

Bid specification for the upgrade of Moedersbond Project

Scope of work

- To refurbish Tunnel complexes according to the specifications outlined.
- The contractor is responsible for the following: All building material and parts to complete this project. (e.g. steel bolts, nuts, cement, sand, etc.).
- The contractor is responsible for the Safety and Health Environment requirements according to the OHS Act until the site is handed over to the ARC-VIMP
- No holes will be permitted since this must be an insect free environment. See paragraph Stainless steel netting.
- Fill all gaps between wet wall, gutters and wall/structure with expanding foam that is weatherproof and damp proof. The foam must be non-toxic and must not expand, shrink or decay once cured. Does not support mold or fungus
- The contractor will be responsible to provide:
 - All building material, i.e., cement, 19mm, bricks, stone and sand
 - Electricity needed by contractor if and when there is no electricity supply at VIMP
 - Water needed by the contractor if and when there is no water supply at VIMP

Standards & dimensions

- All work to comply with the National Building Regulations & Building Standards Act SANS 0400 1990 (or latest). Local council requirements & all relevant specifications and codes to be adhered to.
- All dimensions, levels, and heights have to be verified on-site and any discrepancies to be reported to the ARC project leader before any work takes place.
- No second-hand equipment of any description may be offered for supply or installation.
- Tenderers must satisfy themselves that the equipment offered by them can be accommodated in the available space and positioned in such a way that access for maintenance, repairs, or removal is not obstructed.
- Indicated dimensions to be taken in preference to scaling. Overall dimensions (external) to take precedence.
- All dimensions, levels, and heights must be checked on-site and any discrepancies to be reported to the Engineers before any work takes place.
- All dimensions on drawings and documents must be checked before commencing any work and/or compiling of tenders. Bidders shall be responsible to obtain the correct measurements and provide costing

accordingly. ARC shall not be held liable for inaccurate measurements provided.

- Within 7 days of being issued with a purchase order, the contractor must indicate what information, drawings or specification are still outstanding or need clarification. After 7 days, it is assumed that the contractor knows exactly what must be done and no delays will result in this respect

SPECIFICATIONS: REPAIR OF TUNNEL B10

- Measurements of the outside structure; $\pm 48\text{m} \times 37\text{m}$
- Greenhouse roof shape: Gable roof
- Steep incline to entrance door
- Brick and mortar room in one corner of building

Photos of B10



General repair

- Cleaning of site - See paragraph: Site cleaning
- Keep the steel structure
- Paint structure: See paragraph: Painting: Galvanized steel structures

- Repair 2 doors. Install hinges for locks and provide locks and keys. Ensure doors can close and open properly: See paragraph - Tunnel doors
- Replace the missing downpipes/gutters and 7 damaged gutter (6.5m long) outside the tunnel
- Service the drainage system and put the new grids/sieve on top of the drainage system to protect it from blocking
- Refurbish steel tables, See paragraph: Painting: Galvanized steel structures, Quantity 38
- Revamp the existing wash concrete trough. (Complete with P- Trap)
- Install a single wash concrete trough (Complete with P- Trap, and Sturdy, SABS approved Cold water tap in each basin) inside the tunnel. Drain water will be channeled to the field, 6m from the structure
- Install 9kg DCP Fire Extinguisher, Quantity 2

Quarantine entrance

- Construct a double door entrance
- Using the natural ground level (Floor will be on an incline)
- See paragraph: Double door quarantine entrance
- 100mm pipe under floor to allow for water flow
- New powder footbath. See: Powder footbath

Polycarbonate translucent

- Replace the roof and wall sheets that are broken: See paragraph: Polycarbonate translucent polycarbonate sheets.
- Replace 17 damaged wall sheets.
- Replace 12 damaged roof sheets:
- See paragraph: Polycarbonate Translucent Roof Sheeting

Sealing of building

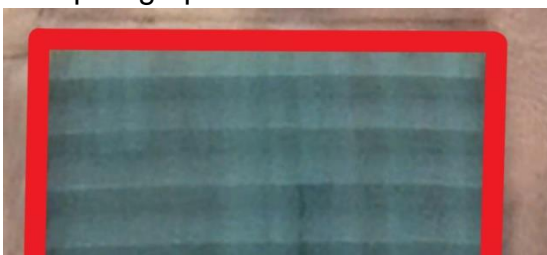
- Building must be sealed with expansion foam between the corrugation of the Polycarbonate and the walls.
- Paint of Fibre-Reinforced Waterproofing over foam 120mm wide covering walls and structure.

Apron inside tunnel

- Replace concrete 46x2m inside the tunnel next to the extracting fans.
- See paragraph: Concrete

Apron around tunnel

- New Concrete around tunnel, 4 x 115m Red line on photo
- New Concrete around tunnel, 4 x 55m Blue line on photo
- See paragraph: Concrete



Shade net structure

- Using existing steel structure
- Paint steel structure: See paragraph Galvanized steel structures
- Replace shade net (this will be provided by the ARC) on top of the tunnel
- See paragraph: Shade netting

Brick and mortar room

- Repair roof leak
- Repair ceiling
- Repair damp on wall
- Paint walls and ceilings. See paragraph: painting

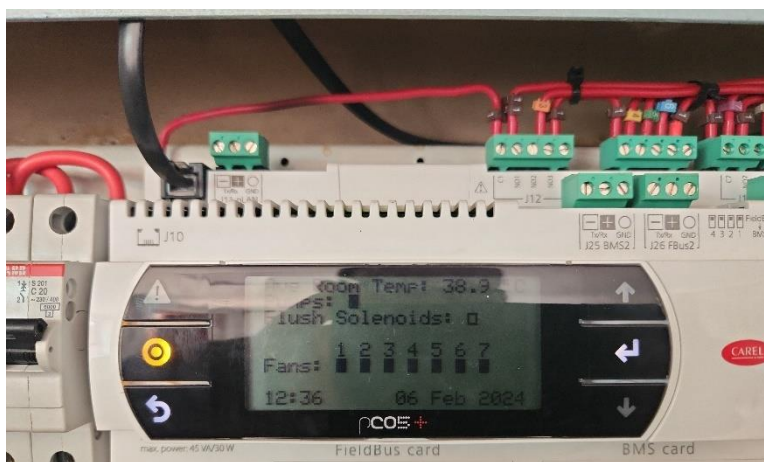
Wet wall

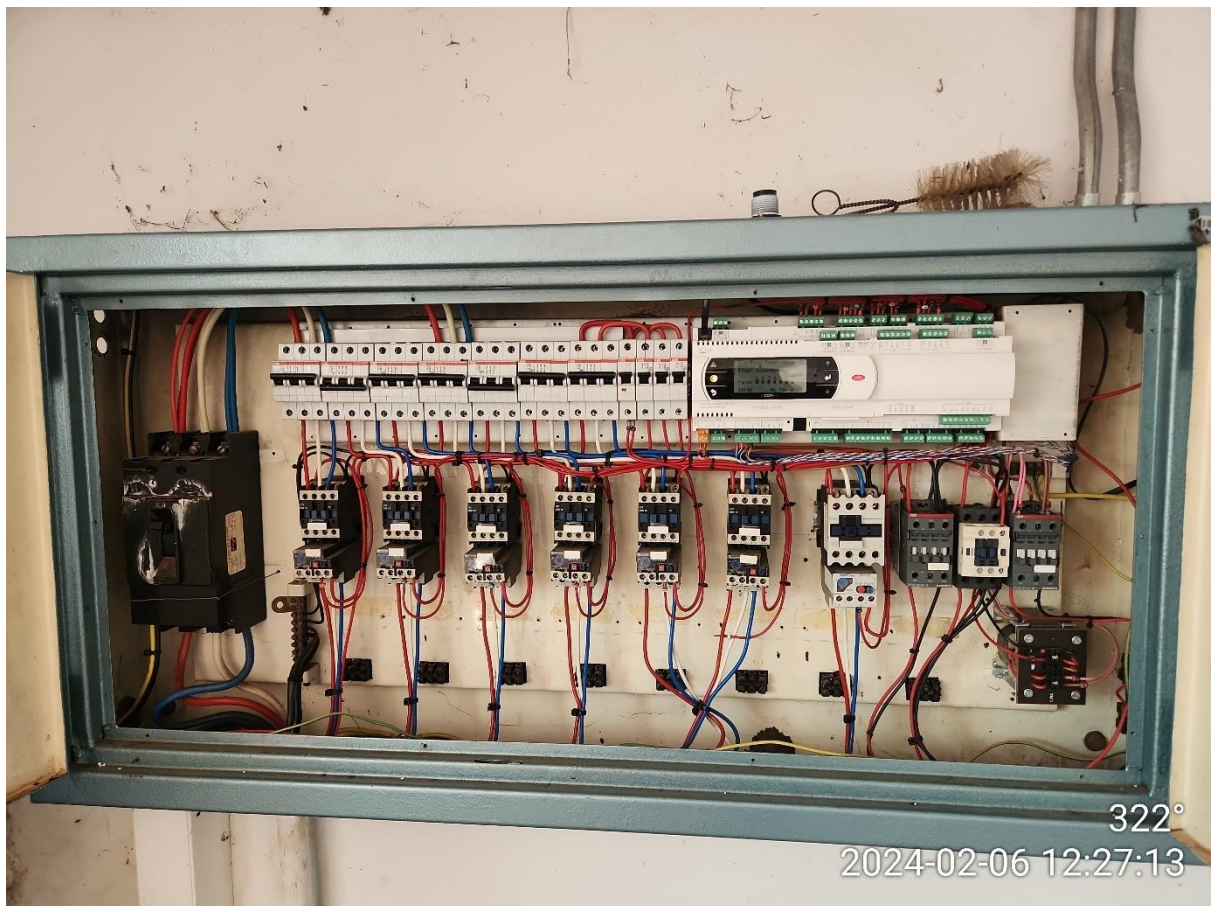
- Size of wet wall 46m x 1.6m
- New Pumps
- New valves, ball valves
- Use existing tanks
- See paragraph: Evaporation system / Wet wall system

Extractor system (7 Fans)

Motor control for fans in Distribution Box

- Using existing equipment, service electrical panel
- Replace all damaged wires
- Replace all relays
- Replace main isolator





Servicing extractor fans

- Painting motor, frame, and fan enclosure: See Painting Galvanized steel structures.
- Replacing bearings of motors
- Service motor windings by spraying Glyptal wire isolating coating.
- Replacing all wires from switch to fan
- Replace isolating switch
- Replace rubber seal around fan and cowling

Irrigation

- Using existing pipes and irrigation nozzles.

- Replacing Irrigation Computer and valve with state-of-the-art equipment. See Paragraph: Irrigation (hand over the old computer and valves to the ARC project manager)

Equipment	Quantity
Computer	1
Irrigation valves	22

SPECIFICATIONS: REPAIR OF TUNNEL B13

- Measurements of the outside structure; Length = 40 m and breadth = 30 m, height of walls 2.3m
- Greenhouse roof shape: Arch roof

Photos of B13



General repair

- Site cleaning - See paragraph: Site cleaning
- Keep the structure
- Painting steel structure: See paragraph: Galvanized steel structures
- Repair 3 doors: See paragraph - Tunnel doors
- Service the drainage system and put the new grids/sieve on top of the drainage system to protect it from blocking
- Replace steel post in corner of building (see photo) with 50mm x 3m length galvanized pipe (2 mm thickness)
- Replace “legs” that support screen before the wet wall. Length 420mm, Quantity 7
- Replace lip channel (see photo) with hot dipped galvanized lip channel 75mm x 50mm x 20mm. It is ±3m long.



- Repair structure cross braces near the wet wall with 5mm stainless steel cable.

Quantity	Replace/Service
	Replace
	Service



- Replace upper plant supporting cable turnbuckles with hot dipped galvanize M4 Turn buckles, Quantity 30



- Replace only the gutter on top of the wet wall with galvanized gutter.



- Replace cross steel wires near the wet wall
- Replacing the poles that support stainless steel mesh frame on the outside with the same existing material, Length 420mm, Quantity 7



- Painting of poles on the outside: See paragraph – Paint standard – wooden poles
- Using existing JOJO tank, creating new base for tank: See paragraph: Water tank base
- Construct a porch enclosure Or construct an entrance/isolation cubicle from steal frame and multi wall polycarbonate (1.25 mm thickness) cover, 2m wide X 2m with sliding door in front of the main entrance. Door must be 1,2 m wide
- Install a single wash trough concrete (Complete with P- Trap and connection to the existing sever system, and Sturdy, SABS approved Cold water tap in each basin) inside the tunnel with water tap
- Fire Extinguisher. See Paragraph. Quantity 3

- Install shade net roof: ARC – VIMP to supply shade net. See paragraph: Shade net roof
- Hand wash station: See paragraph: hand wash station.
- Quarantine entrance: See paragraph: Double door quarantine entrance
- Replace the wet wall panels (Length = 18m, Height =1.2m) See paragraph: Evaporation system / Wet wall system
- Replace 4 fan motor and shutters: See paragraph Evaporation system / Wet wall system / Fan motor and shutters.
- Replace the building support wires near wet wall
- New powder footbath. See: Powder footbath

Gutters

- Replace the tunnel gutter inside tunnel: Using existing cutter as specifications $\pm 10\text{m}$

Roof gutter

- Replace three 3.5 m roof gutters inside the tunnel.



Gutter box and downpipe

- Replace one gutter box and downpipe
- Using existing gutters as specification



Shade Net structure

- Using existing structure
- Shade net will be supplied by ARC- VIMP
- Replace all anchor cable with similar stainless steel cable.

Polycarbonate translucent

- Replace the roof and wall sheets that **are** broken: See paragraph: Polycarbonate translucent polycarbonate sheets.
- Replace 17 damaged wall sheets
- Replace 28 damaged roof sheets:
- See paragraph: Polycarbonate Translucent Roof Sheeting

Irrigation water supply

- Building a new stand for the water tank that can host 2 tanks
- Re use existing tank
- Install a new 5000 litre vertical water storage tank and connect it to existing water supply and irrigation system

Irrigation computer

- Supply and install irrigation control pc with 12 stations (hand over the old controller to the ARC project leader)
- Replace irrigation pipes and sprayers (micro sprayers)
- Move the water tap inside the tunnel
- Install PC based irrigation control system with individual control of lanes
- Replace irrigation pump (aquadrive 1500 model 7252std-a25x) (Old pump will be kept as spare)
- Install PC based irrigation monitoring and warning system
- Design and install irrigation system

Wet wall

- New Wet wall. Size of wet wall 34m x 1.2m
- New Pumps
- New valves, ball valves
- Use existing tanks
- See paragraph: Evaporation system / Wet wall system

Extractor fans

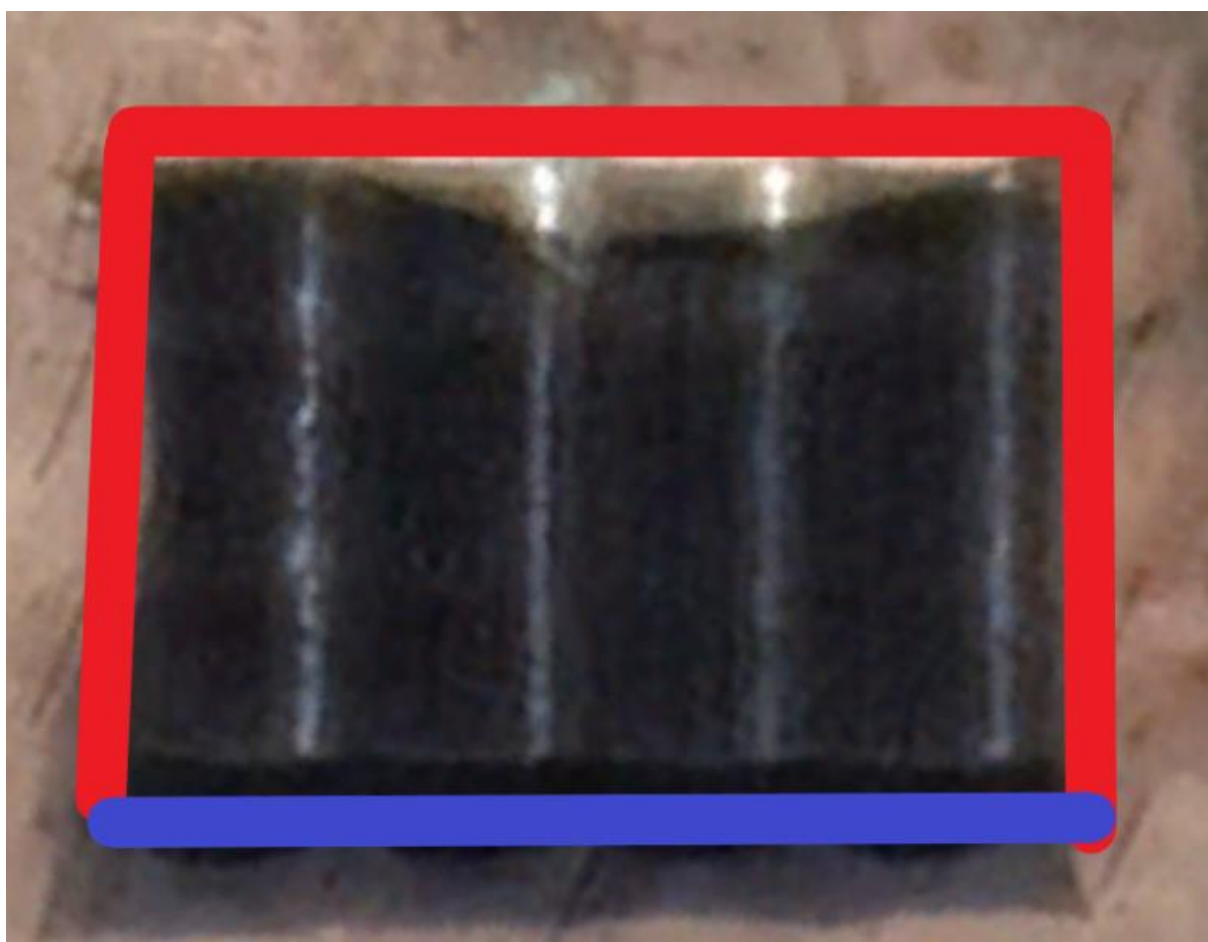
Using existing motor control for fans



- Replace the corrugated frames for the wet wall pads
- Replace the wet wall panels (Length = 3.446 m, Height = 1.2 m)
- Replace 7 fans with the new square fans, the size of the square fans 1.4 m x 1.4m

Apron around tunnel

- New Concrete around tunnel, 2 x 75m Red line on photo
- New Concrete around tunnel, 4 x 34m Blue line on photo
- See paragraph: Concrete



Moedersbond - Tunnel MB01



Structure

- Greenhouse roof shape: arch roof
- Keep the structure (length = 44 m, breath = 9.2 m, height = 4 m)
- See paragraph: Site cleaning
- Replace the insect proof wall and roof cover with stainless steel insect proof: See paragraph: Stainless steel insect netting
- Service the drainage system and put the new grids/sieve on top of the drainage system to protect it from blocking
- Install 9kg DCP Fire Extinguisher, Quantity 2
- Replace manhole cover outside the building on the northern side
- New powder footbath. See: Powder footbath

Tables

- Split the tables in the middle (Make 2 tables out of the one). Use existing design to strengthen one of the cut of end (50x50x5 angle iron for legs (900/leg) and horizontal member (1200)
- Repair the broken steel and grids on the tables, Paint tables and grids: See paragraph Paint standards: Color Black Quantity 21

Apron

- New 2m wide concrete around tunnel
- See paragraph: Concrete

Shade net structure

- Using existing steel structure
- Paint steel structure: See paragraph Galvanized steel structures
- Replace shade net on top of the tunnel. Service provider must provide the shade net
- See paragraph: Shade netting

Brick and mortar room

- Repair damp on wall
- Paint walls and ceilings. See paragraph: painting

Doors and locks

- Fix the doors and replace the locks. See paragraph
- Replace glass with 2mm steel plates on entrance doors
- Install safety gate inside brick room: See paragraph: Safety gate

Container

- Supply of 6m Used container

Window

- Replace broken window with safety glass
- Size of window $\pm 1.2\text{m} \times 200\text{mm}$
- Mentis Pressure Lock Grating Infront off all windows for burglar bars

Irrigation

- Replace the irrigation pipes and drippers (Using existing system as standard)
- New pipes and irrigation nozzles. (Using existing system as standard)
- New misting system
- New irrigation pump and motor that will supply pressure to irrigate a third of the tunnel. (Irrigation of the tunnel will be in 3 stages)
- Replacing Irrigation Computer and valve with state-of-the-art equipment (minimum 22 station). See Paragraph: Irrigation
- All pumps, irrigation computers, DB boards must be housed in the Container
- All old equipment must be handed over to the ARC to be use as spares
- Irrigation, fertigation, and misting must be design and install by a certify SABI installer (South African Irrigation Institute)

Equipment	Quantity
Irrigation Computer	1
Irrigation	Using one irrigation computer zone per 2 plant tables
Fertigation	Service existing dosatron x2 D25RE2
Misting	Using one zone of computer

Moedersbond - TUNNEL MB02



Structure

- Keep the structure Length = 29.8m x 8m
- Replace the insect proof wall and roof cover with stainless steel insect proof:
See paragraph: Stainless steel insect netting
- Treat for rust and antirust paint the whole steel structure
- Repair the cracked floor
- Service the drainage system and put the new grids/sieve on top of the drainage system to protect it from blocking
- New powder footbath. See: Powder footbath

Tables

- Construct new tables
- Quantity 30
- 3.25m long and 1.2 m wide and 800mm high
- Use table in Moedersbond 01 as samples include the “splitting” modifications
- Hot dipped galvanizing

Apron

- New 2m wide concrete around tunnel
- See paragraph: Concrete

Shade net structure

- Using existing steel structure
- Paint steel structure: See paragraph Galvanized steel structures
- Replace shade net on top of the tunnel. Service provider must provide the shade net for this Moedersbond 02 Structure
- 50% Green shade net
- See paragraph: Shade netting

Double door quarantine entrance

- See paragraph: 31 Double door quarantine entrance

Irrigation

- Replace the irrigation pipes and drippers (Using MB01 existing system as standard)
- New pipes and irrigation nozzles. (Using existing system as standard)
- New misting system
- New irrigation pump and motor that will supply pressure to irrigate a third of the tunnel. (Irrigation of the tunnel will be in 3 stages)
- Replacing Irrigation Computer and valve with state-of-the-art equipment (minimum 22 station). See Paragraph: Irrigation
- All pumps, irrigation computers, DB boards must be housed in the Container
- All old equipment must be handed over to the ARC to be use as spares
- Irrigation, fertigation, and misting must be design and install by a certify SABI installer (South African Irrigation Institute)

Equipment	Quantity
Irrigation Computer	1
Irrigation	Using one irrigation computer zone per 2 plant tables
Fertigation	New similar or equivalent to dosatron (D25RE2). Quantity 2
Misting	Using one zone of the computer

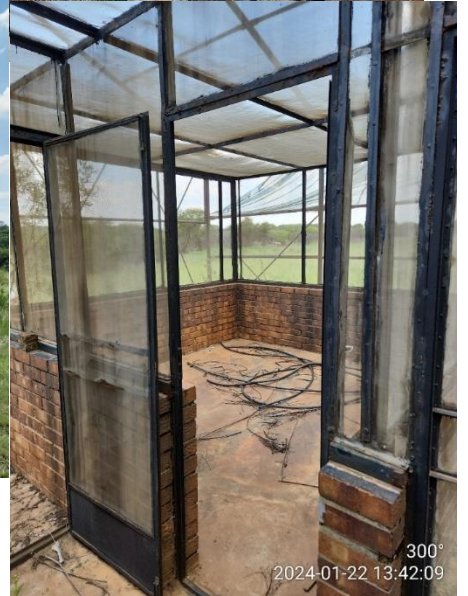
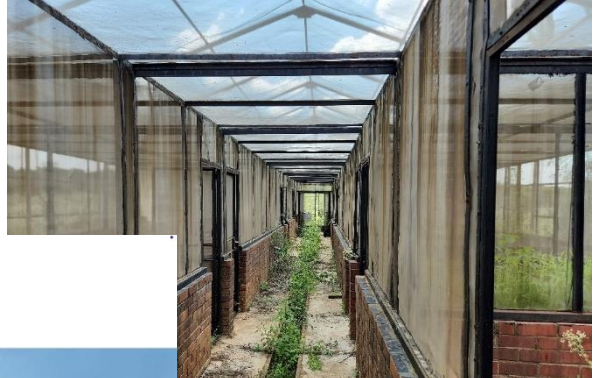
Electrical Distribution board (DB)

- Supply and install new surface mount DB board with switchgear and feeder cable to from transformer.
- Minimum switch gear requirement for the DB
 - 40 A Isolator
 - 40 A Earth leakage
 - 20 A Plug (Irrigation computer)
 - 20 A Plug (Pump supply)

Moedersbond - TUNNEL MB03

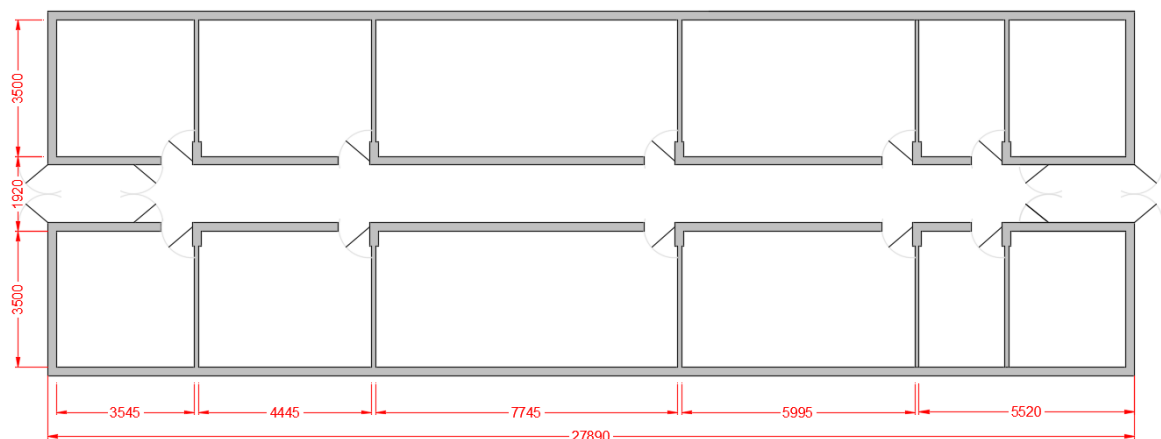
Photos of MB03





Existing structure

- Brick walls are built up to a height of 920mm. On top there is a woven stainless steel very fine mesh.
- The ceiling consists of this very fine mesh
- There is a “tent” around the structure of shade cloth.
- Entrance to the structure is through a double door system on both sides.
- Drainage of the irrigation and or rainwater is through a centre channel that exit the building through an insect barrier (P trap)
- The aim of this structure is to keep small insects out.



Scope of repair

- See paragraph: Site cleaning
- The whole “house” must be insect proof with no holes, cracks, or crevasse to let small insects in.
- Keep the outside walls of the structure Length = 24.4m, Breadth = 8m
- Remove all steel (except tent) and hand over to the ARC project manager
- Buildup aluminum doors, walls and ceiling frames that can frame the woven insect mesh.
- Size of mesh. See paragraph: Stainless steel insect netting
- Replace shade net on top of the roof.
- New powder footbath. See: Powder footbath
- Remove the beam and replace with galvanize steel beam on top of the structure 50mm diameter x 2mx 3mm. Quantity 22

- Replace the whole insect proof mesh with stainless steel insect proof
- Treat for rust and anti-rust paint the whole steel structure
- Repair the cracked floor
- Service the drainage system and put the new grids/sieve on top of the drainage system to protect it from blocking
- Build a porch enclosure Or construct an entrance/isolation cubicle from bricks, 3 X 3m to the west entrance
- Pave around the tunnel, 2 m distance from the tunnel
- No tables needed.

Frame of building

- All steel to be replace by Aluminum
- Buildup aluminum doors, walls and ceiling frames that can frame the woven insect mesh.
- Size of mesh
- Gaskets: Vinyl-Rubber modified gaskets for improved cold temperature flexibility and Poly vinyl Chloride 15 lb density double sided adhesive gasket.
- Extrusions: The glazing bars are proprietary solid extrusions that incorporate an internal and external weep channels to direct moisture, which could collect on the interior of the glazing, to the exterior of the enclosure.

Container

- All electrical distribution boards, pumps and irrigation systems must be install into container
- Container must stand next to the Tunnel
- See paragraph: Container

Apron

- New apron 2m around building
- See paragraph: Apron

Irrigation

- Replace the irrigation pipes and drippers (Using MB01 existing system as standard)
- New pipes and irrigation nozzles. (Using existing system as standard)
- New misting system
- New irrigation pump and motor that will supply pressure to irrigate a third of the tunnel. (Irrigation of the tunnel will be in 3 stages)
- Supply and install Irrigation Computer and valve with state-of-the-art equipment. See Paragraph: Irrigation
- All pumps, irrigation computers, DB boards must be house in Container

- All old equipment must be handed over to the ARC to be use as spares
- Irrigation, fertigation, and misting must be design and install by a certify SABI installer (South African Irrigation Institute)

Equipment	Quantity
Irrigation Computer	1
Irrigation	Using one irrigation computer zone per 1 small compartment
Fertigation	ew similar or equivalent to dosatron (D25RE2). Quantity 2

Water supply inside glass compartments

- Supply and install 25 mm plastic bib tap on new 25mm galvanized water reticulation system in each room including one tap on each entrances
- Four x 5 meter long, 20 mm diameter hose-pipe complete with Gardena fittings on Tap and hosepipe, with a six year warranty.
- One x 10 meter long, 20 mm diameter hose-pipe complete with Gardena fittings on Tap and hosepipe, with a six year warranty.
- One Trigger Nozzle to be connected to each hose pipe

Electrical Distribution board (DB)

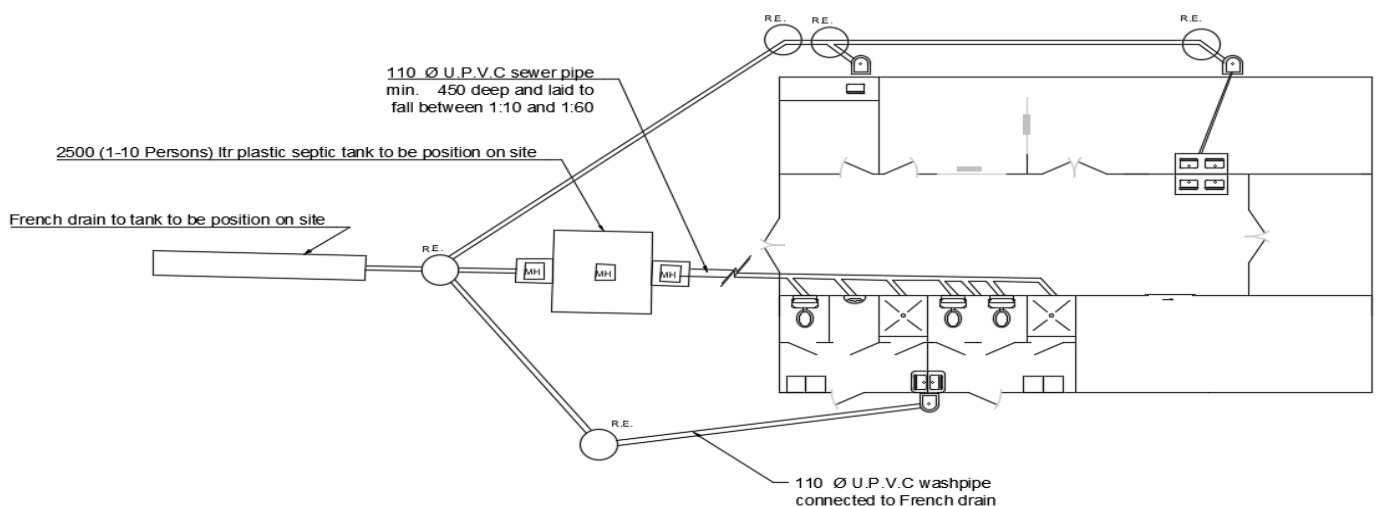
- Supply and install new surface mount DB board with switchgear and feeder cable to from transformer.
- Minimum switch gear requirement for the DB
 - 40 A Isolator
 - 40 A Earth leakage
 - 20 A Plug (Irrigation computer)
 - 20 A Plug (Pump supply)

Moedersbond - Ablution

6m Ablution Container

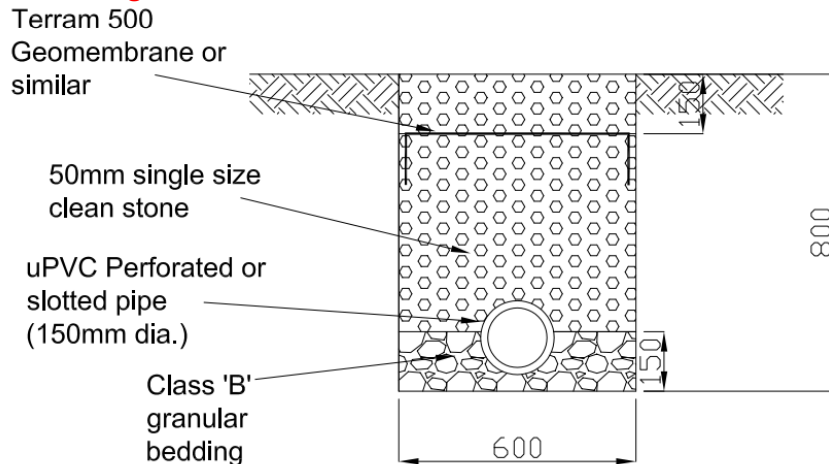
- New (used) container: See paragraph: container
- Male: Basins: 1, Toilet seats: 1 urinals: 2
- Fe male: Basins: 2, Toilet seats: 2
- Mentis Pressure Lock Grating Infront off all windows for burglar bars
- Safety gate manufacture from Mentis Pressure Lock Grating in 'n Angle iron frame.
- All soil drain pipes (110mm ø) have a minimum fall of 1: 60 with a minimum cover of 450mm with a vented, closed gulley, all waste pipes to be 40mm external diameter.
- Rodding eyes to be installed at max distances (as prescribed in SANS/SABS), change of direction or fall.
- Toilet pan and hand wash basin to be porcelain.
- Sinks, basins and baths to be silicone pointed.
- All taps if fixed to the wall to be attached to an approved backplate (100mm x 100mm x 2mm galvanised steel).
- All waste pipes to be accessible for cleaning purposes.
- All plumbing and drainage to conform to SANS/SABS and Local Authority standards.
- All basins complete with P/S traps
- Emergency open shower (no walls) inside only one of the bathrooms with only cold water. I.e. Shower head and water tap for rinsing of exposed chemicals.
- **NO COPPER PIPES**

Sever system



French drain.

- Minimum length of French drain = 25m



Moedersbond Water reticulation

- Expand existing water supply tanks by adding 2 extra 10 000 Liter tanks
- New base for new tanks. See paragraph: Base for water tanks
- Base must be on the same height of existing tanks
- Replace existing floats in old tanks, install 2 new floats for new tanks
- All Tanks must have new shut off valves for supply and delivery.
- Service reticulation pipes to 3 structures and install new pipes to all new facilities (32mm HDPE pipes, minimum class 6)

Moedersbond - Security

- Install security cameras in 4 corners of the Moedersbond facing inside the yard
- Install one 15 – 18m high mast lighting pole with motion sensors multiple lights in the center of the Moedersbond yard
- LED solar powered streetlight with remote control

Galvanised Lamp pole

- Pole designed in accordance with SABS 0214-1987.
- Pole must hinge in the middle for ease of maintenance

- Off the shelf lamp post must be used.
- Tubular steel material is grade 300 MPA to SABS 657 with welding also conforming to SABS standards.
- Minimum height of pole: 7 m
- Pole and all ancillary items are hot dipped galvanized to SABS 763 specifications.
- Base plate 400 x 400 x 4 mm thick, which is attached to the pole shaft by means of 2 x M 16 hook bolts.
- Single cable entry 100 x 50 mm wide is provided 400 mm below ground level.
- A hinged flush-mounted door with the poles with Allan cap screw as door-locking method.

Hole and concrete

- Hole for post: 800 mm deep.
- Flood light
- LED flood light 80 W x 4 with built in driver
- IP 65 Rating
- Fitting/housing: Cast Aluminium/steel
- Concrete for post: 25 MPa
- Flood light must be switched with a day/night sensor off and on.

Electricity: General

- The electricity Certificate of Compliance must be supplied when the wiring is completed, and electricity restored before final payment will be considered.
- The cable sizes, circuit breaker sizes, cable lengths, etc. must be verified by the Contractor and agreed upon by the Engineer and must be in compliance with the National Building Regulations.
- All equipment must comply with SANS standards.
- All equipment to be installed according to SANS 10142.
- All cables must be installed according to SANS 10142.

Moedersbond - Electrical Power

- Connect all the tunnels to electrical transformer
- Replace vandalized transformer on pole with 25 KVA, 11KVA – 415KVA
- New DB box on cable with switchgear to each building.

To prevent theft of the transformer

- There must be no visible threads (drill through wooden poles). Drill holes through the poles so that the threaded bar is not exposed to cutting. Thief will have to cut transformer with a grinder on the structure or cut down the pole.

- All nuts must be welded to prevent turning
- The poles must be wrapped with razor wire.

Preventing theft of electrical cable.

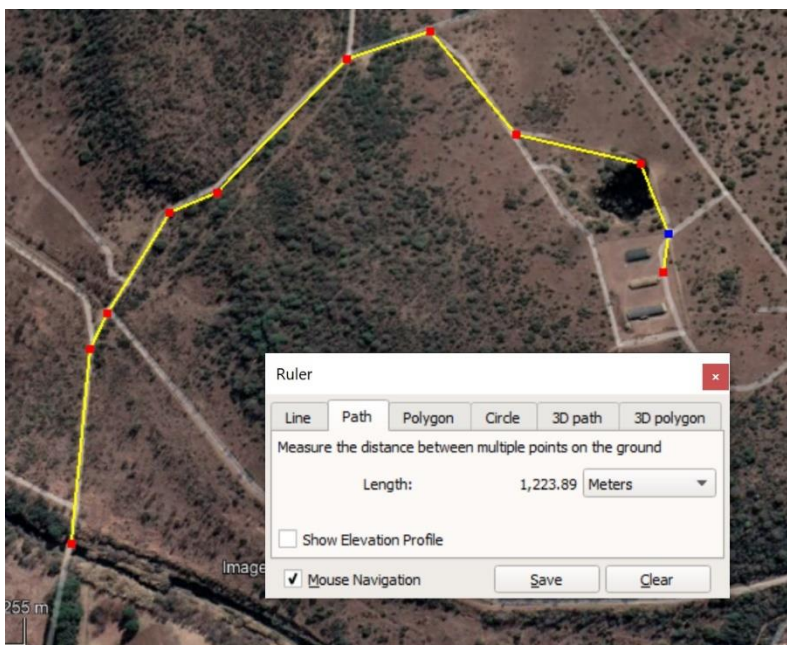
- All cable between buildings and transformer must be minimum of 1 m under the natural ground level.
- Where possible, all cables above ground must be cast in concrete, 300x300.

Name boards

- Full color printing material: 1.4 mm chromadek (CKS 191 standards)
- Size of sign: A2
- Chromadek, printed at 300 dpi on a monomeric vinyl sticker
- Mounted with galvanized bolts
- The Chromadek label shall have a minimum guaranteed life of 10 years
- ARC will provide the Artwork in a Microsoft Word format
- Quantity: 5
- Mounting of Name boards on Buildings

Road maintenance

- Cut drainage ditches at lease every 100m, 30 cm wide and 30 cm deep.
- Cut all tree branches that grow over the road



- from the area must be pave in the ditches to prevent soil erosion



Evaporation system / Wet wall system

Wet wall system

- New evaporative cooling pads.
- Replace gutters- The gutters must be similar or equivalent to Munters Cooldek Gutters
- All steel work must be galvanised
- Use existing water tank.
- Fill all gaps between wet wall, gutters and wall/structure with expanding foam that is weatherproof and damp proof. Is non-toxic and will not expand, shrink or decay once cured. Does not support mould or fungus
- Build and plaster new brick wall (0.140m x 7m) under the wetwall gutter. NO PAINT

Wet wall water circulation system

- New swimming pool pump
- Diameter off pipe 25mm from pump to inlets of wet walls.
- All wet wall circulation pipes, PVC pressure pipes. SABS 966 and ISO 9001. Polyvinyl Chloride (Blue pipes))
- All pumps must be save guard with floating switches (i.e. if the tank runs dry the pump must automatically shut off)
- 2 wet wall inlets (Minimum 20mm)
- Outlet of wet wall (back to tank), 2 x 50mm OR 1 x 110mm
- The water circulation system must consist of a swimming pool type centrifugal pump, similar and equivalent to a Speck Pump Model Badu Magic 6. It must be able to deliver 4 cubic metre/h at a dynamic pressure head of 10 m water and self-priming pump. The water reticulation system must distribute the water evenly across the cooling material, with no dry patches.
- Supply water to wet wall reservoir from municipality
- New 20mm Galvanized pipe and tap (SABS approved)
- Install new 20mm Polycop water pipe
- The level for water tank of the water must be controlled with a float or ball valve with a minimum of 20 mm water supply pipe.



Samples of the quality work expected from contractor

Fan motor and shutters

- Similar or equal to Munters SMT 50 Inlet shutter, Inlet opening 1.7m² complete with fans (370w, Multi speed, 900-1100RPM, Air volume /flow 1050-2100L/s)
- Compact design and easy installation
- Self-cleaning shutter blade profile prevents the build-up of dust
- Tight sealing and durable shutter blades
- Guard mesh to prevent entry of wild animals or birds (Complete package)
- Galvanized steel frame and shutter blades
- Maintenance free and UV resistant bearings for shutter blades



Duct Construction

- The unit are equipped with supply and return air openings. Duct connection to the unit should be made with duct flanges and secured directly to the air openings with flexible duct connectors to avoid normal noise transmission.
- To prevent air leakage, all duct seams should be sealed.
- Ducts in the spaces that not air-conditioned must be insulated.
- Ducts exposed to the outside must be weather proofed.
- Ducts that entering structure through the roof, the entering should be sealed with weather stripping to prevent rain, sand, dust etc., from entering the building.
- Correct size of filter must be installed at the return air duct.

Portable Fire extinguishers

- Portable fire extinguishers, SANS 1567 & SANS 1910.
- 9 kg or 9 Liter fire extinguishers.
- Appropriate signage must be mounted on the wall next to fire extinguishers.

Site cleaning and safety

- The site must be clean at all time
- The Contractor is liable for the safety of workers and work conditions according to the OHS act.
- The Contractor is responsible to keep all equipment safe.
- Remove all building rubble and clean site after completion of work before final payment.

Electrical standards

- The cable sizes, circuit breaker sizes, cable lengths, make of pillar boxes, etc. to be verified by the contractor and agreed upon by the engineer and to be in compliance with the National Building Regulations.
- All equipment to comply with SANS standards.
- All equipment to be installed according to SABS 0142
- All cables to be SWA copper
- All cables to be installed according to SANS 0142
- All cables to be protected by lightning protection systems to SANS
- Certificate of Compliance must be issued for all electrical work done.
- As-built drawings to be supplied by the successful contractor.

Polycarbonate Translucent Roof Sheeting

- Replace the cover of the whole structure (wall and roof) with corrugated polycarbonate sheets (multi wall 6mm/10mm) and with UV protection
- Install IPR Polycarbonate Translucent Roof Sheeting. Similar or equal to Modek
- Seal open ends effectively to prevent debris from entering
- Thickness of sheets: 1.25mm
- Colour: Clear
- Warrantee from the Contractor for the sheets:
 - Up to 5 years from the date of purchase, replacement value of 100 % of the material.
 - Up to 6 years from the date of purchase, replacement value of 70 % of the material.
 - Up to 7 years from the date of purchase, replacement value of 55 % of the material.
 - Up to 8 years from the date of purchase, replacement value of 40 % of the material.

- Up to 9 years from the date of purchase, replacement value of 25 % of the material.
- Up to 10 years from the date of purchase, replacement value of 10 % of the material.

Paint standard

Galvanized steel structures

- All steel work must be sanded down, washed, primed where necessary with undercoat primer and repainted with 2 coats of Cold galvanizing paint (Zinc content: > 90%).
- Minimum new paint thickness 75µm wet and 35µm dry.
- The use of thinners or solvents at any stage of the work is prohibited, unless specified by the paint manufacturer.
- The paint manufacturer shall guarantee the paint for at least 10 years.

Steel

- All steel work must be sanded down, washed, primed where necessary with undercoat primer and repainted with 2 coats of Cold galvanizing paint (Zinc content: > 90%).
- Minimum new paint thickness 75µm wet and 35µm dry.

Walls

Strip and brush all loose paint and scaling completely from the existing walls.

- Repair all damaged walls inside and outside with plaster filler
- Clean and wash all walls properly using sugar soap – to be inspected before any painting commences.
- Paint with bonding liquid where required.
- Paint all walls with appropriate universal under coat where required.
- Paint inside with 2 coats of Roof paint. (High wearing surface)
- Paint the outside of buildings with 3 coats of water based acrylic for exterior use, same colour as existing buildings. First coat to be inspected before final coat is started.
- Paint must have a 12 year product guarantee that is stated on the product. (Similar or equal to Dulux Roofguard)

Wooden poles

- Clean surface with steel wire brush
- Paint 2 layers of Creosote

Area cleaning

- The contractor must remove all trees and shrubs within a radius of 5 m from the structure.
- Mow all grass at a radius of 10m around the structure complex.
- Remove all grass and plants in concrete/paving joints in and around the glasshouse complex

Hand wash station

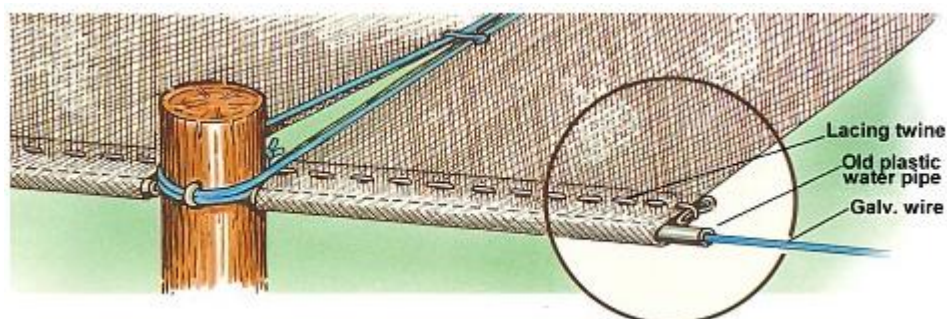
- 2x2m, 80mm Concrete floor on compacted soil (see Paragraph on aprons)
- Final concrete level must be 100mm above natural ground level
- Install single Wash Trough Concrete.
- Water must be waisted into the veld at least 5m from the building/station
- Sturdy, SABS approved Cold water tap in basin



Shade netting

Provide sample of netting for approval before purchasing

Using seams to anchor netting on the edge

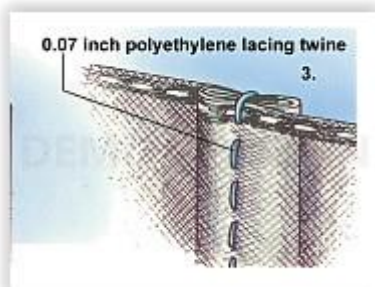


Wrap netting



- Where a pole come in contact with the tight horizontal shade net, an extra piece of shade net must be wrap at a minimum of 2 layers around the pole. (Fig. 6)
- The Net around the pole must be minimum 200 high with the horizontal tight net in the middle.
- The wrap Net around the pole must be staple to the pole.

Joining the net in the width



Lasing cord 2mm

- Polyethylene Ultraviolet stabilized twine must be use
- Be supplied by successfully tenderer

Additional information resources

- <http://www.protect-o-net.com/basics-of-a-shadehouse.shtml>

Stainless steel insect netting

- Insect proof wall and roof cover with stainless steel insect proof

- Please note that the keyhole must not allow for opening to the outside as this will allow insect to enter the facility
- Stainless steel
- Mesh 20/10 cm, mesh size 0.77x0.27 mm
- Shade percentage 20-29%, air transmission 20%
- Please note that the keyhole must not allow for opening to the outside as this will allow insect to enter the facility.

Concrete

- Concrete floor of 80 mm thickness must be cast.
- Slightly slope away from the structure (1:100)
- Minimum reinforcement for concrete Ref. 245 (200 x 200 x 6.3 mm) SANS 1024:2012 welded steel mesh
- 25 MPa Concrete mixes must be supplied by an approved ready mix concrete supplier.
- Concrete must be vibrated to expel entrapped air.
- Broom finish of the concrete
- Cut concrete in 2.5 m intervals for expansion, joints 20 mm deep
- The placing of concrete must be done to maintain the quality and uniformity, and , once the concrete has been placed and vibrated, it is necessary to protect it from drying out and extreme of temperatures. It must also be cured to maintain a satisfactory moisture content and temperature in the concrete during early stages so that the desired properties may develop.

Powder footbath

- Cast Footbath 1.2m x 2m
- See paragraph : Concrete
- Slopes on sides, 50mm depth
- 80mm thickness of concrete
- Ref 200 mesh



Tunnel Doors

- Use existing door frame

Sliding doors

- Repair / replace all door locks and handles
- Rail and wheels must be hot dipped galvanized
- Replace similar or equal to Hillaldam 100T steel rail (4m). (Max door Weight 100kg)
- Replace similar or equal to Hillaldam track stop (Rubber X2)
- Replace on door 100TF Top fixing adjustable hangers (Galv)
- Cover door with new Polycarbonate sheets
- Doors must be lock with pad locks. See paragraph Padlocks

Hinged doors

- Repair / replace all door locks and handles
- Heavy duty hinges.
- Cover door with new Polycarbonate sheets
- Doors must be lock with pad locks. See paragraph Padlocks

Padlocks

- Brass padlock
- Minimum Width 76mm
- 2 keys



Existing taps

- Replace all tap washers in tunnel (watering plants and wet wall system)

Double door quarantine entrance

- Create a new room to be use as double entrance (Two doors)
- Dimensions 3 x 3m
- Threshold must be so that wheels can past over profile without damaging the aluminum profile
- Room must be insect proof. NO insects must be entering the tunnels
- Walls and roof: polycarbonate or Stainless steel insect netting (Similar of the rest of the house)
- Manufacture a door and door frames using aluminum profiles
- Floor: 80mm concrete on compacted soil (See paragraph – Aprons)
- Auto closures on all doors
- 2m concrete apron in front of first door

Foot bath

- Construct with cement floor foot bath over the width of the quarantine entrance
- Entrance and exit with 30° slope,
- 1500mm wide x 100mm deep.
- Concrete to be mix with cement sealer, Similar to Coprox Masonry Waterproofing

Irrigation computer

- Complete turnkey irrigation system. The ARC only specifies the irrigation computer and valve. The successful contractor must design a turnkey system with all other equipment that is needed to make this a turn key irrigation system
- No Pipes and conduits over walkways will be permitted

Irrigation Computer

- Similar or equal to Rainbird ESP series controller
- 2 wire system (use 2 wires to daisy chain between all valves)
- Minimum 50 station two-wire decoder controller standard expandable to 200 stations
- Test function to test All Stations
- Remote irrigation control with ethernet
- WIFI router with simcard and data to operate system for one year
- Control included, bore hole, boost, fertigation, and other pumps
- Minimum 4x independent programs
- Power back-up
- 1 x Barcode pen to program and read system. Connecting with Bluetooth or usb
- Remote Control to switch station (Valves) remotely on or off. Run manual watering cycles without modifying regular program
- Operation line of sight range $\pm 300\text{m}$

Valves

- Integrated valve module technology
- 2 wire system (use 2 wires to daisy chain between all valves)
- 2 way communication. Condition report back from valves to main station
- History of valve health
- Advance valve diagnosis (Computer diagnostics on male function valves)
- Valve health monitoring (see if a valve is mal function)

Base for water tank

- Compacting of soil. Minimum of two (2) successful Dynamic Cone Penetrometer (DCP) test per unit to be recorded by a trained operator. The maximum allowable displacement per blow is 15mm to a dept of 0.5m deep.
- Concrete floor of 100 mm thickness must be cast.
- A minimum of 1m larger than the tank mut be cast around the structure (Veld fires)

- Slightly slope away from the structure (1:100)
- Minimum reinforcement for concrete Ref. 245 (200 x 200 x 6.3 mm) SANS 1024:2012 welded steel mesh
- 25 MPa Concrete mixes must be supplied by an approved ready mix concrete supplier.
- Concrete must be vibrated to expel entrapped air.
- Broom finish of the concrete
- The placing of concrete must be done to maintain the quality and uniformity, and , once the concrete has been placed and vibrated, it is necessary to protect it from drying out and extreme of temperatures. It must also be cured to maintain a satisfactory moisture content and temperature in the concrete during early stages so that the desired properties may develop.

Container

- The container will be use as store for equipment and tools.

Container preparation

- Containers must be watertight after all the cut outs have been made
- Clean all rust spots with a wire brush with angle grinder
- All doors, door frames and window frames must be clean, dry, firm and dust free, painted with one coat merit universal undercoat (UC1) (before glazing) and apply two coats of enamel paint similar to Plascon Velvagro to manufacturer's specification
- Colour: White

Lock box

Install lock box similar or equile to: <https://everythingcontainer.co.za/product/container-lock-box/> or <https://twistlockafrica.co.za/product/container-lock-box/>



Contingency

- The contingency amount of 10% is applicable to this bid.
- The contingency amount will be utilized only approved by the Research Team Manager: Roots, Tubers and Bulbous Crops - Prof MW Bairu in writing.
- The ARC has the right not to spend this contingency or only part of it.
- The 10% must be clearly stated in the quotation as Contingency.

Technical enquiries

- All technical enquiries are to be directed to:
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- Swanepoelf@arc.agric.za