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**PHILIPPINE AGRICULTURAL ENGINEERING STANDARD PAES 422-1:2012**  
**Agricultural Structures – Poultry Dressing/Slaughtering Plant (Part 1 – small scale)**

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## **Foreword**

The formulation of this national standard was initiated by the Agricultural Machinery Testing and Evaluation Center (AMTEC) under the project entitled “Development of Technical Standards for Poultry Dressing Plant” which was funded by the Department of Agriculture – National Meat Inspection Service (DA-NMIS).

This standard has been technically prepared in accordance with PAES 010-2 – Rules for the Structure and Drafting of International Standards.

This standard cancels and replaces PAES 412: 2002 - Agricultural Structures – Poultry Dressing Plant.

The word “shall” is used to indicate mandatory requirements to conform to the standard.

The word “should” is used to indicate that among several possibilities one is recommended as particularly suitable without mentioning or excluding others.

In preparation of this standard, the following documents/publications were considered:

Chapter 2 – Establishment and Equipment Design and Construction New Establishment Approval Process.<http://www.inspection.gc.ca/english/anima/meavia/mmopmmhv/chap2.shtml>

PAES 010-1: 2005      General – Formulation of PAES – Part 1 : General Procedures

PAES 010-2: 2005      General – Formulation of PAES – Part 2 : Rules for the Structure and Drafting

PAES 020:2005        General – Metrication Guidelines

PAES 411:2000        Agricultural Structures – Slaughterhouse for Swine, Small and Large Animals – General Requirements

PAES 412:2002        Agricultural Structures – Poultry Dressing Plant

Presidential Decree No. 1096 - Adopting A National Building Code Of The Philippines Thereby Revising Republic Act Numbered Sixty-Five Hundred Forty-One

Federal Register. 1997. USDA/NCDA & CS Facility Guidelines for Meat Processing Plants. Rules and Regulation. Vol 62. No. 164.

Food and Agriculture Organization. Standard Plans for a Small Abattoir and Meat Market. FAO Corporate Document Repository.

Thai Agricultural Standard (TAS) 9008-2006. Good Manufacturing Practices for Poultry Abattoir. National Bureau of Agricultural Commodity and Food Standards. Ministry of Agriculture and Cooperatives. ICS 65.040.20 ISBN 974-403-404-1

United States Department of Agriculture. 1982. Guidelines for Establishing and Operating Broiler Processing Plants. Agricultural Research Service. Agriculture Handbook No. 581

Caribbean Poultry Association. HACCP Manual for Poultry Processors and Further Processors.

## **1 Scope**

This standard specifies the minimum requirements of a small-scale poultry dressing/slaughtering plant with a maximum capacity of 200 heads per hour. This covers from the unloading of live birds, dressing/slaughtering, up to the dispatch of carcass.

## **2 References**

The following normative documents contain provisions, which, through the reference in this text, constitute provisions of this National Standard:

**CAC/RCP 1-1969. 2003.** Codex Standard for General Principles of Food Hygiene. Adopted 1969. Amendment 1999. Revisions 1997 and 2003

**DA A.O. No. 21. 2004** Mandatory Application of Good Manufacturing Practices (GMP) in All NMIC Accredited “AA” Meat Establishments.

**PAES 414-1:2002** Agricultural Structures – Waste Management Structures Part 1: Agricultural Liquid Waste

**PD No. 856** Code on Sanitation of the Philippines and its Implementing Rules and Regulations (1998)

**Philippine Electrical Code. 2009**

**Republic Act 6541** National Building Code of the Philippines (1972)

**Republic Act 9296** Meat Inspection Code of the Philippines and its Implementing Rules and Regulations

**Revised National Plumbing Code. 1999**

## **3 Definitions**

For the purpose of this standard, the definitions in PAES 412, RA 9296 and the following shall apply:

### **3.1**

#### **carcass**

body of slaughtered poultry animal after defeathering, evisceration, and removal of head and feet

**3.2**

**cove**

concave molding that joins wall and ceiling or floor or another wall

**3.3**

**defeathering**

**plucking**

process of removing feathers from the skin of the poultry animal after scalding to prepare its meat for food

**3.4**

**dressing**

**slaughtering**

process composed of stunning, slitting and bleeding, defeathering, eviscerating from which head, shanks, crop, oil gland and other inedible parts are removed

**3.5**

**evisceration**

process of removing the internal organs on the abdominal and thoracic cavities

**3.6**

**giblet**

edible offals

**3.7**

**kill floor**

slaughtering area

**3.8**

**offal**

by-products, organs, glands and tissue other than the meat of the dressed poultry

**3.9**

**poultry**

group of poultry animals that are mostly domesticated for their eggs, meat and/or feathers (e.g. chicken, geese, turkeys, ducks and ostriches)

**3.10**

**poultry dressing/slaughtering plant**

any premises and building established for poultry dressing/slaughtering which include cut up processes to prepare poultry meat, parts, and products for human consumption

**3.11**

**scalding**

subjecting poultry into steam or hot water to loosen feathers from its skin prior to defeathering

**3.12**

**trench drain**

trough that collects waste from a larger area and directs the flow to a drain opening

**3.13****vermin**

animal species regarded as pests

**4 Location**

- 4.1** The selected location shall comply with the comprehensive land use plan (CLUP) of the municipality or city.
- 4.2** The poultry dressing plant shall be located in area with at least 200 m distance to dwellings, schools, churches and other public or commercial buildings due to possible nuisance from noise and smell congestion. Likely future commercial and residential developments should also be taken into account in site selection.
- 4.3** The poultry dressing plant shall be constructed in an area conforming to the requirements of the Code of Sanitation and its Implementing Rules and Regulations as well as the National Building Code of the Philippines.
- 4.4** The location shall have adequate water supply and other utilities (e.g. electricity and communication services) to suffice for the needs of poultry dressing plant.
- 4.5** The direction of prevailing winds should be considered in site determination to prevent contamination to and from the meat establishment.

**5 Functional Areas**

The poultry dressing/slaughtering plant shall have functional areas which include locker room, change room, washing area and offices which may be integrated in the plant or housed in another structure near the poultry dressing/slaughtering plant. Such amenities shall conform to the requirements stated in the Codex Standard for General Principles of Food Hygiene and the DA A.O. No. 21. 2004 - Mandatory Application of Good Manufacturing Practices (GMP).

**6 Structural and Functional Requirements**

The poultry dressing/slaughtering plant shall be in compliance with the requirements of the National Building Code.

**6.1 Floor**

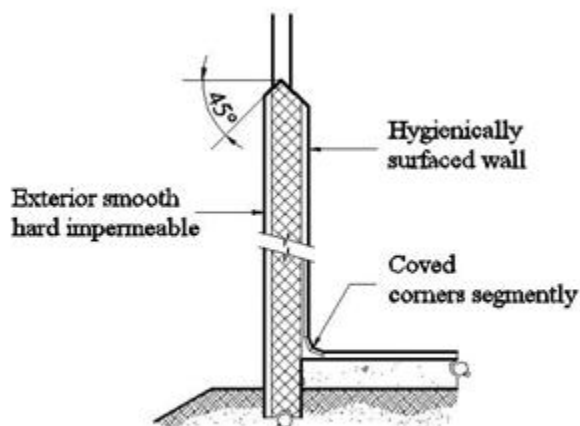
- 6.1.1** Finish floor line shall be at least 0.8 m from the ground. It shall be designed such that it shall facilitate easy receiving of live birds and dispatch of carcass.
- 6.1.2** Floor elevation shall be sufficient for effective drainage. There shall be a minimum slope of two to four percent uniformly from the walls to the drain.
- 6.1.3** Floor shall be concrete and properly reinforced to prevent cracks. It shall be constructed from materials such as dense waterproof concrete mortar containing an approved latex

or synthetic resin base or equivalent. It shall have a durable finish which is easy to clean and impervious to moisture.

- 6.1.4 Floors in operational areas shall have a non-slip finish to reduce hazards to workers.
- 6.1.5 Floors where wet operations are performed shall be well drained.
- 6.1.6 Floor-to-wall junction shall be coved with 50 mm to 60 mm radius for easy cleaning.
- 6.1.7 All floor surfaces shall slope uniformly to the drains without any low areas that would permit pooling of water.

**6.2 Walls**

- 6.2.1 Walls shall be designed to resist all perceived load.
- 6.2.2 Surfaces should be smooth to ensure proper cleaning. It shall be covered with impervious material such as prefabricated panel.
- 6.2.3 Wall surfaces should be preferably not painted. However, if painting is required, surfaces should be painted white or light-coloured for sanitary purposes.
- 6.2.4 Moisture-impervious materials such as glazed brick and tile or smooth surface portland cement plaster are typically used, but other nontoxic, non-absorbent materials applied to a suitable base can be equally satisfactory. Walls shall be hygienically smooth, level, hard and consist of impervious material.
- 6.2.5 All wall tops and ledges shall slope at 45°. It shall be coved at wall-to-wall junctions with a radius of 50 mm to 60 mm (Fig. 1).



**Figure 1. Coved wall-to-floor junction.**

- 6.2.6 Joints between walls and ceilings shall be sealed.

### **6.3 Foundations and Columns**

- 6.3.1** Foundations and columns of the poultry dressing/slaughtering plant shall conform to the National Building Code.
- 6.3.2** Factors which include soil type, location, wind speed and direction shall be taken into account during the design of the foundations and columns.
- 6.3.3** Design of foundations and columns system shall take into account the loads that will be contributed by the production live load. There shall be provision for future installations of poultry dressing/slaughtering equipment.

### **6.4 Roof**

- 6.4.1** Roof shall be designed to conform with the National Building Code. It shall sustain all dead load plus unit live loads which are assumed to act vertically upon the area projected upon a horizontal plane (see Annex A.8 and Annex A.9).
- 6.4.2** Design of roofing system shall consider data on wind direction and wind speed for that specific location during the design phase.
- 6.4.3** Vents should be installed to enhance air flow in the poultry dressing/slaughtering plant. The vents shall be provided with screens properly mounted on the frames to protect the plant from infestation of vermin.

### **6.5 Ceiling**

- 6.5.1** Ceiling should be at least 2.4 m in height from finish floor line inside operational areas.
- 6.5.2** Ceiling shall be constructed from non-corrosive material (e.g. PVC sheet) or rust-resistant metal sheet fastened to the metal structure or joists by acceptable means.
- 6.5.3** Ceiling surfaces should be preferably not painted. However, if painting is required, surfaces should be painted white or light-coloured for sanitary purposes.
- 6.5.4** Ceiling shall be smoothly finished as to minimize possible mold development, flaking and accumulation of dirt.
- 6.5.5** Open joist construction of ceiling may be permitted, provided joists are treated to prevent rusting, corrosion, dust accumulation and can be readily cleaned and sanitized.

### **6.6 Windows**

- 6.6.1** Window sills should be at least one (1) meter above the floor to minimize glass breakage, and the ledges should be sloped 45 ° to promote sanitation.
- 6.6.2** Construction of windows must be minimized in operational areas.

## **6.7 Doors , Doorways and Channels**

- 6.7.1** Doors, doorjambs and hinges shall be made of non-corrosive material (e.g. stainless steel 304). Doors shall have solid core and self-closing. The juncture between the wall and the doorjamb must be sealed with a flexible sealing compound.
- 6.7.2** Doorways that lead to different operational areas shall be provided with overlapping strip curtains with 50 % overlaps. Curtains shall be made of non-corrosive material such as polycarbonate or polyvinyl chloride (PVC) which is smooth and easy to clean (see Annex A.6).
- 6.7.3** Doorways should be at least one meter wide so that products transferred on rails not come in contact with the building surfaces.
- 6.7.4** Doorways shall be provided with foot baths to separate operational rooms for sanitary purposes. The foot baths shall be designed to facilitate easy draining.
- 6.7.5** Wall and floor channels shall be provided to facilitate transfer of processed products for handling (see Annex A.6). Ledges of the channels shall be sloped at 45 ° to promote sanitation. A clearance between the edges of the channel and the crate shall be provided.
- 6.7.6** Floor channels shall be coved to the floor at a radius of 50 mm to 60 mm.
- 6.7.7** Channels for rails shall be provided to allow overhead rail system to pass through the walls.
- 6.7.8** Channels shall have a smooth finish and shall not be painted. It shall be provided with overlapping strip curtains with 50 % overlaps. Curtains shall be made of non-corrosive material such as polycarbonate or polyvinyl chloride.

## **7 Lighting Requirements**

- 7.1** To prevent glare and provide the maximum illumination, special attention shall be given to the amount and direction of lighting in inspection areas.
- 7.2** Light sources must not impart illumination that distorts the normal appearance of meat. Fixtures shall have protective covering to prevent contamination of carcass in case of breakage or shattering.
- 7.3** All rooms in which poultry is slaughtered, dressed, or otherwise processed shall have at least 323 lux of light intensity on all working surfaces (see Annex B.2).
- 7.4** There shall be a light intensity of 538 lux at inspection stations.

## **8 Ventilation**

- 8.1** Ventilation system shall be designed to separate departments, control air movement and eliminate undesirable conditions such as steam, excess moisture, odors, dust, dirt or



variations in temperature.

- 8.2 Airflow systems (see Annex A.7) shall be designed to flow from clean to soiled areas (i.e., processing to kill floor).
- 8.3 Fresh air intakes should not be located in an area prone to contamination sources such as odors, dust, or smoke. Air intakes shall be equipped with effective filters, which prevent the entry of insects or dust.

## 9 Water Requirements

- 9.1 Potable water, under adequate pressure, and in sufficient quantities, shall be provided throughout the plant with updated potability certificates for both water and ice.
- 9.2 If non-potable water is used for fire prevention or for condensers in refrigeration systems, it shall be kept completely separated from the potable water system, clearly identified, and never used where edible products are processed, handled, packaged, or stored to prevent cross-contamination of carcass.
- 9.3 Hand washing facilities shall have sufficient running water and hand-free operated to comply with the requirements in Codex Standard for General Principles of Food Hygiene.
- 9.4 Adequate and conveniently located facilities for hand washing and drying shall be provided wherever the process demands.

## 10 Plumbing Requirements

- 10.1 Plumbing fixtures and layout shall conform to the Revised National Plumbing Code of the Philippines (see Annex A.13).
- 10.2 Plumbing fixtures, devices and accessories shall be supplied with water in sufficient volume and at pressures adequate to enable them to function satisfactorily and without undue noise under normal conditions of use.
- 10.3 The piping of the plumbing system shall be made of durable materials (e.g. G.I. pipe schedule 40), free from defective workmanship and so designed and constructed as to give satisfactory service for its reasonable expected life. PVC material shall not be used in hot water services.
- 10.4 Pipelines shall be color coded to distinguish potable water lines from other lines. Blue pipes shall be used for potable water lines.

## 11 Drainage Requirements

- 11.1 The drainage system (see Annex A.14) shall be designed to provide an adequate circulation of air in pipes with no danger of siphonage, aspiration, or forcing of trap seals under condition of ordinary use.
- 11.2 Drainage pipe shall be made of ABS lined canal, PVC pipes, PE pipes or other approved materials having a smooth and uniform bore.
- 11.3 For trench drains (Fig.3), the bottom of each shall have a slope of two to four percent. Open type canal shall have a minimum dimension of 20 cm x 20 cm and shall have a cover made of non-corrosive material (e.g. engineering plastic or polycarbonate).

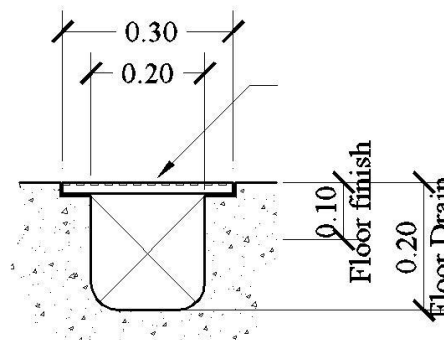


Figure 3. Drain cross-section

- 11.4 Sanitary sewage from shall be discharged directly into a wastewater treatment facility in accordance with the criteria set by the National Sanitation Code.
- 11.5 Black or dark grey pipes (e.g. PE pipe) shall be used for drainage system.

## 12 Electrical Requirements

- 12.1 During the design phase, the total load shall take into account the individual load of equipment in the plant.
- 12.2 A panel board complete with main switch and sub-circuit breakers shall be provided. It shall be mounted in a weatherproof box outside the operational area.
- 12.3 Wiring systems shall be protected by rigid PVC conduit or its equivalent. Wiring layouts shall be designed in accordance with the requirements set by the Philippine Electrical Code (see Annex A.11). Where portions of the conduit are known to be subjected to different temperatures, the conduit shall be filled with an approved material to prevent the circulation of warm air to a colder section of the conduit.
- 12.4 Convenience outlets shall be installed at 1 m to 1.5 m above the finish floor line. Such convenience outlets shall have receptacle plate and shall be waterproof type.
- 12.5 Branch-circuit conductors or feeders shall have an ampere rating not less than the maximum load to be served. Branch circuit conductors or feeders and equipment shall

be protected by overcurrent devices that have a rating not less than the non-continuous load plus 125 % of the continuous load except when the assembly, including the overcurrent devices protecting the branch circuit(s) or feeder(s), is listed for operation at 100 % of its rating. In such case, the ampere rating of the overcurrent device shall be permitted to be not less than the sum of the continuous load plus the non-continuous load.

- 12.6** Branch circuit conductors that supply a single motor used in a continuous duty application shall have an ampere rating of not less than 125 % of the motor's full-load current rating. Conductors supplying several motors, or a motor(s) and other load(s), shall have an ampacity not less than 125 % of the full-load current rating of the highest rated motor plus the sum of the full-load current ratings of all the other motors in the group, plus the ampere rating required for the other loads. Overload devices intended to protect motors, motor-control apparatus, and motor branch-circuit conductors against excessive heating due to motor overloads and failure to start shall be provided.
- 12.7** Branch circuits shall be rated in accordance with the maximum permitted ampere rating or setting of the overcurrent device. Where conductors of higher ampacity are used for any reason, the ampere rating or setting of the specified overcurrent device shall determine the circuit rating.
- 12.8** The minimum size of conductors to be used shall conform to the requirements of the branch circuits (Table 2).

**Table 2. Minimum size of conductors (Philippine Electrical Code 2009)**

Circuit Rating	15A	20A	30A	40A	50A
Circuit wires (copper conductors)	<b>2.0 mm<sup>2</sup></b> (14 AWG)	<b>3.5 mm<sup>2</sup></b> (12 AWG)	<b>5.5 mm<sup>2</sup></b> (10 AWG)	<b>8.0 mm<sup>2</sup></b> (8 AWG)	<b>14 mm<sup>2</sup></b> (6 AWG)
Taps	<b>2.0 mm<sup>2</sup></b> (14 AWG)	<b>2.0 mm<sup>2</sup></b> (14 AWG)	<b>2.0 mm<sup>2</sup></b> (14 AWG)	<b>3.5 mm<sup>2</sup></b> (12 AWG)	<b>3.5 mm<sup>2</sup></b> (12 AWG)
Fixture wires and conductors		<b>0.75 mm<sup>2</sup></b> (18 AWG), up to 15 m of run length <b>1.25 mm<sup>2</sup></b> (16 AWG), up to 30 m of run length <b>2.0 mm<sup>2</sup></b> (14 AWG) and larger	<b>2.0 mm<sup>2</sup></b> (14 AWG) and larger	<b>3.5 mm<sup>2</sup></b> (12 AWG) and larger	<b>3.5 mm<sup>2</sup></b> (12 AWG) and larger

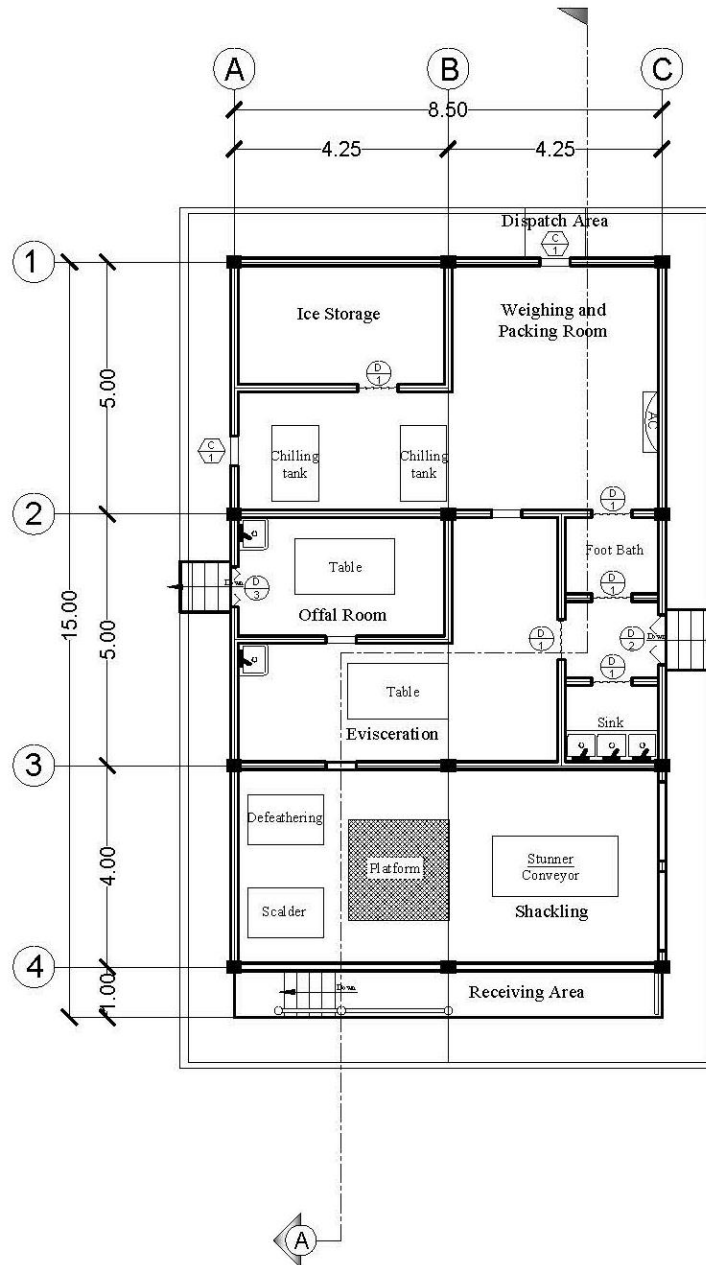
### 13 Waste Disposal

- 13.1** Wastes from the poultry dressing/slaughtering plant shall be segregated to separate solid from liquid wastes. Liquid wastes shall be directed into the wastewater treatment facility which conforms to PAES 414-1. Blood shall be completely separated from waste water.

- 13.2** Feathers and poultry viscera shall be promptly removed to control insects and to prevent offensive odors. Sacks or its equivalent shall be used for holding feathers until and removed from the plant.

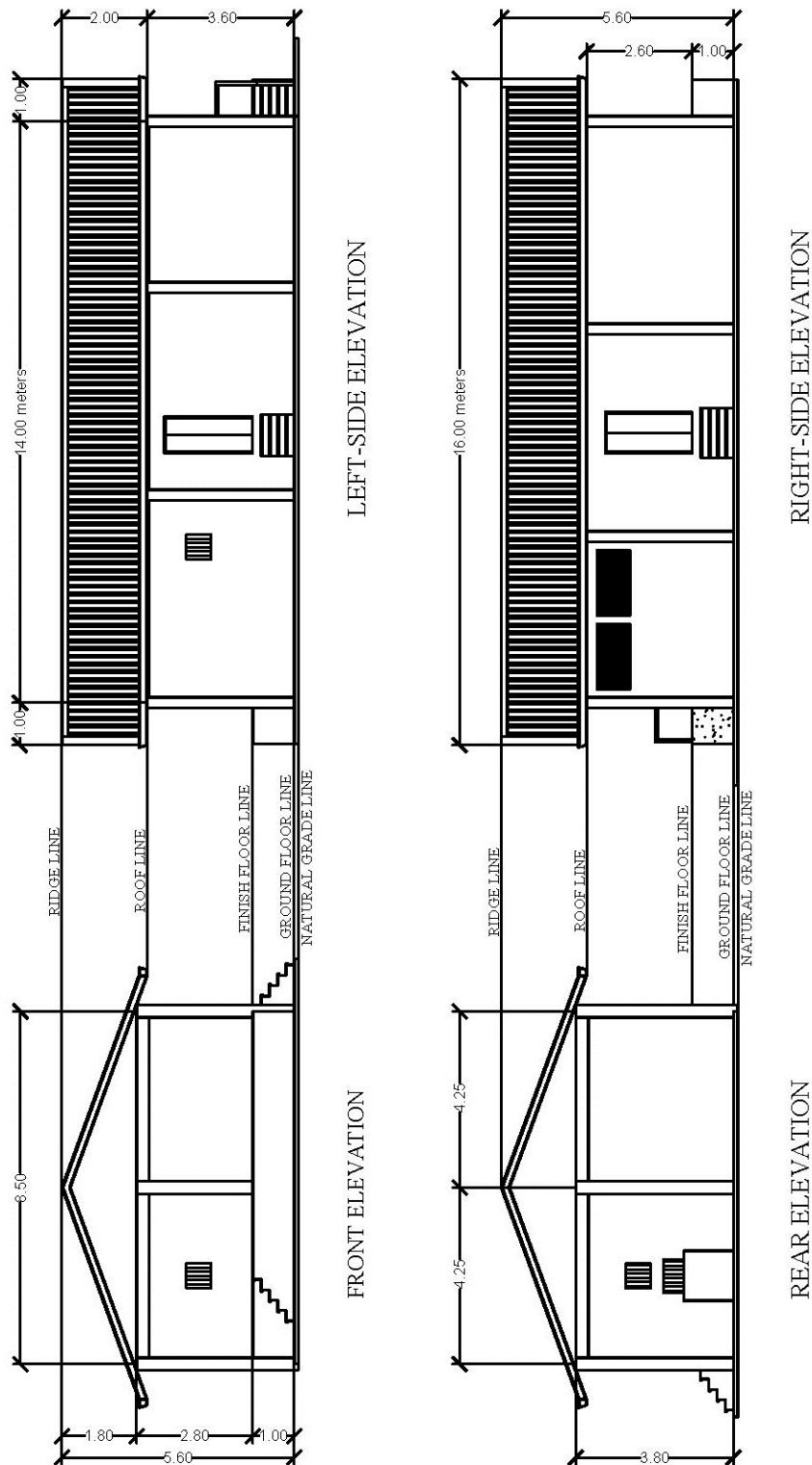
Annex A

A.1 Sample poultry dressing plant floor plan<sup>1</sup>



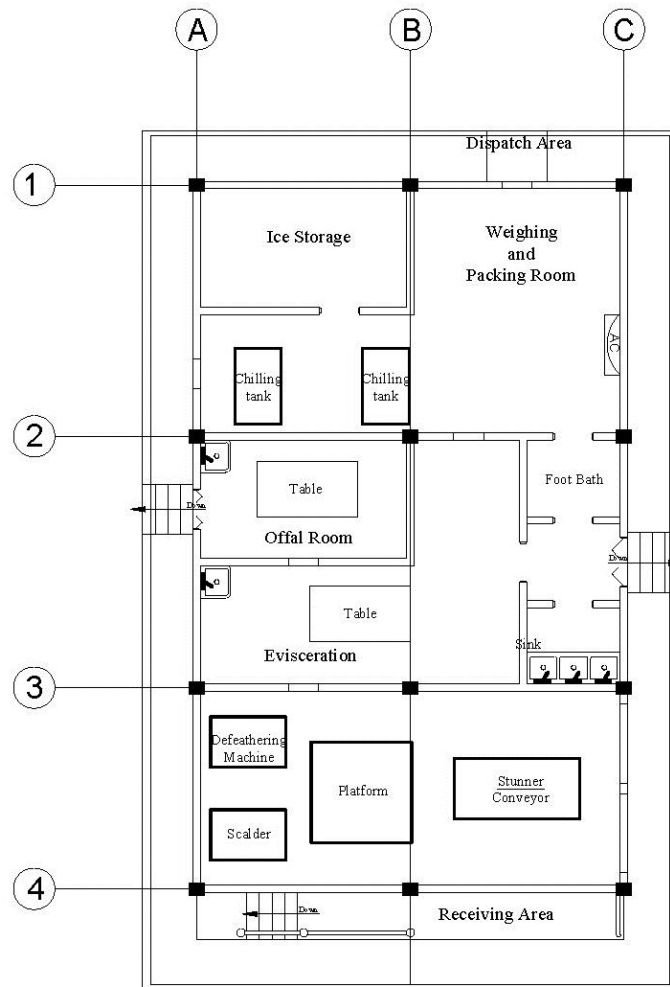
<sup>1</sup> Scale 1:150 m. Not for construction purposes

A.2 Sample poultry dressing plant elevation<sup>2</sup>



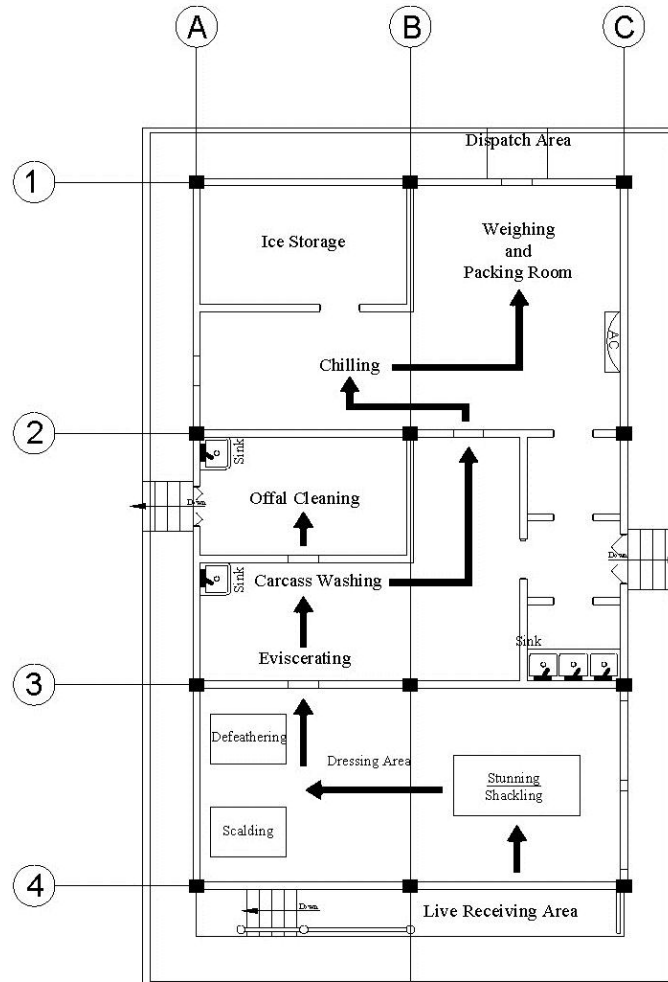
<sup>2</sup> Scale 1:175 m. Not for construction purposes

A.3 Sample equipment layout<sup>3</sup>



<sup>3</sup> Scale 1:150 m. Not for construction purposes

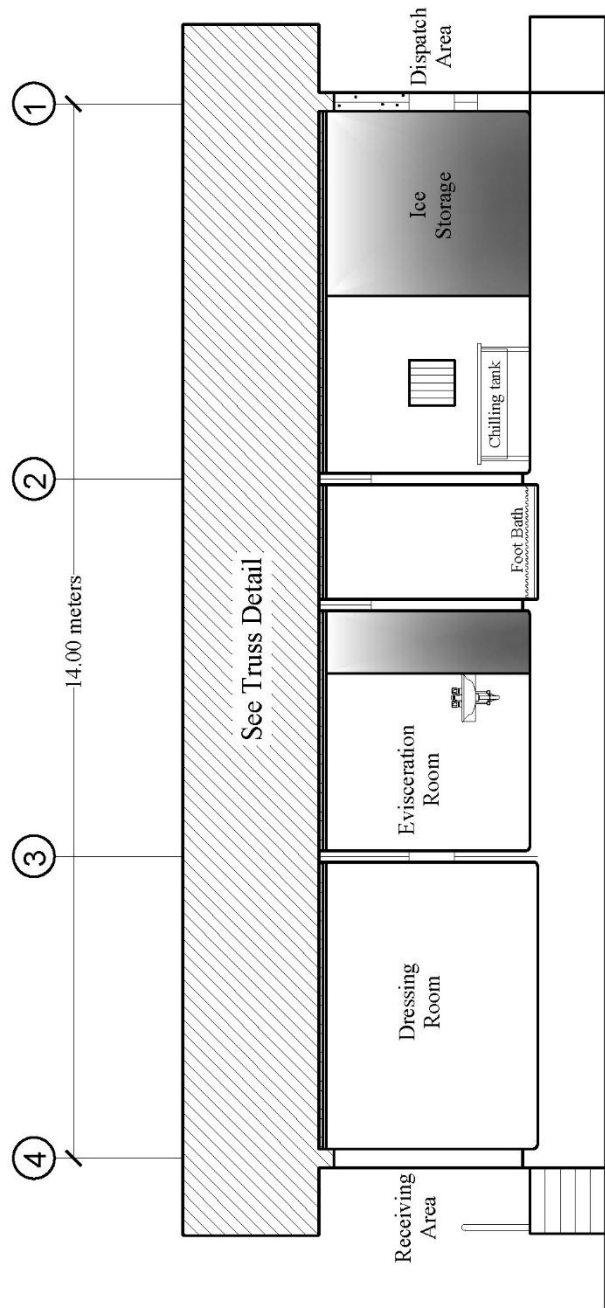
A.4 Sample process layout<sup>4</sup>



<sup>4</sup> Scale 1:150 m. Not for construction purposes

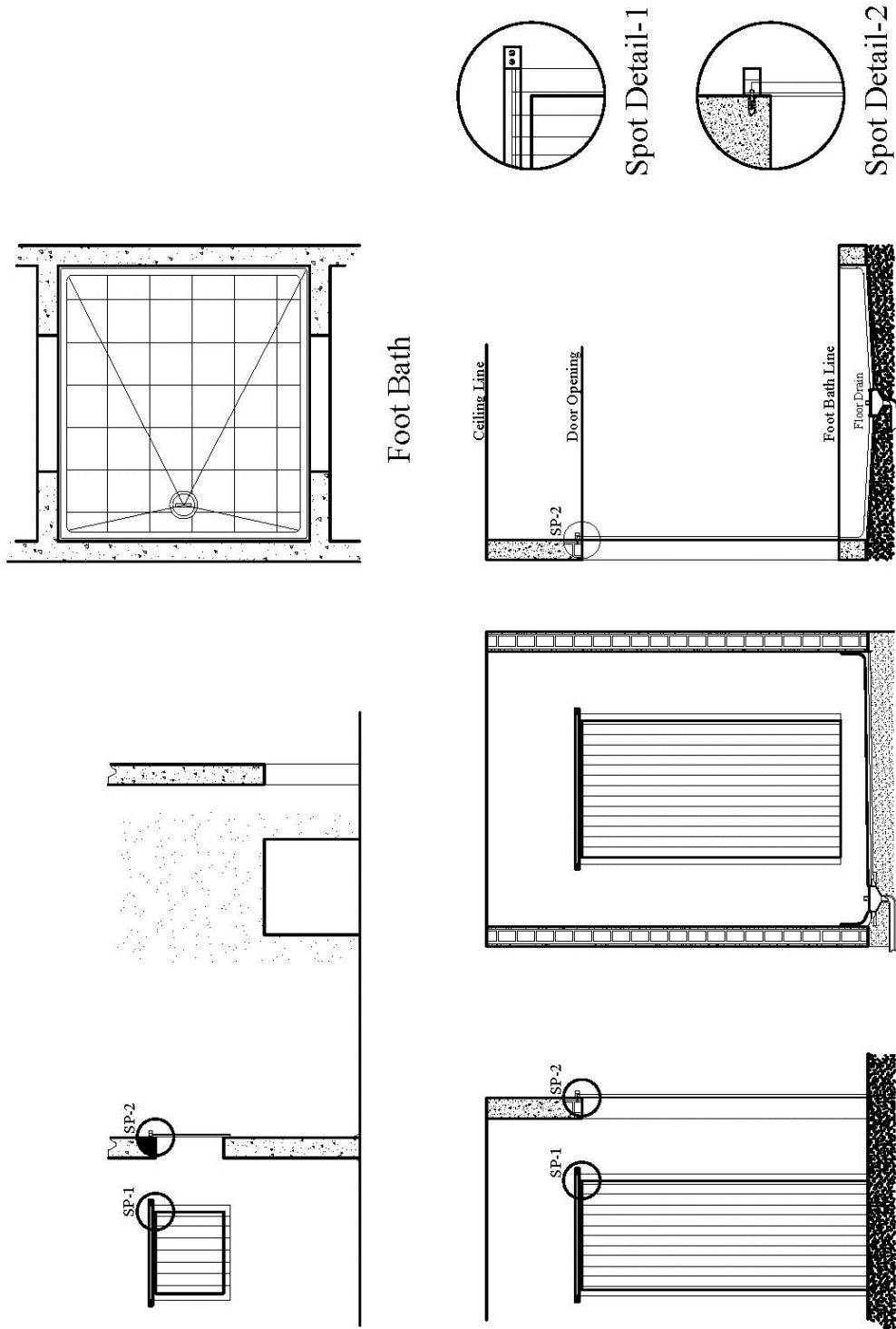


A.5 Section view<sup>5</sup>



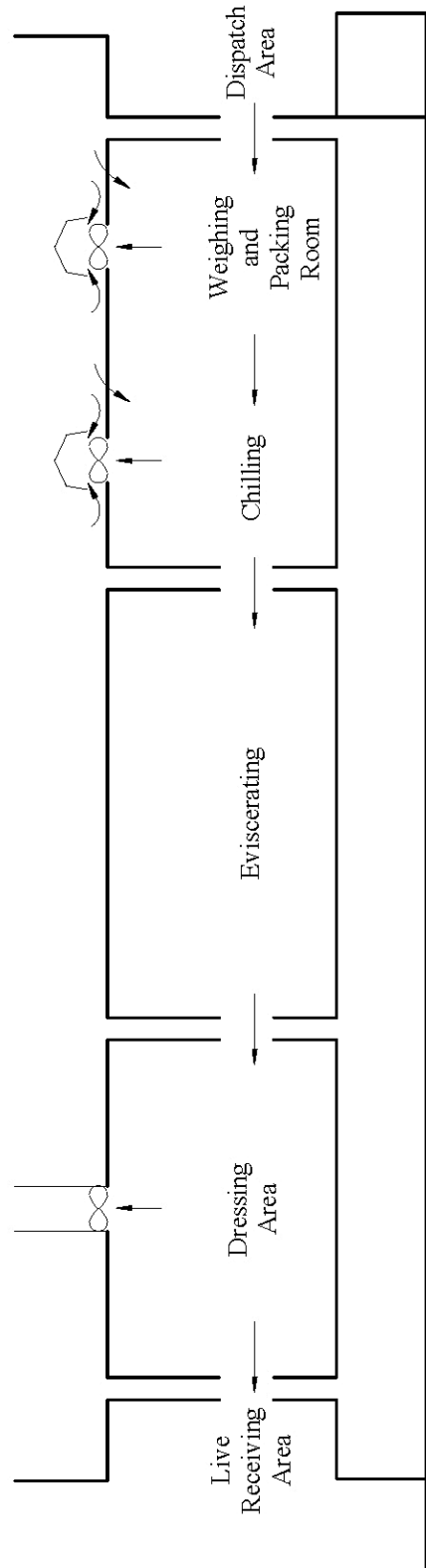
<sup>5</sup> Scale 1:100 m. Not for construction purposes

A.6 Door, doorways and channels<sup>6</sup>



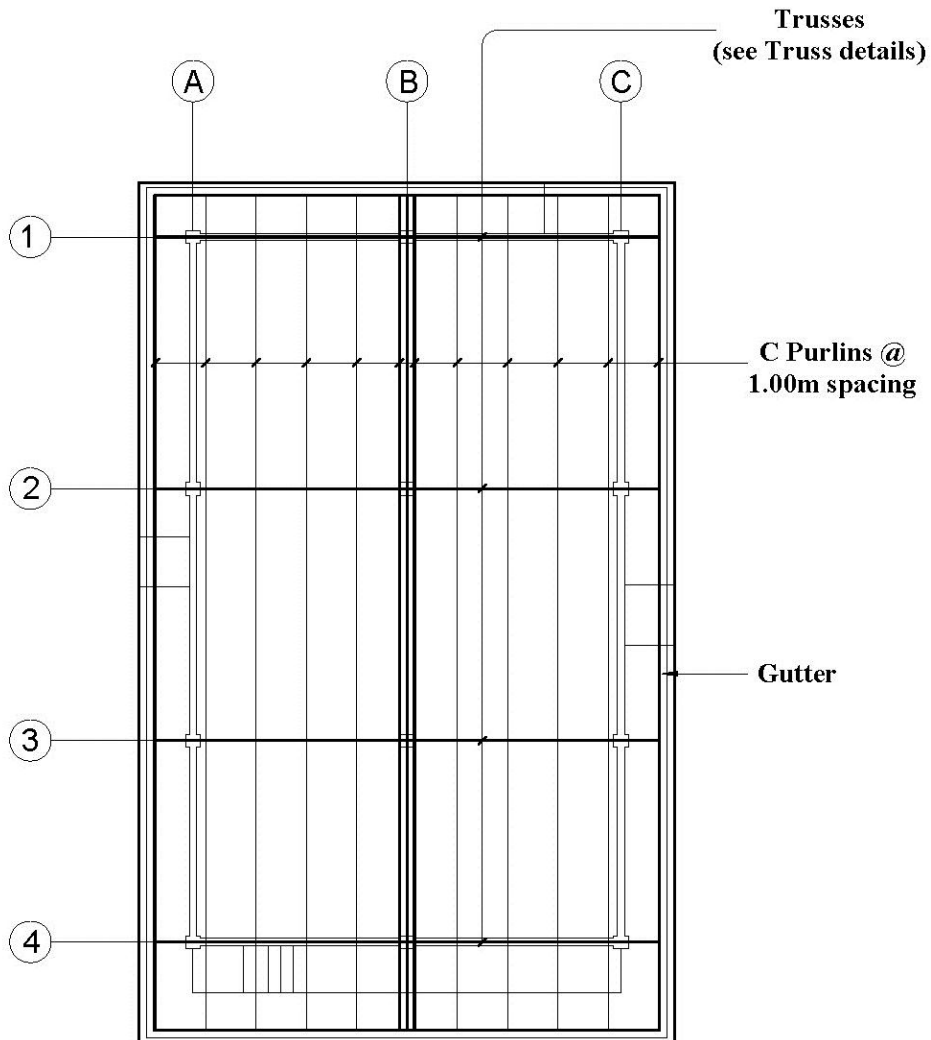
<sup>6</sup> Not drawn to scale. Not for construction purposes

A.7 Airflow<sup>7</sup>



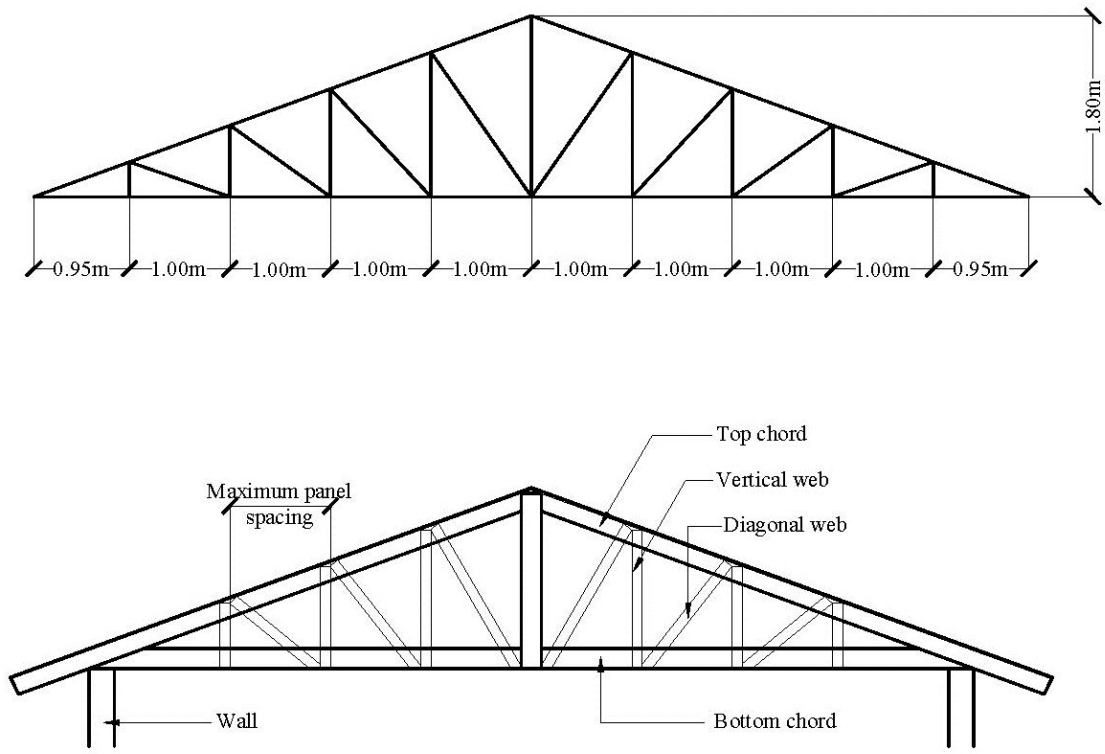
<sup>7</sup> Scale 1:100 m. Not for construction purposes

A.8 Sample roof framing plan<sup>8</sup>



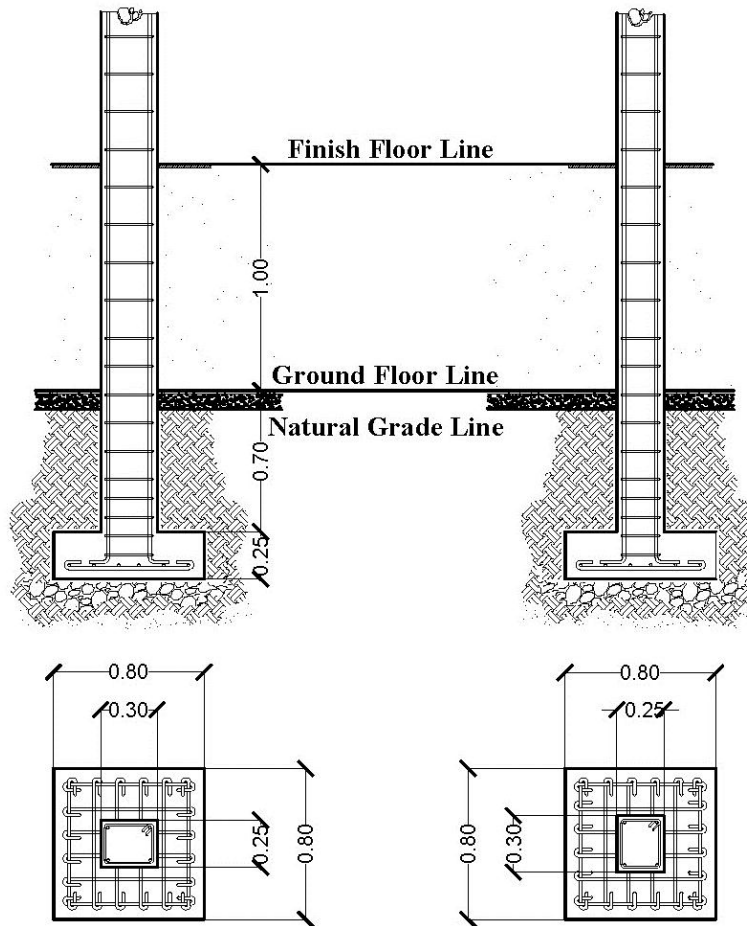
<sup>8</sup> Scale 1:150 m. Not for construction purposes

**A.9 Roof truss details<sup>9</sup>**



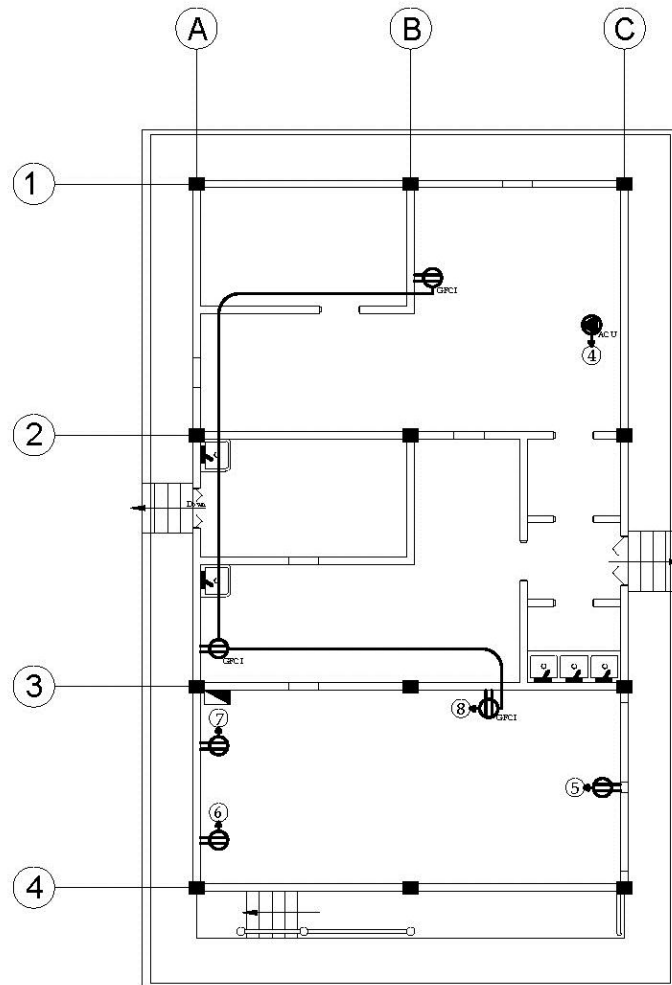
<sup>9</sup> Not drawn to scale. Not for construction purposes. Design of trusses shall take into account all external factors such as wind speed and direction as well as other loads.

A.10 Sample column and footing details<sup>10</sup>








<sup>10</sup> Not drawn to scale. Not for construction purposes. Design of column and footing shall take into account the type of soil.

A.11 Sample power layout<sup>11</sup>

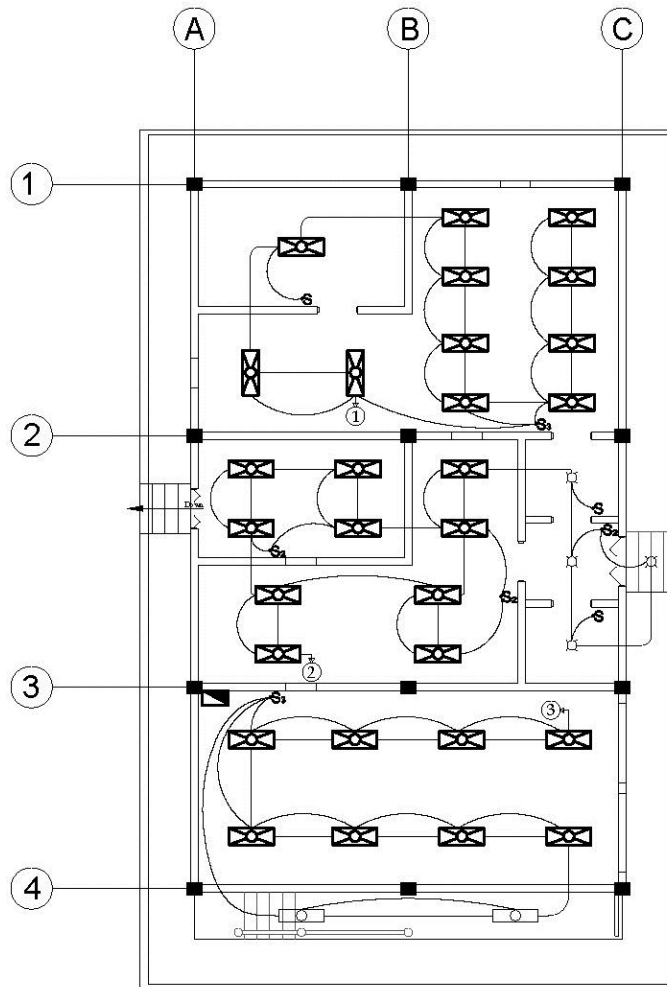


LEGEND:











-  MAIN DISTRIBUTION PANEL
-  CONVENIENCE OUTLET
-  AIR CONDITIONING UNIT
-  BRANCH CIRCUIT LINE
-  CIRCUIT HOMERUN

<sup>11</sup> Scale 1:150 m. Not for construction purposes

A.12 Sample lighting layout<sup>12</sup>



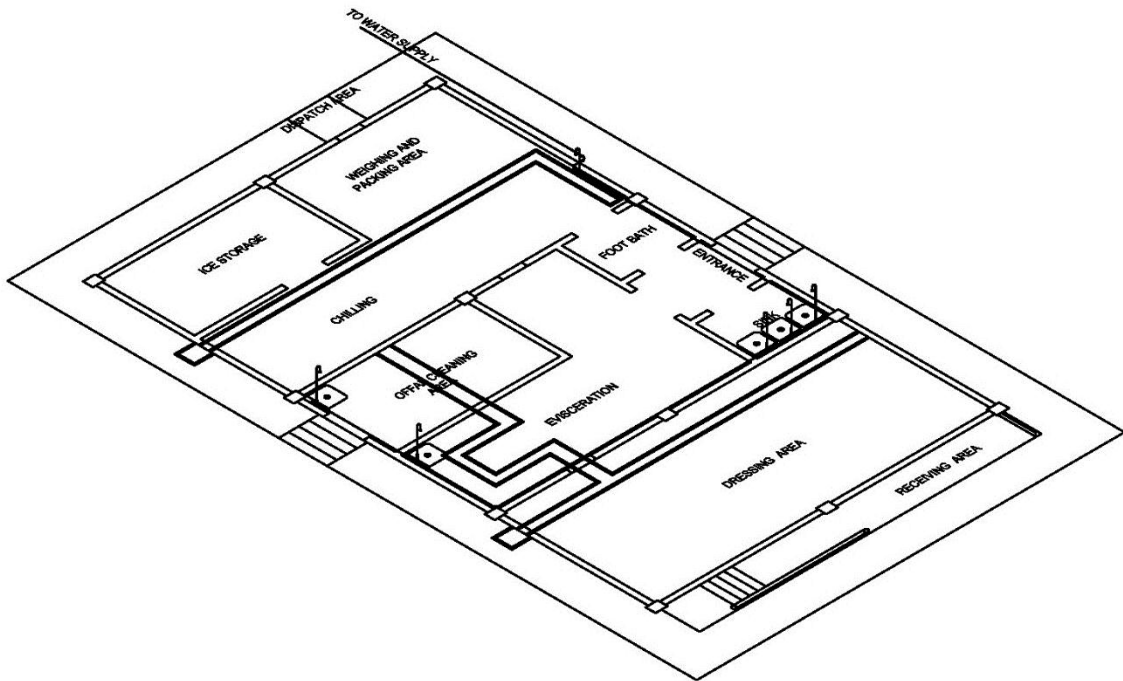
LEGEND:

	MAIN DISTRIBUTION PANEL		SWITCH LINE
	LIGHTING OUTLET (CFL)		•S1 ONE-GANG SWITCH
	LED TUBE (2 lamps/luminaire)		•S2 TWO-GANG SWITCH
	LED TUBE (1 lamp/luminaire)		•S3W THREE-WAY SWITCH
	BRANCH CIRCUIT LINE		CIRCUIT HOMERUN

<sup>12</sup> Scale 1:150 m. Not for construction purposes



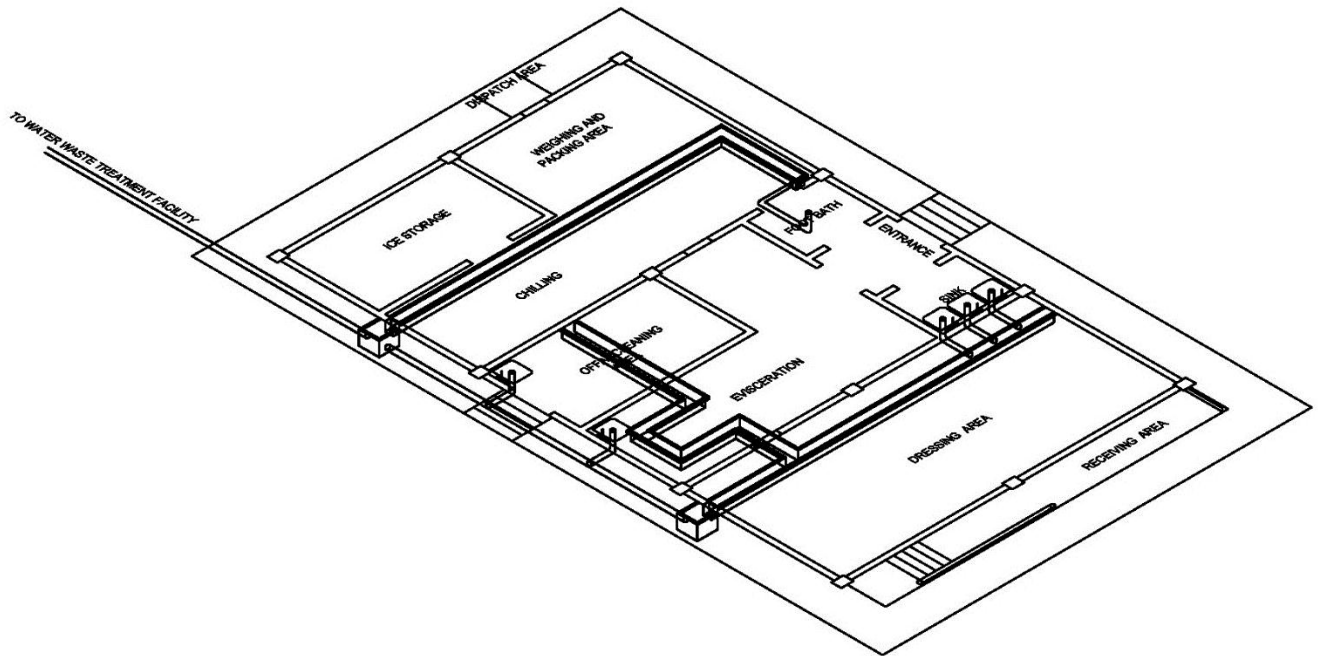
A.13 Sample plumbing layout<sup>13</sup>



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<sup>13</sup> Not drawn to scale. Not for construction purposes

A.14 Sample drainage layout<sup>14</sup>



<sup>14</sup> Not drawn to scale. Not for construction purposes

## ANNEX B

## B.1 Sample load schedule

Branch Circuit No.	Load Description	Quantity	Power (VA)	Voltage (V)	Current (A)	TDF	Conductor		Circuit Breaker			Conduit	
							Size	Type	AT	AF	No. of Poles	Size	Type
1	2 Lamps - 40 W Fluorescent	11	880	230	3.83	0.91	2.0mm <sup>2</sup>	THHN	15	50	2	15mmΦ	rigid PVC
2	2 Lamps - 40 W Fluorescent	12	960	230	4.59	0.91	2.0mm <sup>2</sup>	THHN	15	50	2	15mmΦ	rigid PVC
	1 Lamp - 24 W Compact Fluorescent	4	96	230									
3	2 Lamps - 40 W Fluorescent	8	640	230	3.13	0.91	2.0mm <sup>2</sup>	THHN	15	50	2	15mmΦ	rigid PVC
	1 Lamp - 40 W Fluorescent	2	80	230									
4	2hp Air Conditioning Unit	1	2760	230	12.00	0.91	3.5mm <sup>2</sup>	THHN	30	50	2	15mmΦ	rigid PVC
5	2hp Stunner - Conveyor	1	2760	230	12.00	0.91	3.5mm <sup>2</sup>	THHN	30	50	2	15mmΦ	rigid PVC
	2.2 kW Scalders	1	2200	230	9.57	0.91	3.5mm <sup>2</sup>	THHN	20	50	2	15mmΦ	rigid PVC
7	2.2 kW Defeathering Machine	1	2200	230	9.57	0.91	3.5mm <sup>2</sup>	THHN	30	50	2	15mmΦ	rigid PVC
8	GFCI	3	540	230	2.35	0.91	3.5mm <sup>2</sup>	THHN	20	50	2	15mmΦ	rigid PVC
9	Spare								20	50	2		

**Main Distribution Panel:**

Circuit Breaker: 70AT/100AF, 2 poles

Feeder: 22.0mm<sup>2</sup> THHN

Conduit: 25mmΦ, rigid PVC

**B.2 Sample illumination calculation**

<b>Room Identification:</b>	<b>Dressing Area</b>
Area (sq.m):	34
Perimeter (m):	25

<b>General Information</b>	
Average Maintained Illuminance (lux):	323
<i>Lamp Data</i>	
Type and Color:	rapid start, standard color
Efficacy:	80 lumens/watt
Lamp output:	40W
<i>Luminaire Data</i>	
IES Catalog Number:	35
Description:	lamp prismatic wraparound
Luminaire Distribution:	semi-direct
Lamps per luminaire:	2

<b>Maintenance Information</b>	
Maintenance Category:	V
Area Atmosphere:	dirty
Operating Characteristics:	12 hrs/day
Cleaning Cycle:	12 months

<b>Coefficient of Utilization</b>	
<i>Cavity Height</i>	
Ceiling Height (hcc):	0
Room Height (hrc):	1.8
Floor Height (hfc):	1

<b>Cavity Ratios</b>	
Ceiling Cavity Ratio (CCR):	0
Room Cavity Ratio (RCR):	3.308824
Floor Cavity Ratio (FCR):	1.838235
Effective Ceiling Cavity Reflectance (pcc):	80
Effective Floor Cavity Reflectance (pfc):	15
Initial Coefficient of Utilization (CU1):	0.551471
Multiplying Factor (F):	0.953162

**Final Coefficient of Utilization (CU):** 0.976581

<b>Light Loss Factor</b>	
Lamp Lumen Depreciation (LLD):	0.86
Lamp Burnout Factor (LBO):	0.9
Luminaire Dirt Depreciation (LDD):	0.76
Room Surface Dirt Depreciation (RSDD):	0.850897

**Light Loss Factor (LLF):** 0.500532

**Number of Luminaires:** 6.37 ≈ 8  
**Actual Illuminance (lux):** 405.9319

**Room Identification:**                   **Offal Cleaning**  
 Area (sq.m):                               10.625  
 Perimeter (m):                           13.5

**General Information**  
 Average Maintained                   323  
 Illuminance (lux):  
*Lamp Data*  
 Type and Color:                        rapid start,  
   standard color  
 Efficacy:                                 80 lumens/watt  
 Lamp output:                            40W  
  
*Luminaire Data*  
 IES Catalog Number:                 35  
 Description:                             lamp prismatic  
   wraparound  
 Luminaire Distribution:               semi-direct  
 Lamps per luminaire:                 2

**Cavity Ratios**  
 Ceiling Cavity Ratio (CCR):        0  
 Room Cavity Ratio (RCR):         5.717647  
 Floor Cavity Ratio (FCR):         3.176471  
  
 Effective Ceiling Cavity             80  
 Reflectance (pcc):  
 Effective Floor Cavity               12.11765  
 Reflectance (pfc):  
 Initial Coefficient of                0.424118  
 Utilization (CU1):  
 Multiplying Factor (F):             0.967588  
  
**Final Coefficient of**                 0.974452  
**Utilization (CU):**

**Maintenance Information**  
 Maintenance Category:                V  
  
 Area Atmosphere:                     medium  
 Operating Characteristics:           12 hrs/day  
  
 Cleaning Cycle:                       12 months

**Light Loss Factor**  
 Lamp Lumen Depreciation           0.86  
 (LLD):  
 Lamp Burnout Factor (LBO):        0.9  
 Luminaire Dirt Depreciation        0.82  
 (LDD):  
 Room Surface Dirt                    0.844824  
 Depreciation (RSDD):

**Coefficient of Utilization**  
*Cavity Height*  
 Ceiling Height (hcc):                0  
 Room Height (hrc):                  1.8  
 Floor Height (hfc):                  1

**Light Loss Factor (LLF):**           0.536193  
  
**Number of Luminaires:**           2.42 ≈ 4  
**Actual Illuminance (lux):**         533.923

<b>Room Identification:</b>	<b>Evisceration</b>
Area (sq.m):	21.875
Perimeter (m):	23

**General Information**

Average Maintained Illuminance (lux):	323
<i>Lamp Data</i>	
Type and Color:	rapid start, standard color
Efficacy:	80 lumens/watt
Lamp output:	40W

*Luminaire Data*

IES Catalog Number:	35
Description:	lamp prismatic wraparound
Luminaire Distribution:	semi-direct
Lamps per luminaire:	2

**Maintenance Information**

Maintenance Category:	V
Area Atmosphere:	medium
Operating Characteristics:	12 hrs/day
Cleaning Cycle:	12 months

**Coefficient of Utilization**

<i>Cavity Height</i>	
Ceiling Height (hcc):	0
Room Height (hrc):	1.8
Floor Height (hfc):	1

**Cavity Ratios**

Ceiling Cavity Ratio (CCR):	0
Room Cavity Ratio (RCR):	4.731429
Floor Cavity Ratio (FCR):	2.628571
Effective Ceiling Cavity Reflectance (pcc):	80
Effective Floor Cavity Reflectance (pfc):	13.85714
Initial Coefficient of Utilization (CU1):	0.473429
Multiplying Factor (F):	0.962389

<b>Final Coefficient of Utilization (CU):</b>	0.976896
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**Light Loss Factor**

Lamp Lumen Depreciation (LLD):	0.86
Lamp Burnout Factor (LBO):	0.9
Luminaire Dirt Depreciation (LDD):	0.82
Room Surface Dirt Depreciation (RSDD):	0.908537

<b>Light Loss Factor (LLF):</b>	0.57663
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<b>Number of Luminaires:</b>	4.14 ≈ 6
<b>Actual Illuminance (lux):</b>	468.1482

<b>Room Identification:</b>	<b>Weighing and Packing, Chilling</b>		
Area (sq.m):	31.875		
Perimeter (m):	24.5		
<b>General Information</b>		<b>Cavity Ratios</b>	
Average Maintained Illuminance (lux):	538	Ceiling Cavity Ratio (CCR):	0
<i>Lamp Data</i>		Room Cavity Ratio (RCR):	3.458824
Type and Color:	rapid start, standard color	Floor Cavity Ratio (FCR):	1.921569
Efficacy:	80 lumens/watt		
Lamp output:	40W	Effective Ceiling Cavity Reflectance (pcc):	80
<i>Luminaire Data</i>		Effective Floor Cavity Reflectance (pfc):	15
IES Catalog Number:	35	Initial Coefficient of Utilization (CU1):	0.542471
Description:	lamp prismatic wraparound	Multiplying Factor (F):	0.954212
Luminaire Distribution:	semi-direct		
Lamps per luminaire:	2	<b>Final Coefficient of Utilization (CU):</b>	0.977106
<b>Maintenance Information</b>		<b>Light Loss Factor</b>	
Maintenance Category:	V	Lamp Lumen Depreciation (LLD):	0.86
Area Atmosphere:	clean	Lamp Burnout Factor (LBO):	0.9
Operating Characteristics:	12 hrs/day	Luminaire Dirt Depreciation (LDD):	0.88
Cleaning Cycle:	12 months	Room Surface Dirt Depreciation (RSDD):	0.896494
<b>Coefficient of Utilization</b>		<b>Light Loss Factor (LLF):</b>	0.61062
<i>Cavity Height</i>			
Ceiling Height (hcc):	0	<b>Number of Luminaires:</b>	8.28 ≈ 10
Room Height (hrc):	1.8	<b>Actual Illuminance (lux):</b>	649.8583
Floor Height (hfc):	1		

**Room Identification: Ice Storage**

Area (sq.m): 10.625  
 Perimeter (m): 13.5

**General Information**

Average Maintained Illuminance (lux): 150  
*Lamp Data*  
 Type and Color: rapid start, standard color  
 Efficacy: 80 lumens/watt  
 Lamp output: 40W

*Luminaire Data*

IES Catalog Number: 35  
 Description: lamp prismatic wraparound  
 Luminaire Distribution: semi-direct  
 Lamps per luminaire: 2

**Maintenance Information**

Maintenance Category: V  
 Area Atmosphere: clean  
 Operating Characteristics: 12 hrs/day  
 Cleaning Cycle: 12 months

**Coefficient of Utilization**

*Cavity Height*  
 Ceiling Height (hcc): 0  
 Room Height (hrc): 1.8  
 Floor Height (hfc): 1

**Cavity Ratios**

Ceiling Cavity Ratio (CCR): 0  
 Room Cavity Ratio (RCR): 5.717647  
 Floor Cavity Ratio (FCR): 3.176471  
 Effective Ceiling Cavity Reflectance (pcc): 80  
 Effective Floor Cavity Reflectance (pfc): 12.11765  
 Initial Coefficient of Utilization (CU1): 0.424118  
 Multiplying Factor (F): 0.967588

**Final Coefficient of Utilization (CU):** 0.974452

**Light Loss Factor**

Lamp Lumen Depreciation (LLD): 0.86  
 Lamp Burnout Factor (LBO): 0.9  
 Luminaire Dirt Depreciation (LDD): 0.88  
 Room Surface Dirt Depreciation (RSDD): 0.930565

**Light Loss Factor (LLF):** 0.633826

**Number of Luminaires:** 0.95 ≈ 1  
**Actual Illuminance (lux):** 157.7858