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The New Meyn 1300 BPH Budget Plant Design

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1 Background of the Budget Concept

APTEC made the design prototype in November 2011 and tested it in three plants in Bangladesh and one in India, making modifications from operation feedback. The design proved to be highly successful and we may soon offer it off-the-shelf.

The market needed such a plant. Traditional offerings from Meyn and direct competitors for 1000 BPH plant used a layout which was already suitable for, say, 4000 BPH, making the initial investment in building etc unnecessarily large for startups. And although local fabricators offered smaller plants, with correspondingly small layouts, they were not expandable because they used no expansion flanges nor any modular approach whatsoever to their design. In fact the layouts were made small because there was no possibility of expansion!

Our bi-annual surveys (Size and Structure of the Poultry Processing Industry in India, updated and posted every six months at the Aptec website www.aptec.in) shows the list of locally built small plants already installed – many of them lying idle. This constitutes a lot of unused capacity, adding to the cost of processing on an industry-wide basis.

Too many of them are of unviable capacity - as low as 200 BPH - and even if they wish to expand and become viable, they cannot do so because their machines are not of modular design. So the owners are forced to first sell their existing plants, and then buy and install bigger plants.

Furthermore, selling old locally fabricated plants is neither common nor practical. Only two locally-built plants have been sold in India in the past 20 years – Lifeline's 300 BPH plant sold to Amrit Group and installed at Jangalpur, Howrah and Lifeline's 1900 BPH plant sold recently to a buyer in Karnataka.

Even if a brisk market for second-sale of local plants existed in India, it would still not be practical for a processor to shut down, sell existing plant and then resume production after installing a bigger plant. By doing so, the processor would lose his market.

In conclusion, we felt that the industry needed a design in which the plant investment could be kept low and yet the capacity could be expanded with practically no downtime – certainly without the need to replace existing machinery.

How the Budget Plant Expands and What happens to the Machines as you Expand				
Machines/Parts	1300 BPH	2600 BPH	3900 BPH	5200 BPH
Overhead Conveyor	Original 74 metres	Can be expanded without discarding any existing parts		
Stunner	The same stunner has electronic regulator to cater to entire range of capacities			
Scalder	Original 7.6 m length	Can be expanded by adding one or more sections as shown in Figure 1		
Feather Plucker	Original JM-32	Capacity increased by adding more feather pluckers		
Evisceration	Semi-automatic. With more pneumatic hand-tools at 2600 BPH		Can fully automate at 3900 or 5200 BPH simply by adding new machines	
Hock Cutter	The same hock cutter is suitable for all these capacities			
Hock Unloader	The same hock unloader is suitable for all these capacities			
Shackle washer	The same shackle washer is suitable for all these capacities			
Screw Chiller	Original 2100mm dia, 3500mm long	Can be expanded by adding one or more sections or by adding second chilling stage at 3900 and 5200 BPH		
Cone deboner	Original 6800mm	Can add one or more sections of 2000 mm to increase capacity		
Control Panel	Local supply, as per APTEC diagram	More motor control groups can be added into available slots		
Other machines	-	You can add automatic cut-up line, deboning line, weighing and grading line as desired at any of the expansion stages		

Our Budget plant, starting at 1300 BPH, may be expanded to 2600, 3900 or 5200 BPH in up to 3 stages **without having to discard any of its machines** – all machines are expandable. With the average



slaughterhouse size reaching 2400 BPH in the organized sector in India this year¹, we took 1300 BPH as the ideal start-up size – a smaller size would soon become unviable.

When you start at 1300 BPH, size of building and several other things is kept to the barest minimum, so your investment is at least 20% lower than a conventional 1000 BPH plant based on imported machinery. Table 1 shows some standard configurations of our Budget design and Figures 2 to 4 show layout drawings.

2 How Meyn's Budget Design Scores Over Others

2.1 MODULARITY

Take a look at a typical scalding. Global players like Meyn manufacture it in sections or modules. These sections are joined together at site. Joining is done along flanges and because these modules are made with the use of sophisticated CNC machine tools, you achieve perfect alignment when you join modules together. Local fabricators cannot make modular design because they do not have high precision CNC machine tools.

Modular design occurs, in the 1300 BPH Budget plant, in the scalding, screw chiller and cone deboner, which together constitute 37% of the processing equipment cost.

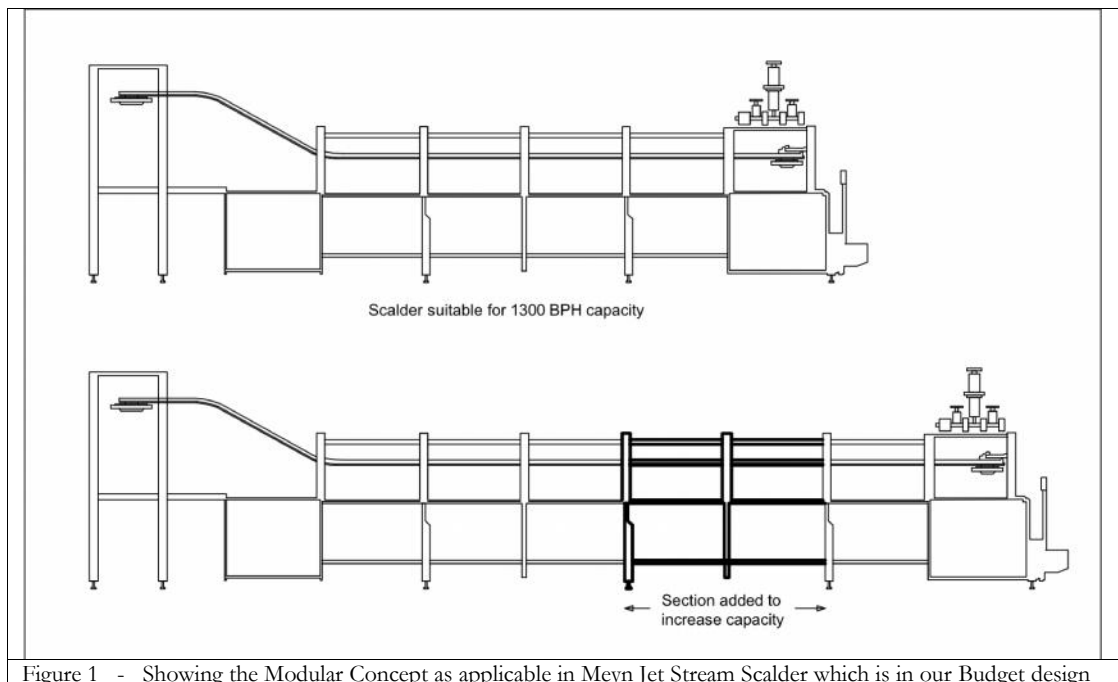


Figure 1 - Showing the Modular Concept as applicable in Meyn Jet Stream Scalding which is in our Budget design

2.2 PLANT ASSEMBLY AT SITE BY BOLTING – NOT BY WELDING

Meyn understands that poultry processors worldwide need to constantly expand so as to benefit from economies of scale, i.e. the larger your plant, the lower your cost of processing each bird.

For a processor to keep expanding, the machines should be easy to dismantle and reassemble. That is why Meyn has a bolted design in its overhead conveyor – no other manufacturer in the world offers this feature. Take a look at figure 2 to understand this concept.

By the use of these bolted clamps, Meyn overhead conveyors can be reconfigured in a very short time, without having to use welding and cutting techniques. In other words, Meyn takes modularity to the next step - beyond just the scalding, screw chiller and cone deboner. This is why our Budget 1300 BPH plant can be relocated and reconfigured into a bigger building within 2 days, without loss of any existing parts.



When a vendor's design is based on dip-galvanized components for overhead conveyor, and the assembly technique calls for welding the components at site, (as in the case of equipment from some of our overseas competitors), then the very act of assembly causes the (galvanizing) zinc coating to evaporate, leaving naked mild steel parts prone to rusting. Naked steel is completely unacceptable to international approval and rating agencies. The only option these vendors have, given their welded assembly feature, is to offer SS components which can be welded without fear of rusting. This makes their offer uncompetitive. Meyn's overseas competitors suffer this disadvantage because they do not offer bolted design.

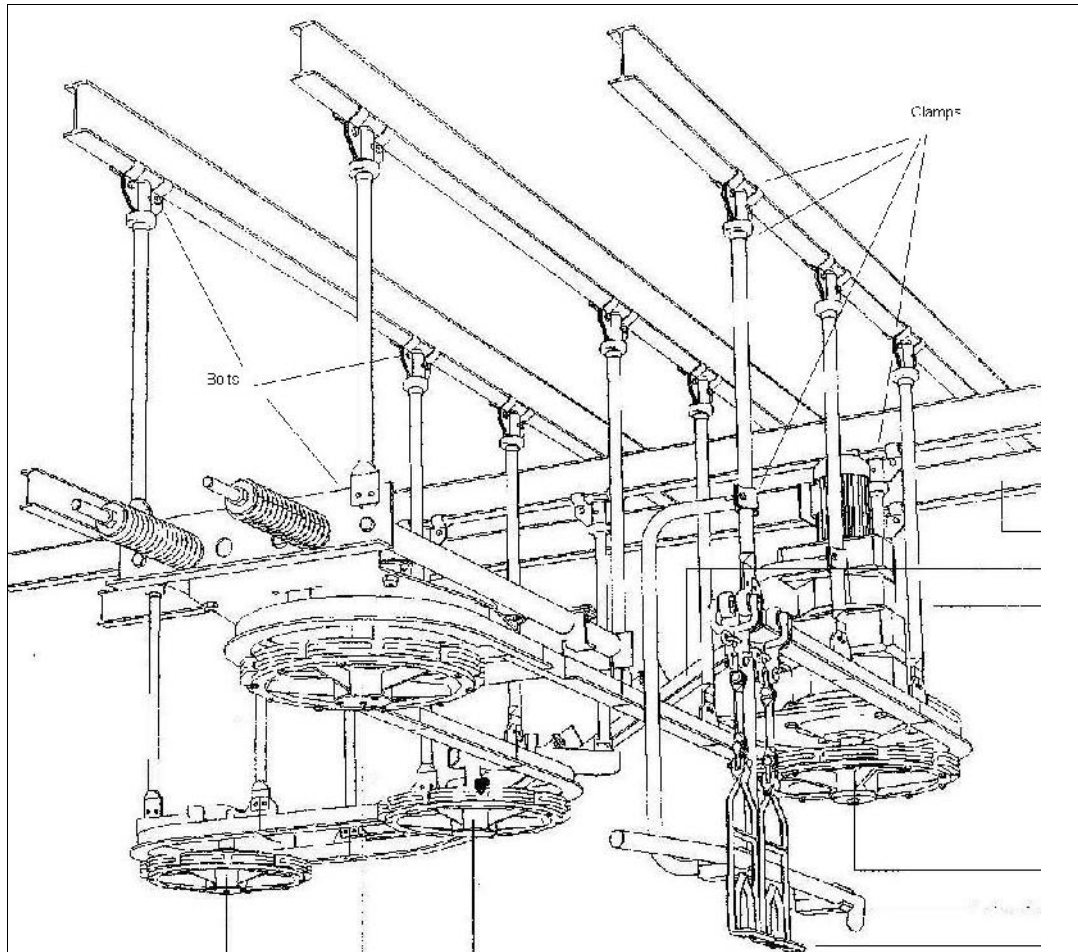


Figure 2 - How Meyn Makes Use of Bolting for Assembly of Overhead Conveyor – Making Relocation and Reconfiguration Easy, Economical and Quick



Figure 3 - Our competing overseas vendors' assembly requires extensive welding at site - making dip-galvanized components unsuitable and relocation and reassembly wasteful and time-consuming. Note the corner wheels in column 3 above. The Meyn corner wheel has a triangle with a hole (to allow it to be bolted from above), whereas the corner wheel of a

competitor who styles himself as a vendor of **compact portable plants** does not – and so his corner wheel needs to be welded in place

3 How Does the Meyn's Budget Design Work?

3.1 STEP 1 – YOU IDENTIFY YOUR IDEAL PLOT OF LAND

Let us know where you propose to set up your poultry processing facility. Not the Budget plant. But the final processing plant of, say, 5200 BPH capacity as part of your master plan in the field of broiler farming and integration.

This site should have all the features you would like – convenience of management control, located close to your farms to keep transit mortality low, plenty of water and in-principle approval from local pollution control board, enough area to allow growth (3.5-5.0 acres is generally sufficient for 5200 BPH capacity), short distance to market, etc.

3.2 STEP 2 – WE PREPARE A MASTER PLAN FOR YOUR PLOT

On your request we will visit your site and prepare a master plan. In the master plan we leave space for growth and expansion as desired by you. Within this master plan, we identify approximately 300 Sq metres within the space that will become your final frozen store.

This is the part of your master plan which you will first construct and within it we will set up your Budget 1300 BPH plant.

3.3 STEP 3 – THE BUDGET PLANT IS BUILT

Setting up the Budget plant takes less time as the walls are made of cam-lock PUR sandwich panels glued in position on the floor, and truss type steel sheet roofing. The floor is dewatered granolithic with frost-heave protection. (All technical assistance for these specifications will be provided by APTEC)

To further reduce cost, equipment from Meyn can be shipped to you in last-voyage reefer containers (subject to availability) which we will be happy to procure for you from Rotterdam Port. Two of these have been shown used in Figure 4.1 as frozen and chill stores), Processing waste can be rendered in a Mavitec containerized rendering plant which has a built-in boiler.

3.4 STEP 4 –YOU EXPAND AND UPGRADE

After operating at 1300 BPH for some time, you will find that the market demand has exceeded your production capacity and you must expand soon so as to retain your hold of the local market and prevent competitors from grabbing a share. When you notice this, we help you decide the configuration of plant which would best suit you. You can grow to 2600 BPH or to 3900 or even 5200 BPH, and you can simultaneously upgrade your operation to a higher degree of automation.

When the additional equipment is ordered, you begin erecting the full building according to the master plan. You also expand utilities and services to suit the new capacity.

When new equipment arrives, we erect them in their designated place and taking a 2 day shut-down, relocate your existing equipment into their designated places and re-commission the plant at an increased capacity.



4 HOW TO CAPTURE THE INDIAN MARKET ON A BUDGET

At present prices, a Budget plant of 1300 BPH needs an investment of approximately INR 13 crores (INR 130 million). This includes all costs – except land. Because of its compact nature, it costs approximately 20% less than an equivalent 1000 BPH plant laid out in a conventional way.

Assuming you had decided to spend INR 60 crores (INR 600 million) for diversifying into processing, keeping in view the emerging trends. Would you consider starting a 4000-5000 BPH standard, fully automated processing plant at one location, say, adjacent to a level 3 town, as the best utilization of your capital?

Or would you rather consider setting up 4 Budget plants at once with a combined capacity of 5200 BPH at 4 different locations?

The choice is obvious. With 4 Budget plants, you immediately block your competitor from entering 4 different level-3 towns. Then, two years later, you can expand the existing Budget plants and relocate the portable cold store, chill store, rendering plant etc to four other level-3 towns, set up another four Budget plants, maintaining further lead over your competitors.

5 SALIENT FEATURES OF THE BUDGET PLANT

An interactive spreadsheet is supplied together with this write-up – both zipped together in one file. Use the spreadsheet to fine-tune your own project depending on local costs and conditions. You can also use the spreadsheet to automatically determine the operating results with variations in critical operating costs such as delivered cost of live birds at your plant.

Capacity	1300 BPH, singles or double shift operation. Not expandable, but entirely re-locatable with enhanced capacity to achieve desired expansion.
Freezing	Depends on size of blast freezer, which in turn determines capacity of refrigeration plant and electricals. We have assumed freezing of 25% of production. Chill/frozen storage 12-14 tonnes (based on use of last voyage reefers as frozen store)
Product	Broilers, average live weight 1800 grams. Maximum weight 2800 grams, minimum 1300. Fresh chilled and frozen. 20% as whole bagged broilers, 30% as curry cut, 50% as tray or bulk-packed portions and deboned. Cleaned, frozen hocks for export – to meet EPCG duty exemption condition.
Plant cost	Meyn's components to be shipped from Holland have an ex-works price of Eur 380-400,000. The entire project costs INR 14 crores. Examine the spreadsheet to determine what costs are included in this estimate, and determine your total outgo based on it.

Chilling	Water chilling		
Summary		Single shift	Double shift
	Manpower		
	Hanging	1	2
	Killing	1	2
	Cropping	2	4
	Evisceration	8	16
	Gizzards	3	6
	Hocks	1	2
	Deboning, filleting	8	12
	Dewatering	1	2
	Curry-cuts	1	2
	Carcass bagging	1	2
	Tray filling, sealing	3	6
	Handling, supervision	4	7
	Rendering, wastewater	3	3
	Maintenance	1	2
	Security	3	3
	TOTAL	41	71



Note: For double shift, capacities of utilities and services must increase

Area	Total plinth area	319 SqM including control room, blast freezer and compressor room (This area does not include rendering plant which is containerized, raw and wastewater treatment, electrical substation and DG set sheds, security room and housing)
Refrigeration	Approximately 60-85 TR comprising water chilling, ice making, blast freezing. Two reefers have built-in 13-14 TR of refrigeration for creating storage space. We are trying to get interested vendors to design an ammonia-based reciprocating two stage compressor module to be built on skids so that they may be trans-located just like containerized rendering and used reefers, to new location when the first Budget plant is expanded.	
Construction	Total cam-lock PUR sandwich panel construction, easily re-locatable	
Steel superstructure	Minimal, GI sections bolted onto floor- mounted columns	
Approx connected load	22kW in process areas 320 kW overall connected load	
Compressed air	Dry compressed air approx 50NM ³ /hr @ 6 bar from local made reciprocating type air compressor.	
Vacuum	Approx 130 NM ³ /hr @ 0.1 bar from local made vacuum pump	
Water	28 Kl/hr for duration of primary processing	
Chilled water	Approx 4400 lit/hr @ 2 deg C	
Flake/Shell ice for chilling	Approx 500 Kg/hr	
Shell ice for packing	Approx 200-500 Kg/hr depending on proximity of market	

Construction period

Approximately 7-8 months from ground breaking
Can be brought down to 4-5 months when Budget plants can be offered off-the-shelf by Meyn

6 SAMPLE PLANTS

The Budget plant layout is given in figure 4.1.



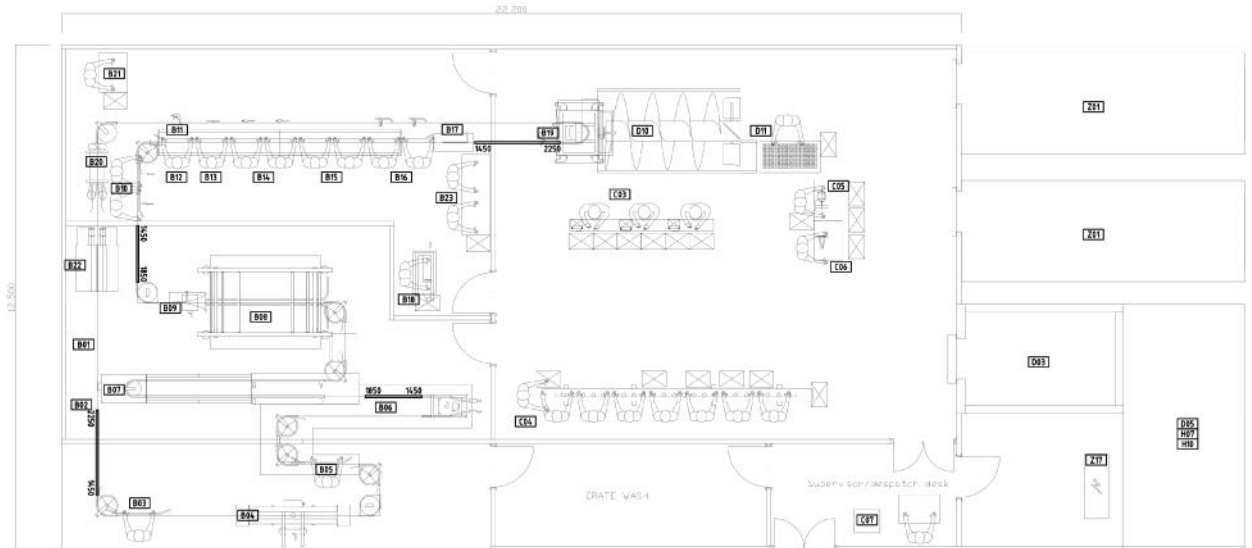
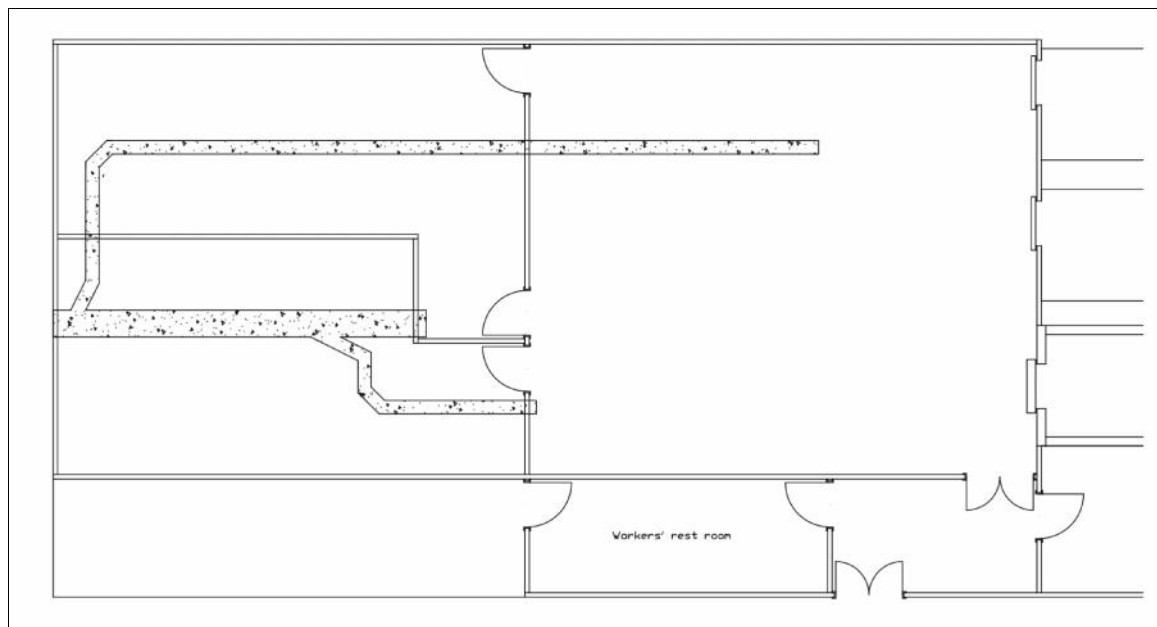
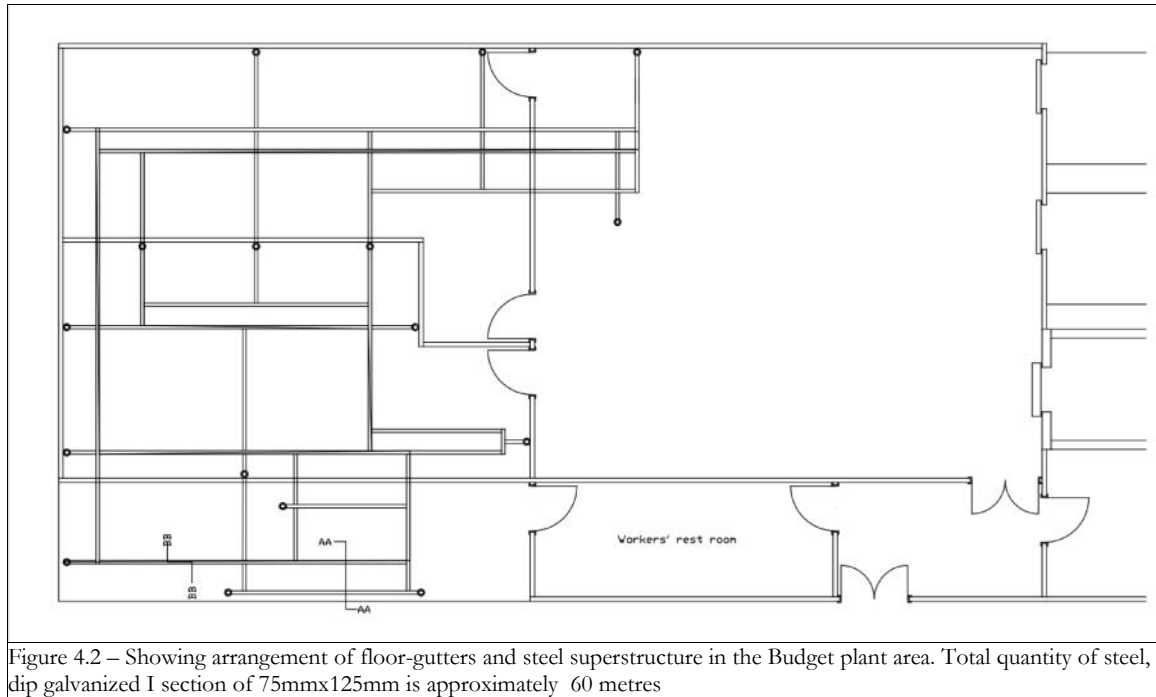


Figure 4.1 - Layout showing general arrangement and plinth of Budget Plant. Floorgutters and steel superstructure are shown in figure 4.2. Machine legend is in figure 4.3. Layout of expanded and relocated plant on masterplan is shown in figures 4.4 and 4.5





To show that the Budget plant can form the start of a big plant, we have shown the same installed in the initial space allocated in the master plan of 5200 and 8000 BPH plant in Figure 4.4, 4.5. It is possible, of course to do the same for a master plan capacity of 2600. Of course the Quibla (direction of Mecca) has to be maintained for killers at all stages

DEFEATHERING – EVISCERATION DEPARTMENT

- B0A - STEEL CONSTRUCTION (local supply)
 B01 - OVERHEAD CONVEYOR L=± 74 m
 BLEEDING TIME: 200 sec
 SCALDING TIME: 116 sec
 B02 - CHAIN LUBRICATION DEVICE
 B03 - HANGING POINT
 B04 - WATER BATH STUNNER
 B05 - KILLER (MANUAL)
 B06 - BLEEDING TROUGH (local supply)
 B07 - JET STREAM SCALDER - 1 SECTION
 B08 - PLUCKER JM32
 B09 - HEAD PULLER LINEAR - SINGLE
 B10 - MANUAL CROP PULLING STATION
 B11 - EVISCERATION TROUGH (local supply)
 B12 - VENT DRILL
 B13 - OPENER KNIFE
 B14 - 2X EVISCERATION FORKS
 B15 - GIBBLET HARVESTING STATION
 B16 - 2X SUCTION PISTOLS
 B17 - OUTSIDE BIRD WASHER (Local Supply)
 B18 - GIZZARD CHECKING / PEELING TABLE - SINGLE
 B19 - HOCK CUTTER
 B20 - HOCK UNLOADER - LINEAR
 B21 - MANUAL HOCK PEELING/SELECTION TABLE
 B22 - SHACKLE WASHER
 B23 - MANUAL OPENING & CLEANING OF GIZZARDS

CHILLING DEPARTMENT

- D10 - SCREW CHILLER Ø 2100 – 3,5 m
 D11 - PERFORATED TABLE (local supply)

DEBONING/PACKING DEPARTMENT

- L01 - CONE DEBONER – 6,8 m
 L02 - TRAYPACKING WITH ELECTRONIC
 SCALES (Local Supply)
 L03 - DISC CUTTER (Local Supply)
 L04 - BAGGING HORN (Local Supply)
 L05 - FLOOR MOUNTED SCALES (Local Supply)

MISC DEPARTMENTS

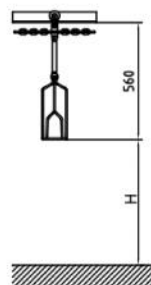
- H01 - FEATHER / OFFAL PUMP (Not Shown)
 H02 - STATIC SCREEN – 1 m (Not Shown)
 H07 - VACUUM SYSTEM (local supply)
 H10 - COMPRESSED AIR SYSTEM (local supply)
 Z01 - 2 X LAST VOYAGE REEFER USED AS FROZEN STORE
 Z02 - LAST VOYAGE REEFER USED AS CHILL STORE
 Z03 - BLAST FREEZER CHAMBER (Local Supply)
 Z04 - REFRIGERATION PLANT, (Local Supply)
 Z05 - CONTROL PANEL FOR ENTIRE PLANT (Local Supply)



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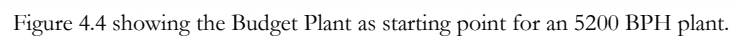
project: SAMPLE PROJECT



KILLING LINE
 JM-8 STAINLESS STEEL
 TROLLEY PITCH = 6"
 SHACKLE PITCH = 6"

alteration:	Capacity:	1300 BPH	Title:	
	Drawn by:	Alok Raj	BUDGET POULTRY PROCESSING PLANT	
	Scale:	1:100		
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	Material:		Figure 4.3	
	Duty:			





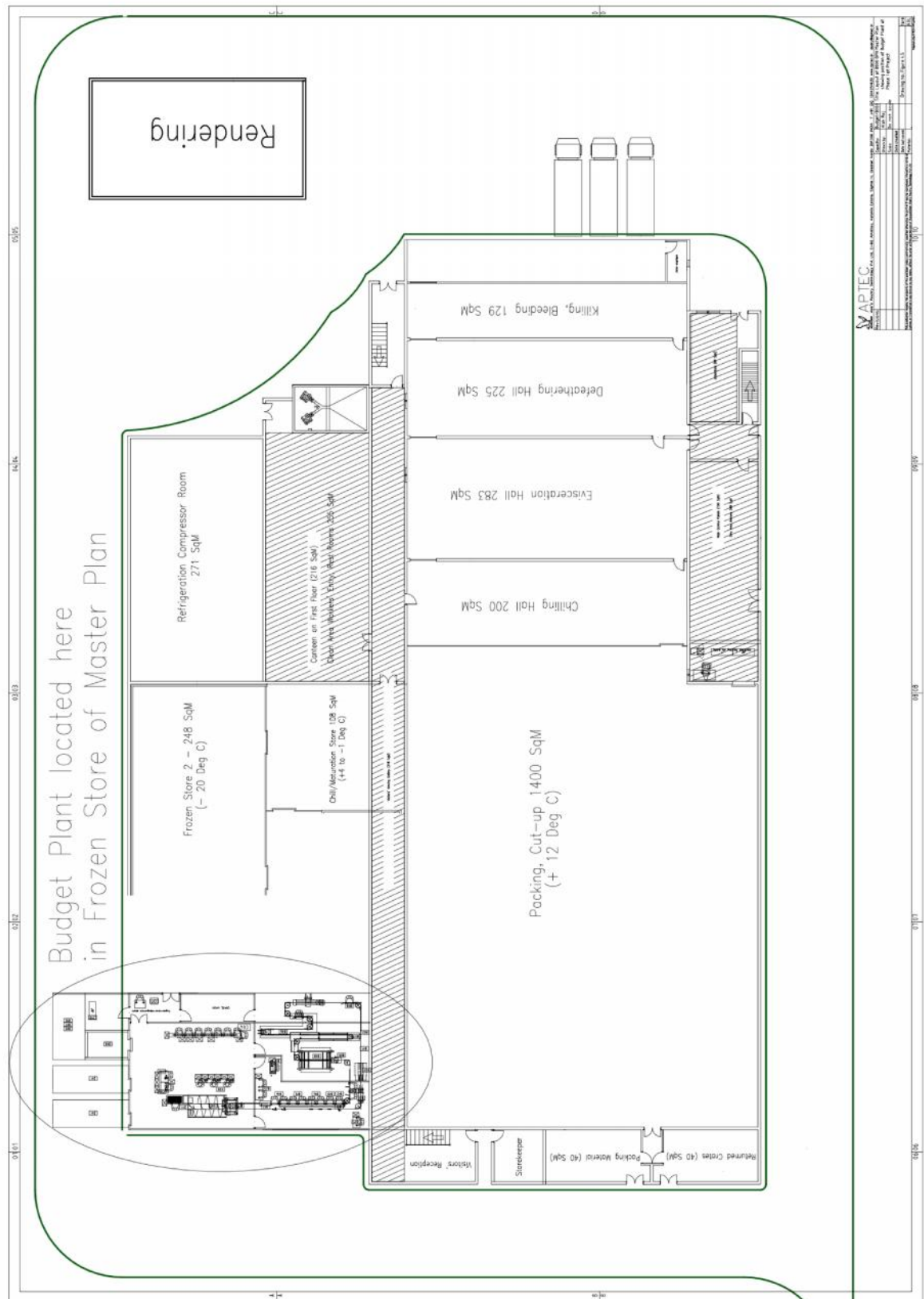


Figure 4.5 showing the Budget Plant as starting point for an 8000 BPH plant.

