

# **Isiolo Abattoir**

## **Mechanical Equipment Specification**

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## 1. Introduction

The Isiolo Country Government invites sealed tenders for the design, supply, and installation of mechanical works necessary to equip the facility as a modern export abattoir.

The main objective of the Isiolo Country government is to increase livestock productivity and quality of meat along the value chain to meet the international standards for export market and Halal standards. The intended export market consists of small stock (Sheep and goat) to be sold to Middle Eastern countries. Cattle and camel are to be slaughtered and sold mainly in the local market.

The facility shall be equipped to slaughter 150 cattle OR 100 camel OR 1800 sheep/goats per day. Two separate slaughter lines shall be installed, a lower slaughter line to slaughter sheep or goat and a high slaughter line to slaughter cattle or camels. Each species will be slaughtered on a rotational basis, therefore, separated by time or slaughtered on alternating days of the week. This time separation is to prevent unacceptable cross flows of “dirty” and “clean” products, furthermore, to allow that the workers required to slaughter the cattle can also be effectively used on the sheep/goat slaughter line.

The carcass chillers consist of three rooms equipped with rails to hold 50 cattle or camel carcasses in each chiller suspended on roller hooks, or alternatively, 360 sheep or goats in each chiller suspended from the overhead rail system on carcass carriers holding 4 to 6 sheep on each carrier.

Rough offal will be removed from the dressing floor to a separate room where the stomach and intestines are separated, emptied of its contents, cleaned with running water, and hung on hooks for cooling and drip drying before being dispatched (*Note: “Rough” or “Green” offal refers to the pig stomach and intestines.*)

The red offal to be removed on the slaughter floor and hung on hooked carriers suspended from the overhead rail system or placed on fixed hooks in the red offal room to be washed. The red offal is to be sold fresh, on the day of slaughter, or refrigerated in the carcass chiller and dispatched with the carcasses. (*Note: “Red offal” or “Pluck” refers to the esophagus liver, lungs, heart, spleen*)

The equipment will be installed in an existing building structure, therefore, the equipment provided is to fit into the existing building dimensions.

As the facility is remotely located, the degree of mechanisation should be limited to be moderately mechanized.

This contract consists of the supply, design, manufacture, delivery, erection, testing, commissioning, and handing over/training of the following:

- a) Cattle and Camel slaughter and dressing line to process 30 units per hour.
- b) Sheep/Goat slaughter and dressing line to process 125 sheep/goat per hour.
- c) Rail systems in the cattle chillers, sheep chillers, marshalling and despatch areas
- d) Equipment to wash and handle offal from the cattle and sheep dressing facility.
- e) Hygienic Equipment (e.g. boot, apron and hand washing equipment)

This specification document provides the minimum technical requirements of the facility, the tendered to submit herein a proposal for the equipment guided by this specification.

## 1.1 Site Data

The facility is located approximately 6.5km outside central Isiolo town and is accessible via well-established dirt road. (Site Coordinates: 0°19'44"N ; 37°32'30"E)

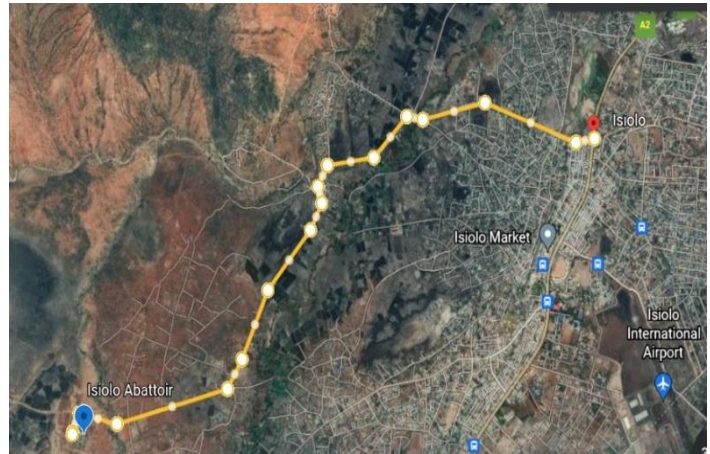
The site consists of an existing abattoir facility, fenced with paved and gravel roads surrounding the site and multiple points of access. The building is a concrete framed building with concrete blockwork walls build between concrete columns and ring beams.

Existing structures include:

- Guard house
- Office building
- Main slaughter building including chillers and offal rooms
- Changeroom amenities
- Hides/skins shed
- Incinerator
- Refrigerated container
- Electrical generator house
- Livestock Offloading facilities
- Water tower and reservoir
- Biofiltration effluent treatment system

It should be noted that contractor understand site conditions should it be so necessary as no claim will be recognized on the grounds of lack of knowledge of any conditions pertaining to the site, building dimensions, available space, misunderstanding the nature of the site or any other information available regarding the site being considered.

Allowance should be made to travel to the facility to obtain all the necessary information before manufacturing of items required in this contract.



### **1.1.1.2 Power, water supply**

Water and electrical supply are available from municipal and borehole connections. Existing services (Water, drainage & electrical) is present on site.

Temporary power distribution points and water connection on the site will be provided.

The Contractor shall provide all connections from the supply points and shall be responsible for the safety and adequacy of those connections. The Contractor shall only make use of those supply points indicated by the Engineer. The power and water will be supplied by the Employer free of charge, but if in the opinion of the Engineer, the Contractor makes use of these services in a wasteful manner, they may then be metered, and the Contractor charged for its use. The Contractor shall make his own arrangements for telephone services during construction.

## **2. Design Data**

### **2.1. Cattle and Camel slaughter line**

Design specifications:

- Operating hours: 7 to 8 hours per day, 5 days per week (Rotational slaughter with Goat/sheep line);
- Line capacity to slaughter 30 Cattle/hour or 30 Camel/hour
- Carcass distance in the bleeding area is 1.500 mm (Automated rail)
- Carcass distance in the dressing area is 2.200 mm (Manual sloped rail)
- Average Cattle live weight 350 kg (from 200 up to 450 kg).
- Average Cattle dressed carcass weight 185 kg. (from 120 to 200kg)
- Average Camel live weight 300 kg (from 250 up to 400/ kg).
- Average Camel dressed carcass weight 170 kg. (From 120 to 200kg)

Transport rail:

- Cattle & Camel Bleeding line: 4.4m high (from finished floor level)
- Cattle & Camel Dressing line: 3.4m high (from finished floor level)

### **2.2. Goat and sheep slaughter line**

Design specifications:

- Operating hours: 7 to 8 hours per day, 5 days per week(Rotational slaughter with Goat/sheep line);
- Line capacity to slaughter 200 goat or 200 Sheep/hour
- Carcass distance in the bleeding area is 1200 mm (Automated rail)
- Carcass distance in the dressing area is 1200 mm (Automated rail)
- Average sheep live weight 30 kg (from 20 up to 40 kg).
- Average sheep dressed carcass weight 18 kg. (from 15 to 40)
- Average export goat live weight 20 kg (from 15 to 25 kg).
- Average export goat dressed carcass weight 9 kg. (from 9 to 12 kg)

Transport rail:

- Goat & Sheep Bleeding line: 2.3m high (from finished floor level)
- Goat & Sheep Dressing line: 2.2m high (from finished floor level)



### **3. Exclusions/Inclusions from the contract**

#### **3.1. Exclusions**

The following shall be excluded from this contract:

##### **3.1.1. Building and Civil work**

All civil and building work. Allowance shall be made to fixing of equipment to floors, concrete columns, slabs, etc. However, all necessary fixing and holding down bolts are to be provided as part of this contract. Building contractor shall be responsible for placing concrete and breaking opening where necessary.

#### **3.2. Inclusions**

The following shall be included in this contract:

##### **3.2.1. Fixings and holding down bolts**

All necessary fixing and holding down bolts are to be provided as part of this contract. Building contractor shall be responsible for placing concrete and breaking opening where necessary.

##### **3.2.2. Electrical cabling and Distribution**

The power supply and electrical communication to all mechanical equipment shall be part of the scope of this contract. Equipment power supply distribution boards and controls shall be centrally located in a room next to the slaughter floor. The building contractor shall be responsible for main power supply to the building and switchgear for the facility and auxiliary power terminals, therefore the boards and controls, supplied in this contract, shall be powered from a main power supply board provided and installed by building contractor.

##### **3.2.3. Interconnecting piping and drainage**

All the interconnecting and internal equipment piping and plumbing for mechanical equipment shall form part of this contract. Piping, for example for the supply from knee valve to delivery spout of wash hand basin is included. The building contractor shall be responsible for main water supply to the building and overhead supply points.

Similarly, preliminary drainage of equipment shall form part of this contract, for example, wash hand basin waste pipe from the basin to the main drainage point of the facility is part of this contract. The effluent main shall form part of the building contractors responsibility.

### **4. Submission of contractor's drawings**

Before manufacture of any equipment the Contractor shall submit for approval, in principle, copies of all general arrangement drawings of equipment showing overall sizes, foundation requirements, building connections, all supply points (water, electrical, steam, etc.) and the position of each item relative to the building and other adjacent equipment.

Electrical schematic and line diagrams shall be submitted on which all terminals and wires are shown, numbered to correspond with the markings on the equipment installed. The Engineer/client may require from the Contractor further detail drawings and or calculations, which clarify any features not adequately shown on the layout drawings.

The Engineer/client will return to the Contractor within ten working days of their receipt by him, one copy marked with any changes which are necessary.

The Contractor shall immediately modify the drawing and re-submit two copies to the Engineer/client.

The Contractor shall issue to the Engineer/client, copies of the final drawings within ten days of receipt by him of approval, in principle, by the Engineer/client.

The approval in principle of drawings by the Engineer/client shall not relieve the Contractor of any responsibility in terms of the contract.

## **5. Inspection, testing and operator training**

### **5.1. Initial testing**

Tests shall be executed on each item of equipment at the manufacturer's works. All equipment shall be tested to the design loads specified and to the satisfaction of the Engineer/client.

The Contractor shall be responsible for the provision of all materials and labour necessary for proper execution of these tests.

### **5.2. Tests on site and at completion**

Tests shall be executed upon installation of equipment and completion.

The Contractor shall at his own cost render all assistance and supply all labour, appliances and any other materials as the Engineer/client may require to check the setting out, measuring up and inspection of any portion of the works at any stage during fabrication, construction, erection.

On completion of the Contractor's Initial Tests as specified above, the first animal will be processed and the plant shall be put into normal operation and final adjustments shall be carried out to ensure that the plant will fulfil the function for which it has been designed.

The Contractor shall be responsible for the proper operation, servicing, oiling, greasing, adjusting and all work in accordance with the manufacturer's recommendations to ensure the correct running of the plant throughout the period of the tests. The Contractor shall provide full-time suitably experienced Engineers and artisan staff during the entire testing period.

At the commencement of and during the whole of the Testing Period, the Contractor shall be required to have stored on site all essential spares and tools considered necessary to enable repair work of defective parts to be carried out immediately in the event of a breakdown.

The contractor will, on completion of tests, submit to the Engineer/client copies of all test records and charts together with reports on all the tests. The Engineer/client reserves the right to ask for any reasonable additional tests or for the repetition of previous tests in order to prove that the operation of the plant is satisfactory and in accordance with the Specification and Drawings.

The Operating and Maintenance Manuals shall be completed and handed over to the Engineer/client prior to the issuing by the Engineer/client of the Taking-over Certificate at the completion of this period.

### **5.3. Operating training period**

The Operator Training Period on the whole of the works shall commence when the first animal is introduced into the Plant and shall continue for a period of not less than two weeks after the issue of the Taking-over Certificate or such longer period as the Contractor may consider to be necessary to ensure that the operating and maintenance staff are fully conversant with the equipment.

The Contractor shall assist during the entire Operator Training Period the instructors appointed by the Engineer on behalf of the Employer.

## 6. Tender drawings

The following drawings form part of this Specification:

<b>Title</b>	<b>Dwg. No</b>
Proposed Abattoir Layout of Mechanical Equipment	1989-M0-01
Abattoir Sections	1989-G0-06
Rotary Drip Rack Detail	1989-MD-118
Paunch & Bible Wash Unit	1898-MD-31B
Bible soaking Tank	1898-MD-28
Intestine Slashing Unit	1898-MD-30

## 7. Regulations and Standards

All materials shall be of adequate quality for the duty specified and the workmanship shall be in accordance with the best accepted modern practice and international standards.

If the Contractor desires to use any other Standard Specification or Code of Practice, it shall be referred to the client for approval.

### 7.1. Equipment

The equipment is in principle to be manufactured to the present regulations of the E.C. and U.S.D.A.

### 7.2. Safety

System and equipment to comply with the essential health and safety requirements of the Machinery Directive 2006/42/EC.

### **7.3. Hygiene Standards**

As far as possible, all equipment shall be free from recesses and cavities to prevent the accumulation of dirt and/or waste material and shall be designed to facilitate ease of cleaning and maintenance.

All stainless-steel profiles adequately sealed and rendered watertight.

All corners should preferably have a radius equal or larger than 6mm, unless otherwise stated.

All surfaces in contact with the product must either be easily accessible for visual inspection and/or manual cleaning.

The exterior and interior of all equipment/supports must not harbour moisture or soils and be self-draining or drainable.

Edges shall be finished by either welding on 12mm round bar in the same grade as the article or by turning down to an acceptable radius.

## **8. Fabrication, Materials & Painting**

The fabrication and manufacture of the plant and equipment shall be completed in the Contractor's workshops before delivery to site. No fabrication of completed units shall take place on site. Site work shall be confined to only such minor alterations and adjustments as are found to be necessary during erection. If major alterations are found necessary, the items of plant concerned shall be returned to the Contractor's workshops for modification or replacement and shall be tested and checked before re-delivery to site.

### **8.1. Stainless steel**

All items fabricated in stainless steel shall be in the grade specified and detailed designs shall be compatible with fabrication techniques.

Should no grade be defined, it shall be accepted that the stainless-steel grade shall be AISI-304.

### **8.2. Welding**

All welded fillet or butt joints shall be ground smooth and shall be free from porosity, cavities and entrapped slag.

Welds shall be neatly formed, smooth and uniform throughout their length, the surfaces shall be acceptably free from cracks in the welds or heat affected zone, from overlap, undercuts, porosity, entrapped slag and spatter in or associated with the welds. The welds shall seal completely the edges of all overlapping or contacting surfaces.

### **8.3. Copper Piping**

All exposed copper piping and sanitary fittings shall be chromium plated. These shall be degreased, cleaned down and polished without damage to the installation.

#### **8.4. Hot-Dip (Galvanized) Zinc Coatings**

All hot dip zinc coatings shall conform to the following:

- The minimum thickness of the coating shall be not less than 125 microns. The finished surface shall be smooth and of a consistent light colour in all areas. Steel to be galvanized shall contain a maximum of 0.25% silica in its composition.
- Tubular constructions shall be provided with adequate vent holes in appropriate locations to prevent internal pressure build-up during the hot dip zinc coating process.
- Fabrication material having pockets which can entrap air in the hot dip zinc bath shall be referred to the galvaniser who shall state his requirements for the vent holes desired. Vent holes shall be sealed after galvanising with an approved epoxy sealer.
- Welding flux shall be chipped away, all welds shall be wire brushed, ground or grit or shot blasted, if necessary, before hot dip zinc coating.
- Exposed surfaces, except welds, when necessary, need not be grit or shot blasted, but the Client's Engineer shall decide to call for grit or shot blasting in cases of unsuitable surface finished on material for hot dip zinc coating. The Engineer shall have the right to inspect all steel components before galvanising and shall have the right to reject or ask for remedial treatment of any material which is considered unsuitable. This applies particularly to welds, burrs and surfaces having visible surface defects.
- Globular extra heavy deposits of zinc which interfere with the intended use of the material shall not be acceptable. Excessively protuberant lumps and nodules shall be removed by hot wiping or skilful application of mechanical means provided that a sufficient minimum thickness of unbroken zinc coating remains after such treatments. Flaws on small parts and working surfaces shall be repaired only by stripping, dressing and re-dipping.
- All galvanised material shall be free from gross deposits of white rust, if material has been affected by white rust the deposit may be removed, by means of non-metallic brushes and provided that the thickness of zinc coating in the affected area meets the requirements of the specification the material can be accepted.

## 8.5. Castings

Because of the corrosion inducing conditions and in order to obtain satisfactory mechanical properties of tensile shear and yield strengths, resistance to impact and transverse loads, and hardness properties, all ferrous castings other than those included in propriety "bought out" items of equipment shall comply with the specification hereunder. If the Contractor wishes to offer alternative materials he shall submit comprehensive details of such alternatives and obtain the prior written approval of the Engineer before proceeding with manufacture.

Material:	Pearlitic Nodular Structure	
Mechanical Properties:	Ultimate Tensile Strength	- 750MPa
	Elongation	- 2%
	Hardness	- 240 to 300
	Brinell (after normalizing)	

Inoculation: All castings shall be inoculated with 3% copper.

Heat Treatment: To provide the optimum physical properties consistent with the pearlitic nodular structure of the material, and to provide a hardness within the range 207 to 235 Brinell.

Test Certificates: The Contractor shall submit to the Engineer all test certificates of analysis including all relevant details of the micro-structure and mechanical properties. The number of tests to be performed and for which certificates of analysis are required shall depend on the respective numbers and sizes of particular castings and shall be agreed in writing with the Engineer.

## 8.6. Painting

### 8.6.1. General

All areas to be painted, as indicated on the drawings and specifications, shall comply with the following requirements:

- (1) Paint shall not be applied over any surface containing traces of grit, grease, oil, etc., loose rust, loose mill-scale or corrosion products of any kind.
- (2) All metal surfaces to which paint is applied shall be moisture dry. Paint surfaces which are to be over coated shall be hard dry before over coating unless the specification states otherwise.
- (3) All traces of soluble salts and corrosive airborne contaminants shall be thoroughly washed from the surface prior to painting dried and repainted immediately thereafter.
- (4) Unless otherwise stated, no paint shall be applied within 50mm of areas which are to be welded.
- (5) Welds and adjacent parent metal shall be deslagged, inspected; and approved and all splatter shall be removed prior to painting.
- (6) The weld area shall be abrasive blasted and/or ground and all contaminants shall be removed prior to painting. Wire-brushing of the weld shall only be allowed if the paint specification calls for wire brushings. The weld area shall then be flushed with fresh water and allowed to dry before receiving the full specified paint system.
- (7) Surfaces which are to rest on concrete or other floors shall receive the full paint system prior to erection.
- (8) Areas where the paint coating has been damaged during transportation, erection or by any means whatever shall be repaired as follows:
  - Rust spots shall be removed by means of a wire brush or emery paper and the surrounding paint which is still intact shall be feathered for a distance of 20mm beyond the damaged area. Spot priming shall consist of all of the coats previously applied and shall overlap the undamaged area by 20mm.
- (9) Where the shop coat has been allowed to age for a few months before painting, it shall be light sanded or rubbed with steel wool or scrubbed with clean water using a bristle brush.
- (10) Mating or contact surfaces shall be protected from corrosion by ensuring that the two surfaces brought into contact with each other shall be prepared and primed in accordance with the specification. The primed surfaces shall be brought together while the paint is still wet.
- (11) Areas which will be inaccessible after erection shall receive the full specified coating system before erection or assembly.
- (12) Unless otherwise specified, steel embedded within concrete shall not be painted except to within 50mm below the concrete/air interface.
- (13) All sharp edges and cut ends shall receive the specified dry film thickness of paint.
- (14) All air used for blast cleaning or spraying shall be free from all traces of water and oil.
- (15) When blast cleaning, a satisfactory blast profile (i.e. anchor pattern) shall be achieved. If the abrasive used for blast cleaning is sand, then it shall be free of clay.
- (16) The Contractor shall ensure that the manufacture's recommended thinners are used for any particular paint.

### Painting General (Continued)

- (17) The Contractor shall ensure that the final finishing coat obscures the previous coat.
- (18) The Contractor shall ensure that primed steelwork which is to be delivered to site is stacked on bearers and is clear of the ground. Wherever possible channels, angles, etc., shall be stacked so that water cannot collect on the steel.
- (19) Surfaces which are to be friction bolted shall be prepared in accordance with the specification (i.e. blast cleaned or wire brushed) but shall receive no paint coating.
- (20) Paint dry film thicknesses shall be measured using a non-destructive thickness gauge such as the MIKROTEST or equivalent.
- (21) The paint manufacturer's instructions shall be strictly adhered to.

## **8.7. Protection of unpainted surfaces**

### **8.7.1. Bright Machined Parts**

All bright machined parts shall have a protective treatment applied by the manufacturer before despatch and this treatment shall be kept intact up to the time of handover unless it has to be removed for installation. If the surface is exposed after installation a further protective coating shall be applied in accordance with the manufacturer's requirements.

## **9. Mechanical drives and Belts**

### **9.1. Chain Drives**

To facilitate maintenance, spares interchangeability and standardisation, the chains selected shall be standard stock roller type precision drive chains of reputable manufacture.

The axial and angular alignments of wheels and chains shall be carefully checked to very close limits to ensure maximum life and trouble free operation.

The amount of adjustment to take up chain wear shall not be less than 2 pitches or 2% elongation above nominal chain length, whichever is the greater. Chains shall be lubricated in accordance with manufacturer's recommendations.

### **9.2. Vee-Belt Drives**

All vee-belt drives shall be as specified below:

#### **9.2.1. Application**

Unless otherwise specified or agreed by the Engineer vee-belt drives shall only be used on applications of constant and slightly varying load conditions.

Belt speeds shall not exceed 900 metres per minute, unless otherwise agreed.

For reasons of spares interchangeability and maintenance standard stock vee-belts shall be used.

#### **9.2.2. Pulleys**

The belt pulleys shall be manufactured from a close-grained cast iron, (castings shall be generally in accordance with Clause 2.7) and accurately balanced. The belt grooves shall be properly machined to the correct groove angle and depth.



### 9.2.3. Adjustment

Adjustment inward, i.e. towards the driven pulley, shall be provided to ensure, sufficient movement of the driving pulley to enable the vee-belts to be fitted by hand, without the use of a lever of any kind to force the belts over the pulleys.

The outward adjustment shall provide for correct belt tensioning to ensure that slipping does not occur.

All belt tensions shall be re-checked within 24 hours and again within a week of start up to ensure that the initial stretch, if any, is taken up.

### 9.2.4. Speed Ratio

Speed ratios greater than 7:1 shall not be acceptable unless otherwise agreed by the Engineer.

Pulley sizes and center distances shall be designed to give a belt contact arc with the smaller pulley of not less than 120 degrees.

## **10. Bearings**

### **10.1. Anti-Friction**

Anti-friction bearings shall include all bearings which provide rolling contact between one or more sets of hardened steel balls or rollers located between hardened steel rings or raceways.

Anti-friction bearings shall be of approved manufacture.

To facilitate maintenance, spares, interchangeability and standardisation anti-friction bearings of standard designs and manufacture shall be employed. All anti-friction bearings shall be provided with greasing facilities in accordance with manufacturer's requirements.

### **10.2. Bushes Bearings**

Only where specifically stated and in cases of low velocities, and light loads in moisture free conditions, will bushed bearings be accepted. All bushed bearings shall be made of an approved bearing metal composition which has good anti-friction qualities and is capable of withstanding severe usage. All bushed bearings shall be provided with lubrication facilities to ensure adequate lubrication and shall be properly grooved to distribute the lubricant uniformly over the bearing surface. Grooves shall not be cut into the journal, but always into the surrounding bush. The edges of all chamfers and grooves shall be rounded to avoid sharp corners and to facilitate the introduction of the oil or grease.

### **10.3. Self-Lubricating or Oil less Bearings**

Self-lubricating or oil less bearings shall only be used on applications of light loads and low velocities, in moisture free and low humidity conditions, and where bearings are difficult to access and likely to be neglected during servicing.

The types of bearing metal composition used shall have frictional and wear resistant properties akin to those of grease lubricated bushed bearings.

## **11. Keys and Keyways**

All keys and key ways and taper pins shall conform to the latest applicable standard specification.

## **12. Limits & Fits**

Limits and tolerances for shafts and holes shall conform to the latest applicable standard specification.

## **13. General Machinery Protection**

### **13.1. Coupling and Shaft Guards**

All high speed couplings, projecting shaft ends and every dangerous moving part of machinery which are within normal reach of a person shall be protected by a guard manufactured from not less than 16 gauge mild steel plate.

The guards shall be neatly formed and securely fixed in position.

### **13.2. Belt Guards**

All belt or rope drives within normal reach shall be adequately protected by a belt guard.

The guard shall be manufactured from wire mesh or open type expanded metal, securely braced and stiffened with light rolled steel sections and bolted in position.

### **13.3. Chain Drives**

All chain drives shall be fitted with sheet steel chain cases and lubrication facilities to chain manufacturer's recommendations.

All joints shall be dust tight and arranged for convenient installation and dismantling.

Each chain case shall be fitted with hinged inspection door, drain hole and plug.

### **13.4. Painting**

Painting shall be Alkyd system comprising a primer, undercoat and high gloss enamel finish all in accordance with the manufacturers specifications.

## **14. Flat-Bar Rails**

The load carrying overhead flat bar rails (both static and mechanised) shall be manufactured from alloy steel material that shall possess high strength and good wearing qualities and shall generally conform to the following composition analysis:

Carbon	0.50% – 0.60%
Silicon	0.03% – 0.35%
Manganese	0.50% - 0.80%
Sulphur max.	0.06%
Phosphorus max.	0.06%

## **15. Overhead Conveyors**

### **15.1. Chain**

The type of conveyor chain employed in all the overhead chain conveyors shall be of the heat-treated, forged steel, rivet less type of a pitch to ensure closed compliance with the layout dimension of the conveyors with particular reference to the limitations imposed on sprocket diameters and vertical plane radii.

In substantiation of the chains selected and offered in their tender, the Contractor shall pay particular attention to the requirement to submit full and detailed calculations governing the chain selection, accompanied by comprehensive information on the physical and strength characteristics of the chain.

In selecting the conveyor chains it shall be noted that for the purpose of standardisation and interchangeability it is preferred wherever possible to use identical chains. The chain selected shall, however, have a permissible maximum working tension to a breaking load of 1:10.

### **15.2. Chain Take-up**

The amount of adjustment to take up chain wear and stretch shall be sufficient to enable the removal of a length of chain equivalent to one pitch of the pusher or carrying assembly spacing.

#### **2.16.iii Sprockets, Bearings & Corner Brackets**

Except where otherwise agreed with the Engineer, the sprockets shall be cast in accordance with the specification for "Casting" and machined to the tolerances demanded by the conveyor chain manufacturers.

The idler sprockets shall be fitted with antifriction thrust and radial load bearings and fitted with adequate pressure lubrication facilities with convenient access. The drive sprockets shall make provision for the housing of a shear pin for protection of the drive, conveyor chain and component mechanism against accidental damage.

All corner brackets shall be cast or heavy fabricated construction with adequate provision for secure bolting to the supporting steelwork to ensure maximum rigidity at and around all sprockets.

### **15.3. Conveyor Chain Lubrication**

Before installation all chains shall be totally immersed for a period in an oil/graphite solution as recommended by the manufacturers, then drained to remove all excess lubricant.

Provision shall be made at a suitable point along the length of the conveyor for a drip-feed or approved alternative method of automatic lubrication to operate while the conveyor is in motion. The method of lubrication to suit the Conveyor Chain offered shall be clearly specified.

The system shall be suitable for use with a non-toxic (vegetable based) lubricant which is compatible with products for human consumption and of a consistency and quality to ensure maximum life of chain. The lubricant to be used shall be clearly stated in the tender submission.

## **16. Cattle/Camel Slaughter Equipment Technical Specification**

### **16.1. Cattle Vee Crush**

This unit shall provide a smooth transition from the driving lane of the lairages to the entrance of the Cattle restraining pen. The vee crush shall be arranged to support the lairage railings, at the inlet end, and vertical sliding gate of the stunning pen at the outlet end.

The crush shall be formed from 6mm thick mild steel plate, adequately braced and stiffened, and supported on structural steel channels.

Removable restraining bars shall be incorporated in the crush to prevent animals backing away from the stunning pen.

The crush shall be thoroughly cleaned and hot dip galvanized after fabrication.

### **16.2. Cattle Restraining pen**

This pen shall be suitable for the restricting and killing of cattle in accordance with the requirements of the Halaal regulations and non-religious slaughter. Therefore, the pen shall include sliding doors, bud pusher, body clamp and head lifter which are pneumatically activated. Furthermore, the pen should be able to rotate the live animal to a horizontal position to be presented for Halaal slaughter

After the animal has entered the box the entrance door will be closed. The bud pusher moves the animal forward to the head fixation device. The lifting plate and fixation bars in front, lift and restrain the head and the pen rotates into a position after which the animal is ready for stunning or cutting of the neck. To release the animal, the bud pusher, head fixation and lifter shall retrieve and the discharge door shall be opened and the animal slides out of the box onto a landing frame.

The landing frame shall hold the animal on its back to facilitate easily shackling of the hind legs.

The pen shall be stainless-steel structure/box. The pen shall be adequately braced and stiffened to withstand the stresses to which it will be subjected.

The landing frame shall form one unit with the stunning box support.

The unit shall be priced complete with all the necessary controls, wiring required.

All electrical components and connections shall be heavy duty and waterproof bearing in mind the rigorous wash-down procedures used in abattoirs

### **16.3. Cattle/Camel Bleeding Hoist**

All animals must be bled in a hanging position away from the floor. Once an animal has been released from the restraining pen, a bleeding chain is attached of the hind leg and the animal is hoisted and engaged onto the bleeding rail above (approximately 4.4m). The hoist must be fast enough to lift animal to bleeding rail in as short period possible.

This hoist shall be an electrically operated chain hoist supported on the overhead secondary steelwork. The hoist shall have a safe working load rating of 2 000 kg and a hoisting speed of not less than 13 to 13.5 m/min.

The hoist shall be fitted with an apparatus to engage the bleeding shackle safely onto the bleeding rail.

Control of the hoist shall be by means of a heavy duty waterproof pendant switch. The pendant shall be suspended by a wire rope in order that the suspension loads are not imposed on the electrical connections.

The hoist, pendant switch and starter shall be suitable for not less than 150 starts per hour and incorporate inching facilities. Limit switches shall be incorporated to prevent over hoisting or lowering.

### **16.4. Bleeding Rail**

This includes the transport rail onto which stunned cattle are hoisted, suspended from bleeding shackle and transported to the transfer platform on the dressing floor.

rail system consists of a Bi-Rail track comprising of two 40x60x3mm stainless steel profile rails suitably supported from the overhead steelwork by heavy duty hangers (min 4mm thick). which shall be evenly spaced and positioned prevent the rail being excessively deflected or twisted.

The bleeding rail shall be slope from the bleeding shackle hoist station to the transfer station and shall be fitted with pneumatic rail stops (measured elsewhere) positioned at each working station.

The rail ends at the joints must be square to ensure that when the rails are butted together the surface on which the dressing rollers run is free of gaps or projections which would impede the smooth movement of the dressing rollers. Furthermore, these joining points shall be staggered in a manner that each respective rail of the twin-track system joints is not made at the same point along the track.

Bleeding rail height approximately 4.4 meters high. Additional hangers shall be provided at the landing/hoisting points.

### 16.5. Bleeding Shackle release device

This unit shall comprise of a of pneumatic hoist mechanism used to lower and release the bleeding shackle from the hind leg of the animal.

The device shall consist of pneumatic hoist fitted with a section/portion of the bleeding bi-rail track system. The hoist shall lower the section of twin track whilst a bleeding shackle is suspended on the portion of rail.

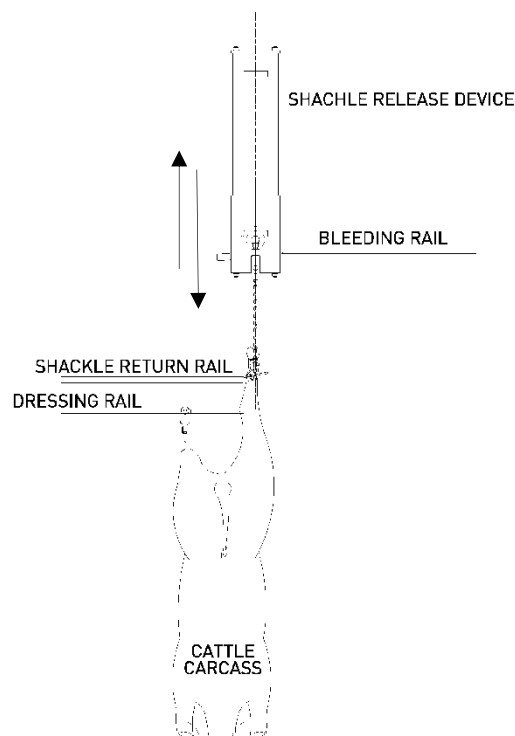
The device shall align with the shackle return rail so that the shackle can roll smoothly onto this rail.. The hoist shall be designed for a safe working load of 1 000 kg.

The rail of the assembly is the same as that which is used for the bleeding rail.

A safety mechanism to prevent bleeding shackle running off the lowered track shall be included.

The hoist shall be controlled by switch positioned such that it does not foul the animal or interfere with the operator's functions. The hoist switch and starter shall be suitable for not less than 150 starts / hour and incorporate inching facilities. The hoist shall incorporate limit switches to prevent over hoisting or lowering.

The device shall be suspended from the overhead steelwork (measured elsewhere).



### **16.6. Shackle return rail**

This rail system is to run from the shackle release device to the entry to the empty shackle lowerator conveyor. This item shall include approximately 15 meters of Bi-Rail track as per the bleeding rail specification.

The rail shall be sloped allow bleeding shackle rollers to freely run from the shackle release device into the shackle lowerator conveyor system.

This rail shall run from the end of the shackle release device to the shackle lowerator (approximately 15m). The rail shall be fabricated as per the bleeding rail specification and be sloped down to the entry of the lowerator at an angle which will allow the empty shackles to roll at a steady speed. Guides shall be provided to prevent the shackle chain swinging and damaging the wall or tangling.

### **16.7. Magazine rail**

This rail shall receive and hold cattle bleeding shackles from the lowerator. The rail shall be fabricated Bi-Rail Track rail (as per the bleeding rail specification) and shall be approximately 4m. It shall be supported by brackets fixed to the wall by “Chemset”, or equal and approved, bolts. The rail shall be approximately 1800mm above the floor at the lowest point and 400mm from the wall. A guard shall be positioned below the rail to prevent the shackle chain damaging the wall and a stop shall be provided to stop the shackle falling from the rail.

### **16.8. Empty shackle lowerator**

This unit shall automatically lower empty bleeding shackles from the high-level shackle return rail, approximately 4.4m high to the magazine rail at approximately 1800mm above the floor

The unit shall consist of a main frame constructed of stainless (AISI 304) steel which shall be supported from the overhead steelwork. The framework shall support the rail, chain and drive unit.

The chain shall be stainless steel hollow bearing pin conveyor chain. To this chain shall be attached pusher/catch fingers which shall engage on the dressing rollers.

The drive shall be from a T.E.F.C. electric motor of not less than 0.37kW through a suitable transmission arrangement to provide a suitable delivery rate.

An automatic feeder shall be provided which will allow only one roller at a time to enter the lowerator and prevent rollers jamming on the pushers.

Limit switches shall be provided on the exit rail to stop the conveyor when this rail is full of rollers and to re-start the conveyor when space is available.



## **16.9. Transfer hoist**

Hoist system to transfer cattle from bleeding shackles to dressing hook.

This unit shall comprise of a of rail hoist mechanism used to lift and engage free hanging leg from cattle carcass onto the main dressing rail. The device can comprise electric hoist with chain and 18mm diameter stainless-steel hook (AISI 304). The hoist shall be designed for a safe working load of 1 000 kg. The electric motor shall be not less than 1 kW and be suitably protected to prevent the ingress of water during the wash-down procedures prevalent in an abattoir. The lifting speed shall be not less than 6m/min

The hoist shall be controlled by a heavy-duty waterproof pendant switch positioned such that it does not foul the animal or interfere with the operator's functions. The hoist switch and starter shall be suitable for not less than 150 starts / hour and incorporate inching facilities. The hoist shall incorporate limit switches to prevent over hoisting or lowering. A suitable chain bucket shall be incorporated in the hoist assembly.

The hoist could be replaced by a pneumatic cylinder. Similarly, the pendant switch can be replaced by waterproof heavy duty foot operated switch.

The device shall be suspended from the overhead steelwork (measured elsewhere).

## **16.10. Dressing rail (including switches and bends)**

This includes the transport rail on which carcasses are suspended and transported throughout the facility.

The rail system consists of a Bi-Rail track comprising of two 40x60x3mm stainless steel profile rails suitably supported from the overhead steelwork by heavy-duty stainless-steel hangers (min 4mm thick) which shall be evenly spaced and positioned prevent the rail being excessively deflected or twisted.

The cattle dressing rail shall be sloped from the transfer point to the splitting station and shall be fitted with pneumatic rail stops (measured elsewhere) positioned at each working station.

The rail ends at the joints must be square to ensure that when the rails are butted together the surface on which the dressing rollers run is free of gaps or projections which would impede the smooth movement of the dressing rollers. Furthermore, these joining points shall be staggered in a manner that each respective rail of the twin-track system joints is not made at the same point along the track.

Dressing rail height approximately 3.4 meters high. Additional hangers shall be provided at the landing/hoisting points. The dressing rail inudes all high level rails from transfer point to dispatches. This includes rails in chillers and suspect rooms.

Switch points or hook routing mechanisms shall be robustly constructed with adequate stiffness to withstand the heavy loading and frequency of operation to which they will be subjected. All sliding surfaces and hinge points shall be accurately machined so as to ensure a consistently smooth action without causing damage to roller hooks. All open track ends shall be fitted with positive safety stops.

Switches to be adequately fixed to overhead steelwork



### **16.11. Secondary steelwork**

All the secondary supporting steelwork required for the support of the conveyors, drives and sprockets, take-up assemblies, bi rail track system and all related component parts from the bleeding area up the dispatch shall be provided under this item.

The steelwork shall be fabricated from S355JR(EN 10025).The steel shall be abrasive blast cleaned and hot dip galvanised after fabrication. The structural members and be designed for the following imposed loads:

- (a) Cattle/Camel Bleeding and Heading 1000kg/metre
- (b) Cattle/Camel Shackle Return Rail 80kg/metre
- (c) Cattle/ Camel Dressing Conveyor (to hide removal) 800kg/metre
- (d) Cattle/Camel Dressing Rail from ( c ) onwards 660kg/metre
- (e) Sheep/Goat Bleeding rail conveyor 380kg/metre
- (f) Sheep dressing rail conveyor 330kg/meter
- (g) Static Rails to suspect and condemned Room 660kg/metre
- (h) Chiller, Corridor, and Carcass Despatch 660kg/metre

Pricing for this item includes are required bolts, stiffing plates/haunches and any other items required to make the system complete, and the design and layout of the steelwork and connections shall be included.

To limit the extent to which existing floors are to be demolished to cast foundations, fixing points required for supporting steelwork shall as far as possible be on existing concrete columns and beams that from part of the building structure. Where no fixing points are available, steel columns shall be provided as part of this contract. Should concrete foundations be required, it shall be provided by building contractor and is excluded.

The tonnage of steel necessary is estimated and as indicated Bill of Quantities (BoQ)

### **16.12. Pneumatic stops**

Pneumatically powered rail stops will keep the carcasses separated during bleeding and hold carcasses in place at each working station along the sloped dressing rail.

The stops will be mounted to the rail system and engage onto the carcasses trailing leg roller. The control of the stops will be either manually override or automatic. All controls to be heavy duty and waterproof, appropriate for the intended purpose.

The stops shall be controlled by automated PLC control system that controls the overall slaughter rate and equipment. The system shall have all the necessary components and interfaces required.

The minimum required stroke of the cylinder is 30mm, mountings and fasteners to be stainless steel (AISI 304). Filter, lubricator, regulator sets shall be supplied with the cylinders.

### **16.13. Static operators Platforms**

This item includes the stainless-steel work platforms required to provide a safe and ergonomic working position for slaughter personnel to perform slaughter operations.

The platforms shall be fabricated from stainless steel profiles and non-slip fibre reinforced plastic (FRP) floor gratings.

The base of the platforms shall consist of a frame with raised kick protection edge and removable FRP floor grids, supported by floor mounted legs/columns. The entire platform structure shall be rigid and robustly manufactured

The legs of the platform shall be arranged so that the carcass does not contact them. The legs shall incorporate sufficient vertical adjustment to compensate for the grades in the floor

Stairs shall be provided for access from the floor to the low level and between the two levels. Platform to include all necessary guard/hand rails. The sides of the platforms shall be guarded with tubular handrail and knee rails supported by tubular stanchions. Stairway or steps shall not exceed 225mm and shall have necessary handrails.

All stainless-steel profiles adequately sealed and rendered watertight. The platform designed such that no water or soils can remain on the surface or within the supports and gaps/crevices where microorganisms can harbour must be avoided. Careful consideration shall be given to the ease of cleaning and accessibility of all surfaces.

A channel or water collection pan shall be fixed underneath the platform into which the hand-washbasins, sterilisers, apron washes shall drain. This collection pan shall be directly connected to a drainpipe in the floor.

The following platforms shall be provided:

#### 16.13.1. Camel stunning platform

The Brisket opening platform shall have the following dimensions:

- 1800mm (long) x 1300mm (Wide) x approximately 1300mm (High)

#### 16.13.2. Transfer Platforms

The Transfer platform consist of three interconnected platforms at differing heights. The dimension of each section is as follows:

- Platform section 1 - 1800mm (long) x 1300mm (Wide) x approximately 1900mm (High)
- Platform section 2 - 2500mm (long) x 1300mm (Wide) x approximately 1200mm (High)
- Platform section 3 - 1800mm (long) x 1300mm (Wide) x approximately 900mm (High)

The heights of the platforms shall be confirmed before platform is manufactured.

Each platform shall include a wash hand basin with knife sterilizer and shallow apron wash. (specifications provided elsewhere)

#### 16.13.3. Brisket opening platform

The Brisket opening platform shall have the following dimensions:

- 1375mm (long) x 1000mm (Wide) x approximately 600mm (High)

Brackets to be allowed to mount brisket saw sterilization unit

#### 16.13.4. Rough(white) offal evisceration platform

The Rough(white) offal evisceration platform shall have the following dimensions:

- 1375mm (long) x 1000mm (Wide) x approximately 1200mm (High)

The shape of the platform and shall be cut back to facilitate the loading of rough offal onto the evisceration slide mounted to underneath the platform

The platform shall include a wash hand basin with knife sterilizer and shallow apron wash. (Specifications provided elsewhere)

#### 16.13.5. Red offal evisceration platform

The Red offal evisceration platform shall have the following dimensions:

- 1375mm (long) x 1000mm (Wide) x approximately 900mm (High)

The platform shall include a wash hand basin with knife sterilizer and shallow apron wash. (Specifications provided elsewhere)

#### 16.13.6. Movable dispatch Platform

This platform shall be fitted with two heavy duty swivel wheels with locking brakes to prevent the platform from moving whilst in use. The platform will be located in the dispatch areas.

- 1500mm (long) x 800mm (Wide) x approximately 900mm (High)

### **16.14. Leg spreader**

Pneumatic spreaders shall be provided at the splitting station. The pneumatic cylinder will hold the trailing leg back whilst another cylinder pushes the leading leg forward to spread the carcass legs apart. The width of the spread shall be approximately 800mm.

### **16.15. Evisceration Rough offal slide**

The stainless steel slide should be 850mm wide with 150mm high up-stands along the sides. The slide shall be "L" shaped arranged to discharge sideways, as indicated on the layout drawing, with a hinged gate to prevent suspect offal entering the rough offal room. The slide must be smooth on the inside walls with no protruding welds, bolts and brackets. Water spray bar to 1inch nominal diameter to be included to facilitate ease of movement of paunches and intestines.

### **16.16. Feet and Udder chutes**

Two chutes shall be provided on the transfer platform to transfer hind feet and udders to ground level. The feet chute shall be 200mm diameter and the udder chute shall be 360mm diameter. The chutes shall be manufactured from stainless steel (AISI 304) sheet not less than 2mm thick. The chutes shall be approximately 1800mm long

The tops of the chutes shall be splayed outwards to facilitate loading of material into the chutes.

### **16.17. Variable Height Platforms**

This unit shall be constructed from Stainless steel sections and incorporate a pneumatic hoist of 300kg carrying capacity. The hoist shall be fixed to the framework and to the moveable platform. Suitable guide rollers and handrails shall be supplied. The complete unit shall be bolted to the floor and the overhead steelwork thus ensuring a rigid construction. The assembly shall incorporate a safety arrangement which will prevent the rapid dropping of the platform in the event of the breaking.

The moving platform shall be constructed as per static platform specification.

The operation of the hoist shall be by foot operated switch and an emergency press-to-lock, turn-to-release stop button shall be mounted on the platform to stop the hoist in an emergency. The hoist switch and starter shall be suitable for 200 starts per hour. All electrical components and connections shall be waterproof bearing in mind the rigorous wash-down procedures used in abattoirs.

Two Pneumatic cylinders shall be provided and shall have a minimum stroke of 2000mm and 100mm diameter. Filter, lubricator, regulator sets shall be supplied with the cylinders.

The following platforms shall be provided:

#### **16.17.1. Splitting platform**

- 1375mm (long) x 1000mm (Wide)

The platform used for splitting shall incorporate a member to support the saw and saw sterilization unit.

The platform shall include a wash hand basin with knife sterilizer and shallow apron wash. (Specifications provided elsewhere)

#### **16.17.2. Inspection and Trimming**

- 1375mm (long) x 1000mm (Wide)

The platform shall include a wash hand basin with knife sterilizer and shallow apron wash. (Specifications provided elsewhere)

### **16.18. Pneumatic hide puller with platforms**

This unit shall be designed for cattle carcass downward de-hiding. The hide is rolled over a drum which has built-in motor. The guide roll transverses downward during the dehiding process and returns to its top position when hide has successfully been removed.

Vertical movement is driven by means of pneumatic pistons with minimum stroke of 2000mm and 160mm diameter.

The hide puller is equipped with two dehiding chains and hide clamps. If required, the head shall also be dehided. In this case, the height of dressing rails and equipment shall be adjusted.

The hide puller shall be fitted with two variable height platforms to allow operators to assist the hide puller by skinning carcass from each side. These platforms shall be able to freely move vertically and shall be controlled as per the variable height platform specification. Similarly, the platform design shall conform to the variable height platforms specifications

### **16.19. Hide Trolley**

This trolley shall be used to transport hides from the hide removal station to the hatch landing to the hide room. The unit shall be approximately 1000mm x 800mm wide x 400mm high with a pushing handle approximately 900mm high

### **16.20. Wall Hatches**

Wall hatches shall be built into the wall between the Dressing floor and the heads and feet rooms, Rough Offal Room, hide and skin room to maintain a separation. The connection between these rooms is restricted to this closable hatch where “dirty” products can be removed from the dressing floor post inspection

These hatches shall be fitted with airtight self-closing top-hinged doors on the discharge side. The bottom edge of the hatch liner shall be sloped to the discharge side. The unit shall be fabricated from stainless steel

The following hatches are to be provided:

- Cattle Rough (White) offal 900mm wide x 600mm high for 230mm wall
- Sheep Rough (White) offal 450mm wide x 500mm high for 230mm wall
- Hides 900mm wide x 600mm high for 230mm wall.
- Heads 500mm wide x 500mm high for 230mm wall.
- Feet 400mm wide x 500mm high for 230mm wall.

### **16.21. Head & Feet inspection unit**

This unit will be used to hold cattle/camel heads and feet for inspection. This unit shall consist of shallow stainless steel trough and head holding frame. The trough shall be fabricated from 2mm thick stainless steel. Division plates shall be provided at 200mm centres to separate the feet from each animals. One head holding frame shall be provided above each division in the through to allow feet and head to be coordinated with the carcass and be inspected at the same time.

The head frame shall consist of a 6mm diater stainless steel bar bent in the shape of a “U” with approximate dimensions 200mm wide x 500mm deep.

Drain holes shall be provided between each division. A collection channel shall be provided below each trough which shall be extended beyond the trough to a drainpipe to be connected to the floor drains. The channel and drainpipe shall be fabricated from stainless steel.

The legs of the unit shall incorporate sufficient vertical adjustment to accommodate the grades in the floor.

The unit should be capable of holding 12 sets of heads and feet. The overall dimension shall be approximately 2700mm long and 400mm wide.

### **16.22. Trimming through**

The trimming throughs shall be placed below the dressing rail at the trimming and splitting stations to collect trimmings and bone chips.

The troughs shall be approximately 1200mm long x 600mm wide x 500 high. The trough shall be semi-circular in section with closed ends fabricated from stainless steel not less than 1-6mm thick. The top edge shall be stiffened by bending or by continuously welding on a stiffening member. A drain shall be provided.

### **16.23. Carcass washing machine**

This item shall be used to automatically wash cattle/camel carcass. The unit shall consist of a stainless-steel cabinet and spray system.

The cabinet shall surround the carcass.

The design of the cabinet shall prevent excessive vapour or water escaping through the roof or sides of the unit. Removable panels shall be provided in the sides of the cabinet for cleaning and maintenance.

The spray system shall be automatically triggered when carcass pass through the cabinet. The spray nozzels shall be arranged to effectively clean the entire carcasses passing though the unit.

### **16.24. Emergency slaughter hoist and slaughter gambrel**

This hoist and slaughter gambrel will be used to lift dead or injured animals to be slaughtered.

The hoist shall be electrically operated and have a safe working load of 2000kg. The hoist shall be mounted a support steel frame in the emergency slaughter room. The beam and columns is to be supplied as part of the secondary steel work .

The hoist, pendant switch and starter shall generally confirm to the specification detailed in the cattle/camel bleeding hoist.

The end of the hoist shall be fitted with a spreading gambrel to be inserted to the skinned gams of the carcass. The body and hook of the gambrel shall be manufactured from stainless steel and the hooks diameter shall be 18mm

### 16.25. Emergency slaughter trolley

This unit will be used to transport dead or injured cattle/camel animals to emergency slaughter facility. The trolley shall consist of a “V” shaped frame that will cradle the body of the carcass and allow initial skinning operations to be performed whilst the carcass is elevated off the floor. After skinning of the legs and opening or hind leg gams of the carcass it shall be gradually hoisted from the slaughter trolley to complete the dressing operations.

The overall dimension 1500 (long) x 850mm (wide) x 1875 (high)

The main frame of the unit shall be fabricated from steel section stiffened and braced. The frame shall robustly constructed..

The frame shall be mounted on four wheels two of which will be directionally fixed and two castor mounted to freely swivel. The diameter of the main load carrying wheels shall not be less than 200 mm. The wheels shall be fitted with anti-friction bearings which shall be adequately sealed to prevent the ingress of dirt and water, due regard, being taken of the conditions in which the wheels will operate. The wheel tyres shall be made from nylon, neoprene or polyurethane.

The carrying capacity of the trolley should be 1000kg



## **17. Sheep/goat Slaughter Equipment Technical Specification**

### **17.1. Sheep/Goat V belt restraining conveyor**

The V belt conveyor is used to gently immobilize and restrain live sheep/goat whilst being conveyed from the outside race into the building to be presented for slaughter.

The unit consists of two flat belt conveyors that are angled toward each other forming a “V”. The width between belts and the tensioning of the belts can be adjusted pneumatically according to the animal race and size.

The body of the conveyor shall be stainless steel and the belt guide material shall be high grade polyethylene (PE)

The approximate overall length of the conveyor shall be 3500mm.

### **17.2. Sheep sticking and shackling table**

This table shall receive sheep/goat from the V-belt restraining conveyor. The sheep will orientate for Halaal slaughter and the neck cut. Following which the hind leg of the animal will be shackled onto the overhead bleeding conveyor.

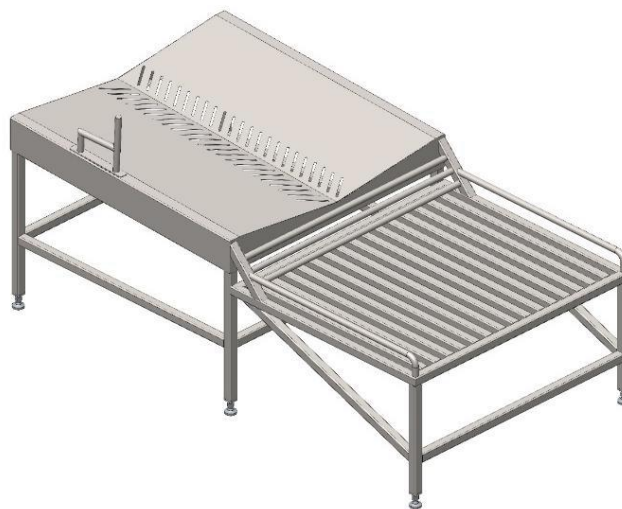
The table shall be robustly constructed to withstand the impact loads applied, without deformation. The table top shall not be less than 2mm thick.

The table shall have leading dimensions of approximately 2270mm long by 1000mm wide by 900mm high. The working surface of the table shall be shape into a “V” and slits are to be cut to allow the table drain quickly.

A “horn” shall be provided on the table edge to rest the animal’s neck against when making the sticking cut. An additional bleeding frame shall be fixed against the frame of the table to hold sheep/goat carcasses to be shackled and suspended from the overhead bleeding conveyor.

The tabletop and frames shall be fabricated from stainless steel. The legs of the unit shall incorporate sufficient vertical and angle adjustment to compensate for the grades in the floor.

The overall dimensions are approximately 2300mm long x 1200mm wide





### 17.3. Sheep/Goat Bleeding conveyor

After being stuck, the sheep/goat are to be shackled onto the bleeding conveyor and bled in a hanging position on the overhead bleeding conveyor.

The unit shall consist of a chain and framework assembly, which shall be supported from the overhead steelwork. The framework shall support the chain, drive and take-up unit.

Bleeding shackles shall be connected to conveyor chain to space the sheep/goat to hang at approximately 900mm to 1200mm centres. The shackle chain shall be fitted with cylindrical handle sized to allow free movement of the chain through the handle. The chain handle shall facilitate ease of shackling. The shackle chain shall be stainless steel with a minimum diameter of 6mm

The drive shall be from a T.E.F.C. electric motor suitable sized to provide a delivery rate of between 200-250 goat/sheep per hour.

Variable speed drive controlled by a PLC automation system with a stop and go operation shall be provided. The rate of slaughter shall be adjustable to suit the required slaughter throughput. The system shall have all the necessary components and interfaces.

Emergency stops shall be installed which, when activated, shall hold the conveyor in the position it is in when the stop is activated. The conveyor shall only restart when the stop is released.

A display on the control interface shall indicate the selected rate of slaughter along with other important information and also which emergency stop or position sensor is preventing the conveyor from moving.

The overhead conveyor chain selection and supporting framework shall be suitable to the loads and application required and as specified in the “secondary steelwork” specification.

Sprockets or idler drums shall be provided at all horizontal bends in the overhead conveyor chain. These sprockets or idler drums shall run on anti-friction bearings provided with adequate lubrication facilities. A take up unit shall be provided which shall allow for stretching in the chain equivalent to one carcass pitch.

The drive shall ensure that the conveyor is fully and exactly synchronized with the dressing conveyor.

The drive shall incorporate a shear-pin or similar overload protection device to prevent any component of the conveyor being damaged in the event of anything causing a jam.



#### **17.4. Sheep Dressing conveyor**

After being bled sheep/goat carcass shall be transferred to the dressing line conveyor. The hind shall be skinned and gam exposed, the hind legs of the sheep/goat shall be engaged onto the dressing gambrels hooks which are fixed to the overhead dressing conveyor

The overhead chain conveyor arrangement shall be similar as specified bleeding conveyor consisting of a chain and framework assembly, which shall be supported from the overhead steelwork. The framework shall support the chain, drive, and take-up unit.

Dressing gambrels shall be connected to the conveyor chain conveyor chain to space the sheep to hang at approximately 900mm to 1200mm centres. Positioning and pitch of the of the gambrels shall align with the bleeding shackles at the point of transfer.

The gambrel hooks shall hold and spread the hind legs of the sheep 300mm apart and shall be swivel mounted onto the overhead conveyor chain. The gambrel shall be fabricated from stainless steel rod not less than 12mm diameter and be adequately braced and stiffened where necessary.

The conveyor shall be driven by a T.E.F.C. electric motor motor suitable sized to provide a delivery rate of between 200-250 goat/sheep per hour. The drive shall be fully, and exactly, synchronized with the bleeding conveyor. Variable speed drive controlled by PLC automation system with a stop and go operation shall be provided. The rate of slaughter shall be adjustable to suit the operational speed of the facility. The automation controls shall be incorporated with bleeding conveyor system.

Emergency stops shall be installed which, when activated, shall hold the conveyor in the position it is in when the stop is activated. The conveyor shall only restart when the stop is released.

A common drive may provide for the two conveyors either by line shafting or cross-drives. The tenderer is to supply details of the drive system with this tender.

Sprockets or idler drums shall be provided at all horizontal bends in the chain. These sprockets or idler drums shall run on anti-friction bearings provided with adequate lubrication facilities.. A take up unit shall be provided which shall allow for stretching in the chain equivalent to one carcass pitch.

The conveyor shall be arranged to position a sheep on to the scale, allow it to remain stationary for weighing and then move it forward before the next sheep is positioned, thus allowing the scale to return to zero. This may be done by a sweep arm on the conveyor or by a separate conveyor or pusher.

### **17.5. Sheep/Goat slaughter operators platforms**

Platform design shall be to same specification as cattle static operators platforms

The platforms to be provided shall have the following dimensions

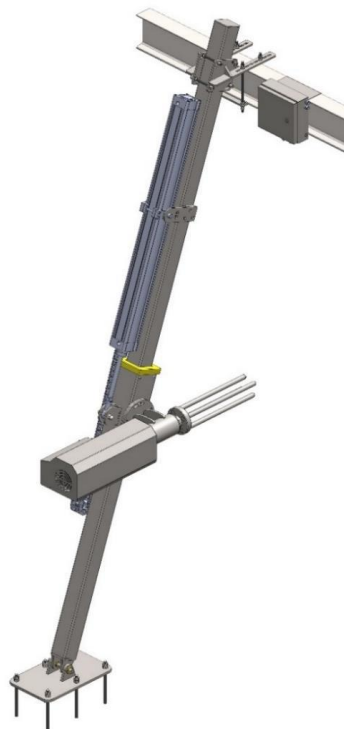
- 1500mm (long) x 800mm (Wide) x each platform varying in height between 500 to 700mm (High)

### **17.6. Sheep/Goat skin puller**

After initial flaying operations of the legs and rump of the carcass, the free hanging portion of skin shall be inserted in between skin puller forks. The skin puller will be activated by suitable control mechanism and the skin pulled from the carcass through a rotational and downward movement of the skin puller forks.

The forks of the skin puller shall be fitted to a geared electrical motor fixed onto a sliding frame which is guided vertically along main support column with a pneumatic cylinder. The support column shall be fixed to the floor and the overhead rail support structure with pinned or hinged connections to allow it to angle to suit the movement of the dressing conveyor. The angle of the skin puller main column shall be adjustable to suit the rate of slaughter

The unit shall be manufactured from stainless steel. and shall include all the necessary controls suitable to for the operation conditions (Heavy duty, waterproof, Filter, lubricator, regulator sets, etc.)



### **17.7. Sheep/Goat rough(white) offal conveyor**

The conveyor shall be a belt conveyor which will carry rough offal (sheep/goat intestines and stomachs). The belting continuous food quality belt not less than 400mm wide. The conveyor be fitted onto a stainless steel frame. The sides of the conveyor shall be raised to a height of 200mm above the belt to prevent offal from sliding off the conveyor. The sides shall be manufactured of polyethene(PE) strips mounted to the frame of the conveyor

The conveyor shall be driven at a speed of approximately 25m/min by an electric motor of not less than 0.75kW through a suitable reduction gearbox. The motor shall be fully protected against ingress of moisture and water particularly during wash-down with high-pressure hoses.

Emergency stop shall be installed which, when activated, shall hold the conveyor in the position it is in when the stop is activated. The conveyor shall only restart when the stop is released.

The conveyor frame shall be supported by legs constructed from square or rectangular hollow sections. The legs shall incorporate sufficient vertical adjustment to compensate for the grades in the floor.

### **17.8. Head & Feet inspection unit**

This unit will be used to hold sheep/goat heads and feet for inspection. This unit shall consist of shallow stainless steel trough and hooks. The trough shall be fabricated from 2mm thick stainless steel. Division plates shall be provided at 200mm centres to separate the feet from each animals. One head hook shall be provided above each division in the through to allow feet and head to be coordinated with the carcass and be inspected at the same time.

Drain holes shall be provided between each division. A collection channel shall be provided below each trough which shall be extended beyond the trough to a drainpipe to be connected to the floor drains. The channel and drainpipe shall be fabricated from stainless steel.

The legs of the unit shall incorporate sufficient vertical adjustment to accommodate the grades in the floor.

The unit should be capable of holding 12 sets of heads and feet. The overall dimension shall be approximately 2700mm long and 400mm wide.

## **18. Offal Handling Equipment**

### **18.1. Tables(General)**

The tables shall comprise a 2mm thick (unless otherwise stated) stainless steel top, mounted on a frame with welded at the connection interfaces. The stainless steel shall be polished to a satin gloss finish.

The top shall be provided with up-stands on all sides formed by bending with a radius of not less than 30mm. The top edge of the up-stand shall be stiffened with a bend or a 10mm diameter bar continuously welded to the up-stand. The top shall be provided drain outlet and a stainless steel drain piped to floor level. The up-stands shall be omitted at points where offal is loaded or unloaded onto adjacent tables.

The support frame shall be fabricated from hollow sections and angles in a manner which will prevent the formation of dirt collecting corners and crevices. Where frames are fixed to walls stainless steel anchor bolts shall be provided with the table. The legs of the frame shall incorporate sufficient vertical adjustment to compensate for the grades in the floor. Where the back of the table frame is fixed to the wall stainless steel anchor bolts shall be provided with the table.

As some tables must fit between existing walls, all dimensions must be confirmed on site manufacture

The following tables shall be provided

#### 18.1.1. Heads and feet receiving table

The top of this unit shall receive heads and feet from the hatch

Dimensions: 4650mm long x 1000mm wide

#### 18.1.2. Heads washing table

This table shall receive heads from receiving table and be used to wash heads.

Dimensions: approximately 2000mm long x 1000mm wide

#### 18.1.3. Feet washing table

This table shall receive feet from receiving table and be used to wash feet.

Dimensions: approximately 2600mm long x 1000mm wide

#### 18.1.4. Red offal separation table

This table shall be used to separate red offal into individual organs for packing. The table working surface can as an alternative be manufactured from Polyethylene sheet(min thickness 30mm)

Dimensions: approximately 2000mm long x 1000mm wide

### **18.2. Rough(White) offal paunch(tripe) receiving, separation and opening table**

This unit will be used to receive cattle/camel or Sheep/goat rough(white) offal from the evisceration slide (or conveyor) and be used to separate and distribute paunch(tripe) subsequent workup tables.

The unit shall comprise a 2.5mm thick stainless-steel top mounted stainless steel frame. The top of the unit shall incorporate an opening grid. The construction of the unit shall in general conform to the specification described “tables (General)” as described elsewhere, with up-stands on all sides and support frame as per the specification.

A removal grid shall be provided in the top of the unit. The edges of the grid shall be formed by flat bar 6mm thick x 40mm deep. The bearer bars shall be 30mm deep x 6mm wide spaced at 120mm. The cross bars shall be 12mm diameter at 150mm centres. The grid shall be fabricated from 316 stainless steel and be approximately 900mm long x 800mm wide.

An ingesta (tripe waste) blow tank shall be fitted to the table below the grid.

The rough offal opening table shall be connected to the bible slide and intestine slashing unit on each side respectively.

The overall length shall be approximately 8 800mm long x 1000mm wide

### **18.3. Paunch(tripe) waste blow tank**

System for conveying intestinal content from opened paunches(tripes) through a tank and pipe system with the aid of compressed air.

The unit shall consist of a stainless steel collection tank with filling funnel and pneumatically operated knife gate valve.

The tank capacity shall be minimum 700 litres with a 300mm diameter inlet and 150mm diameter outlet. The blow tank shall be capable of conveying intestinal content approximately 50 meters.

The piping from the tank to the discharge point is not included as part of this contract and will be arranged separately.

The tank to include all the necessary fittings, valves and controls for a complete system. The expected pressure rating is 8 Bar.

The collection tank shall be tank is fully or partially grouted into the floor or placed in a prepared pit.



### **18.4. Bible slide**

This unit shall be used to facilitate the movement of bibles from the receiving table to the soaking tank.

The construction of the unit shall in general conform to the specification described “tables(General)” with up-stands on all sides and support frame as per the specification.

The approximate dimensions are 3600mm long x 800mm wide

#### **18.5. Bible soaking tank**

This unit shall receive bibles from the slides and be used to soak the bible.

The tank shall be fabricated from 2.5mm thick 304L stainless steel polished to a satin finish. The top edge of the tank shall be stiffened by bending or continuously welding on a 10mm diameter stainless steel bar.

The tank shall have up-stands of the same height as the table. The corners of the tank shall be formed with a radius of not less than 40mm. The tank shall be approximately 1800mm long x 600mm wide x 450mm deep fitted with a drain and an overflow.

The overflow shall be in the wall at the end of the tank. It shall be 390mm above the bottom of the tank and shall be 40mm high by 300mm wide. The water shall be directed to the floor channel below the tank. The drain shall be provided with a watertight plug which shall be fixed to the side of the tank with a length of chain.

#### **18.6. Paunch (Tripe) washing Tank**

This unit shall consist of a two washing tanks mounted on a frame for the washing of cattle/camel or sheep/goat paunches(tripes)

The washing section shall consist of tanks approximately 1800mm long x 800mm wide x 450mm deep, fabricated from 2.0mm thick 304 L stainless steel polished to a stain gloss finish. The corners of the tank shall be formed with a radius of not less than 40mm. The tank shall be sub-divided into two divisions, each 900mm long.

The tanks shall be fitted with a 100mm diameter drain and which shall direct the water flow to the floor channel. Drain plugs shall be attached to the side of the tank by a length of chain.

#### **18.7. Intestine slashing and washing unit**

This unit shall receive intestines from the Rough Offal Receiving Table. The unit will be used for the slashing, opening, and washing of the intestines.

The unit consists of a tank, a drip trough and a holding section mounted on a frame.

The top section shall have overall dimensions of approximately 2750mm long x 800mm wide. The top shall be fabricated from 2.0mm thick 304L stainless steel polished to a satin gloss finish using. All internal corners shall be formed with large radii. The tank section will be used to float intestines with portions hanging over the front for slashing. Therefore the tank must be arranged to allow water to overflow along the full length of the front of the tank. The tank section shall be approximately 1300mm long x 800mm wide x 300mm deep. The tank shall also be provided with a 100mm diameter drainpipe which shall direct the wastewater to the floor channel below the opening table. A drain plug shall be provided and be attached to the top of the tank by means of a chain. The tank shall be fitted with 2 nozzles onto which the intestine will be placed for flushing. The flow of water to the nozzles shall be controlled by foot-operated valves.

The overflow water and intestinal contents shall be caught in a drip trough mounted on the front of the support frame. The trough shall be fabricated from 2mm thick 304L stainless steel polished in the same manner as the tank. The trough shall extend past the end of the tank in order to discharge the contents to the floor channel below the table.

The washing section shall be approximately 1400mm long x 800mm wide x 100deep and be fitted with a perforated plate. The up-stand shall be cranked to provide lateral stiffening. The washing section shall be sloped towards the slashing section so that the water collected can drain into the slashing section. The perforated plate shall also be fabricated from 2.5mm thick 304L stainless steel and shall be supported 25mm above the inside of the table top to allow a free flow of water to the slashing tank. The perforations shall be approximately 25mm diameter at 50mm centres.

The splash back shall be mounted and sealed on the wall and shall be bent at the bottom to ensure that water hitting the screen will drain to the table. The screen shall be fabricated from 1.6mm thick 304L stainless steel and shall be cross-bent to provide stiffness and to remove unsightly ripples, dents or bulges.

A rail shall be fixed to the wall using stainless steel bolts with a stainless steel backing plate and be fitted with seven hooks to hold the intestines for washing. The rail shall be fabricated from 60 x 12 stainless steel flat bar and the hooks from 12mm diameter stainless steel round bar.

The unit shall be supplied complete with two 15mm diameter flexible hoses with spray nozzles fitted with spring loaded self-closing valves. The piping supplying the hoses shall be 20mm diameter from a 25mm diameter header which shall incorporate an isolating valve and a connection to the slashing unit. The piping shall be galvanised mild steel piping.

#### **18.8. Rotary drip rack**

After paunches(tripes) and intestines have been cleaned, it will be hung onto drip racks, to allow majority of water to drain for offal to be packed/bagged.

The drip rack shall comprise of a rotating ring, approximately 900mm in diameter to which 19 hooks are attached, supported on a floor mounted column.

The column shall be fabricated from 100mm diameter stainless steel tube and 300mm square base plate. To facilitate the rotation the ring shall have a single ball support for a top bearing and a bottom bearing of bronze, nylon or Vesconite.

#### **18.9. Fixed hooks Rack**

After inspection red offal will be hung on fixed hooks to be cleaned and separated to be packed.

The rack shall comprise a set of hooks fixed to a frame attached to the wall by suitable brackets.

The rail shall be 3000mm long with 10 hooks attached at 300mm intervals. The hooks shall be formed from 12mm diameter stainless steel rod. The frame shall be fabricated from 30mm x 30mmx2mm stainless steel square profile.

The brackets shall support the rail 400mm away from the wall and be fabricated from stainless steel sections. Anchor bolts to fix the brackets to the wall shall be provided.

#### **18.10. Offal trolley**

This unit will be used to store and transport offal.

The overall dimension 1500 (long) x 850mm (wide) x 1875 (high)

The main frame of the unit shall be fabricated from stainless steel square hollow section stiffened and braced with a flat bar. The frame shall support 16 rectangular profile rails (40mm x 60mm x 20) fitted



with 12mm diameter hooks at 250 mm centres. The frame shall have 4 levels, each with 4 rails allowing for a total of 88 hooks.

The frame shall be mounted on four wheels two of which will be directionally fixed and two castor mounted. The diameter of the main load carrying wheels shall not be less than 200 mm. The wheels shall be fitted with anti-friction bearings which shall be adequately sealed to prevent the ingress of dirt and water, due regard, being taken of the conditions in which the wheels will operate. The wheel tyres shall be made from nylon, neoprene or polyurethane to prevent damage to the floor.

#### **18.11. Blood collection tank**

Blood from the bleeding area will be drained into a stainless steel blood collection tank, from which it will be pumped into the effluent treatment system or tanker vehicle to be removed from the facility

The tanks shall have a capacity to hold 7 tonnes of blood. The tank shall include a 400mm diameter manhole/access hatch with two flanges of 2 inch and 6 inch diameter to connect filling drain and a mixing motor. The motor shall be minimum 4kW and fitted mixing arm fitting rotating at a rate to prevent blood from coagulating. The unit shall be supplied with heavy duty waterproof control system

#### **18.12. Blood pump**

Blood collected in the collection to be pumped to the effluent treatment facility or into a blood collection tanker.

The pump shall be powered by compressed air with a capacity of 500 litres/min. The pump shall be suitable for pumping blood (double diaphragm) with the membrane and shut of valves manufactured from Neoprene. The inlet and outlet dimeters shall be 2 inch. The sucking point and from the pump to shall be connected to the storage tank using suitable stainless-steel piping and fittings. The pump can be disconnected for cleaning purposes.

The body of the pump shall be is made of stainless steel or aluminium

Allowance shall be made for piping, approximately 25m long, shall be made of stainless-steel tubing and fitted with shut-off valves at both sides and suspension brackets. All piping, fittings and valves required to be included. The pump shall be easily disconnected for cleaning and maintenance purposes.

The pump shall be able to be time controlled and have a push start override button. Pump controls to be included.

## **19. Transport rail track equipment**

### **19.1. Cattle/Camel Bleeding shackle**

Bleeding shackles used to suspend cattle/camel carcass on the overhead bi rail track system

The assembly shall be designed and manufactured to carry a safe working load on the shackle chain of 2000kg.

The wheel shall be fitted anti-friction stainless steel bearings, located in the wheels, and shall be sealed with blood and water-resistant seals. Wheels shall rotate freely on the bearings and not bind against the seals.

The wheel shall be of such material as to ensure good wearing qualities with hardness tensile and impact resistant characteristics to withstand fracture and distortion under the operating conditions in the abattoir where the rollers and shackles are subject to constant impact with each other and with concrete and other hard surfaces.

### **19.2. Dressing roller**

Dressing roller with hook used to suspend carcasses on overhead bi rail track system

The roller assembly shall be designed to carry a safe working load, on the hook, of 1250 kg and tested with a static load of 1500kg. The roller hook shall be twin-track roller suitable for use with the dressing rail system.

The weight of the rollers shall be uniform and shall have tolerance of plus or minus 30 grams on the average weight calculated on the total number supplied.

The wheel shall be of such material as to ensure good wearing qualities with hardness tensile and impact resistant characteristics to withstand fracture and distortion under the operating conditions in the abattoir where the rollers and shackles are subject to constant impact with each other and with concrete and other hard surfaces.

The hook shall be suitably formed for insertion into the punched gams of beef carcasses and shall be manufactured from 18/8 type 316 stainless steel round bar of not less than 19mm diameter.



### 19.3. Sheep carrier logs

After the sheep/goat has been inspected it shall be transferred onto the high rail system by placing the carcasses onto 8 hook double level carrier logs (also referred to as multiple storage hook).

These units shall be double level units and consist of the following components:-

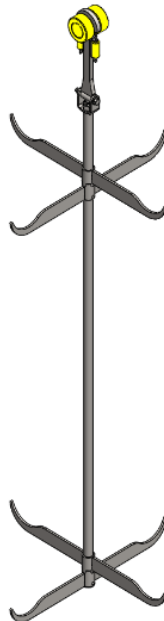
- Upper Carrier Log.
- Extension Rod.
- Lower Carrier Log.

The carrier logs shall be fabricated from stainless steel.

The Carrier bars shall be 50mm diameter tube, totally sealed to prevent the ingress of water and dirt. Each bar shall be fitted with 4 suitable to carry sheep or goats weighing up to 50kg. The hooks shall be arranged so that the hooks on the top carrier are not directly above the lower hooks.

The extension rod shall be hooked to the bottom of the top carrier and to the top of the bottom carrier. The distance from the top hooks to the bottom hooks shall be approximately 1400mm. The rod shall be fabricated from 12mm diameter stainless steel.

The carrier log assembly shall be hooked onto a twin-rail track roller (described elsewhere). The connection between the carrier and the skid shall allow the carrier to freely revolve around its own axis (i.e. to swivel).



#### **19.4. Overhead track scale**

The scale shall be of an electronic operation. It shall be suitable for linking to the employer's data management system.

The track section shall fitted to the scale frame shall be suitable to use with the bi rail track system, and conform to the same specification as the dressing rail system.

It will have a minimum length of 800mm.

The scale shall have a capacity of not less than 1000 kgs, with a five digit display and tare function. The scale shall included a back up battery which is capable of working for 48 hours without power and store 100 weighing records in memory.

The mounting bracket/shelf for the display unit shall be included under this clause.

The display unit and all electrical connections shall be dust and waterproof (IP 65 rated) to accommodate the rigorous wash-down procedures experienced in abattoirs.

#### **19.5. Automatic washing unit**

This item shall be used to automatically wash and sterilize the bleeding shackles and dressing gambrels.

The unit shall consist of a stainless-steel cabinet and spray system.

The cabinet dimensions to suit the hook or shackle being washed. The cabinet shall surround the dressing gambrels or shackles and the conveyor and be attached to the overhead steelwork. The design of the cabinet shall prevent excessive vapour or water escaping through the roof or sides of the unit. The unit shall be fitted with a vent pipe which shall be routed to the outside of the building. Removable panels shall be provided in the sides of the cabinet for cleaning and maintenance. The cabinet shall include a drain pipe which shall be connected directly to the drainage system

The spray system shall be automatically triggered when hooks pass through the cabinet. The spray nozzles shall effectively clean and disinfect hooks and shackless passing though the unit.

The following washing unit shall be provided with according to the same specification but the cabinet and spray system dimensions shall be adjusted, to accommodate different type of hooks/shackles to be washed:

- Sheep/Goat Bleeding shackles automatic washing unit
- Sheep/Goat Dressing gambrels automatic washing unit

#### **19.6. Track roller and carrier log washing unit**

This assembly shall consist of 3 stainless steel tanks mounted on a frame. The washing and rinsing tanks shall each be approximately 600mm(long) x 450mm (wide)x 450mm (deep) and formed with a common splash back 400 high.

Water connections (20mm dia.) shall be mounted on the splash back, complete with stop valves and hoses, above the washing and rinsing tank. Each tank shall be provided with a combined drain and overflow.

The washing tank shall be provided with a thermostatically controlled electric element, of not less than 4kW, to maintain the water in the tank at approximately 40°C. A perforated plate shall be installed in this tank to protect the element.

The sterilizing tank shall be similar to the washing tank but the heater elements shall be not less than 8 kW to maintain a temperature of 82°C, also this tank shall be fitted with a dial thermometer. The elements shall be suitable for operation in hard and dirty water.

### **19.7. Quarter lowering conveyer**

This unit shall comprise of a of automatic lowering conveyer mechanism used to lower carcass quarters or sheep/goat carriers suspended on a bi-rail track roller to a lower level suitable for personnel to carry carcasses into vehicles in dispatch areas.

The lowerator shall be designed to that quarters and sheep/goat carcasses on gambrels are lowered safely without causing excessive swinging.

The track rollers shall be lowered from the high-level rail track system, approximately 3.4m high to the to approximately 2.2m high.

The unit shall consist of a main frame constructed of stainless (AISI 304) steel which shall be supported from the overhead steelwork. The framework shall support the rail, chain and drive unit.

The chain shall be stainless steel hollow bearing pin conveyor chain. To this chain shall be attached pusher/catch fingers which shall engage on the dressing rollers.

The drive shall be from a T.E.F.C. electric motor of not less than 1.5kW through a suitable transmission arrangement to provide a suitable delivery rate.

An automatic feeder shall be provided which will allow only one roller at a time to enter the lowerator and prevent rollers jamming on the pushers.

Limit switches shall be provided on the exit rail to stop the conveyer when this rail is full of rollers and to re-start the conveyer when space is available.

### **19.8. Pneumatic lowering/lifting rail hoist**

This unit shall comprise of a of pneumatic hoist mechanism used to lower (or lift) carcass quarters or sheep/goat carriers suspended on a bi-rail track roller to a lower level suitable for personnel to carry carcasses into vehicles in dispatch areas (or to lift sheep/goat carriers to the high rail track)

The device shall consist of pneumatic hoist fitted with a section of bi-rail track. The hoist shall lower the section of twin track whilst a roller is suspended on the portion of rail.

The device shall align with twin-rail track system installed in the dispatch so rollers can roll smoothly onto this rail to be lowered. The hoist shall be designed for a safe working load of 500 kg.

A safety mechanism to prevent track roller running off the lowered track shall be included.

The hoist shall be controlled by switch positioned such that it does not foul the animal or interfere with the operator's functions. The hoist switch and starter shall be suitable for not less than 150 starts / hour and incorporate inching facilities. The hoist shall incorporate limit switches to prevent over hoisting or lowering.

The cylinder shall have a minimum stroke of 2000mm.

The device shall be suspended from the overhead steelwork (measured elsewhere).

## **20. Hygienic Equipment**

### **20.1. Wash Hand Basin with Sterilizer**

Wash hand basin to be freestanding or mounted on stainless steel worker platforms (described elsewhere).

The entire units shall be manufactured from stainless steel. Particular attention shall be given in the design and construction, to the continuity and uniformity of welds and to the elimination of areas where dirt and solids can collect and which are difficult to clean. The basin shall have as little exposed welds as possible.

All pipe work on the basin and steriliser shall also be supplied. Stainless steel drainpipes shall be supplied to connect the unit directly to floor drain connections at floor level. The unit shall be connected, with an isolating valve, to the 45°C water reticulation system.

The basin shall be fitted with a water saving spray delivery spout mounted. The flow of water to the spout shall be controlled by a spring-loaded knee or foot operated valve.

Hand and elbow operated soap and sanitizer dispensers shall also be fitted to the splash back of the basin and included in the cost of this item.

A knife steriliser shall be fitted to the side of the basin and arranged to overflow independently of the basin. A rack shall be provided in the steriliser to hold knives and sharpening steels. The rack shall be positioned so that the whole of the blade and handle to blade joint is in hot water but that the handle remains moderately cool.

The steriliser shall be fitted with a thermostatically controlled electric heating element, of not less than 3kw, set to maintain the water at 85°C. The element shall be suitable for operation in dirty water or so arranged that it is protected. The flow of water shall be controlled with a needle valve or orifice plate to achieve a flow rate of approximately 0.3 litres per min. The drain from the steriliser shall be connected into the drain of the basin to provide a single outlet for connection to the floor drainage system.

### **20.2. Wash Hand Basin with saw sterilizer**

This unit shall be similar to the “wash hand basin with knife sterilizing unit” (described elsewhere) but the steriliser shall be able to accommodate a handsaw, used for quartering.

### **20.3. Wash hand Basin (Single station)**

This unit shall be as specified for the “wash hand basin with knife sterilizing unit”, except it excludes the knife sterilizer

### **20.4. Wash hand Basin (Triple station)**

This unit shall be as specified for the “wash hand basin with knife sterilizing unit”, except it excludes the knife sterilizer

### **20.5. Hand and Apron wash with knife sterilizer (platform mounted)**

This apron wash, hand wash and knife sterilisation combination unit shall consist of a shallow stainless-steel splash screen with waterspout and drip pan and drainage piping. Soap dispenser and knife sterilizer shall be mounted on the face splash back. A foot or knee valve shall be included for activating the flow of water. The water spout shall be so positioned that the operator can effectively wash either hands or apron. The unit size shall compactly to fit onto the operators platforms without obstructing work operations.

The units shall be supplied complete with the necessary valves complete. The sterilizer and shall conform to the specification outlined in “wash hand basin with sterilizer” specification.



### **20.6. Apron washing units**

The unit shall allow aprons to be hooked onto the splashback to be washed with scrubbing brush hose nozzle. The unit shall include a foot rest to allow for manual washing of boots.

These shall be manufactured from a stainless-steel splash screen with food grade heavy duty 15mm diameter flexible hoses fitted with heavy duty hand activated scrubbing brush that allows flow of water through the brush.

### **20.7. Apron hanging wall mounted hooks**

The wall mounted apron hook shall comprise of 6mm diameter stainless steel hooks welded to 50mm x 6mm stainless steel flat strip with connection plates for bolting to walls

The types shall consist of the following types

- 4 Hook Unit 350 long
- 7 Hook Unit 650 long
- 10 Hook Unit 950 long

### **20.8. Manual Boot Wash**

The single station boot wash unit manufactured from stainless steel shall be approximately 350mm wide x 600mm long and comprise a footrest mounted over a drip collection tray, a splash back and a 15mm diameter hose with a scrubbing brush. The stainless-steel drain from the drip tray shall be connected directly to the floor drains.

The flow of water to the hose shall be controlled by a foot actuated valve incorporated into the footrest.

### **20.9. Hygienic control boot and hand disinfection station**

The automatic hygienic control boot wash and hand disinfection station shall be placed at entrances to the main processing areas to clean boots and disinfect hand for personnel before entering the facility.

The unit shall include mechanized horizontal and vertical rotating brushes. The size and positioning of the brushes shall be able to clean sides and bottom of high boots. Brushes to be heavy duty type applicable to food factories and be easily removable to be replaced or to clean. Disinfection chemical shall be automatically sprayed onto brushes during use.

Hand will be disinfected by automatic dispensing hand sanitizer which is activated when hands are placed below the sensors. A tumbling type of turnstile will enforce hand sanitation before allowing personnel to pass through the unit.

The unit to be supplied complete with all the necessary fittings, sanitizer brackets, etc.





## **21. Slaughter tools**

Slaughter tools shall be sourced from a reputable manufacturer with proven experience in manufacture and supply of slaughter equipment. The supplier shall preferably have support locally to provide maintenance and spare part.

All slaughter tools to be provided complete to make the device function as per its intended purpose with necessary fittings, piping, lubricators grease gun, grease, spare blades, balancers with support frame

The following slaughter equipment shall be provided:

### **21.1. Stunning Device**

Source supply install and commission the following:

Jarvis - Non penetrating stunner model: USSS 2 A,

or

EFA – Non penetrating stunner model VB 316

or

similar equipment to be approved

### **21.2. Splitting saw with sterilization unit**

Source supply install and commission the following:

Jarvis – Splitting saw model: Buster V,

or

EFA – splitting saw model: SB 295 E

or

similar equipment to be approved

Furthermore, the included shall be the cleaning/sterilization unit suited to the equipment

### **21.3. Breastbone/brisket saw with sterilization unit**

Source supply install and commission the following:

Jarvis – Brisket opening model: MG-1E,

or

EFA – Brisket opening model: SB 67 longlife

or

similar equipment to be approved

Furthermore, the included shall be the cleaning/sterilization unit suited to the equipment

#### **21.4. Leg/hock cutter and sterilization unit**

Source supply install and commission the following:

Jarvis – Hydraulic cutter for fore- and hind-legs model: 30CL,

or

EFA – Hydraulic cutter for fore- and hind-legs model: Z 14

or

similar equipment to be approved

Furthermore, the included shall be the cleaning/sterilization unit suited to the equipment

#### **21.5. Skinning Dehider**

Source supply install and commission the following:

Jarvis – Dehider Model: JC III A

or

EFA – Dehider Model: EFA 2000

or

similar equipment to be approved

Furthermore, the included shall be the cleaning/sterilization unit suited to the equipment

## **22. Pricing preamble, notes and instruction to tenderers**

- a) The Price Schedules shall form part of the Contract documents and shall be read in conjunction with the Conditions of Contract, General Specification, Particular Specification, Schedules and Drawings.
- b) The Price Schedule includes as far as can be determined, every class of operation, construction, equipment or material which the contractor is likely to be called upon to perform or supply. All rates entered in these schedules shall cover all cost, charges and profits that may be considered necessary to cover all the Contractor's liabilities and obligations under the Contract. The work shall be provided complete and all items necessary for completion of the service in its entirety shall be allowed for and provided by the Contractor, whether specified in detail or not, and no extra price will be considered beyond the Price Schedule for any incidental or contingent work, labour or materials unless detailed by the Sub-Contractor in a covering letter submitted with his tender.
- c) Tenderers are to complete the Price Schedules and enter a unit rate and total amount against each item. Scheduled items, although it is not preferred, can be grouped together and a lump sum entered against them but if any item is left unpriced it will be assumed that allowance has been made in other items to cover it.
- d) The Price Schedules are not to be used for ordering purposes. Any ordering based on scheduled quantities shall be at the sole risk of the Sub-Contractor. The final quantities of these items may vary from the quantities stated in the Schedule as dictated by the actual final details of the installation.
- e) The pricing of items in the Price Schedules shall be such that the final total of the Schedules agrees with the amount tendered. Tenderers are advised to check their item extensions and total additions; the rates will be taken as correct and the Tender Sum adjusted accordingly.
- f) No alteration, erasure or addition is to be made to the text of any part of the documents. Should any alteration, be made it will not be recognised but the original wording will be adhered to.
- g) Contract Works shall be carried out in strict accordance with the provisions of the accepted Tender unless the Engineer shall sanction or request in writing that changes be made.
- h) The words 'Provisional Sum' in the Schedules are intended to provide for works and operations, the scope and extent of which cannot be forecast. Such works will be required to be carried out by the Contractor on the basis of drawings and information furnished by the Engineer at a later date.

### **22.1. Alternatives to specifications**

Should a Tenderer wish to offer alternative materials, equipment or methods to those specified; the tenderer shall provide descriptions and details of these alternatives, with priced rates where applicable. All necessary information is to be provided to make alternative provided comparable to the specification provided.

## **23. Bill of Quantities**

Isiolo Abattoir - Mechanical Equipment Bill of Quantities

ITEM	DESCRIPTION	QTY		UNIT PRICE	AMOUNT
<b>SPEC</b>	<b>16. CATTLE/CAMEL SLAUGHTER EQUIPMENT</b>				
16.1	Cattle Vee Crush	1	No		
16.2	Cattle Restraining Pen	1	No		
16.3	Cattle/Camel Bleeding Hoist	2	No		
16.4	Bleeding Rail				
	a) Camel shackling Area to Cattle shackling Area	25	m		
	b) Cattle shackling Area to Transfer point	20	m		
16.5	Shackle Release Device	1	No		
16.6	Shackle Return Rail	15	m		
16.7	a) Magazine Cattle	4	m		
	b) Magazine Camel	4	m		
16.8	Empty Shackle Lowerator	1	No		
16.9	Transfer Hoist	1	No		
16.10	a) Cattle/Camel Dressing Rail	320	m		
	b) Switch points (3 way)	35	No		
	c) Rail Bends	20	No		
16.11	Secondary Steelwork	16	ton		
16.12	a) Pneumatic stops	20	No		
	b) Automated Control System	1	Sum		
16.13	Static Operators Platforms				
16.13.1	Camel stunning Platform	1	No		
16.13.2	Transfer platforms	1	No		
16.13.3	Brisket opening platform	1	No		
16.13.4	Rough(white) offal evisceration platform	1	No		
16.13.5	Red offal evesceration platform	1	No		
16.13.6	Movable dispach platform	2	No		
16.14	Pneumatic leg spreader	1	No		
16.15	Evisceration Rough offal Slide	1	m		
16.16	Feet and Udder chutes	2	No		
16.17	Variable Height Platforms				
16.17.1	Splitting platform	1	No		
16.17.2	Inspection and trimming platform	1	No		
16.19	Hide Trolley	1	No		
<b>TOTAL - Carried to next page</b>					





Isiolo Abattoir - Mechanical Equipment Bill of Quantities

ITEM	DESCRIPTION	QUANTITY		UNIT PRICE	AMOUNT
	<b>18. OFFAL HANDLING EQUIPMENT</b>				
18.1	Offal Tables(general)				
18.1.1	Heads and feet receiving table	1	No		
18.1.2	Heads washing table	1	No		
18.1.3	Feet washing table	1	No		
18.1.4	Red offal seperation table	1	No		
18.2	Rough(White) offal paunch(tripe) receiving, separation and opening tab	1	No		
18.3	Paunch(tripe) waste blow tank	1	Sum		
18.4	Bible slide	1	No		
18.5	Bible soaking tank	1	No		
18.6	Paunch(tripe) washing tank	1	No		
18.7	Intestine slashing and washing unit	1	Sum		
18.8	Rotary Drip rack	2	No		
18.9	Fixed hook rack	2	No		
18.1	Offal trolley	2	No		
18.11	Blood collection tank	2	No		
18.12	Blood pump	2	No		
<b>TOTAL CARRIED TO TENDER SUMMARY (SECTION 3)</b>					



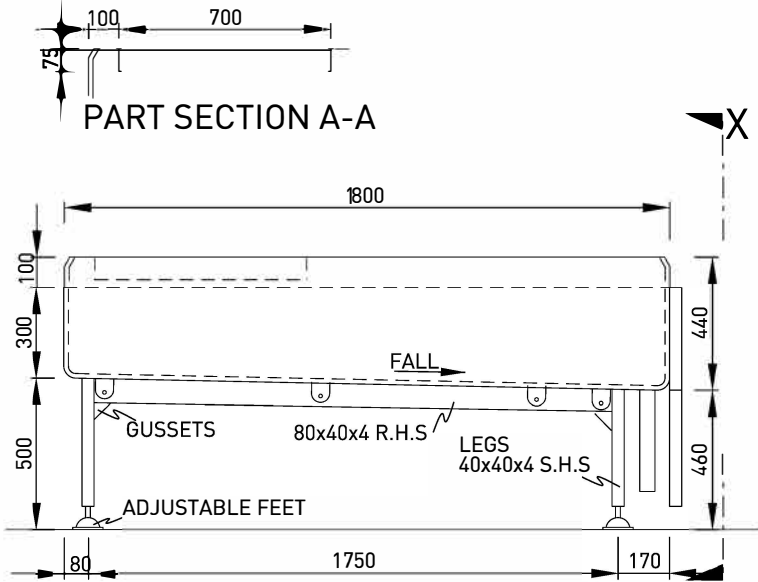




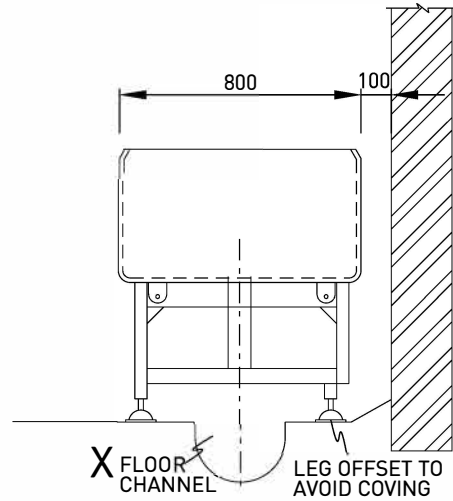


Isiolo Abattoir - Mechanical Equipment Bill of Quantities

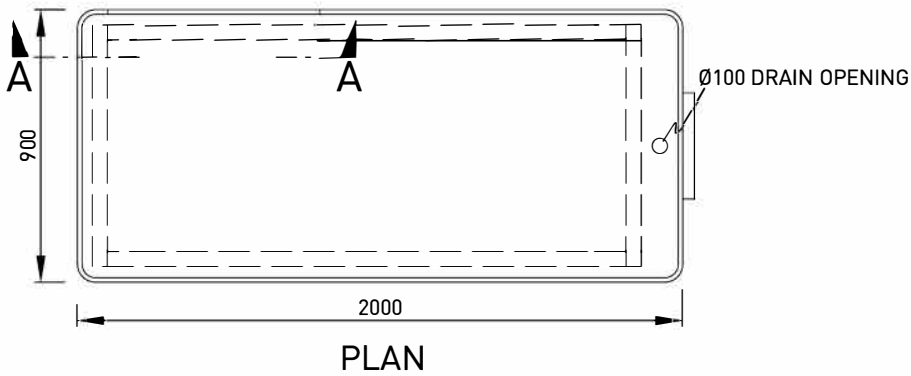
SUMMARY			
SECTION	DESCRIPTION	TOTAL PRICE (KENYAN SHILLING)	TOTAL PRICE (U.S. DOLLAR)
1	Cattle/Camel Slaughter Equipment (Specification Schedule 16)		
2	Sheep/Goat Slaughter Equipment (Specification Schedule 17)		
3	Offal Handling Equipment (Specification Schedule 18)		
4	Transport Rail System (Specification Schedule 19)		
5	Hygiene Equipment (Specification Schedule 20)		
6	Slaughter tools (Specification Schedule 21)		
7	Provisional Sums		\$ 100,000.00
<b>SUB-TOTAL</b>			
Add 10% Contingency Amount			
<b>TOTAL</b>			
Installation Costs			
Transport/Shipment Costs			
Flights and Accomidation			
Training Costs			
<b>TOTAL CARRIED TO FORM OF TENDER</b>			



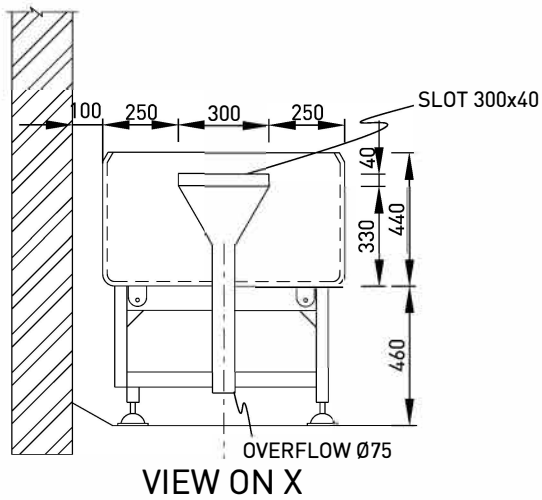
FRONT ELEVATION



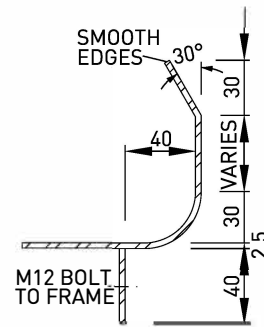
END ELEVATION



PLAN



VIEW ON X



TYPICAL EDGE DETAIL  
SCALE: NTS

**NOTES:**

- TOP TO BE STAINLESS STEEL 2mmTHK
- ALL WELDS TO BE CONTINUOUS
- SUPPORT FRAME TO BE MILDSTEEL HOT DIP GALVANISED AFTER FABRICATION OR STAINLESS STEEL
- REMOVE ALL BURRS AND SHARP EDGES AND GRIND SMOOTH.
- ALL HOLLOW SECTIONS TO BE CLOSED AND RENDERED WATERTIGHT.



**SCIP ENGINEERING GROUP**  
JOHANNESBURG  
WITBANK

IN PARTNERSHIP WITH:



PO Box 48550  
Roosevelt Park, 2129  
Johannesburg  
South Africa

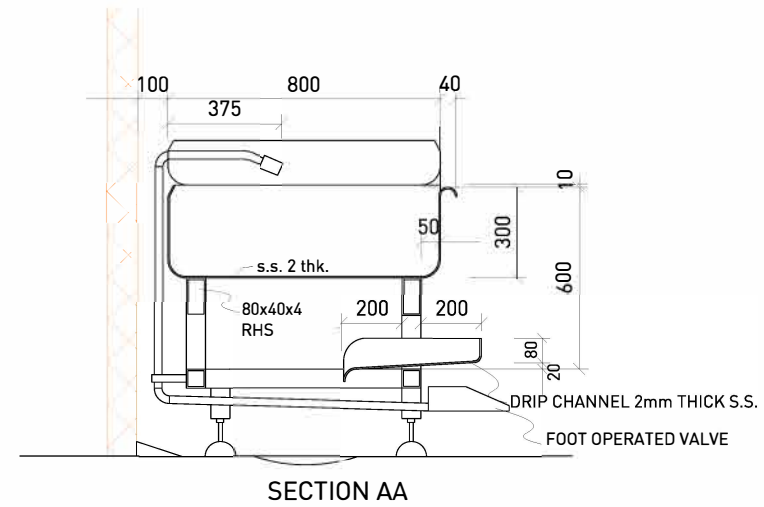
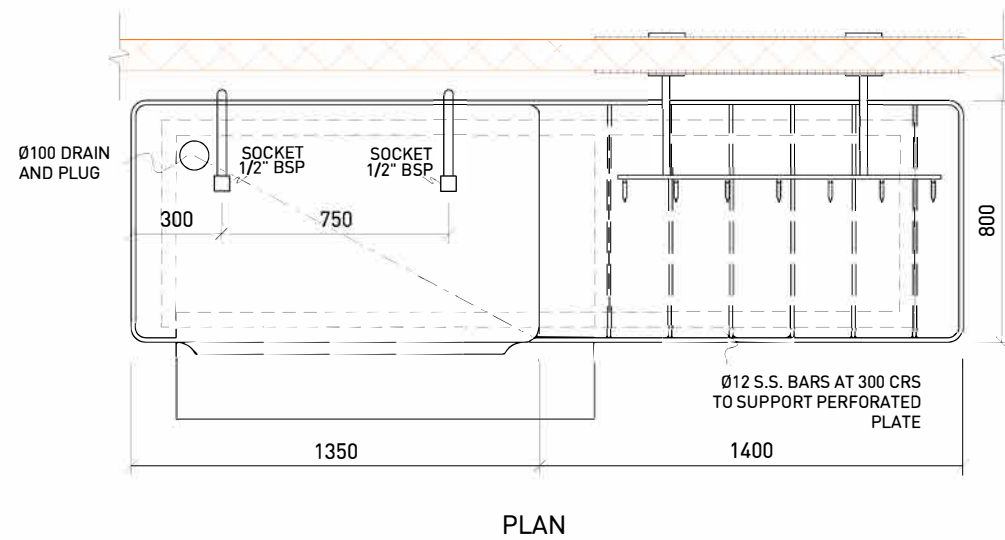
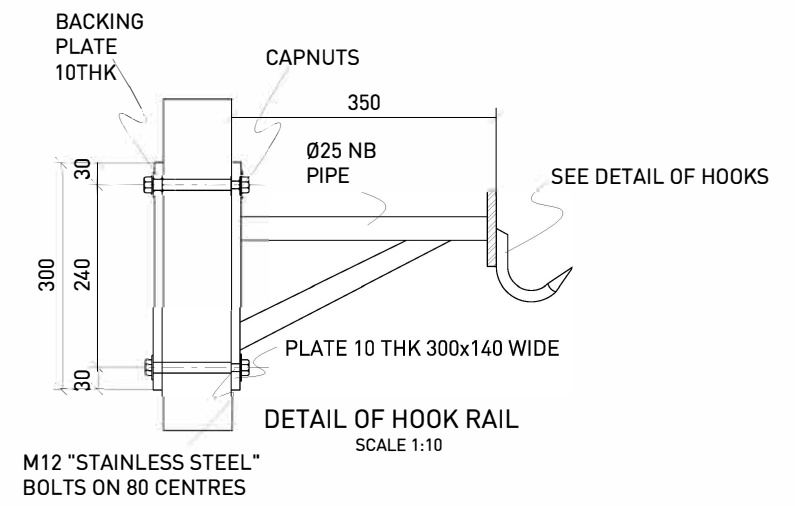
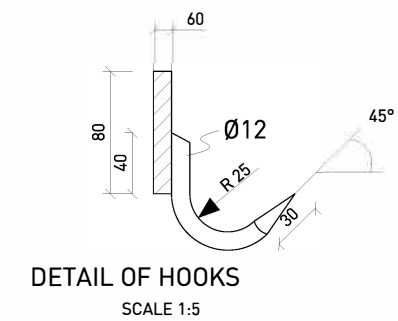
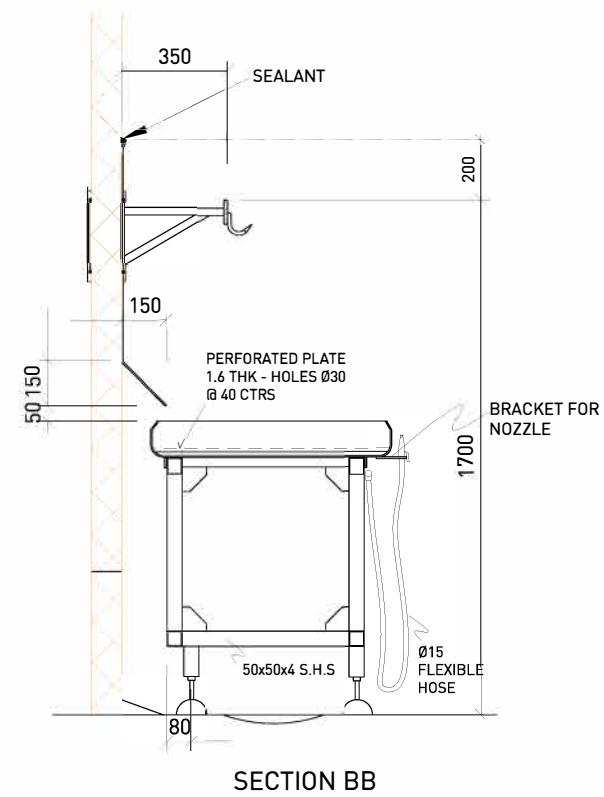
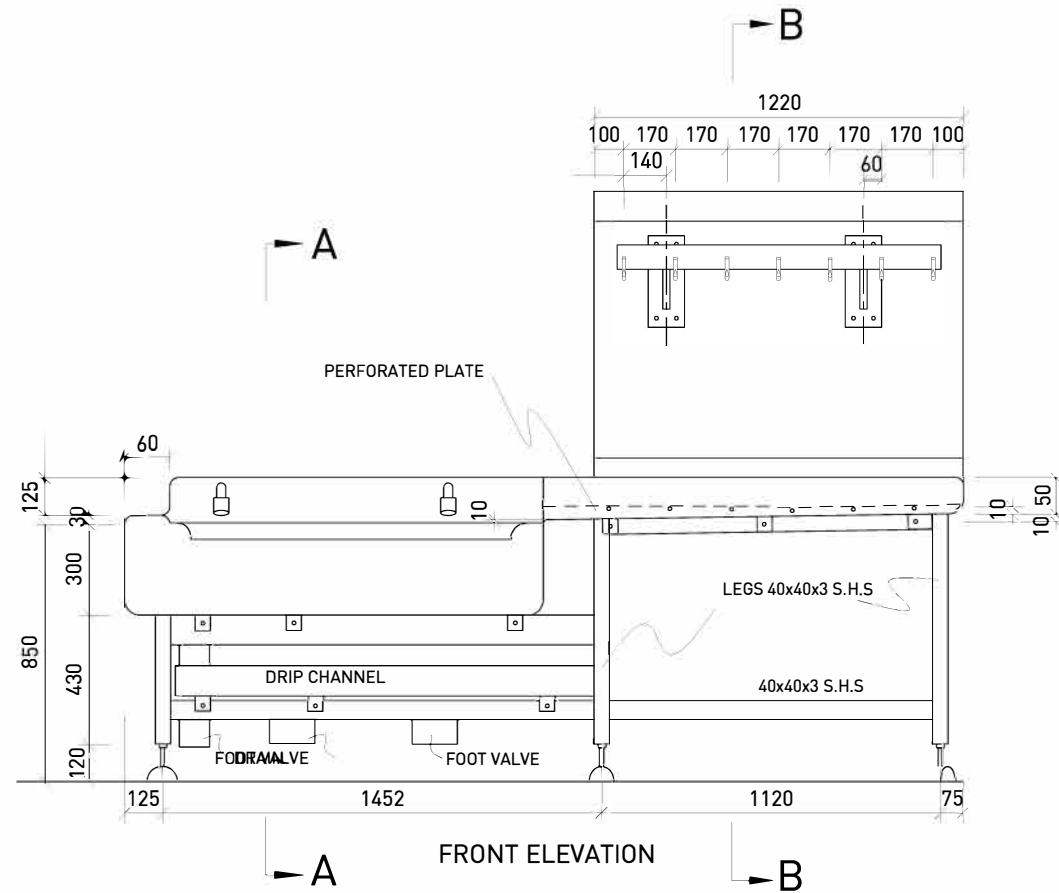
Tel: 011 888 1425  
Fax: 011 888 1075  
johburg@scip.co.za  
www.scip.co.za

VAN VLIET DE WET & PARTNERS

PROJECT  
**ISILO COUNTY ABATTOIR**

DESCRIPTION  
**BIBLE SOAKING TANK**

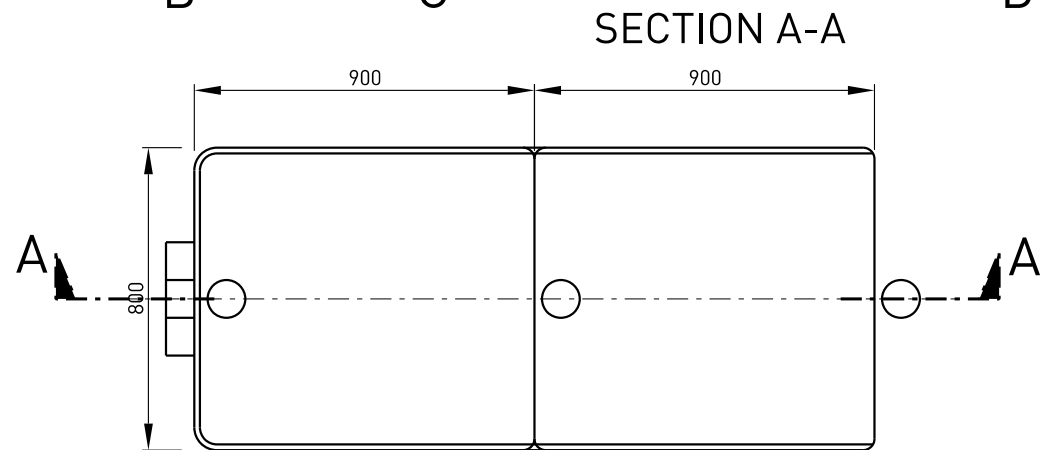
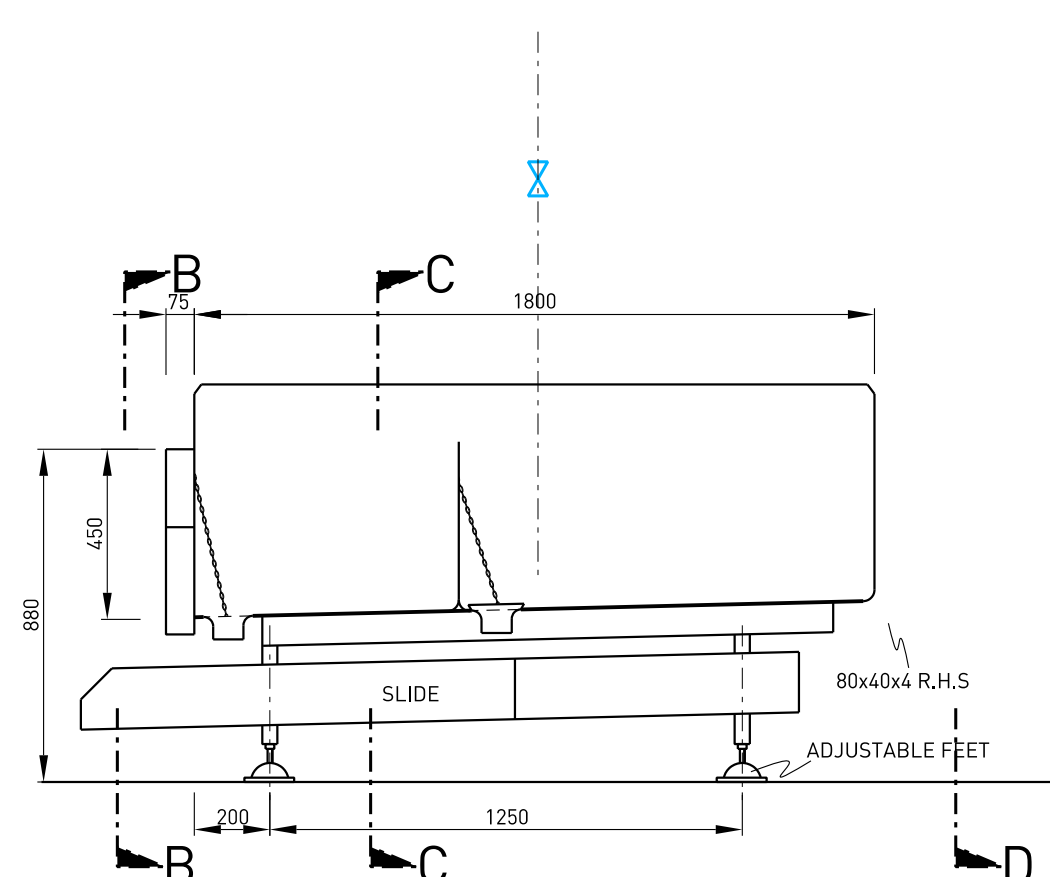
DATE	MARCH '21	DRAWN	PF	SCALE	1:25	A4
DESIGNED	B.C	DRAWING NO.				
CHECKED	--	1898-MD-28 - Rev -				



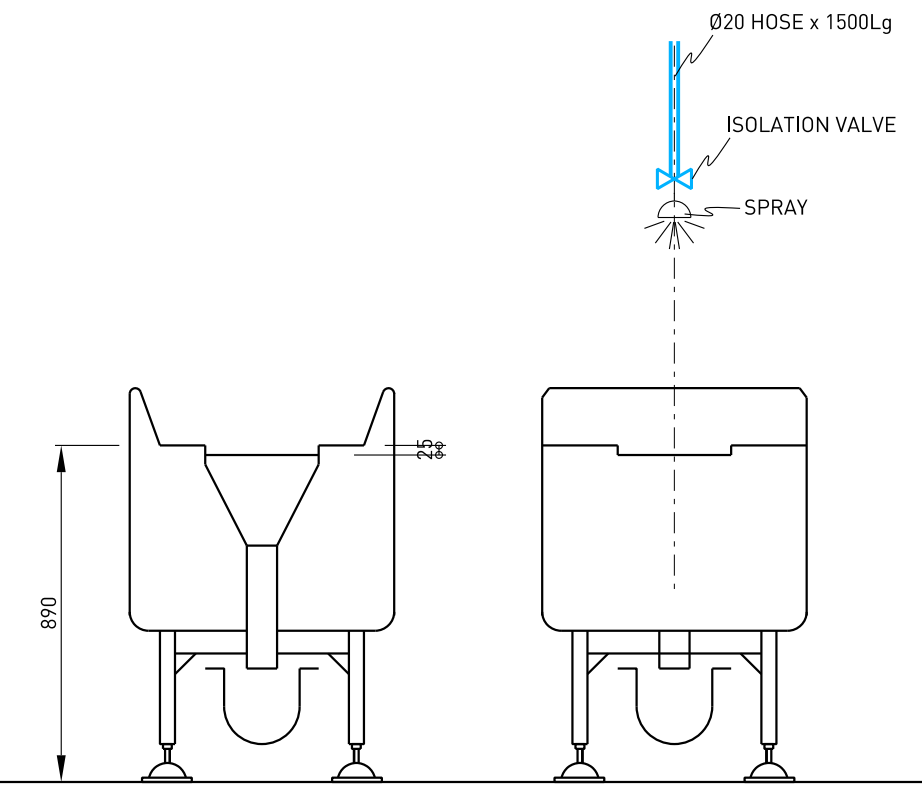
- ALL WELDS TO BE CONTINUOUS
- MATERIAL OF FRAME TO BE M.S. HOT DIP GALVANISED AFTER FABRICATION OR STAINLESS STEEL
- TOP, TANK, DRIP CHANNEL 304 L STAINLESS STEEL


**SCIP** ENGINEERING GROUP  
 JOHANNESBURG WITBANK  
 IN PARTNERSHIP WITH:  
 VAN VLIET DE WET & PARTNERS  
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 Johannesburg  
 Gauteng  
 Tel: 011 888 1425  
 Fax: 011 888 1075  
 joburg@scip.co.za  
 www.scip.co.za

PROJECT	ISILO ABATTOIR	DRAWN:	GM	SCALE:	1:25 AND AS NOTED	DETAIL NO.:	MD30
DRAWING TITLE	CATTLE INTESTINE SLASHING UNIT	DATE:	JULY 2022	JOB NO.	1898	REV.:	

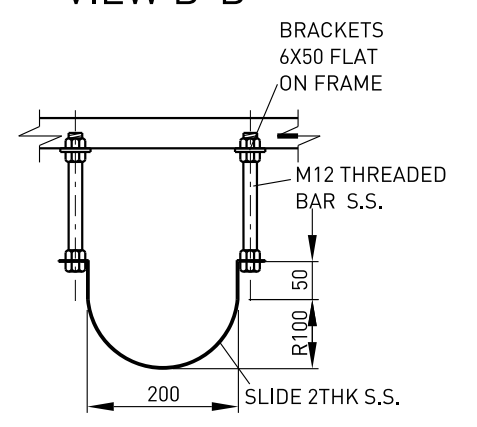


PLAN  
GRID OMMITTED FOR CLARITY



VIEW B-B

SECTION C-C



SECTION B-B  
1:10

NOTES:

- TOP TO BE 304L STAINLESS STEEL 2mmTHK
- ALL WELDS TO BE CONTINUOUS
- SUPPORT FRAME TO BE MILDSTEEL HOT DIP GALVNISED AFTER FABRICATION.
- REMOVE ALL BURRS AND SHARP EDGES AND GRIND SMOOTH.
- HOLLOW SECTIONS TO BE CLOSED AND RENDERED WATERTIGHT.

**SCIP ENGINEERING GROUP**  
JOHANNESBURG WITBANK  
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Gauteng

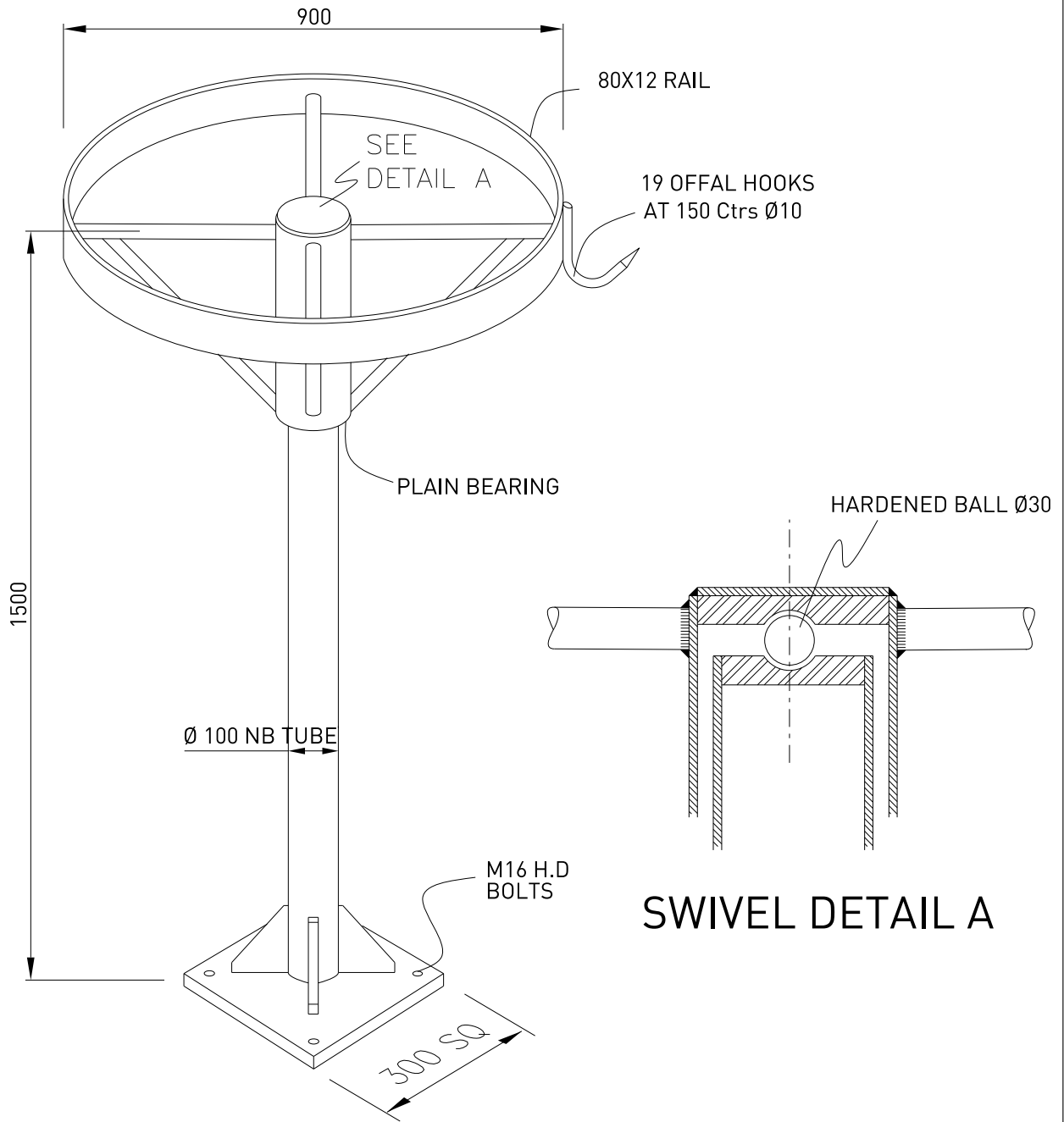
Tel: 011 888 1425  
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PROJECT	ISILOLO COUNTY ABATTOIR		
DRAWING TITLE	CATTLE PAUNCH AND BIBLE WASH UNIT		

DRAWN:	G.M
DATE:	MARCH 2021

SCALE:	1:20
JOB NO.	1898

DETAIL NO.:	MD-31/B
REV.:	



 <p><b>SCIP</b> ENGINEERING GROUP JOHANNESBURG WITBANK</p> <p>IN PARTNERSHIP WITH:</p>  <p>VAN VLEET DE WET &amp; PARTNERS</p> <p>PO Box 48550 Roosevelt Park, 2129 Johannesburg Gauteng</p> <p>Tel: 011 888 1425 Fax: 011 888 1075 j@scip.co.za www.scip.co.za</p>	PROJECT	DATE	2022	DRAWN	GM	SCALE	NTS	A4
	ISILO ABATTOIR	DESIGNED	B.C	DRAWING NO.				
	DESCRIPTION	CHECKED	--	1898-MD-118 - Rev -				
<b>ROTARY DRIP RACK</b>								





NO.	DATE	REVISION	BY
A	2022-07-18	REVISED SECTION A-A TO SHOW COLD DISPATCH	FJ/P
			NM



**SCIP** ENGINEERING GROUP  
JOHANNESBURG  
WITBANK

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Gauteng  
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Fax: 011 888 1025  
jburg@scip.co.za  
www.scip.co.za



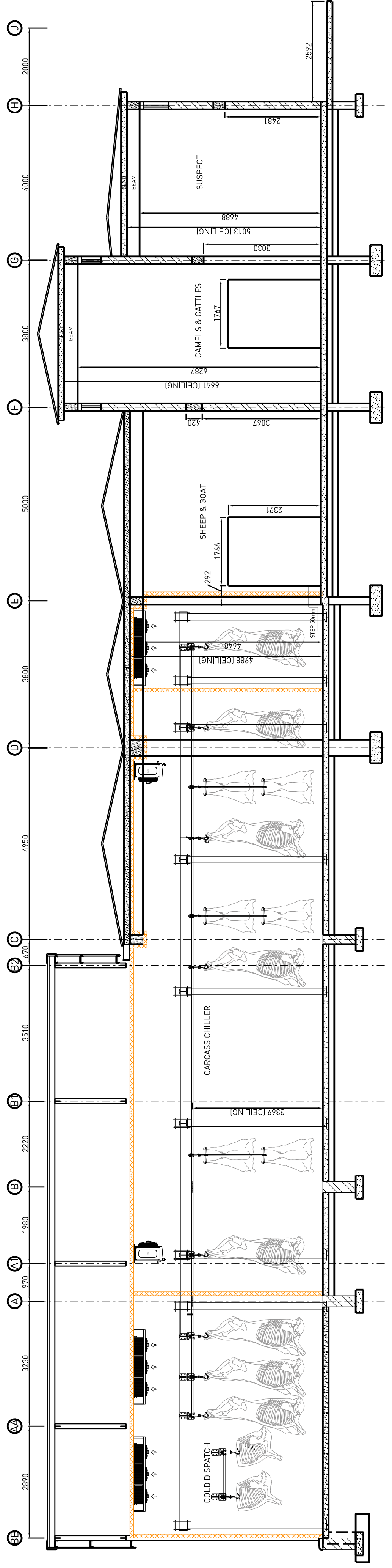
IN PARTNERSHIP WITH:  
VAN NIEUW WET & PARTNERS

CLIENT  
**KENYA CLIMATE SMART AGRICULTURE PROJECT**  
ISIOLO COUNTY

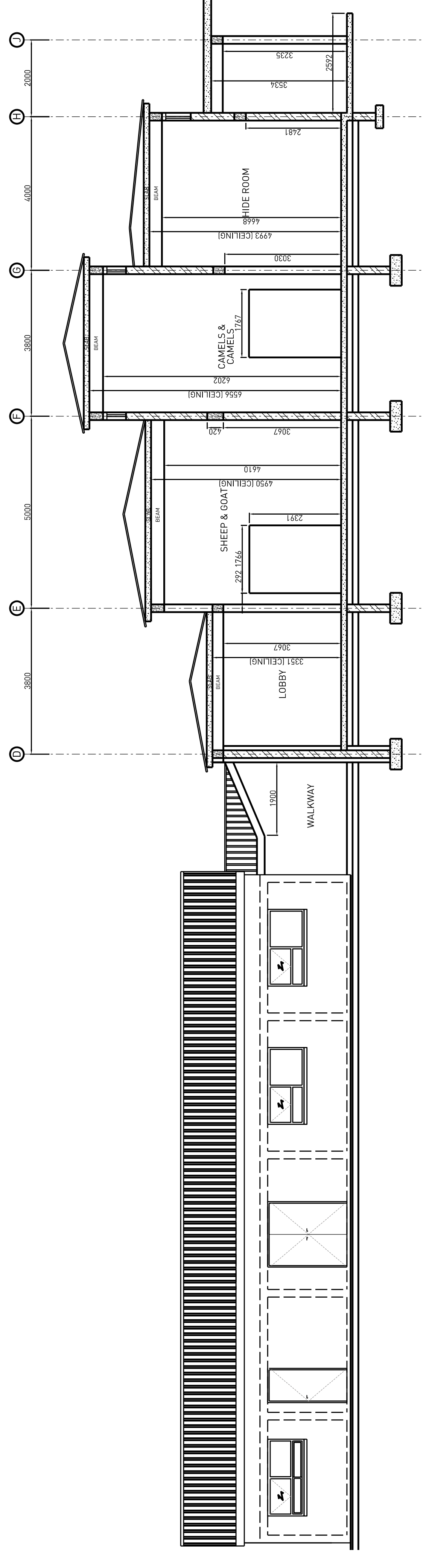
PROJECT  
**ISIOLO ABATTOIR**

DESCRIPTION  
**PROPOSED ABATTOIR SECTIONS**

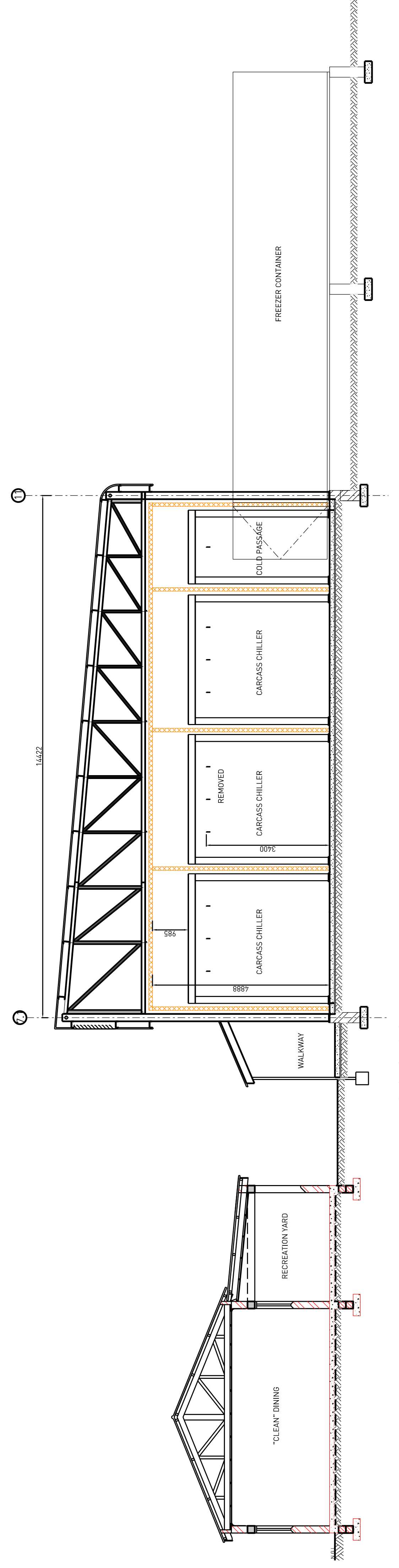
DESIGNED	SCALE	PAPER SIZE
DRAWN	1:75	A1
CHECKED	DATE	DECEMBER 2020
SIGNED	GM	
		CONSTRUCTION AS BUILT DRAWING
		CONCEPT DRAWING
		TENDER DRAWING
		DRAWING STATUS
DRAWING No.	<b>1898-G0-06</b>	
REVISION:	<b>A</b>	



SECTION A-A



SECTION B-B



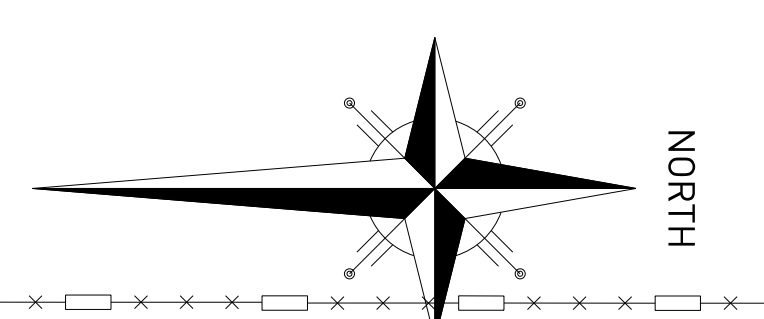
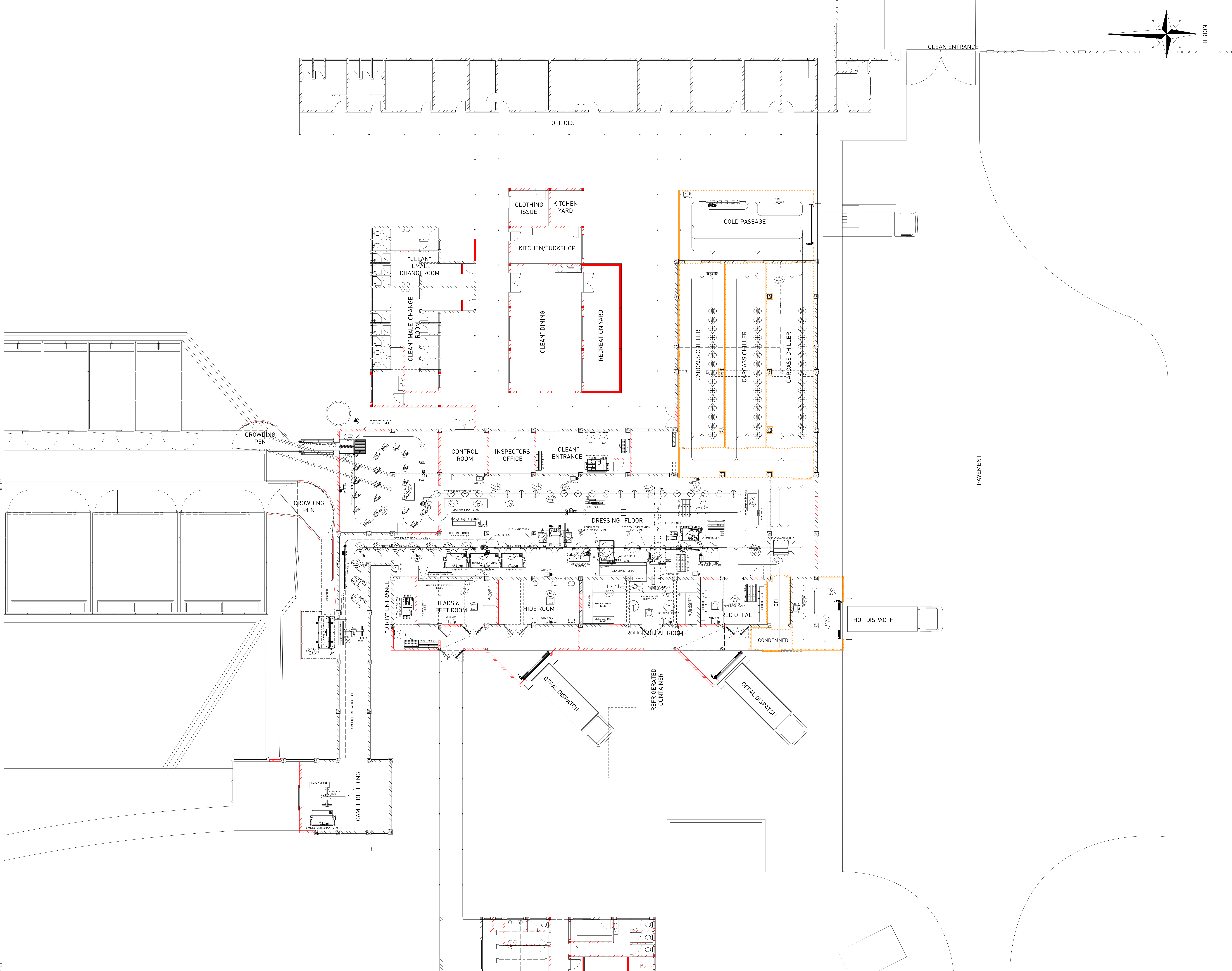
SECTION C-C



1:1000

1:1000

1:1000



- LEGEND:**
- NEW WALL
  - INSULATION PANEL WALL
  - EXISTING WALL
  - CONCRETE COLUMN
  - EXISTING WALL REMOVED

NO.	DATE	REVISION	BY
A	21-07-2022	ISSUE FOR TENDER	LR
			NM

**SCIP ENGINEERING GROUP**  
 JOHANNESBURG  
 WITSBANK

IN PARTNERSHIP WITH:

**W**  
 WILSON PEREIRA & PARTNERS

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CLIENT	ISILOLO COUNTY ABATTOIR		
PROJECT	KENYA CLIMATE SMART AGRICULTURE		
DESCRIPTION	EQUIPMENT LAYOUT		
DESIGNED	SCALE	1:200	PAPER SIZE A0
DRAWN	GM	DATE	DEC 2020
CHECKED			
SIGNED			
DRAWING NO.	1898-M0-01	REVISION	-