

TERMS OF REFERENCE FOR INTERNATIONAL CONSULTANTS TO PROVIDE CONSTRUCTION MANAGEMENT SERVICES FOR THE SCHOOL CONSTRUCTION COMPONENT OF THE EFA-FTI CF PROJECT (draft)

A. Background

Liberia is in a post-conflict situation and many school facilities have been badly damaged or destroyed, there has been virtually no school construction for over 20 years and the needs are therefore enormous.

The situation is further complicated in that many of the primary school classrooms that are needed will be located in small, remote rural schools with very difficult access for materials and contractors. In very remote, under-populated areas it will also probably mean for reasons of cost and efficiency, the construction probably managed by the local communities of three-classroom multi-grade schools.

In the more accessible rural areas primary and junior secondary schools will be constructed by local contractors. However, very few good quality buildings have been constructed in Liberia in the last twenty years and there are therefore very few contractors and construction professional with a basic understanding of contract documentation and of good practice in construction.

A different approach will therefore have to be taken in the school construction programme to both the management and supervision of the construction of the primary and junior secondary schools. Training and capacity building of both contractors and local civil works staff supervisors will have to be a major part of the implementation approach.

It is proposed that an international firm of civil works or project management consultants is employed to both manage and supervise the construction of schools built both by contractors and communities.

The consultants should however not only manage the construction programme but employ and train local construction supervisors both before and during the construction process and provide on-the-job training to contractors. This should ensure that at the end of the project there will be at least a small number of competent construction supervisors and contractors who will be capable of managing, supervising and constructing similar projects in the future.

B. General Information

The EFA-FTI CF Project will focus on basic education but it will not be able to solve all of the problems of reconstructing Liberia's primary and junior secondary schools as it will not have the necessary financial resources. It should however provide a model that other projects and programmes could follow.

The infrastructure component of the EFA-FTI CF Project is part of *Component 1: Increasing access and equity* and will consist of the replacement/reconstruction

of existing primary and junior secondary schools that are occupying facilities that are either makeshift (mud brick walls and thatched roofs) or semi-solid (mud brick and profiled steel roof sheet roofs). There may also be some construction of new schools on new sites (especially of new junior secondary schools) if the school mapping data justifies this.

The Project will construct eighty five (85) primary schools and six (6) junior secondary schools in the rural areas of the country where communications and access are difficult particularly during the rainy season.

It is intended that ten (10) of the primary schools will be small (three classroom) schools in remote areas and that the construction of these schools will be managed by a school or community committee. Community development work with and training of these committees will be carried out by an experienced NGO and the consultants will provide technical assistance to the committees and work closely with the NGO.

C. Objectives of the Consultancy

The primary objectives of the Consultancy are to provide construction management services to facilitate the construction of primary schools and junior secondary schools and that will ensure that:

- The construction works carried out by contractors are carried out in accordance with the contract drawings, specifications and other contract documents, in accordance with the contract conditions, on time and to an acceptable standard.
- The construction works managed by communities and carried out by local artisans are carried out in accordance with the drawings and specifications and to an acceptable standard.

The secondary objectives of the assignment are to provide:

- On-the-job and other training to construction supervisors and other construction professionals employed by the Consultants to ensure that they understand the project documents and can carry out their duties in managing and supervising the construction work in a competent and professional manner.
- On-the-job training to contractors and artisans to ensure that they understand the project documentation and are capable of constructing the facilities to an acceptable standard.
- Training to communities to ensure that they are capable, if provided with technical assistance to manage small construction projects at their schools.

It must be remembered that the majority of the facilities that will be constructed under this project will be located in remote locations with difficult access and

therefore, given the current very low capacity of small contractors and artisans, the major responsibility for ensuring that the facilities are constructed in accordance with the drawings and specifications and on time will rest with the Consultants and in particular the construction supervisors. It is essential therefore that the construction supervisors have a good understanding of the project documents and of their role in ensuring that the contractor carries out the work in accordance with the drawings and specification and to an acceptable standard.

A further objective of the project will be to provide technical assistance and capacity building to the Division of Educational Facilities (DEF) in the Ministry of Education (MOE). The Consultant's team leader will be based in the DEF and will provide technical assistance and training to DEF staff.

The Consultants will report to the Deputy Minister of Planning through the Director of the Educational Facilities Unit of the Ministry of Education of the Government of the Republic of Liberia.

D. Qualification Requirements for Consulting Firms

Consulting firms should be registered or incorporated in and employ individuals and personnel who are nationals of, World Bank member countries subject to their eligibility as stipulated in the "Guidelines Selection and Employment of Consultants by World Bank Borrowers", January 1997, revised January 1999.

Consulting firms shall ensure adequate resources are available to complete the work within the specified time frame and shall not engage in any assignment that may place them in a position of not being able to carry out the specific services described in these Terms of Reference.

Consulting firms may associate with each other to complement their respective areas of expertise. The "association" may take the form of a joint venture or of sub-consultancy. In the case of a joint venture, all the members of the joint venture shall sign the contract and shall be jointly and severally liable for the entire assignment. Once the Request for Proposals (RFP) is issued, any association in the form of joint venture or sub-consultancy among short-listed firms shall be permissible only with the approval of the Borrower or Client. Borrowers shall not require consultants to form association with any specific form or group of firms, but may encourage association with qualified national firms.

Consulting firms shall not be under a declaration of ineligibility for corrupt and fraudulent practices (including bribery) issued by the World Bank.

Consulting firms must have: 1) audited financial statements for at least two years and 2) at least ten years experience in similar assignments.

The consulting firms should be of international standard and have the necessary personnel required to provide the services.

The consultants should have experience in the design and construction of educational or similar facilities in developing countries in the tropics and of the provision of construction management services in remote rural areas. They should also have the financial and technical resources to undertake the assignment.

The consultants must provide proof of professional indemnity insurance in the form of a certified copy of their current insurance policy.

E. Scope of Services

General

The Consultants will provide design, documentation, management, supervision and training services for the construction of the new primary and junior secondary schools in one package.

This will include surveys of school sites, final designs, cost estimates, working drawings, bills of quantities, schedules of materials and bidding documents together with management and supervision services for:

- the seventy (70) new primary schools to be constructed by contractors;
- the fifteen (15) new primary schools to be constructed by local artisans managed by community committees
- and the six (6) new junior secondary schools to be constructed by contractors.

Separate bidding documents will be prepared for all schools to be constructed by contractors and the Consultants will assist the Department for Educational Facilities in the Ministry of Education (the Client) in the evaluation of the bids.

The Consultants will also provide technical assistance and training to staff members of the DEF.

It will be the Consultants' responsibility to ensure that this engagement is managed and completed within the agreed fee. The Consultants will be required to absorb reasonable client-initiated changes to the final designs whilst remaining within the agreed fee. Any changes asked for by the Client after the agreement of the final designs could however result in the payment of extra fees.

The Consultants will prepare cost estimates at the final design stage and when contract documentation is complete and will be responsible for ensuring that the school facilities are built within the agreed cost limits.

The Consultants' Quality Assurance Program is to be applied to the documentation of this project.

The Consultants are to ensure that the designs and the final documentation of the project are complete and to the satisfaction of the Client and any relevant authorities and in accordance with the design briefs and agreed budgets.

The Consultants' team is to use AutoCad for the preparation of all drawings and Excel for the preparation of bills of quantities and schedules of materials.

Site Surveys

The Consultants will visit all school sites and carry out a comprehensive survey and prepare site layouts for all sites showing the site boundaries and levels, any perimeter walls or fences, any existing buildings, all significant natural features including streams, ponds or swampy ground, large rocks, trees, etc, any existing paths and roads, all neighbouring buildings, water supplies, electrical services, etc.

Architectural Services

The Consultants will provide all necessary architectural services for the design of:

- Site layouts and site works
- All buildings and other facilities

Civil Engineering Services

The Consultants will provide all necessary civil engineering services for the design of:

- Site works including roads, paths, retaining walls, etc
- Soil and waste drainage
- Storm and rain water drainage
- Sanitary installations and drainage
- Water supplies and installations
- Fire hydrants, hose reels and extinguishers

Structural Engineering Services

The Consultants will provide all necessary structural engineering services which will include:

- advice on all matters related to construction, structural engineering, demolition and excavation;
- identifying and designing simple and economic structural solutions
- providing assistance in the preparation of cost estimates;
- checking workshop drawings prepared by specialised contractors as required;
- providing certificates of structural adequacy.

Electrical Engineering Services

The Consultants will provide all necessary electrical engineering services which will include the design of:

- The incoming supply from the Supply Authority's service
- Consumers mains, sub-mains, distribution boards, switchboards, earthing and metering
- Lighting and power circuits
- IT infrastructure
- Fire protection and warning systems
- Lightning protection systems

Quantity Surveying Services

The Consultants will provide all necessary quantity surveying services which will include:

- Preparation of cost estimates
- Preparation of bills of quantities, specifications and bidding documents
- Preparation of schedules of materials for facilities to be constructed by artisans and managed by community committees
- Preparation of payment certificates for contractors
- Cost control services
- Preparation of final accounts

Construction Management and Supervision

The specific activities of the consultants with respect to the management and supervision of the construction works will include but not be restricted to the following:

- Training of the construction co-ordinators and construction supervisors employed by the Consultants before the construction programme starts to ensure that they fully understand the construction documentation, how the buildings are to be constructed and their responsibilities with regard to ensuring that the buildings are constructed in accordance with the drawings and specifications;
- Construction of a typical classroom building and a typical VIP latrine building on a school site in or around Monrovia to be selected by the MOE as a training exercise for the construction co-ordinators and supervisors and as demonstration buildings for contractors and community committees (include lump sum of US\$25,000).
- Training as necessary on site of contractors to ensure that they understand the construction documentation, how the buildings are to be constructed and their responsibilities with regard to ensuring that the

buildings are constructed in accordance with the drawings and specifications;

- Training of community committees who are to manage the construction work at their schools (in co-operation with an NGO) in financial management, procurement and project management and monitoring of the construction work at their schools;
- Reviewing and revising as necessary the contractors' construction programmes;
- Preparation of financial, progress and other reports as required;
- Liaising with the MOE and advising on areas of concern, potential delays or cost increases;
- Maintaining a diary at every site recording the daily weather conditions, instructions issued to the contractor, problems occurring, deliveries of materials, progress on site, workers on site, visitors, etc;
- Checking that the buildings are correctly located and that the works are correctly set out;
- Inspecting and supervising the construction works on a daily basis to ensure that the buildings are constructed in accordance with the drawings and specifications;
- Measuring the work as completed;
- Arranging the testing, commissioning, acceptance and handover of the works on completion;
- Supervising the work at each of the school sites where construction work is in progress on a daily basis to ensure that the buildings are constructed in accordance with the contract drawings, specifications and other contract documents and in accordance with any applicable Liberian law and within the contract amounts;
- Monitoring the progress of the works against the construction implementation programmes provided by the contractors for each school site. Advise the contractors on any necessary measures to ensure the completion of the construction works in accordance with the construction programmes. Advise the client of any deviations from the contract drawings and documents by the contractors. Advise the client of any likely delays to the construction works. Chair monthly site meetings with representatives of the MOE, the client and the contractors to discuss the progress of the works and any problems. Prepare agendas and minutes of all site and other meetings arranged to discuss the progress of the construction programme;

- Advising the client on any possible problems or necessary changes as they arise that will incur extra costs and on ways to avoid these costs if at all possible;
- Advising the client on any possible claims by the contractors or any other contractual problems arising during the works;
- Certifying payments to the contractors in accordance with the contract provisions;
- Preparing and submitting to the client weekly and monthly progress reports on the progress of the construction works at each site;
- Carrying out any other tasks related to the supervision of the works as may be requested by the MOE.
- Preparing accurate 'as-built' drawings of the facilities at each site;

Note: the Consultants will not issue any instructions to the contractors that will change the design or construction of the buildings; that will impede the progress of the works; that will lengthen the contract period or that will add to the cost of the works without first agreeing these measures with the client and obtaining the written authority of the MOE.

Training and Capacity Building in the DEF

There is an urgent need developing the capacity of DEF to enable the Division to carry out the tasks required of it. The team leader/project manager provided by the consultants will therefore be based in the DEF and as well as managing the construction of the schools funded under the project, he/she will be required to assist the DEF in:

- Monitoring the school construction programme that will be funded by the project and any other construction programmes that might be started during the duration of the project.
- Developing a long-term plan for the reconstruction of existing and the construction of new primary, junior secondary and senior secondary school facilities after the completion of the project.
- Establishing space and quality standards and design briefs for educational facilities at all levels for the use of architectural and engineering consultants in the designing of these facilities.
- Procuring more effectively and efficiently the services of architectural and engineering consultants to design, document and supervise construction and to procure if necessary the services of construction firms to carry out the construction of both large and small projects. This will include assistance with the preparation of bidding documents and training in the evaluation of bids, etc and will be carried out in co-operation with the Procurement Division.

- Managing more efficiently and effectively the work of consultants engaged to both design and supervise construction projects for the Ministry and in monitoring both their work and the work of contractors.
- Setting up a data-base of construction costs for educational facilities which can be easily managed and updated.
- Setting up and managing an educational facilities register for the whole country with the co-operation of the EMIS Division.
- Setting up an effective system for the management and maintenance of all of the Ministry's facilities.
- Establishing if necessary Educational Facilities Units in the three regions of the country.

He/she will also train DEF staff in:

- The use of computer-aided design and the use of software currently used in the building industry and advise the MOE on the provision of hardware and software.
- The management and supervision of small construction projects for the MOE.

An evaluation of the consultants' performance in building the capacity of the DEF will be conducted prior to the end of the project.

F. Outputs

Documentation

Final Designs

The Consultants will prepare final designs for the new primary and junior secondary schools based upon the preliminary designs and schedules of accommodation agreed with the MOE. See Attachment 1 for details.

The designs should be based upon the structural modules shown in the preliminary designs and the layouts should allow for easy expansion of the facilities in the future. Designs should include all necessary services, roads, paths, landscaping, etc.

The designs should include site layouts, floor plans, elevations and sections and any details deemed necessary, to a scale of 1:500, 1: 200, 1/8" to 1' 0", 1/4" to 1' 0", 1/2" to 1' 0" and 1/4 full-size.

The buildings should be designed to deal with the tropical climate. The designs should ensure that the sun is kept out of the buildings during the hours of 8.00am to 5.00pm and all buildings should be oriented north/south if at all possible. All buildings should be designed for cross-ventilation where appropriate.

The MOE should be consulted and informed of the main design decisions throughout the process.

Preliminary cost estimates should be prepared by the Consultants at this stage in order that the total budget for school construction can be re-assessed before the working drawings and bidding documents are produced.

Outputs will include final design drawings to scales of 1:500, 1:200, 1/8" to 1' 0", 1/4" to 1' 0" and to larger scales if necessary for all school sites that will include:

- Site layouts showing levels, new and existing buildings, roads and parking, major civil works, landscape proposals and any major external elements.
- General floor plans at 1/8" to 1' 0" scale showing room arrangements, room areas, floor levels and any major internal design elements.
- Room layouts for principle rooms at 1/4" to 1' 0" scale including wall elevations and room data sheets.
- Elevations at 1/8" to 1' 0" scale showing the general arrangement of the building forms, windows and any major design elements to the facades.
- Sufficient cross sections at 1/2" to 1' 0" to show general building resolution including levels, ceiling heights, structure and services.
- Roof plans at 1/8" to 1' 0"
- Schedules of internal and external materials, finishes and colours.
- Details of major external and internal design elements.
- Engineering services concepts and performance criteria for electrical, hydraulics, security, fire services, communications and lighting.
- Analysis of structural and services options to confirm best value design solutions.
- A final design report including a cost estimate for all of the schools.

Working Drawings, Specifications and Bills of Quantities

When the final designs and cost estimates have been agreed with the Government, the consultants will prepare architectural and engineering working drawings, bills of quantities, schedules of materials and bidding documents for all new primary and junior secondary schools.

Full working drawings and specifications will be prepared for all buildings. Working drawings should be prepared at scales of 1:500, 1:200, 1/8" to 1' 0", 1/4" to 1' 0" and to larger scales where necessary to show details. Drawings should include foundation plans, floor plans, ceiling and roof plans; elevations and sections; electrical, plumbing and sanitation details and details of all fixtures and fittings. Detailed specifications should be prepared for all materials, fixtures and fittings for all building units. Site layouts, site works details and site service drawings will be prepared for all sites showing any existing buildings to be retained and all new buildings, covered

ways, footpaths, roads, parking areas, storm drains, soil drains, septic tanks, soakaways, etc.

Outputs will include:

- working drawings to a scale of 1:500, 1:200, 1/8" to 1' 0", 1/4" to 1' 0", 1/2" to 1' 0" and 1/4 full-size and larger if necessary including:
- Site layouts showing new and existing work, roads and parking, major civil works, landscaping and any major external elements.
- General floor plans at 1/8" to 1' 0" and 1/4" to 1' 0" showing room arrangements, room areas, floor levels and any major internal design elements.
- Room layouts for principle rooms at 1/4" to 1' 0" including wall elevations and room data sheets.
- Elevations at 1/8" to 1' 0" showing the general arrangement of the building forms, windows and any major design elements to the facades.
- Cross sections for all buildings at 1/2" to 1' 0".
- Roof plans at 1/8" to 1' 0"
- Construction details at 1/2" to 1' 0" and 1/4 full-size and larger if necessary
- Final schedules of internal and external materials, finishes and colours.
- Details of major external and internal design elements.
- Structural, civil, and electrical engineering drawings and details.
- Specifications for all materials and works.
- bills of quantities for the primary and junior secondary schools to be constructed by contractors
- schedules of materials for the primary schools to be constructed by artisans and managed by community committees

Bid Documents and Bid Evaluation Reports

Bid documents will be prepared for each school site and contractors will be allowed to bid for more than one school if they have the financial capacity to do so.

Bidding will be carried out following World Bank guidelines on a National Competitive Bidding basis and the bidding process including advertising, issuing of bidding documents, acceptance and opening of bids, etc will be managed by the Consultants.

The Consultants will prepare evaluation reports on all bids for the consideration of the MOE, the MOF and the World Bank and assist the MOE in awarding the contracts.

The Consultant will prepare contract documents for all contracts to be signed by the contractors and the Minister of Education.

Outputs will include:

- Bidding documents for each school site to be constructed by contractors.
- Bid evaluation reports for the bids for each school site.
- Contract documents for all contracts.

Maintenance Manuals

When the buildings are completed, it is important that the MOE, school staff and communities are made aware of what is required to maintain them in good condition.

The consultants will therefore be required to produce simple maintenance manuals to be used by the MOE, school staff and communities in maintaining their buildings and equipment and carry out maintenance training for selected staff.

Outputs will include:

- Maintenance manuals for all schools facilities

Training and Capacity Building Programmes

Outputs will include training programmes for:

- Local staff employed assist with the supervision and management of the construction programme to develop their capacity to manage and supervise construction programmes.
- DEF staff to develop their capacity to carry out the tasks required of them in planning and implementing school building and maintenance programmes.

Construction Management and Supervision

Outputs will include:

- Monthly progress reports for each school site
- Monthly certificates of payment for each school where construction work is being carried out by a contractor
- Final completion reports for each school site
- Final accounts for each school site
- Defects lists for each school constructed by a contractor at practical completion
- Defects lists for each school constructed by a contractor at the end of the defects liability period.

- Signed off certificates for each school when complete or at the end of the defects liability period.

G. Deliverables

The following are the document delivery requirements:

Final Designs:

Final Design Report	6 copies
Final Design Drawings	6 copies

Editable disks containing all documents	1 set
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Bidding Documents:

Working drawings, Bills of Quantities, Schedules of Materials and Specifications	6 copies
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Editable disks containing all documents	1 set
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Maintenance Manuals:

Maintenance manuals	6 copies
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Editable disks containing all documents	1 set
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H. Technical Staff, Facilities and Equipment

Technical Staff

The Consultants will provide the following technical staff for the duration of the construction programme or as required to complete the assignment.

Team Leader/Project Manager

The Team Leader/Project Manager who will lead the team and provide overall management of the construction programme will be an expatriate architect or civil engineer with the following qualifications, skills and experience:

Qualifications and skills

Degree in architecture or civil engineering from a recognized University and a recognized professional qualification from the country of residence together with:

- Proven project management skills
- Fluency in English
- Computer skills – AutoCad, MS Office, etc

Professional experience

At least 15 years professional experience, 10 years of which should have been in developing tropical countries and which should have included:

- The design of school buildings and school building projects;
- The management and supervision of large-scale rural construction projects;
- Experience of managing a supervision team.

Experience of designing and managing community-based construction projects would be an advantage.

Construction Co-ordinators

The Construction Co-ordinator (s) (one or two as necessary to carry out their duties) who will co-ordinate and supervise the work of the Construction Supervisors and report to the Team Leader will be expatriate architects or engineers (probably from the region) with the following qualifications, skills and experience:

Qualifications and skills

Degree in architecture or civil engineering from a recognized University and a recognized professional qualification from the country of residence together with:

- Proven project management skills
- Fluency in English
- Computer skills – AutoCad, MS Office, etc

Professional experience

At least 10 years professional experience, 5 years of which should have been in developing tropical countries and which should have included:

- The management and supervision of large-scale rural construction projects;
- Experience of managing a supervision team.

Experience of managing community-based construction projects would be an advantage.

Construction Supervisors

The Construction Supervisors who will be based on the school construction sites (the actual numbers will depend on the number of sites that are operational at any given time) will supervise the construction work on the sites, provide advice and technical assistance to the contractors as necessary and report back to the

Construction Co-ordinators. The Construction Supervisors based on the sites where communities will be managing the construction of school facilities will provide advice and technical assistance to the community committees managing the work.

Qualifications and skills

- Degree in architecture or engineering from a recognized University
- Fluency in English
- Computer skills – MS Office

Professional experience

- At least 5 years of experience of working on construction projects in Liberia preferably including construction projects in the rural areas;
- Experience of the day to day supervision of construction contracts on sites.

Note: in the event that it is impossible to recruit sufficient numbers of graduate engineers or architects to carry out the duties of construction supervisors the Consultants can recruit Clerks of the Works or Site Foremen providing that they can provide evidence of at least 15 years of experience of working on construction projects in these roles.

Facilities, Furniture, Vehicles, Equipment, etc

The Team Leader/Project Co-ordinator will be based in the DEF offices in the MOE in Monrovia but the Consultants shall make adequate provision for all office space and living accommodation required whether in Monrovia or at the construction sites for all project staff.

The Consultants shall make adequate provision for communication between the Team Leader/Project Manager and all other staff and for any necessary furniture and equipment including computers, printers, photocopiers, etc.

The Consultants shall make adequate provision for the reproduction and delivery of all reports, photographs and other necessary documents.

The Consultants shall make adequate provision for vehicles, transport and fuel and other necessary transport costs to enable the supervision services to be carried out by all staff but especially by staff based on sites.

The Consultants shall ensure that adequate insurance cover is provided for all staff working on the assignment.

The Consultants shall ensure that all staff are paid regularly and in a timely manner and reimbursed for all expenses incurred while carrying out their duties.

The costs of any necessary office equipment, site technical equipment, accommodation and vehicles for the Consultants' staff are considered to be included in the total fee.

The Consultants shall, as and when necessary undertake field trips and investigations, the expenses for which shall also be included in the total fee.

ATTACHMENT 1: SCHOOL CONSTRUCTION PROGRAMME

GENERAL

This document sets out the school construction programme for the EFA-FTI CF Project. It explains how the construction programme is to be managed and supervised; what types, sizes and numbers of educational facilities are to be constructed and what the roles of the various parties to the construction programme will be.

The construction programme is planned to take place in two phases over a minimum of two years but may well have to be extended.

CONSTRUCTION MANAGEMENT

General

The construction programme will be managed by construction consultants engaged for this purpose.

The majority of the facilities that will be constructed will be located in remote rural locations with difficult access and therefore, given the current low capacity of small contractors and artisans to carry out building works, the major responsibility for ensuring that the facilities are constructed in accordance with the drawings and specifications and on time will rest with the consultants and in particular the site supervisors employed by the consultants.

Objectives

The primary objectives of the consultancy are to provide construction management services to facilitate the construction of ECD centres, primary schools and basic education schools (combined primary and junior secondary schools) and the consultants will ensure that:

- The construction works carried out by contractors are carried out in accordance with the contract drawings and specifications and in accordance with the contract conditions, contract period and to an acceptable standard;
- The construction works managed by communities and carried out by local artisans or small builders are carried out in accordance with the drawings and specifications and to an acceptable standard.

The secondary objectives of the assignment are to provide:

- Training to site supervisors and other construction professionals employed by the consultants to ensure that they understand the project documents and can carry out their duties in managing and supervising the construction work in a competent and professional manner;
- Training to contractors and artisans to ensure that they understand the project documentation and are capable of constructing the facilities to an acceptable standard;
- Training to communities to ensure that they are capable, if provided with technical assistance to manage small construction projects at their schools.

The construction contracts will be labour-only contracts and part of the consultants' responsibilities will be to ensure that the construction materials are delivered to the sites on time.

The consultants when appointed will have to visit each site and carry out a basic survey in order that they can prepare site layout drawings showing the position of all the school buildings, toilets and wells, play areas, paths and other site works and schedules of materials for any site works.

Technical Assistance

As set out above, technical supervision and assistance will be provided by the construction consultants engaged to supervise and manage the entire school construction programme. Construction will also be monitored by DEF staff.

The construction of sixteen 3-classroom primary schools and eight ECD centres will be managed by local communities. Sensitisation of the communities and community development work with the communities will be provided by an NGO or NGOs contracted to provide such services to the 16 communities who will be managing the construction of their primary schools.

SUPPLY OF CONSTRUCTION MATERIALS

Two of the major constraints for the small and medium contractors who will be carrying out the construction work are 1) difficulty in obtaining credit from either banks or suppliers to enable them to purchase building materials and 2) difficulties in transporting the materials to the sites.

In order to avoid these difficulties, construction materials such as cement, reinforcement, steel roof sheets, hinges, door locks, nails and screws and sawn timber will be purchased and supplied to each contractor and each site by the MOE. The contractors will however be responsible for obtaining sand and aggregate for concrete locally.

The construction consultants will prepare schedules of materials for all buildings and all school building sites and the schedules of materials will set out in detail the amount of materials required for the individual buildings and sites. They will set out for instance: the number of cubic yards of sand and large aggregate and the number of bags of cement required for the concrete in the foundations, floor slabs and ring beams; the number of stabilised soil blocks required for the walls; the number and length of roof sheets required to cover the roof; the size, length and number of pieces of timber required for the roof trusses and purlins, the number of sheets of plywood required for ceilings; the number of cubic yards of sand and bags of cement that are required for the render to walls; the amount of nails and screws required; etc, etc. All quantities will have to allow for damage and wastage.

The consultants will then prepare bidding documents for the materials required for all school building sites and the MOE procurement division will advertise the bids and award contracts. The consultants will advise the procurement division on the award of contracts and all building materials supply contracts will include delivery to the individual sites.

The contracts for construction will therefore be labour-only contracts (apart from the supply of sand and large aggregate) but the contractors will have to allow for the security and storage of materials supplied to them on the sites.

CONSTRUCTION MATERIALS & TECHNIQUES

The ECD centres, primary schools and basic education schools will be simply constructed utilising the following materials:

- Floors will be of 4" mass concrete built on 8" solid (or filled) concrete block foundation walls on mass concrete footings. The floors will be cast in 10'0" wide bays with movement joints between bays and finished with a steel trowel to an acceptable flat surface which will have to be protected until the building construction is completed; there will be no screeds;
- Walls will be of 6" stabilised soil blocks (with block piers to increase stability) rendered internally with smooth sand/cement render and externally with self-coloured 'tyrolean' render to produce a durable, maintenance-free finish. There will be a concrete ring beam on top of the walls but no concrete columns in any buildings;
- Roofs will be of 28 gauge corrugated steel sheets on timber purlins on exposed timber trusses sitting on and fixed to the concrete ring beams. There will be large roof overhangs around the perimeter of the buildings to protect walls and windows from sun and rain. Sloping ½" plywood ceilings to internal rooms will be fixed to timber framing under the purlins following the slope of the roof but there will be no ceilings to verandas or under any other external roof overhangs;
- Light and ventilation to all rooms to the ECD centres, primary schools and to the lower school of the basic education schools will be provided through openings in the walls (see drawings) and timber shutters at child-eye height;
- Light to all rooms in all buildings in the upper school of the basic education schools will be provided through timber shutters (see drawings);
- All buildings will have 6' 0" or 8' 0" wide front access verandas with 4" diameter steel posts supporting the ends of roof trusses or rafters.

All rooms to the ECD centres, the primary schools and to the administration building and the lower school of the basic education schools will be 20' 0" wide internally with blockwork walls or piers at 10' 0" centres giving a range of room lengths: 9' 6"; 19' 6"; 29' 6", etc. All other rooms to the upper school of the basic education schools will be 22' 0" wide to accommodate the older and larger students. The rooms will therefore be 22' 0" wide internally with structural walls or blockwork piers at 10' 0" centres giving a range of room lengths of 9' 6"; 19' 6"; 29' 6", 39' 6" and 49' 6".

CLASSROOM SIZES

The classrooms or group rooms to the ECD centres are designed to accommodate 30 children and will be 20'0" x 29'6". The internal floor area is 590ft² (54.6m²) giving an area per child of 19.66ft² (1.82m²).

The maximum number of students per primary school classroom has been set at 44 and a standard classroom size of 20'0" x 29'6" will be used for primary schools and the lower school of basic education schools. The classroom will accommodate 44 students at double desks (with chairs) 3' 8" x 1' 10" which can be arranged in different layouts. The internal floor area is 590ft² (54.6m²) giving an area per pupil of 13.4ft² (1.24m²). See Drawings 1-3: Primary School Classroom: Plan, Section and Elevations.

A standard general classroom size of 22'0" x 29'6" will be used in the upper school of the basic education schools. The classroom will accommodate 40 students at double desks (with chairs) 4' 0" x 2' 0" which can be arranged in different layouts. The internal floor area is 649ft² (60m²) giving an area per pupil of 16.23ft² (1.5m²). See Drawings 4-6: Upper School (junior secondary) Classroom: Plan, Section and Elevation.

It is common practice in many countries to provide a number of larger general classrooms in secondary schools for project work when teaching subjects such as geography, history and even maths as these allow room for students to work on projects requiring light practical work such as drawing, working on models, preparing maps, etc. These larger classrooms can still be used as class bases and are usually provided in the ratio of one larger classroom to four or five standard classrooms. The size of the large general classroom will be 22' 0" x 39' 6" and these classrooms will each have two stores attached approximately 11' 0" x 9' 6" for the storage of teaching materials.

3-CLASSROOM PRIMARY SCHOOLS & EARLY CHILDHOOD DEVELOPMENT CENTRES

General

Sixteen 3-classroom primary schools will be constructed in remote rural villages where there are at present no primary schools and where there is a primary school age population (6 -11 years) of less than 132.

ECD centres will be constructed on eight of the sixteen sites selected for the construction of 3-classroom primary schools. The centres will be on the same sites as the schools but will have separate facilities (group rooms and toilets) and a separate play area. The centres will however share the use of the school's well and hand-pump or other water supply.

The construction of the primary schools and the ECD centres will be carried out by local artisans or small contractors and managed by the communities with the assistance and support of an NGO and the construction consultants and monitored by DEF staff.

Ramps will be provided up to access verandas to all buildings to allow access for physically disabled children and at least one disabled toilet will be provided for each sex.

It is very unlikely that there will be a piped water supply to any of the school sites and the toilets at all sites will therefore be pour-flush toilets which will have WCs that will be flushed with water from the well or borehole and that will drain to a septic tank and soakaway. Girls' toilets should be separated on the site from the boys' toilets. Soakaways should be at least 100'0" from any well or borehole.

The layout of the buildings at the individual sites will vary according to the physical characteristics of the sites. However all buildings should if possible be oriented to face north/south to avoid solar penetration into rooms. See Drawing 7: Typical Site Layout for 3-classroom Primary School and ECD Centre.

Three-Classroom Primary Schools

The facilities to be provided in the 3-classroom primary schools will consist of:

- One building with three classrooms (29' 0" x 20' 0"), an attached principal's office and store (20' 0" x 9' 6") and a 6'0" wide front access veranda;
- two, 3-cubicle pour-flush toilet buildings one for boys and male teachers and one for girls and female teachers;
- a well or bore-hole and a hand-pump.

See Drawing 8: 3-Classroom Primary School Building.

ECD Centres

The facilities to be provided for the ECD centres will consist of:

- One building with three group rooms (29' 0" x 20' 0") with an 8'0" wide front access veranda. There will also be an office and store and two pour-flush toilets and a shower room at the end of the building.

The group rooms will be divided up by bookshelves and lightweight partitions in order to accommodate different activities. It will be possible to form one large room for community activities from two of the group rooms through the use of mobile book-shelf units. The verandas will accommodate activities such as cooking and activities requiring water. See Drawings 9-11: ECD Centre: Plan, Section and Elevations.

6-CLASSROOM PRIMARY SCHOOLS

General

Four of these schools will be constructed in remote rural villages with a primary school age population (6 – 11 years) of up to 264 within a distance of 2 kilometres. The schools will be constructed on the sites of existing primary schools where the existing facilities are temporary, semi-permanent or in such bad condition that they require replacement. The construction will be carried out by small contractors managed and supervised by the construction consultants and monitored by DEF staff.

Ramps will be provided up to access verandas to all buildings to allow access for physically disabled children and at least one disabled toilet will be provided for each sex.

It is very unlikely that there will be a piped water supply to any of the school sites and the toilets at all sites will therefore be pour-flush toilets which will have WCs that will be flushed with water from the well or borehole and that will drain to a septic tank and soakaway. Girls' toilets should be separated on the site from the boys' toilets. Soakaways should be at least 100'0" from any well or borehole.

The actual layout of the buildings for the four schools will vary according to the characteristics of the school sites; the shape, size, contours, etc. If at all possible

however, all buildings should be oriented to face north/south to avoid solar penetration into rooms.

6-Classroom Primary Schools

The facilities to be provided will consist of:

- administration building containing a principal's office and store (20' 0" x 9' 6"); a teachers' room (20' 0" x 9' 6"); a library (20' 0" x 19' 6") and two classrooms (20'0" x 29'6");
- and either one, 4-classroom building or two, 2-classroom buildings depending on the site conditions;
- two, 5-cubicle pour-flush toilet buildings one for boys and male teachers and one for girls and female teachers;
- and a well or bore-hole and a hand-pump.

See Drawing 12 for the layout of the buildings for a typical 6-Classroom Primary School; Drawing 13 for the Administration and Classroom Building; Drawing 14 for the 4-Classroom Building and Drawing 15 for the 2-Classroom Building.

BASIC EDUCATION SCHOOLS

General

The basic education schools will consist of a single stream lower school (primary) and a two stream upper school (junior secondary). The target number of pupils per class for the lower school will be 44 and the total number of pupils for the lower school will be 264. The target number of pupils per class for the upper school will be 40 and the total number of students in the upper school will be 240.

Twenty of the basic education schools will be constructed in rural areas where there are sufficient Grade 7 pupils for two grade entry (80 pupils) from both the lower school and from surrounding primary schools.

Ramps will be provided up to access verandas to all buildings to allow access for physically disabled children and at least one disabled toilet will be provided for each sex.

Concrete paths will link all of the buildings and other facilities.

It is very unlikely that there will be a piped water supply to any of the school sites and the toilets at all sites will therefore be pour-flush toilets which will have WCs that will be flushed with water from the well or borehole and that will drain to a septic tank and soakaway. Girls' toilets should be separated on the site from the boys' toilets. Soakaways should be at least 100'0" from any well or borehole.

The actual layout of the buildings for the twenty schools will vary according to the characteristics of the school sites; the shape, size, contours, etc. If at all possible however, all buildings should be oriented to face north/south to avoid solar penetration into rooms. See Drawing 16 for the layout of the buildings for a typical basic education school.

Lower Basic Education School Facilities

The facilities to be provided for the lower school will consist of:

- two, 3-classroom buildings each with an attached teachers' room/store;
- two, 5-cubicle pour-flush toilet buildings one for boys and male teachers and one for girls and female teachers;
- a well or bore-hole and a hand-pump.

The girls' toilets will be separated on the site from the boys' toilets.

See Drawing 17 for details of the lower school 3-classroom building.

Upper Basic Education School Facilities

Classrooms

Six classrooms will be provided as class bases and it is proposed that these will consist of four standard general classrooms and two large classrooms in two, three-classroom buildings. See Drawing 18 for details of the upper school 3-classroom building.

Specialist facilities

The only subjects likely to need a specialist facility for teaching are general science, an introduction to technology and agriculture. The only specialist teaching facility that will be required therefore will be a multi-purpose room for science and practical subjects. The room will have benches down one long, window wall with some sinks and possibly electrical outlets (although the science of electricity at this level can probably be taught using dry cell batteries). Gas supplies will not be required. Only one multi-purpose room will be required in this size of school for the number of practical periods taught for all three subjects. Storage space will however be needed for all three subjects.

The only other facility that will be required is a library. It is noted that IT is not on the proposed new curriculum but IT facilities could be used to support the teaching of many subjects. The provision of IT equipment will depend on the provision of teachers, a budget and on a dependable electricity supply (solar power should be investigated as a viable option) but a room for IT use has been provided in the library resource centre.

The specialist facilities to be provided will therefore consist of:

- a multi-purpose room for science, agriculture and light practical technology subjects that is 22' 0" x 39' 6" with two stores 10' 6" and 11' 0" x 9' 6";
- and a library resource centre consisting of a library space 22' 0" x 49' 6", a store/office 18' 6" x 9' 6" and an IT resource room 22' 0" x 19' 6". The library will accommodate a full class and the IT resource room will accommodate half a class.

See Drawing 19 for details of the multi-purpose building and Drawing 20 for details of the library resource centre. It should be noted that the library resource centre will be shared by both the lower and upper schools.

Other Facilities

There will also be:

- two, 5-cubicle pour-flush toilets one for boys and male teachers and one for girls and female teachers;
- and a well or bore-hole and a hand-pump.

The girls' toilets will be separated on the site from the boys' toilets.

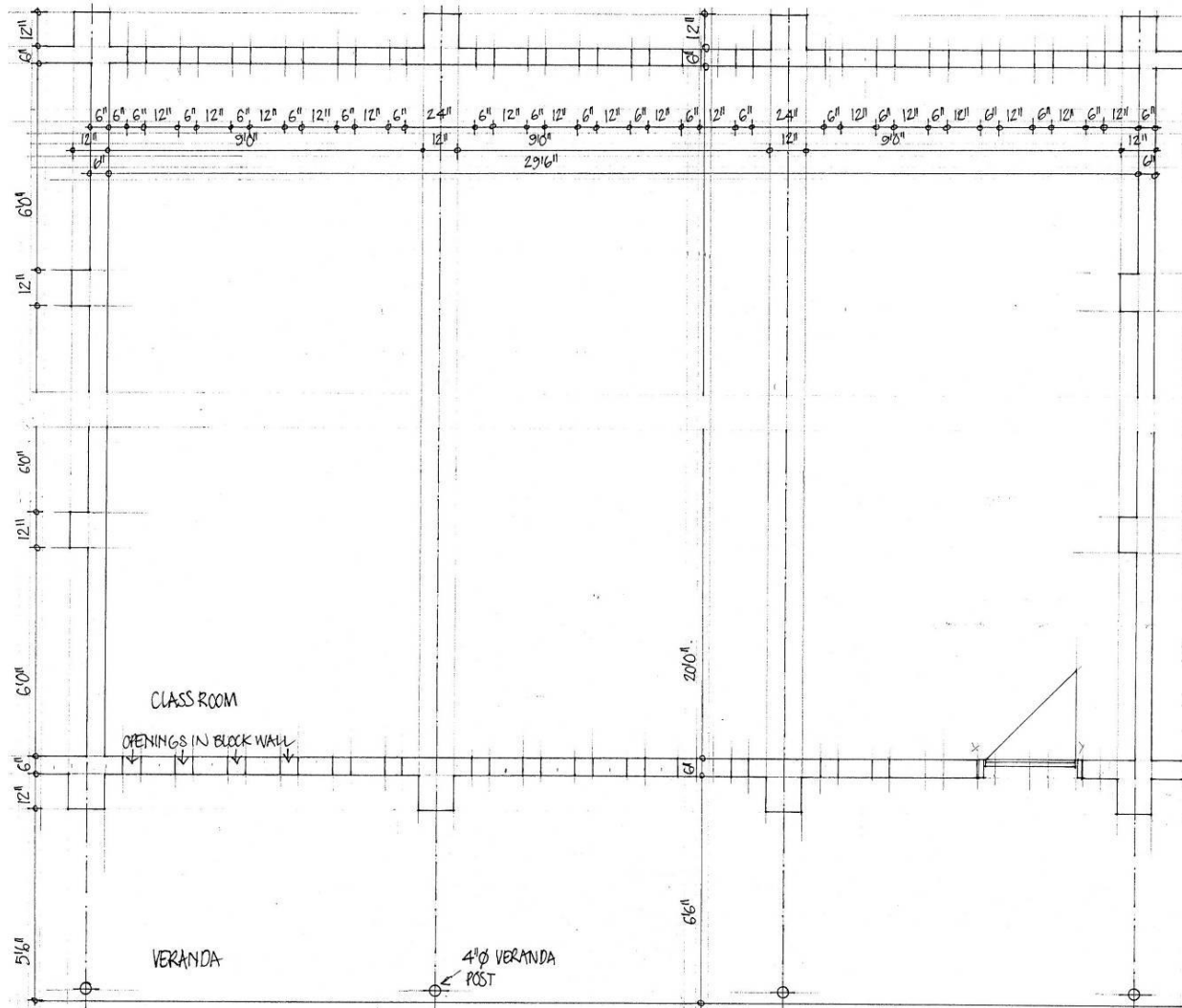
Administration and Teaching Staff Facilities for Lower and Upper Schools

The following accommodation will be provided for the teaching and administrative staff of the combined lower and upper schools:

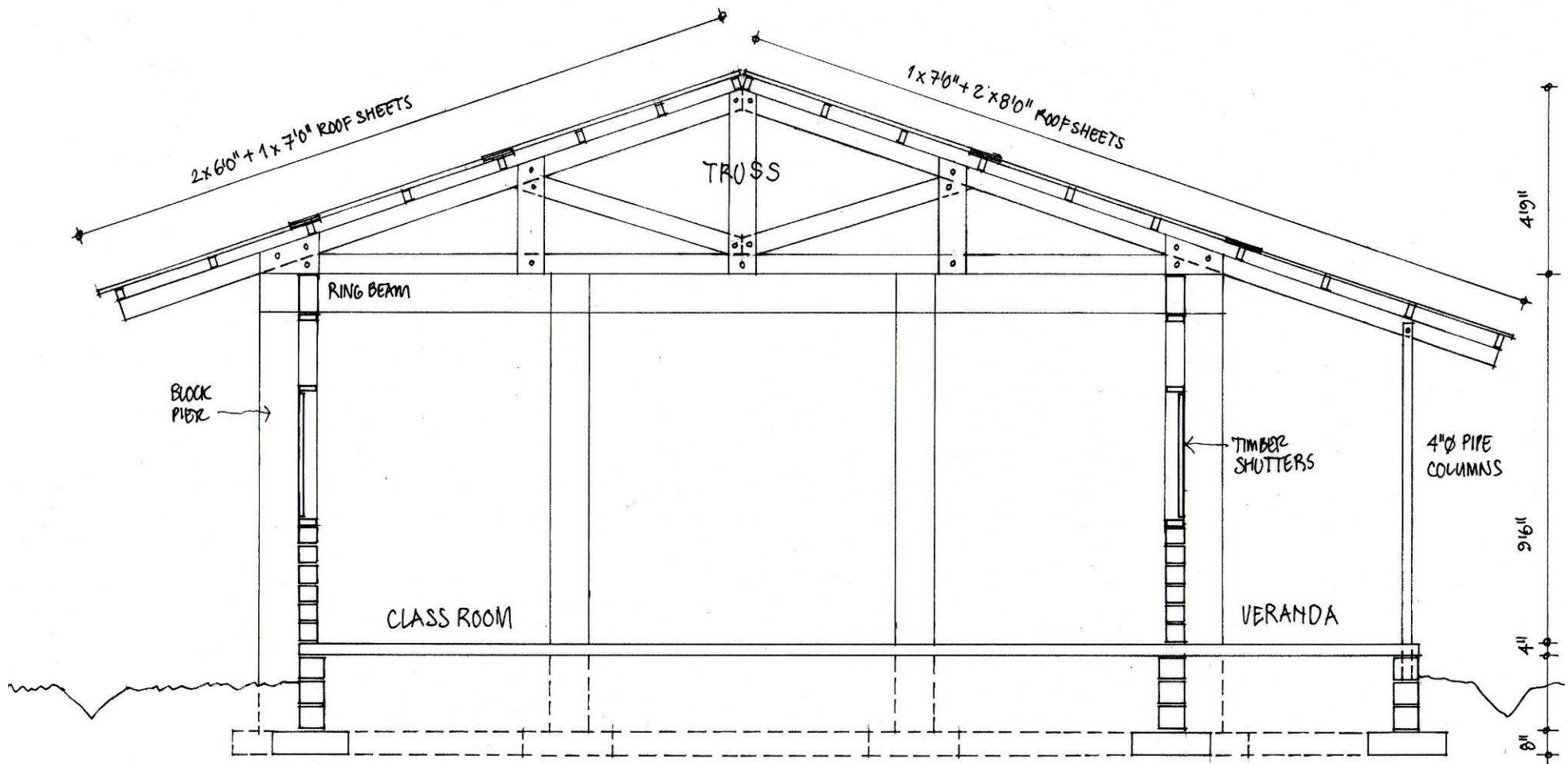
- principal's office 20'0" x 9' 6";
- administration office, store and waiting area 20' x 19' 6";
- vice-principal's office, lower school 20' 0" x 9' 6";
- vice-principal's office, upper school 20' 0" x 9' 6";
- registrar's office 20' 0" x 9' 6";
- 3 pour-flush toilets; one for female staff and two for male staff 20'0" x 9'6";
- two stores 9' 6" x 9' 6" and 10' 0" x 9' 6"
- teachers' room 20' 0" x 29' 6".

See Drawing 21 attached for details of the administration building.

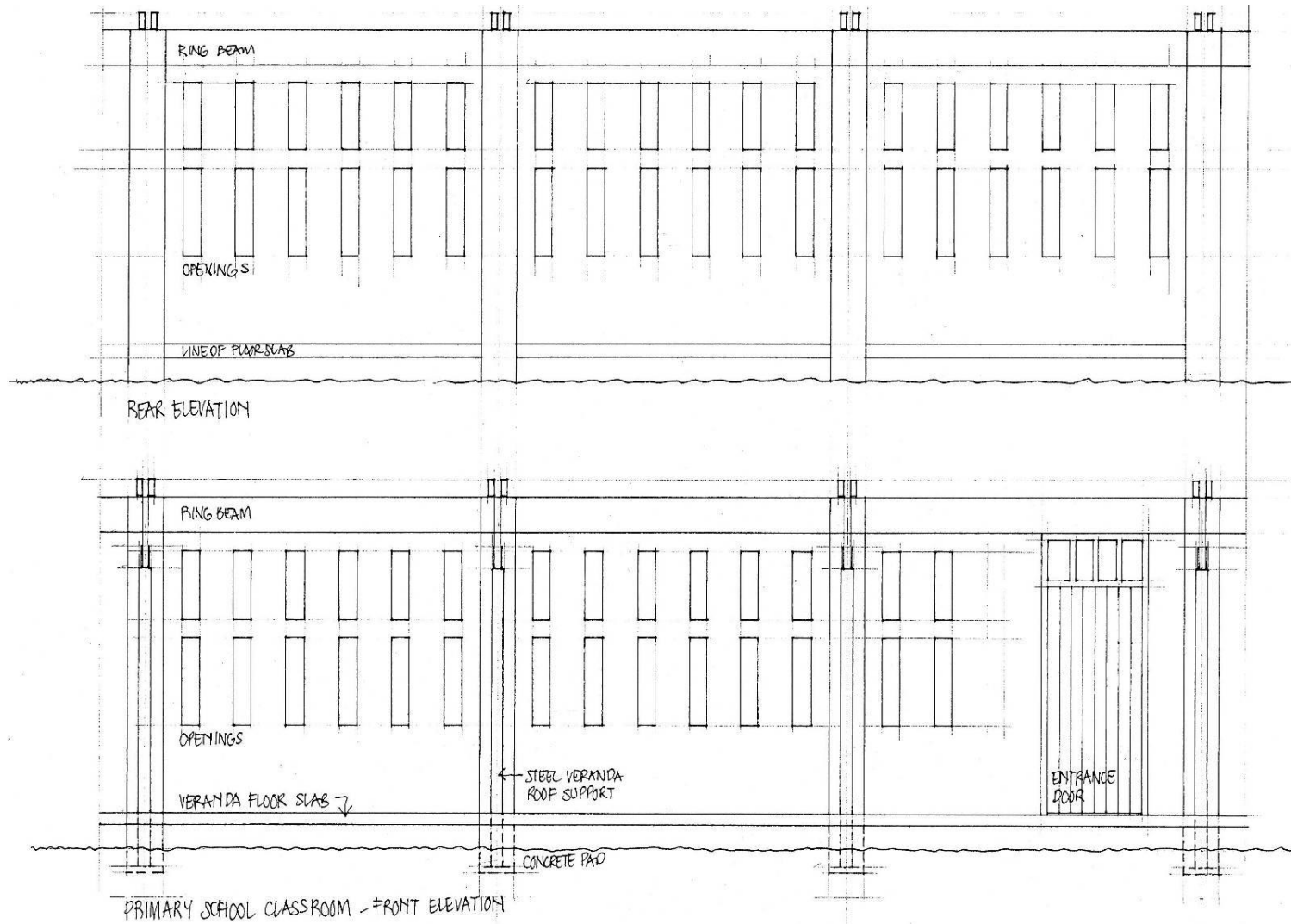
Electrical installations will be provided to those schools with a dependable public electricity supply or the likelihood of obtaining one in the near future. Remote rural schools with no likelihood of an electricity supply within the next ten years will not be provided with an electrical installation. The possibility of providing solar power systems to remote rural schools should however be explored to provide power for the IT room, the admin building and the multi-purpose room.



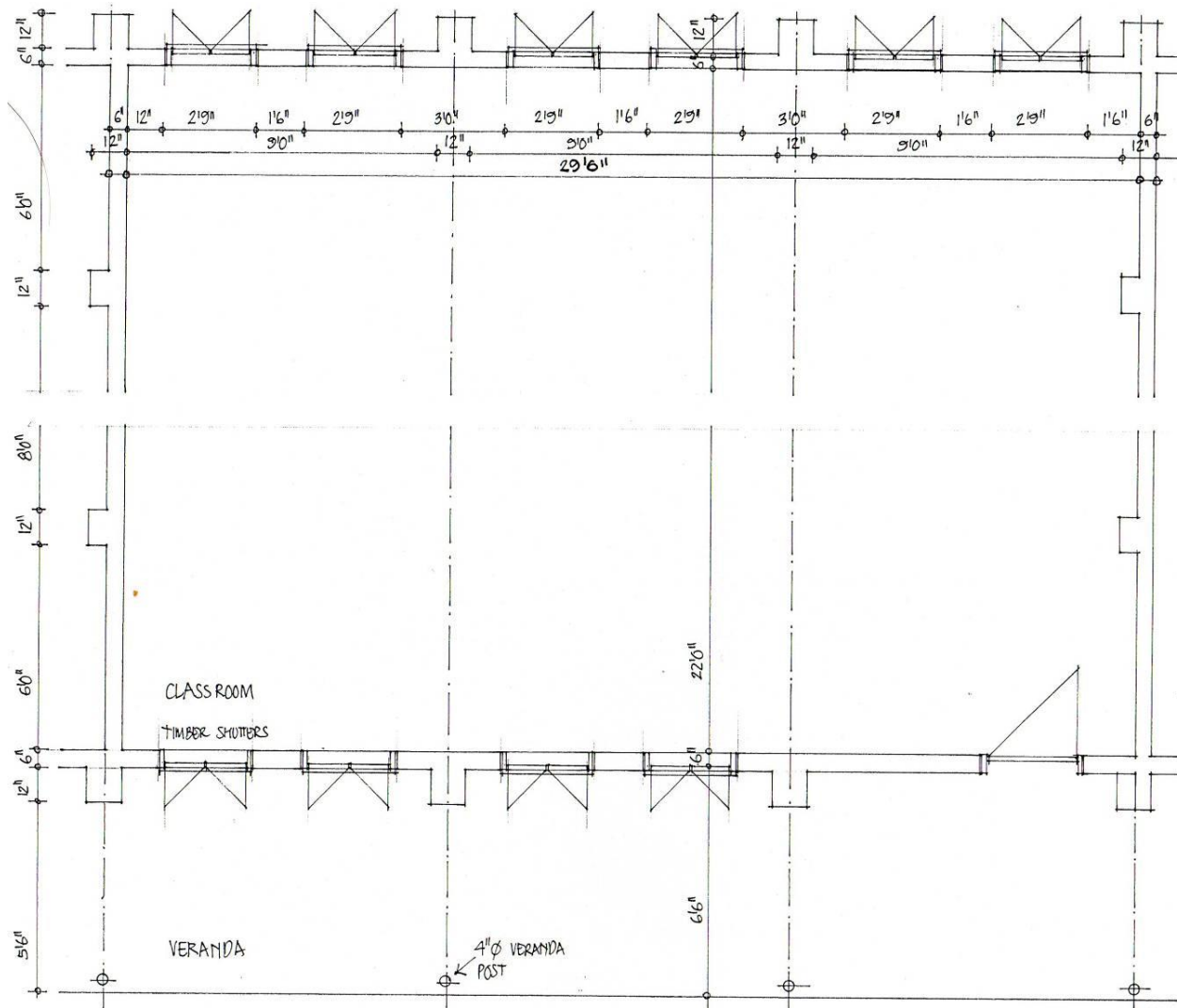
Drawing 1: Primary School Classroom: Plan



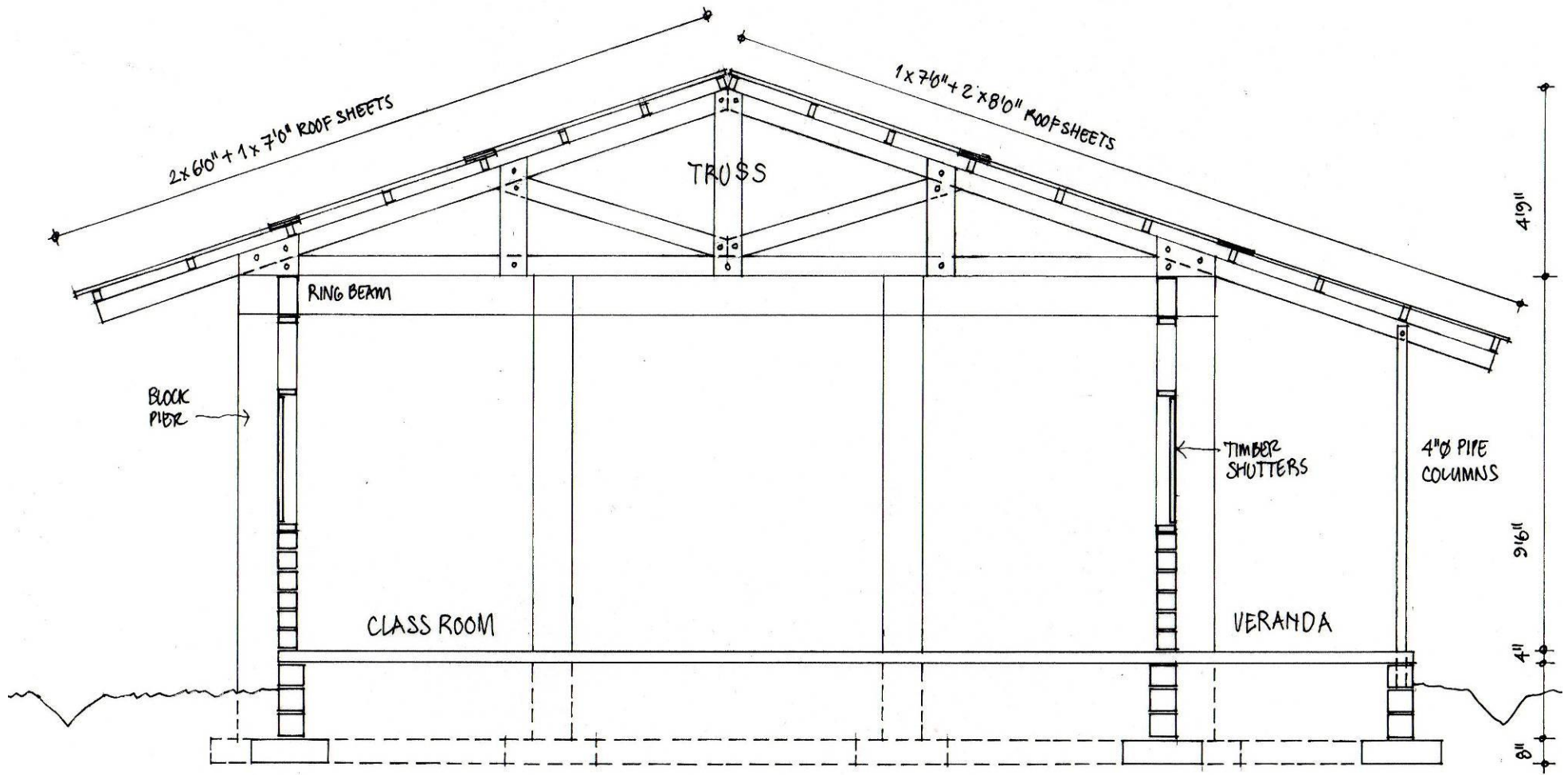
Drawing 2: Primary School Classroom: Section



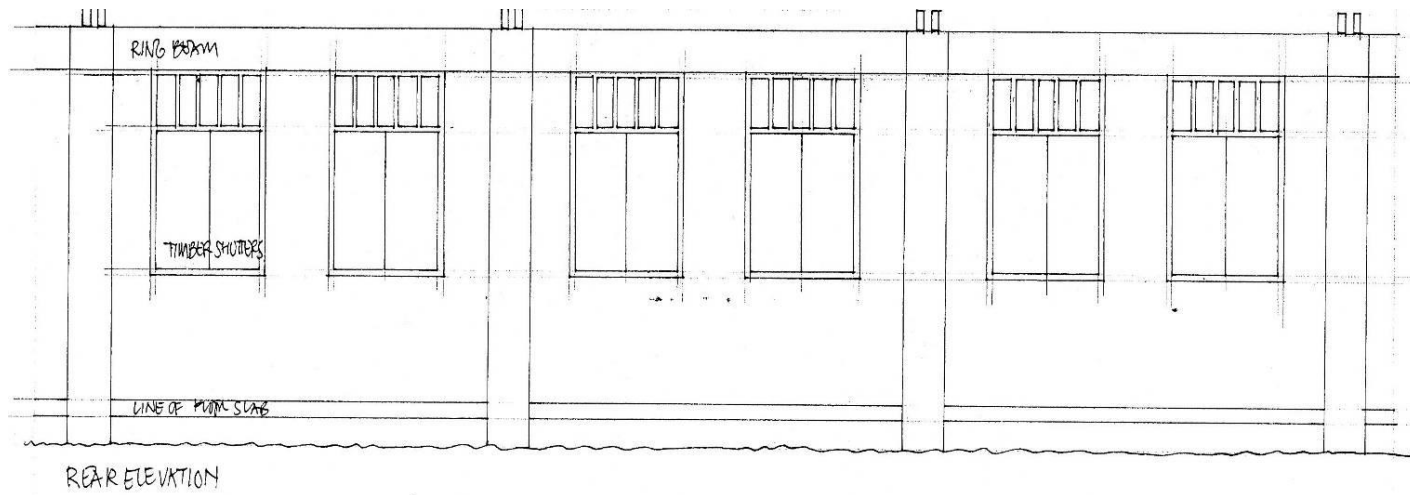
Drawing 3: Primary School Classroom: Elevations



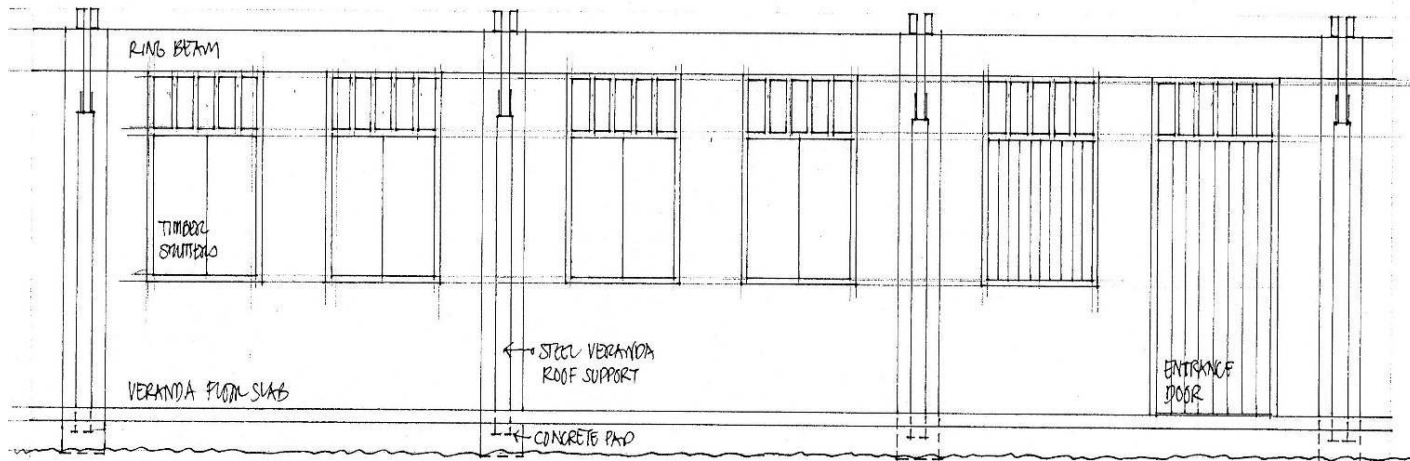
Drawing 4: Upper School (junior secondary) Classroom: Plan



Drawing 5: Upper School (junior secondary) Classroom: Section

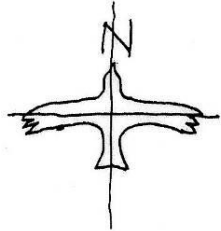


REAR ELEVATION



JUNIOR SECONDARY SCHOOL CLASSROOM - FRONT ELEVATION

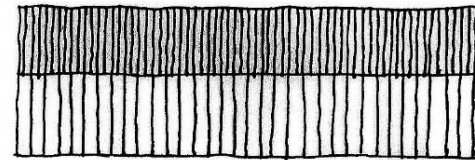
Drawing 6: Upper School (junior secondary) Classroom: Elevations



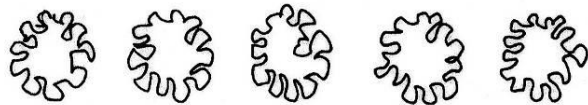
GIRLS



BOYS

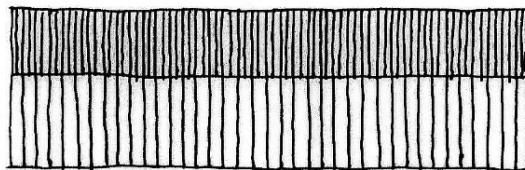


3-CLASS ROOM PRIMARY SCHOOL



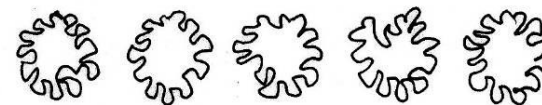
WELL OR BOREHOLE

PLAY AREA

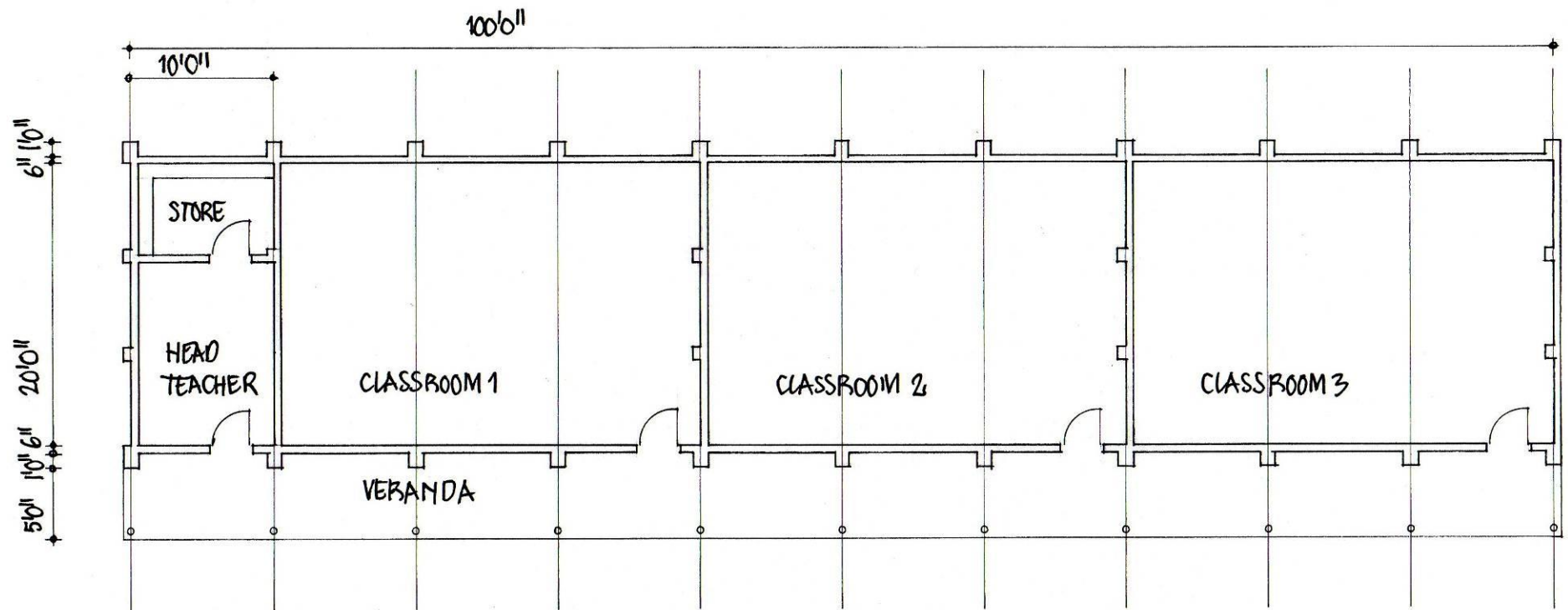


ECD CENTRE

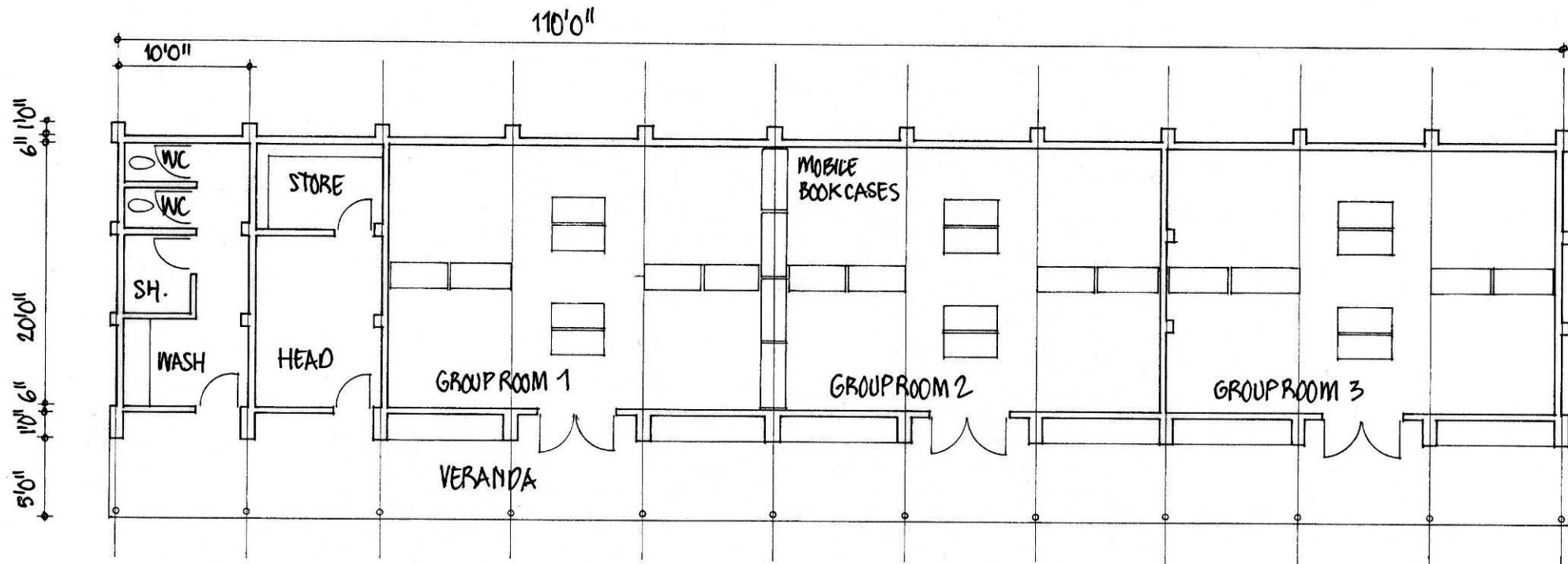
PLAY AREA



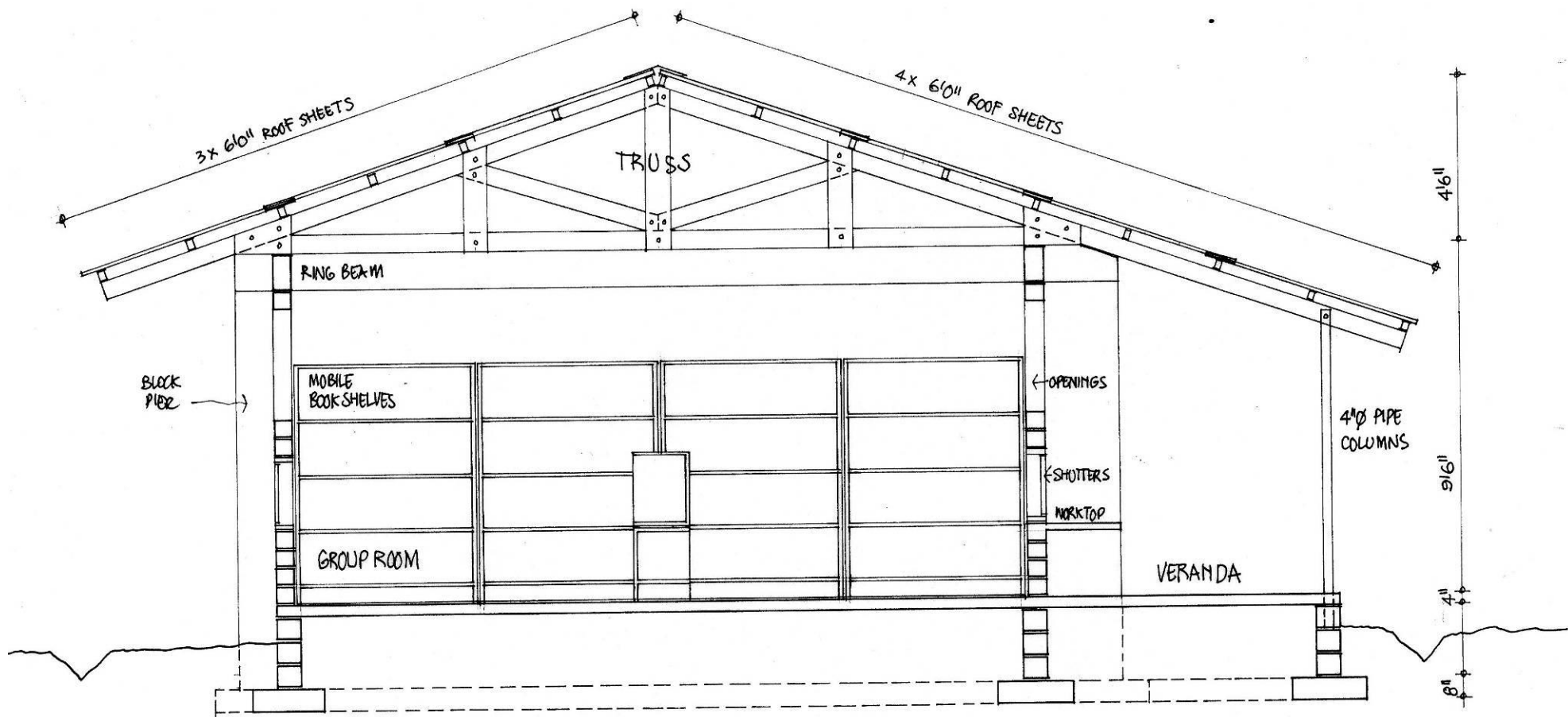
Drawing 7: Typical Site Layout of 3-Classroom Primary School & ECD Centre



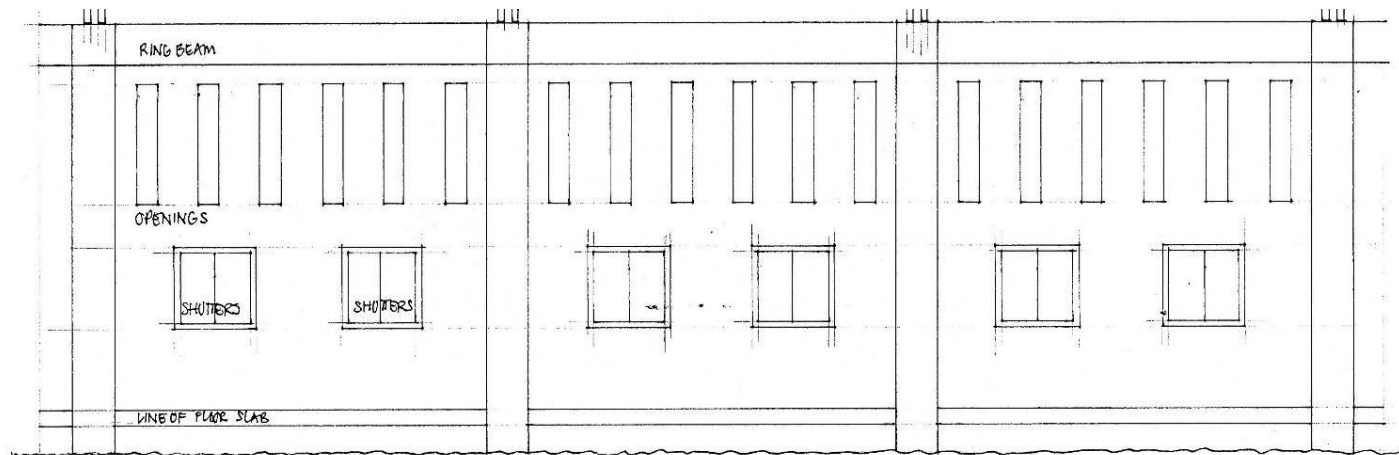
Drawing 8: 3-Classroom Primary School Building: Plan



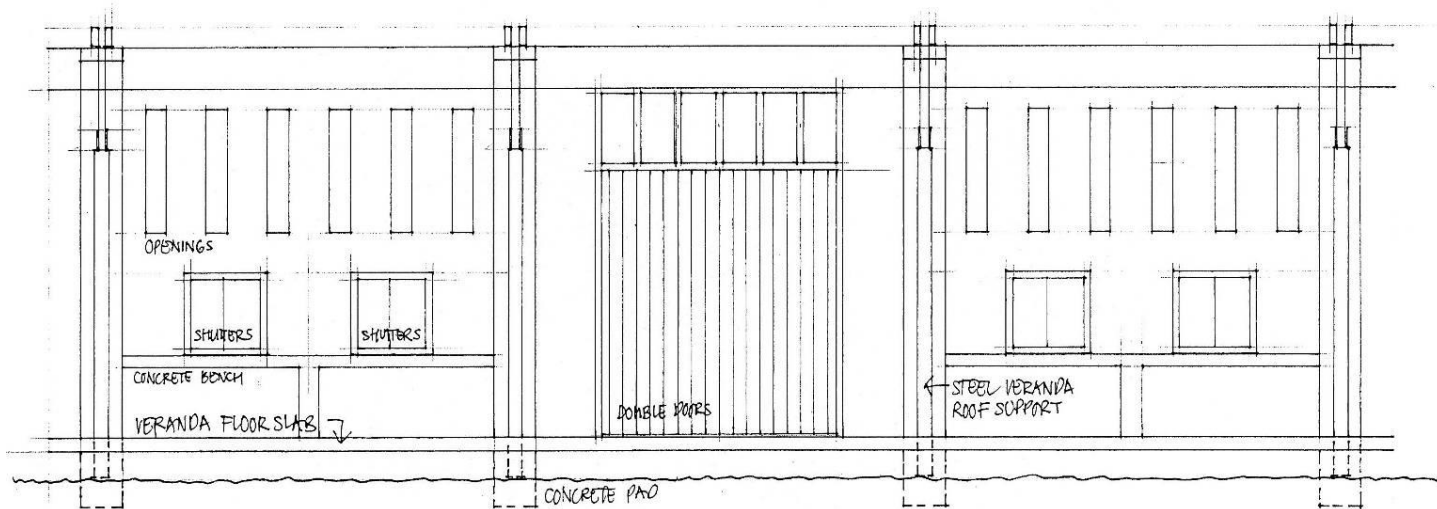
Drawing 9: ECD Centre: Plan



Drawing 10: ECD Centre: Section

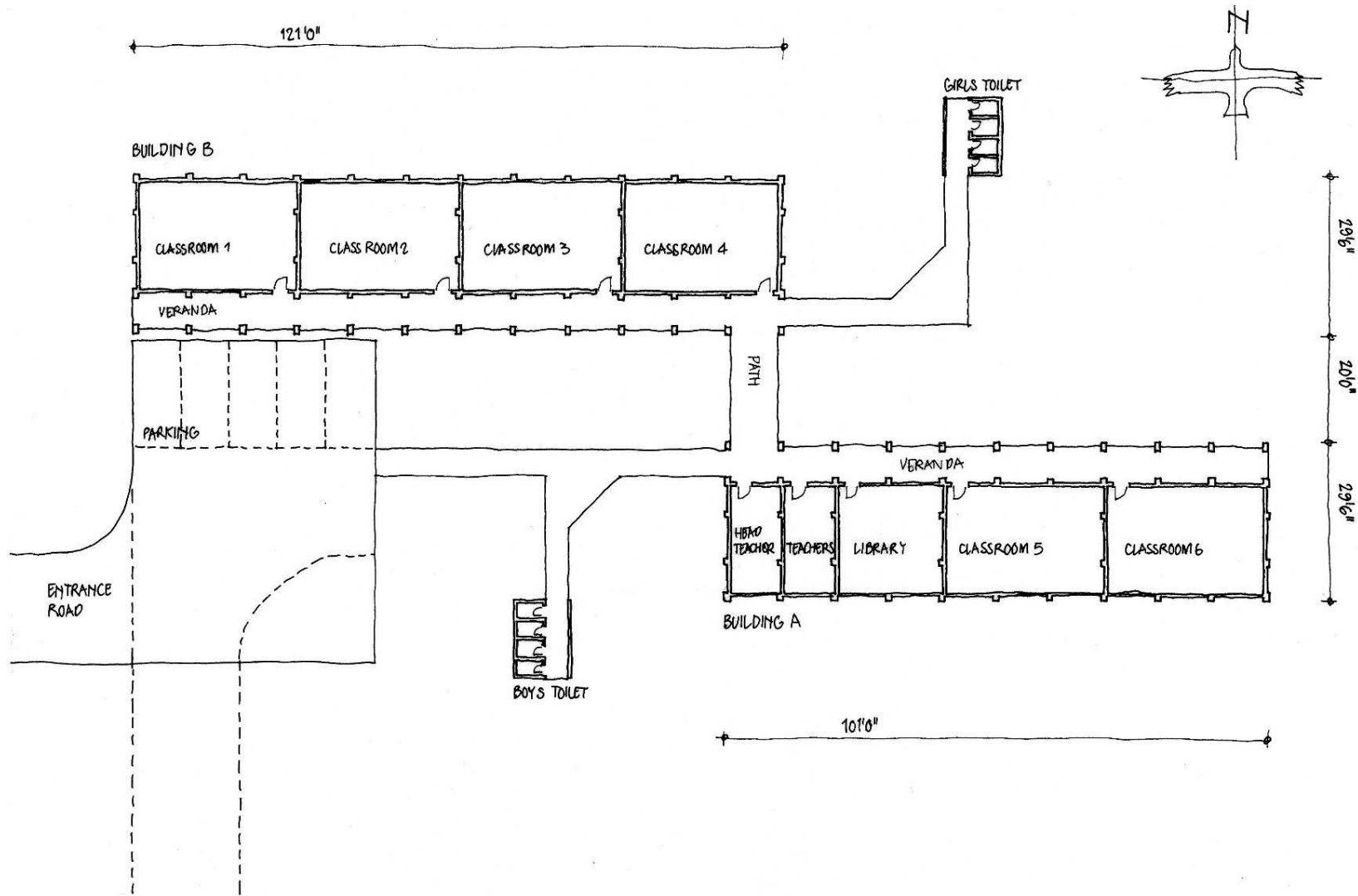


REAR ELEVATION

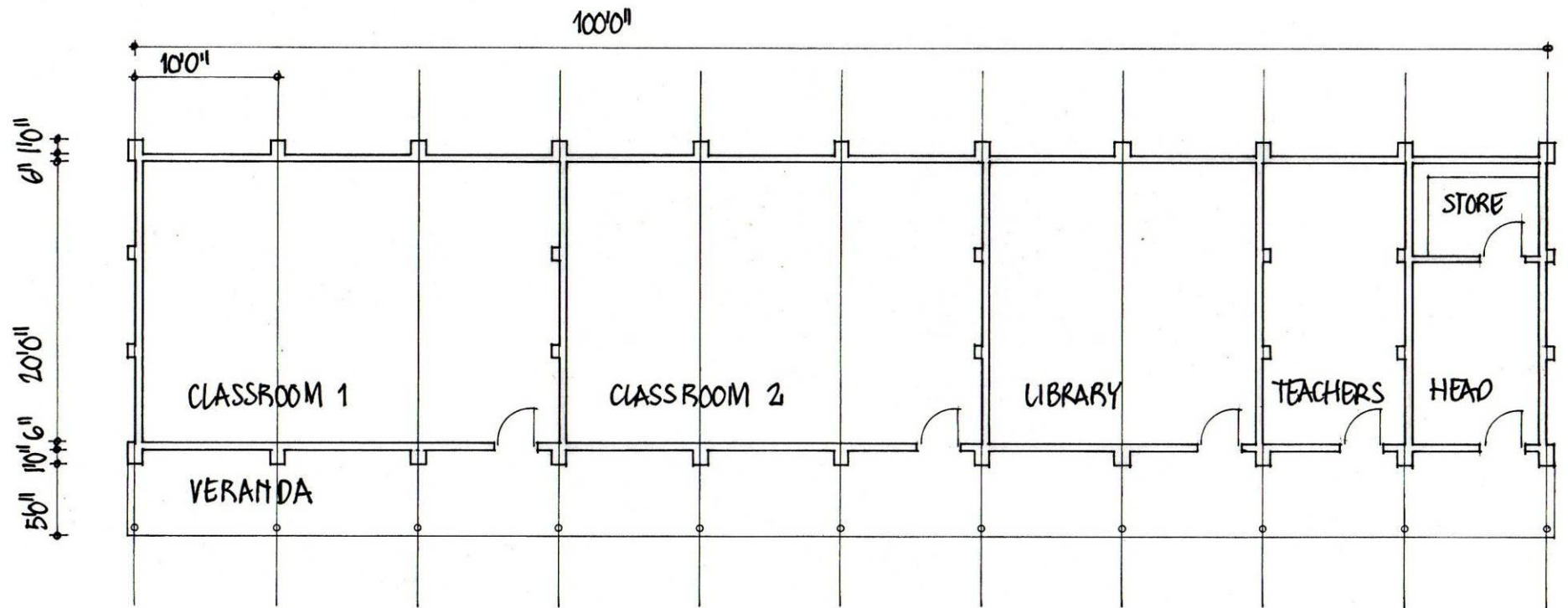


ECD CENTRE FRONT ELEVATION

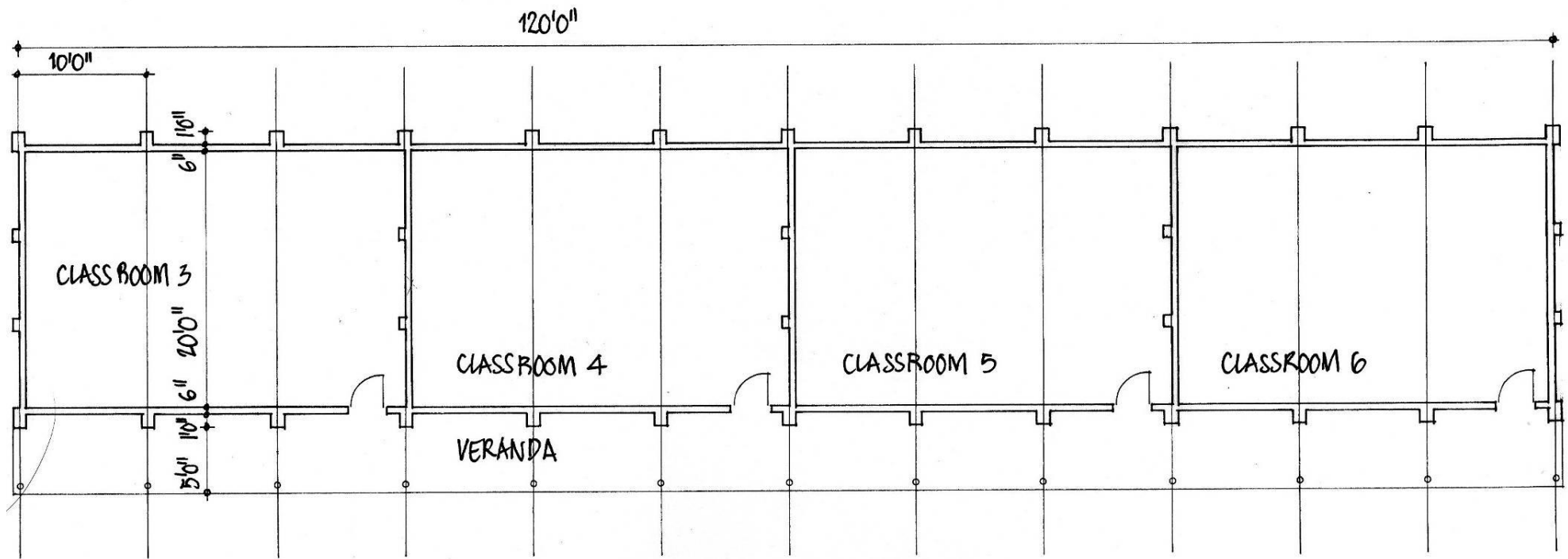
Drawing 11: ECD Centre: Elevations



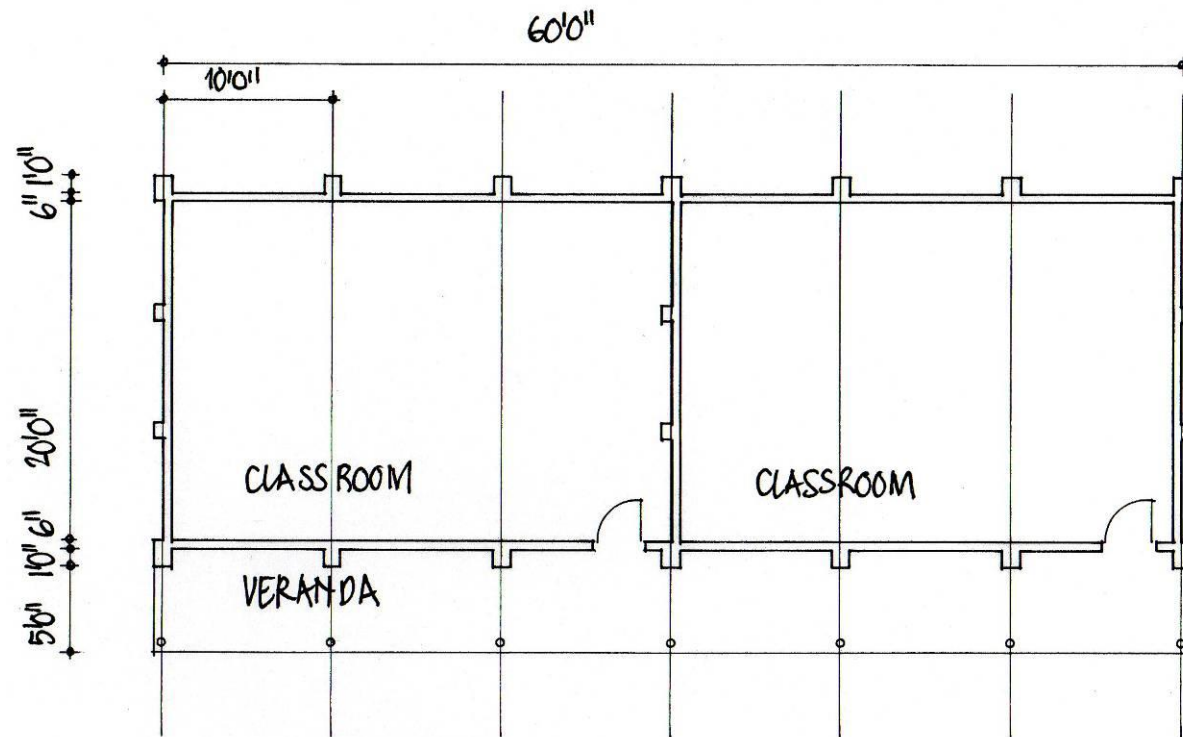
Drawing 12: 6-Classroom Primary School: Typical Site Layout



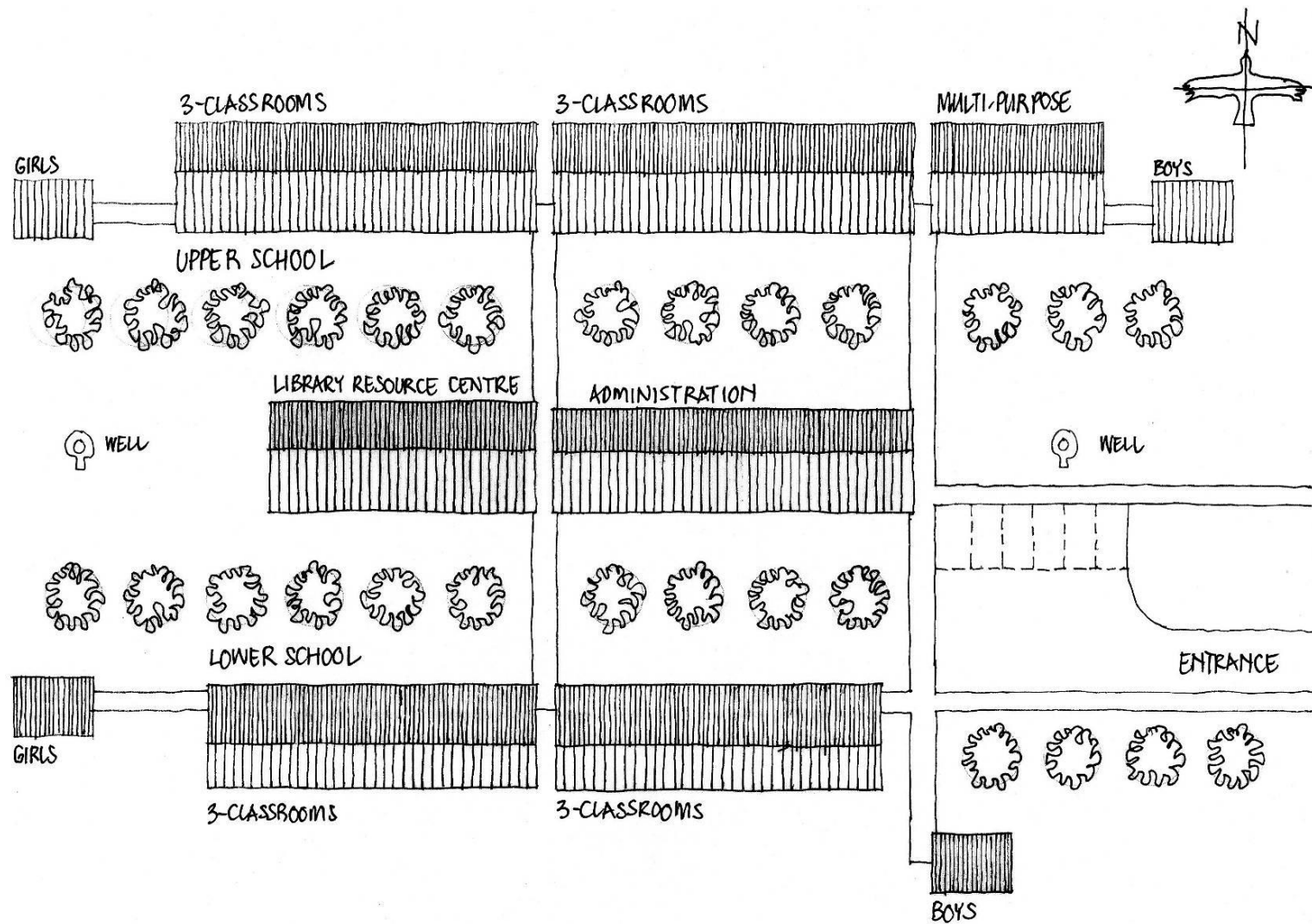
Drawing 13: 6-Classroom Primary School: Administration and Classroom Building



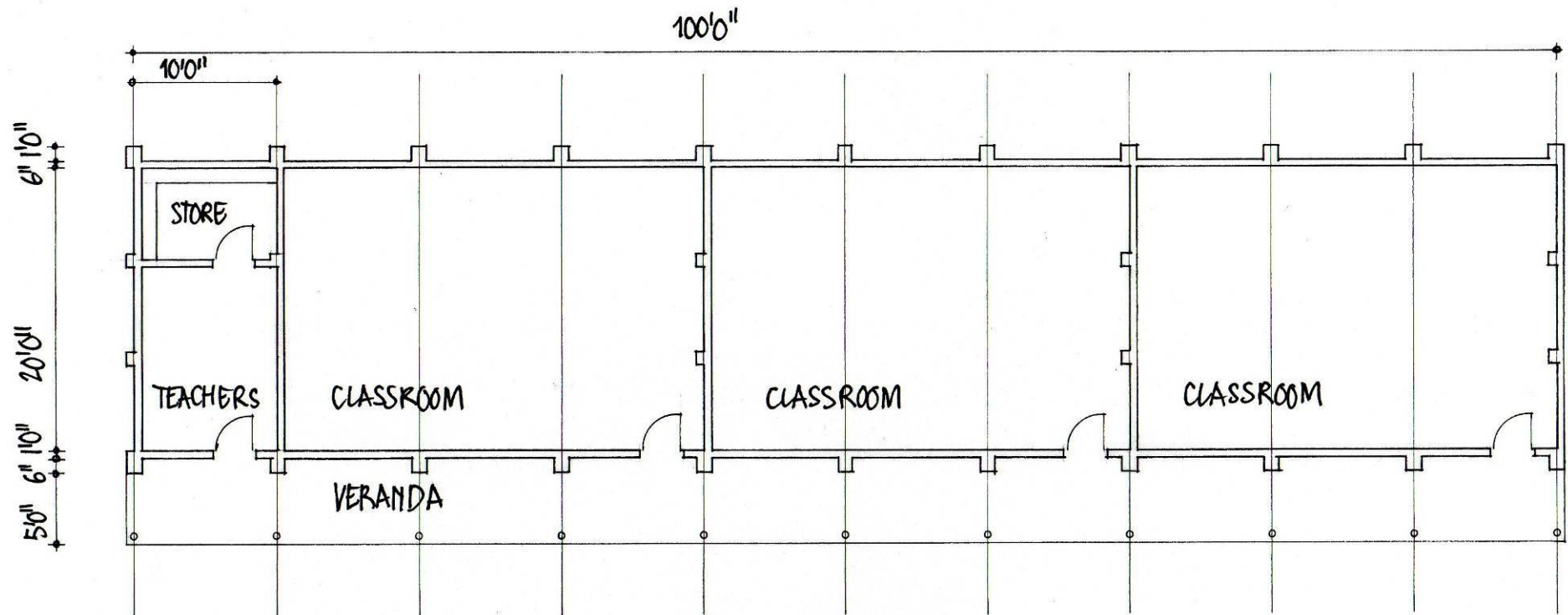
Drawing 14: 6-Classroom Primary School: 4-Classroom Building



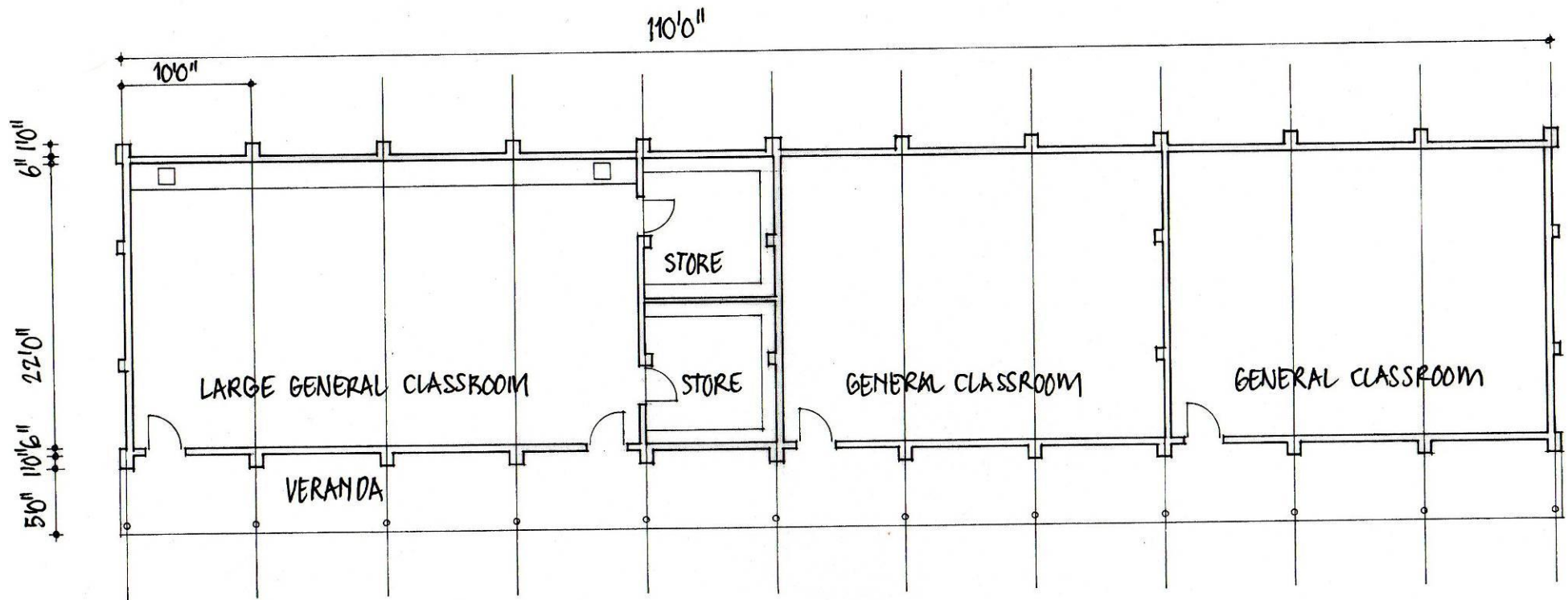
Drawing 15: 6-Classroom Primary School: 2-Classroom Building (2No if used)



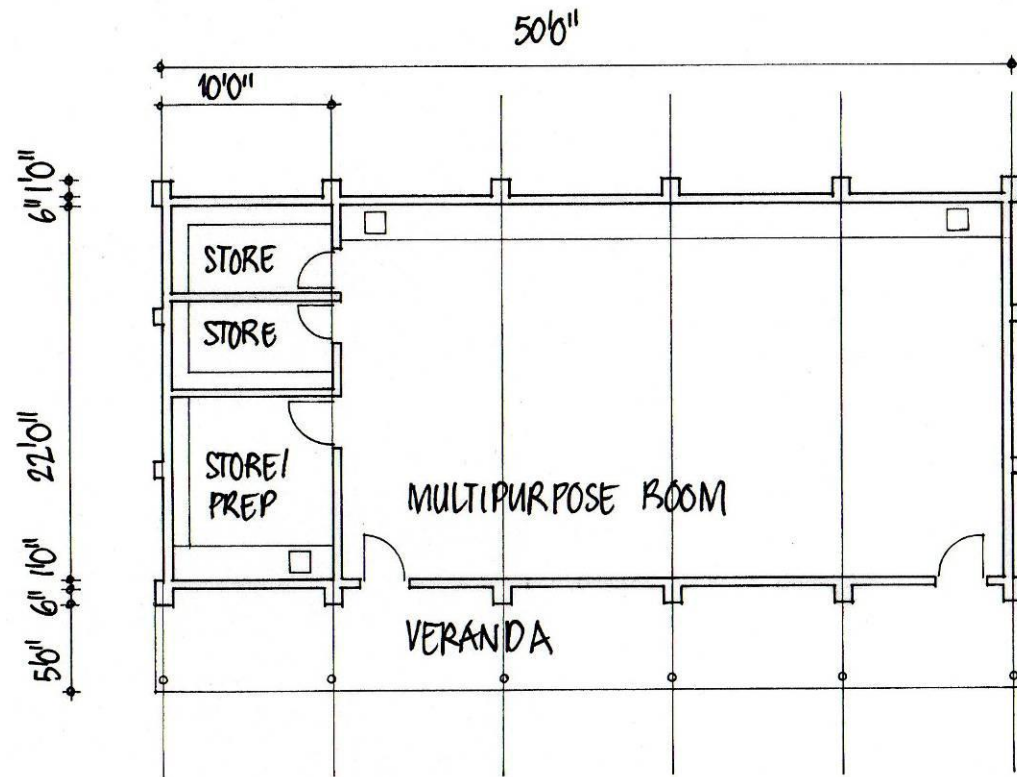
Drawing 16: Basic Education School: Typical Site Layout



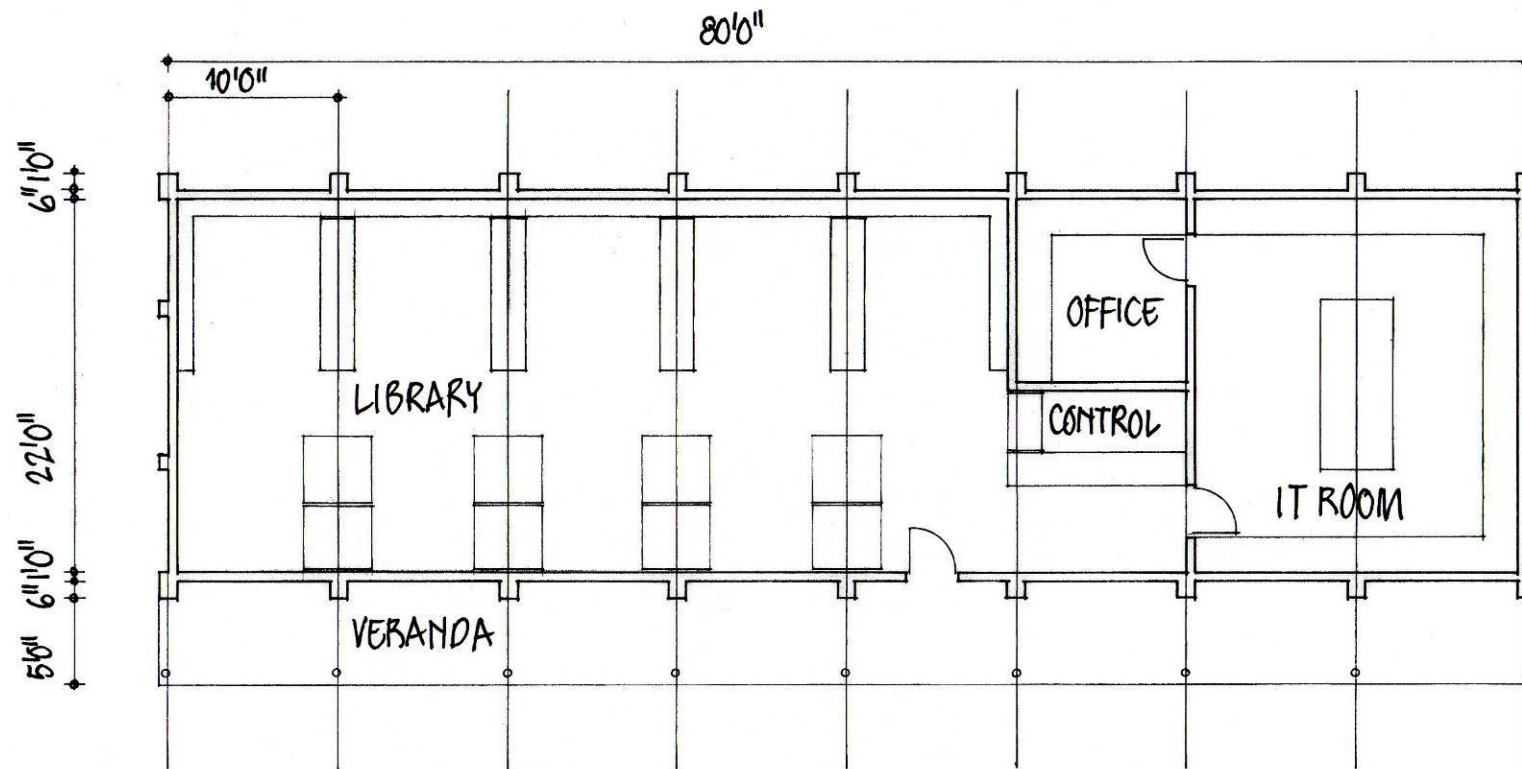
Drawing 17: Basic Education School: Lower School: 3-Classroom Building (x2)



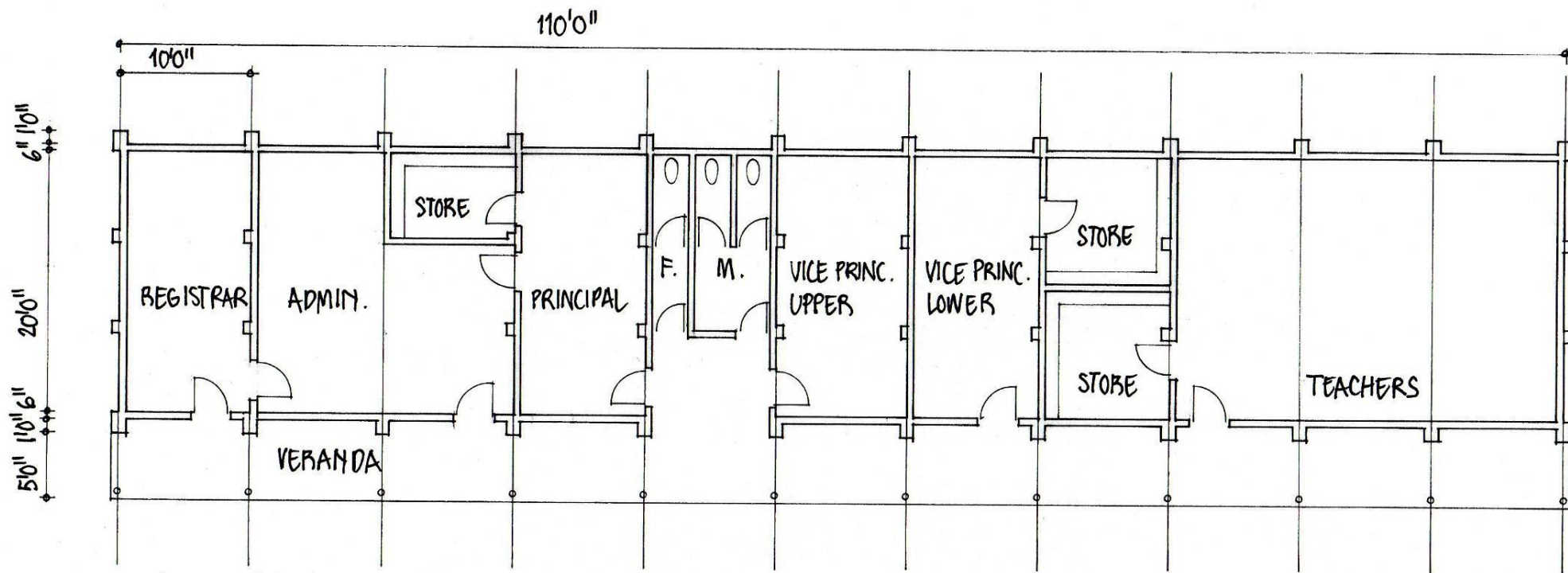
Drawing 18: Basic Education School: Upper School: 3-Classroom Building (x2)



Drawing 19: Basic Education School: Upper School: Multipurpose Building



Drawing 20: Basic Education School: Upper School and Lower Schools: Library Resource Building



Drawing 21: Basic Education School: Upper School and Lower Schools: Administration Building