DEPARTMENT OF CIVIL

ENGINEERING

GOVERNMENT POLYTECHNIC COLLAGE

ANANTNAG

MAJOR PROJECT REPORT ENTITLED

“DESIGN AND ESTIMATION OF PRIMARY HEALTH CENTER (PHC)”

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Major Project Report Entitled

"DESIGN AND ESTIMATION OF PRIMARY HEALTH CENTER (PHC)"

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CERTIFICATE

This is to certify that the major project entitled “Design and estimation of Primary Health Center” for Govt. Polytechnic College Anantnag have successfully completed by group “C” of 6th semester in partial fulfillment for the award of diploma o civil engineering.

This whole work has been done by the following students under my supervision and guidelines.

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ACKNOWLEDGEMENT

I sincerely acknowledge with thanks the contribution and cooperation extended by Er. Asrar Ahmed Lecturer, Government Polytechnic College Anantnag and other staff members of Civil Engineering Department to bring out this major project.

I also acknowledge with thanks, the efforts rendered by all other who have contributed for the development of this major project.

MESSAGE

National Rural Health Mission (NRHM) was launched to strengthen the Rural Public Health System and has since met many hopes and expectations. The Mission seeks to provide effective health care to the rural populace throughout the country with special focus on the States and Union Territories (UTs), which have weak public health indicators and/or weak infrastructure.

Towards this end, the Indian Public Health Standards (IPHS) for Sub-Centers, Primary Health. Centers (PHCs), Community Health Centers (CHCs), Sub-District and District Hospitals were published in January/February, 2007 and have been used as the reference point for public healthcare infrastructure planning and up-gradation in the States and UTs. IPHS are a set of uniform standards envisaged to improve the quality of health care delivery in the country.

The IPHS documents have been revised keeping in view the changing protocols of the existing programmes and introduction of new programmes especially for Non-Communicable Diseases. Flexibility is allowed to suit the diverse needs of the states and regions.

Our country has a large number of public health institutions in rural areas from sub-centers at the most peripheral level to the district hospitals at the district level. It is highly desirable that they should be fully functional and deliver quality care. I strongly believe that these IPHS guidelines will act as the main driver for continuous improvement in quality and serve as the bench mark for assessing the functional status of health facilities.

I call upon all States and UTs to adopt these IPHS guidelines for strengthening the Public Health Care Institutions and put in their best efforts to achieve high quality of health care for our people across the country.

New Delhi

23.11.2011

(Ghulam Nabi Azad

FOREWORD

As envisaged under National Rural Health Mission (NRHM), the public health institutions in rural areas are to be upgraded from its present level to a level of a set of standards called "Indian Public Health Standards (IPHS)". The Indian Public Health Standards are the benchmarks for quality expected from various components of Public health care organizations and may be used for assessing performance of health care delivery system.

As early as 1951, the Primary Health Centers (PHCs) were established as an integral part of community development Programmed. Since then lot of changes have taken place. Currently the PHC covers a population of 20,000-30,000 (depending upon the geographical location) and is occupying a place between a Sub-Centre at the most peripheral level and Community Health Centre at block level.

As setting standards is a dynamic process, need was felt to update the IPHS keeping in view the changing protocols of existing National Health Programmes, introduction of new programmes especially for Non-Communicable Diseases and prevailing epidemiological situation in the country. The IPHS for PHC has been revised by a taskforce comprising of various stakeholders under the Chairmanship of Director General of Health Services. Subject experts, NGOs, State representatives and health workers working in the health facilities have also been consulted at different stages of revision.

The newly revised IPHS for PHC has considered the services, infrastructure, manpower, equipment and drugs into two categories of Essential (minimum assured services) and Desirable (the ideal level services which the states and Union Territories (UTs) shall try to achieve). PHCs have been categorized into two categories depending upon the case load of deliveries. This has been done to ensure optimal utilization of resources. Sates/UTs are expected to categorize the PHCs and provide infrastructure according to the laid down guidelines in this document.

I am sure this document will help the States Governments and Panchayati Raj Institutions to monitor effectively as to how many of the PHCs are conforming to IPHS and take measures to upgrade the remaining to desired level.

I would like to acknowledge the efforts put by the Directorate General of Health Services in preparing the guidelines. Comments and suggestions for further improvement are most welcome.

(P.K.Pradhan)

PREFACE

Standards are a means of describing a level of quality that the health care organizations are expected to meet or aspire to achieve. For the first time under National Rural Health Mission (NRHM), an effort had been made to develop Indian Public Health Standards (IPHS) for a vast network of peripheral public health institutions in the country and the first set of standards was released in early 2007.

A Primary Health Centre (PHC) serves as a first port of call to a qualified doctor in the public health sector in rural areas providing a range of curative, primitive and preventive health care. A PHC providing 24-hour services and with appropriate linkages, plays an important role in increasing institutional deliveries thereby helping to reduce maternal mortality and infant mortality. The IPHS for Primary Health Centers has been revised keeping in view the resources available with respect to functional requirements of Primary Health Centre with minimum standards for such as building, manpower, instruments and equipment, drugs and other facilities etc. The revised IPHS has also incorporated the changed protocols of the existing health programmes and new programmes and initiatives especially in respect of Non Communicable Diseases. The task of revision was completed as a result of consultations held over many months with task force members, programme officers, Regional Directors of Health and Family Welfare, experts, health functionaries, representatives of Non-Government organizations, development partners and State/Union Territory Government representatives after reaching a consensus. The contribution of all of them is well appreciated. Several innovative approaches have been incorporated in the management process to ensure community and Panchayati Raj Institutions' involvement and accountability. From Service delivery angle, PHCs may be of two types depending upon the delivery case load – Type A and Type B. The PHCs with delivery case load of less than 20 deliveries in a month will be of Type A and those with delivery case load of 20 or more in a month will be of Type B. This has been done to ensure optimal utilization of manpower and resources. Setting standards is a dynamic process and this document is not an end in itself. Further revision of the standards shall be undertaken as and when the Primary Health Centers will achieve a minimum functional grade. It is hoped that this document will be of immense help to the States/Union Territories and other stakeholders in bringing up Primary Health Centers to the level of Indian Public Health Standards.

(Dr. Jagdish Prasad

EXECUTIVE SUMMARY

Primary Health Centre is the cornerstone of rural building, manpower, instruments and equipment health services- a first port of call to a qualified drug and other facilities etc. The revised IPHS has doctor of the public sector in rural areas for the incorporated the changed protocols of the existing sick and those who directly report or referred from health programmes and new programmes and Sub-Centers for curative, preventive and primitive initiatives especially in respect of Non-communicable health care diseases. A typical Primary Health Centre covers a population The overall objective of IPHS for PHC is to provide of 20,000 in hilly, tribal, or difficult areas and 30,000 health care that is quality oriented and sensitive to populations in plain areas with 6 indoor/observation the needs of the community. These standards would beds. It acts as a referral unit for 6 Sub-Centers and also help monitor and improve the functioning of therefore out cases to CHC (30 bedded hospital) and high PHCs. order public hospitals located at sub-district and district level. However, as the population density in the country is not uniform, the number of PHCs would depend upon the case load. PHCs should become a 24 hour facility with nursing facilities. Select PHCs, especially in large blocks where the CHC/FRU is over one hour of journey time away, may be upgraded to provide 24 hour emergency hospital care for a number of conditions by increasing number of Medical Officers, preferably such PHCs should have the same IPHS norms as for a CHC. Standards are the main driver for continuous improvements in quality. The performance of Primary Health Centers can be assessed against the set standards. Setting standards is a dynamic process. Currently the IPHS for Primary Health Centers has been revised keeping in view the resources available with respect to functional requirements of Primary Health Centre with minimum standards such as

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1. BUILDING

INTRODUCTION

Building construction is the process of adding structures to real property .In the field of civil engineering, construction is a process that consists of building or assembling of infrastructure. Far from being a single activity, large scale construction is a combination of human multitasking. Normally, the job is managed by a project manager and supervised by a construction manager, design engineer, construction engineer or project architect.

For the successful execution of a project, effective planning is essential .Those involved with the design and execution of the infrastructure projects must consider the parameters like environment impact of the job, the successful, budgeting, construction site safety, availability of building materials, logistics, and inconvenience to the public caused by construction delays and bidding, etc.

The building construction in India is growing at a rapid pace and the construction industry is increasing at over 49 percent per year with more than 40 million sq. m of commercial and residential space being added annually. Indian building construction industry is now recognizing the role of environment management as a tool to enhance competitiveness. “A green building is an outcome of a design which focuses on increasing the efficiency of resource used; energy, water and material, while reducing building impacts on human health and the environment during the building life cycle, through better orientation, design, construction, operation, maintenance, and removal”. The concept of energy efficient **green building** is already popular, which promises a clean and serene lifestyle. Increasingly building are going green and the benefits to the environment are showing their results. India is the country where more green building is springing up each year. Apart from saving on operating costs, adopting environment friendly technologies and practices in the building sector can address sustainability issue, as well as contribute to the conservation of natural resources.

1.1 DEFINITION OF A BUILDING

A building can be defined as a structure broadly consisting of walls, floors and roofs, erected to provide covered space for a different uses such as residence, education, business, hospitals, manufacturing, worship, entertainment etc.

A building may be defined as a permanent or temporary structure enclosed within exterior walls and a roof, and including all attached apparatus, equipment and fixtures that cannot be removed without cutting into ceiling, floors or walls.

Usually, the building are constructed according to drawings and specifications prepared by architects and structural engineers. Each city has prescribed building byelaws (regulations and code of practice) to which building must conform. The building byelaws lay down certain norms like minimum front side, and rear setbacks, maximum height of the building maximum covered area, minimum height and area of habitable rooms, etc. Which are to be followed by the architect in evolving utilization of built up space, thermal comfort, proper ventilation, desirable illumination and acoustical characteristics and above all, it must satisfy the functional requirements of people who live and work in the building.

1.2DIFFERENT PARTS OF A BUILDING

A building can be broadly classified in two parts:

i. Sub-structure
ii. Super-structure.

SUB-STRUCTURE: The part of the building below the surrounding ground is known as sub-structure. Due to the scarcity of space, it is very common now-a-days to construct two-three floors below the ground level. This portion of the building is in direct contact with the sub-strata and resists the side pressure of the surrounding soil. This portion of the building which provides accommodation below ground level is also known as basement.

Basement along with other portion of the building is supported by the foundation lying below it,

SUPER-STRUCTURE: It is that part of the structure which is constructed above the ground level.

A building in general is made of the following structural components.

1. Foundation
2. Plinth
3. Walls
4. Columns and piers
5. Ground basement and upper floors
6. Doors, windows and ventilators
7. Sills, lintels and weather shades
8. Stairs
9. Roof/slabs
10. Building finishes
11. Building services and utility fixtures.

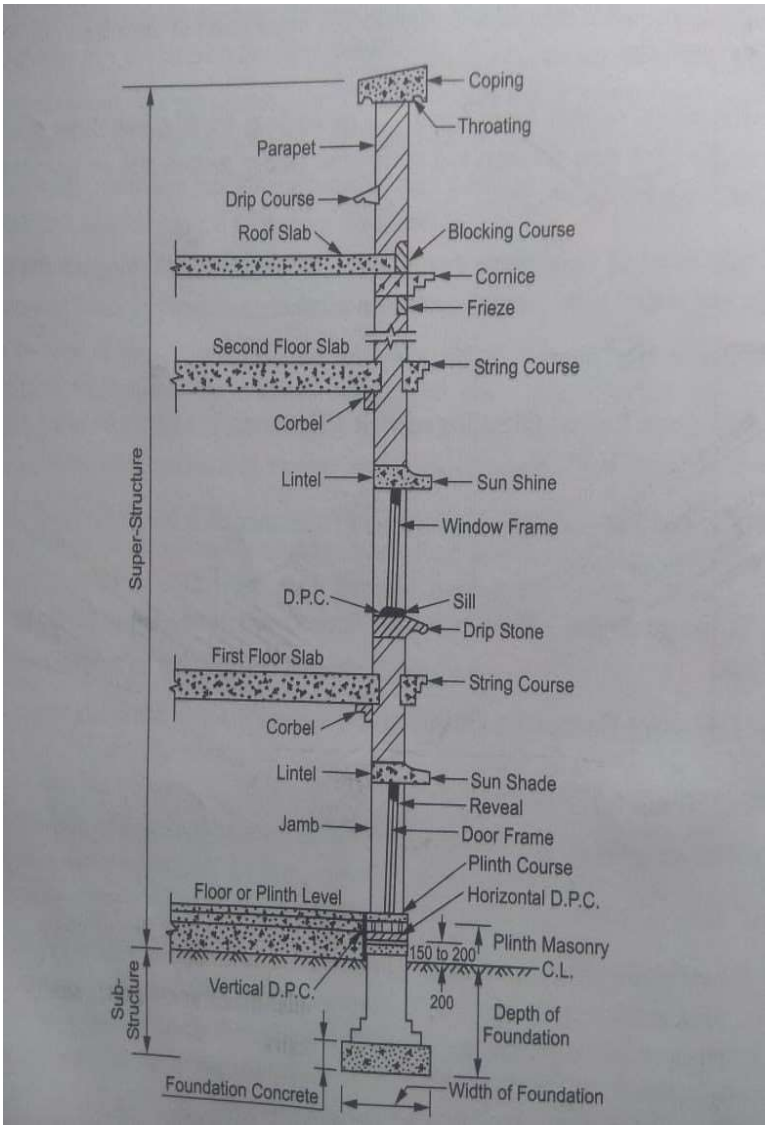


Fig. 1

FOUNDATION:

Foundation is a part of a sub-structure and it plays a vital role in transferring the load and stresses to the soil below. The foundation is so designed that the soil below the foundation is not stressed beyond its safe allowable bearing capacity.

REQUIREMENTS/FUNCTIONS OF FOUNDATION

i. It helps in distributing the load on wider area.
ii. It prevents the differential settlement of structure.
iii. It increases the stability of structure.
iv. It prevents the lateral movement of building.
v. It distributes the load uniformly to sub-soil.

PILINTH: This is the portion of the building between the surface of the surrounding ground and surface of the floor, immediately above the ground. The level of the surrounding ground is known as formation level or simply ground level and the level of the ground floor of the building is termed as plinth level.

REQUIREMENTS/FUNCTION OF PLINTH

i. It acts as a medium to transfer the load of super-structure to the foundation below.
ii. It helps in protecting the building from dampness or moisture penetration into it.
iii. It helps in retaining the filling material in position below the raised floor of the building.
iv. It provides architectural appearance to building.
v. It helps in maintaining the level of a building.

WALLS: The main function of wall is to enclose or divide the space in desired pattern. In addition, walls provide privacy, security and protect the inhabitants from the weathering agencies like sun, rain, wind etc. Walls are constructed with the help of bricks, stones, concrete blocks (solid or hallow) etc. These building units are bonded together with the help of cement-sand-motor.

REQUIREMENTS/FUNCTION OF LOAD BEARING WALLS IN SUPER-STRUCTURE

i. They should be strong enough to withstand the dead loads and the superimposed loads.
ii. They should provide sufficient stability against overturning and buckling caused by excessive slenderness.
iii. They should be weather insulation against heat and sound.
iv. They should provide security and privacy to the building.

COLUMNS AND PIERS: A columns may be defined as an isolated vertical load carrying members, the width of which is neither less than its thickness nor more than four times its thickness. Where as a pier is similar to a column except that it is bonded into load bearing wall at regular intervals to from an integral part and extends to full height.

GROUND BASEMENT AND UPPER FLOOR: The primary function of a floor is to provide to support to the inhabitants, furniture etc. The building is vertically elevated to provide more accommodation with the limited space.

REQUIREMENTS/FUNCTION OF FLOOR

i. It should provide strength and stability to the building.
ii. It should in transferring the dead and live load.
iii. It should provide a clean, smooth, durable and impervious surface.
iv. It should provide insulation against heat and sound.
v. It should provide a barrier against fire, to travel to the upper floor.

DOORS, WINDOWS AND VENTILATION: The main function of the door is to provide free access to inside and outside a room. It serves as a connecting link between internal parts and also to allow the free movement outside of building. A door mainly consists of two components namely: 1, Doors frame 2, Door shutter.

The door frame is permanently held in position and fixed to the masonry of the opening with the help of hold fasts or fisher bolts, whereas door shutters are the movable part of the door.

The window may be defined as an opening left out in a wall for the purpose of providing natural day light, sunlight and air into the building.

Ventilators are providing in a building to vent out or exhaust the air from the building.

REQUIRNMENTS/FUNCTION OF DOORS, WINDOWS AND VENTILATORS

i. To perform their basic functions it is required that they should be weather resistant (i.e for strength and durability requirements). These members should be strong enough to resist the adverse effects of rain, sun and wind.
ii. They must be sound and thermal resistant.
iii. They must provide security and privacy to the occupants.
iv. They must be damp proof.

SILLS, LINTELS AND WEATHER SHADES: Window sills are provided between the bottom of window frame and the masonry wall below. It is provided to protect the wall from wear and tear.

The frame of a door or a window is not strong enough to withstand the weight of the wall above that opening, therefore it is provided with a separate structure element known as lintel. A lintel is basically a beam which is provided over the opening.

Sun shades are generally combined with lintel of window to protect them from the adverse effects of weathering agencies like wind, sun and rain.

ESSENTIAL REQUIRNMENTS/FUNCTION OF SILLS, LINTELS AND WEATHER SHADES

i. Window sills are generally throated to throw away the rain water.
ii. Lintels should be designed properly to carry load effectively.
iii. Length of sunshade projection should be sufficient to protect them from weathering agencies.

STAIRS: A stairs may be defined as a structure comprising of a number of steps connecting one floor to another. The stair must be connected in such a manner that it is safe and comfortable to use, the stair should be centrally located and should have sufficient width to accommodate the inhabitants in case of emergence.

ESSENTIAL REQUIREMENTS/FUNCTION FOR STAIR

i. Stair should be comfortable enough to access i.e. the pitch, rise and tread should be properly designed.
ii. They should be strong enough to carry the anticipated loads safely.
iii. They should be made from fire resistant materials and provide safe means of escape in case of fire.

ROOF/SLABS: A roof may be pitched or flat type and is the uppermost part of a building and its main function is to cover the space below and protect it from weathering agencies like rain, wind, snow, sun etc. As the roof is directly exposed to the adverse effects of weathering agencies, therefore it should be designed accordingly.

ESSENTIAL REQUIRNMENT/FUNCTION OF ROOF

i. Roof/slabs should be strong enough to withstand the anticipated loads (I.e. dead loads and live loads).
ii. As it is exposed to atmospheric agencies, therefore it should be weather resistance.
iii. Proper drainage arrangement should be providing.
iv. It should provide insulation against heat and sound.
v. It should be fire resistance.

BUILDING FINISHES: A building is considered incomplete till the time the surface of its components are given appropriate treatment. Finishing is of several types such as pointing, plastering, painting, white washing, distempering, varnishing, decorative finishing etc.

ESSENTIAL REQUIRNMENT/FUNCTION OF FINISHES

i. They protect the surface from the adverse effects of the weather.
ii. They should provide decorative effect to the building.
iii. They should provide true, even and smooth finished surface and also enhance the aesthetic appearance of the building.
iv. To some extent they cover the poor or defective workmanship.

BUILDING SERVICES AND UTILITY FIXTURES: Building services include services like water supply, drainage, sanitation, electricity, lighting, acoustics, heating/cooling, fire detection and fire control etc. These built-in items are of immovable nature which are added considerably to the utility of a building and hence, are termed as utility fixtures.

ESSENTIAL REQUIRENMENT/FUNCTION OF UTILITY FIXTURES

i. They should be of good quality as per Indian standards.
ii. They fittings and other accessories must be as per the guidelines laid down be the IS codes.
iii. The guidelines of local authority must be followed.

2. PRIMARY HEALTH CENTER(P.H.C

INTRODUCTION

The Primary Healthcare Centre (PHC) is the basic structural and functional unit of the public health services in developing countries. Primary Health centers were established to provide accessible affordable and available primary health care to people, in accordance with the Alma Ata declaration of 1978 by the member nations of the World Health Organization (WHO). In India, PHCs form a basic part of the health care system the Medical Officer appointed to run the PHC must be MBBS degree holder. In addition to the provision of diagnostic and curative Services, the Medical Officer acts as the primary administrator for D PHC. The primary field staff, which provides outreach Services and Ked, ASHA (Accredited Social Health Activist) or World health nurse, depending upon the Indian state where the PHC is located .The World health nurse provides Services at the point of care, often in the patients' home. If additional diagnostic testing or chemical intervention is required, the patient is transported to the PHC to be evaluated by the Medical Officer, under the national rural health mission, PHCs are rapidly being upgraded. Presently the 23,109 PHCs in India.

Fig. 2

2.1OBJECTIVES OF PHC

The main objectives of primary health centre will be to provide better health care services to the rural slums. The population will be encouraged both individually and collectively to participate in the development of health. The Govt. and the medical profession will help the people to realize their responsibility by providing a large band of health volunteers from among the community itself to take care of the basic health needs and the community. There will be a more equitable distribution of health resources and to correct past imbalances preferential allocations will be made for developing health facilities in rural areas. The primary emphasis will be on preventive, primitive and rehabilitative aspects of health which will be integrated with functions and responsibilities of all these institutions which currently are providing only curative services in providing PHC, full advantage will be taken of the traditional methods and techniques which are scientifically sound familiar and acceptable to the community and easy to adopt. Primary health centre will form an integral part of the health system. At this time 5739 PHC are operating in India, each covering a population of between 80,000-125,000. Primary Health Centre to the rural population will be backed up by proper referral services.

2.2REQUIREMENTS OF PHC

APPROPRIATENESS

Primary health care must be suitable or fit for a particular purpose, a person whether the service is needed at all about essential human needs, priorities, and policies. Primary health care service has to be properly selected and carried out by trained personnel in the proper way. For example, a nurse should know how to give an injection correctly and safely, and use the ultrasound to provide antenatal care to pregnant women. Appropriate healthcare technologies are an important strategy for improving the availability and accessibility of healthcare services.

AVAILABILITY

Availability of medical and health care means the sufficient supply of resources and competent and skilled health workers that ease of community people for emergency or urgent service's needs. If services are available and there is an adequate supply of equipment, then the opportunity to obtain health care exists and can easily improve community people's health. Such TB drugs must be available in the primary health care center and available DOT workers who go to a patient's home or worksite to facilitate the method.

ADEQUACY

Adequacy means the ability to provide reasonable health care services for a particular purpose to meet the need and demands of the community and country. Adequacy doesn't indicate excellence or abundance, or even more than what is necessary. For example: having 200,000 children in need of the polio vaccine, the number of vaccines should be equal to the demand.

ACCESSIBILITY

Access to health care means having "the timely use, reachable and convenient health services to achieve the best health outcomes of community and country people.

ACCEPATABILITTY

Acceptability is to be something that is considered to be socially pleasing to the receiver, agreeable, or within the realm of what is appropriate, or something tolerable. For example, if a maternal clinic is not good, pregnant women will visit it only when suffering severe pain or bleeding, and avoid recommended checkups.

Acceptability of primary health care depends on

- Cultural sensitivity of health technology and intervention.
- User friendly and convenient.
- Treat all people with dignity.
- Right Target population.
- Maintain confidentiality and privacy.

AFFORDABILITY

Affordability means a person or community able to pay health care costs. The cost should be cheap enough for the people and resources of the individual and the country.

ASSESSABILITY

Accessibility means to set or determine the amount of medical care with a special payment that can be readily evaluated.

ACCOUNTABILITY

Accountability is an essential element in the health care system. It entails the procedures and processes by which health care workers justify and take responsibility for their activities. Accountable and honest Health care providers are constantly striving to improve quality and efficiency by using performance management systems and quality improvement initiatives.

- Making the boundaries of everybody role very clear.
- Making duties clear and ensuring have the right training to carry them out safely and effectively.
- Ensuring adequate support and supervision.
- Providing agreed protocols to guide care delivery.
- Offering opportunities to develop in the role.
- Making issues around delegation clear.

COMPLETENESS

Completeness means the quality of being whole or perfect and having nothing missing. In primary health care, completeness is suitable and whole care to all aspects of a medical problem such as prevention, screening, early diagnosis, treatment, follow up measures, and rehabilitation without any restriction. Such as: providing physiotherapy for the hemiplegic after a cerebrovascular stroke and continuous follow-ups for diabetic patients after describing drugs to them.

COMPREHENSIVENESS

The comprehensiveness of care means providing care for all types of health problems, not just the medical and physical ones. By comprehensive care in primary health care, they provide multiple physical and emotional health support of a patient over a period of time in relationship to family, life events, and environment and reduce hospitalization, long-term care placement, and mortality.

CONTINUITY

Continuity of care means provides quality health care to community people over time. It is a method by which community people and health care team are cooperatively comprised of continuous health care management toward the goal of high quality, cost-effective medical care. Continuity of care is important for chronic diseases: diabetes, hypertension, ischemic heart disease. Because these diseases if not controlled, cause severe problems, however, if they're controlled the mortality rate will be greatly reduced.

2.3 PRINCIPLES OF PRIMARY HEALTH CENTER

Behind these elements lies a series of basic objectives that should be formulated in national policies to launch and sustain primary healthcare (PHC) as part of a comprehensive health system and coordination with other sectors.

1. Improvement in the level of health care of the community.

2. Favorable population growth structure.

3. Reduction in the prevalence of preventable, communicable, and other diseases.

4. Reduction in morbidity and mortality rates especially among infants and children.

5. Extension of essential health services with priority given to the underserved sectors.

6. Improvement in basic sanitation.

7. Development of the capability of the community aimed at self-reliance.

8. Maximizing the contribution of the other sectors for the social and economic development of the community.

9. Equitable distribution of health care– according to this principle, primary care and other services to meet the main health problems in a community must be provided equally to all individuals irrespective of their gender, age, and caste, urban/rural, and social class. Community participation-comprehensive healthcare relies on adequate numbers and distribution of trained physicians, nurses, allied health professions,

10. Community health workers, and others working as a health team and supported at the local and referral levels.

11. Multi-sectional approach-recognition that health cannot be improved by intervention within just the formal health sector; other sectors are equally important in promoting the health and self-reliance of communities.

12. Use of appropriate technology- medical technology should be provided that accessible, affordable, feasible, and culturally acceptable to the community.

2.4 IMPORTANCE OF PRIMARY HEALTH CENTER

The importances of primary health center are as follows

Abroad Studies Opportunities

It is shaped around life partners of the population.

It serves and meets the needs of the community.

It can be delivered by the villagers after simple training and preparation, etc.

It is based on available community resources.

It helps to bring the health care into line with local needs and priority.

It is fully integrated with community developmental activities.

It is an integrated approach of preventive, pro-motive, curative and rehabilitation services for the individual, family and community.

2.5 COMPONENTS OF PRIMARY HEALTH CENTER

The facilities and services of PHC may vary in various countries and communities. However, the basic concept of PHC is the same. The Alma Ata conference has put forward eight important aspects of primary health care. They are adequate supply of safe drinking water and basic sanitation

There is a close relationship between supply of water and sanitation. If there is no supply of water, the sanitary condition will automatically be affected. It is due to lack of safe drinking water and poor sanitation, the gastrointestinal diseases like diarrhea, cholera, typhoid; roundworm, dysentery, etc. make us the victim. If we do not protect us from such diseases, we cannot maintain our good health. Therefore, a good supply of safe drinking water is absolutely necessary. Similarly, we should also pay our full attention and take necessary measures for good sanitation.

HEALTH EDUCATION

Good health is fundamentally and intrinsically important to live a worthwhile human life. Good health, of itself, is an end of all human endeavors. It health inhibits access to opportunities in education, work, income earning, political and cultural participation and other value dimensions of human life. In fact, health education communicates with the facts that help to promote the ways of healthy living and to solve basic health problems

NUTRITION

A balanced diet is highly necessary to live a healthy life. Sufficient supply of food and management of proper nutrition is necessary to get a balanced diet. We suffer from malnutrition if we lack a balance diet. Various health related problems emerge along with malnutrition. Therefore, proper supply of food and management of nutrition is one of the important aspects of PHC.

IMMUNIZATION

Immunization is a widely accepted level of protection against a large number of communicable diseases. People of developing countries due to lack of proper knowledge of health, poor economic status, and sophisticated curative health service are not a position to afford the expenses of treatment. In such a context immunization is the only major preventive measure against various communicable diseases such as T. B., Tetanus, Diphtheria, Whooping cough and polloi. So, the primary health care is giving more emphasis on immunization programmes for the protection and development of health.

2.6 PUBLIC HEALTHCARE INFARSTRUCTURE IN INDIA

India has a mixed health-care system, inclusive of public and private health-care service provides. The public health-care infrastructure in rural areas has been developed as a three-tier system based on the population norms. The size of a hospital depends upon the hospital bed requirement, which in turn is a function of the size of the population it serves. As per the Indian Public Health Standards (IPHS), 2012, the calculation of number of beds is based on-

• Annual rate of admission as 1 per 50 populations

• Average length of stay in a hospital as 5 days

For example: In India the population size of a district varies from 50,000 to 15, 00,000. For the purpose of convenience the average size of the district is taken as one million populations. Based on the assumptions the number of beds required for 10, 00,000 population is No. of bed days per year :(10, 00,000 x 1/50) x 5 = 1, 00,000

• No. of beds required with 100% occupancy: 1, 00,000 / 365 = 275

• No. of beds required with 80% occupancy: (1, 00,000 / 365) x 80% = 220

The Department of Health and Family welfare suggests incorporation of Trauma Centers in the highways cutting across urban local authority jurisdiction. The trauma care centers should be suitably positioned along the highways with doctors trained in emergency medicine and trauma care, with adequate emergency management technicians, supported by efficient and efficient ambulance system. (URDPFI Guidelines, MoUD, 2015)360 URDPFI Guidelines, 2014. Ministry of Urban Development.

Table 8.50: Health Care Facilities Serial Number Category Number of beds Population served per unit Area requirement

1. Dispensary -- 15000 0.08 to 0.12 Ha

2. Nursing home, child welfare and maternity centre25 to 30 beds 45000 to 1 lakh 0.20 to 0.30 Ha

3. Polyclinic Some observation beds 1 lakh 0.20 to 0.30 Ha

4. Intermediate Hospital (Category B) 80 beds initially maybe for 50beds including 20maternity beds1 lack Total Area = 1.00 Ha

a) Area for Hospital = 0.60 Ha

b) Area for residential

Accommodation = 0.40 Ha

5. Intermediate Hospital (Category A) 200 beds initially the provision may be for 100 beds1 lakh Total Area = 3.70 Ha

a) Area for hospital = 2.70 Ha

b) Area for residential

Accommodation = 1.00 Ha

6. Multi-Specialty Hospital (NBC) 200 beds initially the provision may be for 100 beds1 Lakh Total Area = 9.00 Ha

a) Area for hospital = 6.00 Ha

b) Area for residential

Accommodation = 3.00 Ha

7. Specialty Hospital (NBC) 200 beds initially the provision may be for 100 beds1 Lakh Total Area = 3.70 Ha

a) Area for hospital = 2.70 Ha

b) Area for residential

Accommodation = 1.00 Ha

8. General Hospital (NBC) 500Initially the provision may be for 300 beds2.5 lakh Total Area = 6.00 Ha

a) Area for hospital = 4.00 Ha

b) Area for residential

Accommodation = 2.00 Ha

9. Family Welfare Centre (MPD, pg 134)As per requirement 50,000 Total area = 500 square mater 800 square mater

10. Diagnostic centre (MPD, pg 134) -- 50,000 Total area = 500 square meter to 800 square mater

11. Veterinary Hospital for pets and animals (MPD, pg134)-- 5 lack Total area = 2000 square mater.

12. Dispensary for pet animals and birds (MPD, pg134)-- 1 lakh Total area = 300 square mater.

13 Rehabilitation centers as per requirement Source: UDPFI Guidelines, 1996, NBC, 2005 Part 3 and MPD, 2021.The Department of Health and Family welfare suggests incorporation of Trauma The Indian Public Health Standards(IPHS) classify the Public Health Care System into the following

CATEGORIES

SUB-CENTERS

A sub-centre (SC) is established in a plain area with a population of 5000 people and in hilly/difficult to reach/tribal areas with a population of 3000, and it is the most peripheral and first contact point between the primary health-care system and the community. Each sub-centre is required to be staffed by at least one auxiliary nurse midwife (ANM)/female health worker and one male health. Sub-centers are assigned tasks relating to interpersonal communication in order to bring about behavior change and provide services in relation to maternal and child health, family welfare, nutrition, immunization, diarrhea control and control of communicable diseases programs. The Ministry of Health & Family Welfare is providing 100% central assistance to all the sub-centers in the country since April 2002. (IPHS for Sub-Centers, 2012)Primary Health Centers .A primary health centre (PHC) is established in a plain area with a population of 30000 people and in hilly/difficult to reach/tribal areas with a population of 20000, and is the first contact point between the village community and the medical officer. PHCs were envisaged to provide integrated curative and preventive health care to the rural population with emphasis on the preventive and primitive aspects of health care. The PHCs are established and maintained by the State Governments under the Minimum Needs Program (MNP)/Basic Minimum Services (BMS) Program. As per minimum requirement, a PHC is to be staffed by a medical officer supported by 14 paramedical and other staff. It acts as a referral unit for 5-6 sub-centers and has 4-6 beds for in-patients. The activities of PHCs involve health-care promotion and curative services. (IPHS for Primary Health Centers, 2012)Community Health Centers Community health centers (CHCs) are established in an area with a population of 120000 people and in hilly/difficult to reach/tribal areas with a population of 80000. As per minimum norms, a CHC is required to be staffed by four medical specialists, that is, surgeon, physician, gynecologist obstetrician and pediatrician supported by 21 paramedical and other staff. It has 30 beds with an operating theatre, X-ray, laboratory room and laboratory facilities. It serves as a referral centre for PHCs within the block and also provides facilities for obstetric care and specialist consultations. (IPHS for 2012) Community Health Centers.

PRIMARY HEALTH CENTERS

A primary health centre (PHC) is established in a plain area with a population of 30000 people and in hilly/difficult to reach/tribal areas with a population of 20000, and is the first contact point between the village community and the medical officer. PHCs were envisaged to provide integrated curative and preventive health care to the rural population with emphasis on the preventive and primitive aspects of health care. The PHCs are established and maintained by the State Governments under the Minimum Needs Program (MNP)/Basic Minimum Services (BMS) Program. As per minimum requirement, a PHC is to be staffed by a medical officer supported by 14 paramedical and other staff. It acts as a referral unit for 5-6 sub-centers and has 4-6 beds for in-patients. The activities of PHCs involve health-care promotion and curative services. (IPHS for Primary Health Centers, 2012)

COMMUNITY HEALTH CENTERS

Community health centers (CHCs) are established in an area with a population of 120000 people and in hilly/difficult to reach/tribal areas with a population of 80000. As per minimum norms, a CHC is required to be staffed by four medical specialists, that is, surgeon, physician, gynecologist/obstetrician and pediatrician supported by 21 paramedical and other staff. It has 30 beds with an operating theatre, X-ray, labor room and laboratory facilities. It serves as a referral centre for PHCs within the block and also provides facilities for obstetric care and specialist consultations. (IPHS for 2012) Community Health Centers.

2.7STRUCTURAL ELEMENTS OF FIRE SAFETY

OPEN SPACES

1. Hospitals shall make provisions for sufficient open space in and around the hospital building to facilitate the free movement of patients and emergency/fire vehicles.

2. These open spaces shall be kept free of obstructions and shall be motorable.

3. Adequate passage way & clearance for fire fighting vehicles to enter the hospital premises shall be provided.

4. The width of such entrances shall be not be less than 4.5m with clear head room not less than 5m.

5. The width of the access road shall be a minimum of 6m.

6. A turning radius of 9m shall be provided for fire tender movement.

7. The covering slab of storage/static water tank shall be able to withstand the total vehicular load of 45 tone equally divided as a four point load (if the slab forms a part of path/drive way).

8. The open space around the building shall not be used for parking and/or any other purpose.

9. The Set back area shall be a minimum 4.5m.

10. The width of the main street on which the hospital building abuts shall not be less than 12 m& when one end of that street shall join another street, the street shall not be less than 12m. Wide.

11. The roads shall not be terminated in dead ends.

BASEMENTS

1. Basements, if provided shall be of type-1 construction and material used shall conform to class material.

2. Basements shall be used only for parking vehicles and shall be protected with automatic sprinkler systems.

3. Each basement shall be separately ventilated.

4. Each vent shall have a cross-sectional area (aggregate) not less than 2.5% of the floor area spread evenly round the perimeter of the basement.

5. A system of air inlets and smoke outlets shall be provided & clearly marked as “AIR INLET” &“SMOKE OUTLET”.

6. Clear headroom of minimum 2.4m shall be provided for the entire basement.

7. A minimum ceiling height of any basement shall be 0.9m and maximum 1.2m above the average surrounding ground level.

8. The access to the basement shall be separate from the main and alternative staircase providing access and exit from higher floors. Where the staircase continues, in the case of buildings served by more than one staircase, the same shall be of enclosed type serving as a Fire Separation between the basement and higher floors.

9. Open ramps shall be permitted if they are constructed within the building line and surface drainage does not enter the basement.

10. The staircase of the basement shall be of enclosed type having fire resistance not less than02 hrs& shall be situated at the periphery of the basement to be entered at ground level from the open air and in such a position that smoke from any fire in the basement shall not obstruct any exit serving the ground & upper stores of the building. The staircase shall communicate with the basement through a lobby provided with fire resisting, self closing doors of 02 hrs. resistance. Additional stairs shall be provided if travel distance does not meet specifications given in Table 22 of the NBC.

11. For multi-storey basements, one intake duct may serve all basement levels, but each level& basement compartment shall have a separate smoke outlet duct or ducts. The ducts shall have the same fire resistance rating as the compartment itself.

12. Mechanical extractors for smoke venting system from lower basement levels shall also be provided. The actuation of the system shall be incorporated with the detection and sprinkler systems. The performance of the system shall be superior to standard units. (13) Mechanical extractors shall have an interlocking arrangement, so that extractors shall continue to operate and supply fans shall stop automatically with the actuation of fire detection system.

13. Mechanical extractors shall be designed to permit 30 air changes per hour in case of a fire emergency.

14. Mechanical extractors shall have an alternate source of electricity supply.

15. Ventilation ducts shall be integrated with the structure of the building and shall be made out of brick masonry or reinforced cement concrete as far as possible. Wherever this duct intersects the transformer area or an electrical switch board, fire dampers shall be provided.

16. The basement shall not be permitted below the ward block of a hospital.

17. No cut outs to upper floors shall be permitted in the basement.

18. An openable window on the external wall shall be fitted with locks that can be easily opened.

19. All floors shall be compartmented by a separation wall with 2 hrs fire rating, such that

20. Each compartment shall have a surface area not exceeding 750sq.m. Floors which are fitted with sprinkler systems may have their surface areas increased by 50%. In long building fire separation wall shall be at distances not exceeding 40m.

21. Lift/Elevators shall not normally communicate with basements; if, however, Lifts are in communication, the lift lobby of the basement shall be pressurized. A positive pressure between 25 & 30 Pascal (Pa), shall be maintained in the lobby & a positive pressure of 50 Pascal be maintained in the Lift shaft. The mechanism for pressurization shall act automatically with the Fire Alarm. Provision shall be made to operate the system manually as well. The Lift car door shall have a Fire resistance rating equal to the Fire resistance of lift enclosure. The material used for interior finishing shall conform to class-1 materials

CORRIDORS AND PASSAGEWAYS

1. The minimum width and height of corridors and passage ways shall be 2.4m. The exit corridor and passage ways shall have a width not less than the aggregate required width of Exit doorways leading from them in the direction of travel to the exterior. Corridors shall be adequately ventilated.

2. Corridor walls shall form a barrier to limit the transfer of smoke, toxic gases and heat.

3. Transfer grills, regardless of whether protected by fusible link operated dampers, shall not be used in corridor walls or doors.

4. Openings if required in corridor walls for specific use, shall be suitably protected

5. Fixed wired glass opening vision panel shall be permitted in corridor walls, provided they don’t exceed 0.84 Sqm. in area and are mounted in steel or other approved metal frames.

RAMPS

1. All ramps shall comply with the applicable requirements for stairways regarding enclosure, capacity and limiting dimensions except in certain cases where steeper slopes may be permitted with inclination less than 1 in 8 (under no condition shall the slopes greater than 1in 8 be used).

2. Ramps shall be surfaced with approved non skid& non slippery material. Universal Precautions of P.H.C.

The universal precautions should be understood and applied by all medical and paramedical staff involved in providing health services. The basic elements include, Hand washing thoroughly with soap and running water.

3. ESTIMATING AND COSTING

INTRODUCTION

For the construction of all the engineering works, it is essential to know beforehand the probable cost of construction for the complete works, which consists of the cost of materials, cost of transportation, cost of labor, cost of scaffolding, cost of tools and plants, establishment and supervision charges, cost of water, taxes and reasonable profit of the contractor, etc. If the above calculated probable cost is greater than the money available, attempts are made to lessen the cost by reducing the work or by changing the specification.

So in preparing an estimate, the quantities of different items of work are calculated by simple methods of mensuration and from these quantities the cost is calculated. The calculations mainly consist of (length × breadth × height), or (length × breadth) or (height /thickness). Therefore an estimator has to go into details of each items big or small by picturing (imaginating some items) the object (building structure, etc) in his mind from the study of drawings of specifications.

Accuracy in estimate is essential; otherwise if the expenditure exceeds the estimate, it is difficult to arrange for additional money. The rate of each item should be reasonable and preferably the present market rates.

3.1DEFINITION OF AN ESTIMATE

Estimation is the scientific way of working out the approximate cost of an engineering project before execution of the work. It is totally different from calculation of the exact cost after completion of the project. Estimation requires a thorough Knowledge of the construction procedures and cost of materials & labor in addition to the skill, experience, foresight and good judgment. An estimate of the cost of a construction job is the probable cost of that job as computed from plans and specifications. For a good estimate the, actual cost of the proposed work after completion should not differ by more than 5 to 10 % from its approximate cost estimate, provided there are no unusual, unforeseen circumstances.

NEED FOR ESTIMATE

1. It help to work out the approximate cost of the project in order to decide its feasibility with respect to the cost and to ensure the financial resources, it the proposal is approved.

2. Requirements of controlled materials, such as cement and steel can be estimated for making applications to the controlling authorities.

3. It is used for framing the tenders for the works and to check contractor's work during and after the its execution for the purpose of making payments to the contractor.

4. From quantities of different items of work calculated in detailed estimation, resources are allocated to different activities of the project and ultimately their durations and whole planning and scheduling of the project is carried out. SITE CONDITIONS AFFECTING THE OVERALL COST:

1. Each type of work requires a different method of construction. Construction may be of an ordinary house or office and it may also be of a Dam, Tunnel, Multistory building, Airport, Bridge, or a Road, already in operation. Each of these works requires totally different construction techniques, type of machinery, and formwork.

2 .Quality of labor and labor output varies in different localities.

3 .Weather conditions greatly affect the output and, hence, the overall cost.

4. Ground conditions vary and change the method of construction. For example, excavation may be dry, wet, hard, soft, shallow or deep requiring different efforts.

3.2 OBJECTIVES OF ESTIMATE

Estimate for a work or project is necessary mainly for the following Objectives:

1. Ascertain the necessary amount of money required by the owner to complete the proposed project. For public construction works, estimates are required in order to obtain administrative approval, allotment of funds, and technical sanctions.

2. Ascertain quantities of materials required to program their timely procurement.

3. Calculate the number of workers that are to be employed to complete the work within the scheduled time of completion.

4. Assess the requirements of tools and equipment required to complete the work according to the program.

5. Fix up the completion period from the volume of works involved in the estimate.

6. Draw up a construction schedule and program.

7. Justify the investment from the benefit-cost ratio.

8. Invite tenders and prepare bills for payment.

9. An estimation for an existing property is required for valuation.

3.3 TYPE OF ESTIMATE

APPROXIMATE ESTIMATE –

It is also called budget, preliminary estimate. This type of estimate is prepared in the initial stage of a project. To give a clear idea to the owner (client) about the amount of cost needed for the project and to get the approval from necessary sanctioning bodies (eg: from banks to get loan). Documents such as project drawing plans, details about the land including electricity & water supply and a full clear report are necessary to carry out the estimate. Commonly the approximate estimate is calculated with relevant to the previous experience.eg: To calculate the estimate for a house, a previously (& also recently) completed similar house will be considered. Here the estimator already knows the rate for 1m2 area & with that he/she calculates the cost estimate for the newly proposed area (of similar house).

Approximate estimate = Rate of 1m2 (already known value) X proposed area (m2)

PLINTH AREA ESTIMATE –

Plinth area estimate can be achieved by multiplying the values of plinth length, plinth width & plinth area rate. Here the plinth area is referred as, external plinth area of the building at floor level. Simply it can be also stated as the roof covered area of a building. Plinth area rate is derived by dividing the total cost of a previously constructed building by plinth area of the previously constructed building.

Plinth area estimate = Plinth area X plinth area rate.

Plinth area = plinth length X plinth width

Plinth area rate = Total cost of a previously built building / Total plinth area of that building.

There are some restrictions in calculating the plinth area of a building and some area have to include or exclude when calculating. Among that, areas which can include are,

Floor area with area of walls at floor level excluding the offsets of the building, internal shafts of sanitary fittings within 2m2, lifts, air conditioning ducts, area of porch at floor level (cantilever part can't be included), area of barsati – a room on the terrace or roof top with veranda outside.

Areas which can't include are,

Area of lofts, open balconies / UN enclosed balconies, fascia, towers which project above terrace level, louvers & vertical sun breakers.

Documents such as line plan with complete specifications & costs for services such as water, electricity should be attached with estimate.

CUBIC CONTENT ESTIMATE

This type of estimate done by multiplying the volume of the building by the unit cubic rate achieved from the previously (also recent) estimate. This type of estimate is a little bit more accurate than above mentioned methods and mostly suitable for multi storied buildings. Here the cost of corbelling (corbel – a piece of stone, wood, brick, or other building material, projecting from the face of a wall and generally used to support a cornice or arch), cornice and other works like that are neglected.

Cubic content estimate = Volume of the building X unit cubic rate (known value)

Volume of the building = plinth area (length X breadth of the proposed building) X height of the building (floor to roof top)

Unit cubic rate = total cost of the previously built building / total volume of that building.

ANNUAL REPAIR ESTIMATE AND SPECIAL REPAIR ESTIMATE

These estimates are prepared in order to maintain the constructed element in good condition. Works that attached when consider repair works, white washing, painting, plastering works, patching works & etc. Special repair estimate is prepared in situations where the costs of materials increased when compare to annual repair estimate cost.

REVISED ESTIMATE-

This estimate is prepared when the rate of previously submitted estimate increases by 5% or more than that. But here the reason for the preparation of estimate must have a strong & valid reason like sudden increase in cost of materials. The reason and comparative statement between 2 estimates should be annexed with the revised estimate.

SUPPLEMENTARY ESTIMATE –

This type of estimate is prepared when there is a necessary situation of supplementary work, to progress out the original work. The annexure of originally prepared estimate & supplementary estimated amount of the originally prepared estimate when submitting for requesting approve.

DETAILED ESTIMATE-

Detail estimate is prepared with the help of complete set of contract documents. The preparation of detailed estimate can do under 2 phases such as work out with quantities of different works and calculate the cost of each work.

1) work out with quantities of different works – The whole construction work procedure is divided into categories such as excavation and earthwork, concrete work, formwork, reinforcement, masonry work, roof covering and roof plumbing, carpentry, painting and decorating, plumbing, electrical installation and etc.

The measurement takeoff procedure is done with the help of drawings/plans and then they are entered in measurement. Measurement sheet is a prescribed form which contains number of columns to enter the respective measurements and descriptions about the works. Finally the measurement columns are multiplied to get the necessary quantity.

2) Calculation of the cost of each work – The already obtained quantities are used to obtain the cost of each work. Calculated costs of each work item are summarized in order and that document is called as abstract sheet.

A detailed estimate should have documents such as report, specifications, drawings/plans, design charts and schedule of rates. Factors such as, material quantity, transportation of materials, location of site, labor charges, cost of equipment (commonly allowed: - 2% of the estimated cost), overhead charges (commonly allowed: - 2% of the estimated cost), contingencies & unforeseen (commonly allowed: - 4% of the estimated cost) items are needed to consider well while preparing the detailed estimate.

Note: The rate used to estimate should check with current standard schedule of rates & in case of quantity, it should check with standard data book.

3.4 METHODS OF ESTIMATION

There are a number of cost estimation methods for calculating the quantities like earthwork, foundation, and concrete, brickwork in plinth and superstructure but mainly below two methods are used.

LONG WALL AND SHORT WALL METHOD

CENTER LINE METHOD

Here we discuss long wall and short wall cost estimation method.

LONG WALL AND SHORT WALL METHOD

For the calculating quantity of various construction item, long wall and short wall method is used. For measuring the long wall and short wall the external out-to-out length of walls running in the longitudinal direction generally is considered as “long wall” while the in-to-in internal length of walls running in the transverse direction is called as “short wall” or “cross wall”. For calculating quantity multiply the length into the breadth and height of the wall.

-For finding out the length of long wall, simply add centre length of wall to the two times half breadth on one side of the wall which gives the out-to-out length of long wall.

Length of Long Wall = Center to Center Length of wall + Half Breadth on One Side + Half Breadth on the Other Side = Center to Center Length of wall + One Breadth.

-For finding out length of short wall or cross wall subtract from the centre length, so the one breadth of the wall, which gives the length of the short wall (in-to-in) (instead of adding).

Length of Short Wall = Centre to Centre Length – One breadth

Note: The length of the long wall usually decreases from earthwork to brickwork, and the length of the short wall is increased.

Measurement and Calculation of Quantities

You can calculate the quantity of various construction items using the above method for different building dimension.

Long wall and short wall method is used for finding out the quantity and cost of materials. This method is simple and accurate, so there is may be no chances of any mistake. But correctly choose long wall and short wall for finding out accurate quantity.

CENTRE LINE METHOD

Centre to centre line method is one of the methods for preparing an estimate. In this method first, calculate the centre line length of the wall, and then multiply it with the breadth and depth of the wall to find out quantity. Center to centre line method is suitable for rectangular, circular (polygonal, hexagonal, octagonal) buildings having no inter or cross walls (the cross wall is an interior dividing wall of a building.).

Centre to centre line method is quick, but it requires special attention and consideration at the junctions or meeting points of partition or cross walls, etc. For each junction, half breadth of the respective item should be deducted from the total centre length for accurate quantity one has to learn seriously as the accuracy is very important while preparing bills rather than working out estimates.

In the case of building having different types of walls, for example, outer (main) walls are of "X " and inner cross wall shall be "Y", then all X type of walls shall be taken jointly first, and then all Y type wall shall be taken together separately. In such cases, no deduction is required for X type walls, but when Y type walls are taken, for each junction deduct half breadth of Y type wall shall have to be made from the total centre length of walls.

Note: At the corners of the building where two walls are meeting no addition or subtraction is required.

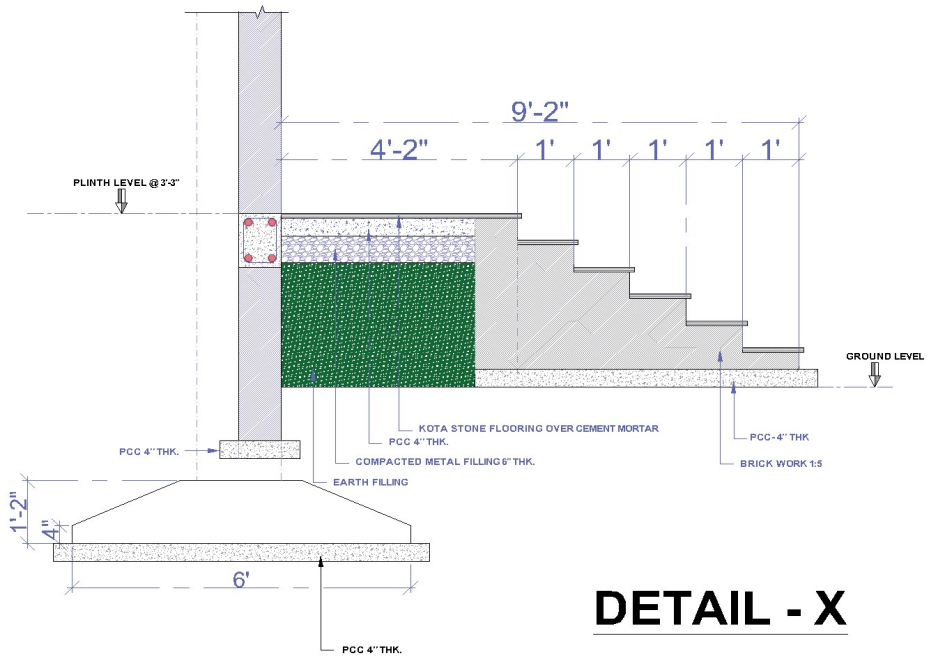


Fig.3

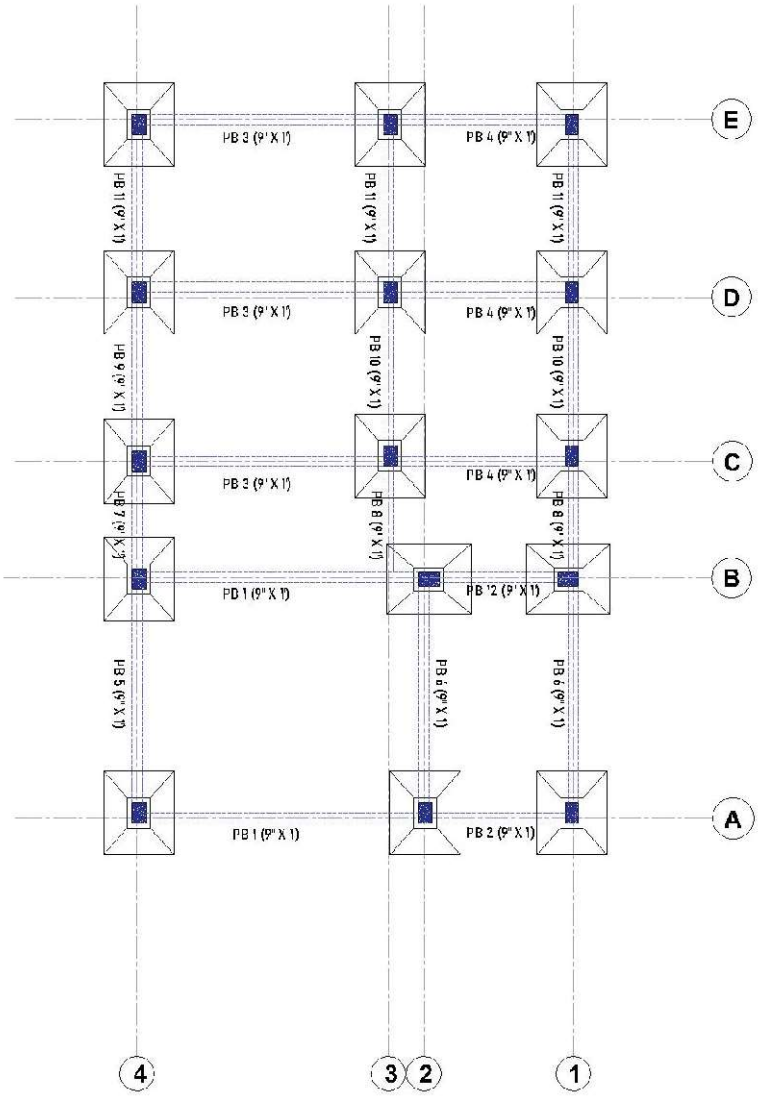
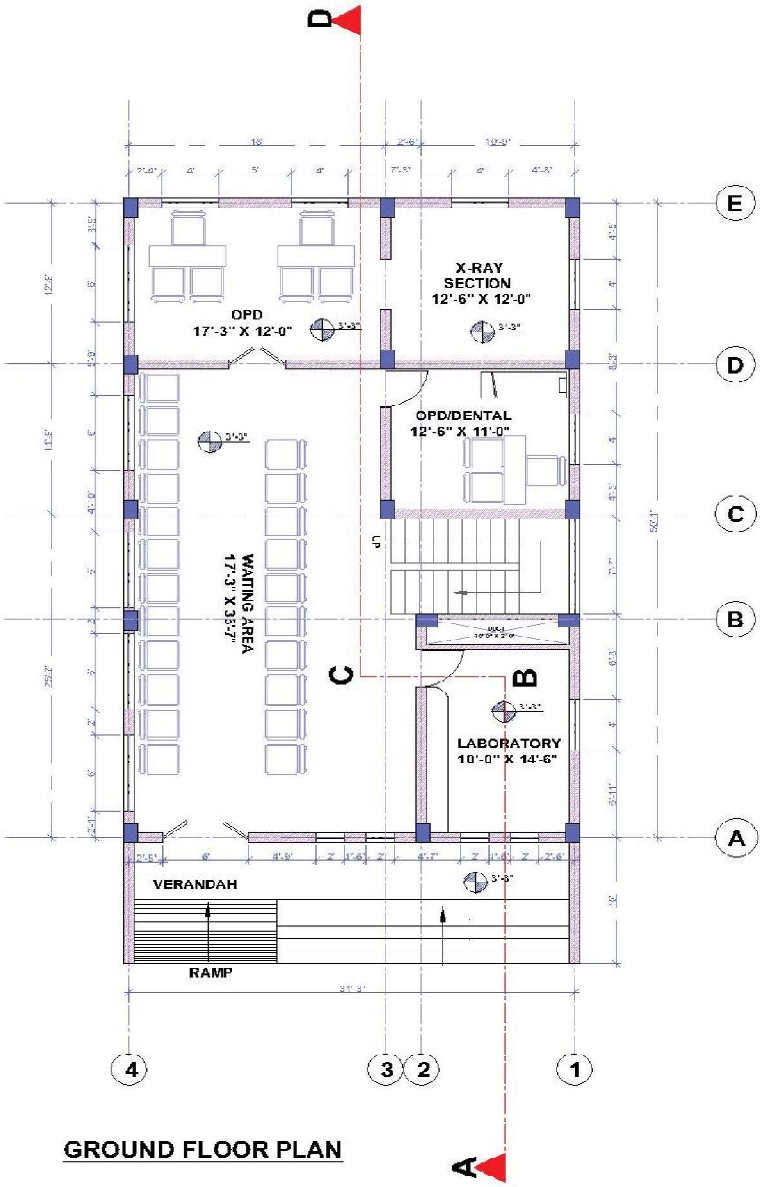


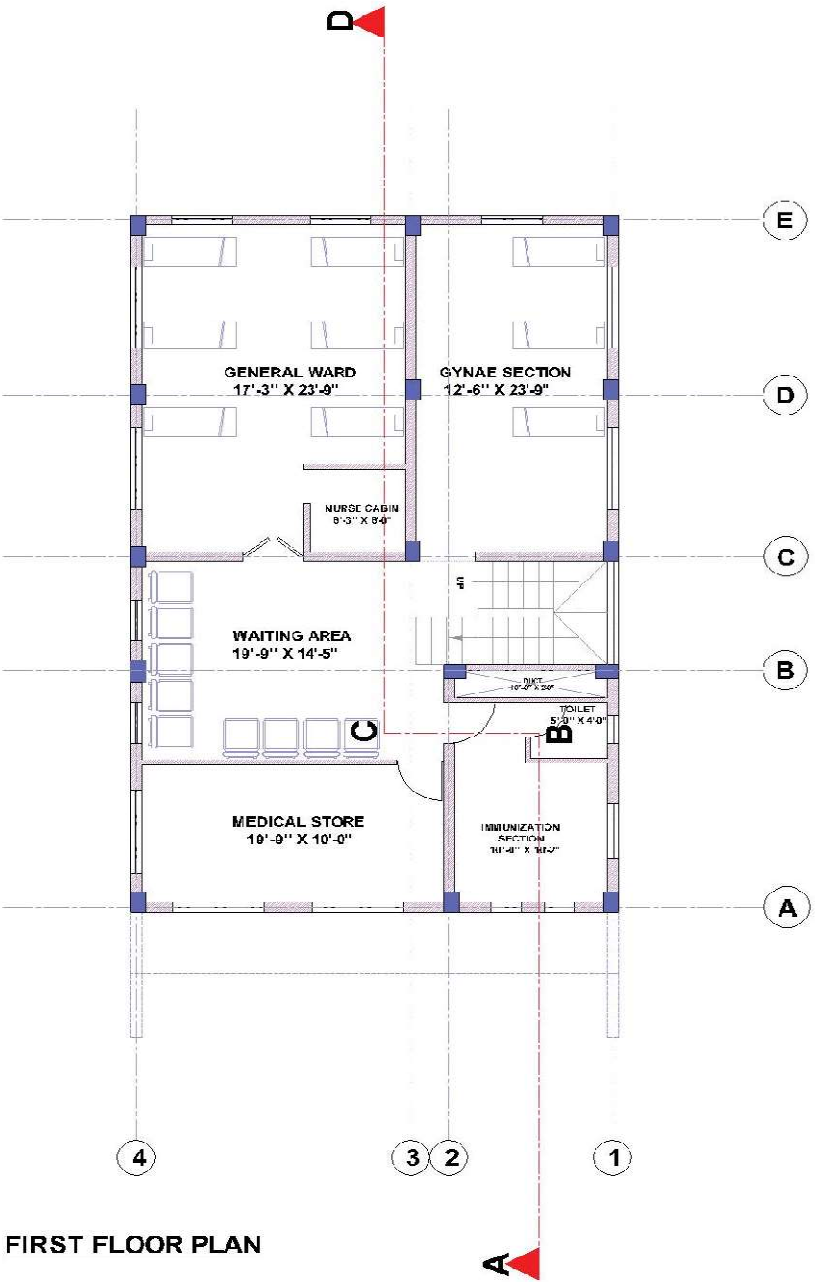
Fig.3.1

FOOTING PLAN



GROUND FLOOR PLAN

Fig.3.2



FIRST FLOOR PLAN

Fig.3.3

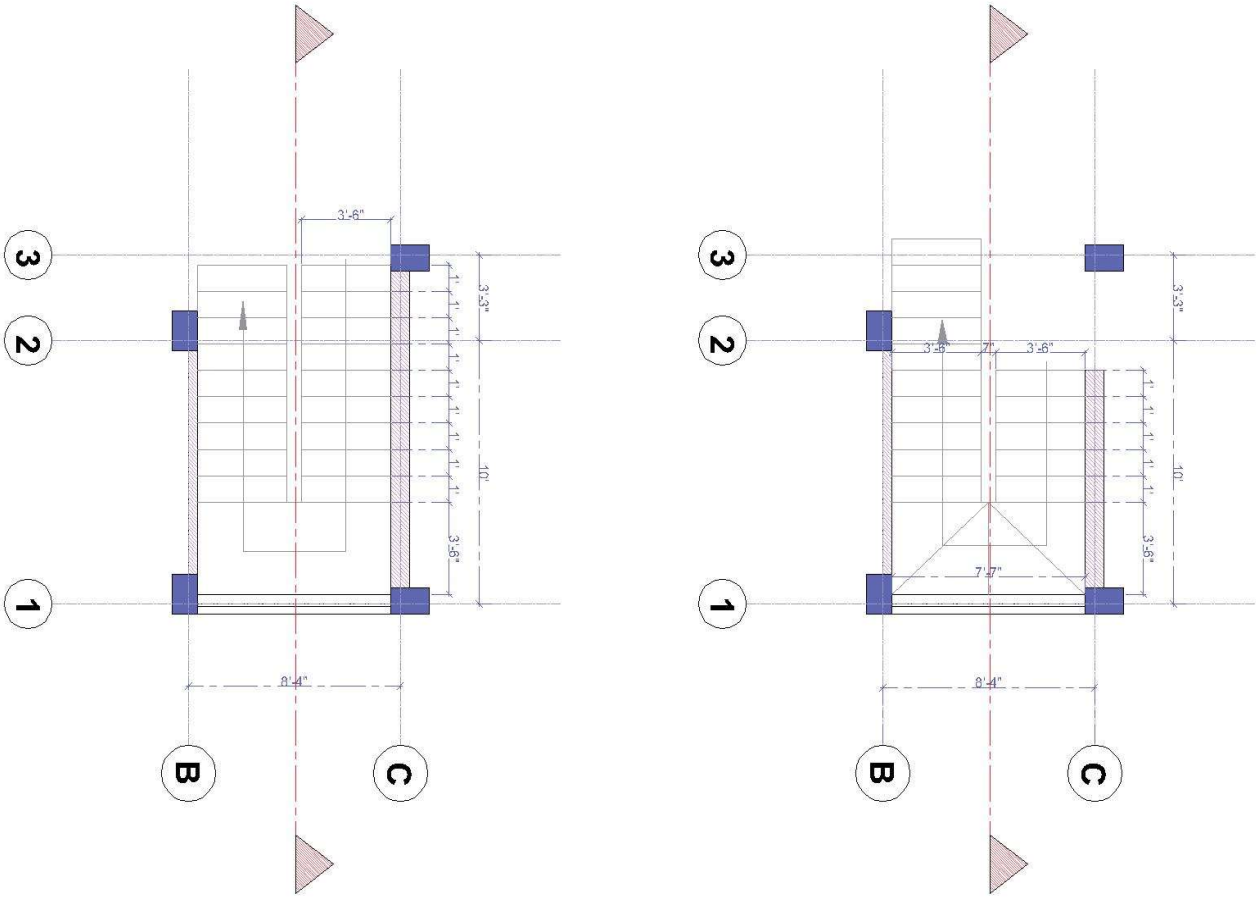


Fig.3.4

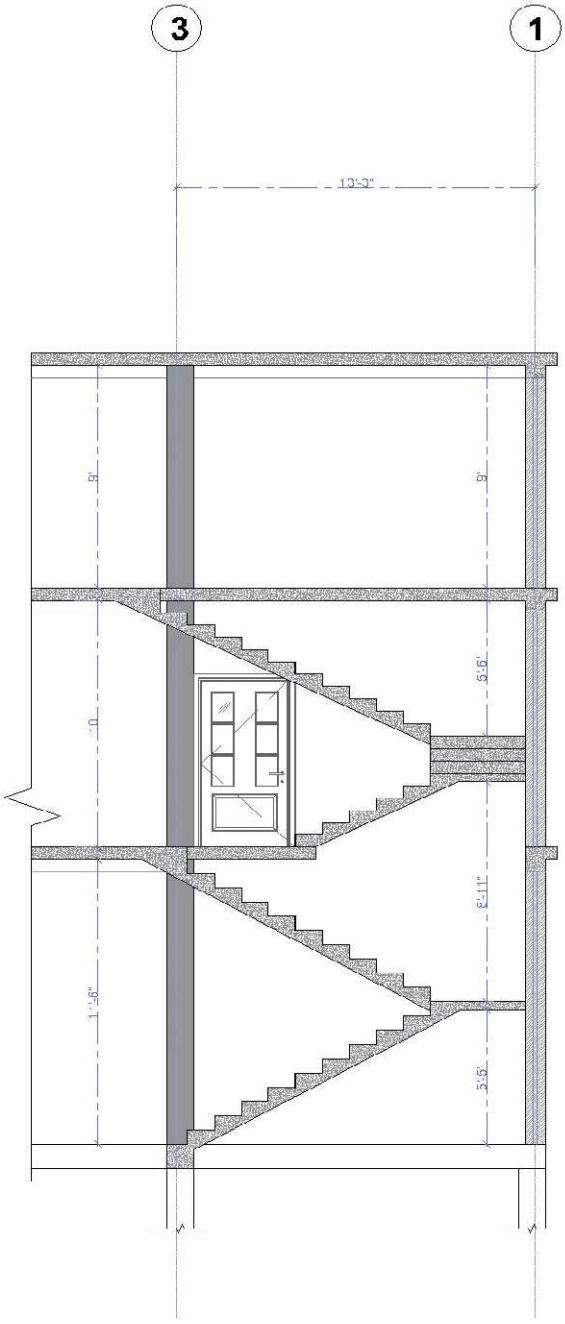
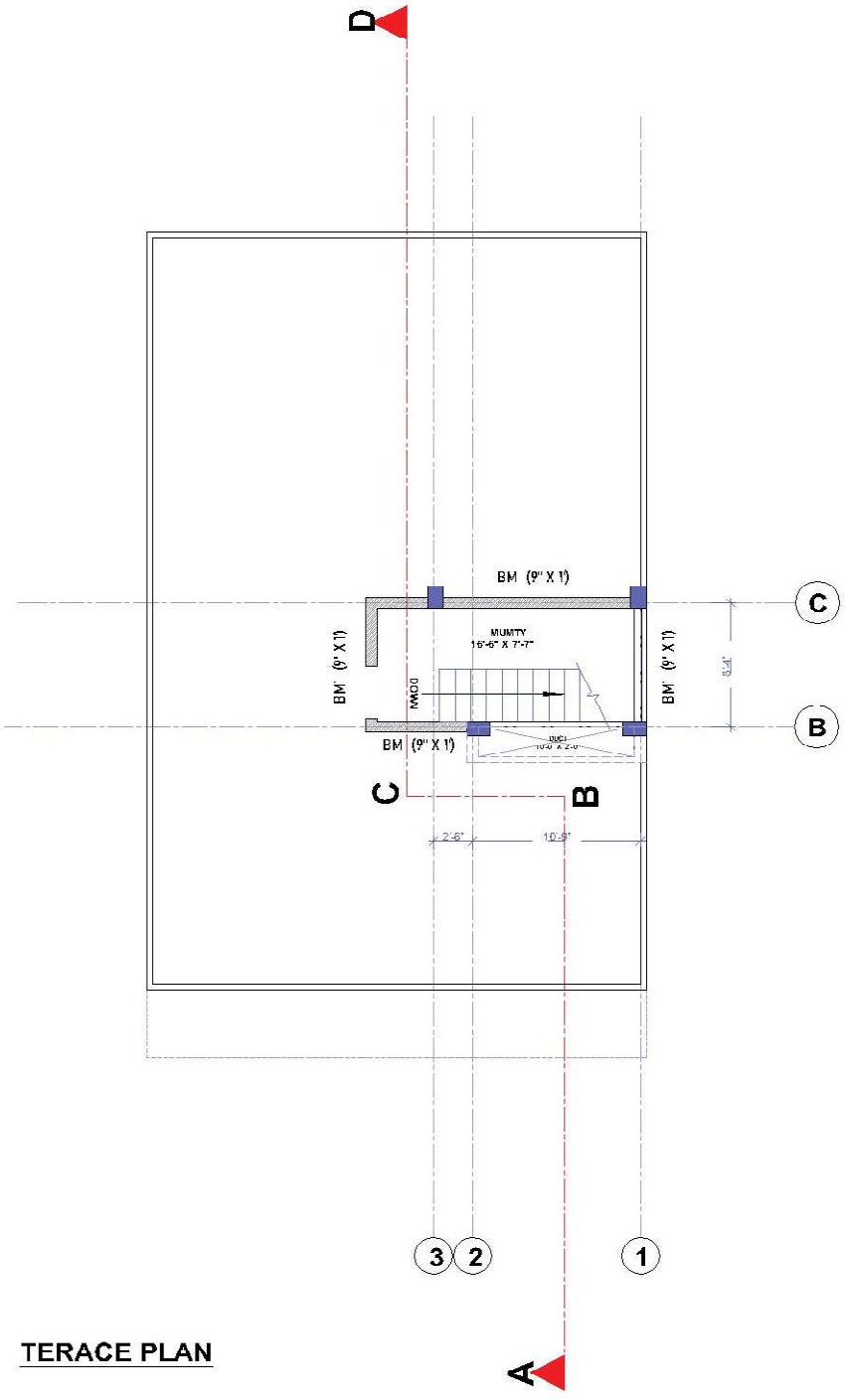


Fig.3.5



TERACE PLAN

Fig.3.6

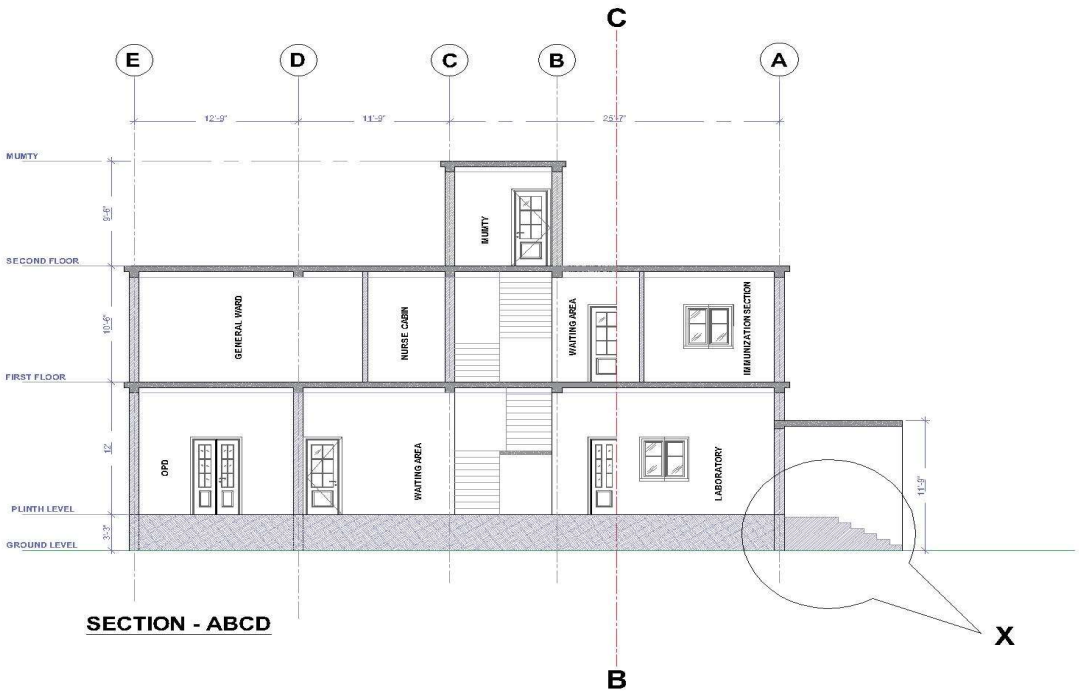

C
E
D
C
B
A
12'-9"
13'-9"
26'-7"
MUMTY
9'-6"
SECOND FLOOR
10'-6"
FIRST FLOOR
12'
PLINTH LEVEL
3'-3"
GROUND LEVEL
MUMTY
GENERAL WARD
NURSE CABIN
WAITING AREA
IMMUNIZATION SECTION
OPD
WAITING AREA
LABORATORY
11'-9"
X
B
SECTION - ABCD

Fig.3.7

ESTIMATE of P.H.C

S.NO	ITEM DES.	NOS	LENGTH	WIDTH	HEIGHT	QTY	UNIT	REMARKS
1	**EXCAVATION**							
A	**Excavation**							
	Footing-F	15	5.67	6.67	3.25	1,841.67		
						1,841.67	**Cuft.**	
B	**Excavation Below Plinth Beam**							
	Plinth Beam External line							
	Waiting Area Short Wall	1	15.42	1.42	1.00	21.84		
	Laboratory Short Wall	1	5.67	1.42	1.00	8.03		
	Laboratory Long Wall	2	11.25	1.42	1.00	31.88		
	Waiting Area Long Wall	1	19.17	1.42	1.00	27.15		
	Waiting Area Short Wall	1	5.75	1.42	1.00	8.15		Adjacent to OPD/Dental
	Duct Long Wall	1	4.00	1.42	1.00	5.67		
	OPD/Dental Long Wall	2	8.00	1.42	1.00	22.67		
	OPD/Dental Short Wall	2	5.75	1.42	1.00	16.29		
	X-Ray Outer Long Wall	1	5.75	1.42	1.00	8.15		
	X-Ray Outer Short Wall	1	6.00	1.42	1.00	8.50		
	OPD Inner & Outer Long Wall	2	13.00	1.42	1.00	36.83		
	OPD Inner & Outer Short Wall	2	6.00	1.42	1.00	17.00		
	Entrance Wall	2	7.33	1.42	1.00	20.78		
						232.92	**Cuft.**	
	Total Excavation					**2,074.59**	**Cuft.**	
2	**PCC**							
A	**PCC Below Plinth**							
	Footing-F	15	5.67	6.67	0.33	188.89		
						188.89	**Cuft.**	
B	**PCC Below Plinth Beam**							
	Waiting Area Short Wall	1	19.42	1.42	0.33	9.17		
	Laboratory Short Wall	1	9.67	1.42	0.33	4.56		
	Laboratory Long Wall	2	15.50	1.42	0.33	14.64		
	Waiting Area Long Wall	1	15.25	1.42	0.33	7.20		
	Waiting Area Short Wall	1	7.33	1.42	0.33	3.46		**Adjacent To OPD/Dental**
		1	9.83	1.42	0.33	4.64		
	Duct Long Wall	1	8.50	1.42	0.33	4.01		
	OPD/Dental Long Wall	2	12.00	1.42	0.33	11.33		
	OPD/Dental Short Wall	2	10.25	1.42	0.33	9.68		
	X-Ray Outer Long Wall	1	12.00	1.42	0.33	5.67		
	X-Ray Outer Short Wall	1	10.50	1.42	0.33	4.96		

	OPD Inner & Outer Long Wall	2	17.00	1.42	0.33	16.06		
	OPD Inner & Outer Short Wall	2	10.92	1.42	0.33	10.31		
	Entrance Wall	2	9.58	1.42	0.33	9.05		
	Below Entrance Stair	1	30.50	6.08	0.33	61.85		
						176.60	**Cuft.**	
C	**PCC at Ground Floor**	1	1,504.20	1.00	0.33	501.40		
	VERANDAH	1	30.50	3.42	0.33	34.74		
						536.14	**Cuft.**	
	Total P.C.C					**901.62**	**Cuft.**	
3	**BRICKWORK UPTO PLINTH**							
A	**BRICKWORK BELOW PLINTH**							
1	**9'' wide**							
	Wall Below Plinth							
	Waiting Area Short Wall	1	19.42	0.75	3.25	47.33		
	Laboratory Short Wall	1	9.67	0.75	3.25	23.56		
	Laboratory Long Wall	2	15.50	0.75	3.25	75.56		
	Waiting Area Long Wall	1	15.25	0.75	3.25	37.17		
	Waiting Area Short Wall	1	7.33	0.75	3.25	17.88		**Adjacent To OPD/Dental**
		1	9.83	0.75	3.25	23.97		
	Duct Long Wall	1	8.50	0.75	3.25	20.72		
	OPD/Dental Long Wall	2	12.00	0.75	3.25	58.50		
	OPD/Dental Short Wall	2	10.25	0.75	3.25	49.97		
	X-Ray Outer Long Wall	1	12.00	0.75	3.25	29.25		
	X-Ray Outer Short Wall	1	10.50	0.75	3.25	25.59		
	OPD Inner & Outer Long Wall	2	17.00	0.75	3.25	82.88		
	OPD Inner & Outer Short Wall	2	10.92	0.75	3.25	53.22		
	Entrance Wall	2	9.58	0.75	3.25	46.72		
	VERANDAH WALL	1	30.50	0.75	2.83	64.81		
						657.13	**Cuft.**	
	VERANDAH STAIR							
	1ST STEP	1	20.50	5.00	0.33	34.17		
	2ND STEP	1	20.50	4.00	0.50	41.00		
	3RD STEP	1	20.50	3.00	0.50	30.75		
	4th STEP	1	20.50	2.00	0.50	20.50		
	5th STEP	1	20.50	1.00	0.50	10.25		
						136.67	**Cuft.**	
	Total BRICK WORK BELOW PLINTH					**793.79**	**Cuft.**	
B	**Brick Work Over Plinth Lvl**							
	9" Thick Brickwork							
	GROUND FLOOR							
	Wall Above Plinth							

	Waiting Area Short Wall	1	19.42	0.75	11.00	160.19		
	Laboratory Short Wall	1	9.67	0.75	11.00	79.75		
	Laboratory Long Wall	2	15.50	0.75	11.00	255.75		
	Waiting Area Long Wall	1	15.25	0.75	11.00	125.81		
	Waiting Area Short Wall	1	7.33	0.75	11.00	60.50		
		1	9.83	0.75	11.00	81.13		
	OPD/Dental Long Wall	2	12.00	0.75	11.00	198.00		
	OPD/Dental Short Wall	2	10.25	0.75	11.00	169.13		
	X-Ray Outer Long Wall	1	12.00	0.75	11.00	99.00		
	X-Ray Outer Short Wall	1	10.50	0.75	11.00	86.63		
	OPD Inner & Outer Long Wall	2	17.00	0.75	11.00	280.50		
	OPD Inner & Outer Short Wall	2	10.92	0.75	11.00	180.13		
	Entrance Wall	2	9.58	0.75	8.00	115.00		
	4.5'' Thick Brickwork							
	Duct Wall	1	8.50	0.38	11.00	35.06		
	Duct Wall	1	10.00	0.38	11.50	43.13		Adjacent to Laboratory
	FIRST FLOOR							
	9'' Thick Brickwork							
	Medical Store Outer Front Long Wall	1	19.42	0.75	9.50	138.34		
	Immunization Section Outer Front Short Wall	1	9.67	0.75	9.50	68.88		
	Immunization Section Inner & Outer Long Wall	2	15.50	0.75	9.50	220.88		
	Medical Store Outer Short Wall	1	9.67	0.75	9.50	68.88		
	Waiting Area Outer Wall	1	5.67	0.75	9.50	40.38		
	Waiting Area Outer Wall	1	6.92	0.75	9.50	49.28		
	General Ward Inner & Outer Short Wall	2	17.00	0.75	9.50	242.25		
	General Ward Inner & Outer Long Wall	2	10.25	0.75	9.50	146.06		
	General Ward Inner & Outer Long Wall	2	10.92	0.75	9.50	155.56		
	Gynae Section Inner & outer Short Wall	2	12.00	0.75	9.50	171.00		
	Gynae Section outer Long Wall	1	10.50	0.75	9.50	74.81		
	Gynae Section outer Long Wall	1	10.25	0.75	9.50	73.03		
	4.5'' Thick Brickwork							
	Duct Long Wall	1	8.50	0.38	9.50	30.28		
	Duct Long Wall	1	10.00	0.38	10.00	37.50		Adjacent to Laboratory
	Medical Store Long Wall	1	19.75	0.38	10.00	74.06		
	Nurse Cabin Long Wall	1	6.67	0.38	10.00	25.00		
	Nurse Cabin Short Wall	1	6.00	0.38	10.00	22.50		
	Toilet Long Wall	1	5.42	0.38	10.00	20.31		
	Toilet Short Wall	1	4.00	0.38	10.00	15.00		
	MUMTY							
	9'' Thick Brickwork							
	Long Wall	1	12.00	0.75	8.50	76.50		

	Long Wall	1	4.00	0.75	8.50	25.50		
	Long Wall	1	6.50	0.75	8.50	41.44		9'' Wall
	Short Wall	2	7.58	0.75	8.50	96.69		
	4.5'' Thick Brickwork	1	8.50	0.38	8.50	27.09		
	DEDUCTION FOR DOOR & WINDOWS							
	GROUND FLOOR							
	DOOR	-1	6.00	0.75	7.00	(31.50)		
	DOOR	-2	3.00	0.75	7.00	(31.50)		
	DOOR	-2	4.00	0.75	7.00	(42.00)		
	FIRST FLOOR							
	DOOR	-2	3.00	0.75	7.00	(31.50)		
	DOOR	-2	2.50	0.75	7.00	(26.25)		
	DOOR	-1	4.00	0.75	7.00	(21.00)		
	DOOR	-1	3.50	0.75	7.00	(18.38)		
	MUMTY							
	DOOR	-1	3.50	0.75	7.00	(18.38)		
	GROUND FLOOR							
	WINDOWS	-5	6.00	0.75	4.00	(90.00)		
	WINDOWS	-6	4.00	0.75	4.00	(72.00)		
	WINDOWS	-4	2.00	0.75	4.00	(24.00)		
	WINDOWS	-1	7.58	0.75	11.00	(62.56)		
	FIRST FLOOR							
	WINDOWS	-7	6.00	0.75	4.00	(126.00)		
	WINDOWS	-4	4.00	0.75	4.00	(48.00)		
	WINDOWS	-2	3.00	0.75	4.00	(18.00)		
	WINDOWS	-2	2.00	0.75	4.00	(12.00)		
	WINDOWS	-1	7.58	0.75	8.50	(48.34)		
	VENTILATOR	-1	2.00	0.75	4.00	(6.00)		
	MUMTY							
	DOOR	-1	3.50	0.75	7.00	(18.38)		
	WINDOWS	-1	7.58	0.75	8.50	(48.34)		
	TOTAL BRICKWORK ABOVE PLINTH					**3,116.78**	**Cuft.**	
4	**REINFORCED CONCETE**							
	Upto Plinth Level							
A	**Footing of Column**							
	Footing-F	15	6.00	5.00	0.33	150.00		RECTANGLE PORTION
		AREA-1=	30.0		AREA-2=	3.61		
	Footing-F	15	h=	10''		183.41		VARYING PORTION
						333.41	**Cuft.**	
B	**Column**							
	upto Plinth Level i.e. +3'-3''	15	1.50	1.00	5.00	112.50		
						112.50	**Cuft.**	

C	**External & Internal Plinth Beam Concrete**							
	Plinth Beam External line							
	PB1 (9"X1')	2	19.50	0.75	1.00	29.25		
	PB2 (9"X1')	1	9.50	0.75	1.00	7.13		
	PB3 (9"X1')	3	17.00	0.75	1.00	38.25		
	PB4 (9"X1')	3	12.00	0.75	1.00	27.00		
	PB5 (9"X1')	1	15.25	0.75	1.00	11.44		
	PB6 (9"X1')	2	15.50	0.75	1.00	23.25		
	PB7 (9"X1')	1	6.92	0.75	1.00	5.19		
	PB8 (9"X1')	2	7.58	0.75	1.00	11.38		
	PB9 (9"X1')	1	10.67	0.75	1.00	8.00		
	PB10 (9"X1')	2	10.25	0.75	1.00	15.38		
	PB11 (9"X1')	3	10.50	0.75	1.00	23.63		
	PB12 (9"X1')	1	8.50	0.75	1.00	6.38		
						206.25	**Cuft.**	
	TOTAL Upto Plinth Level					**652.16**	**Cuft.**	
5	**Concrete Above Plinth Level**							
A	**Column Above Plinth to Terrace Level**							
	Column (1' x 1'6")	15	1.00	1.50	22.50	506.25		
	Column (1' x 1'6")	4	1.00	1.50	9.50	57.00		Upto Mumty Top Slab
						563.25	**Cuft.**	
B	**BEAM First Floor LVL.**							
	B1 (9" X 1')	2	19.50	0.75	1.00	29.25		
	B2 (9" X 1')	1	9.50	0.75	1.00	7.13		
	B3 (9" X 1')	3	17.00	0.75	1.00	38.25		
	B4 (9" X 1')	3	12.00	0.75	1.00	27.00		
	B5 (9" X 1')	1	15.25	0.75	1.00	11.44		
	B6 (9" X 1')	2	15.50	0.75	1.00	23.25		
	B7 (9" X 1')	1	6.92	0.75	1.00	5.19		
	B8 (9" X 1')	1	7.58	0.75	1.00	5.69		
	B9 (9" X 1')	1	10.67	0.75	1.00	8.00		
	B10 (9" X 1')	2	10.25	0.75	1.00	15.38		
	B11 (9" X 1')	3	10.50	0.75	1.00	23.63		
	B12 (9" X 1')	1	8.50	0.75	1.00	6.38		
						200.56	**Cuft.**	
	BEAM Second Floor LVL.							
	B1 (9" X 1')	2	19.50	0.75	1.00	29.25		
	B2 (9" X 1')	1	9.50	0.75	1.00	7.13		
	B3 (9" X 1')	3	17.00	0.75	1.00	38.25		
	B4 (9" X 1')	3	12.00	0.75	1.00	27.00		
	B5 (9" X 1')	1	15.25	0.75	1.00	11.44		
	B6 (9" X 1')	2	15.50	0.75	1.00	23.25		

	B7 (9'' X 1')	1	6.92	0.75	1.00	5.19		
	B8 (9'' X 1')	1	7.58	0.75	1.00	5.69		
	B9 (9'' X 1')	1	10.67	0.75	1.00	8.00		
	B10 (9'' X 1')	2	10.25	0.75	1.00	15.38		
	B11 (9'' X 1')	3	10.50	0.75	1.00	23.63		
	B12 (9'' X 1')	1	8.50	0.75	1.00	6.38		
						200.56	**Cuft.**	
	MUMTY(Terrace Floor LVL)							
	BM (9'' X 1')	2	18.00	0.75	1.00	27.00		
	BM1 (9'' X 1')	2	7.50	0.75	1.00	11.25		
						38.25	**Cuft.**	
	5'' thick Slab Concrete							
	First Floor LVL	1	1681.83		0.42	700.76		
	Second Floor LVL	1	1,681.83		0.42	700.76		
	TERRACE FLOOR LEVEL	1	163.22		0.42	68.01		
	FRONT PORCH	1	32.00	9.17	0.42	122.22		
	Beams Over Doors & Windows							
	GROUND FLOOR							
	DOOR	1	6.67	0.75	0.50	2.50		
	DOOR	2	3.67	0.75	0.50	2.75		
	DOOR	2	4.67	0.75	0.50	3.50		
	FIRST FLOOR							
	DOOR	2	3.67	0.75	0.50	2.75		
	DOOR	2	3.17	0.75	0.50	2.38		
	DOOR	1	4.67	0.75	0.50	1.75		
	DOOR	1	4.17	0.75	0.50	1.56		
	MUMTY							
	DOOR	1	4.17	0.75	0.50	1.56		
	GROUND FLOOR							
	WINDOWS	5	6.67	0.75	0.50	12.51		
	WINDOWS	6	4.67	0.75	0.50	10.51		
	WINDOWS	4	2.67	0.75	0.50	4.01		
	FIRST FLOOR							
	WINDOWS	7	6.67	0.75	0.50	17.51		
	WINDOWS	4	4.67	0.75	0.50	7.01		
	WINDOWS	2	3.67	0.75	0.50	2.75		
	WINDOWS	2	2.67	0.75	0.50	2.00		
	VENTILATOR	1	2.67	0.75	0.50	1.00		
	MUMTY							
	DOOR	1	4.17	0.75	0.50	1.56		
	Porch Beam	1	32.00	0.75	0.50	12.00		
						1,681.36	**Cuft.**	

	DEDUCTION FOR STAIR OPENING	-1	79.94		0.42	(33.31)		
	Stair Opening	-1	84.01		0.42	(35.00)		
	DUCT OPENING	-2	20.00		0.42	(16.67)		
						(84.98)	**Cuft.**	
	TOTAL Above Plinth Level					**2,599.01**	**Cuft.**	
6	**STAIR CASE**							
	GROUND FLOOR							
	STEPS	18	3.50	**AREA =**	0.29	18.11		
	LANDING	1	7.58	3.50	0.33	8.85		
	WAIST SLAB-1	1	11.33	3.50	0.33	13.22		
	WAIST SLAB-2	1	12.33	3.50	0.33	14.39		
	FIRST FLOOR							
	STEPS	15	3.50	**AREA =**	0.25	13.13		
	STEPS	4	**AREA =**	6.62	0.50	13.24		
	WAIST SLAB-1	1	6.00	3.50	0.33	7.00		
	WAIST SLAB-2	1	13.17	3.50	0.33	15.36		
						103.30	**Cuft.**	
7	**EARTH FILLING**							
	Below Entrance	1	30.50	3.42	2.33	243.15	Cuft.	
	Back Fill	1	520.80	1.00	1.00	520.80	Cuft.	
	Below Plinth to Ground Level	1	1,528.85		2.83	4,331.74	Cuft.	
						5,095.70	**Cuft.**	
8	**PLASTER WORK**							
A	**INTERNAL WALL**							
	GROUND FLOOR							
	WAITING AREA	1	36.58		11.50	420.71		
	WAITING AREA	1	17.25		11.50	198.38		
	WAITING AREA	1	11.75		11.50	135.13		
	WAITING AREA	1	19.75		11.50	227.13		
	WAITING AREA	1	17.25		11.50	198.38		
	LABORATORY	2	10.00		11.50	230.00		
	LABORATORY	2	14.50		11.50	333.50		
	STAIR	1	13.25		11.50	152.38		
	STAIR	1	10.75		11.50	123.63		
	OPD/DENTAL	2	12.50		11.50	287.50		
	OPD/DENTAL	2	11.00		11.50	253.00		
	X-RAY SECTION	2	12.50		11.50	287.50		
	X-RAY SECTION	2	12.00		11.50	276.00		
	OPD	2	17.25		11.50	396.75		
	OPD	2	12.00		11.50	276.00		
	Front Walls	2	9.17		11.25	206.25		

	FIRST FLOOR							
	MEDICAL STORE	2	19.75		10.00	395.00		
	MEDICAL STORE	2	10.00		10.00	200.00		
	WAITING AREA	1	14.42		10.00	144.17		
	WAITING AREA	1	19.75		10.00	197.50		
	WAITING AREA	1	18.25		10.00	182.50		
	WAITING AREA	1	6.92		10.00	69.17		
	IMMUNIZATION SECTION	1	10.00		10.00	100.00		
	IMMUNIZATION SECTION	1	10.17		10.00	101.67		
	IMMUNIZATION SECTION	1	14.50		10.00	145.00		
	IMMUNIZATION SECTION	1	5.42		10.00	54.17		
	IMMUNIZATION SECTION	1	4.42		10.00	44.17		
	IMMUNIZATION SECTION	1	5.42		10.00	54.17		
	TOILET	2	5.00		10.00	100.00		
	TOILET	2	4.00		10.00	80.00		
	ADJACENT TO DUCT & STAIR	1	10.75		10.00	107.50		
	ADJACENT TO DUCT & STAIR	1	12.25		10.00	122.50		
	GYNAE SECTION	2	23.75		10.00	475.00		
	GYNAE SECTION	2	12.33		10.00	246.67		
	GENERAL WARD	2	17.25		10.00	345.00		
	GENERAL WARD	2	23.75		10.00	475.00		
	NURSE CABIN	2	6.00		10.00	120.00		
	NURSE CABIN	2	6.67		10.00	133.33		
	MUMTY	2	16.50		9.00	297.00		
	MUMTY	1	7.58		9.00	68.25		
	DEDUCTION FOR DOOR & WINDOWS							
	Door	-4	3.00		7.00	(84.00)		
	Door	-3	4.00		7.00	(84.00)		
	Door	-2	2.50		7.00	(35.00)		
	Door	-1	3.50		7.00	(24.50)		
	FRONT Ramp	-1	89.768			(89.77)		
	FRONT Stair	-1	92.590			(92.59)		
B	**EXTERNAL WALL**							
	GROUND FLOOR							
	OUTER LONG WALL	2	60.42		15.25	1,842.71		
	FRONT WALL	2	0.75		12.00	18.00		
	BACK WALL	1	32.00		15.25	488.00		
	FRONT WALL	1	30.50		12.00	366.00		
	FIRST FLOOR							
	OUTER WALL	2	50.83		10.50	1,067.50		
	BACK & FRONT WALL	2	32.00		10.50	672.00		
	MUMTY	1	18.00		9.50	171.00		
	MUMTY	1	9.08		9.50	86.29		

	MUMTY	1	6.50		9.50	61.75		
	DEDUCTION FOR DOOR & WINDOWS							
	GROUND FLOOR							
	WINDOWS	-5	6.00		4.00	(120.00)		
	DOOR	-1	6.00		7.00	(42.00)		
	WINDOWS	-6	4.00		4.00	(96.00)		
	WINDOWS	-4	2.00		4.00	(32.00)		
	FIRST FLOOR							
	WINDOWS	-7	6.00		4.00	(168.00)		
	WINDOWS	-4	4.00		4.00	(64.00)		
	WINDOWS	-2	3.00		4.00	(24.00)		
	WINDOWS	-2	2.00		4.00	(16.00)		
	VENTILATOR	-1	2.00		1.00	(2.00)		
C	**CEILING PLASTER**							
	GROUND FLOOR							
	WAITING AREA	1	673.790			673.79		
	LABORATORY	1	10.00	14.50		145.00		
	OPD/DENTAL	1	12.50	11.00		137.50		
	OPD	1	17.25	12.00		207.00		
	X-RAY	1	12.50	12.00		150.00		
	FIRST FLOOR							
	MEDICAL STORE	1	19.75	10.00		197.50		
	IMMUNIZATION SECTION INCLUDING TOILET	1	10.00	14.50		145.00		
	WAITING AREA	1	287.29			287.29		
	GYNAE SECTION	1	23.75	12.50		296.88		
	GENERAL WARD INCLUDING NURSE CABIN	1	23.75	17.25		409.69		
	MUMTY	1	16.50	7.58		125.13		
	TOTAL PLASTER WORK					**14,834.12**	**Sqft.**	
9	**Interior & Exterior Wall Painting**							
	Same As Interior & Exterior Plaster	1	1	1	1	14,834.12	Sqft.	
10	**FLOORING WORK**							
A	**Kota Stone Flooring**							
	Ground Floor	1	1,504.20	1.00		1,504.20		
	First Floor	1	1,373.63	1.00		1,373.63		
B	**Kota Stone Flooring on Staircase**					-		
	Ground Floor							
	Staircase Tread	18	3.50	1.00		63.00		
	Staircase Riser	19	3.50	0.58		38.24		
	Landing	1	7.58	3.50		26.54		
	First Floor							
	Staircase Tread	14	3.50	1.00		49.00		
	Staircase Riser	16	3.50	0.50		28.00		
	Staircase Tread	4		6.62		26.48		
	Staircase Riser	2	5.17	0.50		5.17		
		1	3.50	0.50		1.75		
						3,116.01	**Sqft.**	

Table 3.0

STEEL STATEMEMT

S.NO	ITEM	UNIT	QUANTITY	STEEL COEFFICIENT (kg per cum)	STEEL (kg)
1	FOOTING	Cum	9.45	90	850.55
2	COLUMN	Cum	19.45	175	3,351.93
3	SLAB/BEAM	cum	73.67	100	7,366.81
4	STAIR CASE	cum	2.93	100	292.79
TOTAL STEEL				**In KG**	**11,862.08**
				In MT	12.00
				5% Wastage	0.600
				Total Steel Required	**12.600**

Table 3.1

4. ANALYSIS OF RATES

4.1ANALYSIS OF RATES

The rate of particular item of work depends on the following:

1. Specifications of works and material about their quality, proportion and constructional operation method.

2. Quantity of materials and their costs.

3. Cost of labors and their wages.

4. Location of site of work and the distances from source and conveyance charges.

5. Overhead and establishment charges.

6. Profit Cost of materials at source and at site of construction. The costs of materials are taken as delivered at site inclusive of the transport local taxes and other charges.

PURPOSE OF ANALYSIS RATES

1. To work out the actual cost of per unit of the items.

2. To work out the economical use of materials and processes in completing the particulars item.

3. To work out the cost of extra items which are not provided in the contract bond, but are to be done as per the directions of the department.

4. To revise the schedule of rates due to increase in the cost of material and labor or due to change in technique.

Cost of labor, types of labor, standard schedule of rates:

The labor can be classified in to

- Skilled – 1^{st} class.
- Skilled – 2^{nd} Class.
- Unskilled.

The labor charges can be obtained from the standard schedule of rates 30% of the skilled labor provided in the data may be taken as 1^{st} class, remaining 70% as 2^{nd} class.

The rates of materials for Government works are fixed by the superintendent Engineer for his circle every year and approved by the Board of Chief Engineers. These rates are incorporated in the standard schedule of rates.

Lead statement: The distance between the source of availability of material and construction site is known as “Lead” and is expected in Km. the cost of conveyance of material depends on lead.

This statement will give the total cost of materials per unit item. It includes first cost, conveyance loading, unloading stacking, charges etc.

The rates shown in the lead statement are for metalled road and include loading and staking charges. The environment leads on the metalled roads are arrived by multiplying by a factor.

a) For metal tracks – Lead x 1.0

b) For cart tracks – Lead x 1.1

c) For Sandy tracks – Lead x 1.4

4.2 ABSTRACT OF ESTIMATION

Estimating is the technique of calculating/computing the various quantities and the expected expenditure to be incurred on a particular work/ project. For all engineering works it is required to know beforehand the probable cost of construction known as the estimated cost. Necessary for preparing an estimate are drawings like plan, elevation and sections of important point's, detailed specifications about workmanship & properties of materials, Standard schedule of rates of the current year. Estimate is required to invite the tenders and Quotations and to arrange contract, also required to control the expenditure during the execution of work. Estimate decides whether the proposed plan matches the funds available or not. In this project we estimate the quantities required for the construction of the individual villa and later calculate the cost by preparing the abstract of cost.

ABSTRACT OF ESTIMATION					
Item No in DSR-14	**DESCRIPTION**	**UNIT**	**QTY**	**Rate**	**Amount**
	EARTH WORK IN EXCAVATION				
2.6	Earth work in excavation by mechanical means (Hydraulic excavator) /manual means over areas including disposal of excavated earth, lead upto 50m and lift upto 1.5m, surface to be leveled and neatly dressed.				
2.6.1	All kinds of soil	Cuft.	2,074.59	7.14	14,821.44
	Earth Filling				
2.25	Filling available excavated earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift upto 1.5 m. (Net consolidated area fill volume will be computed from the initial and final levels. Volume in slopes, embankments etc. will be computed applying appropriate formula, as per CPWD specification).	Cuft.	5,095.70	5.63	28,699.41
	CONCRETE WORK (PLAIN AND RCC)				
	(Rates for all cement concrete items plain and reinforced described below shall include work from Basement Level to top of last roof including roof of machine room, Mumty, over head water tanks and parapets above at all floors and for all heights, required hacking of the surfaces for smooth plaster. (This section covers cast in situ structural and architectural as well as precast structural and architectural concrete work).				
	Plain cement concrete				
4.19	Providing and laying in position ready mixed plain cement concrete, using fly ash and cement content as per approved design mix and manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for plain cement concrete work, including pumping of R.M.C. from transit mixer to site of laying and curing, excluding the cost of centering, shuttering and finishing, including cost of curing, admixtures in recommended proportions as per IS : 9103 to accelerate/ retard setting of concrete, improve workability without impairing strength and durability as per direction of the Engineer - in - charge.				
	Note :				
	(1) Excess/less cement used than specified in this item is payable/ recoverable separately.				
	(2) Fly ash conforming to grade I of IS 3812 (Part-1) only be used as part replacement of OPC as per IS : 456. Uniform blending with cement is to be ensured in accordance with clauses 5.2 and 5.2.1 of IS: 456 -2000 in the items of BMC and RMC.				
4.19.1	All works upto plinth level :				
4.19.1.1	M-15 grade plain cement concrete (cement content considered @ 240 kg/Cum.)	Cuft.	901.62	166.59	1,50,205.20

	Cast - in -situ concrete				
5.40	Providing and laying in position ready mixed M-25 grade concrete for reinforced cement concrete work, using fly ash and cement content as per approved design mix, and manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work, including pumping of R.M.C.from transit mixer to site of laying, excluding the cost of centering, shuttering, finishing and reinforcement, including cost of admixtures in recommended proportions as per IS : 9103 to accelerate / retard setting of concrete, improve workability without impairing strength and durability as per direction of the Engineer - in - charge.				
	NOTE- (1) Cement content considered in this item is @ 330 kg/Cuft.. Excess/ less cement used as per design mix is payable/ recoverable separately.				
	(2) Fly ash conforming to grade I of IS 3812 (Part-1) only be used as part replacement of OPC as per IS : 456. Uniform blending with cement to be ensured in accordance with clauses 5.2 and 5.2.1 of IS: 456 -2000 in the items of BMC and RMC.				
5.40.1	All works up to Plinth level.	Cuft.	652.16	201.01	1,31,090.95
5.40.2	All works above plinth & up to floor level.	Cuft.	2,702.31	242.43	6,55,113.84
5.22	**Reinforcement steel**				
	Laying and fixing in position steel reinforcement in all reinforced concrete work, including straightening, cutting, removal of loose rust by wire brush and coating with cement slurry, bending, hoisting, laying in position to the shape and profile required at all levels and heights as per drawing and design and/ or as directed, binding with 16 gauge MS annealed steel wire etc. complete. (Quoted rate also to include providing & fixing the binding wire, cement mortar spacer blocks etc.)				
5.22.6	Thermo mechanically Treated Reinforcement (TMT) or High yield strength Deformed (Tor steel) bars of all size & grades. Basic Rate of Steel : Rs. 44000/Ton				
	FE-500 Grade	MT	12.60	44,000.00	5,54,400.00
	MASONRY WORK				
	(Quoted Rates are for all heights, all depths, all levels, including basement to roof (mumty) & all leads and lifts, including racking curved or circular masonry work, racking of brick work should be 10mm)				
	Brick work upto Plinth Level				
6.1.2	Providing and constructing brick masonry using selected quality burnt clay FPS bricks of class designation 75 in foundation and plinth laid in cement mortar 1:6 (1 cement : 6 coarse sand) mix, joints finished, flush/ raked to 6mm depth including scaffolding, curing complete as per specification and drawing or as directed by Project Manager.	Cuft.	793.79	154.91	1,22,969.08

	Full Brick work in Super Structure				
6.1.2	Providing and constructing brick masonry of thickness 230 mm or more for any shapes, fins, projections, in shafts, under counter / platform / cupboards, using selected quality burnt clay FPS bricks of class designation 75 laid in cement mortar 1:6 (1 cement: 6 coarse sand) mix, joints finished, flush/ raked to 6mm depth including scaffolding, curing complete as per specification and drawing or as directed by Project Manager.	Cuft..	3,116.78	154.91	4,82,831.64
	PLASTERING - INTERNAL AND EXTERNAL				
	(Quoted Rate shall be for all heights, depths, levels, leads and lifts and to include providing Recron polyester fibers in cement mortar at junction RCC and brick / AAC Block walls and all chasing for electrical & plumbing conduits, pipes etc. for internal and external plaster works).				
	Wall plaster				
13.2.2	Providing and applying 12-15mm thick plaster to masonry and RCC walls, columns etc. in cement mortar 1:6 (1 cement : 6 fine and coarse sand in equal proportion) finished smooth including scaffolding, curing, making grooves at desired location etc. complete as per drawing. To prevent surface cracks appearing between junction of columns, beams and walls 150mm wide chicken wire mesh should be fixed with U-nails 150mm c/c before plastering the junction. The plaster of walls & beams/column in one vertical plan should be carried out in one so. All U-nails should be provided without any extra payment.	Sqft.	12,059.4	22.47	2,70,943.13
	Ceiling plaster				
13.16	Providing and applying 6mm thick plaster to RCC slab in cement mortar 1:3 (1 cement : 3 fine and coarse sand in equal proportion) finished smooth including scaffolding, curing, making grooves at desired location etc. complete as per drawing.	Sqft.	2,774.77	20.59	57,119.98
	FLOORING / CLADDING WORKS				
	(Quoted Rates are for all heights, depths, levels, leads and lifts and for all design and pattern shown in drawings)				
	Stone shall be procured in standard and equal cut to size pieces, quoted rates also to include cutting of odd sizes and skirting from standard size stone pieces, rest all other stones shall be procured in slabs of varying sizes. All types of unpolished stone shall be cut by the machine only.				
	Staircase Flooring				
	Providing and laying stone in specified size (in single piece) of stone slab in treads and risers of steps as per design and pattern shown in drawings laid over 20mm average thick CM 1:3 (1 cement : 3 coarse sand) jointed with cement slurry mixed with pigment to match the shade of slab including chamfering, corner /edge grinding and mirror polishing, making nosing as per profile in steps, rubbing and mirror polishing, drilling holes and grouting for fixing of staircase railing etc. complete as per specification and as per detail drawing complete.				
	Treads of steps				
11.25 11.24	With 25mm thick rough Kota stone and joint to be filled with grey cement slurry mixed with pigment to match the shade of stone (Note: rough Kota stone shall be got approved by the Architect/ Project Manager).	Sqft.	138.48	192.58	26,668.34
	Risers of step.				-

					-
11.25	With 25mm thick rough Kota stone and joint to be filled with grey cement slurry mixed with pigment to match the shade of stone (Note: rough Kota stone shall be got approved by the Architect/ Project Manager).	Sqft.	99.70	192.58	19,199.32
11.26	**KOTA STONE FLOORING**				
	P/L of Kota stone slab flooring over 20 mm (average) thick base laid over and jointed with grey cement slurry mixed with pigment to match the shade of the slab, including rubbing and polishing complete with base of cement mortar 1 : 4 (1 cement : 4 coarse sand) :				
11.26.1	25 mm thick	Sqft.	2,877.83	177.99	5,12,218.97
13.57	Finishing with deluxe multi surface paint system for interiors & exteriors using primer as per manufacturers' specification:				
13.57.1	Two or more coats applied @ 1.25 liter/10 Sqm. Over and including one coat of special primer applied @ 0.75 Liter./10 Sqm.	Sqft.	14,834.12	12.77	1,89,493.45
TOTAL CARRIED OVER					**₹ 32,15,774.77**
ADD 2% MISC. WORK					**₹ 64,315.50**
TOTAL ESTIMATED COST					**₹ 32,80,090.27**

Table 4.0

CONCLUSION

Whatever we achieved during whole process for the complete of project is indeed a kind of blessings bestowed by Lord to us. The completion of the project was no possible without the joint cooperation of our project mentor i.e. Er Asrar Ahmed and group members we can the study of PHC (Primary Health center) and made a detailed estimated of them.

6. REFERENCE

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