GUIDELINE AND

TYPE DESIGNS FOR A

SLAUGHTER HOUSE

[5-10 LARGE & 20 SMALL ANIMALS (TINY)]

SUCHITWA MISSION
LOCAL SELF GOVERNMENT DEPARTMENT
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Preface

In Kerala there are 889 licensed slaughter houses. It was reported that about 4,00,000 metric tonne of mutton and 6,00,000 metric tonne of beef is consumed annually in Kerala. Per capita meat consumption is reported as 40 kg per annum. Slaughtering is normally done by small scale animal dealers or slaughter house contractors or meat stall owners. They usually bring animals to slaughter houses and take away meat, hide, bones and other valuable materials.

There are various central Acts/Rules and guidelines which necessitate streamline of the facilities, systems and protocols of operation of slaughter houses. The Prevention of Cruelty to Animals Rules, 2001 is the important legislation in this regard.

Local bodies are responsible for providing sufficient facilities for slaughtering of animals. Though, slaughtering facilities are provided in many Local Bodies, especially Urban Local Bodies, their hygienic condition is generally very poor. Crude methods of slaughtering are practiced in most of the slaughter houses. Mixing of meat with viscera, blood and other evisceration waste is a common practice and thereby chances of contamination of meat are very high in most of these places. Waste especially solid waste are used to be bundle in gunny bags are usually thrown on the bank of major roads, open spaces and water bodies. Therefore, there is urgent necessity for segregation of waste and resource recovery from slaughter house waste.

The Hon'ble High Court of Kerala while deciding on a number of petitions related to functioning of slaughter houses ordered that slaughtering of animals should be done in authorised slaughter houses only, unauthorised slaughter house should be close down and meat should not be exposed in public places/markets for selling purpose. Accordingly, the Local Self Govt. Department has issued directions to all Local Self Govt. Institutions (LSGIs) requesting to take action for complying the orders of the Hon'ble High Court and designated a nodal agency to extend support to LSGD.

The Govt. of Kerala designated Suchitwa Mission as the Nodal Agency for providing technical assistance and issuing of technical approval to the projects on slaughter houses. In order to streamline the establishment of a genuine slaughter houses and modernize the existing ones, type designs, estimate and operational guidelines of two basic models has been prepared and got vetted in consultations with experts. These models are compatible to

medium size Municipalities and a Grama Panchayats and complies with statutory provisions, to ensure hygienic meat production, segregation of waste, recovery of resources, waste reduction and waste management. The type design adopts a strategy of minimum mechanisation for suiting to the limited technical and financial resources available with LSGIs. This guidebook would be useful to LSGIs for construction and maintenance of Slaughter Houses.

1. INTRODUCTION

1.1. The Concept

Modern slaughter house is required to be established in all Local Self Government Institutions (LSGIs) for ensuring slaughtering of animals in a scientific way, for producing hygienic meat and ensuring recovery of resources. Layout of slaughter house should enable that resource can be segregated and recovered at appropriate stages. The model slaughter house should comply with all statutory provisions and guidelines. Modern slaughter houses functioning outside the State at some places have all facilities in order to perform slaughtering in most hygienic way, but those slaughter houses are functioning in a factory mode. In Kerala, there is no need for highly mechanised automated slaughter houses in LSGIs since it requires high capital and operating costs. Hence, mini or tiny type of slaughter house with minimum mechanisation required to be established in Kerala. The primary objective of this guideline is to propagate slaughter house in most suited way so as to suit Kerala condition and having all components with waste management facilities.

Scientific slaughtering, maintenance of hygienic conditions in slaughter houses and maximum utilization of byproducts are the three most important requirements for sustaining our meat industry. Quality and hygiene levels in slaughter house are low due to imperfect bleeding, primitive and crude slaughtering, lack of infrastructure facilities for water, electricity and facilities for hanging carcass / flaying. This has resulted in increase of waste contamination / deterioration of meat. Qualitative and quantitative capacities of abattoirs need to be upgraded and these are required to be linked with commercial processing of meat, both for domestic consumption and exports. It will ultimately results in discouraging unauthorized slaughtering.

Considering the special nature of the State, it may not be necessary to provide fully automated slaughter house with highly sophisticated machineries in Grama Panchayats and small Municipality level. In Kerala, slaughtering are being done by meat vendors, which are intended for sale themselves through meat stalls. If the Local Self Govt. Institution (LSGI) provides a common slaughter house it can be made use by those meat vendors, it will ensure hygienic meat production and proper waste management at the lowest cost.

1.2. Scenario in Kerala

In Kerala there are 889 slaughter houses in the LSGIs which are in most cases not meeting the basic facilities required for a modern slaughter house. In Kerala, most of the LSGIs at present does not have proper slaughter house, which are having basic facilities for slaughtering of animals, processing of meat in hygienic way and proper disposal of waste generated. The animals are usually slaughtered in open space by crude method in an unhygienic environment. One reason for the spread of certain diseases among the public may be due to slaughtering the animals in unhygienic environment and distributing contaminated meat. People are looking for good quality meat processed in neat and clean environment. It should be safe for consumption. Accordingly the slaughtering of animals should be done inside the slaughter houses which are having required basic facilities. LSGIs are responsible for the construction and maintenance of slaughter house and for ensuring distribution of good quality meat to the people.

The Hon'ble High Court of Kerala as per order dated 10.12.08 directed all LSGIs to ensure closure of all unauthorized meat vending points. Also directed that no slaughtering shall be allowed in the places other than slaughter houses having butchers license or slaughter house license. It is further ordered that LSGIs should ensure that at the time of sale of meat or slaughtering operations, no animal carcass of whole or huge parcels of animal is allowed to be exhibited / displayed. In compliance of High Court direction, the Government have given necessary directions to all District Panchayats and Government in Home Department and to all LSGI.

The Hon'ble High Court as per order dated 12.08.09 has directed that the competent Government Secretary will issue a circular forthwith incorporating the clause on import of animals into the State of Kerala inorder to ensure that sick animals having contagious diseases or animals having prohibited age are not transported to the State through check post for food or other purposes specifying such responsibility to the District Collectors, District Magistrate, Additional District Magistrate, Commissioner of Police and Superintendent of Police through out the State. Accordingly the Local Self Govt. have issued circular to all stake holders to take action to comply the Court order.

1.3. The Strategy

Slaughter House with waste management facilities are to be established in all LSGIs in a time bound manner. Detailed Project Report (DPR) for construction of slaughter house has to be prepared by LSGIs. Engaging of external consultants for preparation of DPR may not be feasible since there are no such service providers who are capable of providing technical services to LSGIs in the area. Hence the strategy has been adopted to give training to the engineering and health wing of LSGIs and making available the model design prepared by the Suchitwa Mission. The LSGIs have to prepare DPRs using their own trained manpower if required they can avail technical assistance from the Suchitwa Mission for preparing DPRs.

2. Legal Requirement and Guidelines

Construction and maintenance of modern slaughterhouse which is having sufficient Waste Management Facilities are inevitable for maintaining societal hygiene in urban and rural areas. There are specific guidelines/ legislations prescribing basic minimum facilities to be provided in a slaughterhouse. The Prevention of Cruelty to Animal Rules 2001, the Kerala Municipality Act 1994, the Kerala Panchayat Raj Act 1994 and Water (Prevention and Control of Pollution) Act 1974 Act are the major legislations, which are applicable and insisting for minimum facilities to be provided in a modern slaughterhouse.

2.1. Prevention of Cruelty to Animal Rules, 2001.

The Prevention of Cruelty to Animal Rules, 2001 (PCA Rules) is an important legislation prescribing quality standards, facilities and operation and maintenance protocol applicable to Slaughter house. The Rule has been notified under Section 38 of the Prevention of Cruelty to Animals Act, 1960 by the Ministry of Social Justice and Empowerment, Govt.of India. Salient provisions in the PCA Rules are summarized and given in Table 1.

Table :1 Provisions under the PCA Rules

Sl. No.	Particulars	Provisions
1	Definition of Slaughter House	- Where 10 or more than 10 animals are slaughtered / day - Duly licensed by Central/State/Local body
2	Stipulations as per Rule (3)	• Animals not to be slaughtered except in recognized or licensed houses • Slaughtering should not be done o If animal is pregnant o Has an offspring less than 3 months

		○ Under the age of 3 months ○ Not certified by a doctor • Local body shall specify number of animals according to requirement of meat in the area
3	Stipulations as per Rule (4)	Reception & Resting • Shall have a reception area of adequate size with inspection facility • Veterinary Doctor shall examine thoroughly, not more than 12 animals / hour, not more than 96 animals per day.
4	Stipulations as per Rule (5)	Lairage • Every animal after inspection shall be allowed to rest for 24 hours • Lairage should have sufficient space ○ Not less than 2.8 m2 per large animal ○ Not less than 1.6 m2 per animal for small • Facility for preventing hot and rain • Facility for watering and post-mortem inspection
5	Stipulations as per Rule (6)	Slaughtering • Not slaughter in sight of other animals • Not administer any chemical, drug or hormone • Knocking section shall be planned escape of animals should be prevented by operator • Sufficient area for bleeding and avoidance of blood splashing on other animals/carcasses The following facilities should be given in the slaughter house • Blood collection and draining, floor wash point, hand wash basin, knife sterilizer, sticker to sterilize knife, tools for dehyding, immediate disposal of hides or skins Facilities for removal of hides or skins Closed wheel barrow, chute with self closing door, not use floor for storage / inspection, immediate removal of legs, horns, hooves and other parts, spring load floor chute or side wall door or closed wheel barrow, not allowed to ply wheel barrows under the dressing rail, give a clear passage for movement of wheel barrow, • Space for inspection of viscera, hand and

		wash facility, tool sterilization floor wash • Arrangements for inspection by owner for identification, inspection and correlation of carcass, viscera head • Floor slope 33 mm per metre to floor drain
6	Stipulations as per Rule (7)	Drainage should be provided with, • One drainage inlet for every 37m2 floor space, slope of 20 mm per metre, uniform with floor slope, provide floor trap with water seal with metal cover, floor drains with P-U or S type traps, Drainage shall be ventilated to outside air with rodent screens • Avoid floor drains at o Freezer rooms o Dry storage areas Lighting and Ventilation • Natural light and ventilation or • Artificial light and ventilation - Uncolored glass in sky lights and windows, glass area approximately one-fourth of flow area, artificial light of intensity not less than 200 lux, inspection hall with intensity not less than 500 lux, dressed carcass should not expose to direct sunlight, supply of fresh water, floor wash with water jet not less than 200 to 330 kPa, carcass wash with water pressure 1000-1700 kPa, supply of hot water not less than 82^0c The following materials should not be used for slaughter house construction; • Copper and its alloys • Cadmium in any form • Equipments with painted surface in product zone • Enamel containers and equipments • Lead

2.2. Basic requirements as per BIS Guideline

Guideline applicable to Slaughter House is specified as guideline titled 'Basic Requirement for an Abattoir' -IS 4393-1979 and it was reaffirmed in 2005. Salient provisions in the guideline is given in Table 2

Table 2: Basic requirements as per BIS Guideline (IS 4393-1979) Reaffirmed in 2005

<table>
<tr><th>Sl. No.</th><th>Particulars</th><th>Specification</th></tr>
<tr><td>1</td><td>Location</td><td>Outside or on the periphery of city or town, away from airport, near to market, availability of water, electricity, sewage disposal facility</td></tr>
<tr><td>2</td><td>Layout Plan</td><td>Essential Facilities includes resting place, facilities for ante-mortem, facility for humane slaughter, flaying, dressing and washing of carcasses, hanging carcasses, handling of by-product, inspection of edible meat, laboratory, staff welfare, isolation of sick animals, water supply and meat vending facility</td></tr>
<tr><td>3</td><td>Rails for carcasses</td><td>Rails with hooks of suitable rest proof metal and hookes and rail should be cleaned and sterilized</td></tr>
<tr><td>4</td><td>Height of rail</td><td><table><tr><th>Operation</th><th>Large Animal</th><th>Small Animal</th></tr><tr><td>Bleeding</td><td>4500 - 5000 mm</td><td>2200 - 3000 mm</td></tr><tr><td>Dressing</td><td>3200 mm</td><td>2000 - 2200 mm</td></tr></table>Falling slope of 10mm per metre for gravity rail</td></tr>
</table>

3. Design Parameters

3.1 Classification

General classification for slaughter house followed in national level is given in Table – 3

Table –3: Classification of Slaughter house

Sl. No.	Class of slaughter house	Number of animals slaughtered per day
1.	Large scale	> 200 large animals or > 1000 goat or sheep / day
2.	Medium scale	50-100 large animals or 300-1000 goat / sheep / day
3.	Small scale	< 50 large animals or < 300 goat or sheep / day

In Kerala, very few LSGIs are having requirement of slaughtering more than 20 large animals per day. In most of the Grama Panchayats, number of large animals slaughtered per day is normally less than 5..

3.2. Land Requirement

In Kerala, land is a major constraint, hence minimum land shall be made set apart for setting up of slaughter house. Land selected should be preferably level and dry, so that construction and waste disposal cost can be minimized. Road connectivity is essential to the project site for transportation of animals to the slaughter house and meat and other items back. It is better to construct the slaughter house near to the market, and if there is no market, a meat stall may be opened as far as near to the slaughter house in order to minimize transportation costs.

Basic land requirement and basic facilities required for a slaughter house for slaughtering 5 – 10 large and 20 small animals are given below**;**

- A minimum of 50 cents of land.
- Level and dry land, rectangular or square shape is preferred.
- Location shall be outside or on the periphery of a city or town and shall be away from an Airport (IS 4393-1979).
- Road connectivity to the area is essential.
- Potable water, electricity and proper hygiene sewage disposal facilities should be ensured.
- More land area, if available, is preferable and it can be used for buffer zone and green belt development.

3.3 Slaughter House Process Flow Chart

Process flow chart for a Modern Slaughter House is given in **Fig – 1**. Main emphasis is to segregate waste at different stages and to recover resources from it. Use of water should be minimum in order to reduce quantity of waste water from slaughter house.

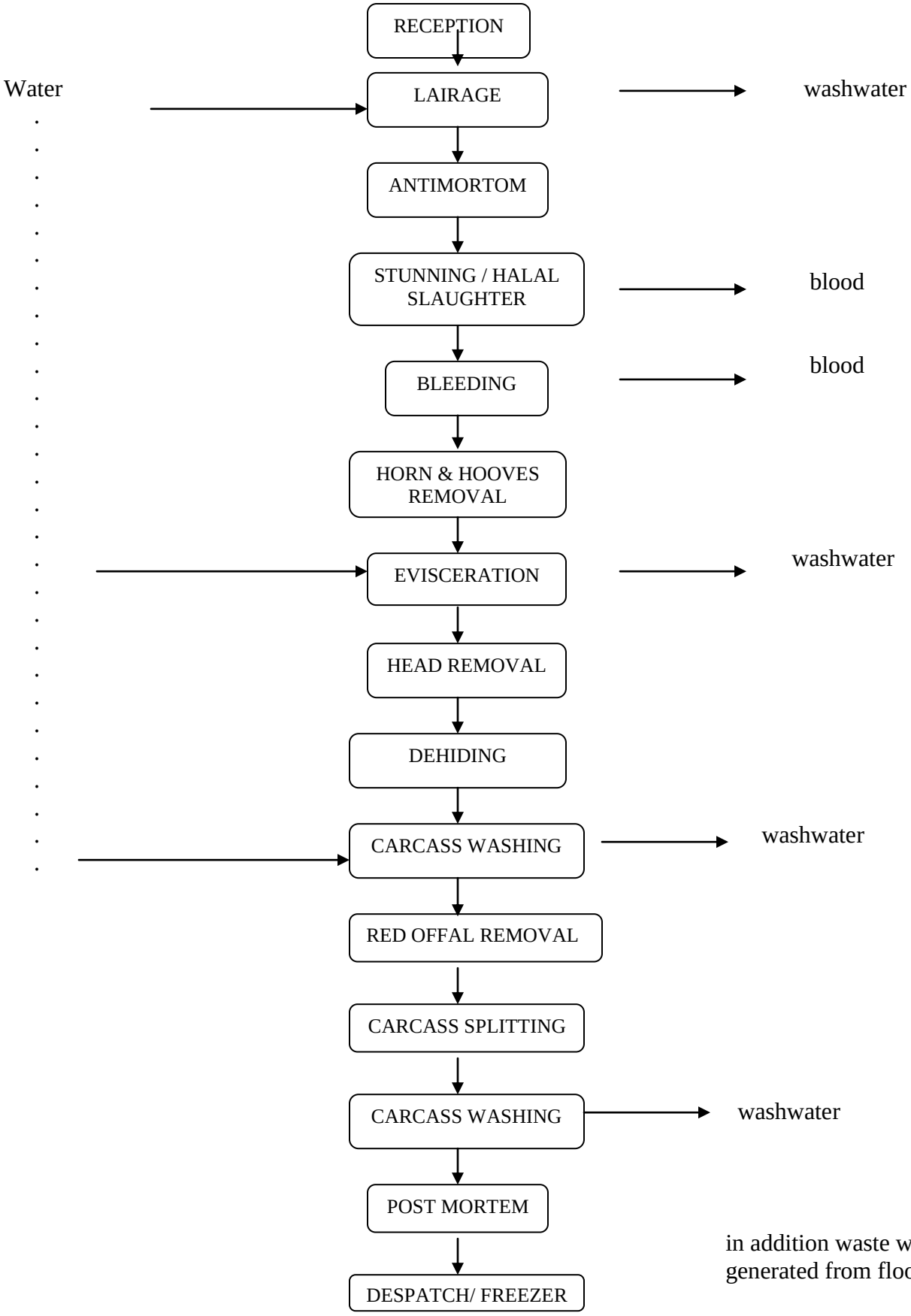


Fig.1: Process Flow chart for a Modern Slaughter House

3.4 Resource Recovery

There is dynamic scope of by-products utilization from abattoirs/livestock and its multifarious benefits are generally not realized by industries, govt. agencies, farmers and the public. Now a major part of such byproducts are considered as waste, which cause environmental pollution, and its potential to enhance the financial viability of such projects are neglected. By-products from livestock should therefore be considered as wealth. India is considered as the largest producer of milk in the world and the major producer of buffalo meat in the world. The scope and potential of byproducts utilisation comprises of newer industries, employment generation, increased revenue generation, better returns to the farmer and environmental protection and safety. Some of the probable by - products and its scope on resource recovery is given in Table 4.

Table 4: Slaughter house by-products and end products

By-product	**End Product**
Blood	Pharmaceutical products, leather finishing agent, plywood adhesive, feed and fertilizer
Bone Gellatine	Hotographic, pharmaceutical, explosives, printing and food
Tallow	Soap, cosmetics, food and feed
Hide/Skin	Leather, collagen:cosmetics, glue and gelatin.
Intestine	Food, surgical sutures, musical strings, sports guts, Prosthetic materials-collagen sheets, burn dressing, heparin and feed.
Horn & Hoof	Horn meal, manure, neats foot oil, fire extinguishers and protein hydrolysate
Hair/Wool	Carpets, felt,upholstery, amino acid and brushes
Stomach	Rennin for dairy industry
Fat	Fatty acids, Tallow, pharmaceuticals, feed, food, cosmetics greese, lubricants and soaps
Vitreous humour intestinal content & Stomach contents	Biogas and manure

3.5. Waste Management

Effective waste management can reduce environmental problems associated with slaughter house. The strategy followed is to reduce waste by segregating resources from different types of wastes generated in the slaughter houses. Solid waste is the main waste product from a slaughter house. Solid waste from slaughter house can be divided into two main groups, namely edible & inedible. Organs such as brain, liver, heart are the examples of edible by-products. Hooves, horns, hair, gall bladder, ears, skin, bones etc. are the inedible by-products. The components left unrecovered forms are the solid wastes.

In a modern slaughter house most of the solid wastes can be recovered as by-products. Success of material recovery depends on how slaughtering is done and how the facilities are provided in the slaughter house. Solid waste generation from slaughter house is given in Table-5.

Table-5: Solid waste generation from Slaughter House

Sl. No.	Animal	Quantity of solid waste	
		kg/head	% of animal wastes
1.	Bovine	83.00	27.50
2.	Goat	2.50	17.00
3.	Pig	2.30	4.00

3.5.1. Solid waste management

Most of the solid wastes can be utilized as by-products. Composting and biomethanisation are the widely used technologies for the processing of solid waste. Solid waste from a slaughter house can be broadly classified into two for processing, Type I waste & Type II waste and it is given in Table: 6.

Table-6: Classification of solid waste from Slaughter House

Category	Constituents of waste
Type I	Vegetable matter such as rumen, stomach and intestine contents, dung, agricultural residues etc.
Type II	Animal matter such as inedible offals, tissues, meat trimmings, waste and condemned meat etc.

(a) Composting

Aerobic composting is the best option for processing of type I and type II wastes. Dung from lairage, ruminal and intestinal contents, blood, meat cuttings, floor sweepings, hair etc. can be stabilized in the compost pile. Carbon to nitrogen ratio, can be balanced by depositing alternate layers of type I waste and type II waste. Maximum heap height of 1.5 m with a width of 2m shall be made use. It is advisable to put flushy matter mixed with earth in the centre of compost pit for avoiding bad odour and for generating high temperature within pit. Aeration of heap can be done once in a week by rotation of materials and within 60-90 days compost can be received. About 200 kg of solid waste can be treated in the composting system. A shed of 20 m^2 area is required for the purpose.

(b) Biogas plant

` Dung from lairage and other wastes in slurry form can be treated in biogas plant. Slaughter house having a capacity to slaughter 5 large and 20 small animals generates about 250 kg of solid waste per day. About 150 kg of solid waste can be treated in biogas plant. Specification, operation and maintenance protocol for biogas plant is given below in Table 7.

Table 7: Specification for biogas plant

Sl.No.	Particulars	Specification
1	Type	fixed dome type
2	Volume of digester including gas holder	22 m^3
3	Digester	RCC or brick masonry with RCC lining with pressure release valve, scum breaker mechanism / mixing having agitator or mixer of propeller type or anchor type, bottom slope 1 in 8 for easy withdrawal of sludge, pumps of screw type of submersible type or external chemical process type pumps for pumping water, slurry and sludge

4	Units for increasing the efficiency of digestion / plant	Pre digester tank for increasing the efficiency of main digester, homogenizer / mixer / pulper / shredder for size reduction and to make the solid waste into uniform composition before putting it to pre-digester tank. Waste to be converted into slurry form by mixing it with equal volume of water to feed in to the digestion for easy and clog free digestion, solar water heater for making hot water, for mixing the waste with hot water, to maintain the temperature in the range of 55-60^{o}C in the digester for the growth of thermophilic microbes, Biogas holder / balloon storage facility for storage of atleast one day biogas generated, Control pane for monitoring / operation of plant
5	Inlet device	PVC pipe of diameter 250mm
6	Inlet chamber with lid	made of cement concrete / ferro cement, circular shape with brick masonry / cement concrete of 120cm diameter
7	Outlet tank	cement concrete/brick masonry having a free board of 30 cm and liquid volume of 4.5 m^3.
8	Outlet opening	150 mm x 150 mm
9	Septic Tank & Soak Pit	for treatment and disposal of effluent from biogas plants. Septic

		tank of at least 2 compartments with maximum of 1.7 m depth and L: B: H ratio of 7.5: 2.25:1.The soak pit has to be concreted at bottom, honey- comb or perforated ring inside wall and 45–100 cm thick 2 mm sand envelop around. Vent pipe is not necessary. Septic tank with size of 1.5m^3.
10	Biogas	Biogas should be utilized for heating purpose for dewatering blood, melting of fat and hot water making.

Additional facilities include;

- Facility for utilizing the gas generated for drying of blood or smelling of fat in the slaughter house.
- Facility for flaring of excess gas with automatic or semi automatic flame ignition.
- Facility for Biogas cleaning for removal of water vapour and H_2S concentration to 100 ppm or less.

11. All metal parts to be coated with epoxy primer and epoxy enamel for avoiding corrosion.
12. All masonry tanks to be coated with epoxy or other corrosion resistant coating.
13. Skilled Manpower for Operation of the Plant.
14. AMC with the consultant / supplier for a period of 2 years after installation

*Plant to be established in a place fully exposed to sunlight and away from drinking water source.

Standards

1. Minimum 45 days waste retention time.
2. Particle size of waste not to exceed 20 mm
3. Rubber hose of ¾ to 1 1/2inch diameter with maximum length of 40 m for

conveyance of biogas

5. Rubber hose, stove and control valve with ISI mark.

6. The capacity of the bio gas plant to be mentioned in terms of the loading rate (ie, maximum quantity of waste to be fed in kg per day)

O&M Protocols

Start up by adding cow dung and equal quantity of water W

1. Waste feeding after chopping and mixed with water in the ratio 1:1
2. Daily feeding of easily degradable waste in slurry form or solid waste mixed with equal quantity of water
3. Limit the quantity of daily waste feed below the designed capacity
4. Maximum particle size of waste shall be 20 mm
5. Daily removal of slurry in to Septic Tank - Soak Pit system
6. Clean the inlet chamber after each feeding and keep it closed
7. Prohibited to feed wastes of slow degrading nature like straw, soil, egg shells, fibrous materials like banana leaves, coconut shells, coconut coir, pseudo stem etc. Feeding of toxic substances like fungicides, insecticides, pesticides, detergents, and disinfectants like phenyl, dettol etc. are prohibited.
8. Mix the substrate or rotate the drum at least weekly for preventing scum formation

Maintenance cost

Rs.30,000 per annum per unit as O&M cost.

3.5.2. Liquid Waste Management

Septic tank with soak pit system shall be utilised for tiny slaughter house having a capacity to slaughter 5 - 10 large animals and 20 small animals.. Waste water generation and typical waste water characteristics of slaughter house waste are given in table 8 and 9.

Table-8: Waste water generation

Sl. No.	Type of animal	Waste generation (in litre)
1.	Cattle	250
2.	Sheep	60
3.	Pig	400
4.	Poultry	15

Table-9: Typical waste water characteristics of Slaughter House effluent

Sl. No.	Parameter	Unit	Concentration
1.	Biological oxygen demand (BOD), 27^0C at 3 days	mg/L	1750
2.	Chemical oxygen demand (COD)	mg/L	3550
3.	Total suspended solids (SSS)	mg/L	875
4.	Oil & grease	mg/L	220

The strategy adopted here is to reduce pollution load by recovering by-products and use of less quantity of water for washing purpose. Wastewater mainly consists of wash water and can be treated in a septic tank and soak pit system established in the site of slaughter house.

3.5.3 Sewage treatment

Septic tank and soak pit should be provided for treatment of sewage generated from toilets in the slaughter house. A septic tank of 2.5 m x 1.2 m x 1.5 m size with soak pit shall be provided for the purpose. Capital cost required for the same is about Rs. 40,000./-

3.6. Other Provisions

The basic facilities required for a tiny slaughter house having a capacity of 5-10 big animals & 20 small animals, are given below.

3.6.1. Basic facilities for a slaughter house

1. Reception area for animals
2. Lairage (Resting place for animals)
3. Room for Veterinary Doctor for performing anti-mortem and post–mortem examination.
4. Place for isolated resting place for diseased animals.
5. Stunning place / Halal slaughtering place
6. Bleeding place (for removal of blood)
7. Removal of skin and washing place
8. Evisceration place (removal of contents from stomach)
9. Meat removal and examination place.
10. Storage facilities for skin, bones, blood, fat etc.

3.6.2. Ancillary facilities

1. Biogas plant with septic tank and soak pit system for treatment and disposal of solid waste.
2. Septic tank and Soak pit for toilet waste (sewage) treatment and disposal.
3. Aerobic composting system for disposal of undigested food from stomach of animals including dung .
4. Other facilities such as compound wall/fence with gate, internal road, water storage facility, wash room for workers, toilet etc.
5. Planting of trees/green belt in the boundary of the land.
6. Solar water heater of 500 litre capacity
7. DG set of 10 KVA

3.6.3. Optional items

1. Meat cutter
2. Waste shredder
3. Meat stall
4. False ceiling for slaughter halls

3.6.4. Power Requirement

Slaughtering is normally commenced early morning hence a standby Diesel Generator Set of 10 KVA is essential for ensuring continuous supply of electricity for proper functioning of equipment and lighting.

It is estimated that 10 KW power connected load is required in the slaughter house. A three phase power supply is required for the purpose.

3.6.5. Water Requirement

The slaughter house requires sufficient quantity and good quality water round the year. Water is required for consumption of animals, its washing before slaughtering, washing of meat, human consumption, washing of floor and other areas. If public water supply is available, water connection can be taken. An over

head PVC water tank can be provided for water storage purpose. Otherwise a bore well can be constructed, and it shall be provided with water pump. Sufficient number of leg operated water taps are also to be provided. A solar water heater with capacity of 500 litre capacity shall be installed for the purpose of hot water in the slaughter house. Hot water shall be used for washing slaughter hall and for sterilizing tools and other requirements. General requirements of water supply to slaughter house are given below.

- Safe, potable and constant supply of fresh water at adequate pressure
- Floor washing with water jet of 200 to 330 kPa pressure
- A constant supply of clean hot water shall be available in the slaughter hall and work rooms during the working hours
- Hot water not less than 82^0C for sterilizing of equipment and secondary floor washing
- Suitable facilities for washing of hands (including adequate supplies of hot and cold running water, nail brushes, soap or other detergents)
- Non-potable water for fire fighting purpose
- PVC water tank of 5000 litre capacity.

3.6.6. Lairage

Lairage is for keeping the animals indented for slaughter, well in advance for rest, observation and convenience. The size of lairage for large animals is 10 m x 2 m and that for small animals is 8.5 m x 1.5 m. Provision for water and feed to the animals shall be provided in the lairage. The lairage should have antimortem examination facility to check each animal for physical disease or pregnancy. Specification for lairage is given below in Table 10.

- As per IS code a minimum area of 2.8 m^2 should be provided for large animals and 1.6 m^2 for small animals
- Animals should be kept separately depending upon type and class
- Lairage should be constituted to protect the animal from heat, cold and rain
- Floor slope should be of 20mm per metre, and 'U' Shape drain leading to biogas plant.
- Separate isolation pen should be provided with water and feeding arrangement for diseased animals (IS.4393)

Table 10: Specification for lairage

Sl. No.	Particulars	Specification
1	Foundation	Rubble masonry
2	Super structure	GI pipe upto roof level and brick wall upto 1.5 m height, preferably lean to roof to compound wall
3	Roof	Lean to roof with GI sheet preferably supported to compound wall
4	Floor	10cm thick rough PCC finish with suitable slope.
5	Entrance	Grill with locking arrangement
6	Access	Through ramp of suitable dimension

3.6.7. Slaughter Hall

Separate provision should be made for slaughtering large and small animals. Separate space should be provided for stunning, bleeding and dressing of carcass. Animals should not be slaughtered in sight of other animals. There should be two areas in the slaughter hall, the dirty area and clean area and there should not be material movement from clean area to dirty area. Dirty area consists of bleeding & dressing section and clean area for meat cutting inspection and despatch. The size of the slaughter hall specified in the type design 10 m x 3.7 m for the large animals and 11 m x 3.6 m for small animals. Pedal operated water taps and wash basin should be provided in the slaughter hall. At the bleeding area, the blood is to be collected in stainless steel basin for further processing/ disposal. The collected blood is to be stored in tank for heating and drying. Stainless steel wheel barrow is to be provided in the slaughter hall for collecting and removing waste items like large bones, tail, intestine etc into the tripery outside. Disposal of waste should be done every day on completing the slaughter of the day. Following specification shall be adopted.

- Internal wall with smooth and flat and constructed by impervious materials with washable surface upto a height of 2.1 m
- Window sill with 1200 mm above the floor level
- Ceiling with a height of 5 m or more
- Door and doorway –1500 mm wide and 3000 mm height

- Doors of rust resistant materials
- As a general rule, one drainage inlet shall be provided for each 37 m^2 floor space.
- Floor with non absorbent and non slippery with rough finish with gradient 20 mm per metre to drainage inlets
- Slaughter hall divided into three portions – stunning place/halal place, dirty area and clean area
- Drains with a longitudinal slope of 33mm per metre length

Specification for slaughter hall is given in Table 11

Table 11: Specification for slaughter hall

Sl. No.	Components	Specification
1	Foundation	Rubble Masonry
2	Floor height (slaughter hall)	60cm above ground level
3	Floor	- Non absorbent and non slippery with rough finish with suitable gradient for drainage (20mm per meter) - No breaks or cracks on the floor - Should have sufficient opening for drainage - Unpolished granite slab for flooring
4	Dadoing	White ceramic glazed tiles upto 2.1 m height in both slaughter halls
5	Doors	Stainless steel (Two door system with air curtain)
6	Windows	- Glass panel with fly proof shutters on both sides and non transparent plane glass - Opening is sliding or swing facing outside - Proper net / screen for preventing insects and flies
7	Roof	- Truss work supported on column above top level lintel

		- Steel truss and GI sheet (powder coated) for slaughter hall - lean to roof with GI sheet (powder coated) for small animal slaughter hall
8	Access	Through ramp with GI pipe barricade of suitable length on either side with locking arrangement

The following ancillary facilities should be provided in the slaughter hall.

(a) **Screens and insect control :** All windows, doorways and other openings that may admit flies should be equipped with effective insect and rodent screens, 'Fly chaser' fans and ducts or air curtains shall be provided over doorways in outside wall of food handling areas that are used for despatch or receiving.

(b) **Rodent proofing :** Except in the case of solid masonry walls constructed of glazed brick, and the like, expanded metal or wire mesh, not exceeding 12.5 mm mesh, shall be embedded in walls and floors at their junctions. This mesh should extend vertically and horizontally to a sufficient distance to exclude the entrance of rats and other rodents.

3.6.8. Stunning box / cubicles in the slaughter hall for large animals

As per PCA Rules a stunning box is to be provided for large animals. Floor level of stunning box need be in an elevated plane than that of the bleeding area. One side of the stunning box shall have hinged plate. Immediately after stunning, the animal falls on the side wall of the stunning box, and the hinged plate will open and the animal slips on to the bleeding area. The bleeding area need be positioned in such a way that, an animal in the stunning box will not see the bleeding animal.

In the case of halal slaughtering, separate cubicles made up of RCC wall and with ceramic tile in walls should be utilised. Sufficient drains and floor slope should be provided for easy drainage of blood from the cubicles. Bleeding is done by hoisting the animal to a height of 5 m rail system and blood collection vessel with funnel should be used for collection of blood. Blood collected should be dewatered by heating in a vessel using stove of LPG and methane from biogas plant. Dried blood mixed with rice bran

shall be disposed of as fish feed / cattle feed or as manure. The following points may be noted while constructing killing place for animals.

- Stunning place separated with a cross wall
- An animal shall not be slaughtered in sight of other animals
- Stunning box manually operated for large animals (statutory requirement)
- Electric stunning box for small animals (statutory requirement)

Bleeding

3.6.9. Continuous rail arrangement in the slaughter hall

A continuous rail arrangement should be provided on the top of the large animal slaughter hall. The rail arrangement should be at a height as specified in **Table-12** below and is fixed on to the roof slab with supporting structures. The rail arrangement should be strong enough to carry and run 10 large animals at a time in the slaughter hall. The rail

arrangement covers the bleeding area and hanging area for the smooth and convenient movement of the carcass for processing.

- Continuous rail system with 1SMB 250 with supporting structures and its fabrication bending etc in large animal slaughter halls.
- The rails should be fixed with a slope of 10 mm per 1 metre from stunning/halal place to clean area for gravity rails.

Specification :

1. Material - ISMB 250
2. Height and length - As given below

Table-12 : Height and length of bleeding and dressing rails

Sl.No	Operation	Height		Length	
		Large animal	Small animal	Large animal	Small animal
1	Bleeding	4500-5000 mm	3000-2200 mm	600 mm	450 mm
2	Dressing	3200 mm	2000-2200 mm	1800 mm for legging & dehiding and 2400 mm for evisceration and further	900 mm
3	Slope	10mm per meter for gravity rails			

3.6.10. Electric Hoist

There should be an electric hoist on each rail for lifting of large animals. Primary objective of electric hoist is to bring the animal to a height of 5 m for bleeding purpose. The hoist should have a capacity of one tone. In addition to electric hoist there should be atleast one unit of manual operated moving hoist. After bleeding the carcass shall be lowered to 3 m high rail, where movement is done using shackles. There shall be atleast 5 shackles for movement of carcass and movement shall be done manually. The hoist will be of reputed brand. The hoist can operate with the pendant switch hanging by the side. A ladder arrangement should also be provided there to access to the hoist and rail for

maintenance. The electric hoist is running on through a three phase power supply. The carcass can be lifted conveniently with the hoist for processing at different stages. After hoisting carcass can be horizontally and vertically moved manually. The throat is cut and the blood is to be collected in stainless steel trough, in hanging position with the help of this hoist. The manually operated moving hoist shall be of reputed brand and it could be used at the time of power failure and during busy hours of working of slaughter house.

Specification for electric hoist is given in Table 13

Table 13: Electric hoist - Specification

Sl. No.	Components	Specification
1	Material	Indef / Brady / Morris or equivalent having ISI certification
2	Capacity	1 tonne
3	Type	Wire rope hoist
4	Operation	1.50 HP, 3 phase power supply with built in control panel and hanging type pendant switch
5	Method of mounting	On specially built steel bracket structure
6	Electric motor capacity	1.5 HP
7	Lifting speed	4m/minute (app)
8	Lifting rope	Upto 18 mm gauge
9	Hook	Forged steel with locking arrangement
10	Hoist body	Metal body with anticorrosive powder Coated finish
11	No. of electric hoist	1no.

Specification for manually operated moving hoist is given in Table 14

Table 14: Manually operated moving hoist - Specification

Sl. No.	Components	Specification
1	Material	Indef / Brady or equivalent having ISI certification
2	Capacity	1 tonne
3	Type	4 wheel type traveling trolley
4	Wheel material	Cast steel IS:1030
5	Trolley operation	Manually with anti corrosive type chain
6	Lift of hoist	5 m
7	Lifting chain	S. S. chain
8	Long travel chain	S. S. chain
9	Lifting hook	Forged steel with locking arrangement
10	Hoist brake	Self sustaining, maintenance free, friction type break
11	Hoist body	Metal body with anticorrosive powder coated finish
12	No. of hoist	1 no.

Specification for shackle and chain is given in Table 15

Table 15: Shackles & chain - Specification

Sl. No.	Item	Specification
1	Material	Stainless steel – 304 Grade
2	Capacity	- 1 tonne (for large animals) - 500 kg (for small animals)
3	Quantity	5 sets (for large animals)
4	Length of chain	2 m (for large animals)

Specification for slink is given in Table 16

Table 16: Slink - Specification:

Sl. No.	Item	Specification
1	Material	10 mm dia 90cm length G.I. wire rope both side bend with brazing
2	No. of slink	15 nos.

3.6.11. Dressing

Dressing is carried out in rails fitted at a height of 3 m. Transferring of animal from 5 m bleeding rails to 3 m dressing rail can be done using the electric hoist. Adequate means and tools for dehiding or belting of the animals should be provided. Hides or skins should be transported either in a closed wheel barrow or by a chute provided with a self - closing door. Immediate disposal of legs, horns, hooves etc. should be done through side wall doors or closed wheel barrows. Care should be taken while using wheel barrows or trucks that at no point wheel barrow or truck has to ply under the dressing rails and a clear passage is provided for movement of the trucks. Care should be taken to comply with the following;

- Dressing of carcasses should not be done on floor
- Hides or skin removed should be transported immediately in a closed wheel barrow
- No hides or skin should be spread on slaughter floor for inspection
- Floor wash point and adequate number of hand wash basins with sterilizer should be provided.

3.6.12. Evisceration

Adequate space and suitable and properly located facilities should be provided for inspection of the viscera of the various types of animals slaughtered. This department should have adequate facilities for hand washing, tool sterilization, floor washing, contrivances for immediate separation and disposal of condemned material. Adequate arrangements may be made for identification, inspection and correlation of carcass, viscera and head of slaughtered animal.

3.6.13. Captive Bolt Pistol

As per PCA rules, a captive bolt pistol should be provided for stunning the animal inside the box. The pistol should be specially made for stunning of animals. It is a trouble free pistol and is in use in slaughter houses in India and abroad. As it is a statutory requirement it is to be procured, even though in most of the slaughter houses in Kerala practices halal type of slaughtering.

Captive bolt pistol and bullets

3.6.14. Stainless steel chute

Stainless steel chute are to be provided on the side wall of the slaughter hall for transferring waste to tripery. Through this chute, waste can be deposited to the tripery situated out side. When the slaughter of the day is over, waste can be collected from tripery. The chute should be made of stainless steel, so that it will last long and easy to keep it in clean and tidy.

3.6.15. Hanging of goat

Stainless steel pipe should be fixed at convenient height (2 m) and having length from one end to the other end of the hall for hanging and processing the small animals. Chain with hook is provided on the pipe for hanging of carcass. The size of the stainless steel pipe shall be of 3".

Small animals are slaughtered by halal cut. After this operation, it is manually hanged with chain and hook over the pipe. After removing the skin, intestine etc it is put on trolley having stainless steel top and can be moved to the despatch area.

3.6.16. Wheel Barrows

Minimum of 10 numbers of wheel barrows is required for 5 - 10 large & 20 small animals (tiny slaughter house). It shall be made use in the large animal slaughter hall for movement of waste and materials. It can also be used for conveying dung, waste etc to the compost unit / biogas plant. Specification for wheel barrow is given in Table 17.

Table 17: Specification for the wheel barrow

Sl. No.	Item	Specification
1	Type	Stainless steel, 2 wheeled, single axle, top side 20mm dia SS pipe, bottom and vertical corner 20mm x 20mm of 3mm thick SS angle, 3" x 8" TOT wheel with MS axle
2	Capacity	75kg (size 70cm x 50cm x 40cm approximate)
3	Body	Fabricated body with steel per IS : 2062
4	Wheel	Pneumatic tires with ball bearing TOT wheel assembly
5	Quantity	10 nos. (min)

3.6.17. Diesel Generator set

A diesel generator set having capacity of 10 KVA, 3 phase power supply is required for the electric hoists, lighting purpose etc for tiny slaughter house. It shall be included in the project proposal. Since slaughtering of animals commences in the early morning, electric power is essential for lighting. In addition to lighting power is essential for operation of the hoists. Therefore, a DG Set should be installed in the slaughter house.

3.6.18. Waste Grinder / Homogeniser

The waste generated is to be grinded / shredded into small pieces before putting in to the biogas plant. For this a motorized waste grinder is needed. Hence it has been included as an optional item in the project proposal.

3.6.19. Meat cutter and scissor type cutter

A motorized meat cutter and scissor type cutter should be included as an optional item in the project proposal. A scissor type meat cutter is ideal for cutting the carcass of large animals in to convenient pieces before dispatch. This can also be used for removing

horn, head and hoof. This will ease the work of butchers in slaughter house. The motorized meat cutter is imported equipment. It is trouble free and is used in modern slaughter houses.

3.6.20. Compound wall

Construction of compound wall should be included in the project. It is to be constructed with rubble basement and super structure with hollow bricks. The slaughter house and its surrounding should not be visible to the public easily. Also it helps to keep away from stray dogs.

3.6.21. Gate

A steel fabricated gate having sufficient width according to the approach road should be included in the project. The gate can be made and fix in such a way that stray dogs cannot enter in to slaughter house premise.

3.6.22. Electrification of the slaughter house

Electrification of the slaughter house should be done in order to get sufficient light in the slaughter hall and inspection area. Sufficient number of electric lamp inside and out side the slaughter house is to be provided. Fan and light is to be provided in the room for veterinary surgeon and health inspector's office. Electrification for hoist and other equipments should also be provided.

3.6.23. Lighting and ventilation

Unrefrigerated work rooms should be provided with adequate direct natural light and ventilation or ample artificial light and ventilation by mechanical means. Uncoloured glass having a high transmissibility of light may be used in skylights and windows. The glass area should be approximately one-fourth the floor area of a workroom. This ratio should be increased where there are obstructions, such as adjacent buildings, overhead catwalks, and hoists, which interfere with the admittance of direct natural light. Well distributed artificial lighting of good quality should be provided at all places where adequate natural light is not available or is insufficient. The following points should be followed while constructing slaughter house.

- Every abattoir should be so constructed that meat inspection may be carried out in daylight. Sockets for the use of inspection lamps shall be provided at convenient places.

- Every abattoir should be provided with well distributed artificial light of an overall intensity of not less than 200 lux throughout the slaughter hall and workrooms and at places where meat inspection is carried out, the overall intensity of artificial lights shall be not less than 500 lux.
- Every abattoir should be provided with suitable and sufficient means of ventilation to the outside air. The construction of the slaughter hall should be so arranged that the dressed carcasses are not exposed to direct sunlight.

3.6.24. Green Belt

A green belt of sufficient width and with suitable species of trees should be developed around the compound in order to have a better environment around the slaughter house.

3.6.25. Office & Rest room

An office for the veterinary doctor and health inspector and rest room for the workers should also be included in the project. A provision is to be made for dress changing of workers and cup boards for keeping their dress and belongings.

3.6.26. Toilet

Toilets are to be provided for the use of workers and for office staff in the slaughterhouse. It should be provided with flush, wash basins, floor with tiles, light fittings etc.

3.6.27. Plumbing work

The slaughter house should be provided with sufficient number of water taps, wash basin, pedal operated water taps etc. Also flexible hose arrangement should be provided for easy cleaning of the slaughter hall. Water jet pressure cleaner should be provided for efficient washing of carcass and slaughter hall with minimum quantity of water. This will ensure less use of water for cleaning purpose and helps in reducing the quantity of waste water.

3.6.28. Unloading Platform with Ramp

An unloading platform with ramp which is suitable for unloading of animals from truck or other small vehicles should be provided in the project.

Table 18: Specification for unloading platform

Sl. No.	Particulars	Specification
1	Size of platform	4m x 3m x 0.9m
2	Foundation	Rubble Masonry
3	Floor	Rough PCC

3.6.29. Guideline for cleaning and hygiene maintenance

The following general guideline should be followed for hygiene maintenance within the slaughter house.

- All parts of the product zone should be readily accessible to sight and reach for cleaning and inspection
- Where necessary for proper cleaning and inspection, equipment should be easily demountable. To facilitate this dismantling, quick opening devices that require no tools or, such simple tools as a mallet and an open – end wrench shall be provided. Bayonet joints, butterfly clamps, spring bolts, and other similar devices are desirable for connecting or closing parts of equipment. Where parts should be retained by nuts and bolts, the design shall provide for fixed studs with wing nuts, rather than bolts to a tapped hole
- Interior corners of equipment shall be provided with radii (minimum 6mm), except where greater radii are required to facilitate drainage and cleaning.
- All welding within the product zone shall be continuous, smooth, even and relatively flush with the adjacent surfaces
- All parts of the product zone shall be free of recesses, open seams and gaps, crevices, protruding ledges, inside threads, inside shoulders, inside bolts or rivets and deal ends.
- Where necessary for sanitary maintenance, equipment shall be constructed and installed so as to be completely self-draining
- Care shall be taken to prevent contaminating product by lubricants used in overhead motors, gears, and similar devices. If drip pans are

necessary, they should be easily accessible for inspection and removable for cleaning.

- All safety or gear guards shall be readily removable for cleaning and inspection
- All external surfaces that do not contact with food products shall be free of pen seams, gaps, crevices and inaccessible recesses.

3.6.30. Guideline for Non acceptable materials

The following materials should be avoided in slaughter house construction as it has toxic potential and thereby meat gets contaminated.

- Copper and its alloys in equipment used for edible products
- Cadmium in any form in equipment handling edible products
- Equipment with painted surface in product zone
- Enamel containers or equipment is not desirable
- Lead

3.6.31. Working Platform

For elimination of fatigue and comfortable working for labourers the working table should be at waist height of the worker to work in standing position. If the table is at more height (that is 800 mm to 860 mm) it should have a platform incorporated for the balance height above 860mm. Working platform for on-the rail operations should be of such height that the slaughter man has neither to stoop too low nor stretch himself to his operation zone, and he should be able to reach operation zone in his natural standing position.

3.6.32. Capital Cost Requirement

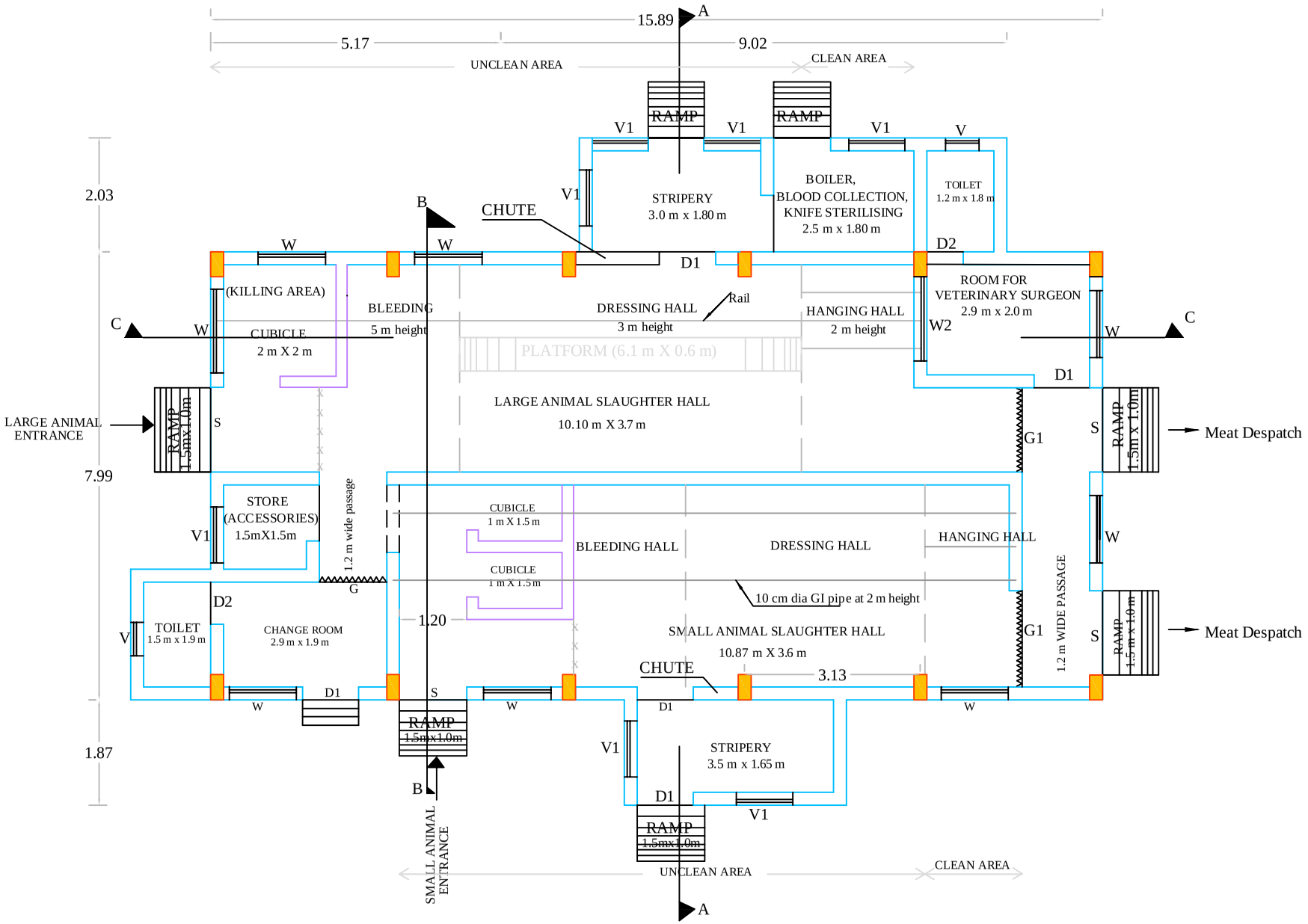
Type design for tiny slaughter house, its estimate, specifications for mechanical equipments and Operation and Maintenance Protocol has been prepared and annexed. The tiny design is suitable for Grama Panchayats. The estimate, for the design has been prepared based on PWD Schedule of Rates (2010).

4. Operation and Maintenance Protocol

Slaughtering of animals should be done in hanging position. This will helps to segregate waste at different stages to recover resources to reduce quantity of waste. The O&M Protocol shall be followed as given below;

1. Reception of animals using raised platform and ramp.
2. Antimortem examination by Veterinary Surgeon.
3. Segregation of diseased animals keeping it in isolation pen
4. Resting of animals in Lairage for a period of 24 hours and they should not feed fodder or any other thick food except water.
5. Leading of animals to slaughter hall through barricade and ramp.
6. Butchers should have butchers license and ensure their entry of slaughter house through main entrance.
7. Butchers should change their dress and entry into slaughter hall with working dress after taking bath.
8. Tying of legs using slink.
9. Killing of animals in cubicles using Halal Method/Stunning in Stunning box.
10. Hooking of tied leg of animal to the hook of electrical hoist and raise to the 5 m high rail. Use of manual hoist in case of power failure.
11. Hanging of animal in head down position and move to outside the cubicle for bleeding and blood collection in wheeled tray and conical hopper.
12. Conveyance of blood to store room.
13. Lowering of animal to 3 m high rail and transfer to shackle and chain system and simultaneous release of electrical hoist.
14. Removal of horn and hooves using scissors type cutter and move carcass to next section manually.
15. Evisceration (removal of contents from stomach) and transferring of stomach content to wheel barrow placed underneath.
16. Washing of carcass
17. Removal head using meat cutter
18. Removal of hides manually
19. Washing of carcass
20. Splitting of carcass to four pieces and transfer it to hook in the rail provided in despatch section at 2 m height.
21. Post mortem examination of meat by Veterinary Doctor.
22. Despatch of meat with seal to market/meat stall.

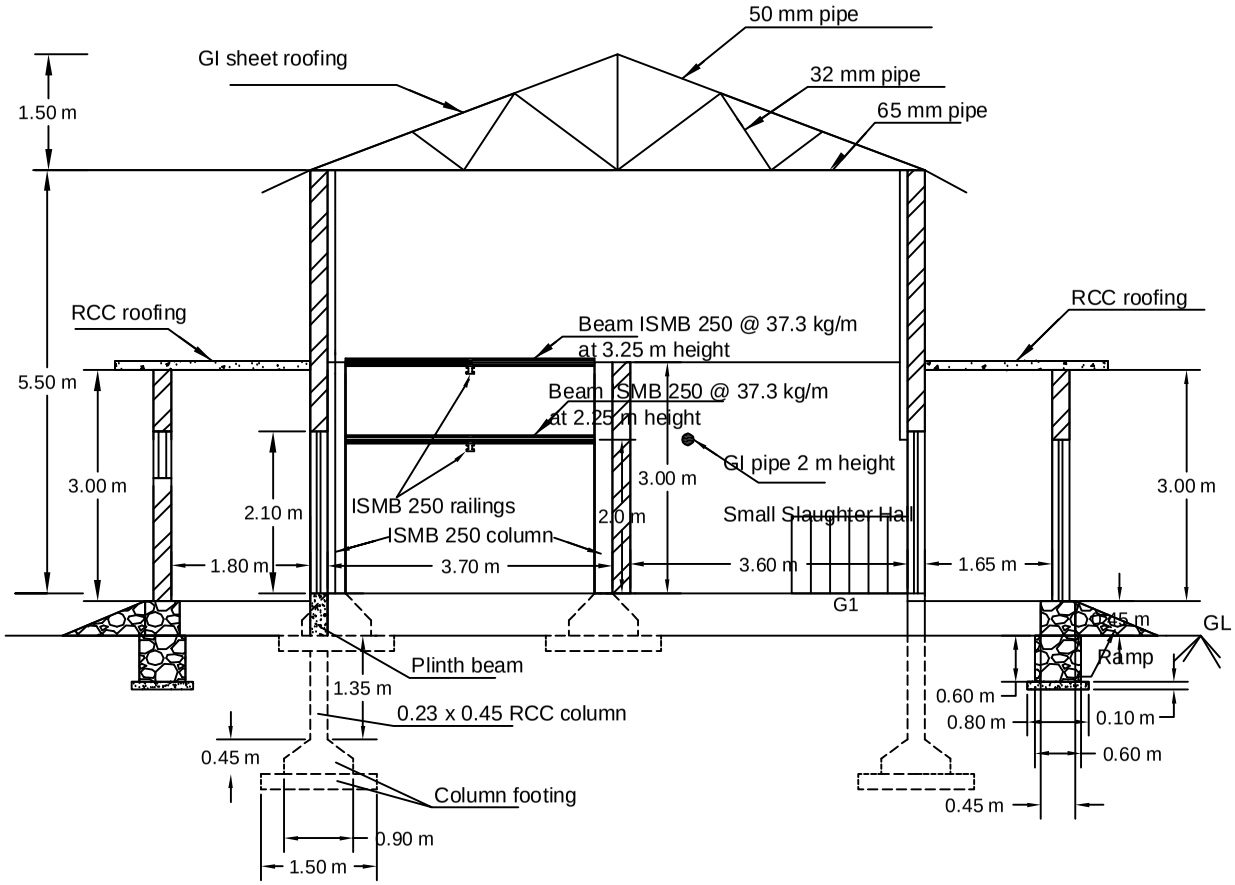
23. Removal of blood, hide, hook, horn head etc to store for further process in vessels.
24. Heating of blood with rice bran in vessels for making fish feed or manure.
25. Heating of fat recovered from stomach/oil trap of waste water treatment plant for melting and safe storage.
26. Salting of hide for safe storage, if it is to be stored in the compound.
27. Heating of bones in vessels for removal of fat and safe storage of bones.
28. Solid Waste except undigested stomach content to biogas plant for treatment.
29. Undigested waste from stomach and dung to compost plant for treatment
30. Wash water to septic tank and soak pit for treatment and disposal.
31. Washing of slaughter house with water first and then with hot water from solar water heater.
32. Use of pressure jet water cleaner for minimising water use.



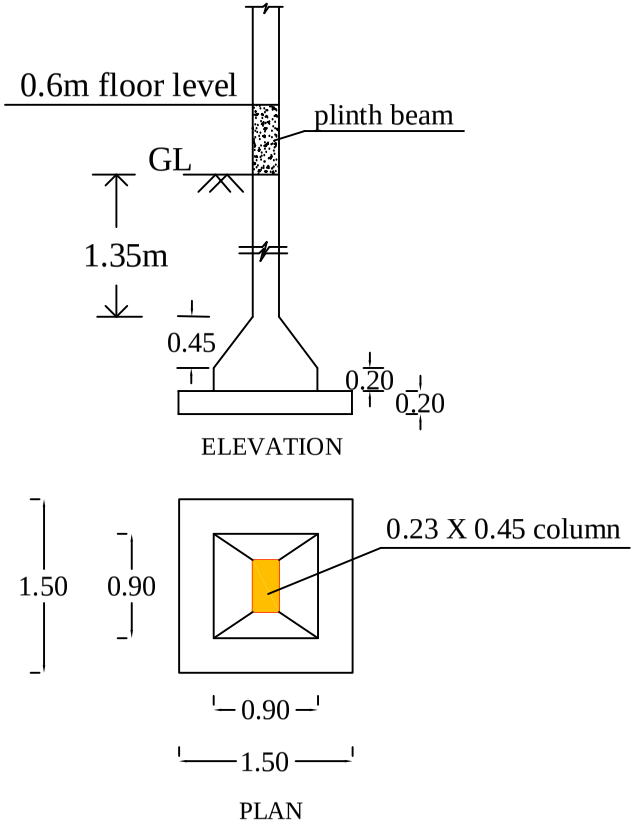
PLAN FOR TINY SLAUGHTER HOUSE

(10 LARGE AND 20 SMALL ANIMALS)

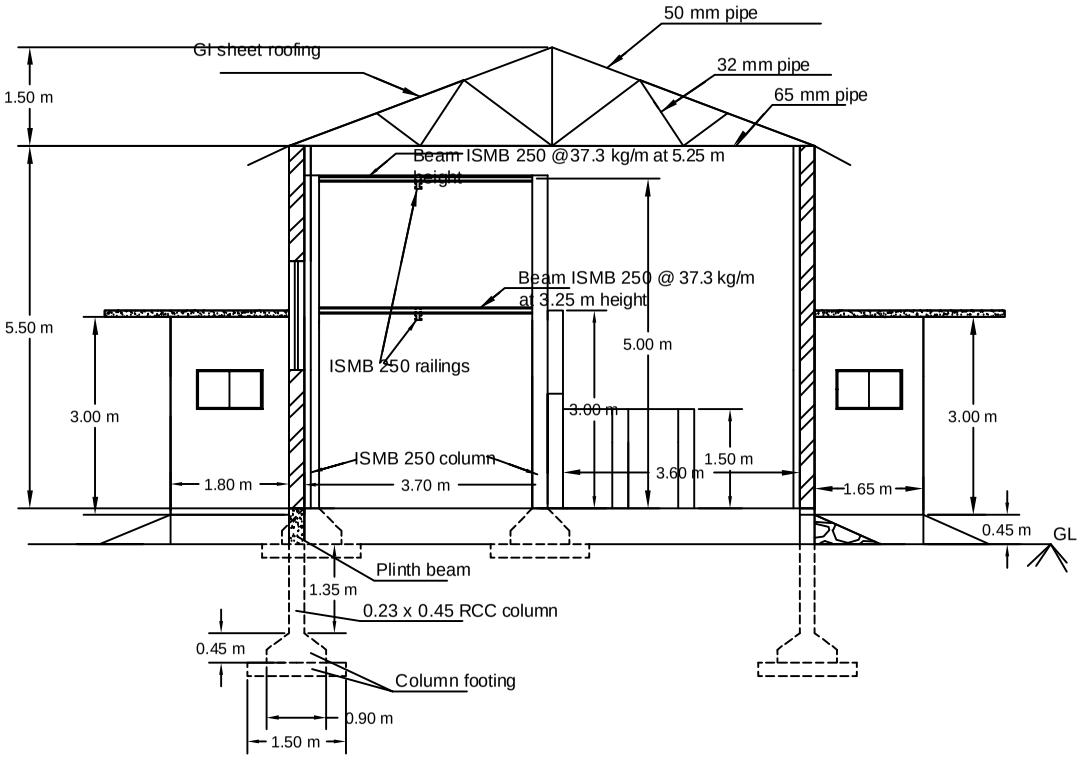
AREA : 153.27 sq.m



TINY TYPE SLAUGHTER HOUSE - SECTION AA



DETAILS OF COLUMN FOOTING

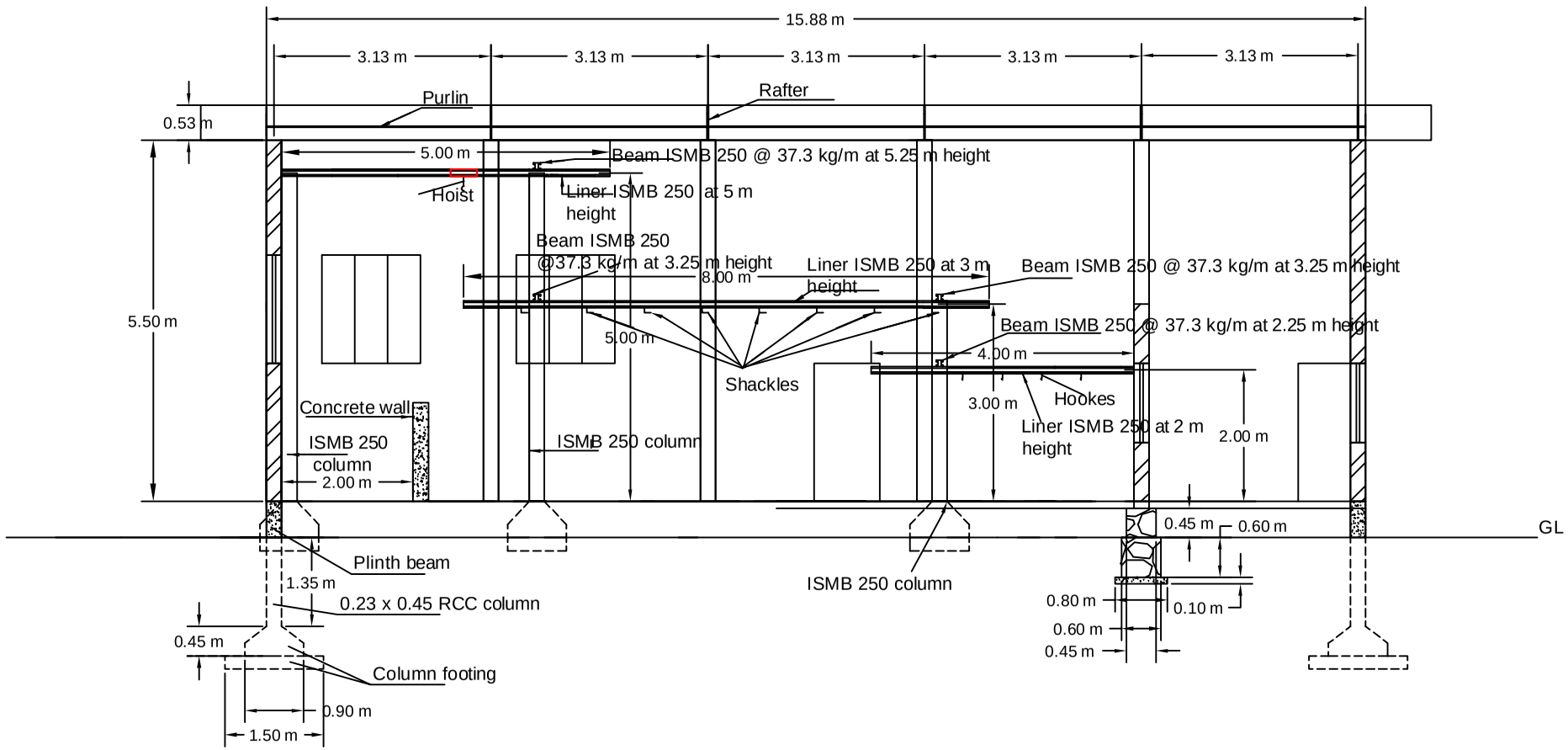


TINY TYPE SLAUGHTER HOUSE - SECTION BB

JOINERY DETAILS		
D1	STAINLESS STEEL DOOR	100 X 210
D2	PVC DOOR	80 X 210
G	GLASS DOOR	200 X 250
G1	GLASS DOOR	150 X 250
S	ROLLING SHUTTER	200 X 240
S1	ROLLING SHUTTER	150X 240
W2	GLASS WINDOW	120 X 120
W	WELDED MESH(BOTTOM)	150 X 120
W	WELDED MESH(TOP)	150 X 165
V	VENTILATOR	60 X 45
V	VENTILATOR	100 X 60

DRAWN TO SCALE
ALL DIMENSIONS ARE IN METRES (m)

PLUMBING DETAILS	
◯	LEG OPERATED WASH TAP

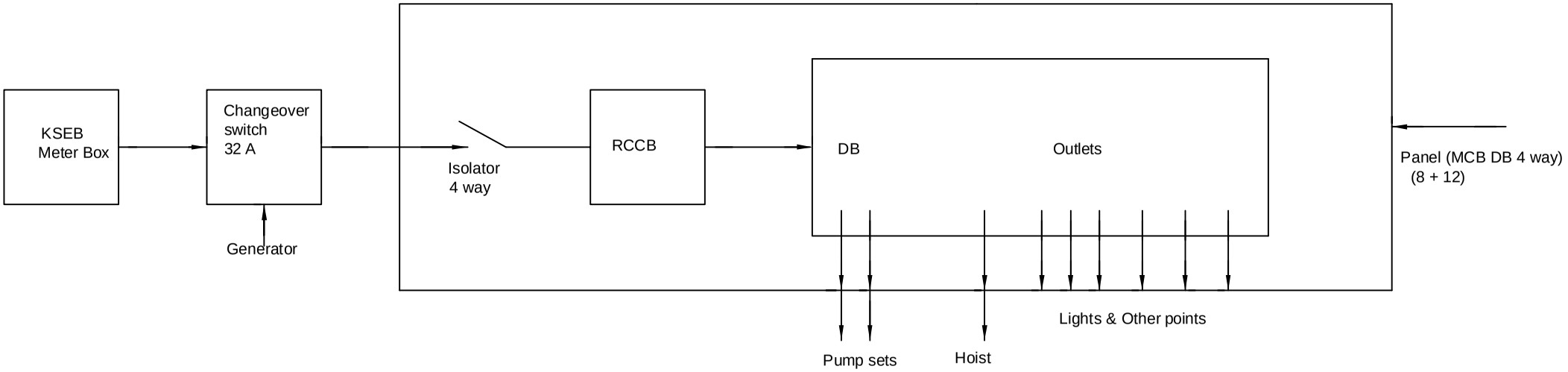


TINY TYPE SLAUGHTER HOUSE - SECTION CC

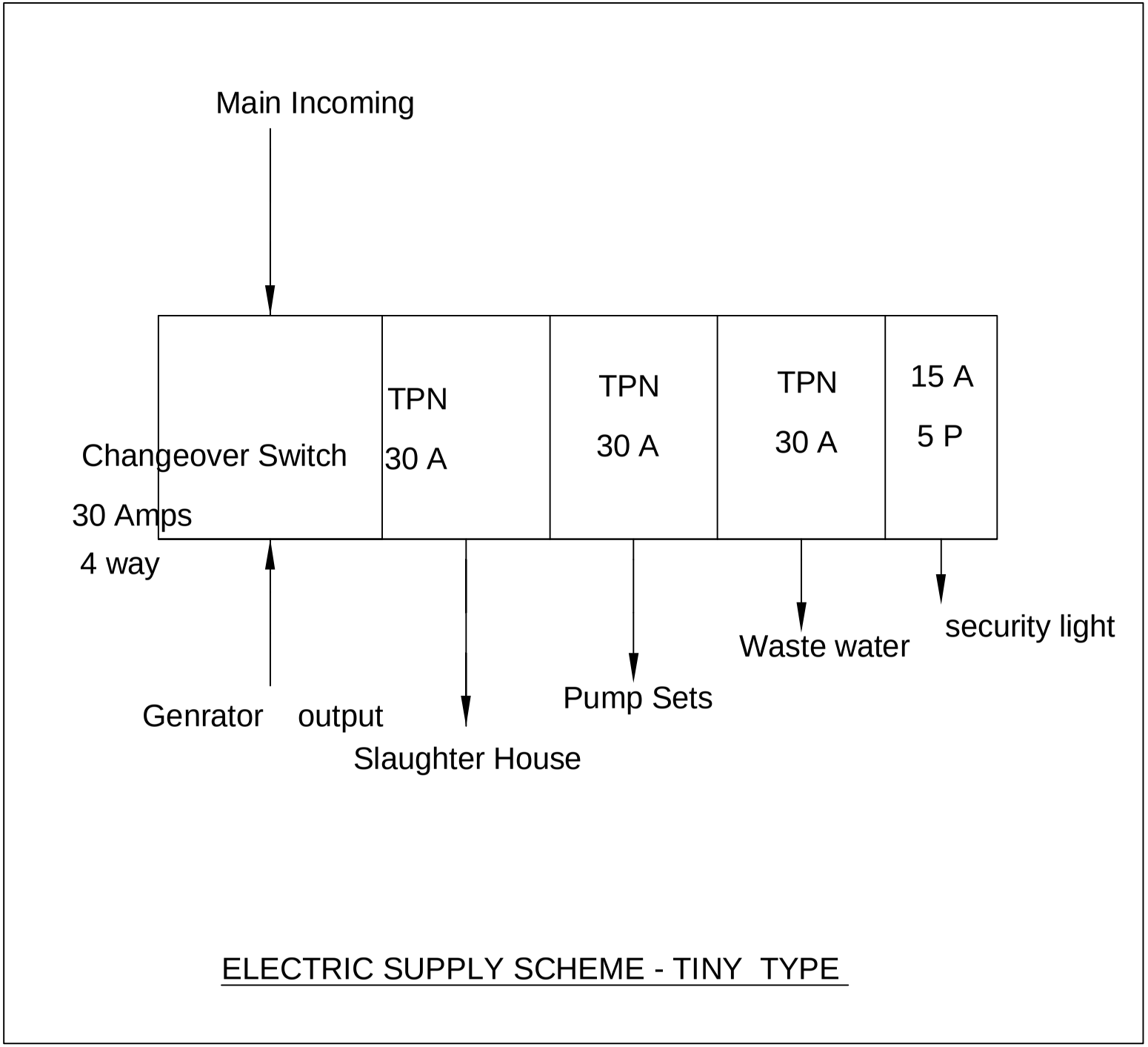
TYPE DESIGN FOR A SLAUGHTER HOUSE FOR 5-10 LARGE & 20 SMALL ANIMALS		
ABSTRACT OF COST		
1	Building and accessories	1900000.00
2	Mechanical & electrical equipments	1000000.00
3	Septic tank	50000.00
4	Biogas plant	500000.00
5	Electrification	70000.00
6	Plumbing	80000.00
	Total	**3600000.00**
		(Rupees thirty six lakh only)

TENTATIVE COST FOR PROVIDING THE FOLLOWING FACILITIES IN THE SLAUGHTER HOUSE FOR 5-10 LARGE AND 20 SMALL ANIMALS					
Sl. No.	**Description**	**Unit**	**Qty**	**Rate**	**Amount**
				Rs.	**Rs.**
1	Supplying and fabricating stunning box of size 2.50m x 1.25m x 2.00 m made up of S.S. Plate having 10mm thick angle, hinges etc. complete	Each	1 no.	25000	25000
2	Supplying and testing captive Bolt pistol / captive power bolt and electric stunner	Each	1 no.	10000	10000
3	Continuous rail system with ISMB 250 with supporting structures and its fabrication, bending etc. in large animal slaughter hall for the continuous movement of electric hoist, fabrication, erection, testing commissioning of rail system including extra fitting etc. as per design	m	55 m	LS	136500
4	Supplying and erecting electric hoist Indef / Brandy / Morris or equivalent having ISI certification and having 1 Tonne capacity, 4 way moving facilities with electric motor 1.5 HP, fixed type wire rope hoist with lifting rope 18mm gauge and hooks forged steel with locking arrangement including electrification of continuous rails with 3 phase electrical supply through base conductor (coppor) sliding contactors, control switch cable etc.(for large animal slaughter hall)	E	1 no.	100000	100000
5	Manual operating moving hoist having ISI certification or Indef / Brandy, one tonne capacity, 4 wheel type traveling trolley, cast steel IS:1030 wheel material, lifting chain 5 m length made up of stainless steel, lifting hooks with forged steel and locking arrangement, self sustaining, maintenance free, friction type brake, metal body with anticorrosive powder coated finish of hoist body etc. complete	E	1 no.	35000	35000
6	Supplying best quality stainless steel blood collection funnel as per IS : 316 with top diameter 100 cm, vertical height 60 cm and having 30 cm slant and bottom diameter 30 cm, 3 mm thick SS sheet having 15 litre capacity round vessel fitted in SS moving trolley etc. complete	E	5 no.	7000	35000
7	Supplying and installation of stainless steel chute as per I.S.316 conical/U type and cutting/rolling and welding etc. for stripery	E	2 nos.	10000	20000
8	Supplying stainless steel shackles and SS chain 304 grade / metal coated anti corrosive material, for large animals having capacity of one tonne load including rolling mechanism (trolly) vertical and horizontal movement in the overhead I section	E	5 Nos.	7000	35000
9	GI pipe of size 100 mm diameter for small animal slaughter hall	m	40 m	500	20000
10	Supplying and fixing hook with ring of 120mm inner diameter made from 25mm diameter SS rod attached with welded SS chain of length 50 cm and one side sharpened hook for small animal slaughter hall	Nos.	15 nos.	750	11250
11	Supplying stainless steel wheel barrow as per IS:2062, 2 wheeled, single axle with a frame of top side 20 mm diameter SS pipe, bottom and vertical corner 20 mm x 20 mm of 3 mm thick SS angle, 75 mm x 200 mm TOT wheel with MS axle	E	4 nos.	30000	120000
12	Supplying slink made with 10 mm diameter, 90 cm long GI wire rope both side bend with brazing etc. complete for tying leg of animal for hanging in the rail	E	5 nos.	250	1250
13	Supplying 500 litre capacity solar water heater as per approved quality of ANERT or equivalent	E	1 no.	30000	30000
14	Supplying high pressure water jet cleaner having 200 kpa pressure with necessary pipe, valve, hose, nozzle etc.for floor washing	E	1 nos.	40000	40000

15	Supplying and installation of 15 KVA generator set with accessories and generator room as per PCB direction	E	1 no.	350000	350000
16	Supplying 25 mm diameter stainless steel rod square 250 x 15 mm suitable for ISMB 250 with welded ring and with sharp hooks at one end for hanging meat in the hanging rails as directed by the departmental officers at site	E	15 nos.	600	9000
17	Blood processing facilities				
(a)	Blood storage vessel having capacity of 150 litres made with SS: 304 grade sheet	E	1 no.	4000	4000
(b)	Supplying circular vessel as per IS: 304 grade stainless steel having a capacity of 100 litres and base diameter of 40 cms including 2 single burner stove for LPG as fuel etc. complete	Set	1 set	10000	10000
©	Supplying two single burner stove with biogas as fuel, best quality etc. complete	Set	1 set	4000	4000
(d)	Providing and fabricating exhaust hood and vent 1mm thick GI sheet pipe etc. for disposal of water vapour / fumes during the blood dewatering process	E	1 no.	5000	5000
(e)	Supplying plastic covers with sealing machine, racks etc. for storing the dried blood materials in the store room in air tight covers for safe storage	LS			10000
18	Fat processing facilities				
(a)	Supplying circular vessel made with stainless steel IS: 304 grade sheet having a capacity of 100 litres and base diameter of 40 cms including one single burner stove for LPG as fuel	E	1 no.	8000	8000
(b)	Supplying one single burner stove best quality, as biogas fuel	E	1 no.	2000	2000
©	Melted fat storage drum 200 litres capacity of PVC container	E	1 no.	2000	2000
19	Supplying stainless steel knives best quality for cutting carcasses in the slaughter house	LS			20000
20	Supplying aluminum ladder with platform				5000
21	Unforseen				2000
	Total				**1050000**
Rupees ten lakhs and Fifty Thousand Only					



ELECTRIC SUPPLY - TINY TYPE - SCHEMATIC DIAGRAM

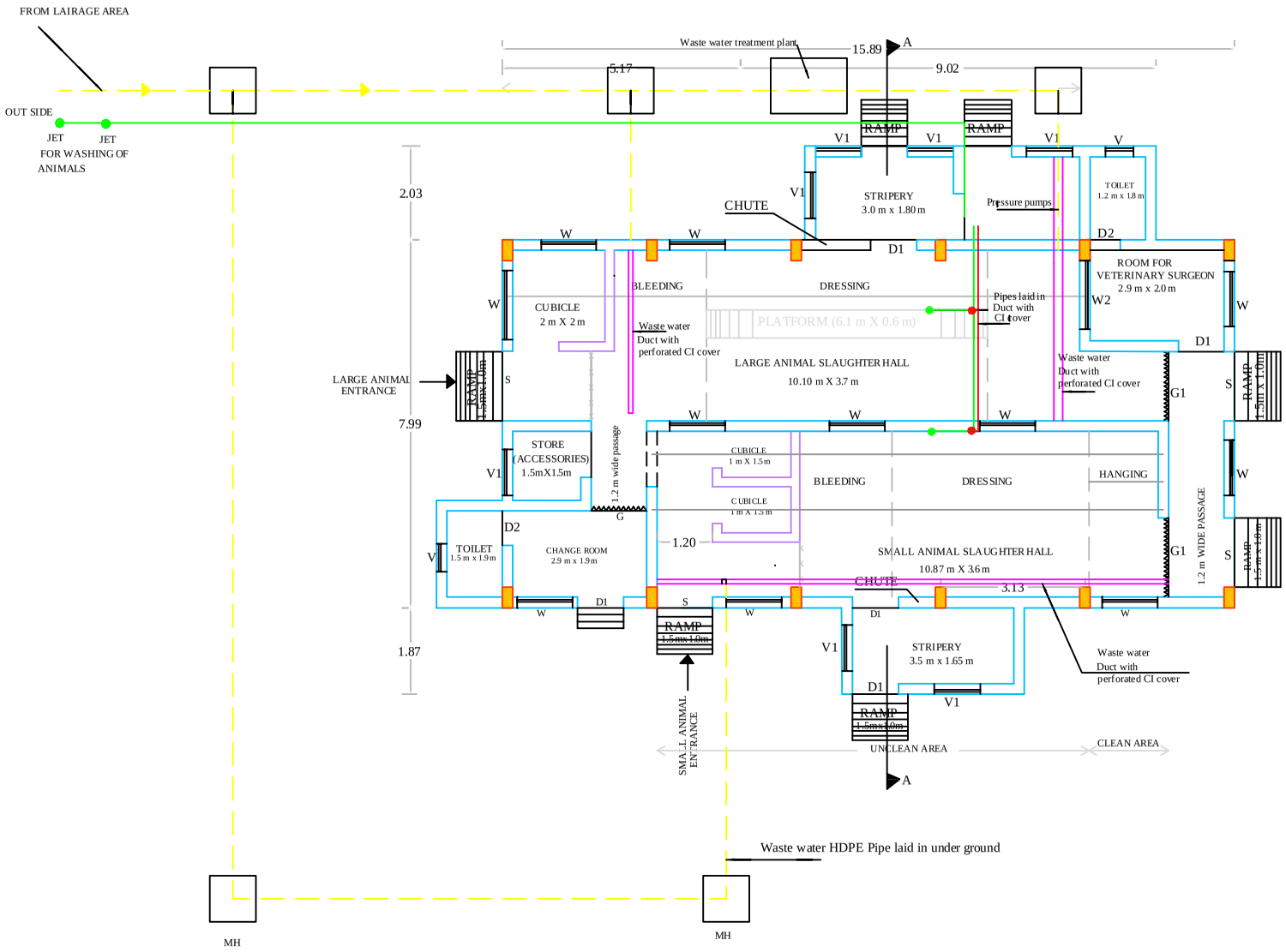


ELECTRIC SUPPLY SCHEME - TINY TYPE

Estimate for Electrification to Tiny Type Slaughter House						
Sl No	Item	A/Unit	Rate	Qty	Amount	Remarks
1	Generator-set :-Supply,install ,test and commission Engine -Alternator set capacity 10 KVA, 3 phase,440V ,50 cycles/sec, 0.8 pf complete with necessary plinth/foundation ,battery,fuel tank(75 litre) ,earthings etc ,with accoustic canopy tested and certified as per latest CPCB norms	1	278000	1	278000	
2	Cable 10 sqmm ,4 core armoured with Aluminium conductor ,PVC,1100V grade supply,lay in trenches 60 cm below ground level/ ducts/ fixed on wall(inside the room),connect with Generator panel on one end and the changeover switch,fixed on the panel room on the other end,including necessary excavation ,earth work ,refilling ,sand cushion ,brick protection ,cable lugs etc	RM	226	20	4520	
3	Supply,draw Cable 2 core 4 sqmm ,un- armoured with copper conductor , multistranded PVC insulated PVC sheathed 1100 V grade alongwith one run 1.5sqmm earth continuity copper conductor in PVC conduits including supply of conduits,conduit fittings and accessories	RM	132	20	2640	
4	All as above number 3 above but with cable 4 core 4 sqmm.	RM	203	15	3045	
5	Mainswitch panel for slaughter house:- Supply fix and commission incl all wiring three pase double cover MCB DB 4 way (4+12) with busbar neutral link ,earth bar ,DIN rail fixed with 4P MCB isolator 63 Amp,RCCB 63 A/ as incomers and one number 3 pole 10A isolator and single pole 20A MCB 2nos and 10A 7 no MCBs as outgoings. sheet steel phosphatised and painted all confirming to IS13032 and IS 8623.	No	16000	1	16000	

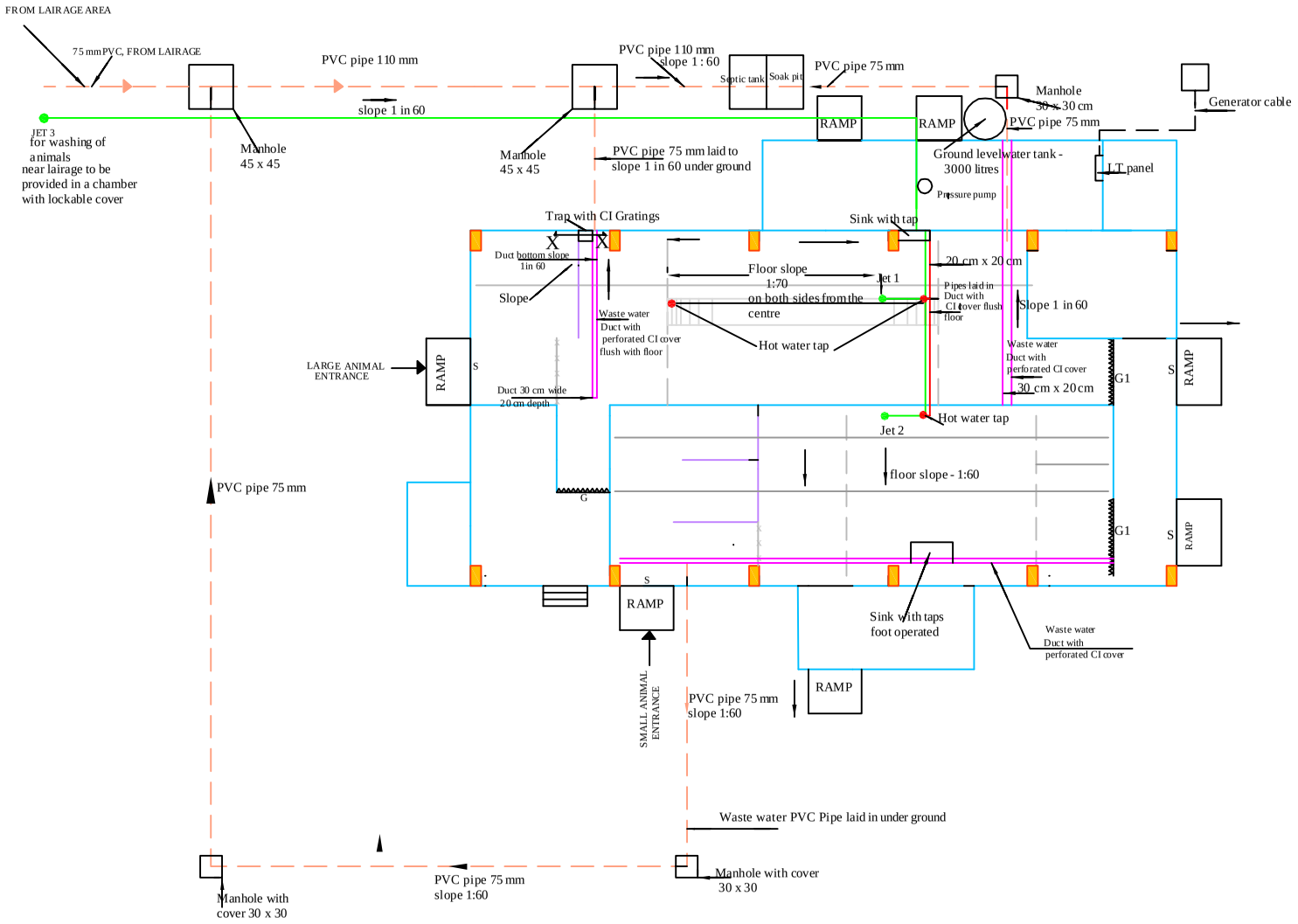
6	Point wiring with PVC insulated single core cable ,manufactured with bright anealed bunched electrolytic copper coductor .1.5 sqmm ,drawn through rigid PVC concealed conduits,incl cutting chases in the wall, floor/beams etc and making good,and provison of wooden box with laminated sheet for fixing switches etc for controlling of light /fan points in a circuit.(number of light points not to exeed 10 in a circuit.)	No	400	34	13600	
7	All as above item ,but with earth continuity ,bare copper conductor 1.5 sqmm for control of sockets	No	400	12	4800	
8	All as item no 7 ,but with cable 2.5 sqmm for industrial sockets (max of two points only be connected to one circuit..	No	1100	4	4400	
9	Supply and fix industrial sockets SP&N metal case enclosure with two pole and earth plug socket along with pin and SPMCB 250V 20A	Nos	806	4	3224	
10	Supply of Flourascent lights for slaughter hall .industrial corossion proof T-5 luminiare incl fixing on roof trusses complete with twin tube 28 W all as per IP 65 polycarbonate housing and cover	No	2774	13	36062	
11	Supply and fix Flourascent light fitting decorative type complete with electronic choke,starter,surface mounting type duly wired alongwith T-5 28W single tube	No	1960	8	15680	
12	Supply and fix light fitting bracket /ceiling mounted type with shade and CFL lamp 15W	No	267	6	1602	
13	Supply and fix ceiling fan 1200 mm sweep ,complete with condenser ,regulator etc	No	1570	5	7850	
14	Supply and fix Exhaust fan heavy duty sweep 450 mm 900 rpm with louvres,incl cutting necessary chase and making good of it on the wall	No	3480	2	6960	
16	Supply and fix switches piano 5A	Nos	25	39	975	
17	Supply and fix ceiling roses	No	27	28	756	
18	Supply and fix switch-socket combination 5A/!5A mutiple three pin	No	95	10	950	

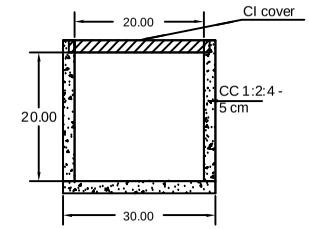
19	Supply and fix metal clad switch with fuse units 230V 15 A mps	No	1500	2	3000	
20	Do- but 415V 32 Amps for control of Hoist	No	3200	1	3200	
21	Supply and fix change over switch 4 pole 32 A mounted on wall with steel brackets	No	5500	1	5500	
22	Provision of earthing incl supply of all materials with 60x60x0.6cm CI earth plate buried vertically below a depth of 1.5m ,15cm filling all around with charcoal and salt connected with copper conductor 14 SWG through boits and nuts,incling GI pipe ,funnel,brick chamber and RCC cover size 30cmx30cm and connecting with the main panel. including necessary excavation and earth work ,refilling etc	No	4500	1	4500	
	Total				**417264**	
	Notes:					
	1. Cost of items to be reworked based on the local conveyance and prevailing market rates and got technically cleared frm the appropriate authority..					
	2.Cost of obtaining electricity from KSEB including deposit if any as required be assertained from them and included.					
	3. Schematic diagram and layout enclosed for ref.					
	4. Only items of reputed make/ISI be incorporated in the work					



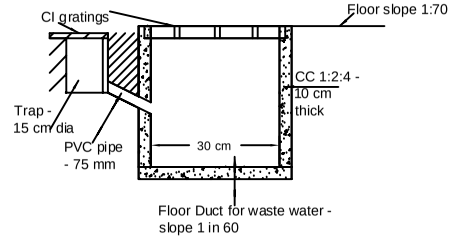
WATER / WASTE WATER LAYOUT - SLAUGHTER HOUSE - TINY TYPE

AREA : 153.27 sq.m



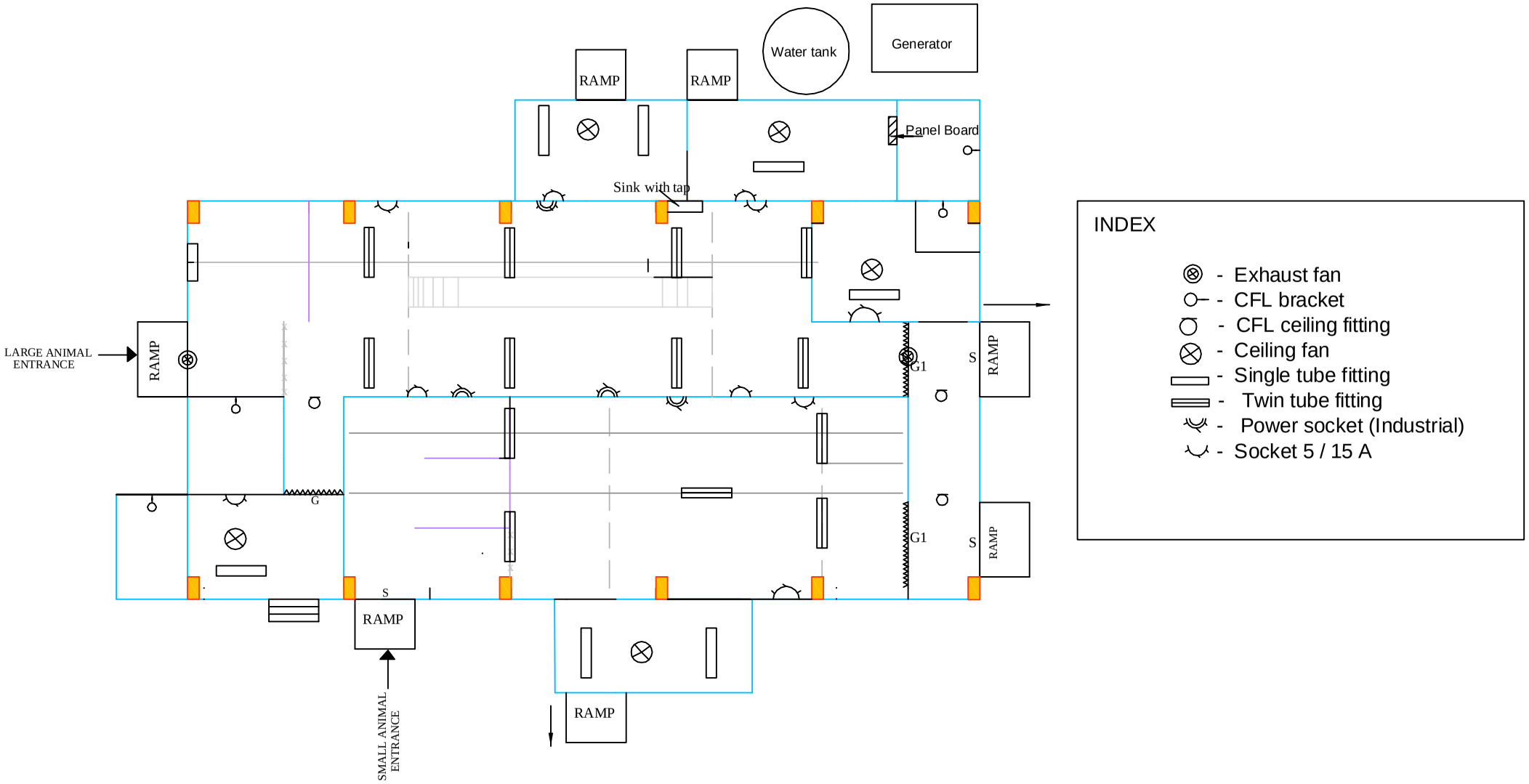


Section - Duct - 20 x 20
for laying pressure pipe

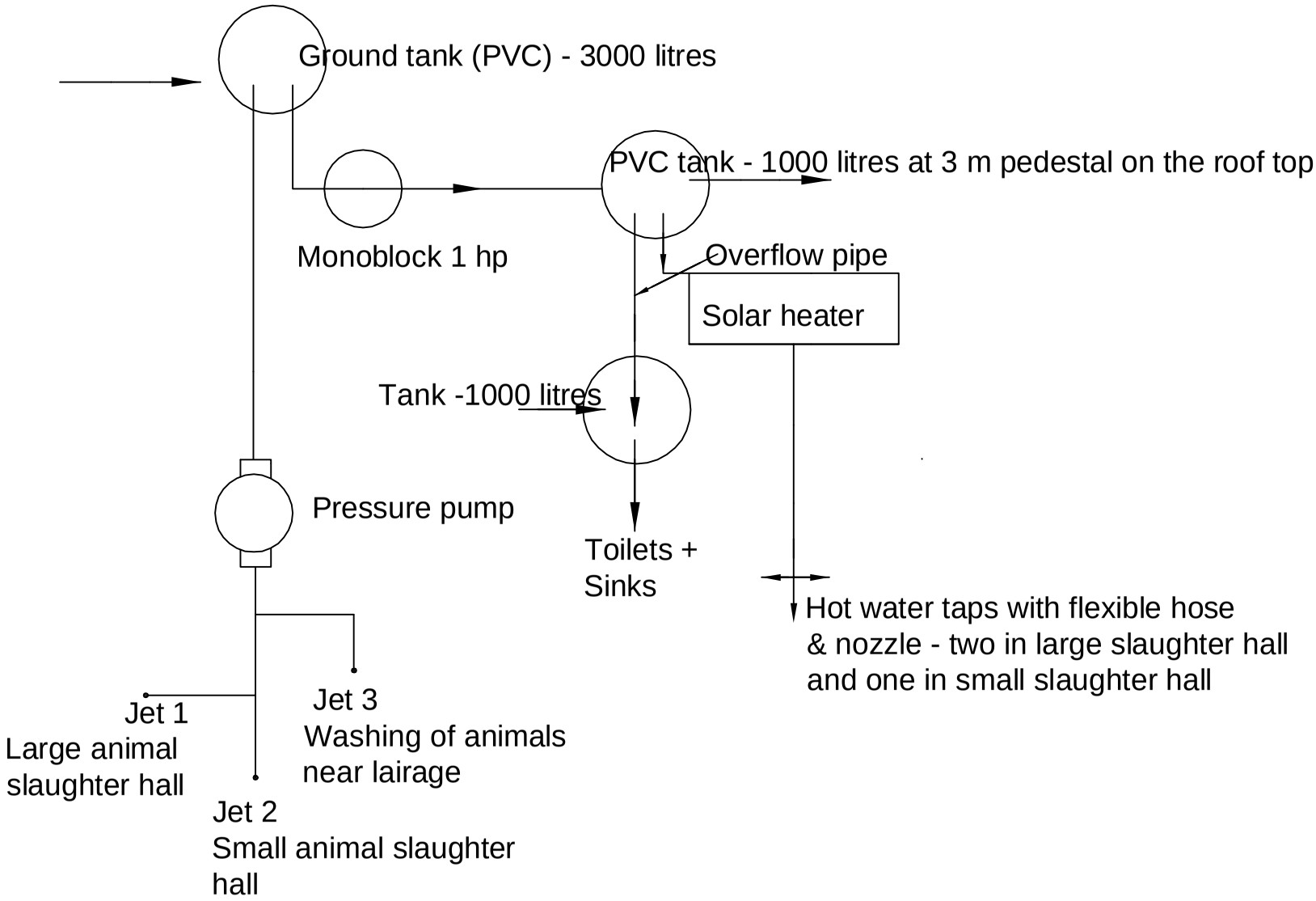


Section xx

WATER / WASTE WATER LAYOUT - SLAUGHTER HOUSE - TINY TYPE



ELECTRIFICATION - LAYOUT - SLAUGHTER HOUSE - TINY TYPE



SCHEMATIC DIAGRAM - WATER SUPPLY - TINY TYPE

	ESTIMATE FOR WATER SUPPLY/ WASTE WATER/SOLAR WATER HEATER- FOR TINY TYPE S.HOUSE					
I	**WATER SUPPLY**					
Sl No	ITEM	A/Unit	Rate	Qty	Amount	Remarks
1	Supply ,fix ,water tank PVC 3000 litres capacity on a level ground incl provision of inlet/outlet connectors.	No	12555	1	12555	
2	All as above but 1000 litres capacity on the roof top	No	4185	1	4185	
3	Supply install and commission monobloc pump 1 hp,along with supply of foot valve and DOL starter	No	6000	1	6000	
4	Supply, install ,test and commission pressure booster pump complete with 1.5 HP /1.1 KW,230V induction motor ,pipes sizes 32x32mm,alongwith pressure tank 60 litre capacity horizontally placed,pressure range 4 to 6 Kg/cm2,discharge 130 -170 litres/min,and can work automatically when trigger of servicing gun turn on also can deliver constant pressure to min 3 service jets,,with suitable relay operated starter. and foot valve 32mm.Make : Kirloskar/Wilo/Lubi	No	35000	1	35000	
5	Supply and lay CPVC pipe 32 mm on ducts/on trenches 50cm below ground. Incl all fittings and specials.	RM	142	45	6390	
6	Supply and fix reinforced flexible PVC hose of suitable lengths, for conveyance of water at a pressure of 16 Kg/cm2,	RM	90	40	4500	
7	Supply and fix brass/stainless steel servicing gun trigger type suitable to withstand a pressure of 16 Kg/cm2	Nos	3000	3	9000	
8	Control brass gate valve 19mm,along with tee 32mm,reducer 32x19mmhose collar grip	set	344	5	1720	
9	Supply and lay PVC heavy dutypipe in trenches /fixed on wall/floor/roof size 25mm	RM	37	30	1110	
10	as above but 20 mm	RM	31	50	1550	
11	Supply and fix float valve 25mm pressure type	No	375	2	750	

12	Supply and fix wheel valve heavy duty brass 25 mm	No	455	2	910	
13	Supply and fix full gate valve GM,20 mm	No	312	2	624	
14	Supply and fix Foot operated tap brass 20mm,incl all specials required.	No	5500	2	11000	MR
15	Supply and fix laboratory type sink incl all brackets and fixng arrangements.	No	2	1800	3600	
					98894	
II	**WASTE WATER COLLECTION SYSTEM**					
14	Provision of ducts on the floor at a slope of 1 in 60 of width 30cm, depth starting from 20 cm,side walls and bottom with RCC 1:2:4 .along with provision perforated CI cover (gratings) all as shown in the sketch	RM	1400	20	28000	
15	Provision of duct 20cm x20cm with RCC 1:2:4 side walls and bottom ,and CI cover for laying PVC /CPVC pipe as per sketch	RM	800	4	3200	
15	Supply and lay PVC heavy duty pipe 75 mm incl all specials in trenches below ground at a depth starting from 45 cm and at a slope of 1 in 60 all as shown in the lay out,for conveyance of waste water(excavation measured separately.)	RM	164	80	13120	
16	All as above but 110 mm size.	RM	315	20	6300	
17	Excavation in all soils	10M3	1267	3.8	4814.6	
18	Provision of man hole with cover sizes 30cm x30cm / 45 cmx45cm incl connecting/grouting the waste water pipes all as directed at site. (Items will be measured as under.					
	a.Brick work in cement motar 1:4	CM	2962	1.47	4354	
	b. Plaster work with cement motar 1:4 over a layer of concrete/brick work inside the manhole and the top surface	10Sqm	1389	0.55	763.95	
	c.Fabrication and fixing of MS cover of suitable size 6mm thick incl hinges and locking arrangements duly painted for the manhole	KG	60	42	2520	

	d.laying of cement concrete 1:2:4 .15mm thick and grouting on the bottom of the manhole and fixing of PVC pipes .	10d M3	52	12	624	
	e.. Fabrication and fixing of Angle iron 20x20x3mm frame for fixing the manhole cover	kg	60	9	540	
					64236.55	
III	Solar Water Heater					
1	Supply ,install and commission Flat Plate collector type Solar water heater,500 litres per day capacity,incl all fixing brackets/support etc on the roof	No	89500	1	89500	To be proccured from MNRE approved agency.Rate as per quotation
2	Water tank PVC 1000 litre capacity mounted on a pedastal 3M high on the roof	No	4185	1	4185	
3	Provision of brick wall 3 m high on two sides of suitable length and an RCC slab 10cm thk with 1:2:4 concrete , for placing a PVC tank of size 2000 litres to be measured as under:					
	a. Brick masonry wall 230x230 cm section errected on the first floor roof top in cm 1:4	CM	2962	1.8	5331.2	
	b. Cement plaster 1:4 over brick masonry work 10mm thick	10SM	1389	1.9	2639	
	c. Provision of RCC slab incl necessry form work ,1:2:4,,with 20 mm metal over the brick walls incl conveyance ,watering ,curing etc ,for placing the PVC water tank	10dM3	85	21	1785	
	d. Provision of steel reinforcements cut to size incl necessary binding wire etc for the above slab	Kg	45	18	810	
3	Supply and lay CPVC pipe 32 mm on the wall/floor/duct incl all fittings	RM	142	40	5680	
	total				109930.2	
	Subsidy expected from Anert				-32000	

	Net				**77930.2**	
	Notes					
	1. Development of water source not included .Same to be included as per local requirements					
	2.Quantities given are measurable and to be verified.					
	3.Estimate to reworked and TS to be got issued from competent authorities					

	ESTIMATE FOR WATER SUPPLY/ WASTE WATER/SOLAR WATER HEATER- FOR TINY TYPE S.HOUSE					
I	WATER SUPPLY					
Sl No	ITEM	A/Unit	Rate	Qty	Amount	Remarks
1						
1	Supply ,fix ,water tank PVC 5000 litres capacity on a level ground incl provision of inlet/outlet	No	20925	1	20925	
2	All as above but 1000 litres capacity on the roof top	No	4185	1	4185	
3	Supply install and commission monobloc pump 1 hp,along with supply of foot valve and DOL starter	No	6000	1	6000	
4	Supply, install ,test and commission pressure booster pump complete with 1.5 HP /1.1 KW,230V induction motor ,pipes sizes 32x32mm,alongwith pressure tank 60 litre capacity horizontally placed,pressure range 4 to 6 Kg/cm2,discharge 130 -170 litres/min,and can work automatically when trigger of servicing gun turn on also can deliver constant pressure to min 3 service jets,,with suitable relay operated starter. and foot valve 32mm.Make : Kirloskar/Wilo/Lubi	No	35000	1	35000	Qn recd from dealer
5	Supply and lay PVC pipe 32 mm of 12 kg/cm2 pressure rating on ducts/on trenches 50cm below ground. Incl all fittings and specials.	RM	51	45	2295	
6	Supply and fix reinforced flexible PVC hose of suitable lengths, for conveyance of water at a pressure of 16 Kg/cm2,	RM	90	40	4500	
7	Supply and fix brass/stainless steel servicing gun trigger type suitable to withstand a pressure of 16 Kg/cm2	Nos	3000	3	9000	
8	Control brass gate valve 19mm,along with tee 32mm,reducer 32x19mmhose collar grip	set	344	5	1720	
9	Supply and lay PVC heavy dutypipe in trenches /fixed on wall/floor/roof size 25mm	RM	37	30	1110	
10	as above but 20 mm	RM	31	50	1550	
11	Supply and fix float valve 25mm pressure type	No	310	2	620	

12	Supply and fix wheel valve heavy duty brass 25 mm	No	455	2	910	
13	Supply and fix full gate valve GM,20 mm	No	312	2	624	
14	Supply and fix Foot operated tap brass 20mm,incl all specials required.	No	5500	2	11000	MR
15	Supply and fix laboratory type sink incl all brackets and fixng arrangements.	No	2	1800	3600	
					103039	
II	WASTE WATER COLLECTION SYSTEM					
14	Provision of ducts on the floor at a slope of 1 in 60 of width 30cm, depth starting from 20 cm,side walls and bottom with RCC 1:2:4 .along with provision perforated CI cover (gratings).Half cut PVC pipe 150mm be embedded in the bottom of the drain, all as shown in the sketch	RM	1600	20	32000	
15	Provision of duct 20cm x20cm with RCC 1:2:4 side walls and bottom ,and CI cover for laying PVC /CPVC pipe as per sketch	RM	800	4	3200	
15	Supply and lay PVC heavy duty pipe 75 mm incl all specials in trenches below ground at a depth starting from 45 cm and at a slope of 1 in 60 all as shown in the lay out,for conveyance of waste water(excavation measured separately.)	RM	164	80	13120	
16	All as above but 110 mm size.	RM	315	20	6300	
17	Excavation in all soils	10M3	1267	3.8	4814.6	
18	Provision of man hole with cover sizes 30cm x30cm / 45 cmx45cm incl connecting/grouting the waste water pipes all as directed at site. (Items will be measured as under.					
	a.Brick work in cement motar 1:4	CM	2962	2.4	7108.8	

	b. Plaster work with cement motar 1:4 over a layer of concrete/brick work inside the manhole and the top surface	10Sqm	1389	0.9	1250	
	c.Fabrication and fixing of MS cover of suitable size 6mm thick incl hinges and locking arrangements duly painted for the manhole	KG	60	75	4500	
	d.laying of cement concrete 1:2:4 .15mm thick and grouting on the bottom of the manhole and fixing of PVC pipes .	10d M3	52	20	1040	
	e.. Fabrication and fixing of Angle iron 20x20x3mm frame for fixing the manhole cover	kg	60	16	960	
					74293.4	
III	Solar Water Heater					
1	Supply ,install and commission Flat Plate collector type Solar water heater,500 litres per day capacity,incl all fixing brackets/support etc on the roof	No	89500	1	89500	T be proccured from MNRE approved agency.Rate as per quotation
2	Water tank PVC 1000 litre capacity mounted on a pedastal 3M high on the roof	No	4185	1	4185	
3	Provision of brick wall 3 m high on two sides of suitable length and an RCC slab 10cm thk with 1:2:4 concrete , for placing a PVC tank of size 2000 litres to be measured as under:					
	a. Brick masonry wall 230x230 cm section errected on the first floor roof top in cm 1:4	CM	2962	1.8	5331.2	
	b. Cement plaster 1:4 over brick masonry work 10mm thick	10SM	1389	1.9	2639	
	c. Provision of RCC slab incl necessry form work ,1:2:4,,with 20 mm metal over the brick walls incl conveyance ,watering ,curing etc ,for placing the PVC water tank	10dM3	85	21	1785	

	d. Provision of steel reinforcements cut to size incl necessary binding wire etc for the above slab	Kg	45	18	810	
3	Supply and lay CPVC pipe 32 mm on the wall/floor/duct incl all fittings	RM	142	40	5680	
	total				109930.2	
	Subsidy expected from Anert				-32000	
	Net				77930.2	
	Notes					
	1.Additional storage tank be provided based on the scarcity of water in the area.					
	2. Development of source not included .Same to be included as per local requirements					
	3.Quantities given are measurable and to be verified.					
	4.Estimate to reworked and TS to be got issued from competent authorities					

ESTIMATE FOR THE CONSTRUCTION OF MODERN SLAUGHTER HOUSE FOR 5-10 LARGE & 20 SMALL ANIMALS									
SL. NO.	**DESCRIPTION**	**NO**	**LENGTH**	**BREADTH**	**HEIGHT**	**QUANTITY**	**UNIT**	**RATE**	**AMOUNT**
1	Clearing grass and other overgrowth of vegetation and small trees of girth upto 30cm including rooting out and removal of rubbish upto a distance of 150m outside the periphery of the area cleared etc. complete.						**LS**		**5000**
2	Earth work excavation in hard soil (except hard rock which requires blasting) and depositing on bank with initial lead upto 50m and lift upto 1.5m including breaking clods, watering, ramming and sectioning of spoil bank etc. complete and re-filling inside of basement in 15cm layers, watering, consolidation by ramming etc. complete.								
	long wall	3	16.49	0.80	0.70	27.70			
	cross wall	3	6.16	0.80	0.70	10.35			
	store								
	long wall	1	1.73	0.80	0.70	0.97			
	cross wall	1	0.93	0.80	0.70	0.52			
		1	3.03	0.80	0.70	1.70			
	toilet								
	long wall	1	2.93	0.80	0.70	1.64			
	cross wall	2	0.93	0.80	0.70	1.04			
	small animal stripery								
	long wall	1	4.53	0.80	0.70	2.54			
	cross wall	2	1.08	0.80	0.70	1.21			
	large animal stripery, boiler room etc.								
	long wall	1	8.19	0.80	0.70	4.59			
	cross wall	4	1.23	0.80	0.70	2.76			
	office	1	1.43	0.80	0.50	0.57			
	large animal cubicle	1	2.23	0.80	0.50	0.89			
		1	1.43	0.80	0.50	0.57			
	small animal cubicle	1	2.46	0.80	0.50	0.98			
		2	1.70	0.80	0.50	1.36			
	ramp	4	1.70	1.20	0.30	2.45			
		3	1.20	1.20	0.30	1.30			
	step	1	1.20	1.00	0.30	0.36			
						63.49			
					say	**64M3**	**10M3**	**1650.00**	**10560.00**
3	Plain cement concrete 1:4:8 (1 cement, 4 sand, 8 broken stone) using 40mm nominal size broken stones to line and level including watering, curing etc. for foundation								
	long wall	3	16.49	0.80	0.10	3.96			
	cross wall	3	6.16	0.80	0.10	1.48			
	store								
	long wall	1	1.73	0.80	0.10	0.14			
	cross wall	1	0.93	0.80	0.10	0.07			
		1	3.03	0.80	0.10	0.24			
	toilet								
	long wall	1	2.93	0.80	0.10	0.23			
	cross wall	2	0.93	0.80	0.10	0.15			
	small animal stripery								
	long wall	1	4.53	0.80	0.10	0.36			
	cross wall	2	1.08	0.80	0.10	0.17			

SL. NO.	DESCRIPTION	NO	LENGTH	BREADTH	HEIGHT	QUANTITY	UNIT	RATE	AMOUNT
	large animal stripery, boiler room etc.								
	long wall	1	9.60	0.80	0.10	0.77			
	cross wall	4	1.23	0.80	0.10	0.39			
	office	1	1.43	0.80	0.10	0.11			
	large animal cubicle	1	2.23	0.80	0.10	0.18			
		1	1.43	0.80	0.10	0.11			
	small animal cubicle	1	2.46	0.80	0.10	0.20			
		2	1.70	0.80	0.10	0.27			
	ramp	4	1.70	1.20	0.10	0.82			
		3	1.20	1.20	0.10	0.43			
	step	1	1.20	1.00	0.10	0.12			
						10.22			
					say	**11M3**	**M3**	**3640.00**	**40040.00**
4	Random rubble masonry in cement mortar 1:6 (one cement and six sand) using 72kg of cement / 1m3 masonry for wall with hammer dressed close finished joints without pinnings and pointing the exposed faces of masonry with the same mortar simultaneously during the course of constrcution, including cost and conveyance of all materials, labour charges etc. complete								
(a)	for foundation								
	long wall	3	16.29	0.60	0.60	17.59			
	cross wall	3	6.56	0.60	0.60	7.08			
	store								
	long wall	1	1.73	0.60	0.60	0.62			
	cross wall	1	1.13	0.60	0.60	0.41			
	passage	1	3.23	0.60	0.60	1.16			
	toilet								
	long wall	1	2.73	0.60	0.60	0.98			
	cross wall	2	1.13	0.60	0.60	0.81			
	small animal stripery								
	long wall	1	4.33	0.60	0.60	1.56			
	cross wall	2	1.28	0.60	0.60	0.92			
	large animal stripery, boiler room etc.								
	long wall	1	8.00	0.60	0.60	2.88			
	cross wall	4	1.43	0.60	0.60	2.06			
	office	1	1.63	0.60	0.60	0.59			
	large animal cubicle	1	2.23	0.60	0.60	0.80			
		1	1.63	0.60	0.60	0.59			
	small animal cubicle	1	2.46	0.60	0.60	0.89			
		2	1.90	0.60	0.60	1.37			
	ramp	4	1.50	0.60	0.60	2.16			
		3	1.10	0.60	0.60	1.19			
						43.66			
(b)	for basement								
	long wall	3	16.29	0.45	0.60	13.19			
	cross wall	3	6.56	0.45	0.60	5.31			
	store			0.45	0.45	0.00			
	long wall	1	1.73	0.45	0.45	0.35			
	cross wall	1	1.13	0.45	0.45	0.23			
	passage	1	3.23	0.45	0.45	0.65			
	toilet			0.45	0.45	0.00			
	long wall	1	2.73	0.45	0.45	0.55			
	cross wall	2	1.13	0.45	0.45	0.46			
	small animal stripery			0.45	0.45	0.00			

SL. NO.	DESCRIPTION	NO	LENGTH	BREADTH	HEIGHT	QUANTITY	UNIT	RATE	AMOUNT
	long wall	1	4.33	0.45	0.45	0.88			
	cross wall	2	1.28	0.45	0.45	0.52			
	large animal stripery, boiler room etc.			0.45	0.45	0.00			
	long wall	1	8.00	0.45	0.45	1.62			
	cross wall	4	1.43	0.45	0.45	1.16			
	office	1	1.63	0.45	0.45	0.33			
	large animal cubicle	1	2.23	0.45	0.45	0.45			
		1	1.63	0.45	0.45	0.33			
	small animal cubicle	1	2.46	0.45	0.45	0.50			
		2	1.90	0.45	0.45	0.77			
	ramp	4	1.50	0.45	0.45	1.22			
		3	1.10	0.45	0.45	0.67			
						24.56			
	grand total					68.22			
					say	**69M3**	**M3**	**2321.00**	**160149.00**
5	Brick work in cm 1:6 (1 cement, 6 sand) using first class country burnt bricks of nominal size 22.9x 11.2x7cm for superstructure including cost of all materilas, conveyance, labour etc. complete								
	long wall	2	15.69	0.23	5.50	39.70			
		1	15.69	0.23	3.00	10.83			
	cross wall	2	8.00	0.23	5.50	20.24			
	store								
	long wall	1	1.73	0.23	3.00	1.19			
	cross wall	1	1.50	0.23	3.00	1.04			
	passage	1	3.60	0.23	3.00	2.48			
		1	2.00	0.23	3.00	1.38			
	small animal stripery								
	long wall	1	3.23	0.23	3.00	2.23			
	cross wall	2	1.65	0.23	3.00	2.28			
	large animal stripery, boiler room etc.			0.23	3.00	0.00			
	long wall	1	7.62	0.23	3.00	5.26			
	cross wall	4	1.80	0.23	3.00	4.97			
	office	1	3.13	0.23	3.00	2.16			
		1	2.00	0.23	3.00	1.38			
	small animal cubicle	1	2.46	0.23	3.00	1.70			
		2	1.80	0.23	3.00	2.48			
	toilet	1	2.33	0.23	3.00	1.61			
		2	1.50	0.23	3.00	2.07			
	total					102.98			
	Deduction								
	column (bed block)	12	0.23	0.23	1.00	0.63			
	opening	2	1.20	0.23	2.10	1.16			
	S	4	1.50	0.23	2.40	3.31			
	D1	9	1.00	0.23	2.10	4.35			
	D2	2	0.80	0.23	2.10	0.77			
	W2	1	1.50	0.23	1.20	0.41			
	W(bottom)	8	1.20	0.23	1.20	2.65			
	W(top)	14	1.50	0.23	1.65	7.97			
	V	2	0.60	0.23	0.45	0.12			
	V1	7	1.00	0.23	0.60	0.97			
	total					22.35			
	Grand total					80.64			
					say	**81M3**	**M3**	**3055.00**	**247455.00**

SL. NO.	DESCRIPTION	NO	LENGTH	BREADTH	HEIGHT	QUANTITY	UNIT	RATE	AMOUNT
6	RCC 1:11/2:3 using 20mm nominal size hard granite, broken stone including all cost, conveyance of materials, formwork and all labour charges for watering curing etc. complete								
	lintel								
	long wall	2	15.92	0.23	0.15	1.10			
	middle wall	2	14.26	0.23	0.15	0.98			
	cross wall	2	7.53	0.23	0.15	0.52			
	store								
	long wall	1	1.73	0.23	0.15	0.06			
	cross wall	1	1.50	0.23	0.15	0.05			
	passage	1	3.60	0.23	0.15	0.12			
		1	2.00	0.23	0.15	0.07			
	small animal stripery								
	long wall	1	3.23	0.23	0.15	0.11			
	cross wall	2	1.65	0.23	0.15	0.11			
	large animal stripery, boiler room etc.								
	long wall	1	7.62	0.23	0.15	0.26			
	cross wall	4	1.80	0.23	0.15	0.25			
	office	1	3.13	0.23	0.15	0.11			
		1	2.00	0.23	0.15	0.07			
	toilet	1	2.33	0.23	0.15	0.08			
		2	1.50	0.23	0.15	0.10			
	Roof slab								
	small animal stripery	1	4.66	2.71	0.12	1.52			
	large animal stripery	1	8.82	2.86	0.12	3.03			
	toilet	1	3.56	2.56	0.12	1.09			
	cabin for large animals	2	2.40	0.20	1.50	1.44			
		1	2.00	0.20	1.50	0.60			
		1	1.00	0.20	1.50	0.30			
	lintel (top)								
	long wall	2	15.92	0.23	0.15	1.10			
	cross wall	2	7.53	0.23	0.15	0.52			
	bed block	12	0.45	0.23	1.00	1.24			
	grand total					14.83			
					say	15.00			
						15000DM3	**10DM3**	**122.69**	**184035.00**
7	Reinforcement for RCC works bent, tied and placed in position (plain grill requiring bending cold) using TMT steel including cost and conveyance of all materials and all labour charges etc. complete @90kg/m3					1170.00			
						11.70QTL	**QTL**	**5728.00**	**67017.60**
8	Fabricating and erecting GI pipe truss of span 8 m and height 1.3m using 65mm medium pipe for tie beam, 50mm medium pipe for principal rafter, 32mm pipe for other members including cost and working charges of MS plate, bolt, cleats, welding charges, lifting etc. complete for truss work	6				6			
						6 no.	**E**	**12374.75**	**74248.50**

SL. NO.	DESCRIPTION	NO	LENGTH	BREADTH	HEIGHT	QUANTITY	UNIT	RATE	AMOUNT
9	Fabricating and erecting GI pipe purlins using 40mm medium pipe including cost and working charges, welding charges, lifting etc. complete	2 x 5	17.50			175.00			
					say	**175 m**	**m**	**188.12**	**32921.00**
10	Roofing with galvanised iron corrugated sheet 1mm thick or nearest available thickness with overlaps of 150mm at ends and G.I. hook or crank bolts and nuts including plain washers and bitumen washers etc. complete	2	5.50			17.50		192.50	
					say	**193 m2**	**m2**	**564.40**	**108929.20**
11	Providing plain G.I. ridge capping 225mm flaps with 1.00 mm thick or nearest available size including crank bolts and nuts and washers etc. complete	1	17.50			17.50			
					say	**17.5M**	**M**	**213.18**	**3730.65**
12	Fabricating and fixing door frame 100cm x 210cm using 40mm x 40mm x 5mm angle and which is fixed in walls using plain concrete of M20 of 23cm x 23cm x 15cm size including cost, conveyance, welding charges, iron butt hinges of 100mm size welded in 45cm c/c etc. complete for door D1	7				**7 nos**	**E**	**1511.81**	**10582.67**
13	Providing and fixing aluminium powder coated frames using 60 x 25 x 1.5mm 3 track sections for frames of door and shutter, fixing novapan sheets of 12mm thick upto 1m from bottom level to the shutters with rubber beedings and fixed to the door frame with aluminium hinges, including cost of all materilas, door handle, door lock, labour etc. complete for door D1	7	1.00		2.10	14.70			
						14.70M2	**M2**	**3875.28**	**56966.62**
14	Providing and fixing fully glazed doors with 12mm thick toughened satety glass for front doors fixed with floor spring and provide stainless steel handle provided with glass tiching	2	1.50		2.10	6.30			
		1	1.20		2.10	2.52			
						8.82			
						8.82M2	**M2**	**4494.60**	**39642.37**

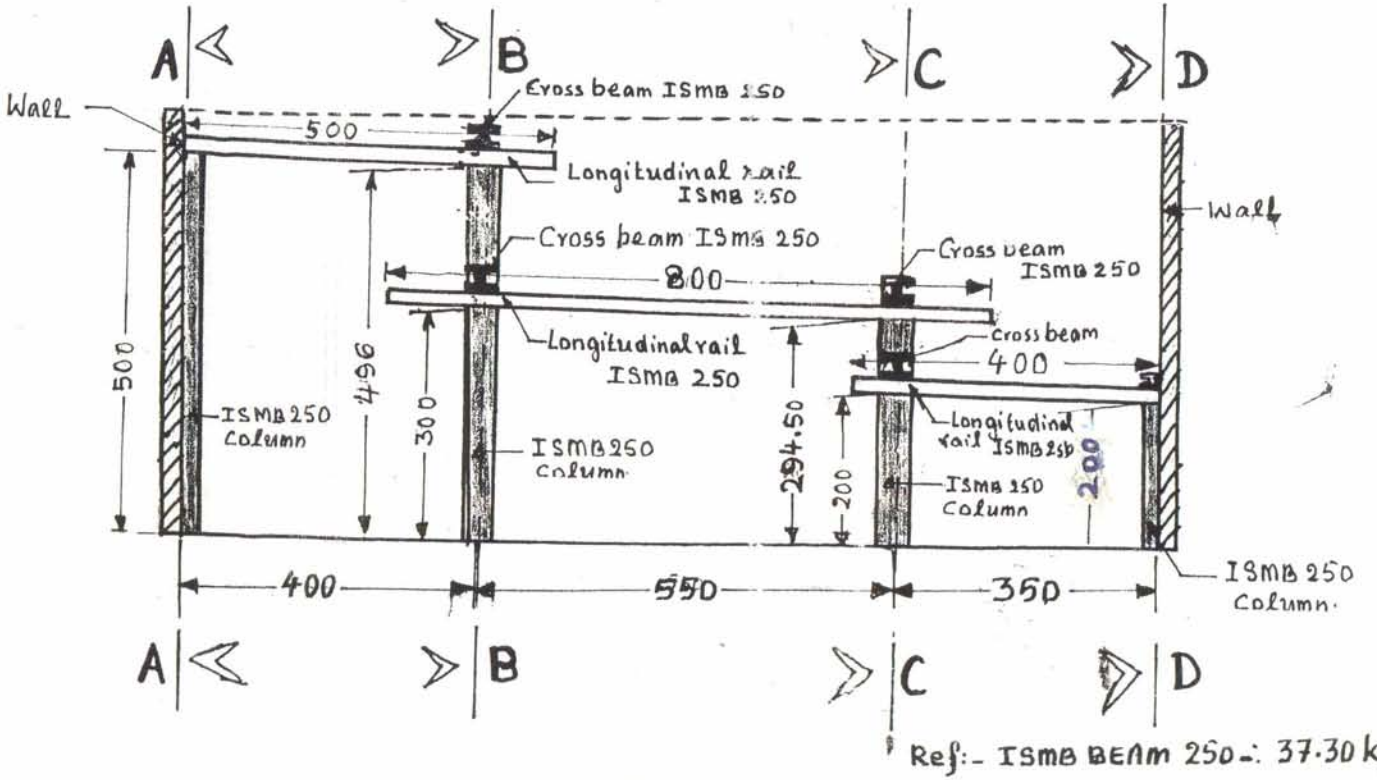
SL. NO.	DESCRIPTION	NO	LENGTH	BREADTH	HEIGHT	QUANTITY	UNIT	RATE	AMOUNT
15	Supplying and fixing rollling shutters of approved make and painted with a priming coat of iron primer, made of 80 x 1.25mm M.S. laths interlocked together through their entire length and jointed together at the end by the end locks mounted on specially designed pipe shaft, with brackets, side guides and arrangements for inside and outside locking with push and pull operation etc. complete	4	1.50		2.40	14.40			
						1440 DM2	**10DM2**	**183.00**	**26352.00**
16	Supplying and fixing FRP door with frame including cost of materials, conveyance, labour for fittings etc. complete for toilet doors	2	0.80		2.10	3.36			
						3.36M2	**M2**	**3225.00**	**10836.00**
17	Fabricating and fixing aluminium powder coated frames using 60 x 25 x 1.5mm 3 track sections and 60 x 25 x 1.5mm single channels for shutter frames and fixing 5.5mm thick plane glass / aluminium grills with 2 face mosquito net best quality to the								
	W(bottom)	8	1.20		1.20	11.52			
	W(top)	14	1.50		1.65	34.65			
	V	2	0.60		0.45	0.54			
	V1	7	1.00		0.60	4.20			
						50.91			
						51M2	**M2**	**4145.00**	**211395.00**
18	Plastering with cement mortar 1:3, 9mm thick one coat, to the underside of slab, shade etc. including cost of materials, conveyance, labour, scaffolding etc. complete								
	small stripery	1	4.66		2.71	12.63			
	large stripery	1	8.82		2.86	25.23			
	toilet	1	3.56		2.56	9.11			
						46.97			
						47M2	**10M2**	**1212.00**	**5696.40**
19	Plastering with cement mortar 1:4, 12 mm thick one coat floted hard and trowelled smooth including cost and conveyance of all materials and all labour charges watering, curing, etc. complete for inside and outside walls								
	long wall	4	15.92		5.50	350.24			
	cross wall	4	8.00		5.50	176.00			
	inner long wall	2	14.46		3.00	86.76			
		2	3.60		3.00	21.60			
	small cabin	2	2.80		1.50	8.40			
		1	4.69		1.50	7.04			
	small stripery	1	6.30		3.00	18.90			
		1	7.22		3.00	21.66			
	cubicle large	1	7.00		1.50	10.50			
		1	3.60		1.50	5.40			
	large stripery	1	11.68		3.00	35.04			
		1	6.60		3.00	19.80			

SL. NO.	DESCRIPTION	NO	LENGTH	BREADTH	HEIGHT	QUANTITY	UNIT	RATE	AMOUNT
		1	6.10		3.00	18.30			
		1	4.80		3.00	14.40			
	toilet	1	4.90		3.00	14.70			
		1	5.82		3.00	17.46			
	store accessries	1	4.50		3.00	13.50			
	change room	1	1.96		3.00	5.88			
	passage	2	2.00		3.00	12.00			
	small hanging	1	2.00		3.00	6.00			
	vet. Doctor's room	1	5.36		3.00	16.08			
	total					879.66			
	deduction								
	S	4	1.50		2.40	14.40			
	O	2	1.20		2.10	5.04			
	D1	9	1.00		2.10	18.90			
	D2	2	0.80		2.10	3.36			
	W2	1	1.50		1.20	1.80			
	W(bottom)	8	1.20		1.20	11.52			
	W(top)	14	1.50		1.65	34.65			
	V	2	0.60		0.45	0.54			
	V1	7	1.00		0.60	4.20			
	total deduction					94.41			
	net total					785.25			
					say	**786M2**	**10M2**	**1420.00**	**111612.00**
20	Flooring with cement concrete 1:2:4, 100 mm thick using 20mm (nominal size) broken stone including cost and conveyance of all materials and labour charges etc. complete								
	slaughter hall	1	15.46	8.00	0.10	12.37			
	small stripery	1	3	1.65	0.10	0.50			
	large stripery	1	3.00	1.80	0.10	0.54			
	total					13.40			
	deduction								
	veterinary room	1	2.90	2.00	0.10	0.58			
	change room	1	2.90	1.90	0.10	0.55			
	store	1	1.50	1.50	0.10	0.23			
						1.36			
	grand total					12.05			
					say	**12100DM3**	**10DM3**	**52.00**	**62920.00**
	Total								
21	Flooring with cement concrete 1:4:8, 75 mm thick using 40mm (nominal size) broken stone including cost and conveyance of all materials and labour charges etc. complete								
	boiler room	1	2.50	1.80	0.075	0.34			
	toilet	1	1.80	1.20	0.075	0.16			
		1	1.50	1.90	0.075	0.21			
	veterinary room	1	2.90	2.00	0.075	0.44			
	change room	1	2.90	1.90	0.075	0.41			
	store	1	1.50	1.50	0.075	0.17			
	total					1.73			
					say	**2 M3**	**M3**	**3640.00**	**7280.00**

SL. NO.	DESCRIPTION	NO	LENGTH	BREADTH	HEIGHT	QUANTITY	UNIT	RATE	AMOUNT
22	Supplying and laying unpolished (non slippery)hard granite slab 20 mm thick of 100cm x 100cm size/sufficient size of approved quality over a base of cement mortar 1:4, 20mm thick including all leads and lifts, laying the granite slab in line and levels closing joints (paper joints - adding necessary pure cement grout to get the proper binding of slabs to the mortar, pointing the joints grouted with white cement, including watering and curing etc. complete as per the direction of departmental officers	1	15.46	8.00		123.68			
	small stripery	1	3.00	1.65		4.95			
	large stripery	1	3.00	1.80		5.40			
	boiler room	1	2.50	1.80		4.50			
						138.53			
	deduction								
	veterinary room	1	3.13	2.23		6.98			
	change room	1	3.13	2.13		6.67			
	store	1	1.73	1.73		2.99			
	total deduction					**16.64**			
	grand total					121.89			
					say	**122 M2**	**M2**	**1596.00**	**194712.00**
23	Flooring with ceramic tiles non slippery 30 x 30cm size of best quality unglazed over a bed of cm. 1:3, 12mm thick including cost of materilas, labour, convewyance etc. complete								
	toilet	1	1.80	1.20		2.16			
		1	1.50	1.90		2.85			
	veterinary room	1	2.90	2.00		5.80			
	change room	1	2.90	1.90		5.51			
	store	1	1.50	1.50		2.25			
	total					18.57			
					say	**19 M2**	**M2**	**724.00**	**13756.00**
24	Dadoing walls with best glazed white or coloured joint free tiles 7.5mm thick or nearest size in cement mortar 1:3, 12mm thick and pointing with cement of suitable colour conveyance of all materials and all labour charges etc. complete								
	large animal slaughter hall	2	12.35		2.10	51.87			
		1	3.70		2.10	7.77			
		1	4.36		2.10	9.16			
		1	1.90		2.10	3.99			
	small slaughter hall	2	10.90		2.10	45.78			
		1	3.60		2.10	7.56			
		1	2.00		2.10	4.20			
	toilet	2	2.70		2.10	11.34			
		2	3.30		2.10	13.86			
	total					155.53			
	deduction								
	S	2	1.50		2.10	6.30			
	opening	2	1.20		2.10	5.04			
	D1	2	1.00		2.00	4.00			
	W	5	1.20		0.90	5.40			

SL. NO.	DESCRIPTION	NO	LENGTH	BREADTH	HEIGHT	QUANTITY	UNIT	RATE	AMOUNT
	D2	2	0.80		2.10	3.36			
	total					24.10			
	grand total					131.43			
					say	**132M2**	**M2**	**991.00**	**130812.00**
25	Supplying and fixing best quality of Indian type white glazed WC pan 580mm or S or P trap and forming squatting plat form 900x700mm & plastered over with cement mortar 1:3, flushing coat etc. complete (Orissa pattern WC pan)	2				**2nos**	**E**	**1314.00**	**2628.00**
26	Painting with epoxy paint two coat over a priming coat including cost and conveyance of all materials and all labour charges etc. complete for inside walls								
	large slaughter hall inside	1	12.33		3.50	43.16			
		1	14.49		0.90	13.04			
	cross wall	1	3.70		3.50	12.95			
		1	5.36		0.90	4.82			
	cubical	2	3.46		1.80	12.46			
	small slaughter hall	1	10.90		0.90	9.81			
		1	12.33		3.50	43.16			
	cross wall	1	3.60		0.90	3.24			
	cubical	2 x 2	3.15		1.80	22.68			
		1	2.00		0.90	1.80			
	cross wall	1 x 1	2.00		3.00	6.00			
		1	5.33		5.50	29.32			
	small stripery	1	6.30		3.00	18.90			
	large stripery	1	6.50		3.00	19.50			
	boiler	1	6.10		3.00	18.30			
	passage	2	2.00		0.90	3.60			
	total					262.73			
	deduction								
	S	2	1.50		0.30	0.90			
		2	1.50		2.40	7.20			
	O	2	1.20		0.30	0.72			
	D1	7	1.00		2.10	14.70			
	V1	6	1.00		0.60	3.60			
	W	1	1.20		1.20	1.44			
	total deduction					28.56			
	deduct half of total deduction					248.45			
					say	**249.00**	**10M2**	**535.00**	**13321.50**
27	Painting with plastic emulsion paint two coat over a priming coat including cost and conveyance of all materials and all labour charges etc. complete for remaining inside wall								
	store	1	6.00		3.00	18.00			
	change room	2	4.80		3.00	28.80			
	toilet	1	3.40		0.90	3.06			
	veterinary room	2	4.90		3.00	29.40			
	toilet	1	3.00		0.90	2.70			
	total					81.96			
	deduction								
	D2	2	0.80		2.10	3.36			
	D1	3	1.00		2.10	6.30			

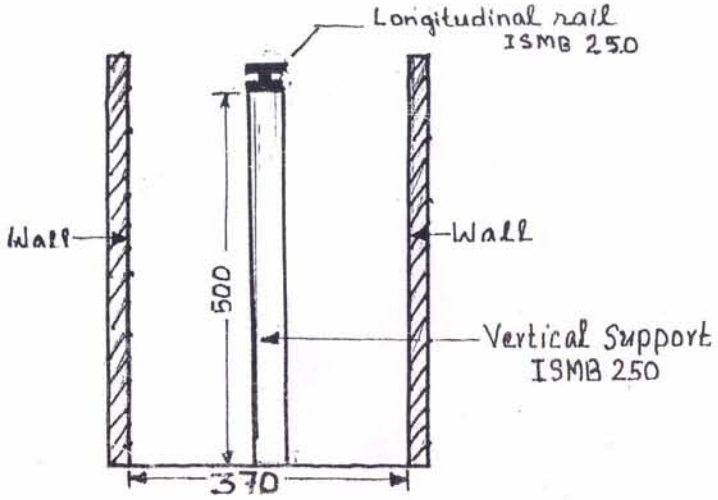
SL. NO.	DESCRIPTION	NO	LENGTH	BREADTH	HEIGHT	QUANTITY	UNIT	RATE	AMOUNT
	V	1	1.00		0.60	0.60			
	W	1	1.20		1.20	1.44			
						11.70			
	grand total					70.26			
					say	**71M2**	**10M2**	**572.35**	**4063.69**
28	Painting with white cement two coat over a priming coat including cost and conveyance of all materials and all labour charges etc. complete for outside wall								
	all around	1	58.50		3.00	175.50			
		1	47.84		2.50	119.60			
	total					295.10			
	deduction								
	S	4	1.50		2.40	14.40			
	W	8	1.20		1.20	11.52			
	V	2	0.60		0.45	0.54			
	V1	7	1.00		1.65	11.55			
						38.01			
	grand total					257.09			
					say	**258.00**	**10M2**	**82.83**	**2137.01**
29	Lairage						**LS**		**45000.00**
									1883799
29	Unforeseen								**16201.00**
	Grand total								**1900000.00**
									(Rupees Nineteen lakh only)



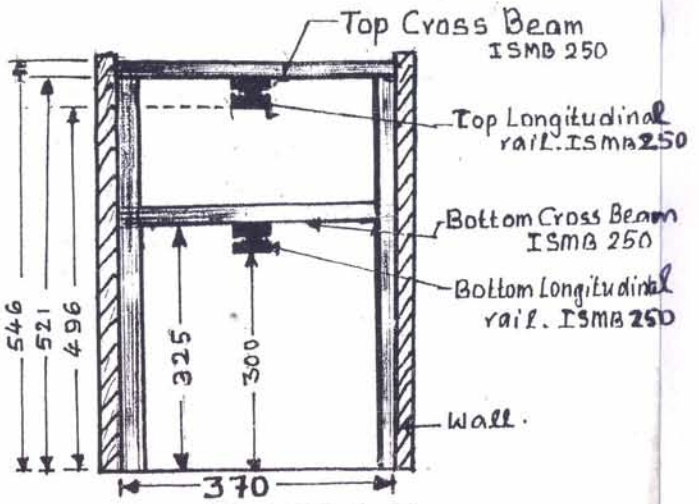
Ref:- ISMB BEAM 250 :- 37.30 kg/M.

SLAUGHTER HOUSE

(TINY TYPE)



DETAILS ON A-A

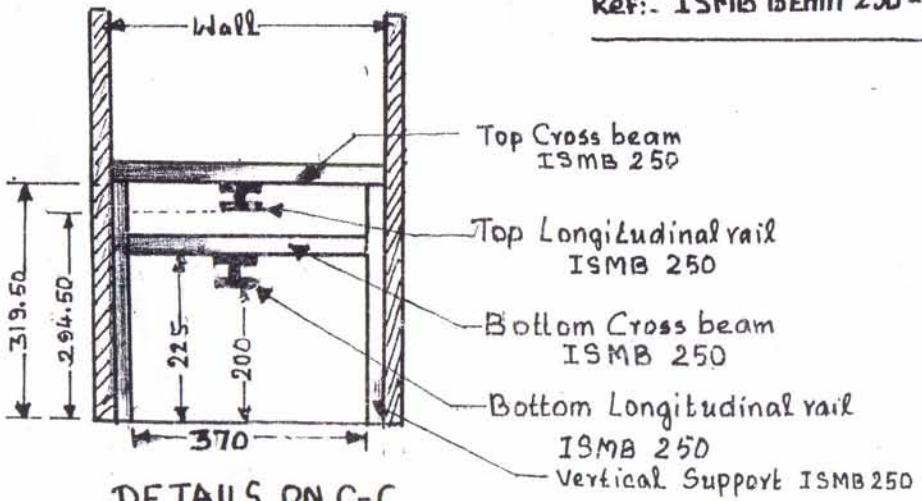


DETAILS ON B-B

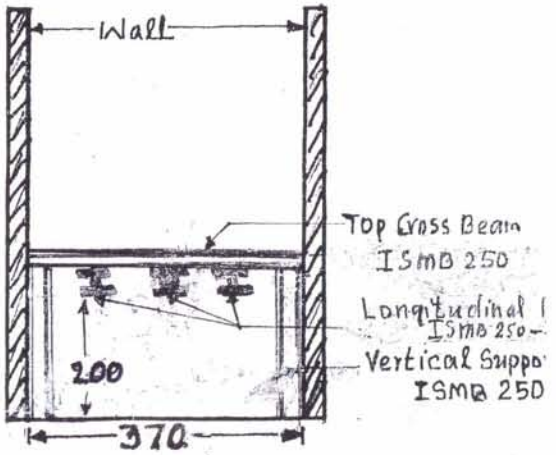
ALL DIMENSIONS IN Centimetres

(drawings from finished floor level)

Ref:. ISMB BEAM 250 - 37.30 kg/M.



DETAILS ON C-C



DETAILS ON D-D

(Slaughter House - Tiny Type)