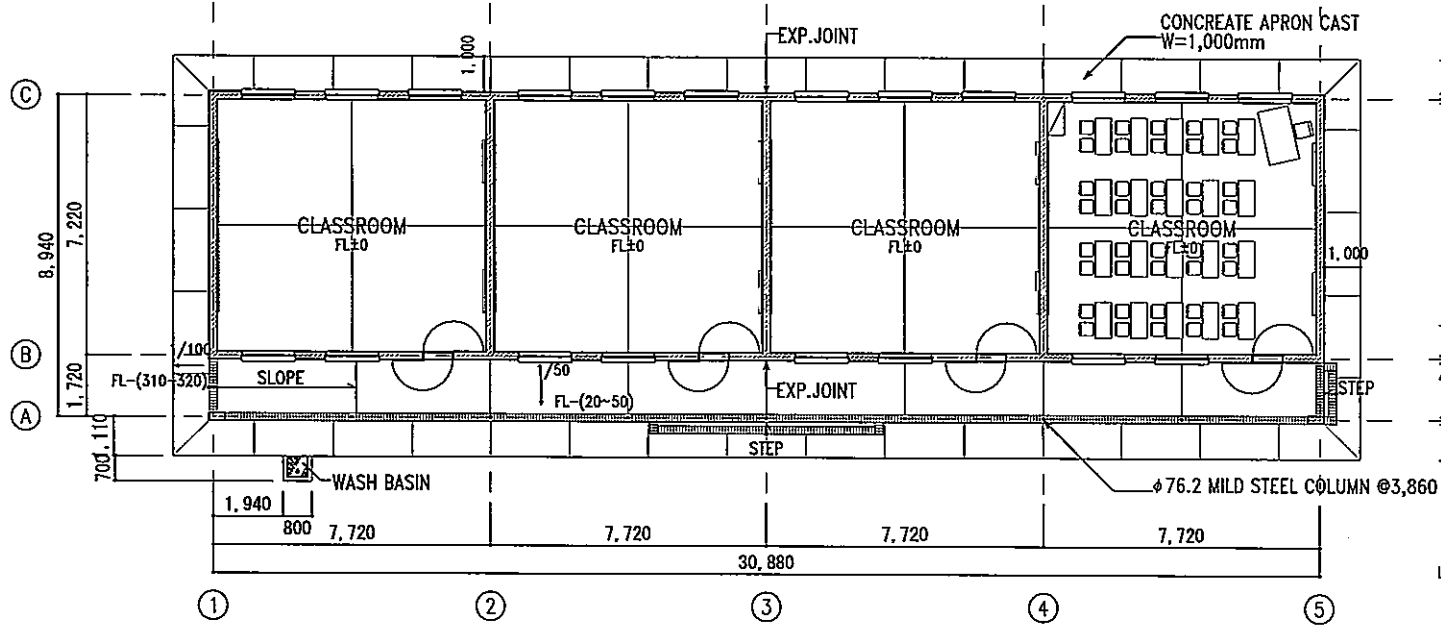
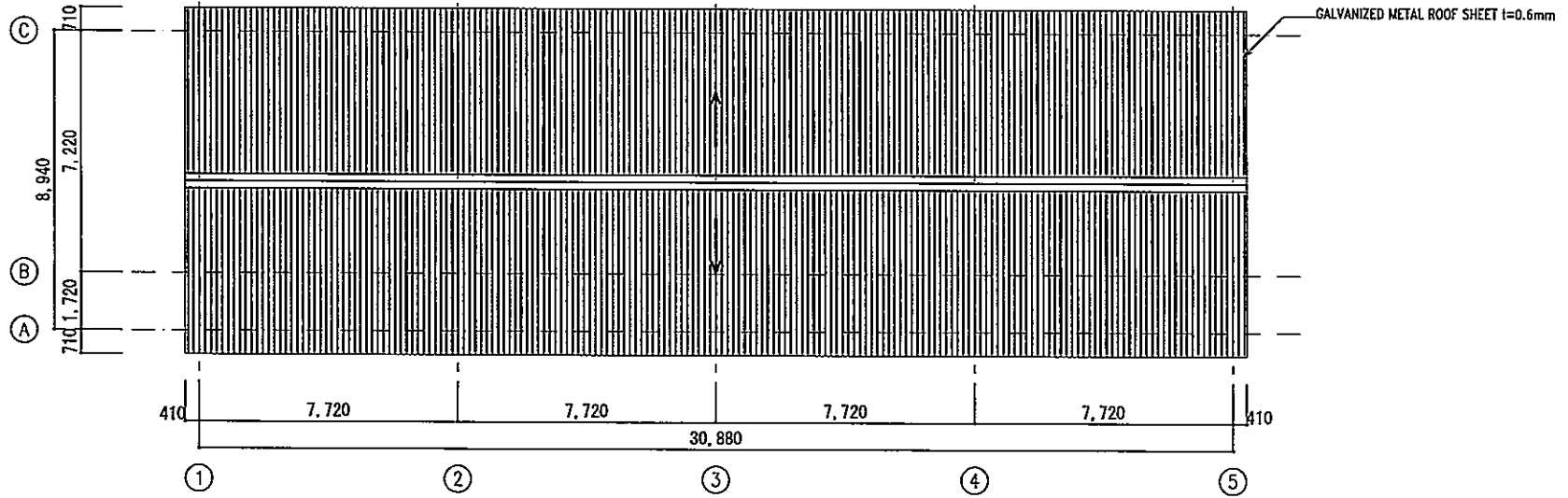
ADMINISTRATION ROOM FURNITURE LAYOUT PLAN

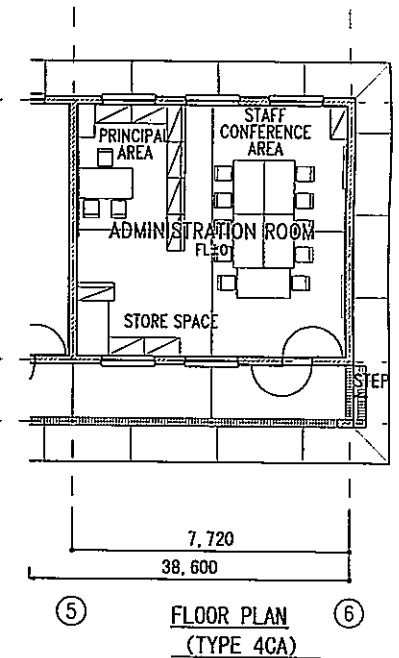
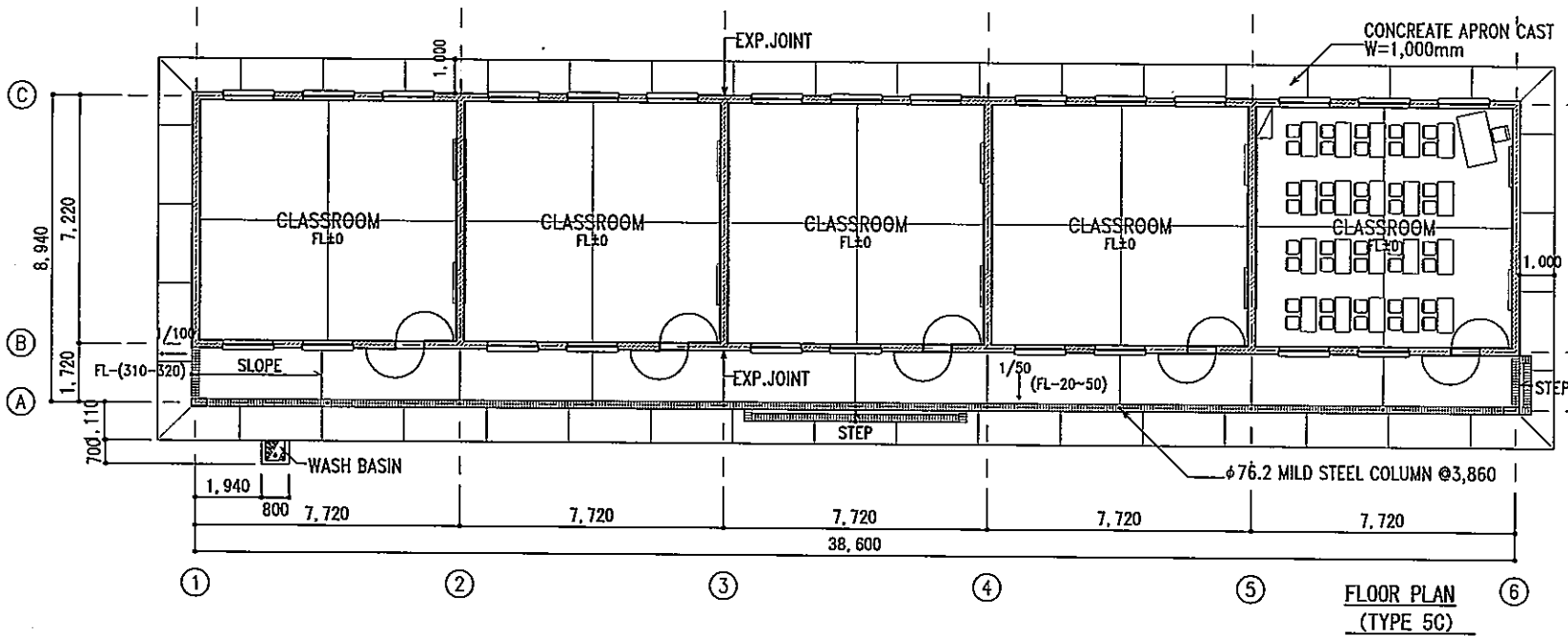
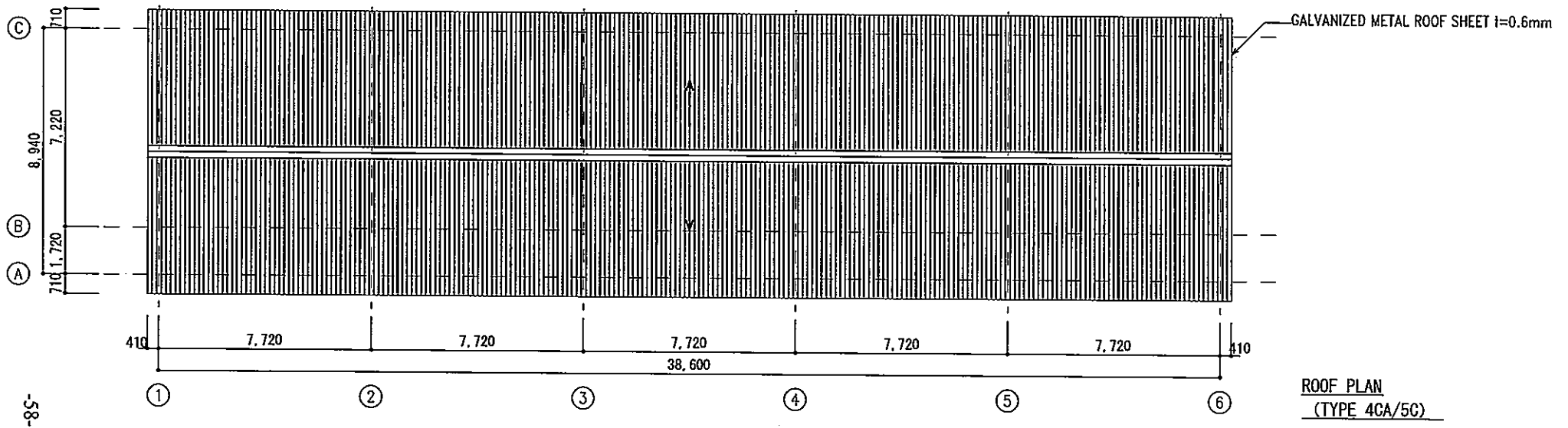


ADMINISTRATION (PRIMARY SCHOOL / SECONDARY SCHOOL)

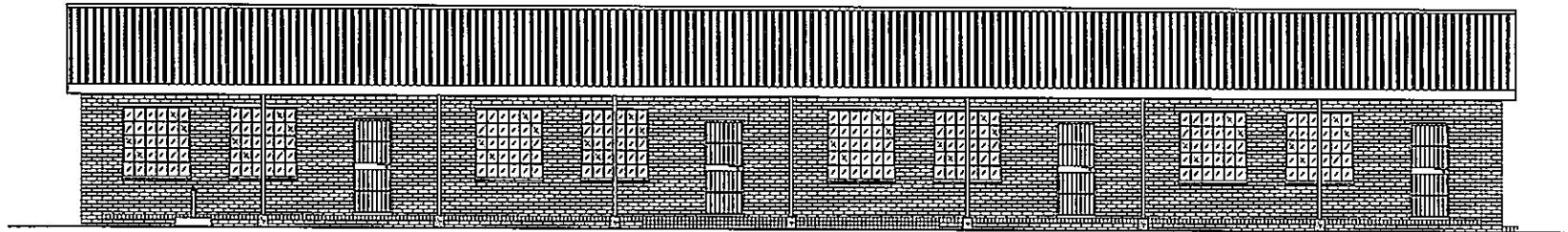
(3) CLASSROOM BUILDING
 PLAN S=1/200





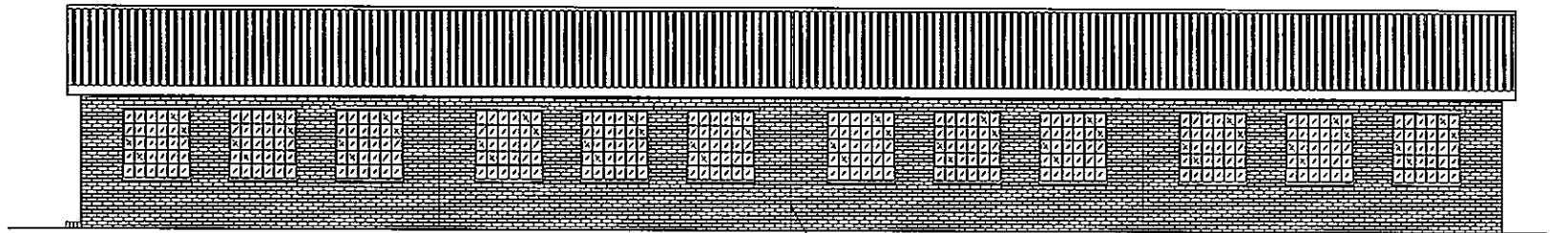


ELEVATION S=1/150



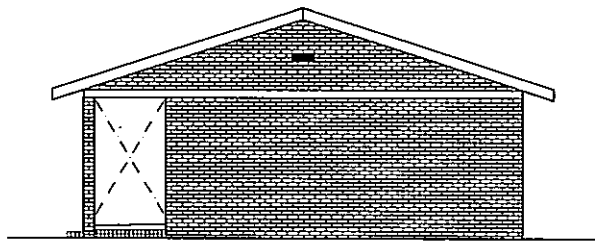
FRONT ELEVATION
(TYPE 3CA/4C)

-59-

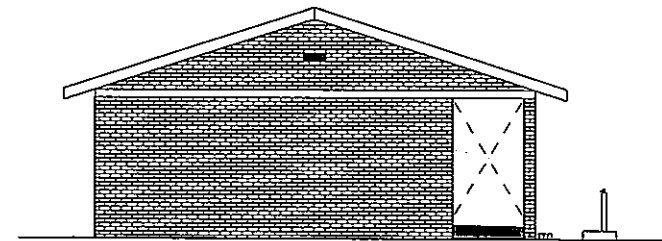


EXP. JOINT

REAR ELEVATION
(TYPE 3CA/4C)

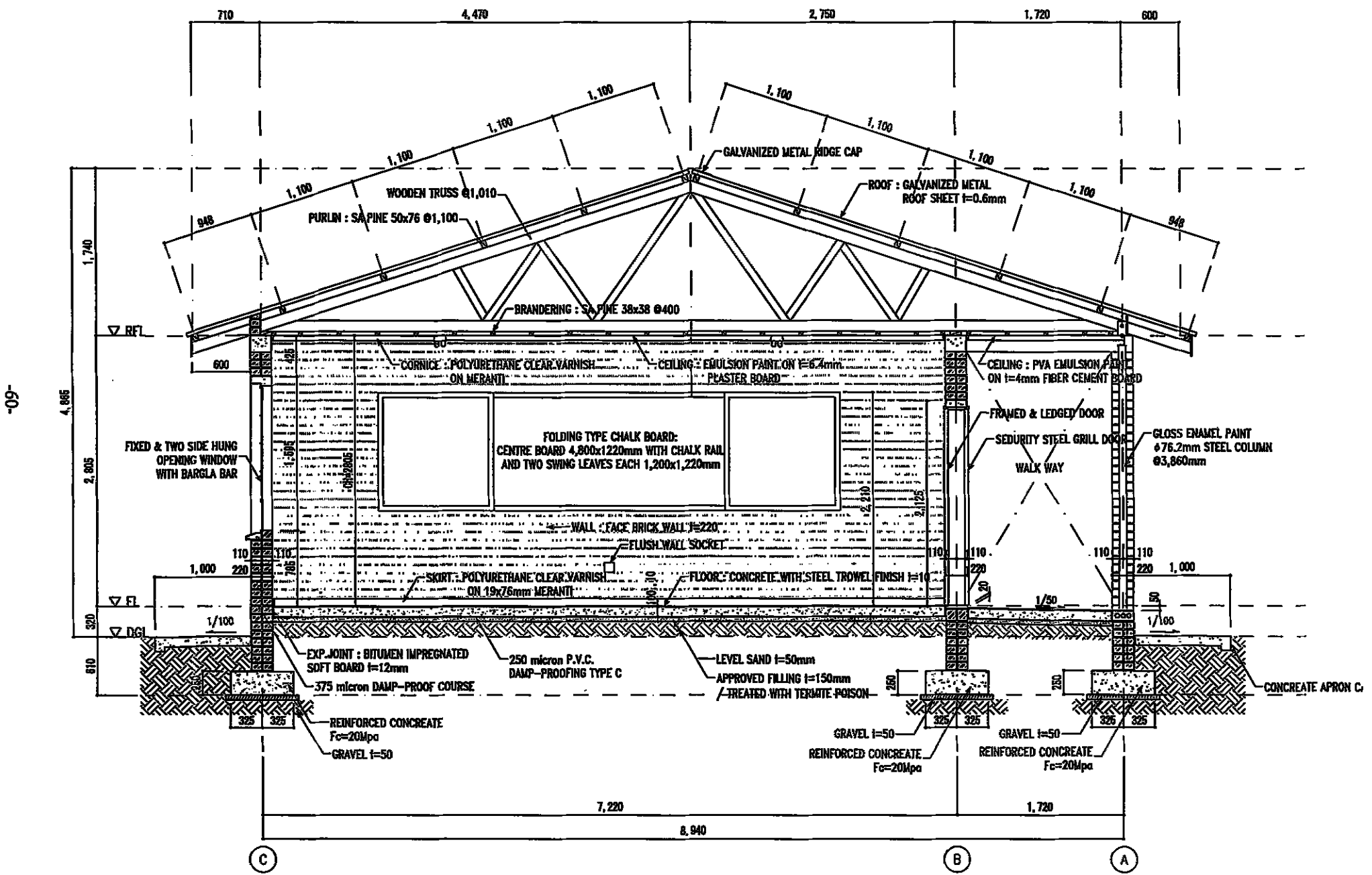


SIDE ELEVATION 1

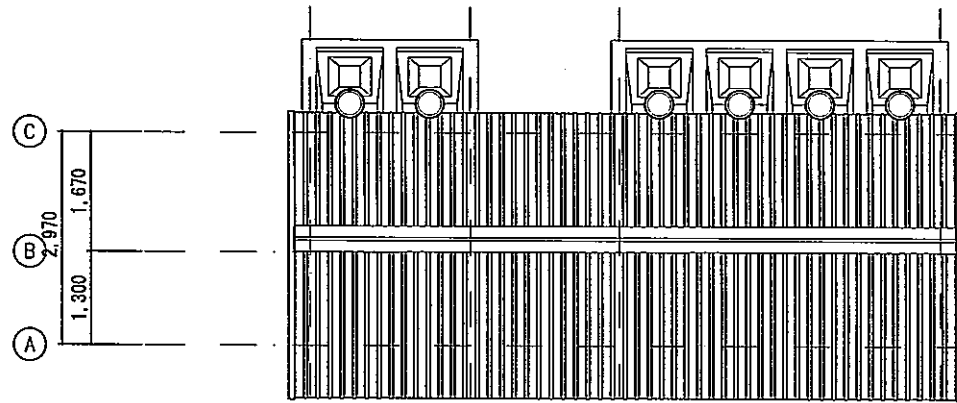


SIDE ELEVATION 2

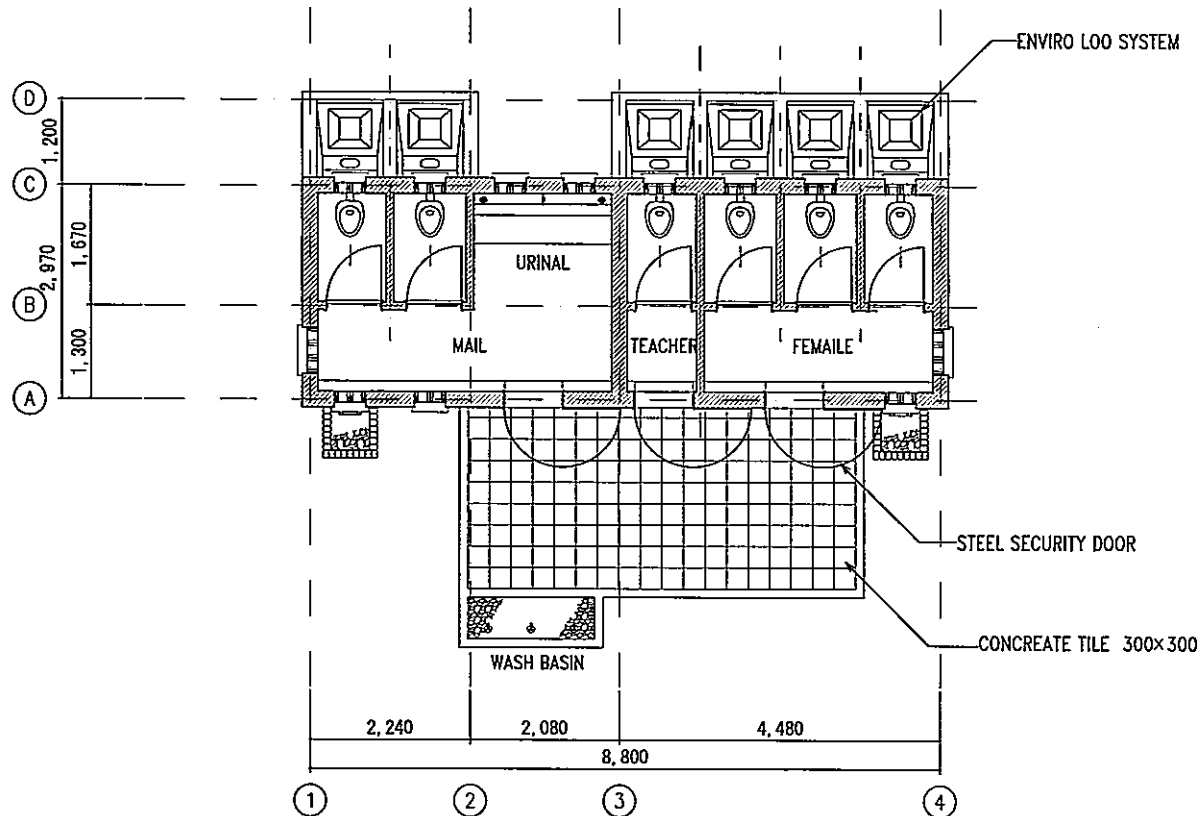
SECTION DETAIL S=1/50



(4) SANITARY BUILDING (TYPE A)
 PLAN S=1/100

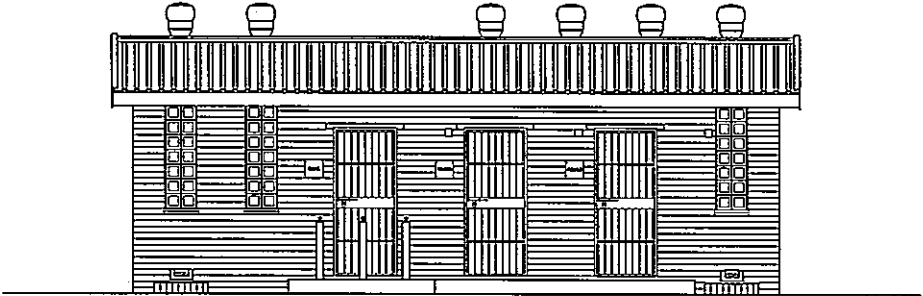


ROOF PLAN

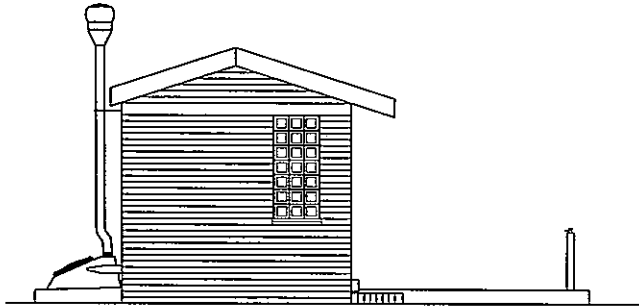


FLOOR PLAN

ELEVATION S=1/100

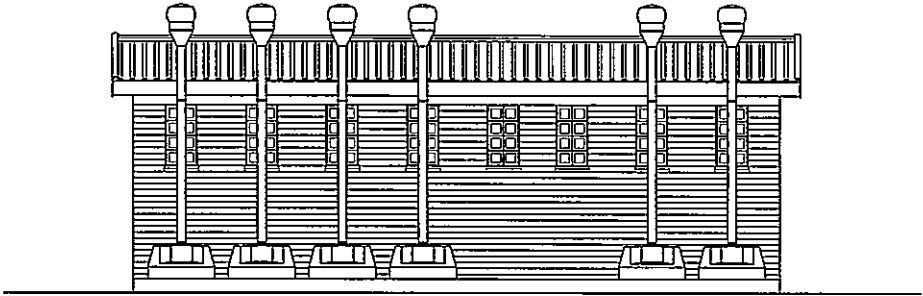


FRONT ELEVATION (TYPEA)

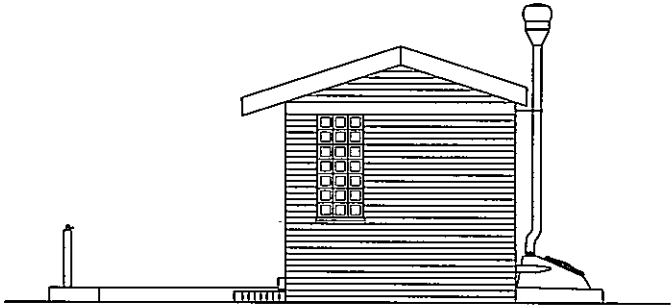


SIDE ELEVATION 1

-62-

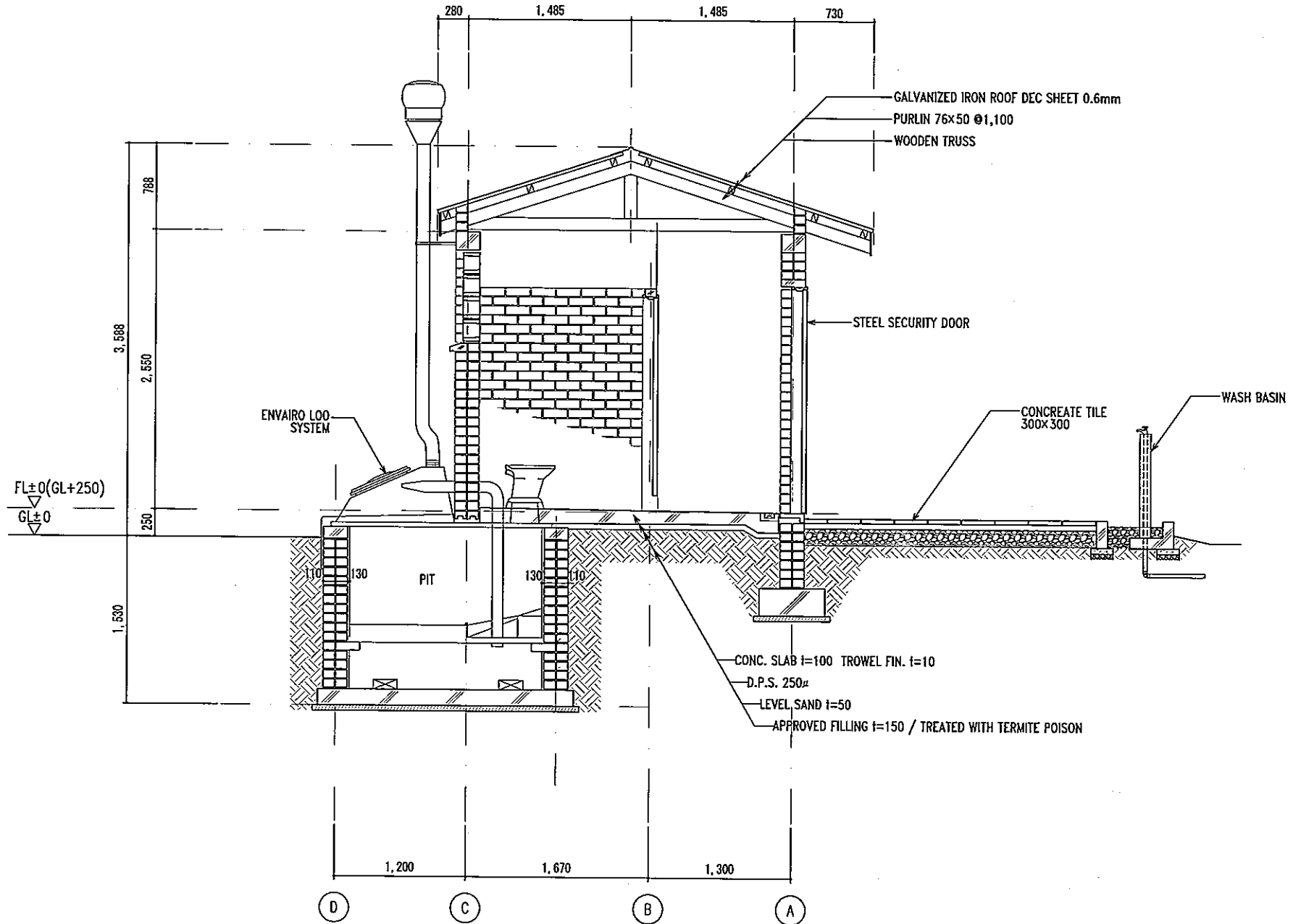


REAR ELEVATION (TYPEA)

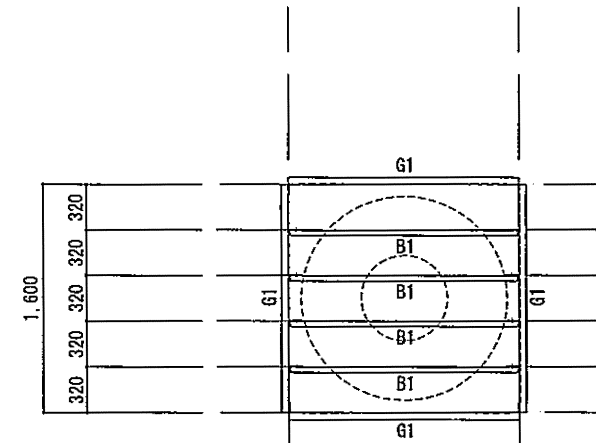


SIDE ELEVATION 2

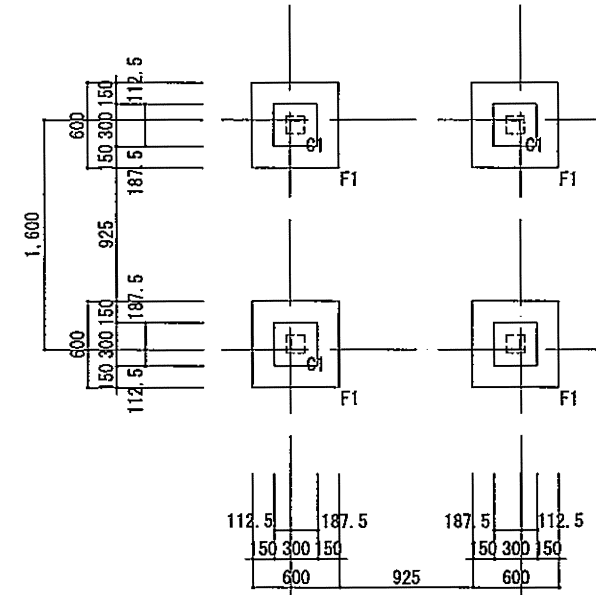
SECTION DETAIL S=1/50



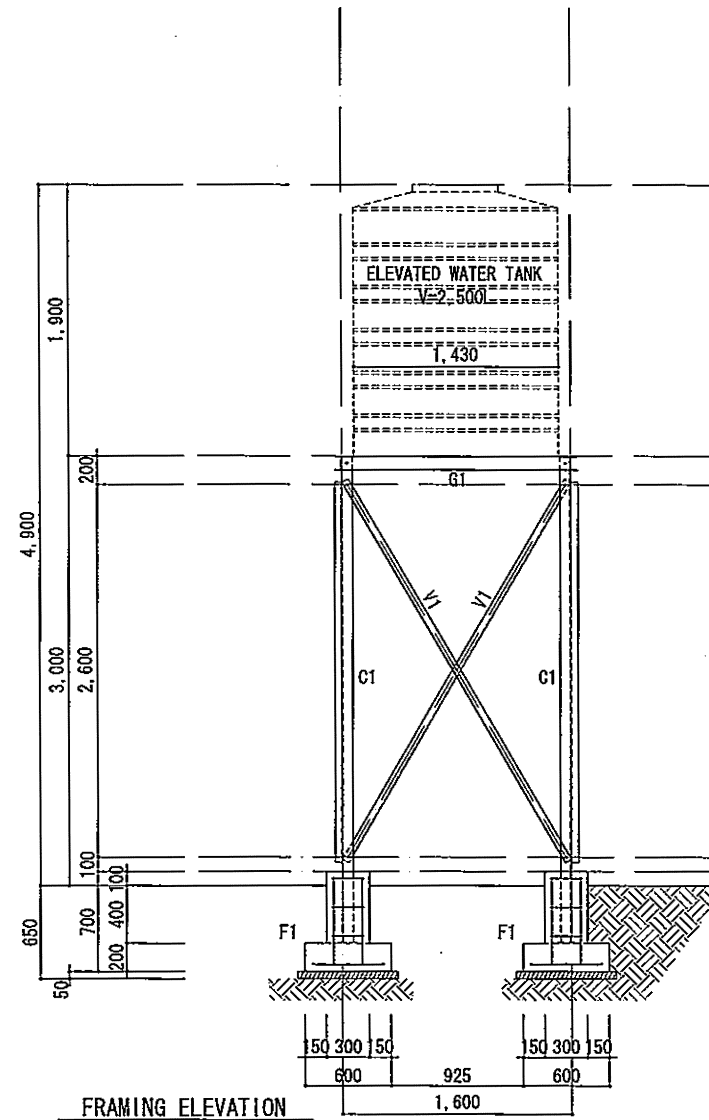
(5) ELEVATED WATER TANK S=1/50



FRAMING PLAN



FOUNDATION PLAN



FRAMING ELEVATION

STEEL MEMBER LIST

- G1 [-100x50x5x7.5 2-M12
- B1 [- 75x40x5x7 G. PL-6 2-M12
- C1 L- 75x75x6 B. PL-9
- V1 L- 50x50x4 2-M12

FOUNDATION LIST

- F1 FOOTING PART MAIN BAR 3-φ10 (MESH)
- COLUMN PART MAIN BAR 4-φ10
- HOOP BAR □-φ6 @250