DESIGN AND PLANNING OF AFFORDABLE INNOVATIVE GREEN SOCIAL HOUSING

(COASTAL REGION)

Development Alternatives

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DESIGN AND PLANNING OF AFFORDABLE INNOVATIVE GREEN SOCIAL HOUSING

(COASTAL REGION)

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FOREWORD

Over the past half century, a rural-to-urban population shift has been underway and the process of urbanization (the concentration of people and activities into areas classified as urban) is set to continue well in this century. The high pace of social and economic development has led to the growth of urban population. Lack of infrastructure, congested traffic, environmental degradation and most prominently housing shortage have become the major issues faced by cities and towns.

The purpose of this catalogue is to introduce design standards and specifications for sustainable affordable housing in the coastal regions of India in order to facilitate the state agencies in planning and construction.

The design standards developed in this catalogue cater to three categories from the economic stand point i.e. Economically Weaker Section (EWS) with carpet area within 21-27 sq.mt , Lower Income Group-A (LIG-A) with carpet area within 28-40 sq.mt. and Lower Income Group-B (LIG-B) with carpet area within 41-60 sq.mt. in coastal India. Besides the economic criteria, the designs are inspired from the vernacular styles of architecture suiting the geo-climatic condition and mainstream aspects of disaster resilience and low carbon construction. The proposed designs will aim to standardize spaces and sizes of various low carbon construction elements and components keeping in mind the minimum National Building Code (NBC) norms.

The designs incorporate green concepts, innovative technology and building materials including prefab technologies and provisions for rain water harvesting and water conservation technologies, plumbing, water supply sewerage system, electrification and renewable energy technologies. Design for both individual units and cluster units are part of the catalogue.

We hope these designs help state agencies and developers in mainstreaming innovative green practices in affordable housing.

ACKNOWLEDEGMENTS

Development Alternatives gratefully acknowledges the important contribution and would like to convey thanks to **Mr J.K. Prasad** and the **Building Materials and Technology Promotion Council (BMTPC)** for their great support and guidance without which it would not have been possible to develop this catalogue. They have always been very responsive in providing necessary information.

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1 INTRODUCTION

Introduction

Impending Housing Shortage in Urban India

India's urban population registered a decadal growth of 32 per cent rising from 285 million to 377 million between 2001 and 2011[1]. It is opined that this trend is likely to persist on the back of robust economic development across the country. By 2050, 900 million people will be added to Indian cities[2]. The rapid pace of urbanisation owing to the rural–urban migration is putting a strain on the urban infrastructure in these cities.

Growing concentrations of people in urban areas has resulted in an increase in the number of people living in slums and squatter settlements. Skyrocketing prices of land and real estate in urban areas have induced the poor and the economically weaker sections of the society to occupy marginal lands typified by poor housing stock, congestion and obsolescence. There are nearly one million households living in non-serviceable katcha houses, while over half a million households are in homeless condition[3].

As urban development takes place, a growing concern for India's urban planners is the massive urban housing shortage plaguing the country. The housing shortage in the urban areas has touched 18.78 million units, where 95% of the shortage is prominent within the EWS (economically weaker sections) and LIG (lower income groups), and an estimation done on Urban Housing Shortage[4].

Affordable Housing: A Big Challenge

Given this scenario, it becomes critical to fill the existing gaps in the country's strained urban infrastructure and in particular, housing. Primarily, it would be important to address the need in the EWS and LIG. Ten Indian States contribute to three-fourths of the urban housing shortage[5]. Out of these states Tamil Nadu, Andhra Pradesh and West Bengal are from coastal region; Uttar Pradesh & Bihar are from central plains region. By providing affordable housing, the real estate sector can play a pivotal role in urban development of these states as well as the country[6].

Encouraging the role of the private sector in affordable housing; that has been traditionally reviewed as the Government's responsibility, is an interesting policy movement observed recently.

Meeting affordable housing targets needs coordinated action between stakeholders from the public and private sector. The Government needs to play a proactive and facilitatory role to promote innovation and sustainability. The private sector needs to embrace low cost appropriate technology and material options that enable affordable, quality and timely delivery.

Approach to Housing Development

The broad elements of the approach of the Government of India to tackle the problem of housing the poor are: special programmes/targeted subsidy to the poor and vulnerable groups, loan assistance to governmental agencies/beneficiaries at below-market interest rate for housing through the Housing and Urban Development Corporation (HUDCO), creation of housing assets as part of employment and income generation programmes, promotion of cost-effective and eco-friendly building materials and technologies and creation of an enabling environment for private sector initiative. Apart from housing schemes at national level, there are also housing schemes being practiced at state level.

i) National Urban Housing & Habitat Policy 2007

The National Urban Housing & Habitat Policy, 2007 seeks to set in motion a process in providing 'Affordable Housing for All' particularly the Economically Weaker Sections (EWS) and Low

[1] *2011, Census of India, http://censusindia.gov.in/2011-prov-results/indiaatglance.html*
[2] *October 2011, Urban Infrastructure in India, Federation of Indian Chambers of Commerce and Industry, FICCI*
[3] *September 2012, Report of the Technical Urban Group (TG-12) on Urban Housing Shortage 2012-17, Ministry of Housing and Urban Poverty Alleviation*
[4] *2012, Report on urban housing shortage, Ministry of Housing and Urban Poverty Alleviation, Government of India.*
[5] *2012, Report on Bridging the Urban Housing Shortage in India, KPMG International*
[6] *Ibid [3]*

Income Group (LIG). The policy advocates measures for promotion of sustainable development of habitat in the country with a view to ensuring equitable supply of land, shelter and services at affordable prices to all sections of society. However, 'Land' and 'Colonisation' being State subjects, it is primarily the responsibility of State Governments to take follow up measures in pursuance of the policy advocacy.

ii) Jawaharlal Nehru National Urban Renewal Mission (JNNURM) 2005

It was launched in December 2005 with aim to cover construction of 1.5 m houses for urban poor during the Mission period (2005- 2012)[7].It had two Sub-Missions:

- **Basic Services for the Urban Poor (BSUP)**

It seeks to provide seven entitlements/ services - security of tenure, affordable housing, water, sanitation, health, education and social security in low income segments in the 65 Mission Cities.

- **The Integrated Housing and Slum Development Programme (IHSDP**)

It seeks to provide the above mentioned 7 entitlements, services in towns/cities other than the Mission Cities.

iii) Rajiv Awas Yojana (2013-2022)

RAY was implemented in a mission mode to provide financial support to States/UTs/Urban Local Bodies (ULBs)/Central Government Agencies, hereafter called implementing agencies, for providing housing and improvement of basic civic infrastructure and social amenities in each selected slums. Rental and transit housing was admissible under the scheme. Operation and maintenance (O&M) of assets created under this scheme was eligible for funding.

RAY also extended financial support to States for creation of affordable housing stock through public-private partnership (PPP) under the Affordable Housing in Partnership (AHP) component of the scheme. It was applicable to "urbanized villages" inside the planning area of the city, urban homeless and pavement dwellers.

The Rajiv Rinn Yojna 2013

A Revised Interest Subsidy Scheme was an additional instrument for addressing the housing needs of the EWS/LIG segments in urban areas. The Scheme envisaged the provision of a fixed interest subsidy of 5% (500 basis points) on interest charged on the admissible loan amount to EWS and LIG segments to enable them to buy or construct a new house or for carrying out addition (of a room/ kitchen/ toilet/ bathroom) to the existing building[8].

iv) Interest Subsidy Scheme for Housing the Urban Poor (ISHUP) 2009

It has sought to enhance affordability of the urban poor through the provision of an interest subsidy of five per cent per annum on a loan amount of up to 1 lakh for the economically weaker sections and lower income groups in the urban areas for acquisition/construction of houses. The Government has also launched a scheme of Affordable Housing in 355 Partnership with an outlay of 5,000 crore for construction of one million houses for EWS/LIG/MIG with at least 25 per cent for EWS category[9]. The Scheme aims at partnership between various agencies/ Government / Urban Local Bodies/ developers for realizing the goal of affordable housing for all.

v) Andhra Pradesh Model: Self-help & Mutual Help

The State of Andhra Pradesh is a pioneer in India in implementing innovative housing programmes for the poor on a large scale. Though the A.P. State Housing Corporation Limited (APSHCL) was established in 1979 to formulate, promote and execute housing schemes for the weaker sections of society, the Corporation has constructed about 3.62 million houses by 31.03.2000 out of which 2.4 million are in rural areas[10]. It ranked first in the country in the implementation of housing for the

[7] *Accessed on 30th June 2014 National Building Organisation http://nbo.nic.in/Webforms/aboutus.html*

[8] *2013, Report on Trend and Progress of Housing in India, National Housing Bank.*

[9] *Accessed on 30th June 2014 National Building Organisation http://nbo.nic.in/Webforms/aboutus.html*

[10] *Ibid [9]*

poor in rural areas from the year 1991–92 onwards.

Households with an annual income of Rs.13, 000 or less are eligible for sanction of houses under various schemes from 1996–97 onwards. 50% of the houses are earmarked for Scheduled Castes and Scheduled Tribes, 33% for Backward Castes, 7% for Minorities and the remaining 10% for other Economically Weaker Sections[11]. The funding of the housing programme includes subsidy from the Government and loan from various financial institutions for the repayment of which the Government stands guarantee irrespective of the ultimate recovery from beneficiaries. Loans are mobilised from HUDCO, Life Insurance Corporation, General Insurance Corporation and Commercial Banks.

NOTES

[11] *Accessed on 30th June 2014 National Building Organisation http://nbo.nic.in/Webforms/aboutus.html*

2 CONTEXT

Context

The climate is changing. With global warming on the increase and species and their habitats on decrease, chances of ecosystem to adapt naturally are diminishing. Climate change may be one of the greatest threats facing the planet.

Impact of Construction Sector on Climate Change

The building and construction sector is a key contributor to the phenomenon to climate change. The built environment accounts for a large share of energy use (with associated greenhouse gas emissions), waste generation and use of natural resources. Areas of key concern also include production of construction materials, use and recycling, consumption of hazardous materials, integration of building materials with other infrastructure and social systems, water use and discharge, etc. The construction industry is estimated to be responsible for around 24 per cent of the total carbon emissions nationally[12]. Buildings are responsible for large shares of resources use and waste generation: approximately 40 per cent of materials use, 30 per cent of solid waste generation, and 20 per cent of water use[13]. The materials and technologies used in buildings also have a significant impact on their users' health and well-being.

Impact of Climate Change on Construction Sector

Construction of buildings should be designed for future climate change. Buildings can be vulnerable to climate change. The weather related impacts like flooding, coastal erosion, subsidence, drainage systems has reflected to the requirement of new building techniques and materials to withstand adverse weather conditions which also influence the choice of site.

Higher groundwater levels, higher water levels in streams and watercourses, and greater risk of storm surges along the coastline, make it pertinent to safeguard buildings against seepage and flooding.

The sheer scale of construction activities required to bridge the housing gap will place immense pressure on the environment. Current building practices are highly resource intensive. This huge volume of housing to be constructed, especially in the affordable sector can have a huge role in this direction towards lowering carbon emissions. Existing cleaner technologies could substantially reduce the ecological footprint of the housing sector. It has been seen that typically a house made using appropriate technologies has the potential to reduce at least 25 per cent of energy input itself, which can prove to be a tipping point, considering the scale of construction[14].

Sustainability in Construction

There is an increasing recognition of the need for inclusion of sustainability concerns in the construction and building sector. A new chapter titled ' Approach to Sustainability' is being added to the National Building Code to provide required guidance with respect to all relevant aspects involved during planning, design, construction, operation and maintenance of buildings. The National Mission on Sustainable Habitat under the efficiency in buildings, management of solid waste and shift to public transport. Green building rating mechanisms like GRIHA and LEED are being increasingly used.

Therefore, green and sustainability aspects are often associated with higher initial cost that developers do not want to bear as the eventual benefits that pass on to the clients are not qualified and appreciated enough to justify the investment. Many stakeholders in both governments and market believe it is a concept better suited to commercial buildings and luxury high-end housing. There is also a lack of acceptance of alternate resource efficient materials and technologies from the user end. The beneficiaries often come from the construction sector, and have a high level of awareness in business as usual practices.

Integration of sustainability aspects in affordable housing can no longer be neglected. With growing

[12] *J Parikh, April 2009, CO2 emissions structure of Indian economy*
[13] *July 2010, Report on Affordable Housing in the Context of Sustainable Habitat, Research done by Development Alternatives*

[14] *Ibid [13]*

demand for housing and the increasing pressure the sector exerts on the resource base it is imperative to take immediate action. Continuing on a business as usual path is no longer an option and there is need for transformative change to be brought about.

NOTES

Scope

Indian Coastal Region

India has a long coastline of 7500 km, and faces maximum threats from tropical cyclones and associated storm surges during the North East monsoon (October–December)[15].

Coastal zones are exposed to various natural forces including cyclones and tsunamis, which constantly affect shorelines, beaches and headlands, causing storm surges, erosion/accretion, landslides, and coastal flooding.

Magnitude and risk of disasters are directly proportional to the sensitivity and inversely proportional to degree of resilience of exposed community. Understanding and assessing the risk is fundamental to enhancing the resilience of coastal communities[16]. The scale of vulnerability changes with individuals and households as it encompasses the response to risk, coping and potential to react and withstand a disaster. The habitat plays a vital role in these areas in terms of social well-being as well as a barrier to the effects of natural hazards and disasters.

Figure 1 COASTAL STATES OF INDIA

[15] *January 12th, 2011, Coastal plains of India: An Amazing Geologic Feature, Maps of India Blog*

[16] *2007, Asian Disaster Preparedness Centre (APDC)*

Below are some examples of disaster that affected in the coastal region-

1. October 2013, Cyclone Phailin[17]

Over 200,000 hectares of agricultural land and 200,000 houses have been destroyed, as per the state government. Power transmission was also crippled in the district as 40 transmission towers were eradicated by the cyclone's fury. Balasore and Mayurbhanj districts were severely affected by heavy floods, and rescue operations are going on. In Balasore alone, 300,000 people are stuck because of the flooding.

In Andhra Pradesh the damage was less, but still considerable. Coconut plantations across 3,200 hectares in the Srikakulum district have been damaged and power supply affected. However, power supply is being restored shortly and roads have been cleared for transportation.

Figure 2: 2013 CYCLONE PHAILIN

2. 1999 Super Cyclone[18]

On October 29, 1999, a very high intensity cyclone with a wind speed of 300 mph struck the state of Odisha, taking more than 10,000 lives and causing property damages worth US $ 1.35 billion. About

[17] *October 15, 2013,* ***Eric Leister,*** *Tropical Cyclone Phailin: Hundreds of Thousands Spared*

[18] *October 12, 2013, Revisiting the super cyclone that hit Odisha in 1999, Hindustan Times, http://www.hindustantimes.com/india-news/revisiting-the-super-cyclone-that-hit-odisha-in-1999/article1-1134192.aspx*

16, 50,086 houses damaged, 23,129 houses washed away, 7, 46,337 houses fully destroyed and 8, 80,620 houses partially damaged. Almost 14901 primary school, 3425 high school buildings and 66 colleges were damaged. 12000 km roads, 1447 bridges were damaged. Electricity supply to most villages was disrupted.

Figure 3: 1999 SUPER CYCLONE

2. 2010 Cyclone Laila[19]

Severe cyclonic storm Laila was the first cyclonic storm to affect southeast India since the 1990 Andhra Pradesh cyclone. Laila developed on May 17, 2010 in the Bay of Bengal and made a landfall in Andhra Pradesh on the 20th of May. Cyclone Laila caused major flooding and damage along its path. Ongole in Andhra Pradesh recorded heavy rainfall of about 460 mm in just two days. Another town Addanki received the highest rainfall of 522 mm, followed by Maddipadu with 510 mm and Kothapatnam 258 mm in just 24 hours. As electricity lines and transformers were damaged in the cyclonic storm, hundreds of villages were plunged into darkness besides 11 towns. In addition to the deaths, thousands have been evacuated from their homes and dozens of area fishermen are still reported missing. The state government faced a loss of over Rs 500 crore due to Cyclone Laila.

[19] *May 20, 2010, Cyclone 'Laila' slams into Andhra Pradesh; seven dead, The Hindu, http://www.thehindu.com/news/national/cyclone-laila-slams-into-andhra-pradesh-seven-dead/article434030.ece*

Figure 4: 2010 CYCLONE LAILA

Increase of perilous construction practices has been emerged due to:

- **Improper location**
  Siting of settlements on irregular terrain and loose soil can affect the overall stability of the building.
- **Faulty design**
  Long walls between the column and more number of openings can make a building vulnerable to disaster.
- **Use of poor quality materials**
  Use of substandard materials and materials which are less durable can also affect the strength of the building.
- **Sub- standard construction practices**
  Lack of awareness about the construction practices for vulnerable area can affect the structure.
- **Non-compliance with building codes**
  Design practices being practiced without following the design codes and standards will hamper the design.
- **Lack of awareness-**
  - Safe construction practices
  - Disaster resistant practices

The quality and methodology of construction is very important. Usually the most vulnerable parts of a building are: too high and long walls, openings too close to corners, use of cut lintels and deficient bond at corners, and differential settlement due to soft soil.

Strategic Approach

Design Considerations at Planning Stage

Design being an evolutionary process, proper implementation is very important at all stages of designing. The key factors that govern design in coastal regions include-

1. Climate Requirements

a) Thermal Comfort

The climate of coastal region being hot and humid, thus for maximum cross air ventilation, openings have been provided at diagonal/ opposite walls. For this the overall form is linear in most options. Louvered ventilators have been provided for permanent ventilation.

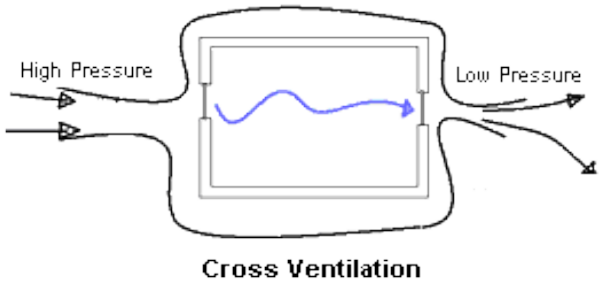


Figure 5: CROSS VENTILATION

b) To Avoid Heat Gain

Hollow/ cavity wall in most options has been induced by the rat-trap masonry bond which will provide insulation from high temperatures. And for protection from direct sunlight and rain, chajjas are also incorporated in the design option. Light weight roof will also impact the overall heat gain.

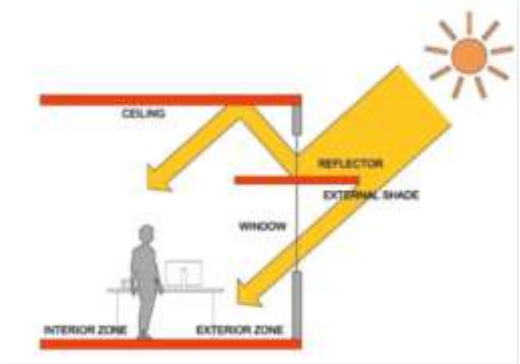


Figure 6: DAYLIGHTING

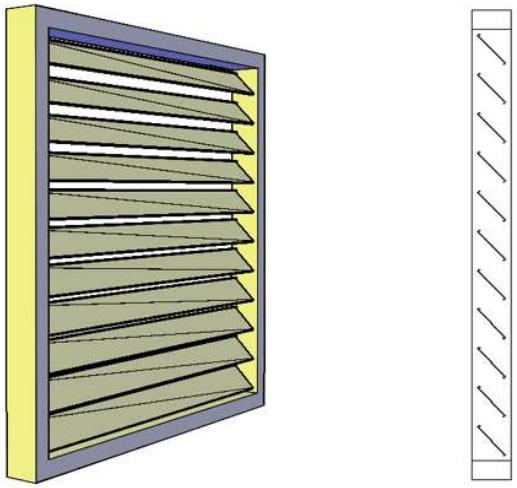


Figure 7: VENTILATION WITH LOUVERS

2. Safety Measures for Cyclone Zone and Flooding

The clustering has been done keeping in mind that minimum is the number of units in a cluster; the minimum is the overall damage and the clustering arrangement are not linear.

The most vulnerable area i.e. the openings are carefully designed such that they are not wide enough or have big panels and also they are not placed near the wall joints so that they do not harm the strength of the wall. Further, the roof of veranda is taken as a separate roof to minimise the disruption.

3. Functional Requirement

The spaces designed are optimised enough by determining the different functional and psychological aspects of the user. Also spaces have flexible usability as per the user's requirement.

4. Minimising of cost

The cost factor has been significantly lowered by minimising the use of additional architectural elements which have only aesthetic purpose, by standardisation of size of doors and windows and by use of locally available materials. Above these provisions, the one factor that counts much is that the time taken for constructing these units are comparatively lesser than traditional method of construction.

Technology Considerations at the Construction Stage

Alternate building materials, like micro-concrete roofing tiles, stabilised earth blocks are available to replace materials with a higher carbon footprint, which are traditionally used. Whereas incorporating pre-fabricated plank and joist roofing, Ferro cement pre-cast arch panels, etc. significantly lowers the construction cost.

Another aspect is the usage of industrial waste like fly ash for construction. The ecological advantages are twofold, it utilises an industrial waste and prevents the usage of potentially fertile agricultural land. Fly ash bricks remove the need for plastering. Unbaked MCR tiles are a great replacement to high energy asbestos sheeting and Mangalore tiles can save up to 46 per cent energy.

a) Foundation Design

In flood prone areas, where a building is constructed on stilts it is necessary that stilts are properly braced in both the principal directions. This will provide stability to the complete building under lateral loads. Depending on the soil type, the foundations to be used are:

- Slab or raft foundation: On soft soils. It spreads the weight over a wider area.
- Strip foundation: On varying soil.
- Stepped foundation: On sloping ground.
- Pad foundation: On firm soil
- Pile foundation: In expansive clay or alluvial soils.

b) Walling Techniques

i) Compressed Earth Blocks Wall

Earth is compressed in a manual press to form high strength blocks. Compaction of soil increases its compressive strength and hence its capacity to carry load. Resistance to water is provided by stabilising with cement or lime which increases resistance to erosion.

Soil block enable rapid construction as well as it can be made locally.

Figure 8: COMPRESSED EARTH BLOCKS

ii) FAL G Bricks

FAL G is named after its ingredients Fly Ash, Lime and Gypsum. These ingredients are dry mixed first and then mixed with water. This mixture is then hydraulically compressed in machine moulds and is left for drying for 1-2 days. It is then cured in water for 14 days, thus avoiding need for firing or steam firing of bricks.

In some places where availability of lime is not there or the prices are high, sludge lime or cement is found as suitable replacement for lime.

Figure 9: FAL G BRICKS

iii) Laterite Blocks

Laterite stone have traditionally used after directly extraction from the naturally occurring laterite sources, after which they are cut into brick-like shapes for use as walling units. Recently, there has been advancement in using laterite in the form of interlocking bricks used to construct walls without the use of cement mortar. Laterite stone is ground and filtered using a sieve, which is then mixed with 5% cement mixture and a chemical setting agent. This mixture is then machine compressed to form high density interlocking bricks. They are manufactured in two

widths of 6 inches and 8 inches; and are also available in varying lengths. Each interlocking brick has grooves and locks on its sides which can be fitted with each other to form a block wall that does not need cement mortar for bonding.
These have high recyclability factor– especially in case of interlocking blocks which don't use connecting mortar is a bonus.

Figure 10: LATERITE BLOCKS

iv) Rat-Trap Masonry

Usage of Rat-trap bond for wall masonry which incorporates a cavity within the 9" wall thickness reduces the brick requirement by 20 per cent per cubic meter of wall. This reduces the overall load of the superstructure on the foundation, resulting in savings due to optimised foundation design as well. Similarly, mortar requirement is reduced by 20 per cent (as compares to conventional English Bond) for a 1:4 cement-sand mortar. The exposed brickwork has led to 15 per cent of overall cost reduction.

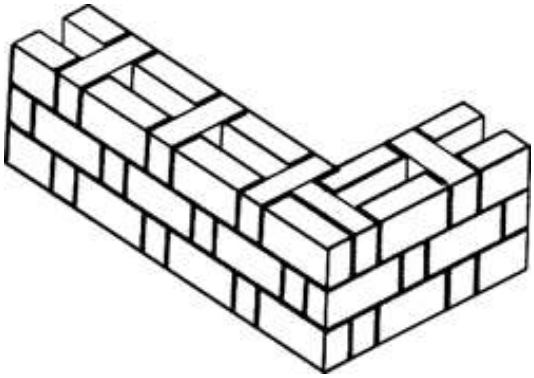


Figure 11: RAT- TRAP MASONRY BOND

c) Roofing Technique

i) Micro Concrete Tile Roofing

It is a roofing tile made of cement mortar vibrated on a table at a controlled frequency and set on mould to shape. The mortar used is a mix of concrete, fine sand, coarse sand and fine aggregate. Care is needed at all stages of production to secure quality of the tile. They provide greater flexibility with uneven under structure in comparison with A.C.C. sheets.
These tiles are water proof, fire proof and insect proof. Hence they are durable than thatch roofs. They also provide a durable, low-cost and thermally most satisfactory option than A.C.C. sheets. It can be manufactured locally with low capital investment using local materials and cement.

Figure 12: MICRO CONCRETE ROOFING TILES

ii) Pre-cast Ferro Cement Roofing Channels

A Ferro cement roof channel is a longitudinal element, semi -cylindrical shaped. It is easy to construct, uses less cement and steel than a conventional RCC roof with a corresponding reduction in self-weight and is also cheaper .During the installation process the roof channel is lifted into place and can immediately be joined together. This technique requires neither scaffolding or shuttering, nor a concrete mixer or a vibrator.
This technique consist of making a mud mould on which the Ferro cement roof channel is cast, left

overnight, de-moulded within the next few days, cured and finally installed and joined at the required site.

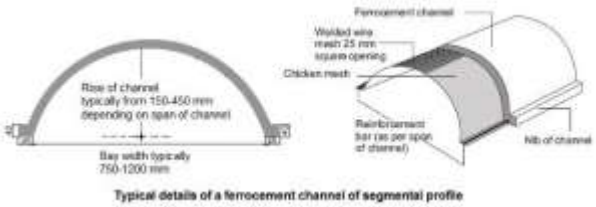


Figure 13: FERRO CEMENT ROOFING CHANNEL

iii) Filler Slab

Filler slab technology is a simple and a very innovative technology for a slab construction. This is one such cost effective roofing system which is based on the concrete portions and instead placing filler material there.

An internal cavity can be provided between the filler material which adds an extra advantage; other than cost savings and energy savings; improved thermal comfort for the interiors. Also an added advantage of lower dead weight transferred to the supporting elements and finally onto the foundation to further adds cost saving in design of these elements.

Figure 14: FILLER SLAB

These filler materials are so placed as not to compromise the structural strength, stability and durability, resulting in replacing unwanted and non-functional tension concrete, from below and thus resulting in economy of high energy material's, consumption and considerable cost saving and decreased dead load of the slab.

Light weight, inert and inexpensive materials such as low grade Mangalore tiles, Burnt Clay Bricks, Hollow Concrete blocks, Stabilized Mud blocks/ Hollow Mud blocks, Clay pots, Coconut shells etc. can be used as filler materials. These materials are laid in the grids of steel reinforcement rods and concreting/concrete topping is done over them.

iv) Pre-cast Reinforced Cement Concrete (R.C.C.) plank and joist

This system consists of two main elements –

1. The plank which represents smaller sections of the slab and therefore of reduced thickness and reinforcement.
2. Joist which is a beam spanning across the room to provide bearing for the planks. The joist is partially precast, with the remaining portion being cast in-situ after the planks are installed.

The planks can be made in standard sizes of 0.3m x 1.5m and the joists can be 0.15m x 0.15m in size for a roof span up to 4 metres.

Plank and joist roof with three layered weather proof course have worked out to be 20 per cent cheaper than conventional RCC roof[1]. Minimum of two days is required for roof construction, including finishing the assembly of prefabricated components with screed concrete, saves at least 10 man-days per house in addition to savings on scaffolding and curing period of 21 days for each house, which amounts to further construction efficiencies[2].

Figure 15: PRE-CAST RCC PLANK AND JOIST

v) Pre- cast arch panel system

The composite beam and panel roof is one such technique where beams and panels are pre-fabricated and assembled in such a way that the assembly works as a single structural roofing system. Typically, the panels are placed on beams which are used along the smaller dimension of the roof and the two are joined together with connectors and in-situ concrete which binds the whole system. There are two types of panels which can be used in this system – Flat or Curved (arch profile). But here we have incorporated arch system. The thickness of panels depends on its material and its profile. Various combinations of materials for beams and panels are possible. While the beam can be made with steel, RCC or timber, the panels can be made with concrete, burnt clay bricks (or brick tiles) or stone.

Figure 16: PRE-CAST ARCH PANEL SYSTEM

d) Flooring Techniques

i) Terrazzo Tile Flooring

Terrazzo flooring is a flooring technique that combines pieces of aggregate (marble, glass or stone chips) with a cement binder. The formulation of the body mix is achieved by the careful calculation of dosages and the choice of bonding agents. This mix is then vibrated at a predetermined frequency, compacted using high pressure and then, and most importantly, all excess water and air is removed. The removal of water and air markedly reduces the porosity and the degree of absorption. This process increases enormously the mechanical-physical performance and allows for the formation of tiles.

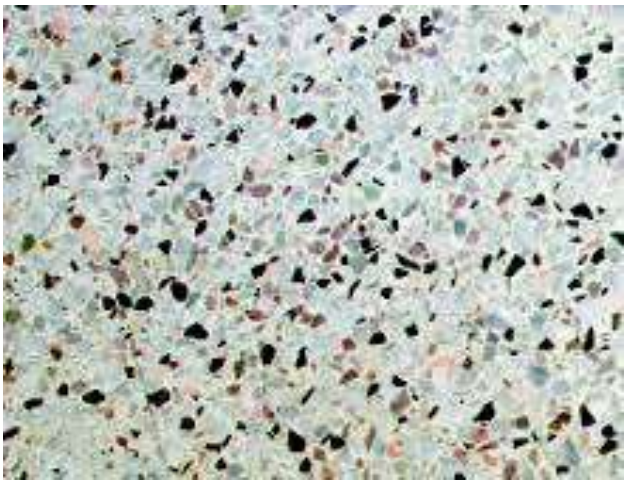


Figure 17: TERRAZZO FLOORING

ii) IPS Flooring

IPS flooring stands for Indian patent stone flooring; it is a basic type of flooring which provides good wearing properties. It is generally used for all types of floors and mix of concrete used for IPS flooring specification is 1:1.5:3 (cement, sand and stone aggregates).

As per the nature of use the flooring thickness of concrete is decided from 25 mm to 50 mm. It is laid over the concrete base (1:4:8), which is almost 3 to 4 inches thick plain cement concrete (PCC) base. For residential floor 75 mm floor thickness is sufficient.

Figure 18: IPS FLOORING

It is recommended to provide adequate slope in Plain cement concrete (PCC) in a base course as it will not be possible to maintain slope in IPS layer due to limited thickness. Door frames should be fixed prior to flooring work.

iii) Ceramic Tile Flooring

Ceramic tile flooring is a versatile architectural resource that can be employed in a variety of environments without having to worry about the constraints of water, stains and design. These are naturally resistant to the ravages of high humidity conditions and are extremely tough and are difficult to crack.

Figure 19: CERAMIC TILE FLOORING

The first and the foremost step in the manufacturing of ceramic tile floors is the formation of body slip by blending raw materials such as clay, feldspar, sand, dolomite, and quartz with 30% of water. After blending, it is grounded in a ball mill to get the body slip. Then it is put into a spray dryer and heated at high temperature. When it gets heated up, it is transformed into powder which contains moisture of about 6%. The powder is then compacted into dies through a press that operates at a pressure of several hundred pounds per square foot. The result of the pressure is a clay body, or bisque. This early stage in the ceramic tile floors manufacturing process will account for their durability later on. The bisque is now heated at high temperature by using natural gas. This removes the moisture from the bisque. The strength and stability of the bisque (body of the ceramic tile floors) depend upon the raw materials and density.

iii) Damp Proof Membrane

The Damp Proof Membrane (DPM) must be installed in conjunction with the Damp Proof Course (DPC) in the outer walls so as to form a continuous layer. The surface should be clean and free from moisture before joining the sheets of the DPM. Overlapping of sheets by at least 4” to 6” (100 to 150 mm) with a help of a double sided butyl tape or mastic strip compound will form a continuous water proof barrier. The exposed overlap joints can then be sealed using 4" (100mm) jointing tape. If any area of the DPM is damaged during installation this should be patched by overlaying a fresh piece of DPM to cover the damaged area and to overlap by at least 6" (150mm) in all directions. Once again use double-sided mastic strip, or butyl tape to create a waterproof barrier, and then seal down the edges with jointing tape.

Figure 20: DAMP PROOF MEMBRANE

Economically Weaker Section (EWS):

The carpet area of a dwelling unit-

21-27 sqm

Floor Area Ratio- 1.75

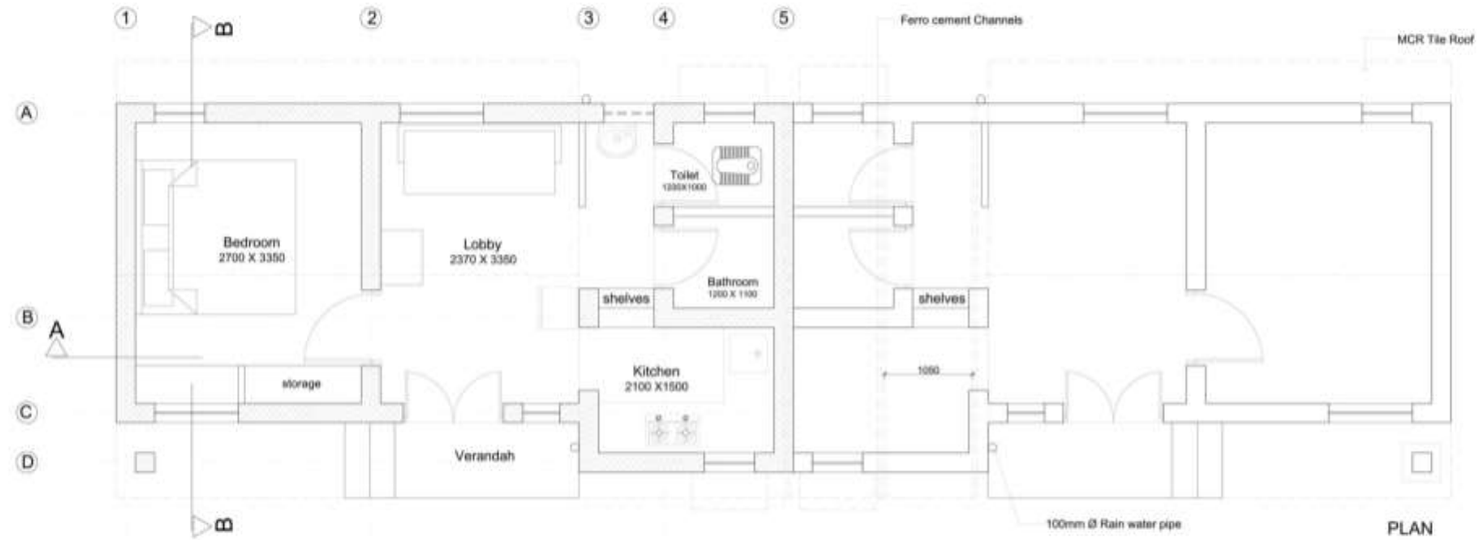
5(a) EWS INDIVIDUAL UNIT OPTION-A

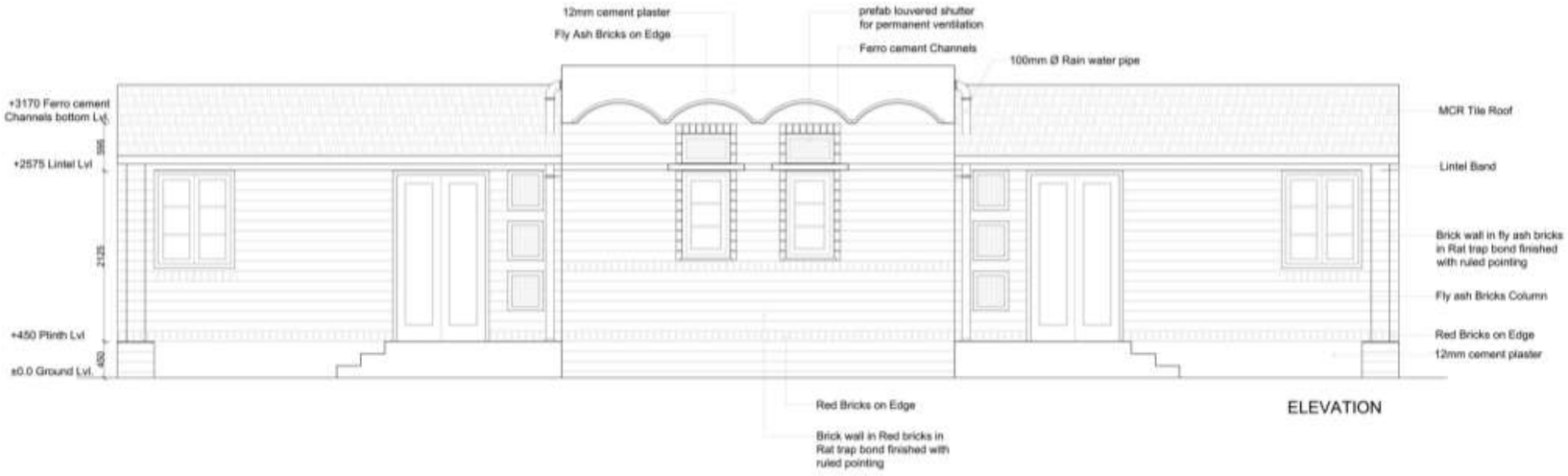
A significant proportion of space has been tailored according to the numbers and characteristic of expected residents. The housing unit is a 1 BHK typology with carpet area of 26.7 sqm. This housing unit is made accessible through a veranda leading to a lobby. The toilet and the bathing area are provided separately as common unit. The kitchen is provided with permanent ventilation through the pre-fabricated louvers. The layout allows easily adaptable internal arrangements.

The roofing system over the kitchen and the washroom unit is designed with Ferro cement channels and for the rest part of the building the roofing is done with Micro Concrete Tiles (MCR). Brick work for the walls are done with a combination of red bricks and fly ash bricks laid in rat-trap bond finished with ruled pointing. The columns too are designed with fly ash bricks.

For disaster resilience, continuous sill and lintel band is incorporated in the design. The chajjas designed will provide barrier from direct sunlight and also from rain.

The dwelling unit is designed so as to provide a flexible, adaptable and accessible environment to the users.





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CARPET AREA - 26.7 sqm

Technology & Material Used:
1. Rat Trap Bond in combination of Fly Ash & Red bricks
2.. Roof of Ferro cement Channels & MCR Tiles

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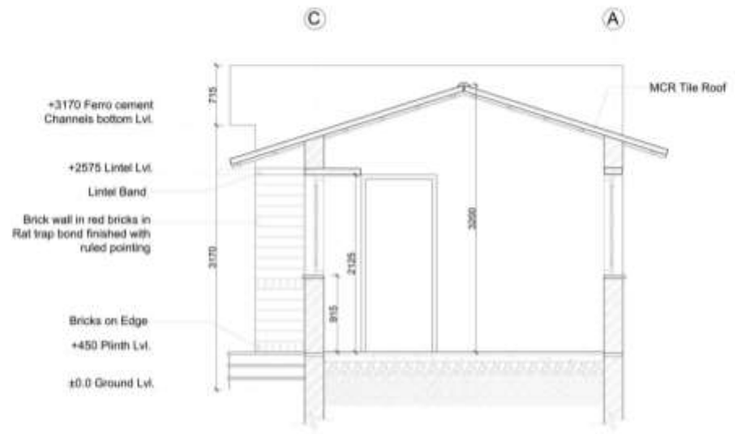
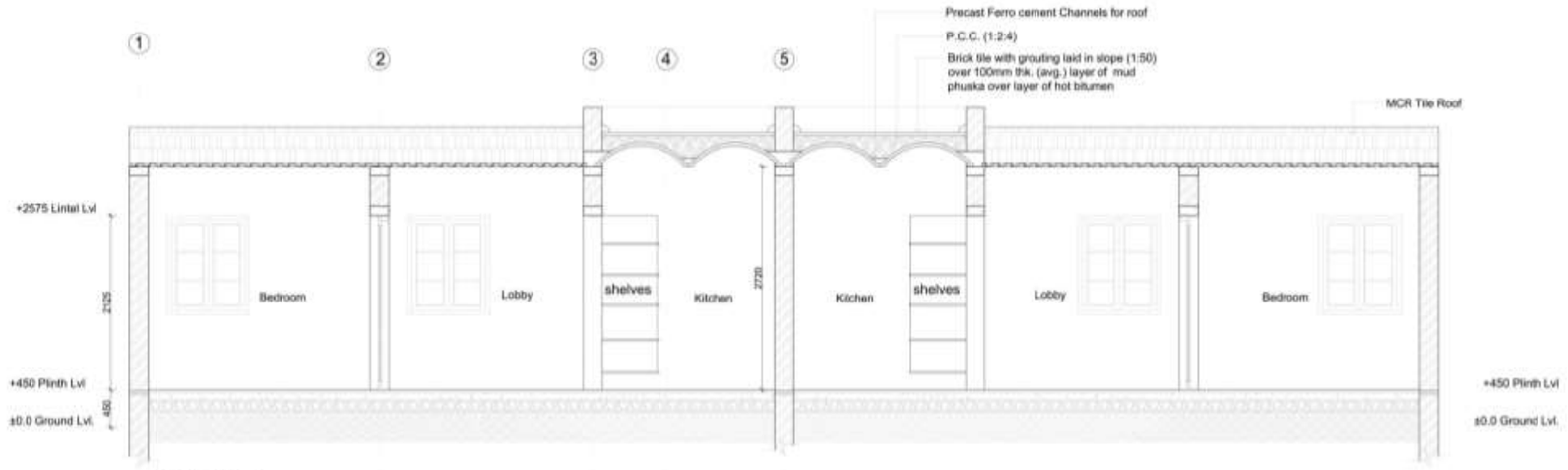
DRAWING TITLE

E.W.S. Individual Unit Option 'A'_I

SCALE -	N.T.S.
DRG NO.-	CO/IU EWS-A1
DATE -	07.04.14



SECTION B-B



SECTION A-A

NOTES

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2.0	THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELEVANT DRAWINGS
3.0	ALL DIMENSIONS ARE IN MM UNLESS MENTIONED OTHERWISE

CARPET AREA - 26.7 sqm

Technology & Material Used:
1. Rat Trap Bond in combination of Fly Ash & Red bricks
2.. Roof of Ferro cement Channels & MCR Tiles

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DRAWING TITLE

E.W.S. Individual Unit Option 'A'_II

SCALE -	N.T.S.
DRG NO.-	CO/IU EWS-A2
DATE -	07.04.14

5(a) EWS INDIVIDUAL UNIT OPTION -A

Figure 21: VIEW OF EWS INDIVIDUAL UNIT OPTION-A

Figure 22: STREET VIEW OF EWS INDIVIDUAL UNIT OPTION-A

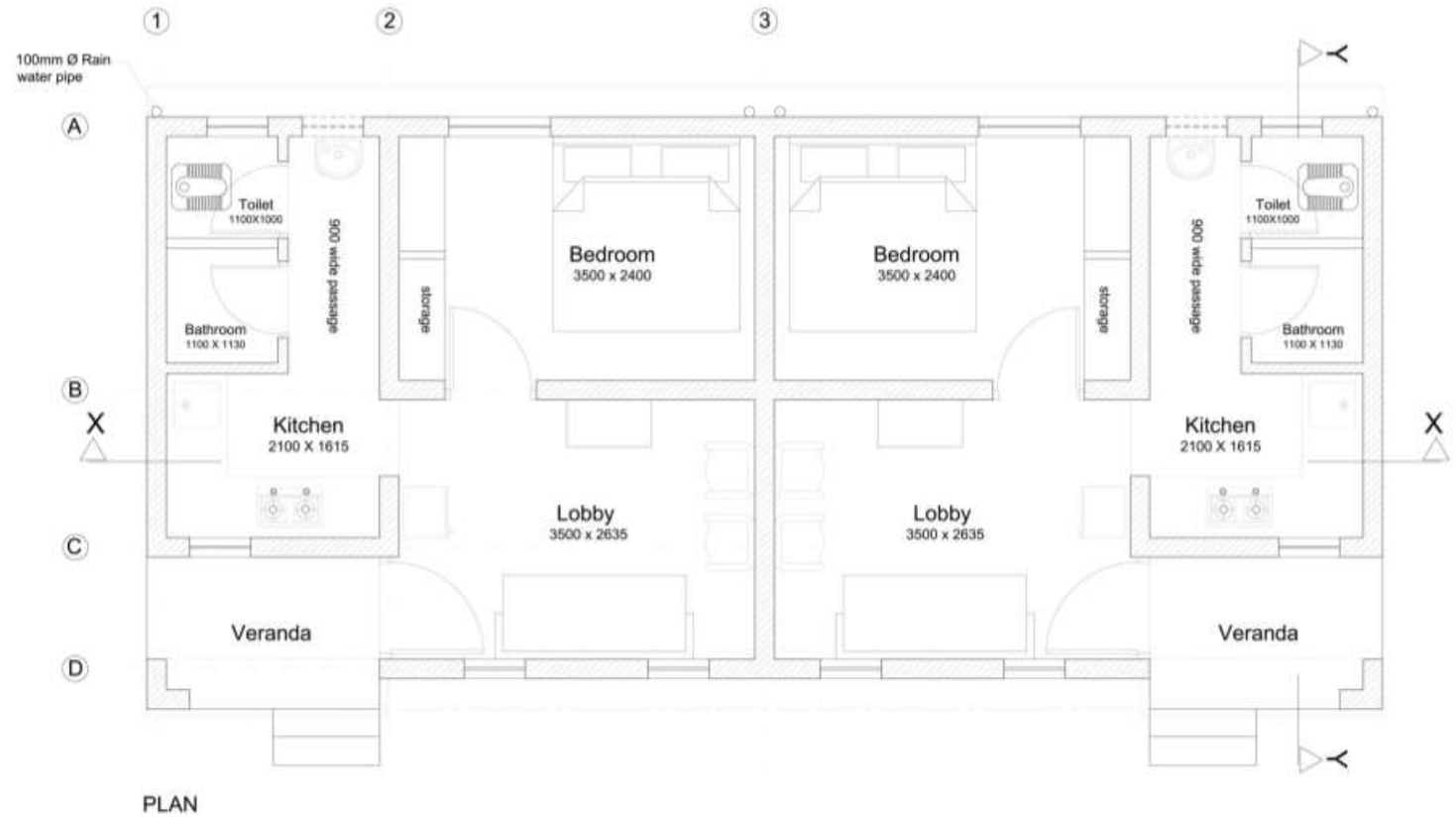
5(b) EWS INDIVIDUAL UNIT OPTION-B

A significant proportion of space has been tailored according to the numbers and characteristic of expected residents. The unit is of 1 BHK typology with carpet area of 25.18 sqm. This housing unit is made accessible through a veranda leading to a lobby. The toilet and the bathing area are provided separately as common unit. The whole unit is provided with pre-fabricated louvers for permanent ventilation. The layout allows easily adaptable internal arrangements.

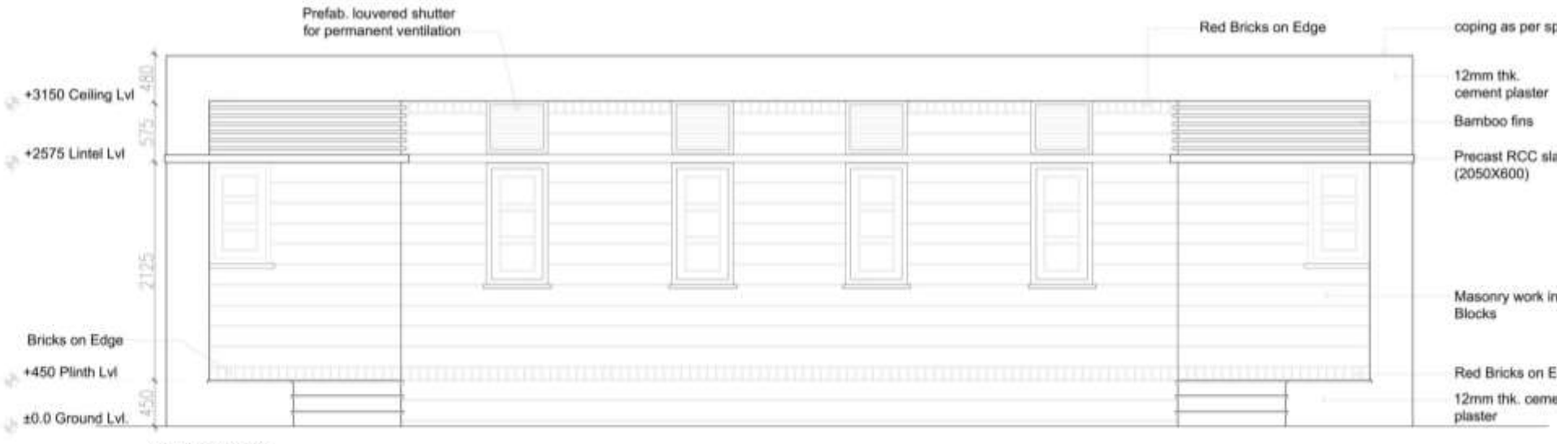
The brick masonry work for the super structure is done with laterite stone blocks in rat- trap bond. Roofing system is composed of filler slab technique which decreases the overall load on the foundation. Bamboo fins are provided at the top in the veranda area to control the daylight.

For disaster resilience, continuous sill and lintel band is incorporated in the design. The chajjas designed will provide barrier from direct sunlight and also from rain.

The dwelling unit is designed so as to provide a flexible, adaptable and accessible environment to the users.



PLAN



ELEVATION

NOTES

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2.0	THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELEVANT DRAWINGS
3.0	ALL DIMENSIONS ARE IN MM UNLESS MENTIONED OTHERWISE

CARPET AREA - 25.18 sqm

Technology & Material Used:
1. Masonry work in Laterite Blocks with Red Bricks Bands
2.. Roof of Filler Slab

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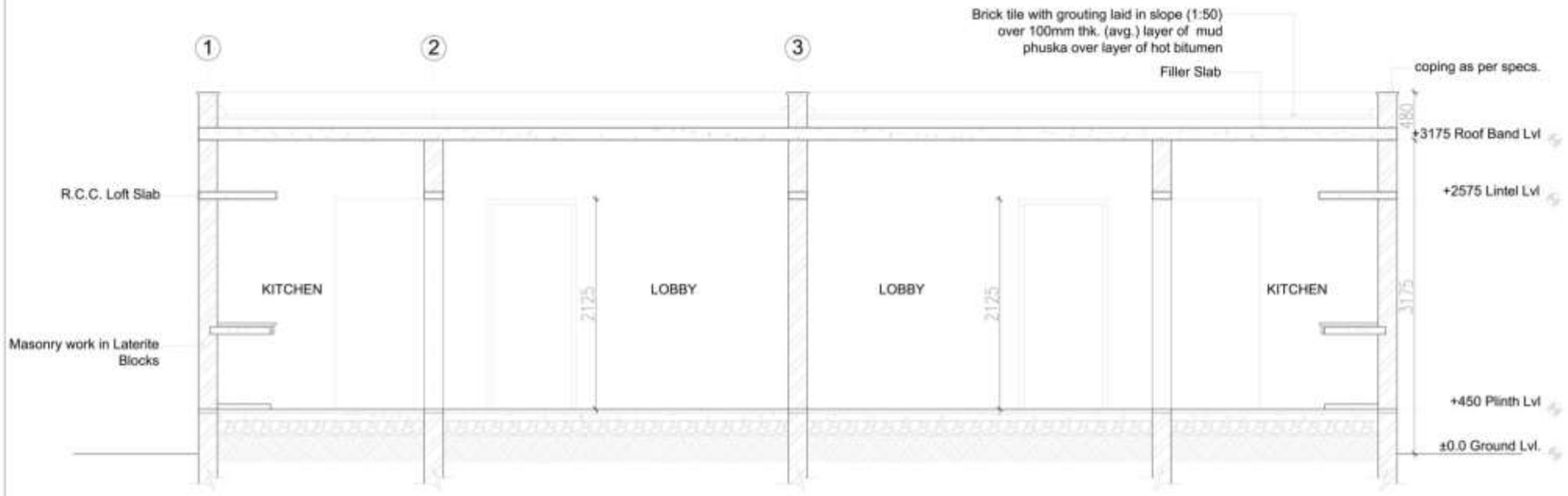
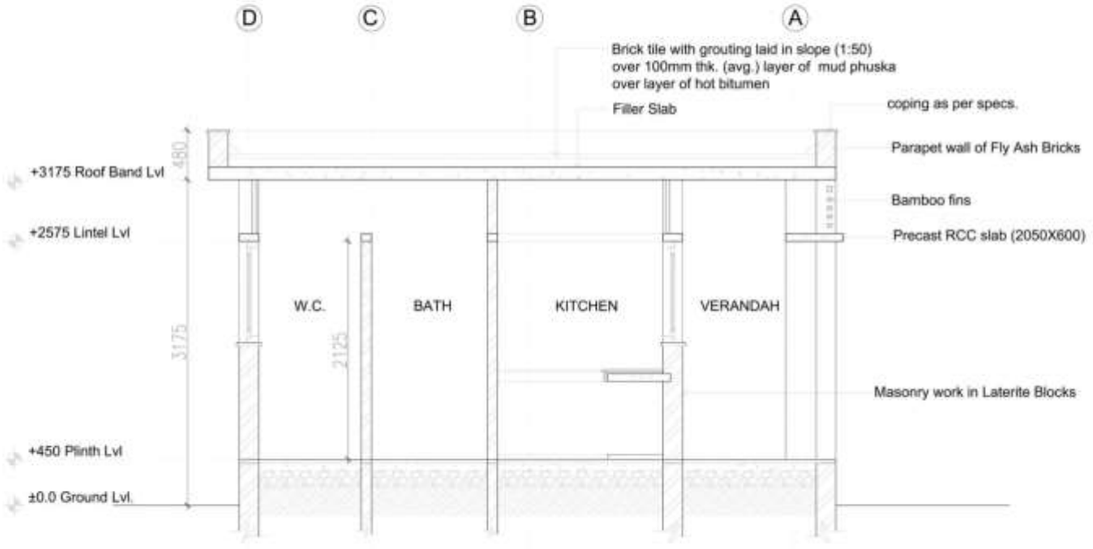
DRAWING TITLE

E.W.S. Individual Unit Option 'B'-I

SCALE -	N.T.S.
DRG NO.-	CO/U EWS_01
DATE -	07.04.14



SECTION X-X



SECTION Y-Y

NOTES

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3.0	ALL DIMENSIONS ARE IN MM UNLESS MENTIONED OTHERWISE

CARPET AREA - 25.18 sqm

Technology & Material Used:
1. Masonry work in Laterite Blocks with Red Bricks Bands
2.. Roof of Filler Slab

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DRAWING TITLE

E.W.S. Individual Unit Option 'B'-II

SCALE -	N.T.S.
DRG NO.-	CO/U EWS_B2
DATE -	07.04.14

Figure 23: VIEW OF EWS INDIVIDUAL UNIT OPTION-B

Figure 24: STREET VIEW OF EWS INDIVIDUAL UNIT OPTION-B

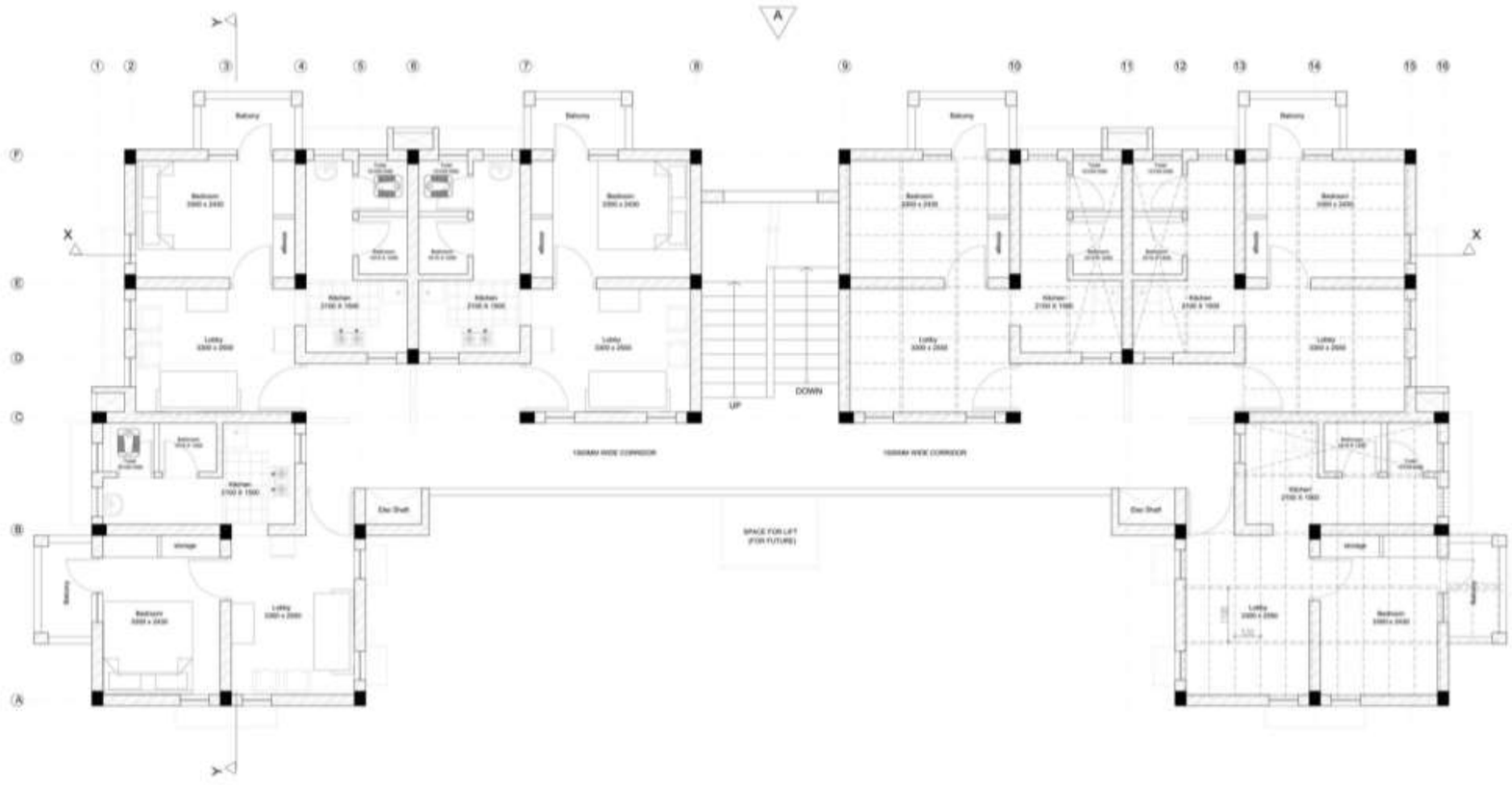
5(c) EWS CLUSTER UNIT OPTION-A

Cluster arrangement is done with six numbers of 1 BHK units at one level with three on each side. The carpet area for one unit is 24.8 sqm. A centrally accessible stairway is provided, which is approached through a 1500mm wide corridor and there is also an option for lift for future restorations. The approach to the habitable area is through a lobby which leads to bedroom and the kitchen. Each unit has been provided with balcony for proper day lighting and ventilation. Also common service ducts are designed for pipework. These ducts are enclosed with precast concrete jail.

The brick masonry work for the super structure is done with fly ash bricks laid in rat-trap bond. Flooring system has been designed with pre cast arch panel roofs supported by per cast beams. The terrace surface is finished with brick tile grouting over the layer of mud phuska and hot bitumen layer of the top floor slab.

For disaster resilience, continuous sill and lintel band is incorporated in the design. The chajjas designed will provide barrier from direct sunlight and also from rain.

The dwelling unit is designed so as to provide a flexible, adaptable and accessible environment to the users.



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CARPET AREA - 24.8 sqm

Technology & Material Used:
1. Composite Structure with Fly ash Bricks (230x115x75)in Rat Trap Bond with Red Bricks Bands
2. Roof of precast Arch panels

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DRAWING TITLE
Layout Plan
EWS Cluster Unit Option 'A'

SCALE -	N.T.S.
DRG NO. -	CO/CU EWS-A_1
DATE -	11.04.14

ELEVATION 'A'

NOTES

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CARPET AREA - 24.8 sqm

Technology & Material Used:
1. Composite Structure with Fly ash Bricks (230x115x75)in Rat Trap Bond with Red Bricks Bands
2. Roof of precast Arch panels

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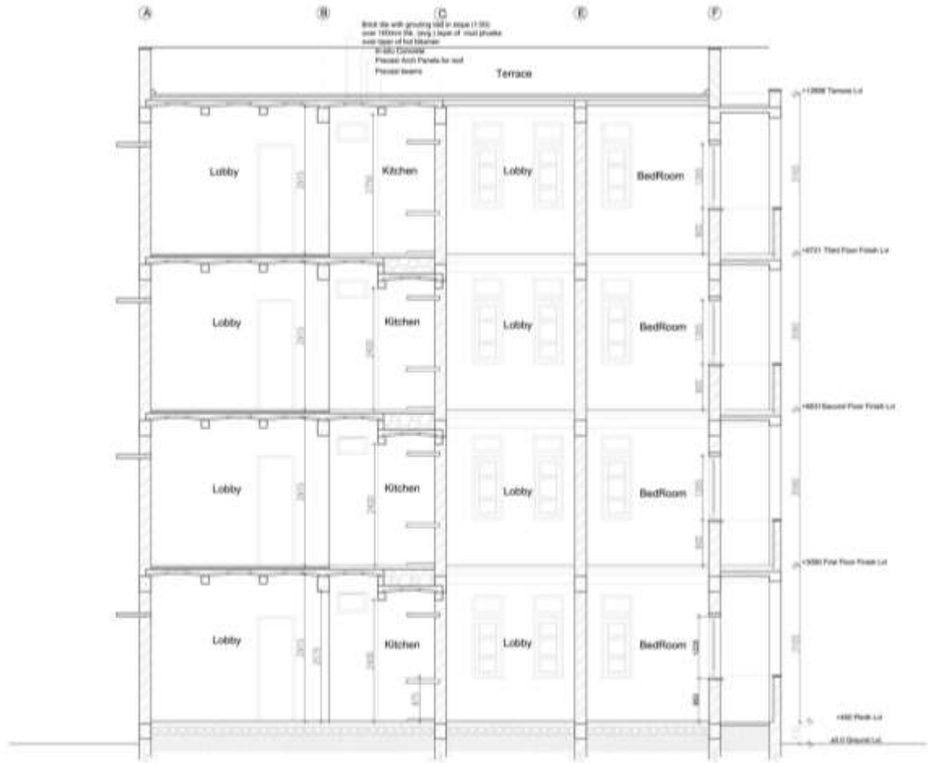
DRAWING TITLE

Elevation A
EWS Cluster Unit Option 'A'

SCALE -	N.T.S.
DRG NO. -	CCICU EWS-A_3
DATE -	11.04.14



NOTES

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3.0	ALL DIMENSIONS ARE IN MM UNLESS MENTIONED OTHERWISE

CARPET AREA - 24.8 sqm

Technology & Material Used:
1. Composite Structure with Fly ash Bricks (230x115x75)in Rat Trap Bond with Red Bricks Bands
2. Roof of precast Arch panels

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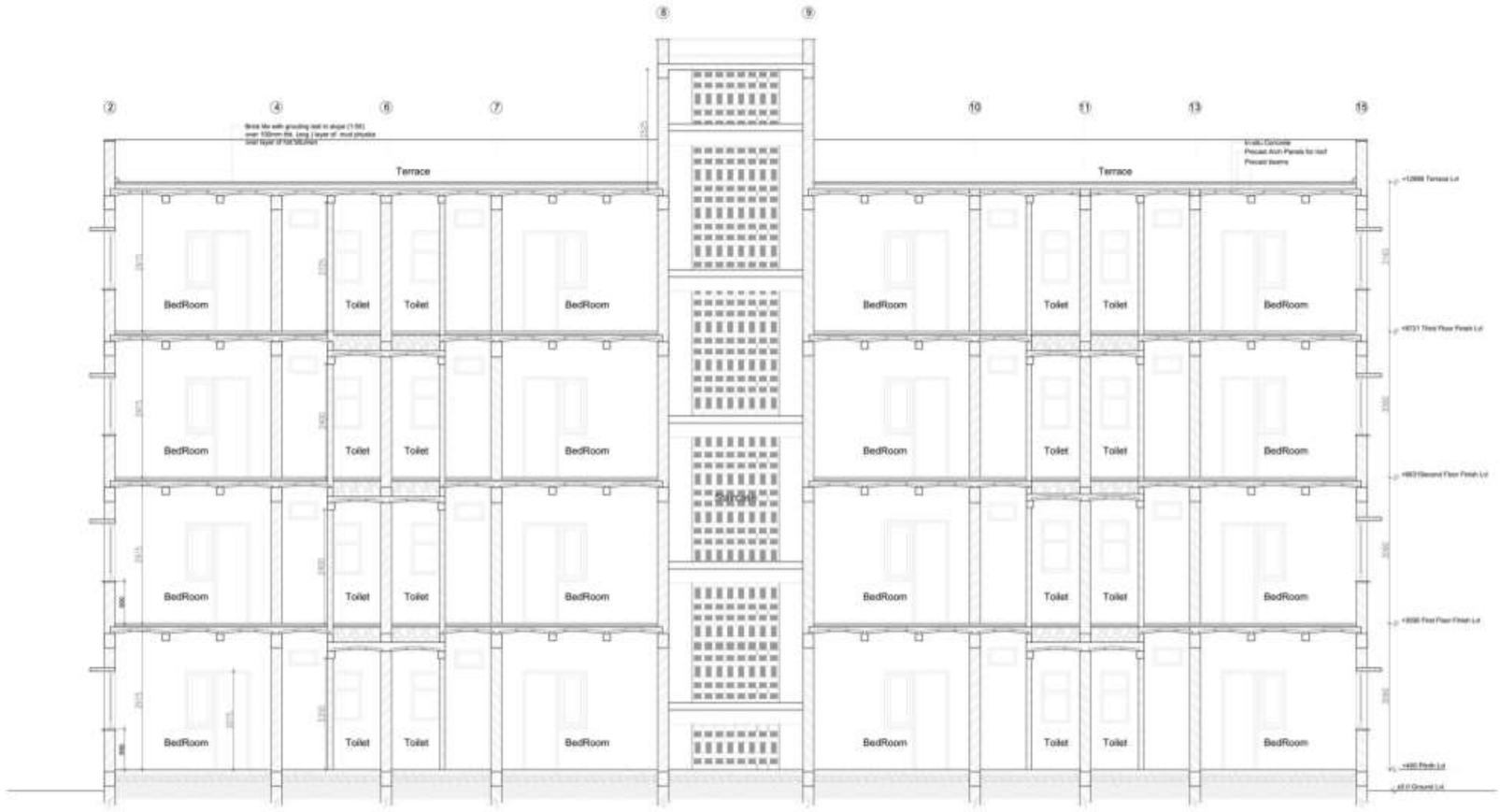
DRAWING TITLE

Section Y-Y
EWS Cluster Unit Option 'A'

SCALE -	N.T.S.
DRG NO. -	CDCU EWS-A_2
DATE -	11.04.14



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CARPET AREA - 24.8 sqm

Technology & Material Used:
1. Composite Structure with Fly ash Bricks (230x115x75)in Rat Trap Bond with Red Bricks Bands
2. Roof of precast Arch panels

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DRAWING TITLE

Section X-X
EWS Cluster Unit Option 'A'

SCALE -	N.T.S.
DRG NO. -	CO/DU EWS-A_4
DATE -	11.04.14

Figure 25: FRONT VIEW OF EWS CLUSTER UNIT OPTION- A

Figure 26: PERSPECTIVE VIEW OF EWS CLUSTER UNIT OPTION- A

5(d) EWS CLUSTER UNIT OPTION-B

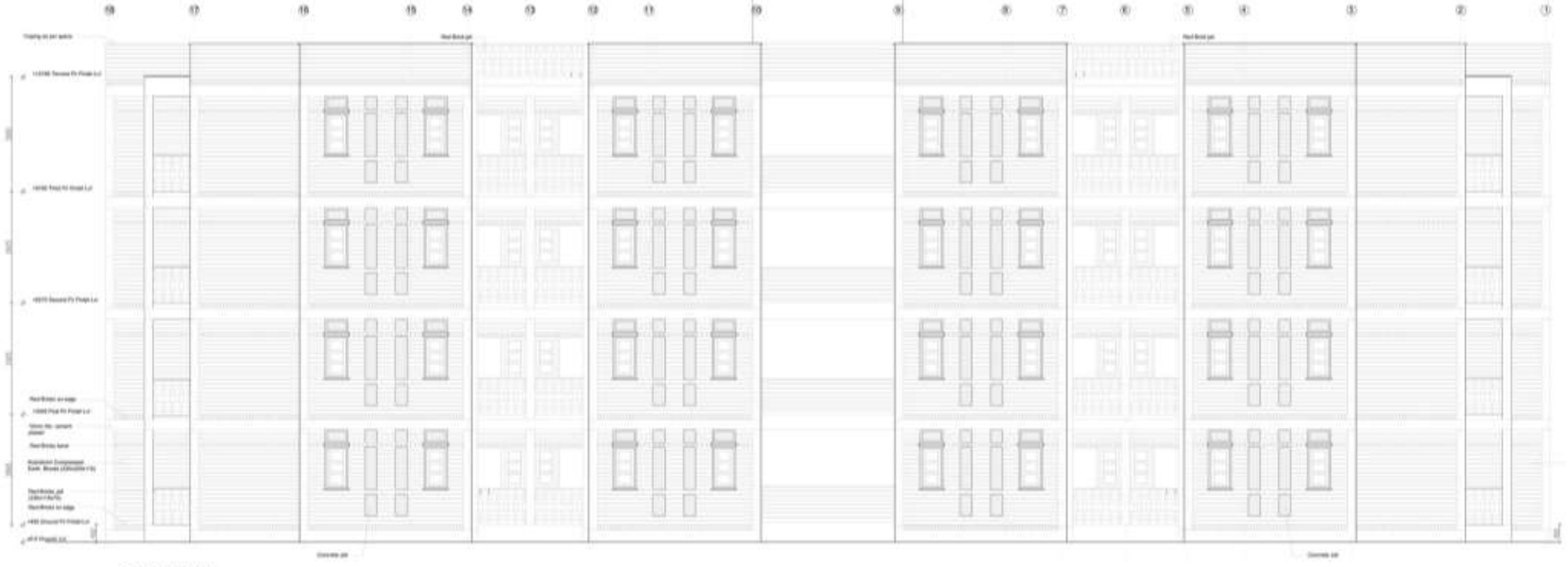
Cluster arrangement is done with six numbers of 1 BHK units at one level with three on each side. The carpet area of one unit is 22.3 sqm. A centrally accessible stairway is provided, which is approached through a 1500mm wide corridor and there is also an option for lift for future restorations. Approach to the habitable area is through a lobby which then leads to kitchen/utility area and to the bedroom. Each unit has been provided with balcony for proper day lighting and ventilation. Also common service ducts are designed for pipework.

The brick masonry work for the super structure is done with hydra form compressed earth blocks laid in rat-trap bond. Flooring system has been designed with pre cast R.C.C planks and joists. The terrace surface is finished with brick tile grouting over the layer of mud phuska and hot bitumen layer of the top floor slab. An alternate option has also been designed with sloping roof.

For disaster resilience, continuous sill and lintel band is incorporated in the design. The chajjas designed will provide barrier from direct sunlight and also from rain.

The dwelling unit is designed so as to provide a flexible, adaptable and accessible environment to the user.

PLAN



ELEVATION 'A'

NOTES

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CARPET AREA - 22.3 sqm

Technology & Material Used:
1. Composite Structure with Hydraform Compressed Earth Blocks (220x220x115) with Red Bricks Bands
2. Roof of precast planks - Joists

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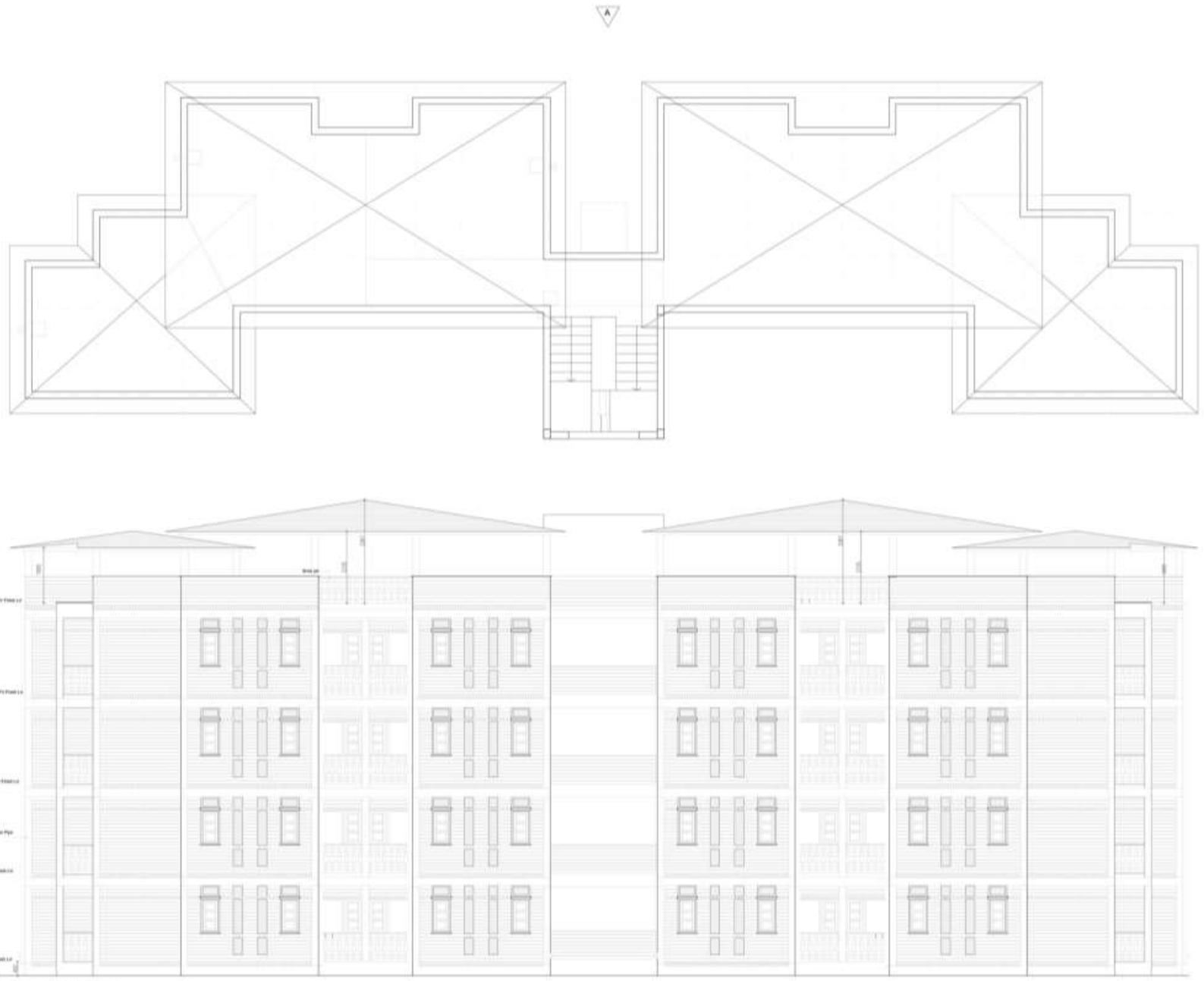
DRAWING TITLE
Layout Plan & Elevation
EWS Cluster Unit Option 'B'

SCALE :	N.T.S.
DRG NO. :	COCU EWS-B_1
DATE :	11.04.14



ELEVATION 'A'

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CARPET AREA - 22.3 sqm
Technology & Material Used:
1. Composite Structure with Hydraform Compressed Earth Blocks (220x220x115) with Red Bricks Bands
2. Roof of precast planks - Joists

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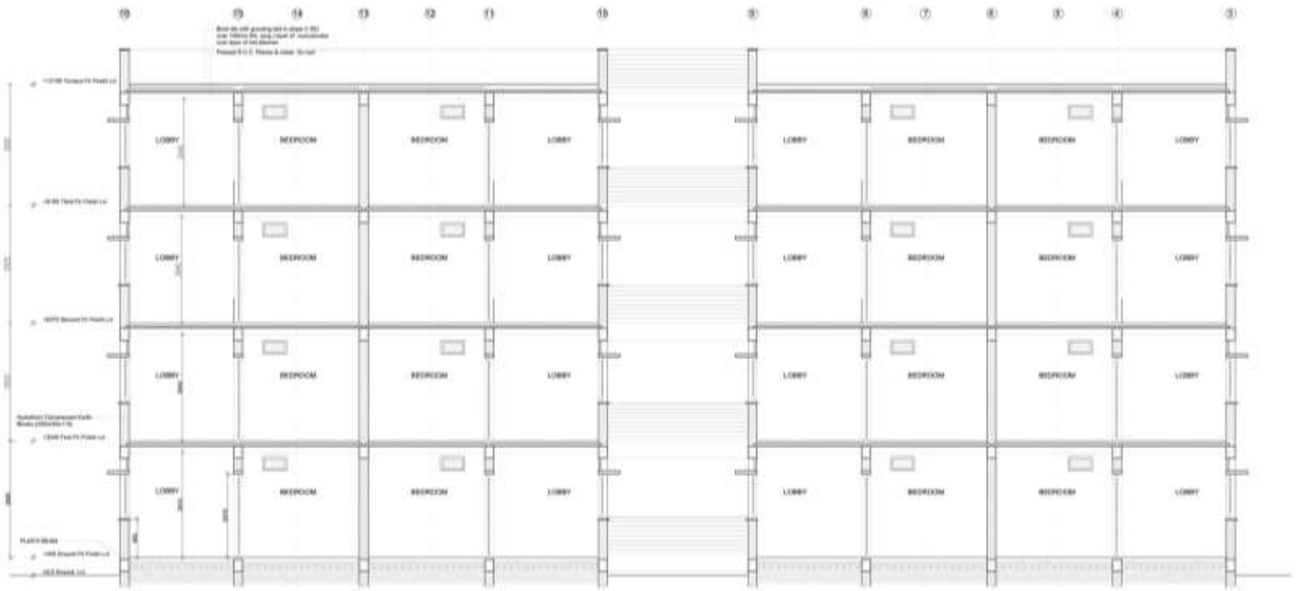
DRAWING TITLE
Sloping roof option
EWS Cluster Unit Option 'B'

SCALE -	N.T.S.
DRG NO. -	EWS-B_1
DATE -	11.04.14



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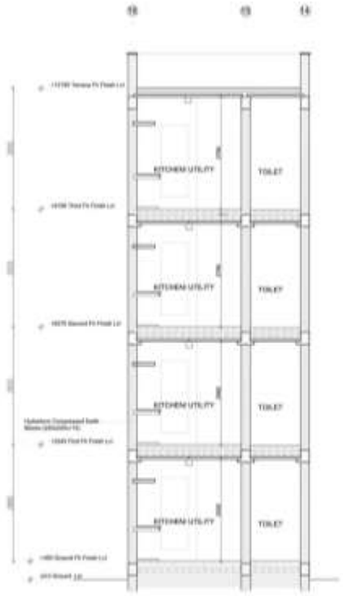

SECTION Y-Y'

NOTES

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2.0 THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELEVANT DRAWINGS

3.0 ALL DIMENSIONS ARE IN MM UNLESS MENTIONED OTHERWISE

CARPET AREA - 22.3 sqm
Technology & Material Used:
1. Composite Structure with Hydraform Compressed Earth Blocks (220x220x115) with Red Bricks Bands
2. Roof of precast planks - Joists

PROJECT

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DRAWING TITLE

Sections
EWS Cluster Unit Option 'B'

SCALE :	N.T.S.
DRG NO. :	COA/U EWS-B_2
DATE :	11.04.14

Figure 27: FRONT VIEW OF EWS CLUSTER UNIT OPTION- B

Figure 28: PERSPECTIVE VIEW OF EWS CLUSTER UNIT OPTION- B

Lower Income Group-A (LIG-A):

The carpet area of a dwelling unit-

28-40 sqm

Floor Area Ratio- 1.75

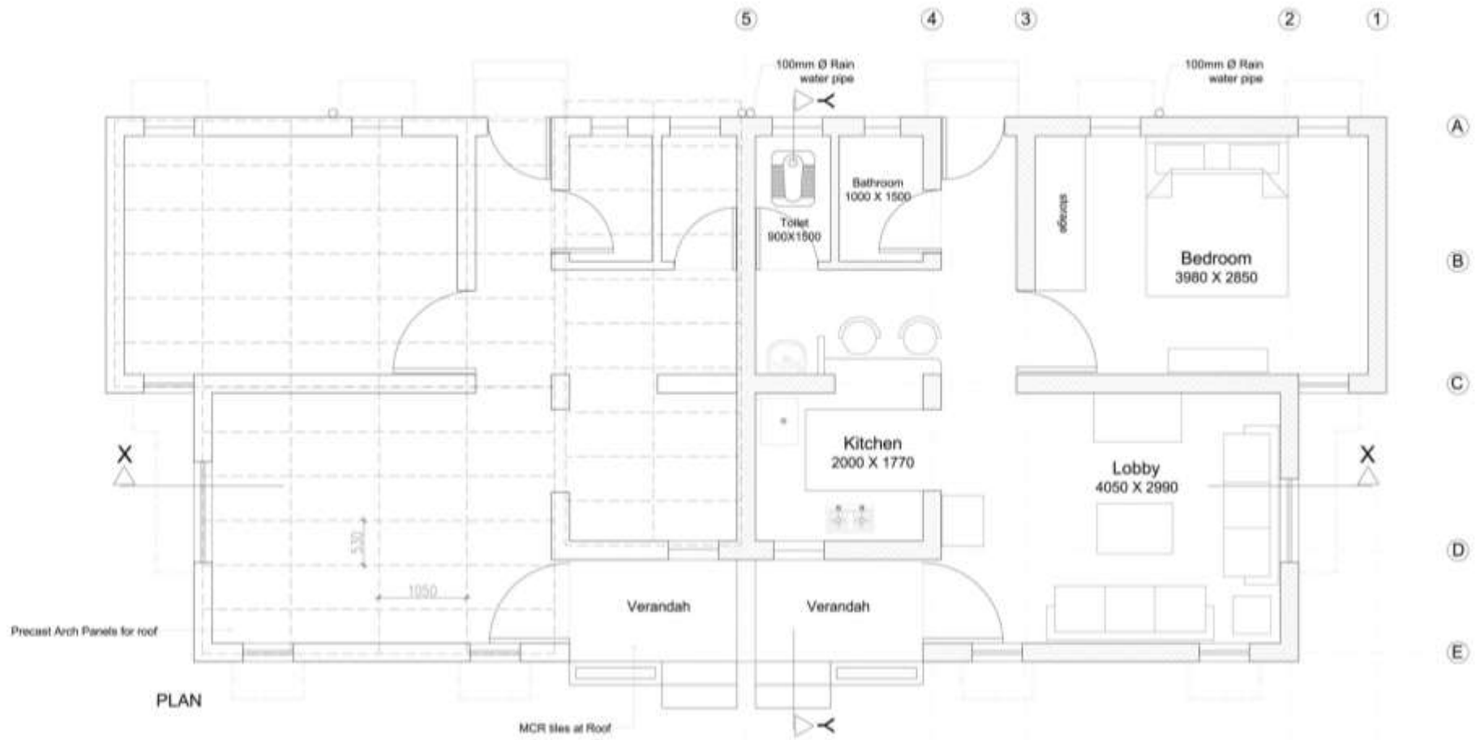
5(e) LIG-A INDIVIDUAL UNIT OPTION-A

A significant proportion of space has been tailored according to the numbers and characteristic of expected residents. The unit is of 1BHK typology with carpet area of 35.36 sqm. This housing unit is made accessible through a veranda leading to a lobby. The toilet and the bathing area are provided separately as common unit. The kitchen is provided with a small space for dining. For permanent ventilation of the habitable area precast louvers has been incorporated to the design. The layout allows easily adaptable internal arrangements.

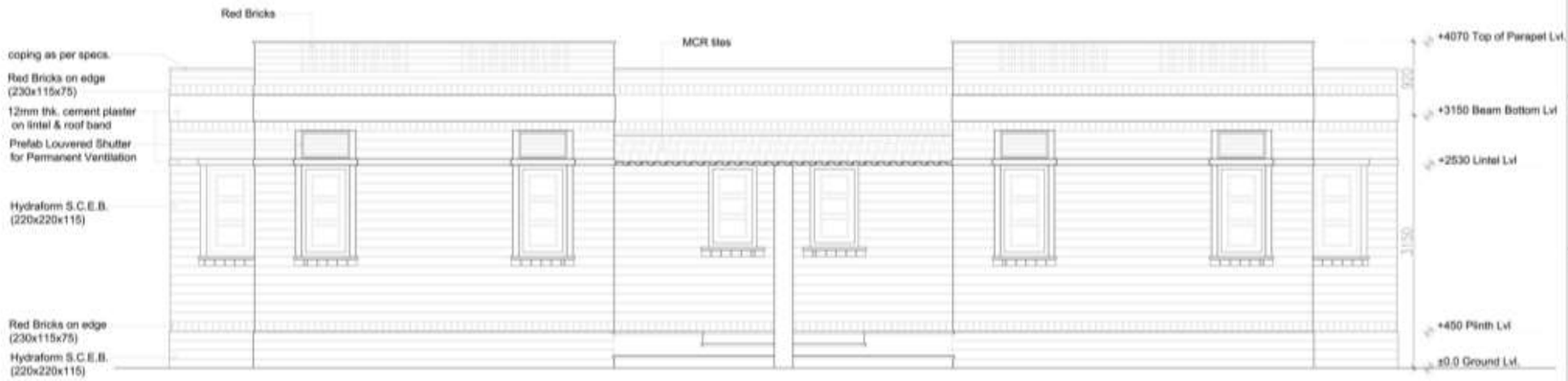
The super structure has been designed with hydra form compressed earth blocks laid in rat- trap masonry bond. The roofing above the veranda has been done with Micro Concrete Tiles (MCR). Roofing of the main unit is done with pre cast arch panel roof supported by pre cast beams. Terrace floor is finished with brick tile over a layer of mud phuska and hot bitumen above the roof slab.

For disaster resilience, continuous sill and lintel band is incorporated in the design. The chajjas designed will provide barrier from direct sunlight and also from rain.

The dwelling unit is designed so as to provide a flexible, adaptable and accessible environment to the users.



PLAN



ELEVATION

NOTES

1.0	THE DIMENSIONS ARE TO BE READ AND NOT SCALED OFF THE DRAWING.
2.0	THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELEVANT DRAWINGS
3.0	ALL DIMENSIONS ARE IN MM UNLESS MENTIONED OTHERWISE

CARPET AREA - 35.36 sqm

Technology & Material Used:
1. Hydraform Stabilized Compressed Earth Blocks (220x220x115) with Red Bricks Bands
2.. Roof of Precast Arch Panels & MCR Tiles

PROJECT

PREPARATION OF STANDARDS & SPECIFICATION FOR DESIGN & PLANNING OF AFFORDABLE INNOVATIVE GREEN SOCIAL HOUSING

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RESEARCH

Development Alternatives
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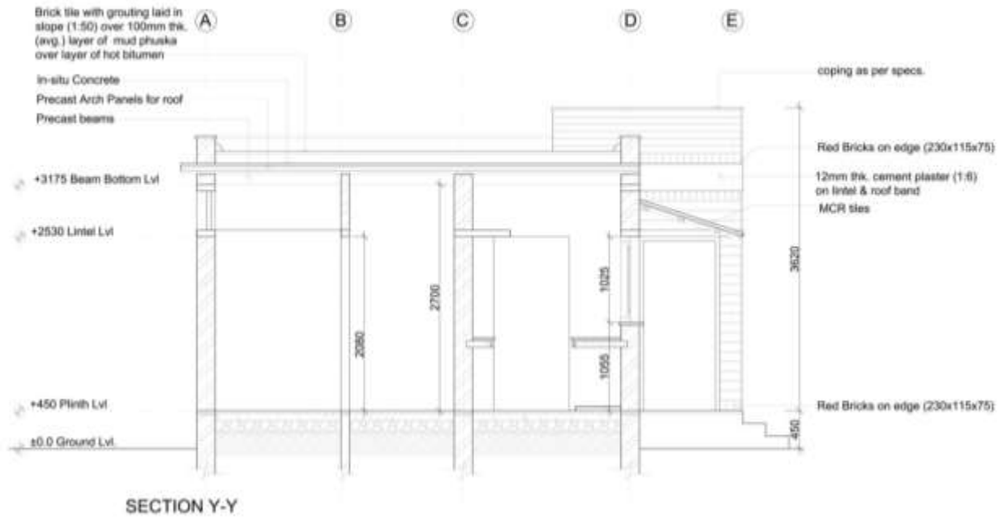
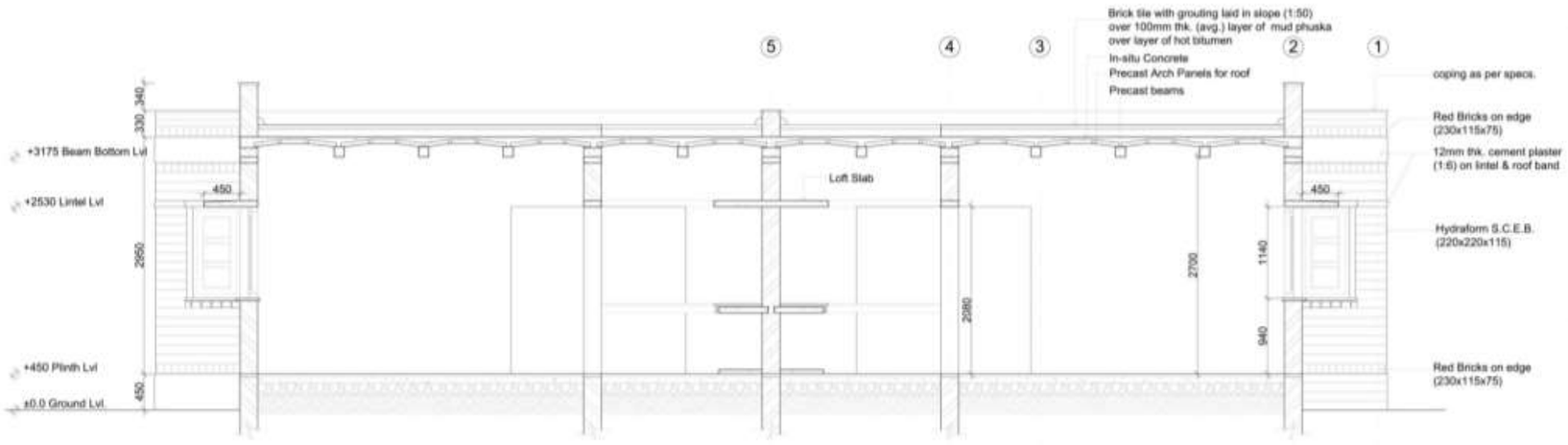
DRAWING TITLE

LIG 'A' Individual Unit Option 'A'-I

SCALE -	N.T.S.
DRG NO.-	CD/U LIG-A_A1
DATE -	07.04.14



SECTION Y-Y



SECTION X-X

NOTES

1.0	THE DIMENSIONS ARE TO BE READ AND NOT SCALED OFF THE DRAWING.
2.0	THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELEVANT DRAWINGS
3.0	ALL DIMENSIONS ARE IN MM UNLESS MENTIONED OTHERWISE

CARPET AREA - 35.36 sqm

Technology & Material Used:
1. Hydraform Stabilized Compressed Earth Blocks (220x220x115) with Red Bricks Bands
2.. Roof of Precast Arch Panels & MCR Tiles

PROJECT

PREPARATION OF STANDARDS & SPECIFICATION FOR DESIGN & PLANNING OF AFFORDABLE INNOVATIVE GREEN SOCIAL HOUSING

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DRAWING TITLE

LIG 'A' Individual Unit Option 'A'-II

SCALE -	N.T.S.
DRG NO.-	COI/U LIG-A_A2
DATE -	07.04.14

5(e) LIG-A INDIVIDUAL UNIT OPTION-A

Figure 29: VIEW OF LIG-A INDIVIDUAL UNIT OPTION-A

Figure 30: STREET VIEW OF LIG-A INDIVIDUAL UNIT OPTION-A

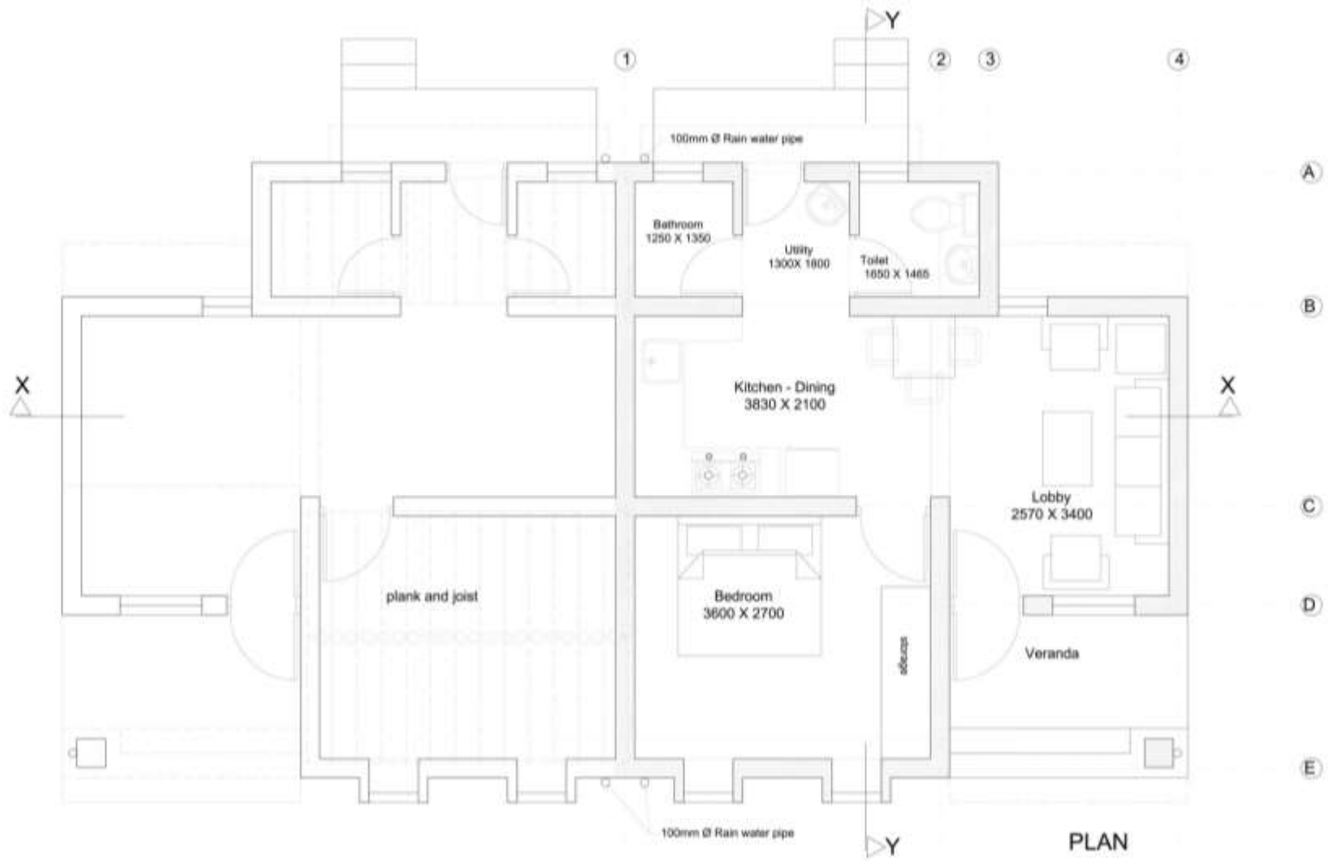
5(f) LIG-A INDIVIDUAL UNIT OPTION-B

A significant proportion of space has been tailored according to the numbers and characteristic of expected residents. The unit is of 1HBK typology with carpet area of 34.5 sqm. This housing unit is made accessible through a veranda leading to a lobby. The toilet and the bathing area are approached through a common utility area. The kitchen is provided with a small space for dining. For permanent ventilation precast louvers has been incorporated to the design. The layout allows easily adaptable internal arrangements.

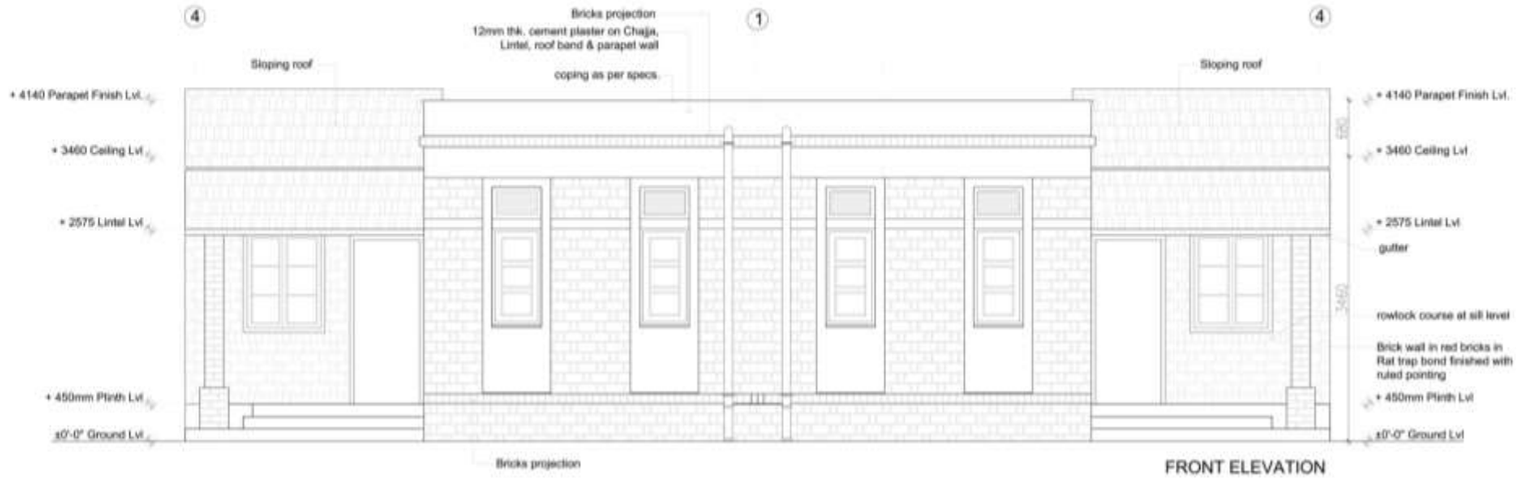
The super structure has been designed with red bricks laid in rat- trap bond. Roofing has been done with pre cast Reinforced Cement Concrete (R.C.C.) planks and joist. Separate sloping roof has been designed for veranda portion with filler slab. Terrace floor is finished with brick tile over a layer of mud phuska and hot bitumen above the roof slab.

For disaster resilience, continuous sill and lintel band is incorporated in the design. The chajjas designed will provide barrier from direct sunlight and also from rain.

The dwelling unit is designed so as to provide a flexible, adaptable and accessible environment to the users.



PLAN



FRONT ELEVATION

NOTES

1.0	THE DIMENSIONS ARE TO BE READ AND NOT SCALED OFF THE DRAWING.
2.0	THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELEVANT DRAWINGS
3.0	ALL DIMENSIONS ARE IN MM UNLESS MENTIONED OTHERWISE

CARPET AREA - 34.5 sqm

Technology & Material Used:
1. Rat Trap Bond in (230x115x75) Red Bricks
2.. Roof of precast planks - Joists(flat roof) & Filler Slab(for sloping roof)

PROJECT

PREPARATION OF STANDARDS & SPECIFICATION FOR DESIGN & PLANNING OF AFFORDABLE INNOVATIVE GREEN SOCIAL HOUSING

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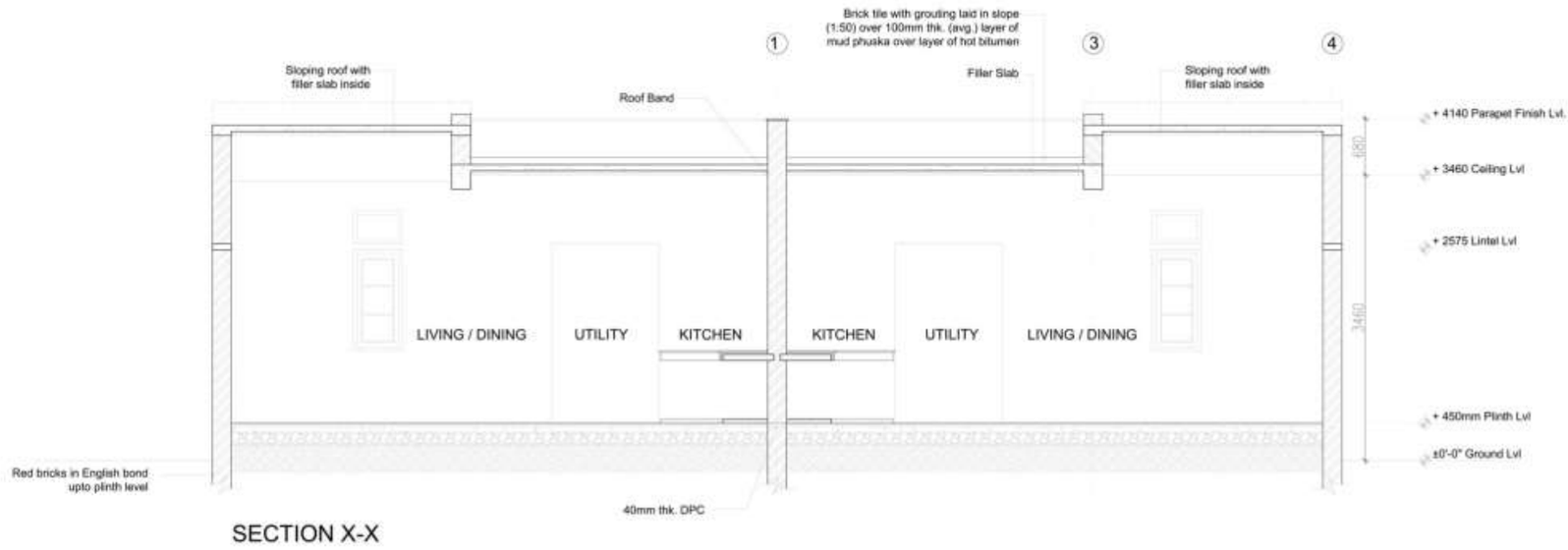
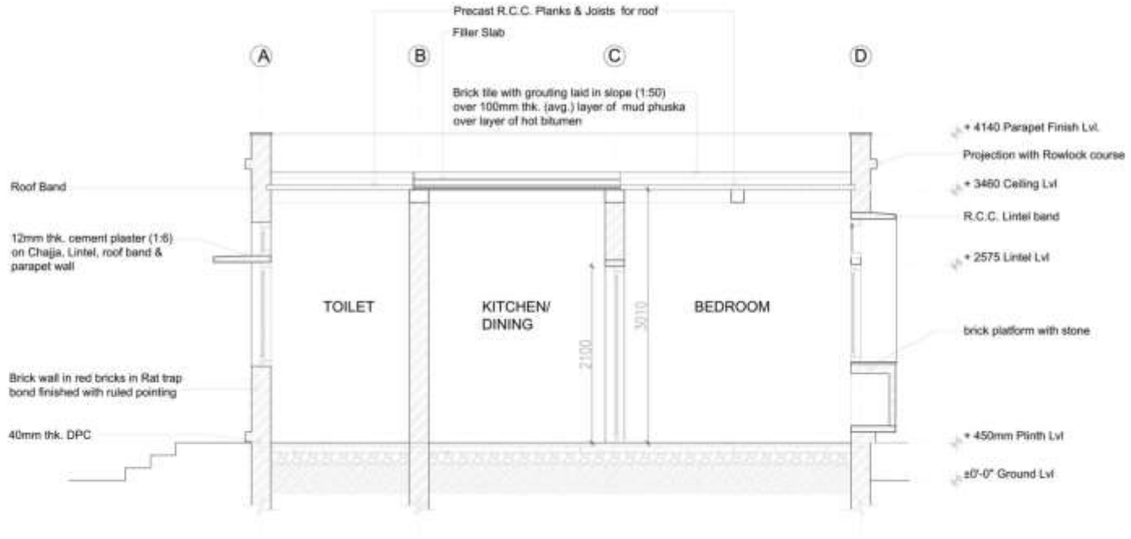
DRAWING TITLE

LIG 'A' Individual Unit Option 'B'-I

SCALE -	N.T.S.
DRG NO.-	CO/EI/ LIG-A_B1
DATE -	07.04.14



SECTION X-X



SECTION Y-Y

NOTES

1.0	THE DIMENSIONS ARE TO BE READ AND NOT SCALED OFF THE DRAWING.
2.0	THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELEVANT DRAWINGS
3.0	ALL DIMENSIONS ARE IN MM UNLESS MENTIONED OTHERWISE

CARPET AREA - 34.5 sqm

Technology & Material Used:
1. Rat Trap Bond in (230x115x75) Red Bricks
2.. Roof of precast planks - Joists(flat roof) & Filler Slab(for sloping roof)

PROJECT

PREPARATION OF STANDARDS & SPECIFICATION FOR DESIGN & PLANNING OF AFFORDABLE INNOVATIVE GREEN SOCIAL HOUSING

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DRAWING TITLE

LIG 'A' Individual Unit Option 'B'-II

SCALE -	N.T.S.
DRG NO.-	CO/IU LIG-A_B2
DATE -	07.04.14

5(f) LIG-A INDIVIDUAL UNIT OPTION-B

Figure 31: VIEW OF LIG-A INDIVIDUAL UNIT OPTION–B

Figure 32: STREET VIEW OF LIG-A INDIVIDUAL UNIT OPTION-B

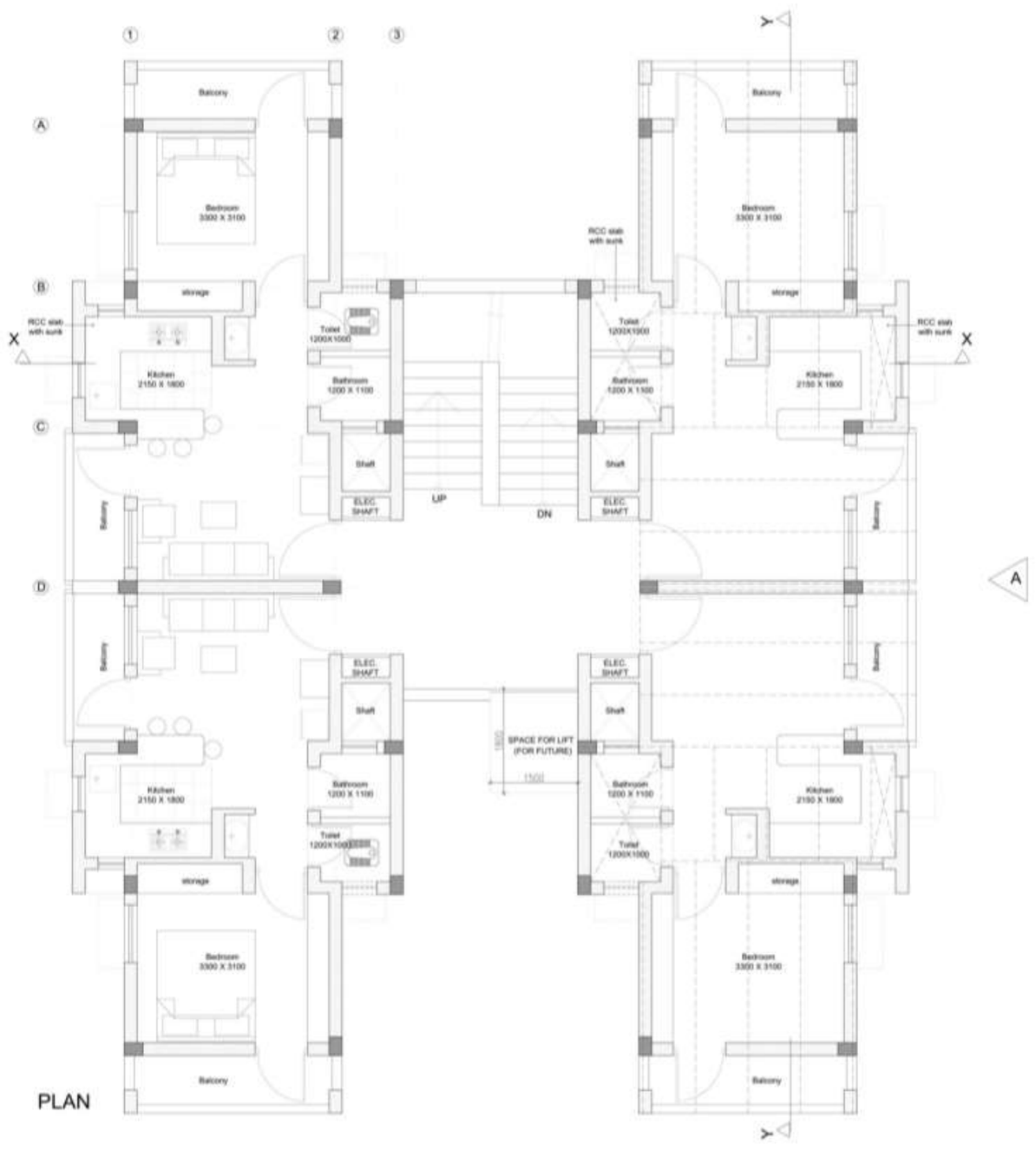
5(g) LIG-A CLUSTER UNIT OPTION-A

Cluster arrangement is done with four numbers of units of 1BHK typology at one level with two on each side. The carpet area of each unit is 29 sqm. A centrally accessible stairway is provided, which is approached through a common space rather than a corridor and there is also an option for lift for future restorations. The approach to the habitable area is through a lobby leading to kitchen/dining area and to bedroom. Each unit has been provided with balcony accessible through bedroom for proper day lighting and ventilation. Also common service ducts are designed for pipework.

The brick masonry work for the super structure is done with hydra form stabilised compressed earth blocks laid in rat-trap bond. Flooring is done with pre cast Ferro cement arch panels supported by pre cast beams. The terrace surface is finished with brick tile grouting over the layer of mud phuska and hot bitumen layer of the top floor slab.

For disaster resilience, continuous sill and lintel band is incorporated in the design. The chajjas designed will provide barrier from direct sunlight and also from rain.

The dwelling unit is designed so as to provide a flexible, adaptable and accessible environment to the user.



PLAN

NOTES

1.0	THE DIMENSIONS ARE TO BE READ AND NOT SCALED OFF THE DRAWING.
2.0	THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELEVANT DRAWINGS
3.0	ALL DIMENSIONS ARE IN MM UNLESS MENTIONED OTHERWISE

CARPET AREA - 29 sqm

Technology & Material Used:
1. Hydraform Stabilized Compressed Earth Blocks (220x220x115) with Red Bricks Bands
2. Roof of Ferrocement Channel

PROJECT

PREPARATION OF STANDARDS & SPECIFICATION FOR DESIGN & PLANNING OF AFFORDABLE INNOVATIVE GREEN SOCIAL HOUSING

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DRAWING TITLE

Layout Plan
LIG 'A' Cluster Unit Option 'A'

SCALE -	N.T.S.
DRG NO. -	CO/CU LIG-A_A1
DATE -	11.04.14

NOTES

1.0	THE DIMENSIONS ARE TO BE READ AND NOT SCALED OFF THE DRAWING.
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3.0	ALL DIMENSIONS ARE IN MM UNLESS MENTIONED OTHERWISE

CARPET AREA - 29 sqm

Technology & Material Used:
1. Hydraform Stabilized Compressed Earth Blocks (220x220x115) with Red Bricks Bands
2. Roof of Ferrocement Channel

PROJECT

PREPARATION OF STANDARDS & SPECIFICATION FOR DESIGN & PLANNING OF AFFORDABLE INNOVATIVE GREEN SOCIAL HOUSING

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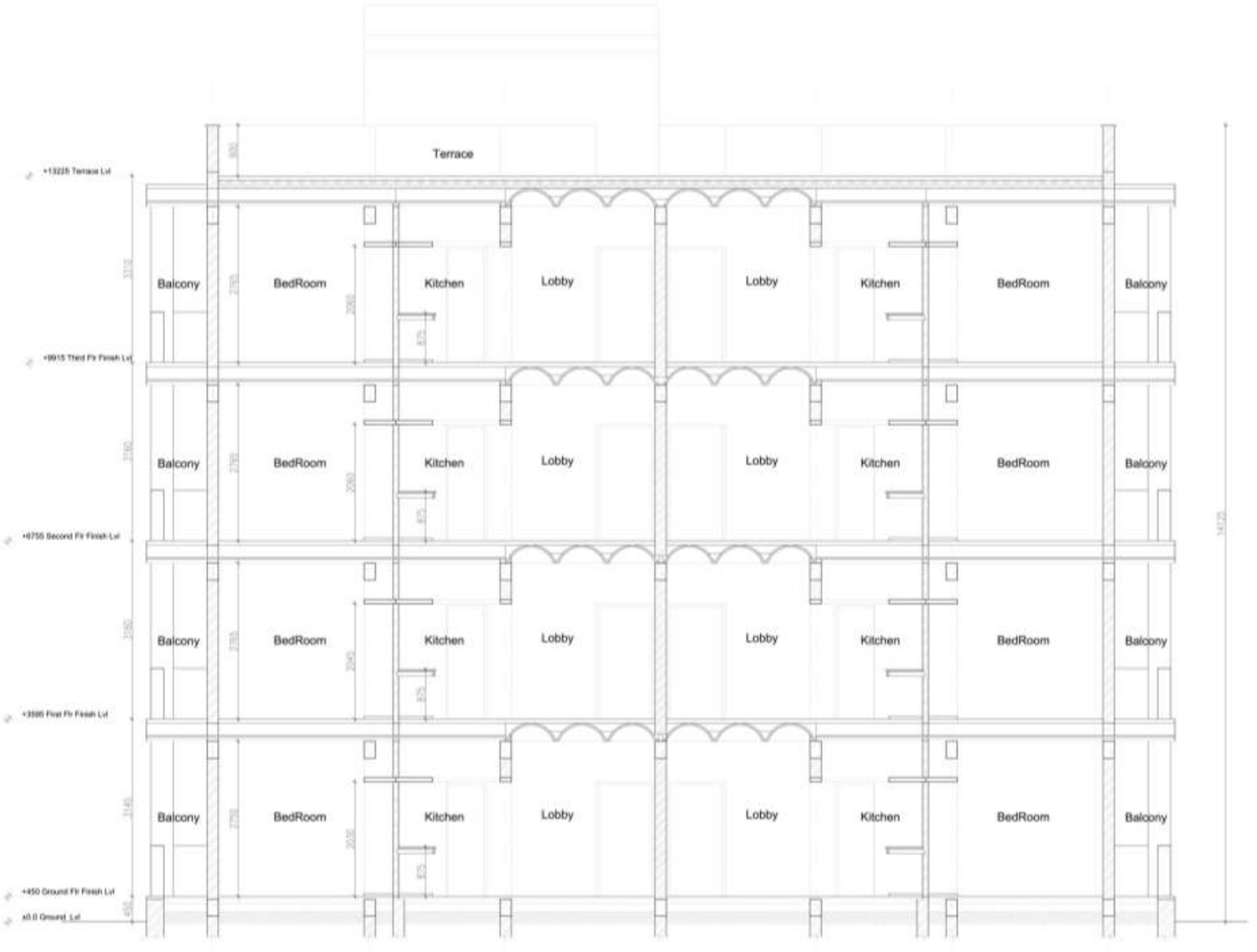
DRAWING TITLE

Elevation 'A'
LIG 'A' Cluster Unit Option 'A'

SCALE -	N.T.S.
DRG NO. -	CO/CU LIG-A_A2
DATE -	11.04.14



SECTION Y-Y

NOTES

1.0	THE DIMENSIONS ARE TO BE READ AND NOT SCALED OFF THE DRAWING.
2.0	THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELEVANT DRAWINGS
3.0	ALL DIMENSIONS ARE IN MM UNLESS MENTIONED OTHERWISE

CARPET AREA - 29 sqm

Technology & Material Used:
1. Hydraform Stabilized Compressed Earth Blocks (220x220x115) with Red Bricks Bands
2. Roof of Ferrocement Channel

PROJECT

PREPARATION OF STANDARDS & SPECIFICATION FOR DESIGN & PLANNING OF AFFORDABLE INNOVATIVE GREEN SOCIAL HOUSING

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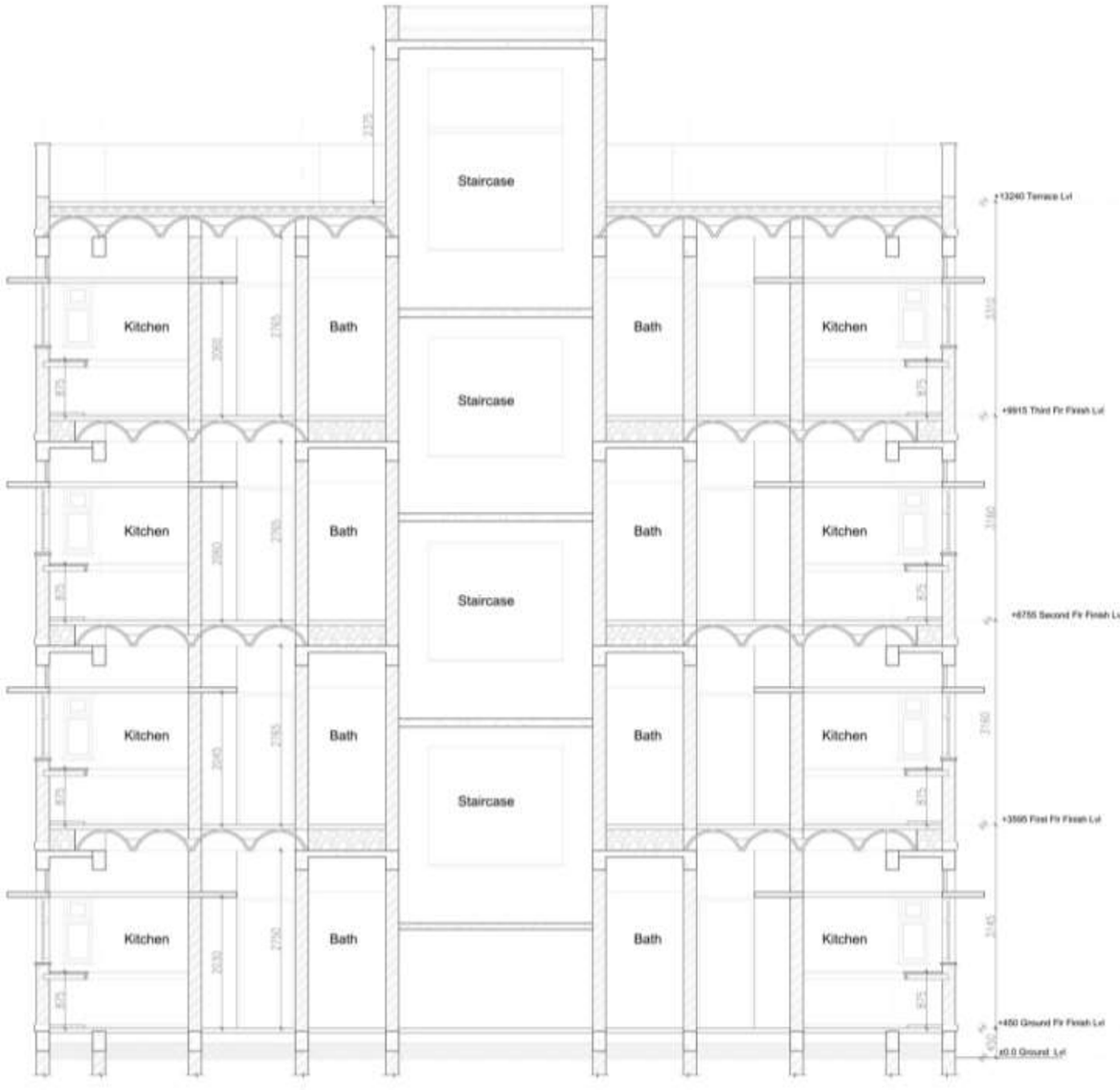
DRAWING TITLE

Section - I
LIG 'A' Cluster Unit Option 'A'

SCALE -	N.T.S.
DRG NO. -	CO/CU LIG-A_A3
DATE -	11.04.14



SECTION X-X

NOTES

1.0	THE DIMENSIONS ARE TO BE READ AND NOT SCALED OFF THE DRAWING.
2.0	THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELEVANT DRAWINGS
3.0	ALL DIMENSIONS ARE IN MM UNLESS MENTIONED OTHERWISE

CARPET AREA - 29 sqm

Technology & Material Used:
1. Hydraform Stabilized Compressed Earth Blocks (220x220x115) with Red Bricks Bands
2. Roof of Ferrocement Channel

PROJECT

PREPARATION OF STANDARDS & SPECIFICATION FOR DESIGN & PLANNING OF AFFORDABLE INNOVATIVE GREEN SOCIAL HOUSING

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DRAWING TITLE

Section - II
LIG 'A' Cluster Unit Option 'A'

SCALE -	N.T.S.
DRG NO. -	CO/CU LIG-A_A4
DATE -	11.04.14

5(h) LIG-A CLUSTER UNIT OPTION-A

Figure 33: PERSPECTIVE VIEW OF LIG-A CLUSTER UNIT OPTION -A

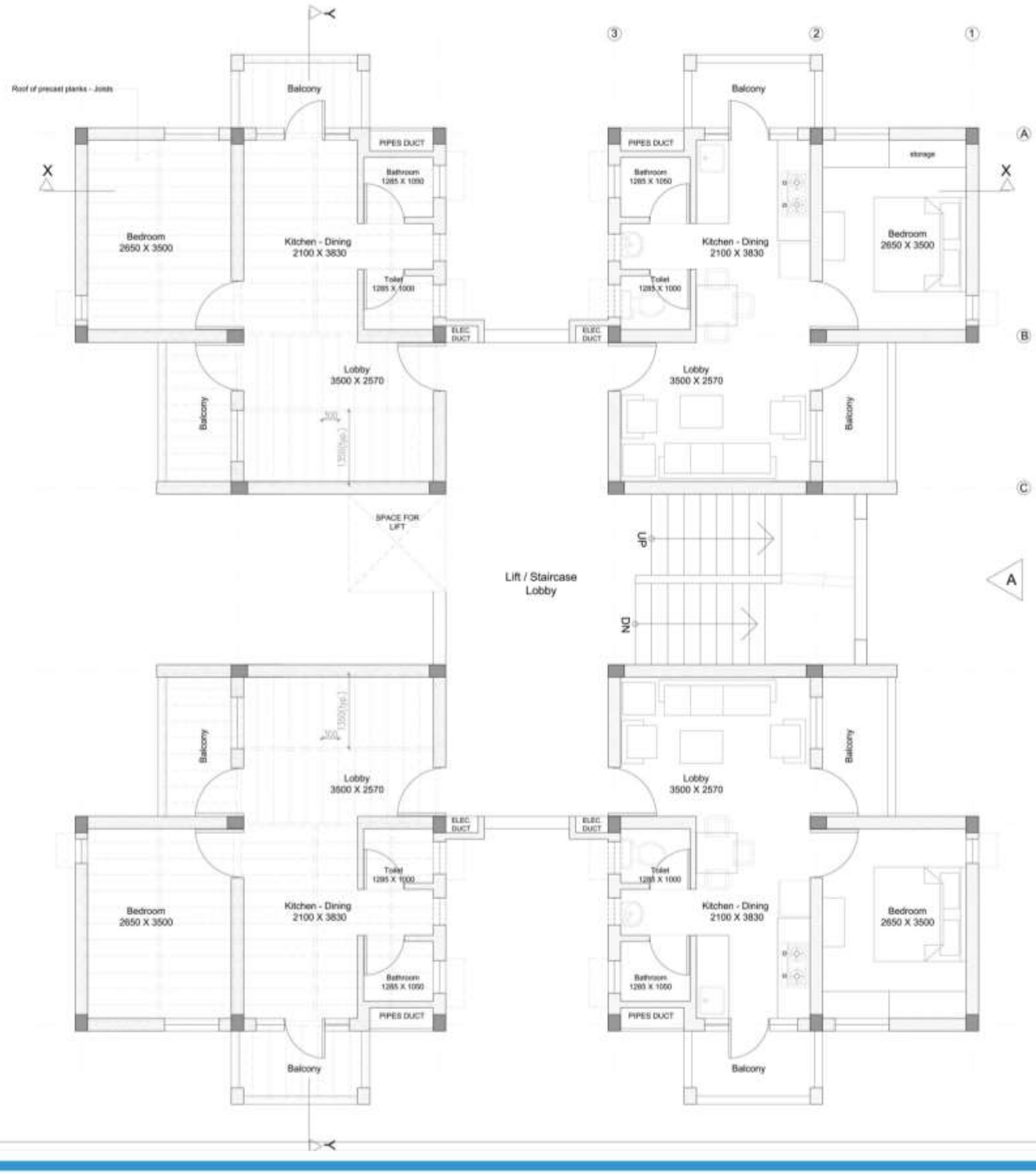
5(h) LIG-A CLUSTER UNIT OPTION-B

Cluster arrangement is done with four numbers of units of 1BHK typology at one level with two on each side. The carpet area of each unit is 30.2 sqm. A centrally accessible stairway is provided, which is approached through a common central lobby area rather than a corridor and there is also an option for lift for future restorations. The approach to the habitable area is through a lobby leading to kitchen/dining area and to bedroom. Each unit has been provided with two balconies, one accessible through kitchen and other accessible through living area for proper day lighting and ventilation. Kitchen area has a space separated for dining purpose. Also common service ducts are designed for pipework.

The brick masonry work for the super structure is done with hydra form stabilised compressed earth blocks laid in rat-trap bond. Flooring is done with pre cast Reinforced Cement Concrete (R.C.C.) planks and joists. The terrace surface is finished with brick tile grouting over the layer of mud phuska and hot bitumen layer of the top floor slab.

For disaster resilience, continuous sill and lintel band is incorporated in the design. The chajjas designed will provide barrier from direct sunlight and also from rain.

The dwelling unit is designed so as to provide a flexible, adaptable and accessible environment to the user.



NOTES

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3.0	ALL DIMENSIONS ARE IN MM UNLESS MENTIONED OTHERWISE

CARPET AREA - 30.2 sqm

Technology & Material Used:
1. Composite Structure with Stabilized Compressed Earth Bricks (230x115x75)in Rat Trap Bond with Red Bricks Bands
2. Roof of precast planks - Joists

PROJECT

PREPARATION OF STANDARDS & SPECIFICATION FOR DESIGN & PLANNING OF AFFORDABLE INNOVATIVE GREEN SOCIAL HOUSING

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DRAWING TITLE: Layout Plan
LIG 'A' Cluster Unit Option 'B'

SCALE - N.T.S.
DRG NO. - CO/CU LIG-A_B1
DATE - 11.04.14

ELEVATION 'A'

NOTES

1.0	THE DIMENSIONS ARE TO BE READ AND NOT SCALED OFF THE DRAWING.
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CARPET AREA - 30.2 sqm

Technology & Material Used:
1. Composite Structure with Stabilized Compressed Earth Bricks (230x115x75)in Rat Trap Bond with Red Bricks Bands
2.Roof of precast planks - Joists

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DRAWING TITLE

Elevation
LIG 'A' Cluster Unit Option 'B'

SCALE -	N.T.S.
DRG NO. -	CO/CU LIG-A_B2
DATE -	11.04.14

SECTION X-X

NOTES

1.0	THE DIMENSIONS ARE TO BE READ AND NOT SCALED OFF THE DRAWING.
2.0	THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELEVANT DRAWINGS
3.0	ALL DIMENSIONS ARE IN MM UNLESS MENTIONED OTHERWISE

CARPET AREA - 30.2 sqm

Technology & Material Used:
1. Composite Structure with Stabilized Compressed Earth Bricks (230x115x75)in Rat Trap Bond with Red Bricks Bands
2.Roof of precast planks - Joists

PROJECT

PREPARATION OF STANDARDS & SPECIFICATION FOR DESIGN & PLANNING OF AFFORDABLE INNOVATIVE GREEN SOCIAL HOUSING

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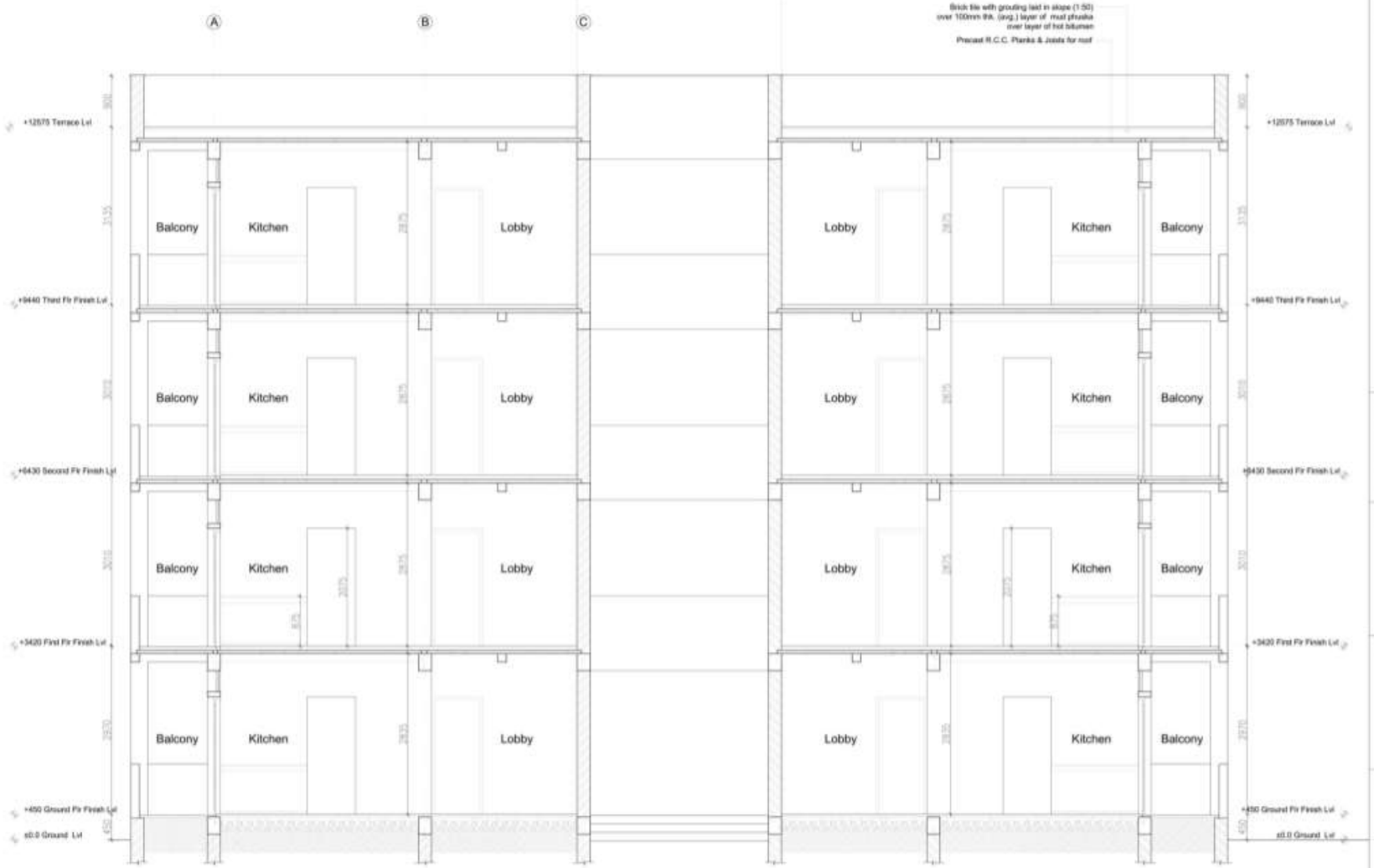
DRAWING TITLE

Section X-X
LIG 'A' Cluster Unit Option 'B'

SCALE -	N.T.S.
DRG NO. -	CO/CU LIG-A_83
DATE -	11.04.14



SECTION Y-Y

NOTES

1.0	THE DIMENSIONS ARE TO BE READ AND NOT SCALED OFF THE DRAWING.
2.0	THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELEVANT DRAWINGS
3.0	ALL DIMENSIONS ARE IN MM UNLESS MENTIONED OTHERWISE

CARPET AREA - 30.2 sqm

Technology & Material Used:
1. Composite Structure with Stabilized Compressed Earth Bricks (230x115x75)in Rat Trap Bond with Red Bricks Bands
2.Roof of precast planks - Joists

PROJECT

PREPARATION OF STANDARDS & SPECIFICATION FOR DESIGN & PLANNING OF AFFORDABLE INNOVATIVE GREEN SOCIAL HOUSING

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DRAWING TITLE

Section Y-Y
LIG 'A' Cluster Unit Option 'B'

SCALE -	N.T.S.
DRG NO. -	CO/CU LIG-A_B4
DATE -	11.04.14

5(h) LIG-A CLUSTER UNIT OPTION-B

Figure 34: FRONT VIEW LIG-A CLUSTER UNIT OPTION-B

Figure 35: PERSPECTIVE VIEW OF LIG-A CLUSTER UNIT OPTION-B

Lower Income Group (LIG-B):

The carpet area of a dwelling unit-

41-60 sqm

Floor Area Ratio- 1.75

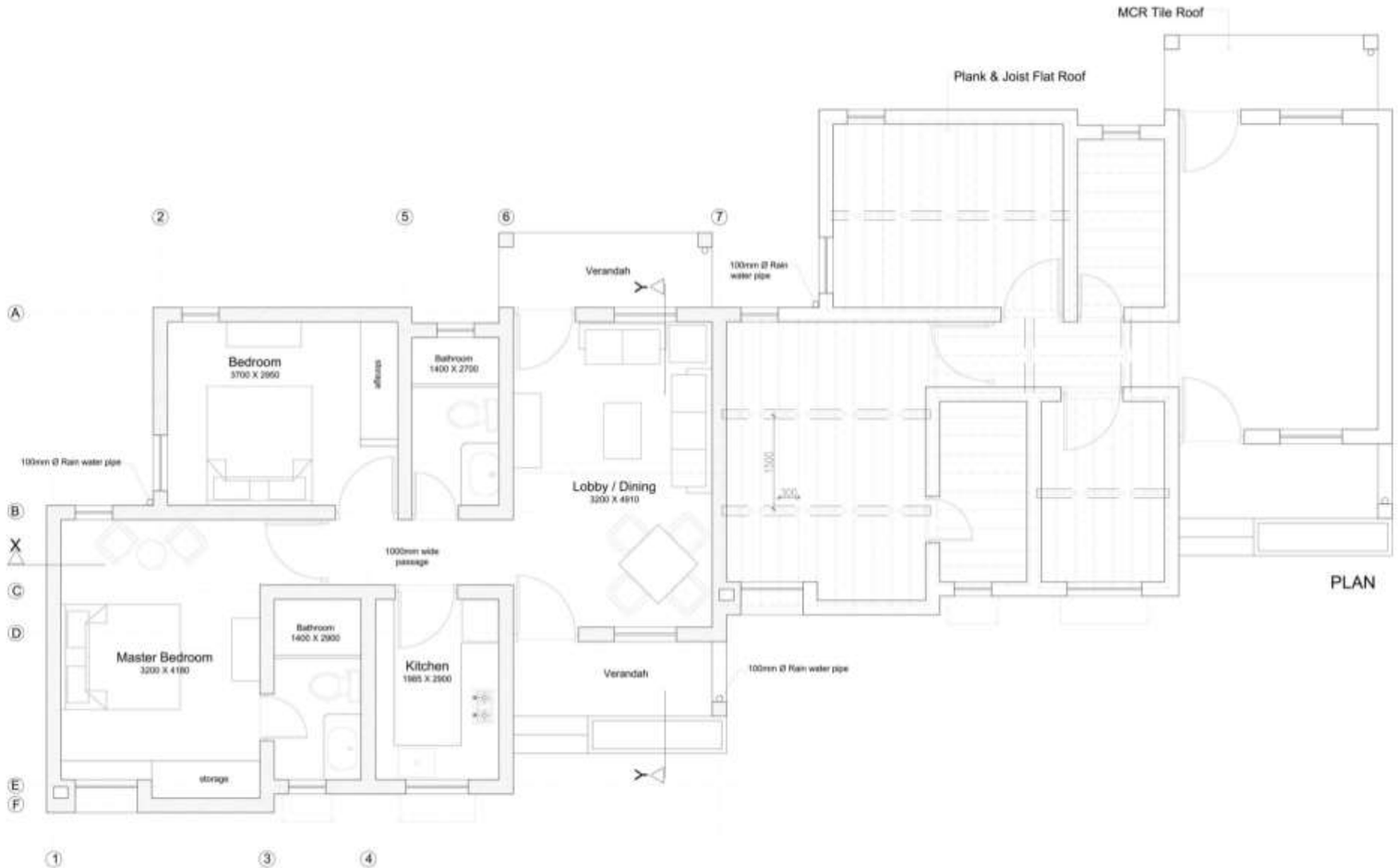
5(i) LIG-B INDIVIDUAL UNIT OPTION-A

A significant proportion of space has been tailored according to the numbers and characteristic of expected residents. The unit is of 2BHK typology with carpet area of 59.06 sqm. This housing unit is made accessible through a veranda leading to a lobby with dining area. The toilet and the bathing area are combined and provided one in the master bedroom and one as common. The unit is provided with permanent ventilation through the pre-fabricated louvers. The layout allows easily adaptable internal arrangements.

The super structure is made up of hydra form stabilised compressed earth blocks laid in rat- trap bond. A combination of red brick is done to enhance the aesthetics of the unit. Roofing of the unit is done with pre cast Reinforced Cement Concrete (R.C.C.) planks and joist. The roof over the veranda is separated from the main unit and is made up of Micro Concrete Tiles (MCR). The terrace floor is finished with brick tile over a layer of mud phuska and hot bitumen over the roof slab.

For disaster resilience, continuous sill and lintel band is incorporated in the design. The chajjas designed will provide barrier from direct sunlight and also from rain.

The dwelling unit is designed so as to provide a flexible, adaptable and accessible environment to the users.



NOTES

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2.0	THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELEVANT DRAWINGS
3.0	ALL DIMENSIONS ARE IN MM UNLESS MENTIONED OTHERWISE

CARPET AREA - 59.06 sqm

Technology & Material Used:
1. Rat Trap Bond in Stabilized Compressed Earth Blocks (230x115x75) with Red Bricks Bands
2. Roof of precast planks - Joists & MCR Tiles

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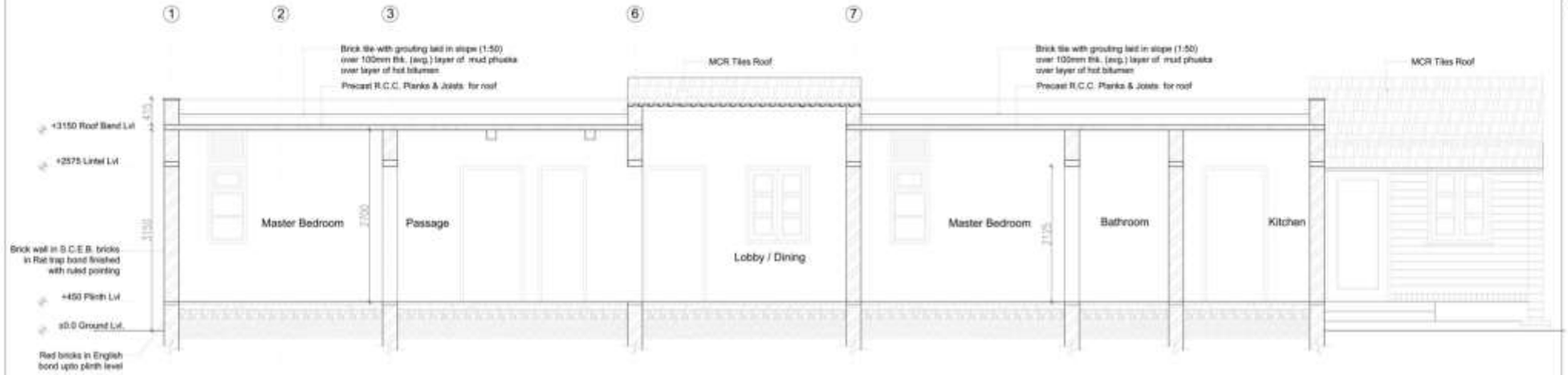
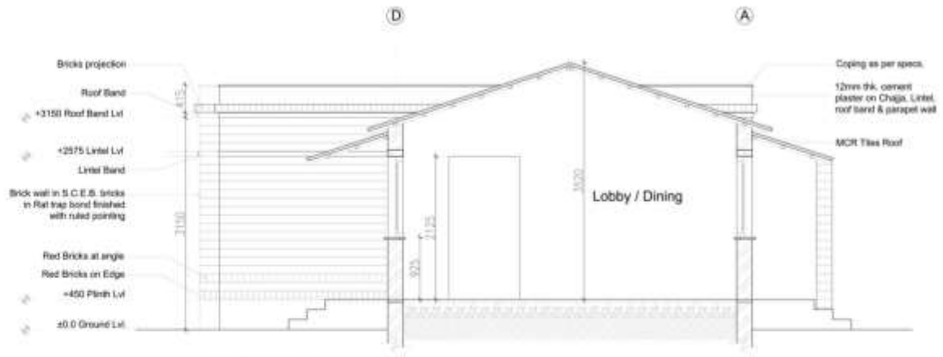
DRAWING TITLE

LIG 'B' Individual Unit Option 'A'-I

SCALE :-	N.T.S.
DRG NO.:-	CO/IU LIG-B_A1
DATE :-	07.04.14



SECTION X-X



SECTION Y-Y

NOTES

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CARPET AREA - 59.06 sqm

Technology & Material Used:
1. Rat Trap Bond in Stabilized Compressed Earth Blocks (230x115x75) with Red Bricks Bands
2.. Roof of precast planks - Joists & MCR Tiles

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DRAWING TITLE

LIG 'B' Individual Unit Option 'A'-II

SCALE -	N.T.S.
DRG NO.-	CO/IU LIG-B_A2
DATE -	07.04.14

5(i) LIG-B INDIVIDUAL UNIT OPTION-A

Figure 36: VIEW OF LIG-B INDIVIDUAL UNIT OPTION-A

Figure 37: STREET VIEW OF LIG-B INDIVIDUAL UNIT OPTION-A

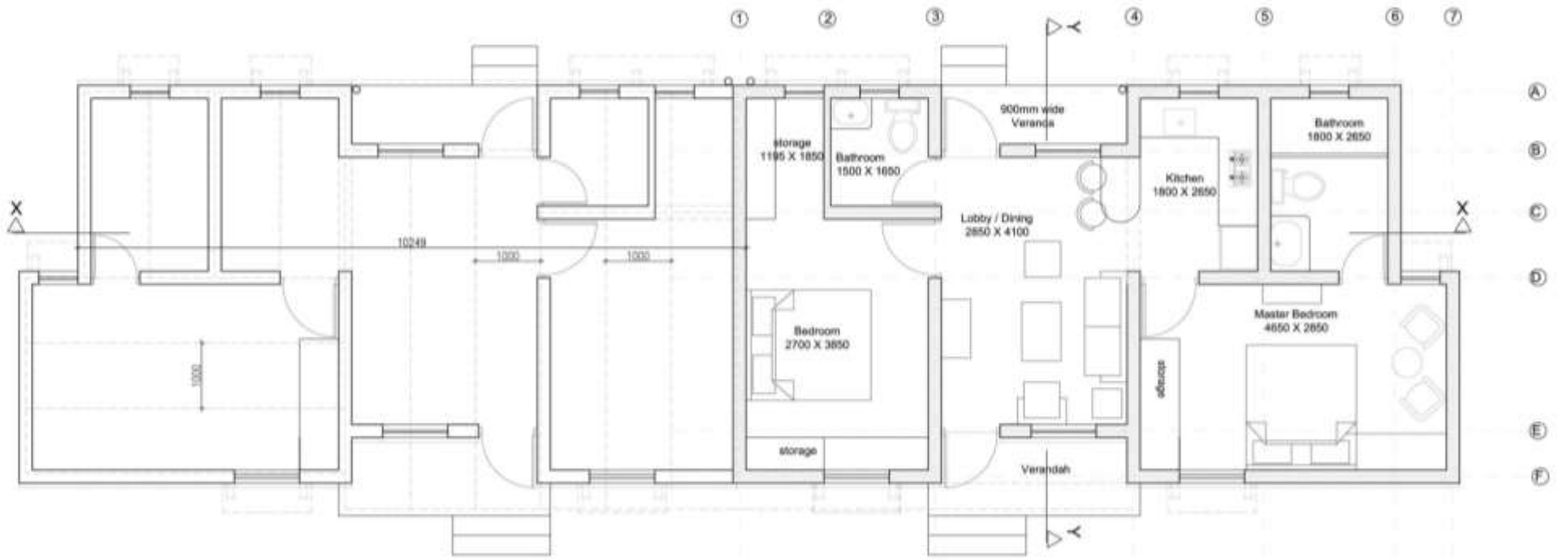
5(j) LIG-B INDIVIDUAL UNIT OPTION-B

A significant proportion of space has been tailored according to the numbers and characteristic of expected residents. The housing unit is of 2BHK typology with carpet area of 51.5 sqm. This housing unit is made accessible through a veranda leading to a lobby with dining area. The toilet and the bathing area are combined and provided one in the master bedroom and one as common. The unit also has another veranda at its rear side. The unit is provided with permanent ventilation through the pre-fabricated louvers. The layout allows easily adaptable internal arrangements.

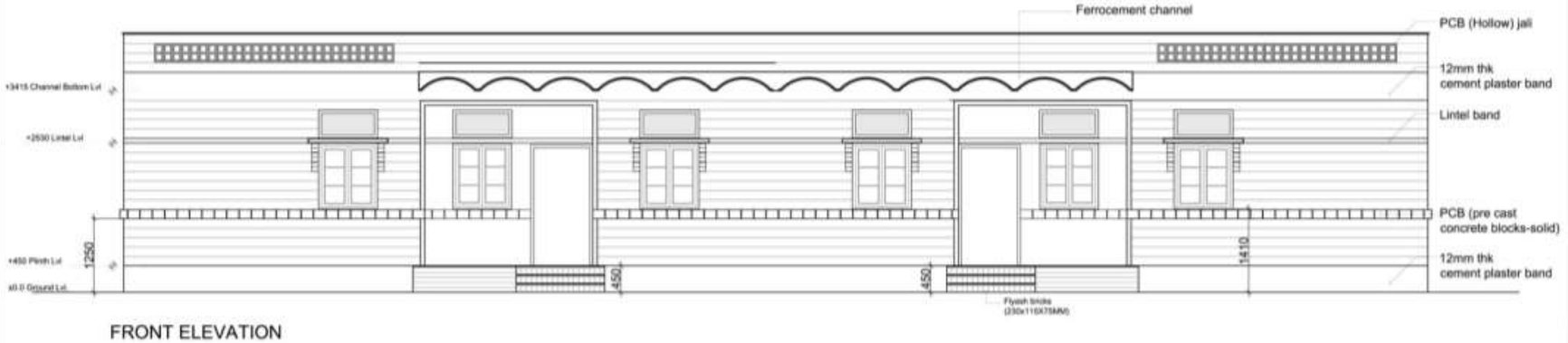
The super structure is made up of fly ash bricks laid in rat- trap bond. A combination of pre-cast concrete block solids is done to enhance the aesthetics of the unit. Roofing is done with Ferro cement arch panels. The terrace floor is finished with brick tile over a layer of mud phuska and hot bitumen over the roof slab.

For disaster resilience, continuous sill and lintel band is incorporated in the design. The chajjas designed will provide barrier from direct sunlight and also from rain.

The dwelling unit is designed so as to provide a flexible, adaptable and accessible environment to the users.



PLAN



FRONT ELEVATION

NOTES

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2.0	THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELEVANT DRAWINGS
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CARPET AREA - 51.5 sqm

Technology & Material Used:
1. PCB Masonry (300X200X150)
2.. Roof of Ferrocement channels (flat roof) and MCR tiles (sloping)

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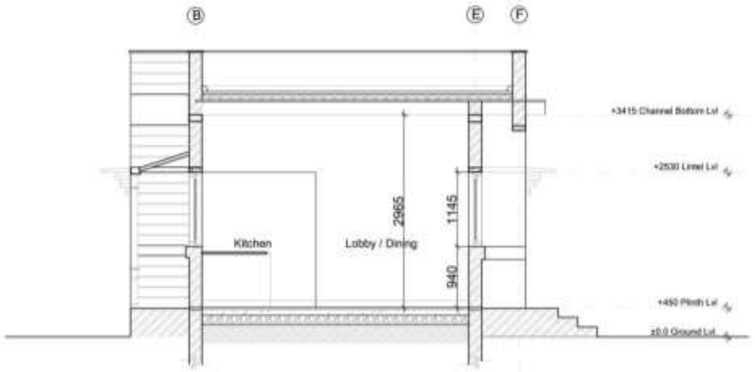
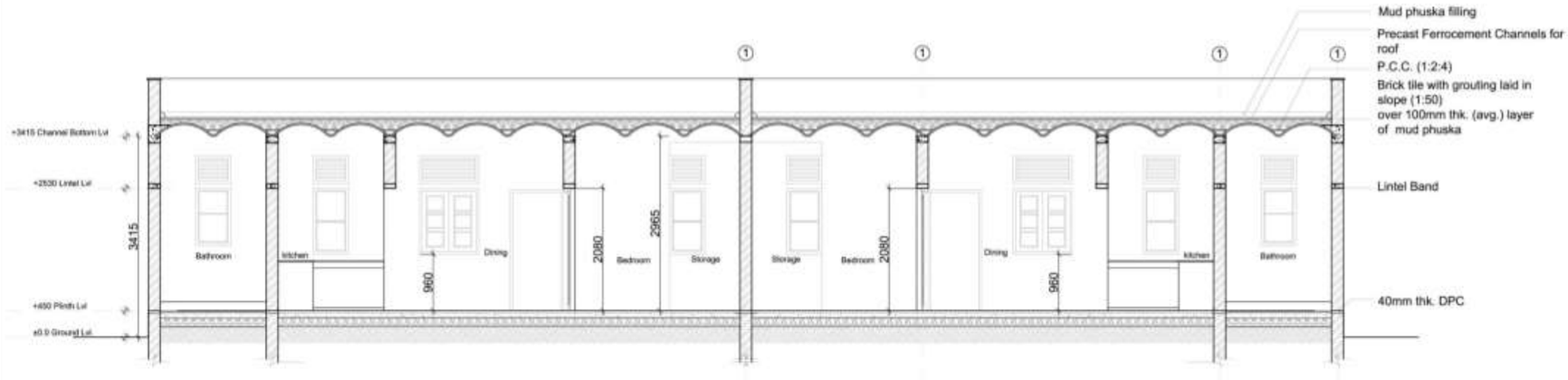
DRAWING TITLE

LIG 'B' Individual Unit Option 'B'-I

SCALE - N.T.S.	DATE - 07.04.14	DRG NO.
DRAWN BY: N.M.	DEALT BY: R.J.	CDW/ LIG-B_B1
CHECKED BY		



SECTION Y-Y



SECTION X-X SECTION X-X

NOTES

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CARPET AREA - 51.5 sqm

Technology & Material Used:
1. PCB Masonry (300X200X150)
2.. Roof of Ferrocement channels (flat roof) and MCR tiles (sloping)

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DRAWING TITLE

LIG 'B' Individual Unit Option 'B'-2

SCALE - N.T.S.	DATE - 07.04.14	DRG NO. CO/IU LIG-B_B2
DRAWN BY: N.M.	DEALT BY: R.J.	
CHECKED BY		

5(j) LIG-B INDIVIDUAL UNIT OPTION-B

Figure 38: VIEW OF LIG-B INDIVIDUAL UNIT OPTION-B

Figure 39: VIEW OF LIG-B INDIVIDUAL UINIT OPTION-B

5(k) LIG-B CLUSTER UNIT OPTION-A

Cluster arrangement is done with four numbers of units of 2BHK typology at one level with two on each side. The carpet area of each unit is 57.4 sqm. A centrally accessible stairway is provided, which is approached through a common central lobby area rather than a corridor and there is also an option for lift for future restorations. The habitable area is approached through a lobby leading to the master bedroom at the front with kitchen and washroom at alternate sides. Each unit has been provided with three balconies, accessible through kitchen, living area and through master bedroom for proper day lighting and ventilation. Also common service ducts are designed for pipework.

The super structure is done with a combination of red bricks and fly ash bricks in a specific pattern laid in rat- trap bond. Flooring is done with pre cast Reinforced Cement Concrete (R.C.C.) planks and joists. The terrace surface is finished with brick tile grouting over the layer of mud phuska and hot bitumen layer of the top floor slab.

For disaster resilience, continuous sill and lintel band is incorporated in the design. The chajjas designed will provide barrier from direct sunlight and also from rain.

The dwelling unit is designed so as to provide a flexible, adaptable and accessible environment to the user.

NOTES

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CARPET AREA - 57.4 sqm

Technology & Material Used:
1. composite structure in REd brick/flyash masonry (230X115X75)
2.. Filler slab

PROJECT

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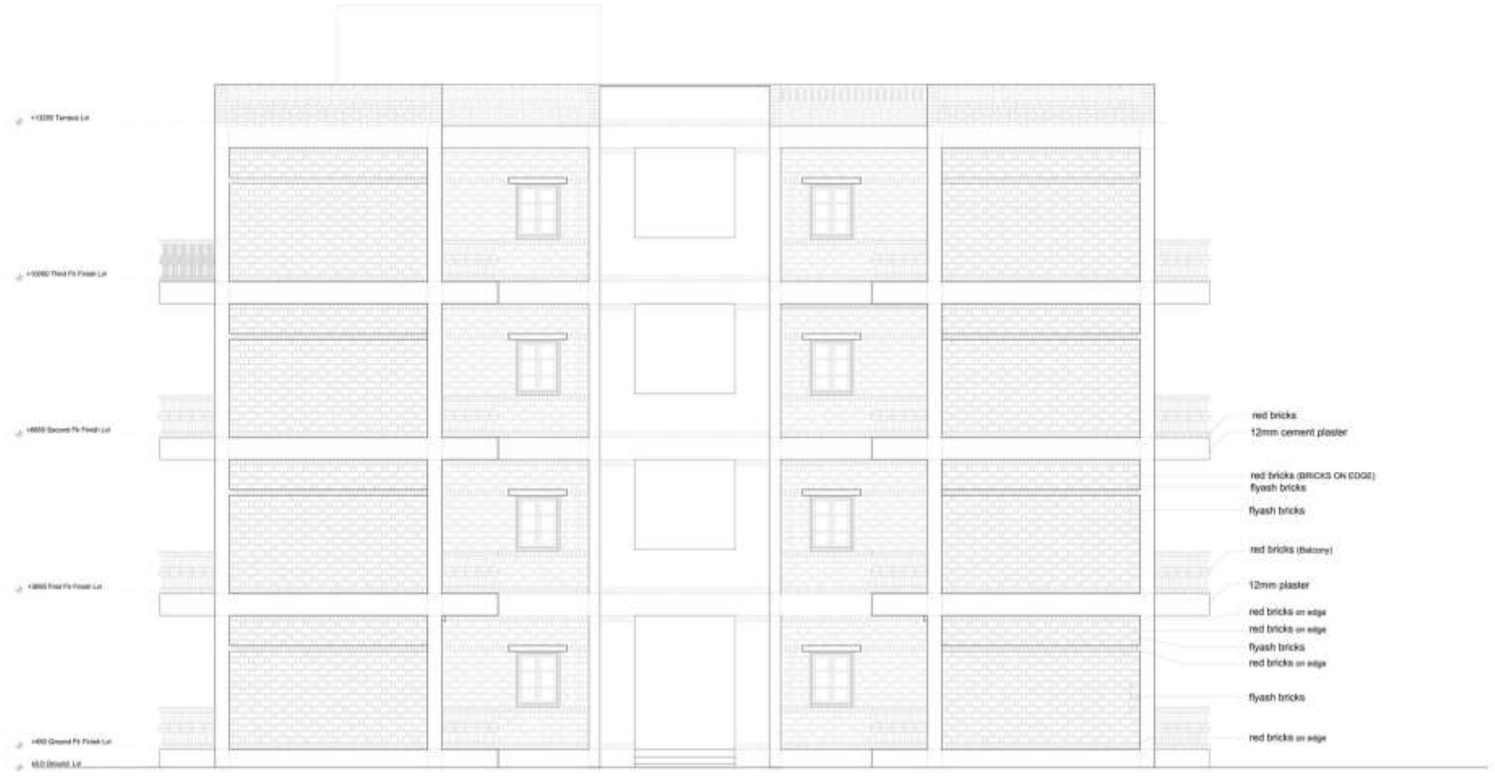
DRAWING TITLE

LIG 'B' Cluster Unit Option 'A'-I

SCALE -	N.T.S.
DRG NO. -	CCRU LIG-B_A1
DATE -	11.04.14



ELEVATION

FLYASH BRICKS
RED BRICKS

NOTES

1.0 THE DIMENSIONS ARE TO BE READ AND NOT SCALED OFF THE DRAWING.

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CARPET AREA - 57.4 sqm

Technology & Material Used:
1. composite structure in REd brick/flyash masonry (230X115X75)
2.. Filler slab

PROJECT

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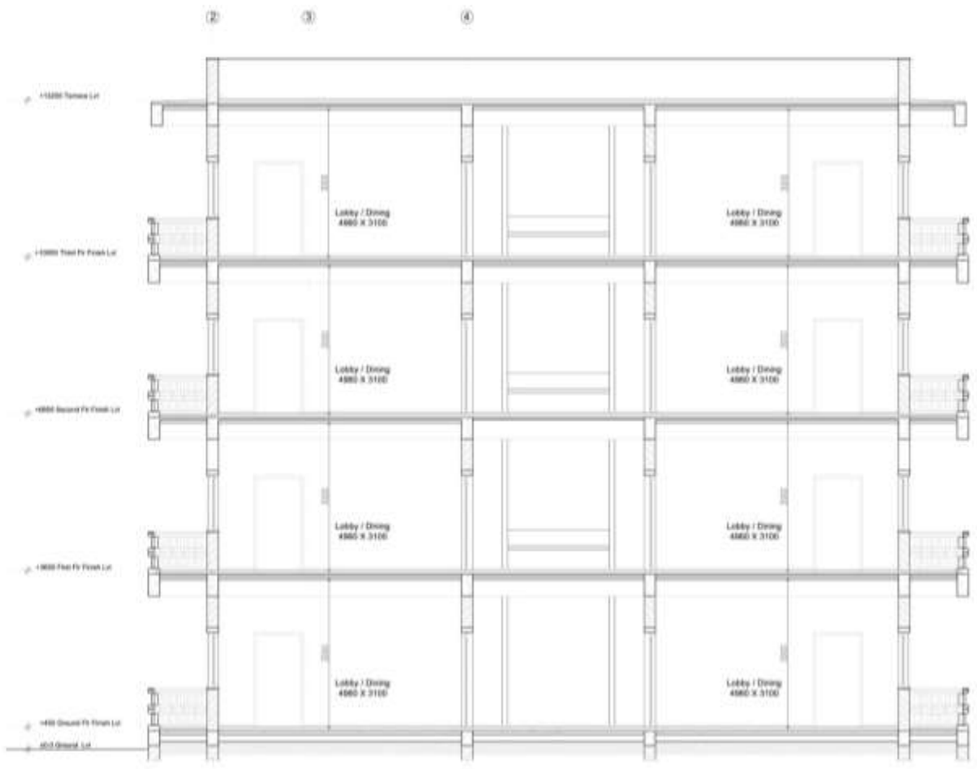
DRAWING TITLE

LIG 'B' Cluster Unit Option 'A'-2

SCALE -	N.T.S.
DRG NO. -	CO/U LIG-B_A2
DATE -	11.04.14



SECTION X-X

NOTES

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CARPET AREA - 57.4 sqm

Technology & Material Used:
1. composite structure in REd brick/flyash masonry (230X115X75)
2., Filler slab

PROJECT

PREPARATION OF STANDARDS & SPECIFICATION FOR DESIGN & PLANNING OF AFFORDABLE INNOVATIVE GREEN SOCIAL HOUSING

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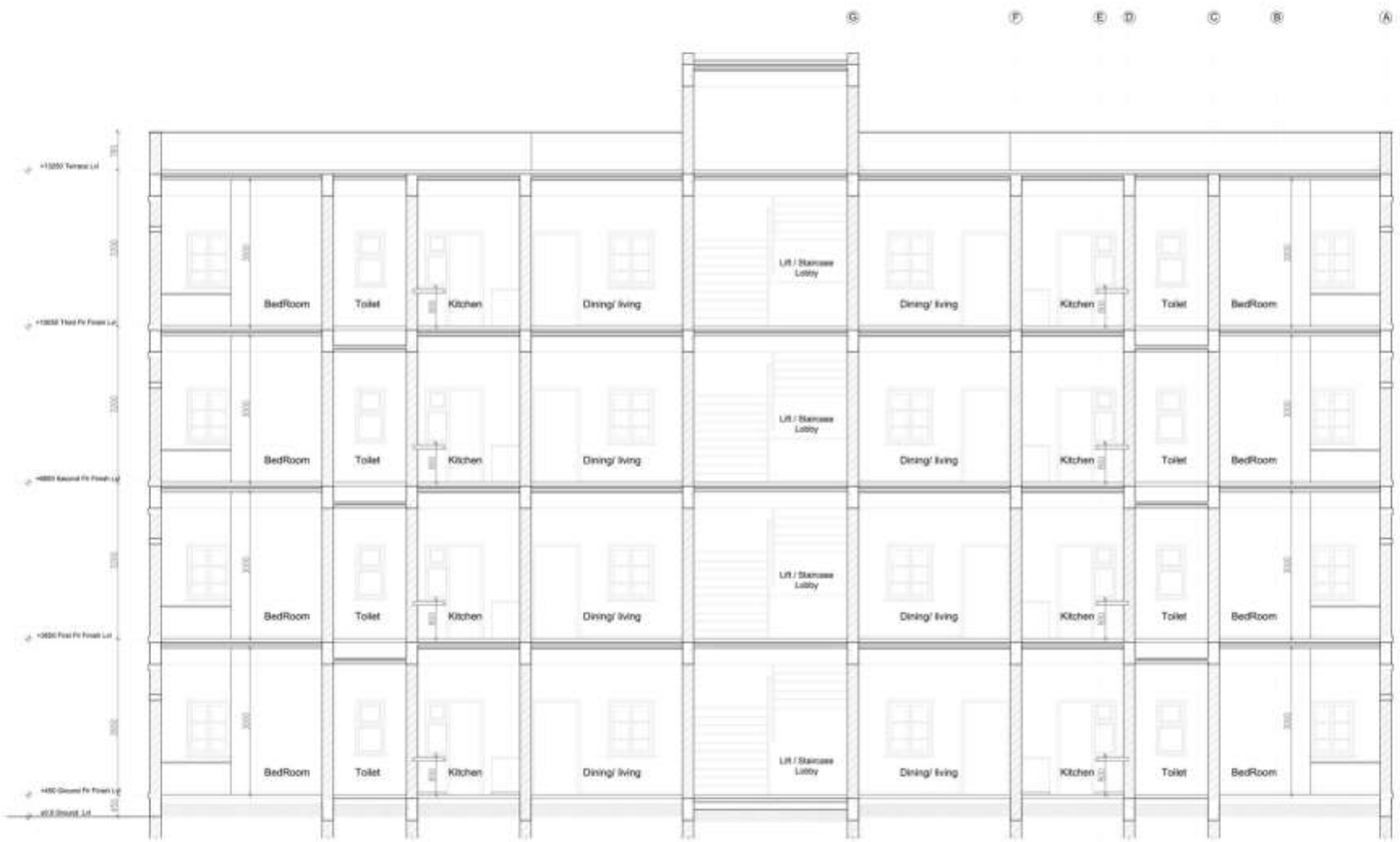
DRAWING TITLE

LIG 'B' Cluster Unit Option 'A'-3

SCALE -	N.T.S.
DRG NO. -	CO/U LIG-B_A3
DATE -	11.04.14



SECTION Y-Y

NOTES

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CARPET AREA - 57.4 sqm

Technology & Material Used:
1. composite structure in REd brick/flyash masonry (230X115X75)
2.. Filler slab

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DRAWING TITLE

LIG 'B' Cluster Unit Option 'A'-4

SCALE -	N.T.S.
DRG NO. -	CO/U LIG-B_A4
DATE -	11.04.14

5(k) LIG-B CLUSTER UNIT OPTION-A

Figure 40: FRONT VIEW OF LIG-B CLUSTER UNIT OPTION-A

Figure 41: PERSPECTIVE VIEW OF LIG-B CLUSTER UNIT OPTION-A

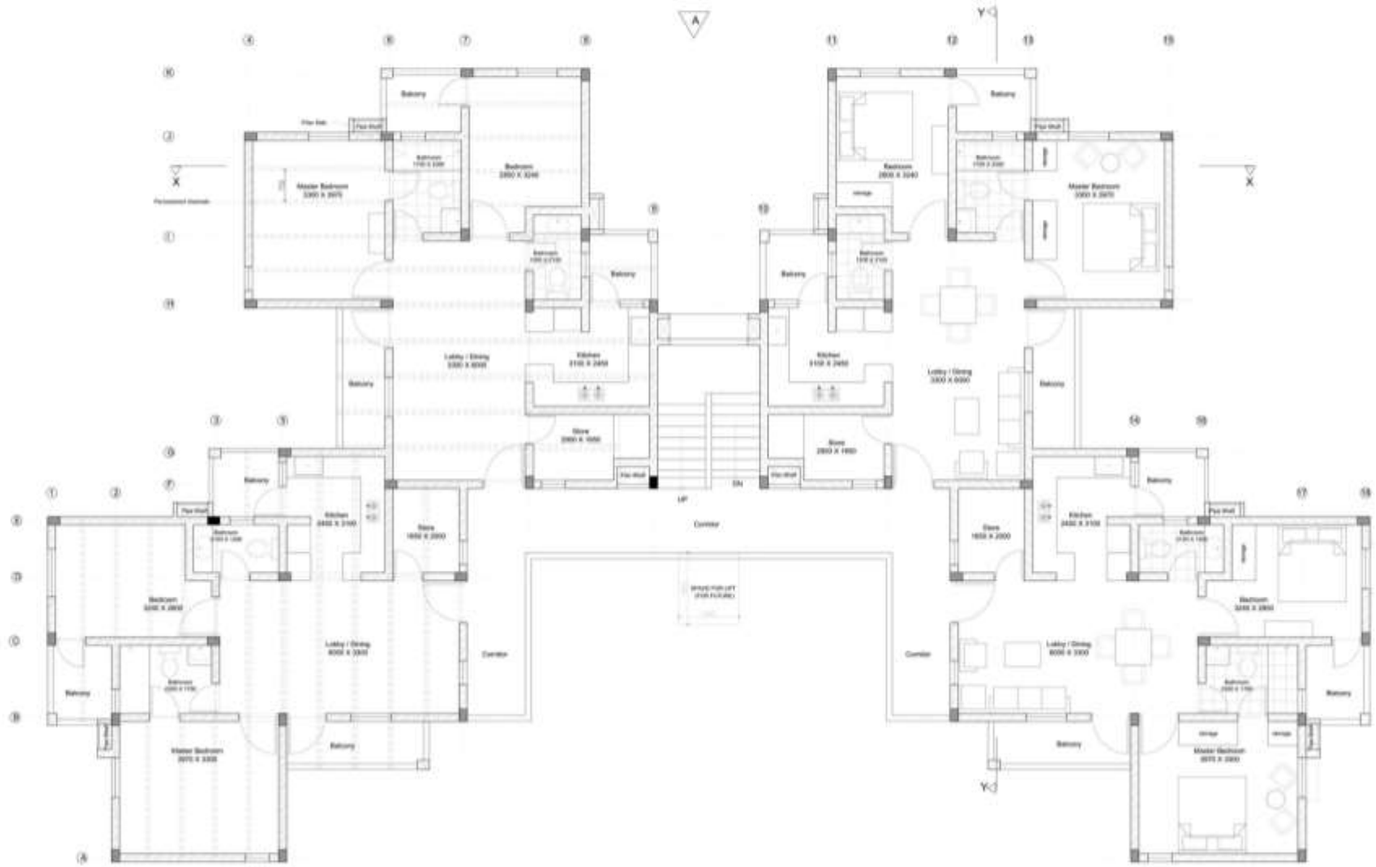
5(I) LIG-B CLUSTER UNIT OPTION-B

Cluster arrangement is done with four number of units with 2 BHK typology at one level with two on each side. The carpet area of each unit is 60 sqm. A centrally accessible stairway is provided, which is approached through a common 1500mm wide corridor and there is also an option for lift for future restorations. The habitable area is approached through a lobby with dining area leading to the master bedroom and bedroom at the front with store, kitchen and washroom on one side. Each unit has been provided with three balconies, accessible through kitchen, living area and through master bedroom for proper day lighting and ventilation. Also common service ducts are designed for pipework.

The super structure is done with a combination of stabilised compressed earth blocks and red bricks in a specific pattern laid in rat- trap bond. For ground floor laterite stone is used in the masonry work. Flooring is done with pre cast Ferro cement arch panels supported with pre- cast beams. The terrace surface is finished with broken ceramic tiles over the layer of mud phuska and hot bitumen layer of the top floor slab.

For disaster resilience, continuous sill and lintel band is incorporated in the design. The chajjas designed will provide barrier from direct sunlight and also from rain.

The dwelling unit is designed so as to provide a flexible, adaptable and accessible environment to the user.



NOTES

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CARPET AREA - 60 sqm

Technology & Material Used:
1. Composite Structure with Laterite Blocks on the Ground floor and Stabilized Compressed Earth Bricks (230x115x75) in Rat Trap Bond with Red Bricks Bands
2. Roof of Ferrocement Channels

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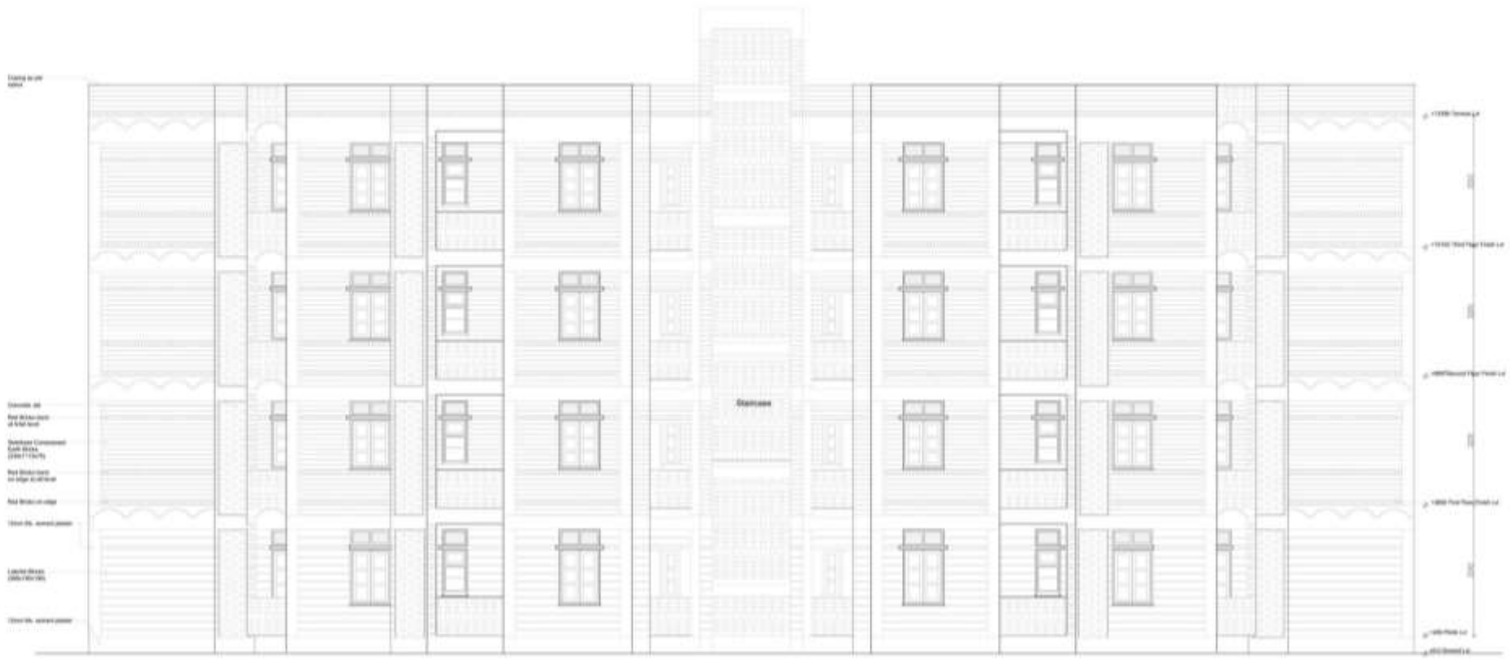
DRAWING TITLE

Layout Plan
LIG B Cluster Unit Option 'B'

SCALE -	N.T.S.
DRG NO. -	CC/CL/ LIG-B_01
DATE -	11.04.14



ELEVATION 'A'

NOTES

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3.0	ALL DIMENSIONS ARE IN MM UNLESS MENTIONED OTHERWISE

CARPET AREA - 60 sqm

Technology & Material Used:
1. Composite Structure with Laterite Blocks on the Ground floor and Stabilized Compressed Earth Bricks (230x110x75) in Rat Trap Bond with Red Bricks Bands
2. Roof of Ferrocement Channels

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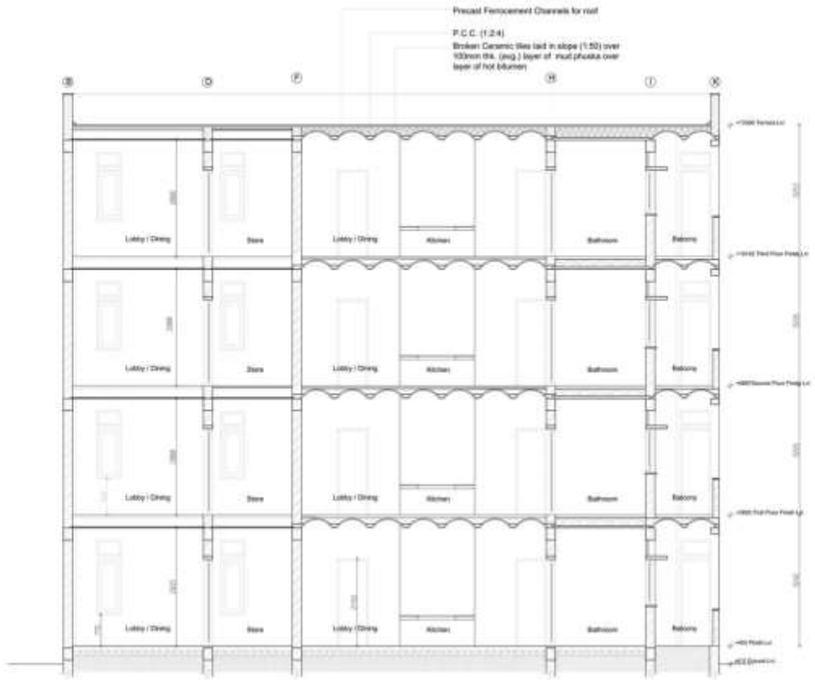
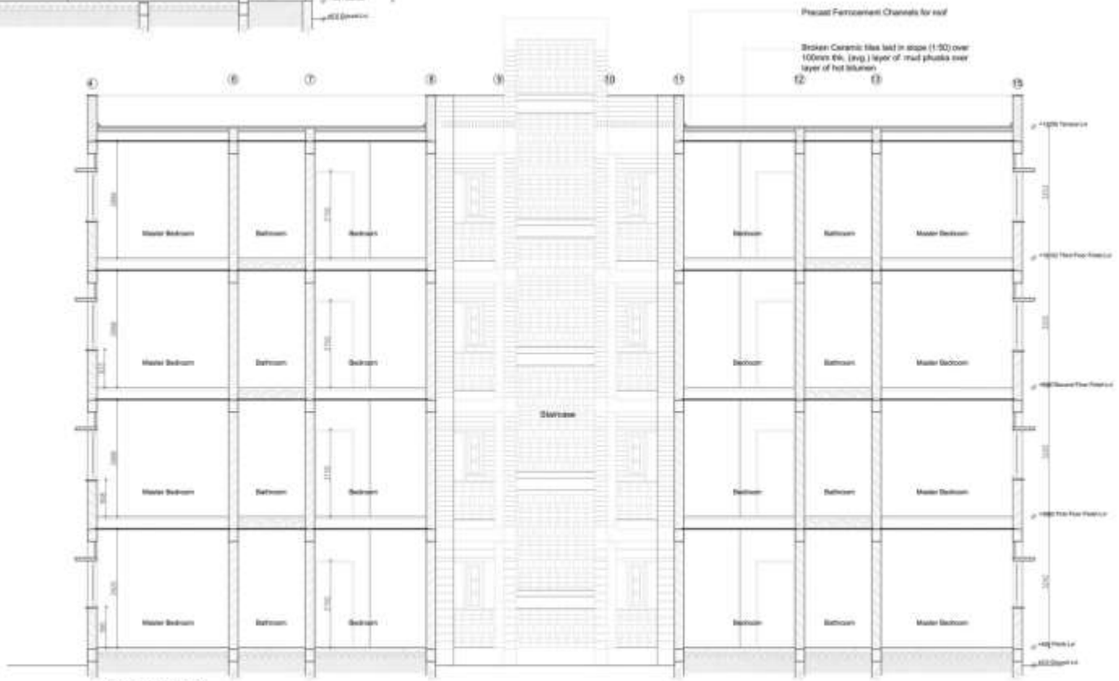
DRAWING TITLE
Elevation
LIG B Cluster Unit Option 'B'

SCALE -	N.T.S.
DRG NO. -	CGCU LIG-B_02
DATE -	11.04.14



SECTION Y-Y'



SECTION X-X'

NOTES

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CARPET AREA - 60 sqm

Technology & Material Used:
1. Composite Structure with Laterite Blocks on the Ground floor and Stabilized Compressed Earth Bricks (230x115x75) in Rat Trap Bond with Red Bricks Bands
2. Roof of Ferrocement Channels

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DRAWING TITLE

Sections
LIG B Cluster Unit Option 'B'

SCALE -	N.T.S.
DRG NO. -	CD/DU LIG-B_60
DATE -	11.04.14

5(I) LIG-B CLUSTER UNIT OPTION- B

Figure 42: PERSPECTIVE VIEW OF LIG-B CLUSTER UNIT OPTION

Summary of BOQ for E.W.S. Individual unit Option 'A' for Coastal Region, using Ferro cement Channels & MCR tiles Roof and Masonry in Rat trap bond using Fly ash bricks & Red bricks		
S.No.	**Description**	**Amount (Rs.)**
A.0	**Civil Works**	
1	Foundation	
2	Super structure	
3	Wall finishes	
4	Flooring	
5	Door & Windows	
6	Roofing	
7	Miscellaneous Works	
8	Plumbing	
9	Electrical	
	Total	
Note:	1. Rain water disposal has been detailed only up to down take rain water pipe. Further disposal of rain water to be as per site situation.	

BOQ for E.W.S. Individual unit Option 'A' using Ferro cement Channels & MCR tiles Roof and Masonry in Rat trap bond using Fly ash bricks & Red bricks

S.No.	Item Description	Unit	Quantity	Rate	Amount (Rs.)
A.0	**Civil Works**				
1	**Foundation**				
1.1	**Earth work in excavation**	Cum			
	Earth work in foundation trenches, column pits, drains etc. (not exceeding 1.5m in width or 10 sqm on plan) after clearing of site from bushes vegetation etc., including dressing of sides and ramming of bottoms, surface preparation as per specification to receive the PCC, lift up to 1.5m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50m.				
1.2	**Anti-termite treatment**	Sqm			
	Supplying, diluting and injecting chemical emulsion for pre-constructional anti termite treatment and creating a chemical barrier under and all-round the column pits, plinth beams, junction of wall and floor, along the external perimeter of building etc. complete				
	With chlorpyrifos /Lindane E.C. 20% with 1% concentration				
1.3	**Back filling of earth**	Cum			
	Filling available excavated earth (Excluding rock) in trenches, plinth, sides of foundation etc. in layers not exceeding 20Cm. in depth, consolidating each deposited layer by ramming and watering, lead up to 50m. and lift up to 1.5m.				
1.4	**D.P.C.**	Sqm	7.29		
	Providing and laying damp proof course 40 mm thick with cement concrete 1:2:4 (1 cement :2 coarse sand: 4 graded stone aggregate 12.5 mm nominal size) and applying a coat of residual petroleum bitumen of penetration 80/100 of approved quality.				
1.5	**PCC in foundation**				
	(Providing) & laying in position cement concrete of specified grade including centring & shuttering complete - All work up to plinth level.				
a)	1:4:8 (1 cement :4 coarse sand : 8 graded stone aggregate 40mm nominal size)	Cum			
b)	1:5:10 (1 cement :5 coarse sand : 10 graded stone aggregate 40mm nominal size)	Cum			
1.6	**R.C.C. up to plinth level**	Cum			
	Providing & laying in position M-20 grade of reinforced cement concrete including centering, shuttering complete but excluding cost of reinforcement - All work up to plinth level.				
1.7	**Reinforcement up to plinth level**	Kg			
	Providing & fixing Reinforcement for R.C.C. work up to plinth level as specified, including straightening, cutting, bending, placing in position and binding all complete.				
1.8	**Brick work in foundation**	Cum			
	Brick work with FPS bricks of class designation 75 in foundation and plinth in cement mortar 1:6 (1 cement: 6 coarse sand).				
	Total of Subhead 1.0				
2	**Super structure**				
2.1	**Brick work in super structure**	Cum	14.59		
	230mm thk. Brick work with Fly ash bricks (FALG bricks) conforming to class 'A' in rat trap bond in cement mortar 1:4 (1 cement : 4 coarse sand) in super structure above plinth level including finishing in ruled pointing on the external side of wall.				

2.2	**Brick work in Red Burnt Bricks**	Cum	1.67		
	Brick work in FPS bricks of class designation 75 in rat trap bond in super structure above plinth level in desired pattern in cement mortar 1:4 (1 cement : 4 coarse sand) including finishing in ruled pointing on the external side of wall where ever specified.				
2.3	**Brick work in Parapet wall**	Cum	1.32		
	Brick work with Fly ash bricks (FALG bricks) conforming to class 'A' in parapet wall in English bond in cement mortar 1:6 (1 cement : 6 coarse sand)				
2.4	**115mm thk brick wall**	Sqm	2.55		
	Half brick masonry with Fly ash bricks (FALG bricks) conforming to class 'A' in super structure above plinth level in cement mortar 1:6, including providing & placing in position 2 nos. 6mm dia. M.S. bars at every third course.				
2.5	**R.C.C. in super structure**	Cum			
	Providing & laying in position M-20 grade of reinforced cement concrete in lintel beams, roof bands, hajjes and counter & Loft slabs etc. in super structure including centering, shuttering complete but excluding cost of reinforcement.				
2.6	**Reinforcement in super structure**	Kg			
	Providing & fixing Reinforcement for R.C.C. work in lintel, hajjes and counter & Loft slabs in super structure as specified, including straightening, cutting, bending, placing in position and binding all complete.				
2.7	**Plain cement concrete**				
	Providing and laying plain cement concrete of specified grade as bed concrete under floor, roof slab, plinth protection, sill, coping, shelves, kitchen platform etc. screeding at roof to required slope and other locations as called for laid, consolidated and cured etc. complete as per specification and drawing.				
a)	1:4:8 (1 cement :4 coarse sand : 8 graded stone aggregate 40mm nominal size)	Cum	3.71		
	Total of Subhead 2.0				
3	**Wall finishes**				
3.1	Providing 12 mm thick cement plaster of mix 1:6 (1 cement: 6 coarse sand).	Sqm	92.07		
3.2	**Lime wash**	Sqm	60.24		
	Providing and applying three or more coats of white wash with lime on wall and ceiling to give an even shade including preparation of surfaces, scaffolding, mixing of indigo blue and DDL adhesive etc. complete.				
3.3	**Stone Counters**	Sqm	1.8		
	Providing and laying 20mm thk. Kota stone slabs on kitchen counters laid on 20mm thk. Cement mortar 1:3 (1 cement 3 coarse sand). Including rubbing and polishing complete.				
3.4	**Coping**	Sqm	0.53		
	Providing & fixing 20mm thk. coping of burnt clay paving tile, on window sill & parapet walls in cement mortar 1:6				
3.5	**Dado**	Sqm	15.37		
	Providing and laying ceramic glazed tiles of size 200x300mm in dado of uniform thickness, size, shade and pattern as approved by Architect/Project Manager laid with rich cement slurry over a bedding plaster of 12 mm thick cement mortar 1:3 (1 cement: 3 fine sand) and grouting the joints with white cement and pigment with matching shade of tile, cutting, curing etc. Complete in all respects as per drawing.				
	Total of Subhead 3.0				
4.1	**IPS Flooring**	Sqm	23.76		
	Providing and laying 40mm thk. IPS flooring 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate) in two layers; finished with a floating coat of neat cement including cement slurry complete.				
4.2	**IPS Skirting**	Sqm	2.69		
	Providing and laying 18mm thk. cement plaster skirting with cement mortar 1:3 (1 cement: 3 coarse sand) finished with a floating coat of neat cement.				
4.3	**Ceramic tile Flooring**	Sqm	3		
	Providing and laying ceramic glazed tile flooring of size 300x300mm of approved make, shade and pattern as approved by Project in charge laid over 20/12 mm average thick bed of cement mortar 1:4 (1 cement : 4 coarse sand), grouting the joints with white cement and pigment to match the shade of tile including cutting, etc. complete in all respects				
4.4	Extra for addition of red oxide of iron (3.5kg per 50 kg of cement) in 40mm thk. IPS flooring	Sqm	5.94		
4.5	**Sand Filling**	Cum	3.56		
	Supplying and filling in plinth with sand under floors including watering, ramming, consolidating, and dressing complete.				
4.6	**Damp proof membrane**	Sqm	23.76		
	Providing & laying 1000 Gauge polythene damp proof membrane under floor PCC				
	Total of Subhead 4.0				

5	**Door Windows**				
5.1	**RCC Frame for door**				
	Providing and fixing RCC Frame for door of size given below, out of section 100x50mm, with single or double rebate as required, with holdfasts, finished with enamel paint of approved colour all complete.				
a)	1200 x 2125mm	Nos.	1		
b)	900 x 2125mm	Nos.	1		
b)	750 x 2125mm	Nos.	2		
5.2	**RCC Frame for windows**				
	Providing and fixing RCC Frame for window of size given below, out of section 100x50mm, with double rebate and holdfasts, finished with enamel paint of approved colour all complete.				
a)	1000x1200mm	Nos.	2		
b)	600x1200mm	Nos.	1		
b)	600x1085mm	Nos.	2		
5.3	**Door Shutters**				
	Providing and fixing door shutter of sizes given below of any of following material as per approval by project in charge/ architect. (Note: Hardware not included in the item, to be as per selection)				
i)	Wooden panelled door shutter using local wood as per approval, 12mm thk. Particle board / M.S. jali as per requirement of panel including finishing with enamel paint of approved colour all complete.				
ii)	24 mm thick factory made PVC door shutters made of styles and rails of an uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both sides. Complete as per manufacturer's specification and direction of Engineer-in-charge. (For W.C. and bathroom door shutter).				
iii)	Providing and fixing 35mm thk. ISI marked flush door shutters conforming to IS : 2202 (Part I) decorative type, core of block board construction with frame of 1st class hard wood and well matched commercial 3 ply veneering with vertical grains or cross bands and face veneers on both faces of shutters.				
iv)	Bamboo door shutters				
a)	550 x 2075mm	Nos.	4		
b)	800 x 2075mm	Nos.	1		
c)	650 x 2075mm	Nos.	2		
5.4	**Window Shutters**				
i)	Providing and fixing Wooden panelled shutter for window of given size using local wood as per approval, including providing & fixing 5mm thk. Clear float glass of approved make, finishing with enamel paint of approved colour all complete. (Note: Hardware not included in the item, to be as per selection)				
ii)	Providing and fixing Wooden panelled shutter for window of given size using local wood as per approval, including providing & fixing M.S. wire gauge of avg. width of aperture 1.4mm with wire of dia 0.63mm , finishing with enamel paint of approved colour all complete. (Note: Hardware not included in the item, to be as per selection)				
iii)	Bamboo window shutters				
a)	450x1100mm	Nos.	4		
b)	500x1100mm	Nos.	1		
c)	500x985mm	Nos.	2		
5.5	**Precast Louvers**				
a)	600x 365mm	Nos	2		
	Total of Subhead 5.0				
6	**Roofing**				
6.1	**Precast Ferro cement Channel system**	Sqm	10.86		
	Providing and Laying precast Ferro cement Channels for roof as per related training and including providing & laying necessary cast in situ RCC and reinforcement as specified in structural drawings, centering & shuttering complete, excluding the cost of reinforcement.				
6.2	**Concrete Filling in Channels valley**	Cum	0.4		
	Providing & laying in position cement concrete (1:2:4) in valley of Ferro cement Channels including centring & shuttering complete.				
6.3	**Micro Concrete Tile Roofing**	Sqm	29		
	Providing prefabricated corrugated MCR tile roofing (pan or roman as approved) and fixing the tiles to M.S. purlins with G.I wire with proper overlaps and interlocks, joints between ridge tiles on doubly pitched roofs sealed with rich cement sand mortar all complete as per approval of project manager, including providing and fixing ridge tiles, gutter, M.S. purlins, cleats/ flats/ angles, flashing and rafters as specified in structural drawings. Work to be				

	complete in all respect including hoisting at all heights, cutting, welding, smooth grinding of all welding joints, applying derusting primer coat, three or more coats of synthetic enamel paint etc. on M.S. members.				
6.4	**Ceiling plaster**	Sqm	Rate only		
	Providing 10 mm thick cement plaster of mix 1:4 (1 cement: 4 coarse sand) in ceiling.				
6.5	**Hot Bitumen layer**	Sqm	12.78		
	Providing layer of residual type petroleum bitumen of penetration 80/100 of approved quality at 17kg per 10sqm impregnated with a coat of coarse sand layer at 60 cudm per 10sqm including cleaning the slab surface with brushes and finally with a piece of cloth lightly soaked in kerosene oil complete.				
6.6	**Mud phuska**	Cum	1.63		
	Providing and laying 100mm thick (average) mud phuska of damped brick earth on roof laid to slope consolidated and plastered with 25mm thk. mud mortar mixed with bhusa at 35kg per cum of earth and gobri leaping with mix 1:1 (1clay: 1 cow dung).				
6.7	**Brick tiles with grouting**	Sqm	10.86		
	(Providing) and laying FPS Brick tiles of class designation 75 over roof grouted with cement mortar 1:3 (1 cement : 3 fine sand) mixed with 2% of integral water proofing compound by weight of cement, over a 12mm layer of cement mortar 1:3 (1 cement : 3 fine sand) and finished neat.				
6.8	**Cement Gola**	Rmt	12.8		
	Providing Gola in cement concrete 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate 10 mm nominal size) including finishing with cement mortar 1:3 (1 cement: 3 sand) as per standard design.				
	Total of Subhead 6.0				
7	**Miscellaneous**				
7.1	Making khurras 450x450 with average minimum thickness of 50mm cement concrete 1:2:4 over PVC sheet 1mx1mx400micron, finished with 12mm cement plaster 1:3 and a coat of neat cement rounding the edges and making and finishing the outlet complete.	Nos	2		
7.2	Providing and fixing 110mm dia PVC rain water pipes of approved make to withstand a test pressure of 4.0kg/sqcm. including all fittings bends, sockets, elbow, tees, clamps, Y - Junction with cover (for collecting rainwater) including testing of joints etc. complete.	Rmt	6		
7.3	**M.S. Grill**	Sqm	1.85		
	Providing and fixing in position M.S. Grill made of 10x10mm m.s. square rods fixed at 150mm avg. c/c in both directions & 25x3mm flat all around to fix the grill to window, complete including grinding, providing two coats of red oxide primer and three or more coats of synthetic enamel paint of approved colour.				
	Total of Subhead 7.0				
	Total of "A'				

Summary of BOQ for E.W.S. Individual unit Option 'B' for Coastal Region, using Filler slab Roof and Masonry in Laterite blocks		
S.No.	**Description**	**Amount (Rs.)**
A.0	**Civil Works**	
1	Foundation	
2	Super structure	
3	Wall finishes	
4	Flooring	
5	Door & Windows	
6	Roofing	
7	Miscellaneous Works	
8	Plumbing	
9	Electrical	
	Total	
Note:	1. Rain water disposal has been detailed only up to down take rain water pipe. Further disposal of rain water to be as per site situation.	

BOQ for E.W.S. Individual unit Option 'B' for Coastal Region, using Filler slab Roof and Masonry in Laterite blocks					
S.No.	**Item Description**	**Unit**	**Quantity**	**Rate**	**Amount (Rs.)**
A.0	**Civil Works**				
1	**Foundation**				
1.1	**Earth work in excavation**	Cum			
	Earth work in foundation trenches, column pits, drains etc. (not exceeding 1.5m in width or 10 sqm on plan) after clearing of site from bushes vegetation etc., including dressing of sides and ramming of bottoms, surface preparation as per specification to receive the PCC, lift up to 1.5m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50m.				
1.2	**Anti-termite treatment**	Sqm			
	Supplying, diluting and injecting chemical emulsion for pre-constructional anti termite treatment and creating a chemical barrier under and all-round the column pits, plinth beams, junction of wall and floor, along the external perimeter of building etc. complete				
	With chlorpyrifos /Lindane E.C. 20% with 1% concentration				
1.3	**Back filling of earth**	Cum			
	Filling available excavated earth (Excluding rock) in trenches, plinth, sides of foundation etc. in layers not exceeding 20Cm. in depth, consolidating each deposited layer by ramming and watering, lead up to 50m. and lift up to 1.5m.				
1.4	**D.P.C.**	Sqm	6.55		
	Providing and laying damp proof course 40 mm thick with cement concrete 1:2:4 (1 cement :2 coarse sand: 4 graded stone aggregate 12.5 mm nominal size) and applying a coat of residual petroleum bitumen of penetration 80/100 of approved quality.				
1.5	**PCC in foundation**				
	(Providing) & laying in position cement concrete of specified grade including centring & shuttering complete - All work up to plinth level.				
a)	1:4:8 (1 cement :4 coarse sand : 8 graded stone aggregate 40mm nominal size)	Cum			
b)	1:5:10 (1 cement :5 coarse sand : 10 graded stone aggregate 40mm nominal size)	Cum			
1.6	**R.C.C. up to plinth level**	Cum			
	Providing & laying in position M-20 grade of reinforced cement concrete including centering, shuttering complete but excluding cost of reinforcement - All work up to plinth level.				
1.7	**Reinforcement up to plinth level**	Kg			
	Providing & fixing Reinforcement for R.C.C. work up to plinth level as specified, including straightening, cutting, bending, placing in position and binding all complete.				
1.8	**Masonry work in foundation**	Cum			
	Masonry work with Laterite stone blocks of size 390x190x190mm confirming to IS code 3620 in foundation and plinth in cement mortar 1:6 (1 cement : 6 coarse sand).				
	Total of Subhead 1.0				
2	**Super structure**				
2.1	**Masonry work in super structure**	Cum	12.82		
	Masonry work with Laterite stone blocks of size 390x190x190mm confirming to IS code 362 in cement mortar 1:4 (1 cement : 4 coarse sand) in super structure above plinth level including finishing in ruled pointing on the external side of wall.				
2.2	**Brick work in Red Burnt Bricks**	Cum	0.82		
	Brick work in FPS bricks of class designation 75 in rat trap bond in super structure above				

	plinth level in desired pattern in cement mortar 1:4 (1 cement : 4 coarse sand) including finishing in ruled pointing on the external side of wall where ever specified.				
2.3	**Brick work in Parapet wall**	Cum	1.84		
	Brick work with Fly ash bricks (FALG bricks) conforming to class 'A' in parapet wall in English bond in cement mortar 1:6 (1 cement : 6 coarse sand)				
2.4	**115mm thk brick wall**	Sqm	11.96		
	Half brick masonry with Fly ash bricks (FALG bricks) conforming to class 'A' in super structure above plinth level in cement mortar 1:6, including providing & placing in position 2 nos. 6mm dia. M.S. bars at every third course.				
2.5	**R.C.C. in super structure**	Cum			
	Providing & laying in position M-20 grade of reinforced cement concrete in Filler slab for roof, lintel beams, roof bands, hajjes and counter & Loft slabs etc. in super structure including centering, shuttering complete but excluding cost of reinforcement.				
2.6	**Reinforcement in super structure**	Kg			
	Providing & fixing Reinforcement for R.C.C. work in Filler slab for roof, lintel, hajjes and counter & Loft slabs in super structure as specified, including straightening, cutting, bending, placing in position and binding all complete.				
2.7	**Plain cement concrete**				
	Providing and laying plain cement concrete of specified grade as bed concrete under floor, roof slab, plinth protection, sill, coping, shelves, kitchen platform etc. screeding at roof to required slope and other locations as called for laid, consolidated and cured etc. complete as per specification and drawing.				
a)	1:4:8 (1 cement :4 coarse sand : 8 graded stone aggregate 40mm nominal size)	Cum	4.06		
	Total of Subhead 2.0				
3	**Wall finishes**				
3.1	Providing 12 mm thick cement plaster of mix 1:6 (1 cement: 6 coarse sand).	Sqm	107.55		
3.2	**Lime wash**	Sqm	120.75		
	Providing and applying three or more coats of white wash with lime on wall and ceiling to give an even shade including preparation of surfaces, scaffolding, mixing of indigo blue and DDL adhesive etc. complete.				
3.3	**Stone Counters**	Sqm	1.87		
	Providing and laying 20mm thk. Kota stone slabs on kitchen counters laid on 20mm thk. Cement mortar 1:3 (1 cement 3 coarse sand). Including rubbing and polishing complete.				
3.4	**Coping**	Sqm	0.56		
	Providing & fixing 20mm thk. coping of burnt clay paving tile, on window sill & parapet walls in cement mortar 1:6				
3.5	**Dado**	Sqm	13.49		
	Providing and laying ceramic glazed tiles of size 200x300mm in dado of uniform thickness, size, shade and pattern as approved by Architect/Project Manager laid with rich cement slurry over a bedding plaster of 12 mm thick cement mortar 1:3 (1 cement: 3 fine sand) and grouting the joints with white cement and pigment with matching shade of tile, cutting, curing etc. complete in all respects as per drawing.				
	Total of Subhead 3.0				
4	**Flooring**				
4.1	**IPS Flooring**	Sqm	23.84		
	Providing and laying 40mm thk. IPS flooring 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate) in two layers; finished with a floating coat of neat cement including cement slurry complete.				
4.2	**IPS Skirting**	Sqm	3.65		
	Providing and laying 18mm thk. cement plaster skirting with cement mortar 1:3 (1 cement: 3 coarse sand) finished with a floating coat of neat cement.				
4.3	**Ceramic tile Flooring**	Sqm	2.6		
	Providing and laying ceramic glazed tile flooring of size 300x300mm of approved make, shade and pattern as approved by Project in charge laid over 20/12 mm average thick bed of cement mortar 1:4 (1 cement : 4 coarse sand), grouting the joints with white cement and pigment to match the shade of tile including cutting, etc. complete in all respects				
4.4	Extra for addition of red oxide of iron (3.5kg per 50 kg of cement) in 40mm thk. IPS flooring	Sqm	6.6		
4.5	**Sand Filling**	Cum	3.96		
	Supplying and filling in plinth with sand under floors including watering, ramming, consolidating, and dressing complete.				
4.6	**Damp proof membrane**	Sqm	26.4		
	Providing & laying 1000 Gauge polythene damp proof membrane under floor PCC				
	Total of Subhead 4.0				
5	**Door Windows**				

5.1	**RCC Frame for door**				
	Providing and fixing Wooden Frame for door of size given below using RCC, out of section 100x50mm, with single or double rebate as required, with holdfasts, finished with enamel paint of approved colour all complete.				
a)	1000 x 2125mm	Nos.	2		
b)	750 x 2125mm	Nos.	2		
5.2	**RCC Frame for windows**				
	Providing and fixing Wooden Frame for window of size given below using RCC, out of section 100x50mm, with double rebate and holdfasts, finished with enamel paint of approved colour all complete.				
a)	1000x1200mm	Nos.	1		
b)	600x1200mm	Nos.	2		
b)	600x1000mm	Nos.	2		
5.3	**Door Shutters**				
	Providing and fixing door shutter of sizes given below of any of following material as per approval by project in charge/ architect. (Note: Hardware not included in the item, to be as per selection)				
i)	Wooden panelled door shutter using local wood as per approval, 12mm thk. particle board / M.S. jali as per requirement of panel including finishing with enamel paint of approved colour all complete.				
ii)	24 mm thick factory made PVC door shutters made of styles and rails of an uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both sides. Complete as per manufacturer's specification and direction of Engineer-in-charge. (For W.C. and bathroom door shutter).				
iii)	Providing and fixing 35mm thk. ISI marked flush door shutters conforming to IS : 2202 (Part I) decorative type, core of block board construction with frame of 1st class hard wood and well matched commercial 3 ply veneering with vertical grains or cross bands and face veneers on both faces of shutters.				
iv)	Bamboo door shutters				
a)	1000 x 2075mm	Nos.	2		
b)	750 x 2075mm	Nos.	2		
5.4	**Window Shutters**	Nos			
i)	Providing and fixing Wooden panelled shutter for window of given size using local wood as per approval, including providing & fixing 5mm thk. clear float glass of approved make, finishing with enamel paint of approved colour all complete. (Note: Hardware not included in the item, to be as per selection)				
ii)	Providing and fixing Wooden panelled shutter for window of given size using local wood as per approval, including providing & fixing M.S. wire gauge of avg. width of aperture 1.4mm with wire of dia 0.63mm , finishing with enamel paint of approved colour all complete. (Note: Hardware not included in the item, to be as per selection)				
iii)	Bamboo shutters				
a)	450x1100mm	Nos.	4		
b)	500x1100mm	Nos.	2		
b)	500x900mm	Nos.	2		
5.5	**Precast Louvers**				
a)	600x 515mm	Nos	4		
a)	1000x 515mm	Nos	1		
	Total of Subhead 5.0				
6	**Roofing**				
6.1	**Filler material for Filler slab**	Sqm	38.3		
	Providing & laying as per instruction, stabilised mud blocks 50mm thk. during casting of Filler slab.				
6.2	**Bamboo fins**	Sqm	0.5		
	Providing & fixing in position bamboo fins of size 40x40mm, including rubbing, finishing with enamel paint.				
6.3	**Precast Concrete slab**	Nos	1		
	Providing & fixing in position Precast Concrete slab of size 2440x600mm, with 1:4:8 mix with nominal reinforcement				
6.4	**Ceiling plaster**	Sqm	13.2		
	Providing 10 mm thick cement plaster of mix 1:4 (1 cement: 4 coarse sand) in ceiling.				
6.5	**Hot Bitumen layer**	Sqm	41.78		
	Providing layer of residual type petroleum bitumen of penetration 80/100 of approved quality at 17kg per 10sqm impregnated with a coat of coarse sand layer at 60 cudm per 10sqm including cleaning the slab surface with brushes and finally with a piece of cloth				

	lightly soaked in kerosene oil complete.				
6.6	**Mud phuska**	Cum	5.75		
	Providing and laying 100mm thick (average) mud phuska of damped brick earth on roof laid to slope consolidated and plastered with 25mm thk. mud mortar mixed with bhusa at 35kg per cum of earth and gobri leaping with mix 1:1 (1clay: 1 cow dung).				
6.7	**Brick tiles with grouting**	Sqm	38.3		
	(Providing) and laying FPS Brick tiles of class designation 75 over roof grouted with cement mortar 1:3 (1 cement : 3 fine sand) mixed with 2% of integral water proofing compound by weight of cement, over a 12mm layer of cement mortar 1:3 (1 cement : 3 fine sand) and finished neat.				
6.8	**Cement Gola**	Rmt	23.2		
	Providing Gola in cement concrete 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate 10 mm nominal size) including finishing with cement mortar 1:3 (1 cement: 3 sand) as per standard design.				
	Total of Subhead 6.0				
7	**Miscellaneous**				
7.1	Making khurras 450x450 with average minimum thickness of 50mm cement concrete 1:2:4 over PVC sheet 1mx1mx400micron, finished with 12mm cement plaster 1:3 and a coat of neat cement rounding the edges and making and finishing the outlet complete.	Nos	2		
7.2	Providing and fixing 110mm dia PVC rain water pipes of approved make to withstand a test pressure of 4.0kg/sqcm. including all fittings bends, sockets, elbow, tees, clamps, Y - Junction with cover (for collecting rainwater) including testing of joints etc. complete.	Rmt	6		
7.3	**M.S. Grill**	Sqm	4.34		
	Providing and fixing in position M.S. Grill made of 10x10mm m.s. square rods fixed at 150mm avg. c/c in both directions & 25x3mm flat all around to fix the grill to window, complete including grinding, providing two coats of red oxide primer and three or more coats of synthetic enamel paint of approved colour.				
7.4	**Concrete jali**	Sqm	2		
	Providing and fixing pre-fabricated Cement Concrete jali of approved pattern with cement mortar 1:4.				
	Total of Subhead 7.0				
	Total of "A'				

Summary of BOQ for Cluster unit EWS Option 'A' for Coastal Region, using Precast Arch Panels Roof and Masonry in Rat trap bond using Fly ash Bricks		
S.No.	**Description**	**Amount (Rs.)**
A.0	**Civil Works**	
1	Foundation	
2	Super structure	
3	Wall finishes	
4	Flooring	
5	Door & Windows	
6	Roofing	
7	Miscellaneous	
8	Plumbing	
9	Electrical	
	Total	
Note:	1. Estimated Cost is the cost of complete cluster (24 units)	
	2. Rain water disposal has been detailed only up to down take rain water pipe. Further disposal of rain water to be as per site situation.	

BOQ for Cluster unit EWS Option 'A' for Coastal Region, using Precast Arch Panels Roof and Masonry in Rat trap bond using Fly ash Bricks					
S.No.	**Item Description**	**Unit**	**Quantity**	**Rate**	**Amount (Rs.)**
A.0	**Civil Works**				
1	**Foundation**				
1.1	**Earth work in excavation**	Cum			
	Earth work in foundation trenches, column pits, drains etc. (not exceeding 1.5m in width or 10 sqm on plan) after clearing of site from bushes vegetation etc., including dressing of sides and ramming of bottoms, surface preparation as per specification to receive the PCC, lift up to 1.5m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50m.				
1.2	**Anti-termite treatment**	Sqm			
	Supplying, diluting and injecting chemical emulsion for pre-constructional anti termite treatment and creating a chemical barrier under and all-round the column pits, plinth beams, junction of wall and floor, along the external perimeter of building etc. complete				
	With chlorpyrifos /Lindane E.C. 20% with 1% concentration				
1.3	**Back filling of earth**	Cum			
	Filling available excavated earth (Excluding rock) in trenches, plinth, sides of foundation etc. in layers not exceeding 20Cm. in depth, consolidating each deposited layer by ramming and watering, lead up to 50m. and lift up to 1.5m.				
1.4	**PCC in foundation**				
	(Providing) & laying in position cement concrete of specified grade including centring & shuttering complete - All work up to plinth level.				
a)	1:4:8 (1 cement :4 coarse sand : 8 graded stone aggregate 40mm nominal size)	Cum			
b)	1:5:10 (1 cement :5 coarse sand : 10 graded stone aggregate 40mm nominal size)	Cum			
1.5	**R.C.C. up to plinth level**	Cum			
	Providing & laying in position M-20 grade of reinforced cement concrete including centering, shuttering complete but excluding cost of reinforcement - All work up to plinth level.				
1.6	**Reinforcement up to plinth level**	Kg			
	Providing & fixing Reinforcement for R.C.C. work up to plinth level as specified, including straightening, cutting, bending, placing in position and binding all complete.				
1.7	**Brick work in foundation**	Cum			
	Brick work with FPS bricks of class designation 75 in foundation and plinth in cement mortar 1:6 (1 cement: 6 coarse sand).				
	Total of Subhead 1.0				
2	**Super structure**				
2.1	**Brick work in super structure in rat trap bond**	Cum	275.78		
	230mm thk. Brick work with Fly ash bricks (FALG bricks) conforming to class 'A' in rat trap bond in cement mortar 1:4 (1 cement : 4 coarse sand) in super structure above plinth level including finishing in ruled pointing on the external side of wall.				
2.2	**Brick work in Red Burnt Bricks**	Cum	16.56		
	Brick work in FPS bricks of class designation 75 in super structure above plinth level in desired pattern in cement mortar 1:4 (1 cement : 4 coarse sand) including finishing in ruled pointing on the external side of wall where ever specified.				
2.3	**115 thk. wall**	Rmt	1652.95		
	115mm thk. Masonry work using Stabilised, Hydraulically Compressed Earth Blocks in super structure above plinth level as per the guidelines of Hydra form construction manual.				
2.4	**Brick work in English Bond**	Cum	102.8		

	Brick work with Fly ash bricks (FALG bricks) conforming to class 'A' in parapet wall in English bond in cement mortar 1:6 (1 cement : 6 coarse sand)				
2.5	**Brick Jali**	Sqm	7.09		
	Brick jali work in desired pattern in parapet wall with FPS bricks of class designation 75 in cement mortar 1:4				
2.6	**R.C.C. in super structure**	Cum			
	Providing & laying in position M-20 grade of reinforced cement concrete in columns, beams, roof slab, lintel beams, hajjes and counter & Loft slabs etc. in super structure including centering, shuttering complete but excluding cost of reinforcement.				
2.7	**Reinforcement in super structure**	Kg			
	Providing & fixing Reinforcement for R.C.C. work in columns, beams, roof slab, lintel, hajjes and counter & Loft slabs in super structure as specified, including straightening, cutting, bending, placing in position and binding all complete.				
2.8	**Plain cement concrete**				
	Providing and laying plain cement concrete of specified grade as bed concrete under floor, roof slab, plinth protection, sill, coping, shelves, kitchen platform etc. screeding at roof to required slope and other locations as called for laid, consolidated and cured etc. complete as per specification and drawing.				
a)	1:4:8 (1 cement :4 coarse sand : 8 graded stone aggregate 40mm nominal size)	Cum	99.82		
	Total of Subhead 2.0				
3	**Wall finishes**				
3.1	Providing 12 mm thick cement plaster of mix 1:6 (1 cement: 6 coarse sand).	Sqm	3033.74		
3.2	**Lime wash**	Sqm	3815.74		
	Providing and applying three or more coats of white wash with lime on wall and ceiling to give an even shade including preparation of surfaces, scaffolding, mixing of indigo blue and DDL adhesive etc. complete.				
3.3	**Stone Counters**	Sqm	48.74		
	Providing and laying 20mm thk. Kota stone slabs on kitchen counters laid on 20mm thk. Cement mortar 1:3 (1 cement 3 coarse sand). Including rubbing and polishing complete.				
3.4	**Coping**	Sqm	48.94		
	Providing & fixing 20mm thk. coping of burnt clay paving tile, on window sill & parapet walls in cement mortar 1:6				
3.5	**Dado**	Sqm	331.92		
	Providing and laying ceramic glazed tiles of size 200x300mm in dado of uniform thickness, size, shade and pattern as approved by Architect/Project Manager laid with rich cement slurry over a bedding plaster of 12 mm thick cement mortar 1:3 (1 cement: 3 fine sand) and grouting the joints with white cement and pigment with matching shade of tile, cutting, curing etc. complete in all respects as per drawing.				
	Total of Subhead 3.0				
4	**Flooring**				
4.1	**IPS Flooring**	Sqm	576.6		
	Providing and laying 40mm thk. IPS flooring 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate) in two layers; finished with a floating coat of neat cement including cement slurry complete.				
4.2	**IPS Skirting**	Sqm	84.91		
	Providing and laying 18mm thk. cement plaster skirting with cement mortar 1:3 (1 cement: 3 coarse sand) finished with a floating coat of neat cement.				
4.3	**Ceramic tile Flooring**	Sqm	60		
	Providing and laying ceramic glazed tile flooring of size 300x300mm of approved make, shade and pattern as approved by Project in charge laid over 20/12 mm average thick bed of cement mortar 1:4 (1 cement : 4 coarse sand), grouting the joints with white cement and pigment to match the shade of tile including cutting, etc. complete in all respects				
4.4	Extra for addition of red oxide of iron (3.5kg per 50 kg of cement) in 40mm thk. IPS flooring	Sqm	144.15		
4.5	**Sand Filling**	Cum	24.93		
	Supplying and filling in plinth with sand under floors including watering, ramming, consolidating, and dressing complete.				
4.6	**Damp proof membrane**	Sqm	144		
	Providing & laying 1000 Gauge polythene damp proof membrane under floor PCC				
	Total of Subhead 4.0				
5	**Door Windows**				
5.1	**RCC Frame for door**				
	Providing and fixing Wooden Frame for door of size given below using RCC, out of section 100x50mm, with single or double rebate as required, with holdfasts, finished with enamel paint of approved colour all complete.				

a)	1000 x 2125mm	Nos.	48		
b)	750 x 2125mm	Nos.	72		
5.2	**RCC Frame for windows**				
	Providing and fixing Wooden Frame for window of size given below using RCC, out of section 100x50mm, with double rebate and holdfasts, finished with enamel paint of approved colour all complete.				
a)	600x1200mm	Nos.	96		
b)	600x1085mm	Nos.	48		
5.3	**Door Shutters**				
	Providing and fixing door shutter of sizes given below of any of following material as per approval by project in charge/ architect. (Note: Hardware not included in the item, to be as per selection)				
i)	Wooden panelled door shutter using local wood as per approval, 12mm thk. particle board / M.S. jali as per requirement of panel including finishing with enamel paint of approved colour all complete.				
ii)	24 mm thick factory made PVC door shutters made of styles and rails of a uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both sides. Complete as per manufacturer's specification and direction of Engineer-in-charge. (For W.C. and bathroom door shutter).				
iii)	Providing and fixing 35mm thk. ISI marked flush door shutters conforming to IS : 2202 (Part I) decorative type, core of block board construction with frame of 1st class hard wood and well matched commercial 3 ply veneering with vertical grains or cross bands and face veneers on both faces of shutters.				
iv)	Bamboo door shutters				
a)	900 x 2075mm	Nos.	72		
b)	650 x 2075mm	Nos.	72		
5.4	**Window Shutters**				
i)	Providing and fixing Wooden panelled shutter for window of given size using local wood as per approval, including providing & fixing 5mm thk. clear float glass of approved make, finishing with enamel paint of approved colour all complete. (Note: Hardware not included in the item, to be as per selection)				
ii)	Providing and fixing Wooden panelled shutter for window of given size using local wood as per approval, including providing & fixing M.S. wire gauge of avg. width of aperture 1.4mm with wire of dia 0.63mm , finishing with enamel paint of approved colour all complete. (Note: Hardware not included in the item, to be as per selection)				
iii)	Bamboo shutters				
a)	500x1100mm	Nos.	96		
b)	500x985mm	Nos.	48		
5.5	**Precast Louvers**				
a)	600x 375mm	Nos	96		
	Total of Subhead 5.0				
6	**Roofing**				
6.1	**Precast Arch Panel system**	Sqm	717.6		
	Providing and Laying precast Arch Panels & Precast RCC Beams for roof as per related training and including providing & laying necessary cast in situ RCC and reinforcement as specified in structural drawings , centering & shuttering complete, excluding the cost of reinforcement.				
6.2	**Ceiling plaster**	Sqm	782		
	Providing 10 mm thick cement plaster of mix 1:4 (1 cement: 4 coarse sand) in ceiling.				
6.3	**Sunken area filling**	Cum	26.83		
	Providing and laying on sunken areas broken light weight concrete block bats of approximately 600 kg. per cum density laid, consolidated, finished smooth, including finished & grouting the top layer with water proof cement mortar with CICO or equivalent brand.				
6.4	**Hot Bitumen layer**	Sqm	185.73		
	Providing layer of residual type petroleum bitumen of penetration 80/100 of approved quality at 17kg per 10sqm impregnated with a coat of coarse sand layer at 60 cudm per 10sqm including cleaning the slab surface with brushes and finally with a piece of cloth lightly soaked in kerosene oil complete.				
6.5	**Mud phuska**	Cum	24.93		
	Providing and laying 100mm thick (average) mud phuska of damped brick earth on roof laid to slope consolidated and plastered with 25mm thk. mud mortar mixed with bhusa at 35kg per cum of earth and gobri leaping with mix 1:1 (1clay: 1 cow dung).				
6.6	**Brick tiles with grouting**	Sqm	166.2		
	(Providing) and laying FPS Brick tiles of class designation 75 over roof grouted with cement mortar 1:3 (1 cement : 3 fine sand) mixed with 2% of integral water proofing compound by				

	weight of cement, over a 12mm layer of cement mortar 1:3 (1 cement : 3 fine sand) and finished neat.				
6.7	**Cement Gola**	Rmt	99		
	Providing Gola in cement concrete 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate 10 mm nominal size) including finishing with cement mortar 1:3 (1 cement: 3 sand) as per standard design.				
	Total of Subhead 6.0				
7	**Miscellaneous**				
7.1	Making khurras 50x450mm with average minimum thickness of 50mm cement concrete 1:2:4 over PVC sheet 1mx1mx400micron, finished with 12mm cement plaster 1:3 and a coat of neat cement rounding the edges and making and finishing the outlet complete.	Nos	8		
7.2	Providing and fixing 110mm dia PVC rain water pipes of approved make to withstand a test pressure of 4.0kg/sqcm. including all fittings bends, sockets, elbow, tees, clamps, Y - Junction with cover (for collecting rainwater) including testing of joints etc. complete.	Rmt	85		
	Total of Subhead 7.0				
	Total of "A'				

Summary of BOQ for Cluster unit EWS Option 'B' for Coastal Region, using Precast Planks & Joist Roof and Masonry in Stabilised, Hydra form Compressed Earth Blocks		
S.No.	**Description**	**Amount (Rs.)**
A.0	**Civil Works**	
1	Foundation	
2	Super structure	
3	Wall finishes	
4	Flooring	
5	Door & Windows	
6	Roofing	
7	Miscellaneous	
8	Plumbing	
9	Electrical	
	Total	
Note:	1. Estimated Cost is the cost of complete cluster (24 units)	
	2. Rain water disposal has been detailed only up to down take rain water pipe. Further disposal of rain water to be as per site situation.	

BOQ for Cluster unit EWS Option 'B' for Coastal Region, using Precast Planks & Joist Roof and Masonry in Stabilised, Hydra form Compressed Earth Blocks					
S.No.	**Item Description**	**Unit**	**Quantity**	**Rate**	**Amount (Rs.)**
A.0	**Civil Works**				
1	**Foundation**				
1.1	**Earth work in excavation**	Cum			
	Earth work in foundation trenches, column pits, drains etc. (not exceeding 1.5m in width or 10 sqm on plan) after clearing of site from bushes vegetation etc., including dressing of sides and ramming of bottoms, surface preparation as per specification to receive the PCC, lift up to 1.5m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50m.				
1.2	**Anti-termite treatment**	Sqm			
	Supplying, diluting and injecting chemical emulsion for pre-constructional anti termite treatment and creating a chemical barrier under and all-round the column pits, plinth beams, junction of wall and floor, along the external perimeter of building etc. complete				
	With chlorpyrifos /Lindane E.C. 20% with 1% concentration				
1.3	**Back filling of earth**	Cum			
	Filling available excavated earth (Excluding rock) in trenches, plinth, sides of foundation etc. in layers not exceeding 20Cm. in depth, consolidating each deposited layer by ramming and watering, lead up to 50m. and lift up to 1.5m.				
1.4	**PCC in foundation**				
	(Providing) & laying in position cement concrete of specified grade including centring & shuttering complete - All work up to plinth level.				
a)	1:4:8 (1 cement :4 coarse sand : 8 graded stone aggregate 40mm nominal size)	Cum			
b)	1:5:10 (1 cement :5 coarse sand : 10 graded stone aggregate 40mm nominal size)	Cum			
1.5	**R.C.C. up to plinth level**	Cum			
	Providing & laying in position M-20 grade of reinforced cement concrete including centering, shuttering complete but excluding cost of reinforcement - All work up to plinth level.				
1.6	**Reinforcement up to plinth level**	Kg			
	Providing & fixing Reinforcement for R.C.C. work up to plinth level as specified, including straightening, cutting, bending, placing in position and binding all complete.				
1.7	**Brick work in foundation**	Cum			
	Brick work with FPS bricks of class designation 75 in foundation and plinth in cement mortar 1:6 (1 cement: 6 coarse sand).				
	Total of Subhead 1.0				
2	**Super structure**				
2.1	**Masonry work in super structure**	Sqm	1695.22		
	220mm thk. Masonry work using Stabilised, Hydraulically Compressed Earth Blocks in super structure above plinth level as per the guidelines of Hydra form construction manual.				
2.2	**115 thk. wall**	Sqm	62.1		
	115mm thk. Masonry work using Stabilised, Hydraulically Compressed Earth Blocks in super structure above plinth level as per the guidelines of Hydra form construction manual.				
2.3	**Brick work in Red Burnt Bricks**	Cum	19.14		
	Brick work in FPS bricks of class designation 75 in super structure above plinth level in desired pattern in cement mortar 1:4 (1 cement : 4 coarse sand) including finishing in ruled pointing on the external side of wall where ever specified.				
2.4	**Brick Jali**	Sqm	5.71		
	Brick jali work in desired pattern in parapet wall with FPS bricks of class designation 75 in				

	cement mortar 1:4				
2.5	**R.C.C. in super structure**	Cum			
	Providing & laying in position M-20 grade of reinforced cement concrete in lintel beams, hajjes and counter & Loft slabs etc. in super structure including centering, shuttering complete but excluding cost of reinforcement.				
2.6	**Reinforcement in super structure**	Kg			
	Providing & fixing Reinforcement for R.C.C. work in lintel, hajjes and counter & Loft slabs in super structure as specified, including straightening, cutting, bending, placing in position and binding all complete.				
2.7	**Plain cement concrete**				
	Providing and laying plain cement concrete of specified grade as bed concrete under floor, roof slab, plinth protection, sill, coping, shelves, kitchen platform etc. screeding at roof to required slope and other locations as called for laid, consolidated and cured etc. complete as per specification and drawing.				
a)	1:4:8 (1 cement :4 coarse sand : 8 graded stone aggregate 40mm nominal size)	Cum	95.4		
	Total of Subhead 2.0				
3	**Wall finishes**				
3.1	Providing 12 mm thick cement plaster of mix 1:6 (1 cement: 6 coarse sand).	Sqm	2551.11		
3.2	**Lime wash**	Sqm	3427		
	Providing and applying three or more coats of white wash with lime on wall and ceiling to give an even shade including preparation of surfaces, scaffolding, mixing of indigo blue and DDL adhesive etc. complete.				
3.3	**Stone Counters**	Sqm	48.74		
	Providing and laying 20mm thk. Kota stone slabs on kitchen counters laid on 20mm thk. Cement mortar 1:3 (1 cement 3 coarse sand). Including rubbing and polishing complete.				
3.4	**Coping**	Sqm	40.46		
	Providing & fixing 20mm thk. coping of burnt clay paving tile, on window sill & parapet walls in cement mortar 1:6				
3.5	**Dado**	Sqm	393.12		
	Providing and laying ceramic glazed tiles of size 200x300mm in dado of uniform thickness, size, shade and pattern as approved by Architect/Project Manager laid with rich cement slurry over a bedding plaster of 12 mm thick cement mortar 1:3 (1 cement: 3 fine sand) and grouting the joints with white cement and pigment with matching shade of tile, cutting, curing etc. complete in all respects as per drawing.				
	Total of Subhead 3.0				
4	**Flooring**				
4.1	**IPS Flooring**	Sqm	492		
	Providing and laying 40mm thk. IPS flooring 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate) in two layers; finished with a floating coat of neat cement including cement slurry complete.				
4.2	**IPS Skirting**	Sqm	72		
	Providing and laying 18mm thk. cement plaster skirting with cement mortar 1:3 (1 cement: 3 coarse sand) finished with a floating coat of neat cement.				
4.3	Extra for addition of red oxide of iron (3.5kg per 50 kg of cement) in 40mm thk. IPS flooring	Sqm	123		
4.4	**Ceramic tile Flooring**	Sqm	70.56		
	Providing and laying ceramic glazed tile flooring of size 300x300mm of approved make, shade and pattern as approved by Project in charge laid over 20/12 mm average thick bed of cement mortar 1:4 (1 cement : 4 coarse sand), grouting the joints with white cement and pigment to match the shade of tile including cutting, etc. complete in all respects				
4.5	**Sand Filling**	Cum	21.06		
	Supplying and filling in plinth with sand under floors including watering, ramming, consolidating, and dressing complete.				
4.6	**Damp proof membrane**	Sqm	140.4		
	Providing & laying 1000 Gauge polythene damp proof membrane under floor PCC				
	Total of Subhead 4.0				
5	**Door Windows**				
5.1	**RCC Frame for door**				
	Providing and fixing Wooden Frame for door of size given below using RCC, out of section 100x50mm, with single or double rebate as required, with holdfasts, finished with enamel paint of approved colour all complete.				
a)	1000 x 2125mm	Nos.	48		
b)	750 x 2125mm	Nos.	72		
5.2	**RCC Frame for windows**				
	Providing and fixing Wooden Frame for window of size given below using RCC, out of section				

	100x50mm, with double rebate and holdfasts, finished with enamel paint of approved colour all complete.				
a)	1000x1200mm	Nos.	24		
b)	600x1200mm	Nos.	24		
c)	600x1085mm	Nos.	48		
5.3	**Door Shutters**				
	Providing and fixing door shutter of sizes given below of any of following material as per approval by project in charge/ architect. (Note: Hardware not included in the item, to be as per selection)				
i)	Wooden panelled door shutter using local wood as per approval, 12mm thk. particle board / M.S. jali as per requirement of panel including finishing with enamel paint of approved colour all complete.				
ii)	24 mm thick factory made PVC door shutters made of styles and rails of a uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both sides. Complete as per manufacturer's specification and direction of Engineer-in-charge. (For W.C. and bathroom door shutter).				
iii)	Providing and fixing 35mm thk. ISI marked flush door shutters conforming to IS : 2202 (Part I) decorative type, core of block board construction with frame of 1st class hard wood and well matched commercial 3 ply veneering with vertical grains or cross bands and face veneers on both faces of shutters.				
iv)	Bamboo door shutters				
a)	900 x 2075mm	Nos.	48		
b)	650 x 2075mm	Nos.	72		
5.4	**Window Shutters**				
i)	Providing and fixing Wooden panelled shutter for window of given size using local wood as per approval, including providing & fixing 5mm thk. clear float glass of approved make, finishing with enamel paint of approved colour all complete. (Note: Hardware not included in the item, to be as per selection)				
ii)	Providing and fixing Wooden panelled shutter for window of given size using local wood as per approval, including providing & fixing M.S. wire gauge of avg. width of aperture 1.4mm with wire of dia 0.63mm , finishing with enamel paint of approved colour all complete. (Note: Hardware not included in the item, to be as per selection)				
iii)	Bamboo shutter				
a)	450x1100mm	Nos.	48		
b)	500x1100mm	Nos.	24		
c)	500x985mm	Nos.	48		
5.5	**Precast Louvers**				
a)	1000x 450mm	Nos	24		
b)	600x 450mm	Nos	24		
	Total of Subhead 5.0				
6	**Roofing**				
6.1	**RCC Plank and Joist system**	Sqm	650.4		
	Providing and Laying precast RCC planks and joists system for roof slab and beams as per related training and including providing & laying necessary cast in situ RCC and reinforcement as specified in structural drawings , centering & shuttering complete, excluding the cost of reinforcement.				
6.2	**Ceiling plaster**	Sqm	876		
	Providing 10 mm thick cement plaster of mix 1:4 (1 cement: 4 coarse sand) in ceiling.				
6.3	**Sunken area filling**	Cum	37.91		
	Providing and laying on sunken areas broken light weight concrete block bats of approximately 600 kg. per cum density laid, consolidated, finished smooth, including finished & grouting the top layer with water proof cement mortar with CICO or equivalent brand.				
6.4	**Hot Bitumen layer**	Sqm	177.92		
	Providing layer of residual type petroleum bitumen of penetration 80/100 of approved quality at 17kg per 10sqm impregnated with a coat of coarse sand layer at 60 cudm per 10sqm including cleaning the slab surface with brushes and finally with a piece of cloth lightly soaked in kerosene oil complete.				
6.5	**Mud phuska**	Cum	21.69		
	Providing and laying 100mm thick (average) mud phuska of damped brick earth on roof laid to slope consolidated and plastered with 25mm thk. mud mortar mixed with bhusa at 35kg per cum of earth and gobri leaping with mix 1:1 (1clay: 1 cow dung).				
6.6	**Brick tiles with grouting**	Sqm	159.06		
	(Providing) and laying FPS Brick tiles of class designation 75 over roof grouted with cement mortar 1:3 (1 cement : 3 fine sand) mixed with 2% of integral water proofing compound by				

	weight of cement, over a 12mm layer of cement mortar 1:3 (1 cement : 3 fine sand) and finished neat.				
6.7	**Cement Gola**	Rmt	124.3		
	Providing Gola in cement concrete 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate 10 mm nominal size) including finishing with cement mortar 1:3 (1 cement: 3 sand) as per standard design.				
	Total of Subhead 6.0				
7	**Miscellaneous**				
7.1	Making khurras 450x450mm with average minimum thickness of 50mm cement concrete 1:2:4 over PVC sheet 1mx1mx400micron, finished with 12mm cement plaster 1:3 and a coat of neat cement rounding the edges and making and finishing the outlet complete.	Nos	8		
7.2	Providing and fixing 110mm dia PVC rain water pipes of approved make to withstand a test pressure of 4.0kg/sqcm. including all fittings bends, sockets, elbow, tees, clamps, Y - Junction with cover (for collecting rainwater) including testing of joints etc. complete.	Rmt	85		
	Total of Subhead 7.0				
	Total of "A'				

Summary of BOQ for LIG'A' Individual unit Option 'A' for Coastal Region, using Precast Arch Panel & Micro Concrete Tiles Roof and Masonry work in Stabilised Compressed Earth Hydra form Blocks		
S.No.	**Description**	**Amount (Rs.)**
A.0	**Civil Works**	
1	Foundation	
2	Super structure	
3	Wall finishes	
4	Flooring	
5	Door & Windows	
6	Roofing	
7	Miscellaneous Works	
8	Plumbing	
9	Electrical	
	Total	
Note:	1. Rain water disposal has been detailed only up to down take rain water pipe. Further disposal of rain water to be as per site situation.	

BOQ for LIG'A' Individual unit Option 'A' for Coastal Region, using Precast Arch Panel & Micro Concrete Tiles Roof and Masonry work in Stabilised Compressed Earth Hydra form Blocks

S.No.	Item Description	Unit	Quantity	Rate	Amount (Rs.)
A.0	**Civil Works**				
1	**Foundation**				
1.1	**Earth work in excavation**	Cum			
	Earth work in foundation trenches, column pits, drains etc. (not exceeding 1.5m in width or 10 sqm on plan) after clearing of site from bushes vegetation etc., including dressing of sides and ramming of bottoms, surface preparation as per specification to receive the PCC, lift up to 1.5m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50m.				
1.2	**Anti-termite treatment**	Sqm			
	Supplying, diluting and injecting chemical emulsion for pre-constructional anti termite treatment and creating a chemical barrier under and all-round the column pits, plinth beams, junction of wall and floor, along the external perimeter of building etc. complete				
	With chlorpyrifos /Lindane E.C. 20% with 1% concentration				
1.3	**Back filling of earth**	Cum			
	Filling available excavated earth (Excluding rock) in trenches, plinth, sides of foundation etc. in layers not exceeding 20Cm. in depth, consolidating each deposited layer by ramming and watering, lead up to 50m. and lift up to 1.5m.				
1.4	**D.P.C.**	Sqm	8.79		
	Providing and laying damp proof course 40 mm thick with cement concrete 1:2:4 (1 cement :2 coarse sand: 4 graded stone aggregate 12.5 mm nominal size) and applying a coat of residual petroleum bitumen of penetration 80/100 of approved quality.				
1.5	**PCC in foundation**				
	(Providing) & laying in position cement concrete of specified grade including centring & shuttering complete - All work up to plinth level.				
a)	1:4:8 (1 cement :4 coarse sand : 8 graded stone aggregate 40mm nominal size)	Cum			
b)	1:5:10 (1 cement :5 coarse sand : 10 graded stone aggregate 40mm nominal size)	Cum			
1.6	**R.C.C. up to plinth level**	Cum			
	Providing & laying in position M-20 grade of reinforced cement concrete including centering, shuttering complete but excluding cost of reinforcement - All work up to plinth level.				
1.7	**Reinforcement up to plinth level**	Kg			
	Providing & fixing Reinforcement for R.C.C. work up to plinth level as specified, including straightening, cutting, bending, placing in position and binding all complete.				
1.8	**Brick work in foundation**	Cum			
	Brick work with FPS bricks of class designation 75 in foundation and plinth in cement mortar 1:6 (1 cement: 6 coarse sand).				
	Total of Subhead 1.0				
2	**Super structure**				
2.1	**Masonry work in super structure**	Sqm	75.31		
	220mm thk. Masonry work using Stabilised, Hydraulically Compressed Earth Blocks in super structure above plinth level as per the guidelines of Hydra form construction manual.				
2.2	**115 thk. wall**	Sqm	6.38		
	115mm thk. Masonry work using Stabilised, Hydraulically Compressed Earth Blocks in super structure above plinth level as per the guidelines of Hydra form construction manual.				
2.3	**Brick work in Parapet wall**	Cum	1.79		

	Brick work with Fly ash bricks (FALG bricks) conforming to class 'A' in super structure above plinth level in English bond in cement mortar 1:6 (1 cement : 6 coarse sand)				
2.4	**Red Brick Bands**	Cum	1.79		
	Brick work in FPS bricks of class designation 75 in super structure above plinth level in desired pattern in cement mortar 1:4 (1 cement : 4 coarse sand) including finishing in ruled pointing on the external side of wall where ever specified.				
2.5	**Red Brick Jali**	Sqm	0.86		
	Brick jali work in desired pattern in parapet wall with FPS bricks of class designation 75 in cement mortar 1:4				
2.6	**R.C.C. in super structure**	Cum			
	Providing & laying in position M-20 grade of reinforced cement concrete in lintel beams, hajjes and counter & Loft slabs etc. in super structure including centering, shuttering complete but excluding cost of reinforcement.				
2.7	**Reinforcement in super structure**	Kg			
	Providing & fixing Reinforcement for R.C.C. work in lintel, hajjes and counter & Loft slabs in super structure as specified, including straightening, cutting, bending, placing in position and binding all complete.				
2.8	**Plain cement concrete**				
	Providing and laying plain cement concrete of specified grade as bed concrete under floor, roof slab, plinth protection, sill, coping, shelves, kitchen platform etc. screeding at roof to required slope and other locations as called for laid, consolidated and cured etc. complete as per specification and drawing.				
a)	1:4:8 (1 cement :4 coarse sand : 8 graded stone aggregate 40mm nominal size)	Cum	5.52		
	Total of Subhead 2.0				
3	**Wall finishes**				
3.1	Providing 12 mm thick cement plaster of mix 1:6 (1 cement: 6 coarse sand).	Sqm	99.9		
3.2	**Lime wash**	Sqm	99.9		
	Providing and applying three or more coats of white wash with lime on wall and ceiling to give an even shade including preparation of surfaces, scaffolding, mixing of indigo blue and DDL adhesive etc. complete.				
3.3	**Stone Counters**	Sqm	2		
	Providing and laying 20mm thk. Kota stone slabs on kitchen counters laid on 20mm thk. Cement mortar 1:3 (1 cement 3 coarse sand). Including rubbing and polishing complete.				
3.4	**Coping**	Sqm	7.23		
	Providing & fixing 20mm thk. coping of burnt clay paving tile, on window sill & parapet walls in cement mortar 1:6				
3.5	**Dado**	Sqm	18.99		
	Providing and laying ceramic glazed tiles of size 200x300mm in dado of uniform thickness, size, shade and pattern as approved by Architect/Project Manager laid with rich cement slurry over a bedding plaster of 12 mm thick cement mortar 1:3 (1 cement: 3 fine sand) and grouting the joints with white cement and pigment with matching shade of tile, cutting, curing etc. complete in all respects as per drawing.				
	Total of Subhead 3.0				
4	**Flooring**				
4.1	**Terrazzo Tile Flooring**	Sqm	29.8		
	Providing and laying precast terrazzo tiles 22mm thick with graded marble chips of size up to 12mm, Light shade using white cement, laid in floors, jointed with neat cement slurry mixed with pigment to match the shade of the tiles including rubbing and polishing complete with precast tiles on 20mm thick bed of cement mortar 1:4 (1 cement :4 coarse sand)				
4.2	**Paving Tiles flooring**	Sqm	3.19		
	Providing & fixing 20mm thk. burnt clay paving tile flooring on 20mm thick bed of cement mortar 1:4 (1 cement :4 coarse sand), jointed with neat cement slurry mixed with pigment to match the shade of the tiles including rubbing and polishing complete				
4.3	**Terrazzo Tile Skirting**	Sqm	4.2		
	Providing and laying precast terrazzo tiles 22mm thick with graded marble chips of size up to 12mm, Light shade using white cement, in skirting jointed with neat cement slurry mixed with pigment to match the shade of the tiles including rubbing and polishing complete with precast tiles on 12mm thick cement mortar 1:3 (1 cement : 3 coarse sand)				
4.4	**Ceramic tile Flooring**	Sqm	3.2		
	Providing and laying ceramic glazed tile flooring of size 300x300mm of approved make, shade and pattern as approved by Project in charge laid over 20/12 mm average thick bed of cement mortar 1:4 (1 cement : 4 coarse sand), grouting the joints with white cement and pigment to match the shade of tile including cutting, etc. complete in all respects				
4.5	**Sand Filling**	Cum	4.95		

	Supplying and filling in plinth with sand under floors including watering, ramming, consolidating, and dressing complete.				
4.6	**Damp proof membrane**	Sqm	33		
	Providing & laying 1000 Gauge polythene damp proof membrane under floor PCC				
	Total of Subhead 4.0				
5	**Door Windows**				
5.1	**RCC Frame for door**				
	Providing and fixing Wooden Frame for door of size given below using RCC, out of section 100x50mm, with single or double rebate as required, with holdfasts, finished with enamel paint of approved colour all complete.				
a)	1000 x 2125mm	Nos.	2		
b)	750 x 2125mm	Nos.	3		
5.2	**RCC Frame for windows**				
	Providing and fixing Wooden Frame for window of size given below using RCC, out of section 100x50mm, with double rebate and holdfasts, finished with enamel paint of approved colour all complete.				
a)	1000x1200mm	Nos.	1		
b)	600x1200mm	Nos.	5		
b)	600x1085mm	Nos.	2		
5.3	**Door Shutters**				
	Providing and fixing door shutter of sizes given below of any of following material as per approval by project in charge/ architect. (Note: Hardware not included in the item, to be as per selection)				
i)	Wooden panelled door shutter using local wood as per approval, 12mm thk. particle board / M.S. jali as per requirement of panel including finishing with enamel paint of approved colour all complete.				
ii)	24 mm thick factory made PVC door shutters made of styles and rails of a uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both sides. Complete as per manufacturer's specification and direction of Engineer-in-charge. (For W.C. and bathroom door shutter).				
iii)	Providing and fixing 35mm thk. ISI marked flush door shutters conforming to IS : 2202 (Part I) decorative type, core of block board construction with frame of 1st class hard wood and well matched commercial 3 ply veneering with vertical grains or cross bands and face veneers on both faces of shutters.				
iv)	Bamboo door shutters				
a)	900 x 2075mm	Nos.	2		
b)	650x 2075mm	Nos.	3		
5.4	**Window Shutters**				
i)	Providing and fixing Wooden panelled shutter for window of given size using local wood as per approval, including providing & fixing 5mm thk. clear float glass of approved make, finishing with enamel paint of approved colour all complete. (Note: Hardware not included in the item, to be as per selection)				
ii)	Providing and fixing Wooden panelled shutter for window of given size using local wood as per approval, including providing & fixing M.S. wire gauge of avg. width of aperture 1.4mm with wire of dia 0.63mm , finishing with enamel paint of approved colour all complete. (Note: Hardware not included in the item, to be as per selection)				
iii)	Bamboo shutters				
a)	450x1100mm	Nos.	2		
b)	500x1100mm	Nos.	5		
b)	500x985mm	Nos.	2		
5.5	**Precast Louvers**				
a)	600x 355mm	Nos	6		
b)	750x 355mm	Nos	1		
	Total of Subhead 5.0				
6	**Roofing**				
6.1	**Precast Arch Panel system**	Sqm	44.5		
	Providing and Laying precast Arch Panels & Precast RCC Beams for roof as per related training and including providing & laying necessary cast in situ RCC and reinforcement as specified in structural drawings , centering & shuttering complete, excluding the cost of reinforcement.				
6.3	**Ceiling plaster**	Sqm	-		
	Providing 10 mm thick cement plaster of mix 1:4 (1 cement: 4 coarse sand) in ceiling.				
6.4	**Hot Bitumen layer**	Sqm	42.32		
	Providing layer of residual type petroleum bitumen of penetration 80/100 of approved quality				

	at 17kg per 10sqm impregnated with a coat of coarse sand layer at 60 cudm per 10sqm including cleaning the slab surface with brushes and finally with a piece of cloth lightly soaked in kerosene oil complete.				
6.5	**Mud phuska**	Cum	5.75		
	Providing and laying 100mm thick (average) mud phuska of damped brick earth on roof laid to slope consolidated and plastered with 25mm thk. mud mortar mixed with bhusa at 35kg per cum of earth and gobri leaping with mix 1:1 (1clay: 1 cow dung).				
6.6	**Brick tiles with grouting**	Sqm	38.3		
	(Providing) and laying FPS Brick tiles of class designation 75 over roof grouted with cement mortar 1:3 (1 cement : 3 fine sand) mixed with 2% of integral water proofing compound by weight of cement, over a 12mm layer of cement mortar 1:3 (1 cement : 3 fine sand) and finished neat.				
6.7	**Cement Gola**	Rmt	26.8		
	Providing Gola in cement concrete 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate 10 mm nominal size) including finishing with cement mortar 1:3 (1 cement: 3 sand) as per standard design.				
	Total of Subhead 6.0				
7	**Miscellaneous**				
	Making khurras 450x450mm with average minimum thickness of 50mm cement concrete 1:2:4 over PVC sheet 1mx1mx400micron, finished with 12mm cement plaster 1:3 and a coat of neat cement rounding the edges and making and finishing the outlet complete.	Nos	2		
7.2	Providing and fixing 110mm dia PVC rain water pipes of approved make to withstand a test pressure of 4.0kg/sqcm. including all fittings bends, sockets, elbow, tees, clamps, Y - Junction with cover (for collecting rainwater) including testing of joints etc. complete.	Rmt	6		
7.3	**M.S. Grill**	Sqm	5.84		
	Providing and fixing in position M.S. Grill made of 10x10mm m.s. square rods fixed at 150mm avg. c/c in both directions & 25x3mm flat all around to fix the grill to window, complete including grinding, providing two coats of red oxide primer and three or more coats of synthetic enamel paint of approved colour.				
7.4	**Concrete jali**	Sqm	2		
	Providing and fixing pre-fabricated Cement Concrete jali of approved pattern with cement mortar 1:4.				
	Total of Subhead 7.0				
	Total of "A'				

Summary of BOQ for LIG'A' Individual unit Option 'B' for Coastal Region, using Precast Planks - Joists & Filler slab and Brick work in Rat trap bond using Red bricks		
S.No.	**Description**	**Amount (Rs.)**
A.0	**Civil Works**	
1	Foundation	
2	Super structure	
3	Wall finishes	
4	Flooring	
5	Door & Windows	
6	Roofing	
7	Miscellaneous Works	
8	Plumbing	
9	Electrical	
	Total	
Note:	1. Rain water disposal has been detailed only up to down take rain water pipe. Further disposal of rain water to be as per site situation.	

BOQ for LIG'A' Individual unit Option 'B' for Coastal Region, using Precast Planks - Joists & Filler slab and Brick work in Rat trap bond using Red bricks

S.No.	Item Description	Unit	Quantity	Rate	Amount (Rs.)
A.0	**Civil Works**				
1	**Foundation**				
1.1	**Earth work in excavation**	Cum			
	Earth work in foundation trenches, column pits, drains etc. (not exceeding 1.5m in width or 10 sqm on plan) after clearing of site from bushes vegetation etc., including dressing of sides and ramming of bottoms, surface preparation as per specification to receive the PCC, lift up to 1.5m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50m.				
1.2	**Anti-termite treatment**	Sqm			
	Supplying, diluting and injecting chemical emulsion for pre-constructional anti termite treatment and creating a chemical barrier under and all-round the column pits, plinth beams, junction of wall and floor, along the external perimeter of building etc. complete				
	With chlorpyrifos /Lindane E.C. 20% with 1% concentration				
1.3	**Back filling of earth**	Cum			
	Filling available excavated earth (Excluding rock) in trenches, plinth, sides of foundation etc. in layers not exceeding 20Cm. in depth, consolidating each deposited layer by ramming and watering, lead up to 50m. and lift up to 1.5m.				
1.4	**D.P.C.**	Sqm	9.14		
	Providing and laying damp proof course 40 mm thick with cement concrete 1:2:4 (1 cement :2 coarse sand: 4 graded stone aggregate 12.5 mm nominal size) and applying a coat of residual petroleum bitumen of penetration 80/100 of approved quality.				
1.5	**PCC in foundation**				
	(Providing) & laying in position cement concrete of specified grade including centring & shuttering complete - All work up to plinth level.				
a)	1:4:8 (1 cement :4 coarse sand : 8 graded stone aggregate 40mm nominal size)	Cum			
b)	1:5:10 (1 cement :5 coarse sand : 10 graded stone aggregate 40mm nominal size)	Cum			
1.6	**R.C.C. up to plinth level**	Cum			
	Providing & laying in position M-20 grade of reinforced cement concrete including centering, shuttering complete but excluding cost of reinforcement - All work up to plinth level.				
1.7	**Reinforcement up to plinth level**	Kg			
	Providing & fixing Reinforcement for R.C.C. work up to plinth level as specified, including straightening, cutting, bending, placing in position and binding all complete.				
1.8	**Brick work in foundation**	Cum			
	Brick work with FPS bricks of class designation 75 in foundation and plinth in cement mortar 1:6 (1 cement: 6 coarse sand).				
	Total of Subhead 1.0				
2	**Super structure**				
2.1	**Brick work in super structure**	Cum	23.51		
	Brick work in FPS bricks of class designation 75 in super structure above plinth level in desired pattern in cement mortar 1:4 (1 cement : 4 coarse sand) including finishing in ruled pointing on the external side of wall where ever specified.				
2.2	**115 thk. Brick wall**	Sqm	10.72		
	Half brick masonry with FPS bricks of class designation 75 in super structure above plinth level in cement mortar 1:6, including providing & placing in position 2 nos. 6mm dia. M.S.				

	bars at every third course.				
2.3	**Brick work in Parapet wall**	Cum	3.58		
	Brick work in FPS bricks of class designation 125 in super structure above plinth level in English bond in cement mortar 1:6 (1 cement : 6 coarse sand)				
2.4	**R.C.C. in super structure**	Cum			
	Providing & laying in position M-20 grade of reinforced cement concrete in Filler slab for roof, lintel beams, hajjes and counter & Loft slabs etc. in super structure including centering, shuttering complete but excluding cost of reinforcement.				
2.5	**Reinforcement in super structure**	Kg	3.4		
	Providing & fixing Reinforcement for R.C.C. work in Filler slab for roof, lintel, hajjes and counter & Loft slabs in super structure as specified, including straightening, cutting, bending, placing in position and binding all complete.				
2.6	**Plain cement concrete**				
	Providing and laying plain cement concrete of specified grade as bed concrete under floor, roof slab, plinth protection, sill, coping, shelves, kitchen platform etc. screeding at roof to required slope and other locations as called for laid, consolidated and cured etc. complete as per specification and drawing.				
a)	1:4:8 (1 cement :4 coarse sand : 8 graded stone aggregate 40mm nominal size)	Cum	6.95		
	Total of Subhead 2.0				
3	**Wall finishes**				
3.1	Providing 12 mm thick cement plaster of mix 1:6 (1 cement: 6 coarse sand).	Sqm	129.76		
3.2	**Lime wash**	Sqm	146.16		
	Providing and applying three or more coats of white wash with lime on wall and ceiling to give an even shade including preparation of surfaces, scaffolding, mixing of indigo blue and DDL adhesive etc. complete.				
3.3	**Stone Counters**	Sqm	2.3		
	Providing and laying 20mm thk. stone slabs on kitchen counters laid on 20mm thk. Cement mortar 1:3 (1 cement 3 coarse sand). Including rubbing and polishing complete.				
3.4	**Coping**	Sqm	6.18		
	Providing & fixing 20mm thk. coping of burnt clay paving tile, on window sill & parapet walls in cement mortar 1:6				
3.5	**Dado**	Sqm	23.01		
	Providing and laying ceramic glazed tiles of size 200x300mm in dado of uniform thickness, size, shade and pattern as approved by Architect/Project Manager laid with rich cement slurry over a bedding plaster of 12 mm thick cement mortar 1:3 (1 cement: 3 fine sand) and grouting the joints with white cement and pigment with matching shade of tile, cutting, curing etc. complete in all respects as per drawing.				
	Total of Subhead 3.0				
4	**Flooring**				
4.1	**Terrazzo Tile Flooring**	Sqm	36		
	Providing and laying precast terrazzo tiles 22mm thick with graded marble chips of size up to 12mm, Light shade using white cement, laid in floors, jointed with neat cement slurry mixed with pigment to match the shade of the tiles including rubbing and polishing complete with precast tiles on 20mm thick bed of cement mortar 1:4 (1 cement :4 coarse sand)				
4.2	**Paving Tiles flooring**	Sqm	9		
	Providing & fixing 20mm thk. burnt clay paving tile flooring on 20mm thick bed of cement mortar 1:4 (1 cement :4 coarse sand), jointed with neat cement slurry mixed with pigment to match the shade of the tiles including rubbing and polishing complete				
4.3	**Terrazzo Tile Skirting**	Sqm	3.07		
	Providing and laying precast terrazzo tiles 22mm thick with graded marble chips of size up to 12mm, Light shade using white cement, in skirting jointed with neat cement slurry mixed with pigment to match the shade of the tiles including rubbing and polishing complete with precast tiles on 12mm thick cement mortar 1:3 (1 cement : 3 coarse sand)				
4.4	**Ceramic tile Flooring**	Sqm	3.75		
	Providing and laying ceramic glazed tile flooring of size 300x300mm of approved make, shade and pattern as approved by Project in charge laid over 20/12 mm average thick bed of cement mortar 1:4 (1 cement : 4 coarse sand), grouting the joints with white cement and pigment to match the shade of tile including cutting, etc. complete in all respects				
4.5	**Sand Filling**	Cum	6.75		
	Supplying and filling in plinth with sand under floors including watering, ramming, consolidating, and dressing complete.				
4.6	**Damp proof membrane**	Sqm	45		
	Providing & laying 1000 Gauge polythene damp proof membrane under floor PCC				

	Total of Subhead 4.0				
5	**Door Windows**				
5.1	**RCC Frame for door**				
	Providing and fixing Wooden Frame for door of size given below using RCC, out of section 100x50mm, with single or double rebate as required, with holdfasts, finished with enamel paint of approved colour all complete.				
a)	1000 x 2125mm	Nos.	2		
b)	750 x 2125mm	Nos.	3		
5.2	**RCC Frame for windows**				
	Providing and fixing Wooden Frame for window of size given below using RCC, out of section 100x50mm, with double rebate and holdfasts, finished with enamel paint of approved colour all complete.				
a)	1000x1200mm	Nos.	1		
b)	600x1200mm	Nos.	5		
5.3	**Door Shutters**				
	Providing and fixing door shutter of sizes given below of any of following material as per approval by project in charge/ architect. (Note: Hardware not included in the item, to be as per selection)				
i)	Wooden panelled door shutter using local wood as per approval, 12mm thk. particle board / M.S. jali as per requirement of panel including finishing with enamel paint of approved colour all complete.				
ii)	24 mm thick factory made PVC door shutters made of styles and rails of a uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both sides. Complete as per manufacturer's specification and direction of Engineer-in-charge. (For W.C. and bathroom door shutter).				
iii)	Providing and fixing 35mm thk. ISI marked flush door shutters conforming to IS : 2202 (Part I) decorative type, core of block board construction with frame of 1st class hard wood and well matched commercial 3 ply veneering with vertical grains or cross bands and face veneers on both faces of shutters.				
iv)	Bamboo door shutters				
a)	900 x 2075mm	Nos.	2		
b)	650 x 2075mm	Nos.	3		
5.4	**Window Shutters**				
i)	Providing and fixing Wooden panelled shutter for window of given size using local wood as per approval, including providing & fixing 5mm thk. clear float glass of approved make, finishing with enamel paint of approved colour all complete. (Note: Hardware not included in the item, to be as per selection)				
ii)	Providing and fixing Wooden panelled shutter for window of given size using local wood as per approval, including providing & fixing M.S. wire gauge of avg. width of aperture 1.4mm with wire of dia 0.63mm , finishing with enamel paint of approved colour all complete. (Note: Hardware not included in the item, to be as per selection)				
iii)	Bamboo shutters				
a)	450x1100mm	Nos.	2		
b)	500x1100mm	Nos.	5		
5.5	**Precast Louvers**				
a)	600x 400mm	Nos	5		
b)	750x400mm	Nos	1		
	Total of Subhead 5.0				
6	**Roofing**				
6.1	**RCC Plank and Joist system**	Sqm	22.4		
	Providing and Laying precast RCC planks and joists system for roof slab and beams as per related training and including providing & laying necessary cast in situ RCC and reinforcement as specified in structural drawings , centering & shuttering complete, excluding the cost of reinforcement.				
6.2	**Filler material for Filler slab**	Sqm	20.3		
	Providing & laying as per instruction, stabilised mud blocks 50mm thk. during casting of Filler slab.				
6.3	**Ceiling plaster**	Sqm	16.4		
	Providing 10 mm thick cement plaster of mix 1:4 (1 cement: 4 coarse sand) in ceiling.				
6.4	**Hot Bitumen layer**	Sqm	29.3		
	Providing layer of residual type petroleum bitumen of penetration 80/100 of approved quality at 17kg per 10sqm impregnated with a coat of coarse sand layer at 60 cudm per 10sqm including cleaning the slab surface with brushes and finally with a piece of cloth lightly				

	soaked in kerosene oil complete.				
6.5	**Mud phuska**	Cum	3.9		
	Providing and laying 100mm thick (average) mud phuska of damped brick earth on roof laid to slope consolidated and plastered with 25mm thk. mud mortar mixed with bhusa at 35kg per cum of earth and gobri leaping with mix 1:1 (1clay: 1 cow dung).				
6.6	**Brick tiles with grouting**	Sqm	26		
	(Providing) and laying FPS Brick tiles of class designation 75 over roof grouted with cement mortar 1:3 (1 cement : 3 fine sand) mixed with 2% of integral water proofing compound by weight of cement, over a 12mm layer of cement mortar 1:3 (1 cement : 3 fine sand) and finished neat.				
6.7	**Cement Gola**	Rmt	26		
	Providing Gola in cement concrete 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate 10 mm nominal size) including finishing with cement mortar 1:3 (1 cement: 3 sand) as per standard design.				
	Total of Subhead 6.0				
7	**Miscellaneous**				
7.1	Making khurras 450x450mm with average minimum thickness of 50mm cement concrete 1:2:4 over PVC sheet 1mx1mx400micron, finished with 12mm cement plaster 1:3 and a coat of neat cement rounding the edges and making and finishing the outlet complete.	Nos	2		
7.2	Providing and fixing 110mm dia PVC rain water pipes of approved make to withstand a test pressure of 4.0kg/sqcm. Including all fittings bends, sockets, elbow, tees, clamps, Y - Junction with cover (for collecting rainwater) including testing of joints etc. complete.	Rmt	11.4		
7.3	**M.S. Grill**	Sqm	2.19		
	Providing and fixing in position M.S. Grill made of 10x10mm m.s. square rods fixed at 150mm avg. c/c in both directions & 25x3mm flat all around to fix the grill to window, complete including grinding, providing two coats of red oxide primer and three or more coats of synthetic enamel paint of approved colour.				
7.4	**Concrete jali**	Sqm	2		
	Providing and fixing pre-fabricated Cement Concrete jali of approved pattern with cement mortar 1:4.				
	Total of Subhead 7.0				
	Total of "A'				

Summary of BOQ for Cluster unit LIG'A' - Option 'B' for Coastal Region, using Precast Ferro cement Channel Roof and Masonry in Hydra form Fly ash blocks		
S.No.	**Description**	**Amount (Rs.)**
A.0	**Civil Works**	
1	Foundation	
2	Super structure	
3	Wall finishes	
4	Flooring	
5	Door & Windows	
6	Roofing	
7	Miscellaneous	
8	Plumbing	
9	Electrical	
	Total	
Note:	1. Estimated Cost is the cost of complete cluster (16 units)	
	2. Rain water disposal has been detailed only up to down take rain water pipe. Further disposal of rain water to be as per site situation.	

BOQ for Cluster unit LIG'A' - Option 'B' for Coastal Region, using Precast Ferro cement Channel Roof and Masonry in Hydra form Fly ash blocks					
S.No.	**Item Description**	**Unit**	**Quantity**	**Rate**	**Amount (Rs.)**
A.0	**Civil Works**				
1	**Foundation**				
1.1	**Earth work in excavation**	Cum			
	Earth work in foundation trenches, column pits, drains etc. (not exceeding 1.5m in width or 10 sqm on plan) after clearing of site from bushes vegetation etc., including dressing of sides and ramming of bottoms, surface preparation as per specification to receive the PCC, lift up to 1.5m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50m.				
1.2	**Anti-termite treatment**	Sqm			
	Supplying, diluting and injecting chemical emulsion for pre-constructional anti termite treatment and creating a chemical barrier under and all-round the column pits, plinth beams, junction of wall and floor, along the external perimeter of building etc. complete				
	With chlorpyrifos /Lindane E.C. 20% with 1% concentration				
1.3	**Back filling of earth**	Cum			
	Filling available excavated earth (Excluding rock) in trenches, plinth, sides of foundation etc. in layers not exceeding 20Cm. in depth, consolidating each deposited layer by ramming and watering, lead up to 50m. and lift up to 1.5m.				
1.4	**PCC in foundation**				
	(Providing) & laying in position cement concrete of specified grade including centring & shuttering complete - All work up to plinth level.				
a)	1:4:8 (1 cement :4 coarse sand : 8 graded stone aggregate 40mm nominal size)	Cum			
b)	1:5:10 (1 cement :5 coarse sand : 10 graded stone aggregate 40mm nominal size)	Cum			
1.5	**R.C.C. up to plinth level**	Cum			
	Providing & laying in position M-20 grade of reinforced cement concrete including centering, shuttering complete but excluding cost of reinforcement - All work up to plinth level.				
1.6	**Reinforcement up to plinth level**	Kg			
	Providing & fixing Reinforcement for R.C.C. work up to plinth level as specified, including straightening, cutting, bending, placing in position and binding all complete.				
1.7	**Brick work in foundation**	Cum			
	Brick work with Fly ash bricks (FALG bricks) conforming to class 'A' in foundation & plinth level in English bond in cement mortar 1:6 (1 cement : 6 coarse sand)				
	Total of Subhead 1.1				
2	**Super structure**				
2.1	**Brick work in super structure**	Rmt	168.13		
	220mm thk. Masonry work using Hydraulically Compressed Fly ash Blocks in super structure above plinth level as per the guidelines of Hydra form construction manual.				
2.2	**Brick work in Red Burnt Bricks**	Cum	8.25		
	Brick work in FPS bricks of class designation 75 in super structure above plinth level in desired pattern in cement mortar 1:4 (1 cement : 4 coarse sand) including finishing in ruled pointing on the external side of wall where ever specified.				
2.3	**115 thk. wall**	Rmt	1523.65		
	115mm thk. Masonry work using Hydraulically Compressed Fly ash Blocks in super structure above plinth level as per the guidelines of Hydra form construction manual.				

2.4	**Brick work in Parapet wall**	Cum	5.27		
	Brick work with Fly ash bricks (FALG bricks) conforming to class 'A' in super structure above plinth level in English bond in cement mortar 1:6 (1 cement : 6 coarse sand)				
2.5	**Brick Jali**	Sqm	5.18		
	Brick jali work in desired pattern in parapet wall with FPS bricks of class designation 75 in cement mortar 1:4				
2.6	**R.C.C. in super structure**	Cum			
	Providing & laying in position M-20 grade of reinforced cement concrete in columns, beams, roof slab, lintel beams, hajjes and counter & Loft slabs etc. in super structure including centering, shuttering complete but excluding cost of reinforcement.				
	(Note: quantity does not include quantities of columns, beams & roof slab)				
2.7	**Reinforcement in super structure**	Kg			
	Providing & fixing Reinforcement for R.C.C. work in columns, beams, roof slab, lintel, hajjes and counter & Loft slabs in super structure as specified, including straightening, cutting, bending, placing in position and binding all complete.				
	(Note: quantity does not include quantities of columns, beams & roof slab)				
2.8	**Plain cement concrete**				
	Providing and laying plain cement concrete of specified grade as bed concrete under floor, roof slab, plinth protection, sill, coping, shelves, kitchen platform etc. screeding at roof to required slope and other locations as called for laid, consolidated and cured etc. complete as per specification and drawing.				
a)	1:4:8 (1 cement :4 coarse sand : 8 graded stone aggregate 40mm nominal size)	Cum	15.49		
	Total of Subhead 2.0				
3	**Wall finishes**				
3.1	Providing 12 mm thick cement plaster of mix 1:6 (1 cement: 6 coarse sand).	Sqm	2328		
3.2	**Lime wash**	Sqm	2448		
	Providing and applying three or more coats of white wash with lime on wall and ceiling to give an even shade including preparation of surfaces, scaffolding, mixing of indigo blue and DDL adhesive etc. complete.				
3.3	**Stone Counters**	Sqm	32.5		
	Providing and laying 20mm thk. Kota stone slabs on kitchen counters laid on 20mm thk. Cement mortar 1:3 (1 cement 3 coarse sand). Including rubbing and polishing complete.				
3.4	**Coping**	Sqm	22.88		
	Providing & fixing 20mm thk. coping of burnt clay paving tile, on window sill & parapet walls in cement mortar 1:6				
3.5	**Dado**	Sqm	293.62		
	Providing and laying ceramic glazed tiles of size 200x300mm in dado of uniform thickness, size, shade and pattern as approved by Architect/Project Manager laid with rich cement slurry over a bedding plaster of 12 mm thick cement mortar 1:3 (1 cement: 3 fine sand) and grouting the joints with white cement and pigment with matching shade of tile, cutting, curing etc. complete in all respects as per drawing.				
	Total of Subhead 3.0				
4	**Flooring**				
4.1	**Terrazzo Tile Flooring**	Sqm	438.56		
	Providing and laying precast terrazzo tiles 22mm thick with graded marble chips of size up to 12mm, Light shade using white cement, laid in floors, jointed with neat cement slurry mixed with pigment to match the shade of the tiles including rubbing and polishing complete with precast tiles on 20mm thick bed of cement mortar 1:4 (1 cement :4 coarse sand)				
4.2	**Terrazzo Tile Skirting**	Sqm	62.72		
	Providing and laying precast terrazzo tiles 22mm thick with graded marble chips of size up to 12mm, Light shade using white cement, in skirting jointed with neat cement slurry mixed with pigment to match the shade of the tiles including rubbing and polishing complete with precast tiles on 12mm thick cement mortar 1:3 (1 cement : 3 coarse sand)				
4.3	**Ceramic tile Flooring**	Sqm	43.2		
	Providing and laying ceramic glazed tile flooring of size 300x300mm of approved make, shade and pattern as approved by Project in charge laid over 20/12 mm average thick bed of cement mortar 1:4 (1 cement : 4 coarse sand), grouting the joints with white cement and pigment to match the shade of tile including cutting, etc. complete in all respects				
4.4	**Sand Filling**	Cum	18.07		
	Supplying and filling in plinth with sand under floors including watering, ramming, consolidating, and dressing complete.				
4.5	**Damp proof membrane**	Sqm	120.44		
	Providing & laying 1000 Gauge polythene damp proof membrane under floor PCC				
	Total of Subhead 4.0				

5	**Door Windows**				
5.1	**RCC Frame for door**				
	Providing and fixing Wooden Frame for door of size given below using RCC, out of section 100x50mm, with single or double rebate as required, with holdfasts, finished with enamel paint of approved colour all complete.				
a)	1000 x 2060mm	Nos.	16		
b)	900 x 2060mm	Nos.	48		
b)	750 x 2060mm	Nos.	32		
5.2	**RCC Frame for windows**				
	Providing and fixing Wooden Frame for window of size given below using RCC, out of section 100x50mm, with double rebate and holdfasts, finished with enamel paint of approved colour all complete.				
a)	1000x1130mm	Nos.	32		
b)	600x1015mm	Nos.	64		
5.3	**Door Shutters**	Nos.			
	Providing and fixing door shutter of sizes given below of any of following material as per approval by project in charge/ architect. (Note: Hardware not included in the item, to be as per selection)				
i)	Wooden panelled door shutter using local wood as per approval, 12mm thk. particle board / M.S. jali as per requirement of panel including finishing with enamel paint of approved colour all complete.				
ii)	24 mm thick factory made PVC door shutters made of styles and rails of a uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both sides. Complete as per manufacturer's specification and direction of Engineer-in-charge. (For W.C. and bathroom door shutter).				
iii)	Providing and fixing 35mm thk. ISI marked flush door shutters conforming to IS : 2202 (Part I) decorative type, core of block board construction with frame of 1st class hard wood and well matched commercial 3 ply veneering with vertical grains or cross bands and face veneers on both faces of shutters.				
iv)	Bamboo door shutters				
a)	900 x 2010mm	Nos.	16		
b)	800 x 2010mm	Nos.	48		
b)	650 x 2010mm	Nos.	32		
5.4	**Window Shutters**				
i)	Providing and fixing Wooden panelled shutter for window of given size using local wood as per approval, including providing & fixing 5mm thk. clear float glass of approved make, finishing with enamel paint of approved colour all complete. (Note: Hardware not included in the item, to be as per selection)				
a)	450x1130mm	Nos.	64		
b)	500x915mm	Nos.	64		
ii)	Providing and fixing Wooden panelled shutter for window of given size using local wood as per approval, including providing & fixing M.S. wire gauge of avg. width of aperture 1.4mm with wire of dia 0.63mm , finishing with enamel paint of approved colour all complete. (Note: Hardware not included in the item, to be as per selection)				
iii)	Bamboo shutter				
a)	450x1130mm	Nos.	96		
b)	500x915mm	Nos.	96		
5.5	**Precast Louvers**				
a)	600x 345mm	Nos	32		
b)	1000x345mm	Nos	16		
	Total of Subhead 5.0				
6	**Roofing**				
6.1	**Precast Ferro cement Channel system**	Sqm	600.32		
	Providing and Laying precast Ferro cement Channels for roof as per related training and including providing & laying necessary cast in situ RCC and reinforcement as specified in structural drawings, centering & shuttering complete, excluding the cost of reinforcement.				
6.2	**Concrete Filling in Channels valley**	Cum	10.71		
	Providing & laying in position cement concrete (1:2:4) in valley of Ferro cement Channels including centring & shuttering complete.				
63	**Ceiling plaster**	Sqm	120.4		
	Providing 10 mm thick cement plaster of mix 1:4 (1 cement: 4 coarse sand) in ceiling.				
6.4	**Sunken area filling**	Cum	13.15		
	Providing and laying on sunken areas broken light weight concrete block bats of approximately 600 kg. per cum density laid, consolidated, finished smooth, including finished & grouting the				

	top layer with water proof cement mortar with CICO or equivalent brand.				
6.5	**Hot Bitumen layer**	Sqm	163.45		
	Providing layer of residual type petroleum bitumen of penetration 80/100 of approved quality at 17kg per 10sqm impregnated with a coat of coarse sand layer at 60 cudm per 10sqm including cleaning the slab surface with brushes and finally with a piece of cloth lightly soaked in kerosene oil complete.				
6.6	**Mud phuska**	Cum	22.58		
	Providing and laying 100mm thick (average) mud phuska of damped brick earth on roof laid to slope consolidated and plastered with 25mm thk. mud mortar mixed with bhusa at 35kg per cum of earth and gobri leaping with mix 1:1 (1clay: 1 cow dung).				
6.7	**Brick tiles with grouting**	Sqm	150.55		
	(Providing) and laying FPS Brick tiles of class designation 75 over roof grouted with cement mortar 1:3 (1 cement : 3 fine sand) mixed with 2% of integral water proofing compound by weight of cement, over a 12mm layer of cement mortar 1:3 (1 cement : 3 fine sand) and finished neat.				
6.8	**Cement Gola**	Rmt	94.6		
	Providing Gola in cement concrete 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate 10 mm nominal size) including finishing with cement mortar 1:3 (1 cement: 3 sand) as per standard design.				
	Total of Subhead 6.0				
7	**Miscellaneous**				
7.1	Making khurras 450x450mm with average minimum thickness of 50mm cement concrete 1:2:4 over PVC sheet 1mx1mx400micron, finished with 12mm cement plaster 1:3 and a coat of neat cement rounding the edges and making and finishing the outlet complete.	Nos	10		
7.2	Providing and fixing 110mm dia PVC rain water pipes of approved make to withstand a test pressure of 4.0kg/sqcm. including all fittings bends, sockets, elbow, tees, clamps, Y - Junction with cover (for collecting rainwater) including testing of joints etc. complete.	Rmt	130		
	Total of Subhead 7.0				
	Total of "A'				

Summary of BOQ for LIG'A' in Cluster unit Option 'B' for Coastal Region, using Precast Planks - Joists Roof and Masonry in Rat trap bond using Stabilized Compressed Earth Bricks		
S.No.	**Description**	**Amount (Rs.)**
A.0	**Civil Works**	
1	Foundation	
2	Super structure	
3	Wall finishes	
4	Flooring	
5	Door & Windows	
6	Roofing	
7	Miscellaneous	
8	Plumbing	
9	Electrical	
	Total	
Note:	1. Estimated Cost is the cost of complete cluster (16 units)	
	2. Rain water disposal has been detailed only up to down take rain water pipe. Further disposal of rain water to be as per site situation.	

BOQ for LIG'A' in Cluster unit Option 'B' for Coastal Region, using Precast Planks - Joists Roof and Masonry in Rat trap bond using Stabilized Compressed Earth Bricks

S.No.	Item Description	Unit	Quantity	Rate	Amount (Rs.)
A.0	**Civil Works**				
1	**Foundation**				
1.1	**Earth work in excavation**	Cum			
	Earth work in foundation trenches, column pits, drains etc. (not exceeding 1.5m in width or 10 sqm on plan) after clearing of site from bushes vegetation etc., including dressing of sides and ramming of bottoms, surface preparation as per specification to receive the PCC, lift up to 1.5m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50m.				
1.2	**Anti-termite treatment**	Sqm			
	Supplying, diluting and injecting chemical emulsion for pre-constructional anti termite treatment and creating a chemical barrier under and all-round the column pits, plinth beams, junction of wall and floor, along the external perimeter of building etc. complete				
	With chlorpyrifos /Lindane E.C. 20% with 1% concentration				
1.3	**Back filling of earth**	Cum			
	Filling available excavated earth (Excluding rock) in trenches, plinth, sides of foundation etc. in layers not exceeding 20Cm. in depth, consolidating each deposited layer by ramming and watering, lead up to 50m. and lift up to 1.5m.				
1.4	**PCC in foundation**				
	(Providing) & laying in position cement concrete of specified grade including centring & shuttering complete - All work up to plinth level.				
a)	1:4:8 (1 cement :4 coarse sand : 8 graded stone aggregate 40mm nominal size)	Cum			
b)	1:5:10 (1 cement :5 coarse sand : 10 graded stone aggregate 40mm nominal size)	Cum			
1.5	**R.C.C. up to plinth level**	Cum			
	Providing & laying in position M-20 grade of reinforced cement concrete including centering, shuttering complete but excluding cost of reinforcement - All work up to plinth level.				
1.6	**Reinforcement up to plinth level**	Kg			
	Providing & fixing Reinforcement for R.C.C. work up to plinth level as specified, including straightening, cutting, bending, placing in position and binding all complete.				
1.7	**Brick work in foundation**	Cum			
	Brick work with FPS bricks of class designation 75 in foundation and plinth in cement mortar 1:6 (1 cement: 6 coarse sand).				
	Total of Subhead 1.0				
2	**Super structure**				
2.1	**Brick work in super structure**	Sqm	1232.91		
	230mm thk. Brick work in Stabilised, Hydraulically Compressed Earth Bricks in rat trap bond in cement mortar 1:4 (1 cement : 4 coarse sand) in super structure above plinth level including finishing in ruled pointing on the external side of wall.				
2.2	**Brick work in Red Burnt Bricks**	Cum	16.3		
	Brick work in FPS bricks of class designation 75 in super structure above plinth level in desired pattern in cement mortar 1:4 (1 cement : 4 coarse sand) including finishing in ruled pointing on the external side of wall where ever specified.				
2.3	**115thk. Brick wall**	Sqm	280.59		

	115mm thk. Brick work in Stabilised, Hydraulically Compressed Earth Bricks in rat trap bond in cement mortar 1:4 (1 cement : 4 coarse sand) in super structure above plinth level including finishing in ruled pointing on the external side of wall.				
2.4	**Brick work in Parapet wall**	Sqm	142.52		
	Brick work in Stabilised, Hydraulically Compressed Earth Bricks in super structure above plinth level in English bond in cement mortar 1:6 (1 cement : 6 coarse sand)				
2.5	**Brick Jali**	Sqm	7.96		
	Brick jali work in desired pattern in parapet wall with FPS bricks of class designation 75 in cement mortar 1:4				
2.6	**R.C.C. in super structure**	Cum			
	Providing & laying in position M-20 grade of reinforced cement concrete in columns, beams, roof slab, lintel beams, hajjes and counter & Loft slabs etc. in super structure including centering, shuttering complete but excluding cost of reinforcement.				
2.7	**Reinforcement in super structure**	Kg			
	Providing & fixing Reinforcement for R.C.C. work in columns, beams, roof slab, lintel, hajjes and counter & Loft slabs in super structure as specified, including straightening, cutting, bending, placing in position and binding all complete.				
2.8	**Plain cement concrete**				
	Providing and laying plain cement concrete of specified grade as bed concrete under floor, roof slab, plinth protection, sill, coping, shelves, kitchen platform etc. screeding at roof to required slope and other locations as called for laid, consolidated and cured etc. complete as per specification and drawing.				
a)	1:4:8 (1 cement :4 coarse sand : 8 graded stone aggregate 40mm nominal size)	Cum	16.93		
	Total of Subhead 2.0				
3	**Wall finishes**				
3.1	Providing 12 mm thick cement plaster of mix 1:6 (1 cement: 6 coarse sand).	Sqm	2221		
3.2	**Lime wash**	Sqm	2985		
	Providing and applying three or more coats of white wash with lime on wall and ceiling to give an even shade including preparation of surfaces, scaffolding, mixing of indigo blue and DDL adhesive etc. complete.				
3.3	**Stone Counters**	Sqm	32.5		
	Providing and laying 20mm thk. stone slabs on kitchen counters laid on 20mm thk. Cement mortar 1:3 (1 cement 3 coarse sand). Including rubbing and polishing complete.				
3.4	**Coping**	Sqm	28.96		
	Providing & fixing 20mm thk. coping of burnt clay paving tile, on window sill & parapet walls in cement mortar 1:6				
3.5	**Dado**	Sqm	301.39		
	Providing and laying precast terrazzo tiles 22mm thick with graded marble chips of size up to 12mm, Light shade using white cement, fixed on walls, jointed with neat cement slurry mixed with pigment to match the shade of the tiles including rubbing and polishing complete with precast tiles on 12mm thick cement mortar 1:3 (1 cement : 3 coarse sand)				
	Total of Subhead 3.0				
4	**Flooring**				
4.1	**Terrazzo Tile Flooring**	Sqm	544		
	Providing and laying precast terrazzo tiles 22mm thick with graded marble chips of size up to 12mm, Light shade using white cement, laid in floors, jointed with neat cement slurry mixed with pigment to match the shade of the tiles including rubbing and polishing complete with precast tiles on 20mm thick bed of cement mortar 1:4 (1 cement :4 coarse sand)				
4.2	**Terrazzo Tile Skirting**	Sqm	84.18		
	Providing and laying precast terrazzo tiles 22mm thick with graded marble chips of size up to 12mm, Light shade using white cement, in skirting jointed with neat cement slurry mixed with pigment to match the shade of the tiles including rubbing and polishing complete with precast tiles on 12mm thick cement mortar 1:3 (1 cement : 3 coarse sand)				
4.3	**Ceramic tile Flooring**	Sqm	48		
	Providing and laying ceramic glazed tile flooring of size 300x300mm of approved make, shade and pattern as approved by Project in charge laid over 20/12 mm average thick bed of cement mortar 1:4 (1 cement : 4 coarse sand), grouting the joints with white cement and pigment to match the shade of tile including cutting, etc. complete in all respects				
4.4	**Sand Filling**	Cum	22.2		
	Supplying and filling in plinth with sand under floors including watering, ramming, consolidating, and dressing complete.				
4.5	**Damp proof membrane**	Sqm	148		
	Providing & laying 1000 Gauge polythene damp proof membrane under floor PCC				
	Total of Subhead 4.0				

5	**Door Windows**				
5.1	**RCC Frame for door**				
	Providing and fixing Wooden Frame for door of size given below using RCC, out of section 100x50mm, with single or double rebate as required, with holdfasts, finished with enamel paint of approved colour all complete.				
a)	1000 x 2125mm	Nos.	48		
b)	750 x 2125mm	Nos.	48		
5.2	**RCC Frame for windows**				
	Providing and fixing Wooden Frame for window of size given below using RCC, out of section 100x50mm, with double rebate and holdfasts, finished with enamel paint of approved colour all complete.				
a)	1000x1200mm	Nos.	32		
b)	450x1200mm	Nos.	16		
c)	450x1085mm	Nos.	32		
d)	600x1085mm	Nos.	32		
5.3	**Door Shutters**				
	Providing and fixing door shutter of sizes given below of any of following material as per approval by project in charge/ architect. (Note: Hardware not included in the item, to be as per selection)				
i)	Wooden panelled door shutter using local wood as per approval, 12mm thk. particle board / M.S. jali as per requirement of panel including finishing with enamel paint of approved colour all complete.				
ii)	24 mm thick factory made PVC door shutters made of styles and rails of a uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both sides. Complete as per manufacturer's specification and direction of Engineer-in-charge. (For W.C. and bathroom door shutter).				
iii)	Providing and fixing 35mm thk. ISI marked flush door shutters conforming to IS : 2202 (Part I) decorative type, core of block board construction with frame of 1st class hard wood and well matched commercial 3 ply veneering with vertical grains or cross bands and face veneers on both faces of shutters.				
iv)	Bamboo door shutters				
a)	900 x 2075mm	Nos.	48		
b)	650 x 20725mm	Nos.	48		
i)	Providing and fixing Wooden panelled shutter for window of given size using local wood as per approval, including providing & fixing 5mm thk. clear float glass of approved make, finishing with enamel paint of approved colour all complete. (Note: Hardware not included in the item, to be as per selection)				
ii)	Providing and fixing Wooden panelled shutter for window of given size using local wood as per approval, including providing & fixing M.S. wire gauge of avg. width of aperture 1.4mm with wire of dia 0.63mm , finishing with enamel paint of approved colour all complete. (Note: Hardware not included in the item, to be as per selection)				
iii)	Bamboo shutter				
a)	450x1100mm	Nos.	64		
b)	350x1100mm	Nos.	16		
c)	350x985mm	Nos.	32		
d)	500x985mm	Nos.	32		
5.5	**Precast Louvers**				
a)	450x 375mm	Nos	32		
b)	600x375mm	Nos	48		
c)	750x375mm	Nos	16		
	Total of Subhead 5.0				
6	**Roofing**				
6.1	**RCC Plank and Joist system**	Sqm	600.32		
	Providing and Laying precast RCC planks and joists system for roof slab and beams as per related training and including providing & laying necessary cast in situ RCC and reinforcement as specified in structural drawings , centering & shuttering complete, excluding the cost of reinforcement.				
6.2	**Ceiling plaster**	Sqm	763.88		
	Providing 10 mm thick cement plaster of mix 1:4 (1 cement: 4 coarse sand) in ceiling.				
6.3	**Sunken area filling**	Cum	10.03		
	Providing and laying on sunken areas broken light weight concrete block bats of approximately 600 kg. per cum density laid, consolidated, finished smooth, including finished & grouting the top layer with water proof cement mortar with CICO or equivalent brand.				
6.4	**Hot Bitumen layer**	Sqm	201.13		

	Providing layer of residual type petroleum bitumen of penetration 80/100 of approved quality at 17kg per 10sqm impregnated with a coat of coarse sand layer at 60 cudm per 10sqm including cleaning the slab surface with brushes and finally with a piece of cloth lightly soaked in kerosene oil complete.				
6.5	**Mud phuska**	Cum	28		
	Providing and laying 100mm thick (average) mud phuska of damped brick earth on roof laid to slope consolidated and plastered with 25mm thk. mud mortar mixed with bhusa at 35kg per cum of earth and gobri leaping with mix 1:1 (1clay: 1 cow dung).				
6.6	**Brick tiles with grouting**	Sqm	185		
	(Providing) and laying FPS Brick tiles of class designation 75 over roof grouted with cement mortar 1:3 (1 cement : 3 fine sand) mixed with 2% of integral water proofing compound by weight of cement, over a 12mm layer of cement mortar 1:3 (1 cement : 3 fine sand) and finished neat.				
6.7	**Cement Gola**	Rmt	107.5		
	Providing Gola in cement concrete 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate 10 mm nominal size) including finishing with cement mortar 1:3 (1 cement: 3 sand) as per standard design.				
	Total of Subhead 6.0				
7	**Miscellaneous**				
7.1	Making khurras 450x450mm with average minimum thickness of 50mm cement concrete 1:2:4 over PVC sheet 1mx1mx400micron, finished with 12mm cement plaster 1:3 and a coat of neat cement rounding the edges and making and finishing the outlet complete.	Nos	10		
7.2	Providing and fixing 110mm dia PVC rain water pipes of approved make to withstand a test pressure of 4.0kg/sqcm. including all fittings bends, sockets, elbow, tees, clamps, Y - Junction with cover (for collecting rainwater) including testing of joints etc. complete.	Rmt	130		
	Total of Subhead 7.0				
	Total of "A'				

Summary of BOQ for LIG'B' Individual unit Option 'A' for Coastal Region, using Precast Planks - Joists & MCR tiles Roof and Masonry in Rat trap bond using Stabilized Compressed Earth Blocks		
S.No.	**Description**	**Amount (Rs.)**
A.0	**Civil Works**	
1	Foundation	
2	Super structure	
3	Wall finishes	
4	Flooring	
5	Door & Windows	
6	Roofing	
7	Miscellaneous Works	
8	Plumbing	
9	Electrical	
	Total	
Note:	1. Rain water disposal has been detailed only up to down take rain water pipe. Further disposal of rain water to be as per site situation.	

BOQ for LIG'B' Individual unit Option 'A' for Coastal Region, using Precast Planks - Joists & MCR tiles Roof and Masonry in Rat trap bond using Stabilized Compressed Earth Blocks					
S.No.	**Item Description**	**Unit**	**Quantity**	**Rate**	**Amount (Rs.)**
A.0	**Civil Works**				
1	**Foundation**				
1.1	**Earth work in excavation**	Cum			
	Earth work in foundation trenches, column pits, drains etc. (not exceeding 1.5m in width or 10 sqm on plan) after clearing of site from bushes vegetation etc., including dressing of sides and ramming of bottoms, surface preparation as per specification to receive the PCC, lift up to 1.5m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50m.				
1.2	**Anti-termite treatment**	Sqm			
	Supplying, diluting and injecting chemical emulsion for pre-constructional anti termite treatment and creating a chemical barrier under and all-round the column pits, plinth beams, junction of wall and floor, along the external perimeter of building etc. complete				
	With chlorpyrifos /Lindane E.C. 20% with 1% concentration				
1.3	**Back filling of earth**	Cum			
	Filling available excavated earth (Excluding rock) in trenches, plinth, sides of foundation etc. in layers not exceeding 20Cm. in depth, consolidating each deposited layer by ramming and watering, lead up to 50m. and lift up to 1.5m.				
1.4	**D.P.C.**	Sqm	13.88		
	Providing and laying damp proof course 40 mm thick with cement concrete 1:2:4 (1 cement :2 coarse sand: 4 graded stone aggregate 12.5 mm nominal size) and applying a coat of residual petroleum bitumen of penetration 80/100 of approved quality.				
1.5	**PCC in foundation**				
	(Providing) & laying in position cement concrete of specified grade including centring & shuttering complete - All work up to plinth level.				
a)	1:4:8 (1 cement :4 coarse sand : 8 graded stone aggregate 40mm nominal size)	Cum			
b)	1:5:10 (1 cement :5 coarse sand : 10 graded stone aggregate 40mm nominal size)	Cum			
1.6	**R.C.C. up to plinth level**	Cum			
	Providing & laying in position M-20 grade of reinforced cement concrete including centering, shuttering complete but excluding cost of reinforcement - All work up to plinth level.				
1.7	**Reinforcement up to plinth level**	Kg			
	Providing & fixing Reinforcement for R.C.C. work up to plinth level as specified, including straightening, cutting, bending, placing in position and binding all complete.				
1.8	**Brick work in foundation**	Cum			
	Brick work with FPS bricks of class designation 75 in foundation and plinth in cement mortar 1:6 (1 cement: 6 coarse sand).				
	Total of Subhead 1.0				
2	**Super structure**				
2.1	**Brick work in super structure**	Sqm	125.91		
	230mm thk. Brick work in Stabilised, Hydraulically Compressed Earth Blocks in rat trap bond in cement mortar 1:4 (1 cement : 4 coarse sand) in super structure above plinth level including finishing in ruled pointing on the external side of wall.				
2.2	**Brick work in Red Burnt Bricks**	Cum	1.65		

	Brick work in FPS bricks of class designation 75 in super structure above plinth level in desired pattern in cement mortar 1:4 (1 cement : 4 coarse sand) including finishing in ruled pointing on the external side of wall where ever specified.				
2.3	**Brick work in Parapet wall**	sqm	11.82		
	Brick work in Stabilised, Hydraulically Compressed Earth Blocks in super structure above plinth level in English bond in cement mortar 1:6 (1 cement : 6 coarse sand)				
2.5	**R.C.C. in super structure**	Cum			
	Providing & laying in position M-20 grade of reinforced cement concrete in lintel beams, hajjes and counter & Loft slabs etc. in super structure including centering, shuttering complete but excluding cost of reinforcement.				
2.6	**Reinforcement in super structure**	Kg			
	Providing & fixing Reinforcement for R.C.C. work in lintel, hajjes and counter & Loft slabs in super structure as specified, including straightening, cutting, bending, placing in position and binding all complete.				
2.7	**Plain cement concrete**				
	Providing and laying plain cement concrete of specified grade as bed concrete under floor, roof slab, plinth protection, sill, coping, shelves, kitchen platform etc. screeding at roof to required slope and other locations as called for laid, consolidated and cured etc. complete as per specification and drawing.				
a)	1:4:8 (1 cement :4 coarse sand : 8 graded stone aggregate 40mm nominal size)	Cum	10.35		
	Total of Subhead 2.0				
3	**Wall finishes**				
3.1	Providing 12 mm thick cement plaster of mix 1:6 (1 cement: 6 coarse sand).	Sqm	159.65		
3.2	**Lime wash**	Sqm	201.65		
	Providing and applying three or more coats of white wash with lime on wall and ceiling to give an even shade including preparation of surfaces, scaffolding, mixing of indigo blue and DDL adhesive etc. complete.				
3.3	**Stone Counters**	Sqm	3		
	Providing and laying 20mm thk. kota stone slabs on kitchen counters laid on 20mm thk. Cement mortar 1:3 (1 cement 3 coarse sand). Including rubbing and polishing complete.				
3.4	**Coping**	Sqm	6.02		
	Providing & fixing 20mm thk. coping of burnt clay paving tile, on window sill & parapet walls in cement mortar 1:6				
3.5	**Dado**	Sqm	35.47		
	Providing & laying ceramic glazed tiles of size 200x300mm in dado of uniform thickness, size, shade and pattern as approved by Architect/Project Manager laid with rich cement slurry over a bedding plaster of 12mm thick cement mortar 1:3 (1 cement: 3 fine sand) & grouting the joints with white cement and pigment with matching shade of tile, cutting, curing etc. complete in all respects as per drawing.				
	Total of Subhead 3.0				
4	**Flooring**				
4.1	**Terrazzo Tile Flooring**	Sqm	58.4		
	Providing and laying precast terrazzo tiles 22mm thick with graded marble chips of size up to 12mm, Light shade using white cement, laid in floors, jointed with neat cement slurry mixed with pigment to match the shade of the tiles including rubbing and polishing complete with precast tiles on 20mm thick bed of cement mortar 1:4 (1 cement :4 coarse sand)				
4.2	**Paving Tiles flooring**	Sqm	9.3		
	Providing & fixing 20mm thk. burnt clay paving tile flooring on 20mm thick bed of cement mortar 1:4 (1 cement :4 coarse sand), jointed with neat cement slurry mixed with pigment to match the shade of the tiles including rubbing and polishing complete				
4.3	**Terrazzo Tile Skirting**	Sqm	5.28		
	Providing and laying precast terrazzo tiles 22mm thick with graded marble chips of size up to 12mm, Light shade using white cement, in skirting jointed with neat cement slurry mixed with pigment to match the shade of the tiles including rubbing and polishing complete with precast tiles on 12mm thick cement mortar 1:3 (1 cement : 3 coarse sand)				
4.4	**Ceramic tile Flooring**	Sqm	8		
	Providing and laying ceramic glazed tile flooring of size 300x300mm of approved make, shade and pattern as approved by Project in charge laid over 20/12 mm average thick bed of cement mortar 1:4 (1 cement : 4 coarse sand), grouting the joints with white cement and pigment to match the shade of tile including cutting, etc. complete in all respects				
4.5	**Sand Filling**	Cum	10.16		
	Supplying and filling in plinth with sand under floors including watering, ramming, consolidating, and dressing complete.				
4.6	**Damp proof membrane**	Sqm	67.7		

	Providing & laying 1000 Gauge polythene damp proof membrane under floor PCC				
	Total of Subhead 4.0				
5	**Door Windows**				
5.1	**RCC Frame for door**				
	Providing and fixing Wooden Frame for door of size given below using RCC, out of section 100x50mm, with single or double rebate as required, with holdfasts, finished with enamel paint of approved colour all complete.				
a)	1000 x 2125mm	Nos.	5		
b)	750 x 2125mm	Nos.	2		
5.2	**RCC Frame for windows**				
	Providing and fixing Wooden Frame for window of size given below using RCC, out of section 100x50mm, with double rebate and holdfasts, finished with enamel paint of approved colour all complete.				
a)	1000x1200mm	Nos.	4		
b)	600x1200mm	Nos.	2		
c)	600x1085mm	Nos.	2		
d)	1000x1085mm	Nos.	1		
5.3	**Door Shutters**				
	Providing and fixing door shutter of sizes given below of any of following material as per approval by project in charge/ architect. (Note: Hardware not included in the item, to be as per selection)				
i)	Wooden panelled door shutter using local wood as per approval, 12mm thk. particle board / M.S. jali as per requirement of panel including finishing with enamel paint of approved colour all complete.				
ii)	24 mm thick factory made PVC door shutters made of styles and rails of a uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both sides. Complete as per manufacturer's specification and direction of Engineer-in-charge. (For W.C. and bathroom door shutter).				
iii)	Providing and fixing 35mm thk. ISI marked flush door shutters conforming to IS : 2202 (Part I) decorative type, core of block board construction with frame of 1st class hard wood and well matched commercial 3 ply veneering with vertical grains or cross bands and face veneers on both faces of shutters.				
iv)	Bamboo door shutters				
a)	900 x 2075mm	Nos.	5		
b)	650 x 2075mm	Nos.	2		
5.4	**Window Shutters**				
i)	Providing and fixing Wooden panelled shutter for window of given size using local wood as per approval, including providing & fixing 5mm thk. clear float glass of approved make, finishing with enamel paint of approved colour all complete. (Note: Hardware not included in the item, to be as per selection)				
ii)	Providing and fixing Wooden panelled shutter for window of given size using local wood as per approval, including providing & fixing M.S. wire gauge of avg. width of aperture 1.4mm with wire of dia 0.63mm , finishing with enamel paint of approved colour all complete. (Note: Hardware not included in the item, to be as per selection)				
iii)	Bamboo shutter				
a)	450x1100mm	Nos.	8		
b)	500x1100mm	Nos.	2		
c)	500x985mm	Nos.	2		
d)	450x985mm	Nos.	2		
5.5	**Precast Louvers**				
a)	600x 500mm	Nos	4		
b)	1000x500mm	Nos	3		
	Total of Subhead 5.0				
6	**Roofing**				
6.1	**RCC Plank and Joist system**	Sqm	54		
	Providing and Laying precast RCC planks and joists system for roof slab and beams as per related training and including providing & laying necessary cast in situ RCC and reinforcement as specified in structural drawings , centering & shuttering complete, excluding the cost of reinforcement.				
6.2	**Micro Concrete Roofing**	Sqm	31.9		
	Providing prefabricated corrugated MCR tile roofing (pan or roman as approved) and fixing the tiles to M.S. purlins with G.I wire with proper overlaps and interlocks, joints between ridge tiles on doubly pitched roofs sealed with rich cement sand mortar all complete as per approval of project manager, including providing and fixing ridge tiles, gutter, M.S. purlins, cleats/ flats/				

	angles, flashing and rafters as specified in structural drawings. Work to be complete in all respect including hoisting at all heights, cutting, welding, smooth grinding of all welding joints, applying derusting primer coat, three or more coats of synthetic enamel paint etc. on M.S. members.				
6.3	**Ceiling plaster**	Sqm	42		
	Providing 10mm thk cement plaster of mix 1:4 (1 cement: 4 coarse sand) in ceiling.				
6.4	**Hot Bitumen layer**	Sqm	51.41		
	Providing layer of residual type petroleum bitumen of penetration 80/100 of approved quality at 17kg per 10sqm impregnated with a coat of coarse sand layer at 60 cudm per 10sqm including cleaning the slab surface with brushes and finally with a piece of cloth lightly soaked in kerosene oil complete.				
6.5	**Mud phuska**	Cum	7.05		
	Providing and laying 100mm thick (avg) mud phuska of damped brick earth on roof laid to slope consolidated and plastered with 25mm thk. mud mortar mixed with bhusa at 35kg per cum of earth and gobri leaping with mix 1:1 (1clay:1 cow dung).				
6.6	**Brick tiles with grouting**	Sqm	47		
	(Providing) and laying FPS Brick tiles of class designation 75 over roof grouted with cement mortar 1:3 (1 cement : 3 fine sand) mixed with 2% of integral water proofing compound by weight of cement, over a 12mm layer of cement mortar 1:3 (1 cement : 3 fine sand) and finished neat.				
6.7	**Cement Gola**	Rmt	29.4		
	Providing Gola in cement concrete 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate 10 mm nominal size) including finishing with cement mortar 1:3 (1 cement: 3 sand) as per standard design.				
	Total of Subhead 6.0				
7	**Miscellaneous**				
7.1	Making khurras 450x450mm with average minimum thickness of 50mm cement concrete 1:2:4 over PVC sheet 1mx1mx400micron, finished with 12mm cement plaster 1:3 and a coat of neat cement rounding the edges and making and finishing the outlet complete.	Nos	2		
7.2	Providing and fixing 110mm dia PVC rain water pipes of approved make to withstand a test pressure of 4.0kg/sqcm. including all fittings bends, sockets, elbow, tees, clamps, Y - Junction with cover (for collecting rainwater) including testing of joints etc. complete.	Rmt	6		
7.3	**M.S. Grill**	Sqm	8.84		
	Providing and fixing in position M.S. Grill made of 10x10mm m.s. square rods fixed at 150mm avg. c/c in both directions & 25x3mm flat all around to fix the grill to window, complete including grinding, providing two coats of red oxide primer and three or more coats of synthetic enamel paint of approved colour.				
7.4	**Concrete jali**	Sqm	2		
	Providing and fixing pre-fabricated Cement Concrete jali of approved pattern with cement mortar 1:4.				
	Total of Subhead 7.0				
	Total of "A'				

Summary of BOQ for LIG'B' Individual unit Option 'B' for Coastal Region, using Ferro cement Channel Roof and Solid Concrete Blocks Masonry		
S.No.	**Description**	**Amount (Rs.)**
A.0	**Civil Works**	
1	Foundation	
2	Super structure	
3	Wall finishes	
4	Flooring	
5	Door & Windows	
6	Roofing	
7	Miscellaneous Works	
8	Plumbing	
9	Electrical	
	Total	
Note:	1. Rain water disposal has been detailed only up to down take rain water pipe. Further disposal of rain water to be as per site situation.	

BOQ for LIG'B' Individual unit Option 'B' for Coastal Region, using Ferro cement Channel Roof and Solid Concrete Blocks Masonry					
S.No.	**Item Description**	**Unit**	**Quantity**	**Rate**	**Amount (Rs.)**
A.0	**Civil Works**				
1	**Foundation**				
1.1	**Earth work in excavation**	Cum			
	Earth work in foundation trenches, column pits, drains etc. (not exceeding 1.5m in width or 10 sqm on plan) after clearing of site from bushes vegetation etc., including dressing of sides and ramming of bottoms, surface preparation as per specification to receive the PCC, lift up to 1.5m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50m.				
1.2	**Anti-termite treatment**	Sqm			
	Supplying, diluting and injecting chemical emulsion for pre-constructional anti termite treatment and creating a chemical barrier under and all-round the column pits, plinth beams, junction of wall and floor, along the external perimeter of building etc. complete				
	With chlorpyrifos /Lindane E.C. 20% with 1% concentration				
1.3	**Back filling of earth**	Cum			
	Filling available excavated earth (Excluding rock) in trenches, plinth, sides of foundation etc. in layers not exceeding 20Cm. in depth, consolidating each deposited layer by ramming and watering, lead up to 50m. and lift up to 1.5m.				
1.4	**D.P.C.**	Sqm	12.14		
	Providing and laying damp proof course 40 mm thick with cement concrete 1:2:4 (1 cement :2 coarse sand: 4 graded stone aggregate 12.5 mm nominal size) and applying a coat of residual petroleum bitumen of penetration 80/100 of approved quality.				
1.5	**PCC in foundation**				
	(Providing) & laying in position cement concrete of specified grade including centring & shuttering complete - All work up to plinth level.				
a)	1:4:8 (1 cement :4 coarse sand : 8 graded stone aggregate 40mm nominal size)	Cum			
b)	1:5:10 (1 cement :5 coarse sand : 10 graded stone aggregate 40mm nominal size)	Cum			
1.6	**R.C.C. up to plinth level**	Cum			
	Providing & laying in position M-20 grade of reinforced cement concrete including centering, shuttering complete but excluding cost of reinforcement - All work up to plinth level.				
1.7	**Reinforcement up to plinth level**	Kg			
	Providing & fixing Reinforcement for R.C.C. work up to plinth level as specified, including straightening, cutting, bending, placing in position and binding all complete.				
1.8	**Solid Concrete Blocks Masonry work in foundation**	Cum			
	Masonry work in Solid Concrete Blocks in foundation and plinth in cement mortar 1:6 (1 cement: 6 coarse sand).				
	Total of Subhead 1.0				
2	**Super structure**				
2.1	**Solid Concrete Blocks Masonry work in super structure**	No.s	2833.33		
	Masonry work in Precast Solid Concrete Blocks (300x200x150), with density not less than 1800 kg/m3, minimum average compressive strength of 5 N/mm2, in cement mortar 1:4 (1 cement : 4 coarse sand) in super structure above plinth level including finishing in ruled pointing on the external side of wall.				
2.2	**Hollow concrete Blocks Jali**		4.67		
	Masonry work in Precast Hollow Concrete Blocks with open cavity, Non-load bearing units of density between 1000-1500 kg/m3, minimum average compressive strength of 1.5 N/mm2.				

	(150x200x150) in cement mortar 1:4 (1 cement: 4 coarse sand) in parapet wall.				
2.3	**Hollow concrete Blocks Masonry**	sqm	4.43		
	Masonry work in Precast Hollow Concrete Blocks (300x200x150), load bearing units with density between 1000 – 1500 kg/m3, minimum average compressive strength of 3 N/mm2, in cement mortar 1:4 (1 cement : 4 coarse sand) in parapet wall.				
2.5	**R.C.C. in super structure**	Cum	2.08		
	Providing & laying in position M-20 grade of reinforced cement concrete in lintel beams, hajjes and counter & Loft slabs etc. in super structure including centering, shuttering complete but excluding cost of reinforcement.				
2.6	**Reinforcement in super structure**	Kg			
	Providing & fixing Reinforcement for R.C.C. work in lintel, hajjes and counter & Loft slabs in super structure as specified, including straightening, cutting, bending, placing in position and binding all complete.				
2.7	**Plain cement concrete**				
	Providing and laying plain cement concrete of specified grade as bed concrete under floor, roof slab, plinth protection, sill, coping, shelves, kitchen platform etc. screeding at roof to required slope and other locations as called for laid, consolidated and cured etc. complete as per specification and drawing.				
a)	1:4:8 (1 cement :4 coarse sand : 8 graded stone aggregate 40mm nominal size)	Cum	9		
	Total of Subhead 2.0				
3	**Wall finishes**				
3.1	Providing 12 mm thick cement plaster of mix 1:6 (1 cement: 6 coarse sand).	Sqm	165.47		
3.2	**Lime wash**	Sqm	165.47		
	Providing and applying three or more coats of white wash with lime on wall and ceiling to give an even shade including preparation of surfaces, scaffolding, mixing of indigo blue and DDL adhesive etc. complete.				
3.3	**Stone Counters**	Sqm	3.1		
	Providing and laying 20mm thk. Kota stone slabs on kitchen counters laid on 20mm thk. Cement mortar 1:3 (1 cement 3 coarse sand). Including rubbing and polishing complete.				
3.4	**Coping**	Sqm	10.01		
	Providing & fixing 20mm thk. coping of burnt clay paving tile, on window sill & parapet walls in cement mortar 1:6				
3.5	**Dado**	Sqm	30.59		
	Providing and laying ceramic glazed tiles of size 200x300mm in dado of uniform thickness, size, shade and pattern as approved by Architect/Project Manager laid with rich cement slurry over a bedding plaster of 12 mm thick cement mortar 1:3 (1 cement: 3 fine sand) and grouting the joints with white cement and pigment with matching shade of tile, cutting, curing etc. complete in all respects as per drawing.				
	Total of Subhead 3.0				
4	**Flooring**				
4.1	**Terrazzo Tile Flooring**	Sqm	51		
	Providing and laying precast terrazzo tiles 22mm thick with graded marble chips of size up to 12mm, Light shade using white cement, laid in floors, jointed with neat cement slurry mixed with pigment to match the shade of the tiles including rubbing and polishing complete with precast tiles on 20mm thick bed of cement mortar 1:4 (1 cement :4 coarse sand)				
4.2	**Paving Tiles flooring**	Sqm	4.5		
	Providing & fixing 20mm thk. burnt clay paving tile flooring on 20mm thick bed of cement mortar 1:4 (1 cement :4 coarse sand), jointed with neat cement slurry mixed with pigment to match the shade of the tiles including rubbing and polishing complete				
4.4	**Ceramic tile Flooring**	Sqm	7.5		
	Providing and laying ceramic glazed tile flooring of size 300x300mm of approved make, shade and pattern as approved by Project in charge laid over 20/12 mm average thick bed of cement mortar 1:4 (1 cement : 4 coarse sand), grouting the joints with white cement and pigment to match the shade of tile including cutting, etc. complete in all respects				
4.3	**Terrazzo Tile Skirting**	Sqm	4.63		
	Providing and laying precast terrazzo tiles 22mm thick with graded marble chips of size up to 12mm, Light shade using white cement, in skirting jointed with neat cement slurry mixed with pigment to match the shade of the tiles including rubbing and polishing complete with precast tiles on 12mm thick cement mortar 1:3 (1 cement : 3 coarse sand)				
4.5	**Sand Filling**	Cum	8.78		
	Supplying and filling in plinth with sand under floors including watering, ramming, consolidating, and dressing complete.				
4.6	**Damp proof membrane**	Sqm	58.5		
	Providing & laying 1000 Gauge polythene damp proof membrane under floor PCC				

	Total of Subhead 4.0				
5	**Door Windows**				
5.1	**RCC Frame for door**				
	Providing and fixing Wooden Frame for door of size given below using RCC, out of section 100x50mm, with single or double rebate as required, with holdfasts, finished with enamel paint of approved colour all complete.				
a)	1000 x 2080mm	Nos.	4		
b)	750 x 2080mm	Nos.	2		
5.2	**RCC Frame for windows**				
	Providing and fixing Wooden Frame for window of size given below using RCC, out of section 100x50mm, with double rebate and holdfasts, finished with enamel paint of approved colour all complete.				
a)	1000x1100mm	Nos.	4		
b)	600x1100mm	Nos.	2		
b)	600x970mm	Nos.	2		
5.3	**Door Shutters**				
	Providing and fixing door shutter of sizes given below of any of following material as per approval by project in charge/ architect. (Note: Hardware not included in the item, to be as per selection)				
i)	Wooden panelled door shutter using local wood as per approval, 12mm thk. particle board / M.S. jali as per requirement of panel including finishing with enamel paint of approved colour all complete.				
ii)	24 mm thick factory made PVC door shutters made of styles and rails of a uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both sides. Complete as per manufacturer's specification and direction of Engineer-in-charge. (For W.C. and bathroom door shutter).				
iii)	Providing and fixing 35mm thk. ISI marked flush door shutters conforming to IS : 2202 (Part I) decorative type, core of block board construction with frame of 1st class hard wood and well matched commercial 3 ply veneering with vertical grains or cross bands and face veneers on both faces of shutters.				
iv)	Bamboo door shutters				
a)	900 x 2030mm	Nos.	4		
b)	650 x 2030mm	Nos.	2		
5.4	**Window Shutters**				
i)	Providing and fixing Wooden panelled shutter for window of given size using local wood as per approval, including providing & fixing 5mm thk. clear float glass of approved make, finishing with enamel paint of approved colour all complete. (Note: Hardware not included in the item, to be as per selection)				
ii)	Providing and fixing Wooden panelled shutter for window of given size using local wood as per approval, including providing & fixing M.S. wire gauge of avg. width of aperture 1.4mm with wire of dia 0.63mm , finishing with enamel paint of approved colour all complete. (Note: Hardware not included in the item, to be as per selection)				
iii)	Bamboo shutter				
a)	450x1000mm	Nos.	8		
b)	500x1000mm	Nos.	2		
c)	500x870mm	Nos.	2		
5.5	**Precast Louvers**				
a)	600x 500mm	Nos	5		
b)	900x500mm	Nos	4		
	Total of Subhead 5.0				
6	**Roofing**				
6.1	**Precast Ferro cement Channel system**	Sqm	62		
	Providing and Laying precast Ferro cement Channels for roof as per related training and including providing & laying necessary cast in situ RCC and reinforcement as specified in structural drawings, centring & shuttering complete, excluding the cost of reinforcement.				
6.2	**Concrete Filling in Channels valley**	Cum	121.5		
	Providing & laying in position cement concrete (1:2:4) in valley of Ferro cement Channels including centring & shuttering complete.				
6.3	**Ceiling plaster**	Sqm	Rate only		
	Providing 10 mm thick cement plaster of mix 1:4 (1 cement: 4 coarse sand) in ceiling.				
6.4	**Hot Bitumen layer**	Sqm	60.99		
	Providing layer of residual type petroleum bitumen of penetration 80/100 of approved quality at 17kg per 10sqm impregnated with a coat of coarse sand layer at 60 cudm per 10sqm				

	including cleaning the slab surface with brushes and finally with a piece of cloth lightly soaked in kerosene oil complete.				
6.5	**Mud phuska**	Cum	41.85		
	Providing and laying 100mm thick (average) mud phuska of damped brick earth on roof laid to slope consolidated and plastered with 25mm thk. mud mortar mixed with bhusa at 35kg per cum of earth and gobri leaping with mix 1:1 (1clay: 1 cow dung).				
6.6	**Brick tiles with grouting**	Sqm	55.8		
	(Providing) and laying FPS Brick tiles of class designation 75 over roof grouted with cement mortar 1:3 (1 cement : 3 fine sand) mixed with 2% of integral water proofing compound by weight of cement, over a 12mm layer of cement mortar 1:3 (1 cement : 3 fine sand) and finished neat.				
6.7	**Cement Gola**	Rmt	34.6		
	Providing Gola in cement concrete 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate 10 mm nominal size) including finishing with cement mortar 1:3 (1 cement: 3 sand) as per standard design.				
	Total of Subhead 6.0				
7	**Miscellaneous**				
7.1	Making khurras 450x450mm with average minimum thickness of 50mm cement concrete 1:2:4 over PVC sheet 1mx1mx400micron, finished with 12mm cement plaster 1:3 and a coat of neat cement rounding the edges and making and finishing the outlet complete.	Nos	2		
7.2	Providing and fixing 110mm dia PVC rain water pipes of approved make to withstand a test pressure of 4.0kg/sqcm. including all fittings bends, sockets, elbow, tees, clamps, Y - Junction with cover (for collecting rainwater) including testing of joints etc. complete.	Rmt	6.6		
7.3	**M.S. Grill**	Sqm	7.75		
	Providing and fixing in position M.S. Grill made of 10x10mm m.s. square rods fixed at 150mm avg. c/c in both directions & 25x3mm flat all around to fix the grill to window, complete including grinding, providing two coats of red oxide primer and three or more coats of synthetic enamel paint of approved colour.				
	Total of Subhead 7.0				
	Total of "A'				

Summary of BOQ for Cluster unit LIG'B' - Option 'A' for Coastal Region, using Precast Filler slab Roof and Masonry in Rat trap bond using Fly ash & Red Bricks in combination		
S.No.	**Description**	**Amount (Rs.)**
A.0	**Civil Works**	
1	Foundation	
2	Super structure	
3	Wall finishes	
4	Flooring	
5	Door & Windows	
6	Roofing	
7	Miscellaneous	
8	Plumbing	
9	Electrical	
	Total	
Note:	1. Estimated Cost is the cost of complete cluster (16 units)	
	2. Rain water disposal has been detailed only up to down take rain water pipe. Further disposal of rain water to be as per site situation.	

BOQ for Cluster unit LIG'B' - Option 'A' for Coastal Region, using Precast Filler slab Roof and Masonry in Rat trap bond using Fly ash & Red Bricks in combination					
S.No.	**Item Description**	**Unit**	**Quantity**	**Rate**	**Amount (Rs.)**
A.0	**Civil Works**				
1	**Foundation**				
1.1	**Earth work in excavation**	Cum			
	Earth work in foundation trenches, column pits, drains etc. (not exceeding 1.5m in width or 10 sqm on plan) after clearing of site from bushes vegetation etc., including dressing of sides and ramming of bottoms, surface preparation as per specification to receive the PCC, lift up to 1.5m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50m.				
1.2	**Anti-termite treatment**	Sqm			
	Supplying, diluting and injecting chemical emulsion for pre-constructional anti termite treatment and creating a chemical barrier under and all-round the column pits, plinth beams, junction of wall and floor, along the external perimeter of building etc. complete				
	With chlorpyrifos /Lindane E.C. 20% with 1% concentration				
1.3	**Back filling of earth**	Cum			
	Filling available excavated earth (Excluding rock) in trenches, plinth, sides of foundation etc. in layers not exceeding 20Cm. in depth, consolidating each deposited layer by ramming and watering, lead up to 50m. and lift up to 1.5m.				
1.4	**PCC in foundation**				
	(Providing) & laying in position cement concrete of specified grade including centring & shuttering complete - All work up to plinth level.				
a)	1:4:8 (1 cement :4 coarse sand : 8 graded stone aggregate 40mm nominal size)	Cum			
b)	1:5:10 (1 cement :5 coarse sand : 10 graded stone aggregate 40mm nominal size)	Cum			
1.5	**R.C.C. up to plinth level**	Cum			
	Providing & laying in position M-20 grade of reinforced cement concrete including centering, shuttering complete but excluding cost of reinforcement - All work up to plinth level.				
1.6	**Reinforcement up to plinth level**	Kg			
	Providing & fixing Reinforcement for R.C.C. work up to plinth level as specified, including straightening, cutting, bending, placing in position and binding all complete.				
1.7	**Brick work in foundation**	Cum			
	230mm thk. Brick work with Fly ash bricks (FALG bricks) conforming to class 'A' in rat trap bond in cement mortar 1:6 (1 cement: 6 coarse sand) in foundation and plinth.				
	Total of Subhead 1.0				
2	**Super structure**				
2.1	**Brick work in Fly ash bricks**	Cum	448.85		
	230mm thk. Brick work with Fly ash bricks (FALG bricks) conforming to class 'A' in rat trap bond in cement mortar 1:4 (1 cement : 4 coarse sand) in super structure above plinth level including finishing in ruled pointing on the external side of wall.				
2.2	**Brick work in Red Burnt Bricks**	Cum	29.5		
	Brick work with FPS bricks of class designation 75 in parapet wall in English bond in cement mortar 1:6 (1 cement : 6 coarse sand)				
2.3	**115mm thk brick wall**	Sqm	25.92		

	Half brick masonry with Fly ash bricks (FALG bricks) conforming to class 'A' in super structure above plinth level in cement mortar 1:6, including providing & placing in position 2 nos. 6mm dia. M.S. bars at every third course.				
2.4	**Brick Jali**	Sqm	11.8		
	Brick jali work in desired pattern in parapet wall with FPS bricks of class designation 75 in cement mortar 1:4				
2.5	**R.C.C. in super structure**	Cum			
	Providing & laying in position M-20 grade of reinforced cement concrete in columns, beams, roof slab, lintel beams, hajjes and counter & Loft slabs etc. in super structure including centering, shuttering complete but excluding cost of reinforcement.				
	(Note: quantity does not include quantities of columns, beams & roof slab)				
2.6	**Reinforcement in super structure**	Kg			
	Providing & fixing Reinforcement for R.C.C. work in lintel, hajjes and counter & Loft slabs in super structure as specified, including straightening, cutting, bending, placing in position and binding all complete.				
	(Note: quantity does not include quantities of columns, beams & roof slab)				
2.7	**Plain cement concrete**				
	Providing and laying plain cement concrete of specified grade as bed concrete under floor, roof slab, plinth protection, sill, coping, shelves, kitchen platform etc. screeding at roof to required slope and other locations as called for laid, consolidated and cured etc. complete as per specification and drawing.				
a)	1:4:8 (1 cement :4 coarse sand : 8 graded stone aggregate 40mm nominal size)	Cum	56.03		
	Total of Subhead 2.0				
3	**Wall finishes**				
3.1	Providing 12 mm thick cement plaster of mix 1:6 (1 cement: 6 coarse sand).	Sqm	3365.09		
3.2	**Lime wash**	Sqm	4593.09		
	Providing and applying three or more coats of white wash with lime on wall and ceiling to give an even shade including preparation of surfaces, scaffolding, mixing of indigo blue and DDL adhesive etc. complete.				
3.3	**Stone Counters**	Sqm	84		
	Providing and laying 20mm thk. Kota stone slabs on kitchen counters laid on 20mm thk. Cement mortar 1:3 (1 cement 3 coarse sand). Including rubbing and polishing complete.				
3.4	**Coping**	Sqm	65.65		
	Providing & fixing 20mm thk. coping of burnt clay paving tile, on window sill & parapet walls in cement mortar 1:6				
3.5	**Dado**	Sqm	518.72		
	Providing and laying precast terrazzo tiles 22mm thick with graded marble chips of size up to 12mm, Light shade using white cement, fixed on walls, jointed with neat cement slurry mixed with pigment to match the shade of the tiles including rubbing and polishing complete with precast tiles on 12mm thick cement mortar 1:3 (1 cement : 3 coarse sand)				
	Total of Subhead 3.0				
4	**Flooring**				
4.1	**Terrazzo Tile Flooring**	Sqm	932.8		
	Providing and laying precast terrazzo tiles 22mm thick with graded marble chips of size up to 12mm, Light shade using white cement, laid in floors, jointed with neat cement slurry mixed with pigment to match the shade of the tiles including rubbing and polishing complete with precast tiles on 20mm thick bed of cement mortar 1:4 (1 cement :4 coarse sand)				
4.2	**Terrazzo Tile Skirting**	Sqm	101.12		
	Providing and laying precast terrazzo tiles 22mm thick with graded marble chips of size up to 12mm, Light shade using white cement, in skirting jointed with neat cement slurry mixed with pigment to match the shade of the tiles including rubbing and polishing complete with precast tiles on 12mm thick cement mortar 1:3 (1 cement : 3 coarse sand)				
4.3	**Ceramic tile Flooring**	Sqm	115.2		
	Providing and laying ceramic glazed tile flooring of size 300x300mm of approved make, shade and pattern as approved by Project in charge laid over 20/12 mm average thick bed of cement mortar 1:4 (1 cement : 4 coarse sand), grouting the joints with white cement and pigment to match the shade of tile including cutting, etc. complete in all respects				
4.4	**Sand Filling**	Cum	39.3		
	Supplying and filling in plinth with sand under floors including watering, ramming, consolidating, and dressing complete.				
4.5	**Damp proof membrane**	Sqm	252.8		
	Providing & laying 1000 Gauge polythene damp proof membrane under floor PCC				
	Total of Subhead 4.0				
5	**Door Windows**				

5.1	**RCC Frame for door**				
	Providing and fixing Wooden Frame for door of size given below using RCC, out of section 100x50mm, with single or double rebate as required, with holdfasts, finished with enamel paint of approved colour all complete.				
a)	1000 x 2050mm	Nos.	96		
b)	750 x 2050mm	Nos.	48		
5.2	**RCC Frame for windows**				
	Providing and fixing Wooden Frame for window of size given below using RCC, out of section 100x50mm, with double rebate and holdfasts, finished with enamel paint of approved colour all complete.				
a)	1000x1200mm	Nos.	48		
b)	450x1200mm	Nos.	16		
c)	450x1085mm	Nos.	16		
d)	600x1085mm	Nos.	32		
d)	600x1200mm	Nos.	32		
5.3	**Door Shutters**				
	Providing and fixing door shutter of sizes given below of any of following material as per approval by project in charge/ architect. (Note: Hardware not included in the item, to be as per selection)				
i)	Wooden panelled door shutter using local wood as per approval, 12mm thk. particle board / M.S. jali as per requirement of panel including finishing with enamel paint of approved colour all complete.				
ii)	24 mm thick factory made PVC door shutters made of styles and rails of a uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both sides. Complete as per manufacturer's specification and direction of Engineer-in-charge. (For W.C. and bathroom door shutter).				
iii)	Providing and fixing 35mm thk. ISI marked flush door shutters conforming to IS : 2202 (Part I) decorative type, core of block board construction with frame of 1st class hard wood and well matched commercial 3 ply veneering with vertical grains or cross bands and face veneers on both faces of shutters.				
iv)	Bamboo door shutters				
a)	900 x 2000mm	Nos.	96		
b)	650 x 2000mm	Nos.	48		
5.4	**Window Shutters**				
i)	Providing and fixing Wooden panelled shutter for window of given size using local wood as per approval, including providing & fixing 5mm thk. clear float glass of approved make, finishing with enamel paint of approved colour all complete. (Note: Hardware not included in the item, to be as per selection)				
ii)	Providing and fixing Wooden panelled shutter for window of given size using local wood as per approval, including providing & fixing M.S. wire gauge of avg. width of aperture 1.4mm with wire of dia 0.63mm , finishing with enamel paint of approved colour all complete. (Note: Hardware not included in the item, to be as per selection)				
iii)	Bamboo shutter				
a)	450x1100mm	Nos.	96		
b)	350x1100mm	Nos.	16		
c)	350x 985mm	Nos.	16		
d)	500x 985mm	Nos.	32		
d)	500x1100mm	Nos.	32		
5.5	**Precast Louvers**				
a)	450x 500mm	Nos	16		
b)	600x500mm	Nos	64		
c)	750x500mm	Nos	16		
	Total of Subhead 5.0				
6	**Roofing**				
6.1	**Filler material for Filler slab**	Sqm	1228		
	Providing & laying as per instruction, stabilised mud blocks 50mm thk. during casting of Filler slab.				
6.2	**Ceiling plaster**	Sqm	1228		
	Providing 10 mm thick cement plaster of mix 1:4 (1 cement: 4 coarse sand) in ceiling.				
6.3	**Sunken area filling**	Cum	36.96		
	Providing and laying on sunken areas broken light weight concrete block bats of approximately 600 kg. per cum density laid, consolidated, finished smooth, including finished & grouting the top layer with water proof cement mortar with CICO or equivalent brand.				
6.4	**Hot Bitumen layer**	Sqm	396.4		

	Providing layer of residual type petroleum bitumen of penetration 80/100 of approved quality at 17kg per 10sqm impregnated with a coat of coarse sand layer at 60 cudm per 10sqm including cleaning the slab surface with brushes and finally with a piece of cloth lightly soaked in kerosene oil complete.				
6.5	**Mud phuska**	Cum	55.95		
	Providing and laying 100mm thick (average) mud phuska of damped brick earth on roof laid to slope consolidated and plastered with 25mm thk. mud mortar mixed with bhusa at 35kg per cum of earth and gobri leaping with mix 1:1 (1clay: 1 cow dung).				
6.6	**Brick tiles with grouting**	Sqm	373		
	(Providing) and laying FPS Brick tiles of class designation 75 over roof grouted with cement mortar 1:3 (1 cement : 3 fine sand) mixed with 2% of integral water proofing compound by weight of cement, over a 12mm layer of cement mortar 1:3 (1 cement : 3 fine sand) and finished neat.				
6.7	**Cement Gola**	Rmt	17.16		
	Providing Gola in cement concrete 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate 10 mm nominal size) including finishing with cement mortar 1:3 (1 cement: 3 sand) as per standard design.				
	Total of Subhead 6.0				
7	**Miscellaneous**				
7.1	Making khurras 450x450mm with average minimum thickness of 50mm cement concrete 1:2:4 over PVC sheet 1mx1mx400micron, finished with 12mm cement plaster 1:3 and a coat of neat cement rounding the edges and making and finishing the outlet complete.	Nos	14		
7.2	Providing and fixing 110mm dia PVC rain water pipes of approved make to withstand a test pressure of 4.0kg/sqcm. including all fittings bends, sockets, elbow, tees, clamps, Y - Junction with cover (for collecting rainwater) including testing of joints etc. complete.	Rmt	182		
	Total of Subhead 7.0				
	Total of "A'				

Summary of BOQ for Cluster unit LIG'B' - Option 'B' for Coastal Region, using Precast Ferro cement Channel Roof and Masonry in Laterite blocks on Ground floor & Stabilised compressed earth Bricks in rat tap bond for rest of floors		
S.No.	**Description**	**Amount (Rs.)**
A.0	**Civil Works**	
1	Foundation	
2	Super structure	
3	Wall finishes	
4	Flooring	
5	Door & Windows	
6	Roofing	
7	Miscellaneous	
8	Plumbing	
9	Electrical	
	Total	
Note:	1. Estimated Cost is the cost of complete cluster (16 units)	
	2. Rain water disposal has been detailed only up to down take rain water pipe. Further disposal of rain water to be as per site situation.	

BOQ for Cluster unit LIG'B' - Option 'B' for Coastal Region, using Precast Ferro cement Channel Roof and Masonry in Laterite blocks on Ground floor & Stabilised compressed earth Bricks in rat tap bond for rest of floors					
S.No.	**Item Description**	**Unit**	**Quantity**	**Rate**	**Amount (Rs.)**
A.0	**Civil Works**				
1	**Foundation**				
1.1	**Earth work in excavation**	Cum			
	Earth work in foundation trenches, column pits, drains etc. (not exceeding 1.5m in width or 10 sqm on plan) after clearing of site from bushes vegetation etc., including dressing of sides and ramming of bottoms, surface preparation as per specification to receive the PCC, lift up to 1.5m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50m.				
1.2	**Anti-termite treatment**	Sqm			
	Supplying, diluting and injecting chemical emulsion for pre-constructional anti termite treatment and creating a chemical barrier under and all-round the column pits, plinth beams, junction of wall and floor, along the external perimeter of building etc. complete				
	With chlorpyrifos /Lindane E.C. 20% with 1% concentration				
1.3	**Back filling of earth**	Cum			
	Filling available excavated earth (Excluding rock) in trenches, plinth, sides of foundation etc. in layers not exceeding 20Cm. in depth, consolidating each deposited layer by ramming and watering, lead up to 50m. and lift up to 1.5m.				
1.4	**PCC in foundation**				
	(Providing) & laying in position cement concrete of specified grade including centring & shuttering complete - All work up to plinth level.				
a)	1:4:8 (1 cement :4 coarse sand : 8 graded stone aggregate 40mm nominal size)	Cum			
b)	1:5:10 (1 cement :5 coarse sand : 10 graded stone aggregate 40mm nominal size)	Cum			
1.6	**Reinforcement up to plinth level**	Kg			
	Providing & fixing Reinforcement for R.C.C. work up to plinth level as specified, including straightening, cutting, bending, placing in position and binding all complete.				
1.7	**Masonry work in foundation**	Cum			
	Masonry work with Laterite stone blocks of size 390x190x190mm confirming to IS code 3620 in foundation and plinth in cement mortar 1:6 (1 cement : 6 coarse sand).				
	Total of Subhead 1.0				
2	**Super structure**				
2.1	**Brick work in super structure**	Sqm	1341.73		
	230mm thk. Brick work in Stabilised, Hydraulically Compressed Earth Bricks in rat trap bond in cement mortar 1:4 (1 cement : 4 coarse sand) in super structure above plinth level including finishing in ruled pointing on the external side of wall.				
2.2	**Masonry work with Laterite blocks in super structure**	Rmt	137.89		
	Masonry work with Laterite stone blocks of size 390x190x190mm confirming to IS code 362 in cement mortar 1:4 (1 cement : 4 coarse sand) in super structure above plinth level including finishing in ruled pointing on the external side of wall.				
2.3	**Brick work in Red Burnt Bricks**	Cum	15.44		
	Brick work in FPS bricks of class designation 75 in super structure above plinth level in desired pattern in cement mortar 1:4 (1 cement : 4 coarse sand) including finishing in ruled pointing				

	on the external side of wall where ever specified.				
2.4	**115 thk. wall**	Sqm	11.55		
	115mm thk. Brick work in Stabilised, Hydraulically Compressed Earth Bricks in rat trap bond in cement mortar 1:4 (1 cement: 4 coarse sand) in super structure above plinth level.				
2.5	**Brick work in Parapet wall**	Sqm	233.86		
	Brick work with Stabilised, Hydraulically Compressed Earth Bricks in super structure above plinth level in English bond in cement mortar 1:6 (1 cement : 6 coarse sand)				
2.6	**Brick Jali**	Sqm	10.32		
	Brick jali work in desired pattern in parapet wall with FPS bricks of class designation 75 in cement mortar 1:4				
2.7	**R.C.C. in super structure**	Cum			
	Providing & laying in position M-20 grade of reinforced cement concrete in lintel beams, hajjes and counter & Loft slabs etc. in super structure including centering, shuttering complete but excluding cost of reinforcement.				
2.8	**Reinforcement in super structure**	Kg			
	Providing & fixing Reinforcement for R.C.C. work in lintel, hajjes and counter & Loft slabs in super structure as specified, including straightening, cutting, bending, placing in position and binding all complete.				
2.9	**Plain cement concrete**				
	Providing and laying plain cement concrete of specified grade as bed concrete under floor, roof slab, plinth protection, sill, coping, shelves, kitchen platform etc. screeding at roof to required slope and other locations as called for laid, consolidated and cured etc. complete as per specification and drawing.				
a)	1:4:8 (1 cement :4 coarse sand : 8 graded stone aggregate 40mm nominal size)	Cum	52.93		
	Total of Subhead 2.0				
3	**Wall finishes**				
3.1	Providing 12 mm thick cement plaster of mix 1:6 (1 cement: 6 coarse sand).	Sqm	3762.43		
3.2	**Lime wash**	Sqm	3922.99		
	Providing and applying three or more coats of white wash with lime on wall and ceiling to give an even shade including preparation of surfaces, scaffolding, mixing of indigo blue and DDL adhesive etc. complete.				
3.3	**Stone Counters**	Sqm	65.6		
	Providing and laying 20mm thk. Kota stone slabs on kitchen counters laid on 20mm thk. Cement mortar 1:3 (1 cement 3 coarse sand). Including rubbing and polishing complete.				
3.4	**Coping**	Sqm	42.45		
	Providing & fixing 20mm thk. coping of burnt clay paving tile, on window sill & parapet walls in cement mortar 1:6				
3.5	**Dado**	Sqm	495.1		
	Providing and laying precast terrazzo tiles 22mm thick with graded marble chips of size up to 12mm, Light shade using white cement, fixed on walls, jointed with neat cement slurry mixed with pigment to match the shade of the tiles including rubbing and polishing complete with precast tiles on 12mm thick cement mortar 1:3 (1 cement : 3 coarse sand)				
	Total of Subhead 3.0				
4	**Flooring**				
4.1	**Terrazzo Tile Flooring**	Sqm	872.64		
	Providing and laying precast terrazzo tiles 22mm thick with graded marble chips of size up to 12mm, Light shade using white cement, laid in floors, jointed with neat cement slurry mixed with pigment to match the shade of the tiles including rubbing and polishing complete with precast tiles on 20mm thick bed of cement mortar 1:4 (1 cement :4 coarse sand)				
4.2	**Terrazzo Tile Skirting**	Sqm	105.65		
	Providing and laying precast terrazzo tiles 22mm thick with graded marble chips of size up to 12mm, Light shade using white cement, in skirting jointed with neat cement slurry mixed with pigment to match the shade of the tiles including rubbing and polishing complete with precast tiles on 12mm thick cement mortar 1:3 (1 cement : 3 coarse sand)				
4.3	**Ceramic tile Flooring**	Sqm	108.64		
	Providing and laying ceramic glazed tile flooring of size 300x300mm of approved make, shade and pattern as approved by Project in charge laid over 20/12 mm average thick bed of cement mortar 1:4 (1 cement : 4 coarse sand), grouting the joints with white cement and pigment to match the shade of tile including cutting, etc. complete in all respects				
4.4	**Sand Filling**	Cum	36.8		
	Supplying and filling in plinth with sand under floors including watering, ramming, consolidating, and dressing complete.				
4.5	**Damp proof membrane**	Sqm	245.32		
	Providing & laying 1000 Gauge polythene damp proof membrane under floor PCC				

	Total of Subhead 4.0				
5	**Door Windows**				
5.1	**RCC Frame for door**				
	Providing and fixing Wooden Frame for door of size given below using RCC, out of section 100x50mm, with single or double rebate as required, with holdfasts, finished with enamel paint of approved colour all complete.				
a)	1000 x 2125mm	Nos.	64		
b)	750 x 2125mm	Nos.	96		
5.2	**RCC Frame for windows**				
	Providing and fixing Wooden Frame for window of size given below using RCC, out of section 100x50mm, with double rebate and holdfasts, finished with enamel paint of approved colour all complete.				
a)	1000x1200mm	Nos.	48		
b)	450x1200mm	Nos.	16		
c)	450x1085mm	Nos.	32		
d)	600x1085mm	Nos.	32		
5.3	**Door Shutters**				
	Providing and fixing door shutter of sizes given below of any of following material as per approval by project in charge/ architect. (Note: Hardware not included in the item, to be as per selection)				
i)	Wooden panelled door shutter using local wood as per approval, 12mm thk. particle board / M.S. jali as per requirement of panel including finishing with enamel paint of approved colour all complete.				
ii)	24 mm thick factory made PVC door shutters made of styles and rails of a uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both sides. Complete as per manufacturer's specification and direction of Engineer-in-charge. (For W.C. and bathroom door shutter).				
iii)	Providing and fixing 35mm thk. ISI marked flush door shutters conforming to IS : 2202 (Part I) decorative type, core of block board construction with frame of 1st class hard wood and well matched commercial 3 ply veneering with vertical grains or cross bands and face veneers on both faces of shutters.				
iv)	Bamboo door shutters				
a)	900 x 2075mm	Nos.	64		
b)	650 x 2075mm	Nos.	96		
5.4	**Window Shutters**				
i)	Providing and fixing Wooden panelled shutter for window of given size using local wood as per approval, including providing & fixing 5mm thk. clear float glass of approved make, finishing with enamel paint of approved colour all complete. (Note: Hardware not included in the item, to be as per selection)				
ii)	Providing and fixing Wooden panelled shutter for window of given size using local wood as per approval, including providing & fixing M.S. wire gauge of avg. width of aperture 1.4mm with wire of dia 0.63mm , finishing with enamel paint of approved colour all complete. (Note: Hardware not included in the item, to be as per selection)				
iii)	Bamboo shutter				
a)	450x1100mm	Nos.	96		
b)	350x1100mm	Nos.	16		
c)	350x985mm	Nos.	32		
d)	500x985mm	Nos.	32		
5.5	**Precast Louvers**				
a)	450x 375mm	Nos	32		
b)	600x375mm	Nos	48		
c)	750x375mm	Nos	16		
	Total of Subhead 5.0				
6	**Roofing**				
6.1	**Precast Ferro cement Channel system**	Sqm	1029.28		
	Providing and Laying precast Ferro cement Channels for roof as per related training and including providing & laying necessary cast in situ RCC and reinforcement as specified in structural drawings, centering & shuttering complete, excluding the cost of reinforcement.				
6.2	**Concrete Filling in Channels valley**	Cum	25.5		
	Providing & laying in position cement concrete (1:2:4) in valley of Ferro cement Channels including centring & shuttering complete.				
6.3	**Ceiling plaster**	Sqm	160.56		
	Providing 10 mm thick cement plaster of mix 1:4 (1 cement: 4 coarse sand) in ceiling.				
6.4	**Sunken area filling**	Cum	22.86		

	Providing and laying on sunken areas broken light weight concrete block bats of approximately 600 kg. per cum density laid, consolidated, finished smooth, including finished & grouting the top layer with water proof cement mortar with CICO or equivalent brand.				
6.5	**Hot Bitumen layer**	Sqm	351.6		
	Providing layer of residual type petroleum bitumen of penetration 80/100 of approved quality at 17kg per 10sqm impregnated with a coat of coarse sand layer at 60 cudm per 10sqm including cleaning the slab surface with brushes and finally with a piece of cloth lightly soaked in kerosene oil complete.				
6.6	**Mud phuska**	Cum	48.25		
	Providing and laying 100mm thick (average) mud phuska of damped brick earth on roof laid to slope consolidated and plastered with 25mm thk. mud mortar mixed with bhusa at 35kg per cum of earth and gobri leaping with mix 1:1 (1clay: 1 cow dung).				
6.7	**Brick tiles with grouting**	Sqm	321.65		
	(Providing) and laying FPS Brick tiles of class designation 75 over roof grouted with cement mortar 1:3 (1 cement : 3 fine sand) mixed with 2% of integral water proofing compound by weight of cement, over a 12mm layer of cement mortar 1:3 (1 cement : 3 fine sand) and finished neat.				
6.8	**Cement Gola**	Rmt	15.6		
	Providing Gola in cement concrete 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate 10 mm nominal size) including finishing with cement mortar 1:3 (1 cement: 3 sand) as per standard design.				
	Total of Subhead 6.0				
7	**Miscellaneous**				
7.1	Making khurras 450x450mm with average minimum thickness of 50mm cement concrete 1:2:4 over PVC sheet 1mx1mx400micron, finished with 12mm cement plaster 1:3 and a coat of neat cement rounding the edges and making and finishing the outlet complete.	Nos	14		
7.2	Providing and fixing 110mm dia PVC rain water pipes of approved make to withstand a test pressure of 4.0kg/sqcm. including all fittings bends, sockets, elbow, tees, clamps, Y - Junction with cover (for collecting rainwater) including testing of joints etc. complete.	Rmt	182		
	Total of Subhead 7.0				
	Total of "A'				

7 RATE ANALYSIS (INDIVIDUAL UNITS)

Rate Analysis Chart for Coastal Region					
Individual Units					
Type	Option	Carpet Area of each Unit (in sqm.)	Total Cost (in Rs.)	Cost/sqm (in Rs.)	Construction Method Used
EWS	Option-A	26.7	3,18,156.41	11,915.97	**Masonry:** Combination of red bricks and fly ash bricks **Flooring/Roofing:** Ferro cement channel, MCR tiles
	Option-B	25.18	2,82,681.58	11,226.43	**Masonry:** Laterite stone blocks **Flooring/Roofing:** Filler slab
LIG-A	Option-A	35.36	3,66,056.06	10,352.26	**Masonry:** Stabilised compressed earth blocks **Flooring/Roofing**: Pre-cast arch panel, MCR tiles
	Option-B	34.5	4,55,948.69	13,215.90	**Masonry:** Red brick **Flooring/Roofing:** Plank and joist & Filler Slab
LIG-B	Option-A	59.06	6,64,873.42	11,257.59	**Masonry:** Stabilised compressed earth blocks **Flooring/Roofing:** Plank and joist, MCR tiles
	Option-B	51.5	5,62,297.96	10,918.41	**Masonry:** Fly ash bricks, solid concrete blocks **Flooring/Roofing**: Ferro cement arch panel

7 RATE ANALYSIS (CLUSTER UNITS)

Rate Analysis Chart for Coastal Region							
Cluster Units							
Type	Option	Carpet Area of each Unit (in sqm.)	Total Cost (in Rs.)	No. of Units in the cluster (in no.s)	Cost/unit house in Rs.)	Cost of each unit/sqm (in Rs)	Construction Method Used
EWS	Option-A	24.8	51,44,429.10	24	2,07,436.66	8,643.19	**Masonry:** Fly ash bricks **Flooring/Roofing:** Pre-cast arch panels
	Option-B	22.3	59,76,151.25	24	2,67,988.85	11,166.20	**Masonry:** Stabilised compressed earth blocks **Flooring/Roofing:** Planks& joists
LIG-A	Option-A	29	39,56,205.90	16	1,36,420.89	8,526.31	**Masonry:** Fly ash bricks **Flooring/Roofing**: Pre-cast Ferro cement channel
	Option-B	30.2	57,02,195.24	16	1,88,814.41	11,800.90	**Masonry:** Stabilised compressed earth blocks **Flooring/Roofing:** Plank and joists
LIG-B	Option-A	57.4	91,75,242.13	16	1,59,847.42	9,990.46	**Masonry:** Combination of fly ash bricks & red bricks **Flooring/Roofing:** Filler slab
	Option-B	60	81,02,529.33	16	1,35,042.16	8,440.13	**Masonry:** Laterite blocks and stabilised compressed earth blocks **Flooring/Roofing**: Ferro cement arch panel

8 GLOSSARY

Affordable Housing- Individual dwelling units with a carpet area of not more than 60 sq. mt. either as a single unit or part of a building complex with multiple dwelling units.

Affordable Housing Projects- Housing projects where at least 60 per cent of the FAR/FSI is used for dwelling units of carpet area not more than 60 sq. mt. The project shall also reserve 15 per cent of the total FAR/FFSI or 35 per cent of the total number of dwelling units for EWS category.

Built up Area- It is the carpet area plus the thickness of outer walls and the balcony.

Carpet Area- The area enclosed within the walls, actual area to lay the carpet. This area does not include the thickness of the inner walls.

Chajja/Sun-Shade- A sloping or horizontal structural overhang, usually provided for protection from sun and rain or for considerations at lintel level.

Damp-Proof Course- A course consisting of some appropriate water proofing material provided to prevent penetration of dampness.

EWS House- A house or dwelling unit intended for Economically Weaker Sections with maximum built up area of 32 sq.mtr.

EWS Plot- A residential plot intended for Economically Weaker Sections having maximum plot area of 48 sq.mtr.

Floor Area Ratio (FAR) - The quotient obtained by dividing the total covered area on all floors with the area of the plot.

Foundation- That part of a structure, which is in direct contact with and meant for transmitting loads to the ground.

LIG House- A house or dwelling unit intended for low income groups with a built up area of maximum 48 sq.mtr.

LIG Plot- A residential plot intended for low income groups with a plot area of maximum 60 sq.mtr.

Masonry- An assemblage of masonry units properly bonded together with mortar.

Plinth- The portion of a structure between the surface of the surrounding ground and the surface floor, immediately above the ground**.**

Sustainability- It is defined as an ability or capacity of something to be maintained or to sustain itself. It's about taking what we need to live now, without jeopardising the potential for people in the future to meet their needs.

Veranda- A roofed platform along the outside of a house, level with the ground floor.

Ventilation- The supply of outside air into a building through window or other openings due to wind outside and convection effects arising from temperature, or vapour pressure differences (or both) between inside and outside of the building.

NOTES

About Development Alternatives (DA):

Ever since its inception in 1982, Development Alternatives (DA) has acted as a research and action organisation, designing and delivering eco-solutions for the poor and the marginalised.

With a deep understanding of the rural market and a strong presence in the Indian heartland, its existence has been a credible and visible one – nationally and internationally – in addressing poverty challenges in a climate-sensitive environment.

A pioneer in sustainable development and the first social enterprise in India, DA realised the necessity of establishing several associated organisations working toward distinct goals that converge on the unified ambition of regenerating the environment and creating large-scale sustainable livelihoods.

The DA Group envisions a world where every citizen can live in security, with a dignified job and an assured income. We believe that the key to achieving this is the creation of the means for sustainable livelihoods in large numbers - providing the rural poor with jobs and decent incomes, giving meaning and dignity to life, producing goods and services for local markets and preserving the environment.

About Building Material And Technology Promotion Council (BMTPC):

In order to bridge the gap between research and development and large scale application of new building material technologies, the erstwhile Ministry of Urban Development, Government of India, had established the BUILDING MATERIALS AND TECHNOLOGY PROMOTION COUNCIL in July 1990.

The Council strives to package proven innovative technologies for the benefit of entrepreneurs interested in setting up manufacturing units in tiny, small, medium and large scale sectors.

There has been a demand for setting up such an apex institution in order to provide an inter-disciplinary platform to various agencies under Central and State Governments and the private sector for scaling up proven technologies to enhance their wide-spread use and for assisting commercial production as well as systematic dissemination of appropriate technology for the benefit of the construction of appropriate technology for the benefit of the construction agencies and different sections of the population.

The Council is structured to undertake the task of the extension and application of technologies and materials developed by research institutions on the ground with the backing of financial institutions and enabling regulatory environment.

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