

HYDRO MASTA PTY LTD



Commercial Hydroponics





HYDRO MASTA

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Our Company

The team at Hydro Masta have over 27 years experience in the hydroponic industry including hands on experience in the installation and management of commercial hydroponic farms, providing information, equipment, technical support, system design, nutrient and water analysis, site visits and evaluations, as well as all the necessary consumables such as crop specific nutrients. We have positioned ourselves at the forefront in the development of small to medium commercial hydroponic programs both in Australia and the Pacific region.

Our aim is to assist regional communities in the development of sustainable agriculture development using hydroponic principles. The objective of the project is to improve food security and livelihoods of target farm families in Australian regional centres and around the Pacific Rim. Hydro Masta 'Mini Farm' hydroponic packages are ideally suited to small to medium communities willing to achieve independence from expensive imports as well as providing a sustainable income stream for the local population, and have even been installed in various schools and homes as excellent 'hands on' projects that not only take people through the practical steps of growing plants, but also rewards them with an edible result! Hydroponic produce not only grows more rapidly, from tiny seedlings to full grown edible plants in just a few short weeks, but consumes only a fraction of the water required for soil-based agriculture. As well as this, there is also the added benefit that the systems offset their initial cost with plenty of highly nutritious saleable vegetables produced like lettuce, herbs, strawberries and tomatoes, just to name a few. This is achieved with very low set up and on-going running costs.

The Hydro Masta 'Mini Farms' are specifically designed to make the growing experience as easy and successful as possible for our clients and there is a Mini Farm package to suit every school, home or community budget, so please take a moment to read over the details about our full range of Hydro Masta Mini Farm Packages. Also, feel free to contact us via email sales@hydromasta.com.au should you have any questions about our products and services.

From a support point of view, you would be hard pressed to find another company like Hydro Masta that could nurture your hydroponic venture from start to finish. We look forward to assisting you in your endeavours.

Kind regards,

Trevor Holt Director

Viability of Hydroponic crops

Australia is now regarded internationally as the largest producer of hydroponic lettuce in the world with over 180 acres under cultivation. Our hydroponic strawberry cultivation is larger than that of the United States, and our flower industry is almost as large as the lucrative American market.

Commercial hydroponic growers in Australia are producing superbly flavoured hydroponic tomatoes as well as cucumbers, roses and other specialty crops such as herbs, watercress and oriental vegetables. Rockmelons have been grown successfully in hydroponic growing systems as well as those previously mentioned. Fruit trees can be grown in hydroponics. In fact anything that grows in soil can be grown in hydroponics, although not always commercially.

Hydroponics is a very economically viable proposition because of the low labour costs (due to less weed control, spraying etc), as well as lower transport costs as most farms can be situated closer to their markets. Hydroponic farms require minimal land to become commercially viable. From 3 to 5 acres is all that is needed to generate a reasonable income, and this makes it an attractive system for market gardeners.

Although set up costs are perceived as higher, hydroponic farms have much lower running costs, which can be offset against the cost of tractors and heavy machinery used in conventional soil grown crops. In hydroponic farms these are generally not required. The most successful hydroponic farms have been operated by astute business people, and the most profitable growers situate their farms on main roads as roadside stalls can markedly increase profitability. (Consider also that if you have a farm in a tourist location, people may pay for a tour of the facility.)

Hydroponic installations have been established on islands, in deserts and other remote locations where normal agricultural practices are unproductive and not cost effective. They are also well suited to remote areas where most produce is freighted in at much higher cost and invariably the produce is of very poor quality.



So, is hydroponics a good business to be in, and is it a growth industry? The answer is obviously yes!

Topography

The direction the land slopes is very important when planning a hydroponic installation. The steepness of the slope plays an important role when choosing the size of the pump. Also, the location and level of the water table on the property is important when considering the site best suited for the system reservoir.

Annual Weather Patterns

This will dictate the type of crop that can be grown and any crop protection that may be necessary, i.e. hail netting for hail protection. Points to consider are prevailing wind directions and speed, temperature range, i.e. lowest, highest and average. Frost frequency and degree of frost, and annual rainfall and hailstorms will all affect your crop – make sure you know your area.

Water Supply

It is essential before anything else that you have the water source tested. Just because you can drink it, doesn't mean it's suitable for hydroponics. Hydro Masta Pty Ltd offers a laboratory service for water analysis and full report. If you have already had a water test, we would be happy to comment on its suitability. If you are buying a property for your venture, be sure to have the available water source tested before considering the property. It could save you financially!

Market Research

An important factor which may determine the type of crop you can actually grow is the market itself, and this will be determined by undertaking extensive market research. Ask these questions before making a decision: What sort of produce does the market actually want? What do people buy locally? How close are you to the market and how far is the next possible market? Does the proposed market have the potential to consume your initial produce? Does it have the ability to absorb your expansion capacity? What competition exists in the area, supplies the same market and what do they supply?

Proposed Crop

Consider carefully the crop that you have established as to its potential in view of the market and whether you would like to work with it. Contact your local Department of Agriculture for information on crop yields. Initially, it is best to concentrate on one crop only as this minimizes problems and reduces the need for multiple remedies should problems arise. A grower devoting all his attention to one crop will usually be more profitable.

Why use NFT (Nutrient Film Technique) as the preferred growing system?

This technique was invented by Dr Allan Cooper in England during the 1970s. His motivation was to save the British glasshouse industry from cheaper European imported vegetables. The system had to be inexpensive to produce crops, and inexpensive to setup. Ideally the nutrient should be the only cost for running (except for the minimal pump power required) and there should be minimal need for cleaning and low labour costs. NFT proved to be one of the best, and still remains the system of choice for most commercial hydroponic cultivation.

NFT (Nutrient Film Technique) is based principally on a series of channels that provide constant flowing water, oxygen and minerals to the plant. This flow has a depth of 1mm so it's not a stream, rather more like a film of nutrient and water solution that supplies the plant. NFT provides oxygen rich water and mineral salts, giving the plants everything required 24 hours a day which enhances growth and produces healthy, fast growing crops.

In order to have the roots in contact with the nutrient, the solution is pumped from a tank up to the feed-line and injected into the ends of the gully via micro tubes, two to each gully. The reason for this is that in the event of one blocking, the plants will still receive some flow of solution. Once inside the gully the nutrient solution moves slowly along the channel and the plants pick it up through capillary action. Upon reaching the end of the gully the solution is collected in a drain box and returned back to the tank to be re-circulated back to the plants.

With NFT systems it is very important to check nutrient and ph levels regularly. This can be done by via automatic hydroponic dosers or by a hand held electronic meter.

Gully size is largely dependent on what crop is grown, and the size and length of the crop cycle will decide this. For example, most lettuce varieties use the 100mm x 50mm channel as lettuce has a short crop time so it doesn't require a large rootzone area. Strawberries, herbs and lower crop types would require the 150mm x 85mm gully because they have a larger rootzone and longer crop cycle. The third size using the NFT principle is the 250mm x 85mm size which is suited mainly to vine type crops like tomatoes, cucumbers or crops with large root systems.

Another benefit of the NFT systems is that large amounts of growing media are not required. NFT is easy to maintain, with low running costs and is relatively problem free. It is a good system for anyone with little or no experience in hydroponics.

CROP SPECIFICATIONS

Lettuce Hearting Varieties (Butter head)

Plant Specifications

- CF (nutrient strength) 10 14 summer, 14 16 winter
- pH (acid/alkaline balance) 6.3
- Solution temperature optimum 25°C and minimum 13°C

Bench Specifications

- 15 plants per square metre with 250mm between lineal centres
- 192 plants per bench
- Benches are 6m long, 1.2m wide and 1m high
- 8 channels per bench
- 5 bench stands per table required
- Gully type used is rigid Polar gully

Growth from seedling to maturity (local climate will affect this), but generally 4 - 6 weeks in summer and 6 - 8 weeks in winter.

Running Costs

Each lettuce will cost approximately 40c each to produce. This includes all farm inputs from seed to market.

Market Average

The market average can vary greatly, however it would be safe to budget on a market value of \$1.49 each.

Other Crops

Other crops suited to this system will include all lettuce varieties, also all herb varieties and some Chinese vegetables.

Crop protection

In tropical and hot dry areas it is recommended that a suitable shade structure is erected using 30% shade cloth. Windbreak should also be considered in arid areas to protect crop from dust storms, it is also recommended in tropical area as hign winds can cause crop losses.

Fancy Lettuce (mignonette, coral, etc)

Plant Requirements

- Spacing 250mm x 250mm 20 25 plants per square metre
- Expected Crops 8 12 crops per year
- Yields 325 plants per square metre of table per annum
- CF (nutrient strength) 6 10 summer, 10 14 winter
- pH (acid/alkaline balance) 6.3
- Nutrient Film Technique
- Solution temperature optimum 25°C minimum 13°C

Bench Specifications

- 192 plants per bench (based on 25 plants per square metre)
- Benches are 6m long x 1.2m wide x 1m high
- 8 channels per bench
- 5 bench stands required

Running Costs

Each fancy lettuce will cost between 30 - 40 cents to produce. This includes all farm input from seed to market.

Market Average

Market average is approximately \$1.99 per head, this is based on local Sydney markets. This may differ in regional and remote areas considerably.

Other Crops

All small or fancy lettuce varieties and most short term herbs.

Crop protection

In tropical and hot dry areas it is recommended that a suitable shade structure is erected using 30% shade cloth. Windbreak should also be considered in arid areas to protect crop from dust storms, it is also recommended in tropical area as hign winds can cause crop losses.

GROWING TOMATOES COMMERCIALLY

Plant Requirements

- CF (nutrient strength) 22 seedlings, 28 growing
- pH (acid/alkaline balance) 6.3
- Preferred growing method Nutrient Film Technique
- Solution temperature optimum 25°C minimum 13°C

Bench Specifications

- 2.5 3 plants per square metre (this includes walkways) with 330mm between lineal centres
- 72 plants per bench (based on 3 plants per square metre)
- Benches are 6 metre long x 60cm wide x 60cm high
- 2 channels per bench
- Bench stands required although they are optional (if required, 5 needed)
- UV stabilised gully 150mm x 75mm

Growth from seedling to finish is approximately nine months. First pick is at approximately 60 days.

Running Costs

Average market value per kg \$1.50. Running costs (all inputs) approximately \$6.50 per plant for 11 months. It is important to have gradient fall of 1:40 from feed to drain.

The average size plastic house is 9m x 50m. 20 benches fit in the average plastic house, giving 1,440 plants per plastic house.

Market Average

Being a seasonal crop, the market average can vary greatly. The commercial hydroponic tomato grower will always be competing with the broad acre soil growers. Average price are between 12 - 18 per box (10 kgs).

Other Crops

Depending on timing of the tomato crop, which varies between cultivars grown, many growers utilise their tomato system for a fast crop in the off season e.g. Lebanese cucumbers, as cucumbers are well suited to the tomato system. Other crops include all the cucurbit family, snow peas, capsicums, beans, broccoli, brussel sprouts, cabbages, cauliflower, celery, eggplant, passionfruit, rhubarb, spinach, silver beet, cherry tomatoes.

Crop protection

With crops such as tomatoes, cucumbers and vine type crops it is recommended that a sutable greenhouse be used not only for crop protection but also for support.

GROWING STRAWBERRIES COMMERCIALLY

Plant Requirements and expected yields

- Expected Crops one crop per year two flushes
- Yields 500g 1kg per plant (2 4 punnets per plant) 15 punnets per square metre (annual) 35 punnets per square metre (excellent)
- Strawberry runners available Feb March
- CF (nutrient strength required) 22 25 CF
- pH (acid/alkaline balance) 6.3
- Nutrient Film Technique
- Solution temperature optimum 25°C minimum 15°C

Bench Specifications

- Spacings 7.5 10 plants per square metre (not including walkways), 250mm between lineal centres
- 240 plants per bench (based on 8.3 plants per square metre). Benches are 6 metres long x 1.6m wide x 1m high (1:40 gradient slope from feed to drain)
- 5 channels per bench
- 5 bench stands required. UV stabilised Jumbo gully (150mm x 75mm)

Other Crops

Using 150 x 75mm channel allows the grower to remove his strawberries from the gully. This process is practised by people hoping to cool store their original runners and re-plant. A grower using 100 x 50mm or RPG cannot easily do this.

This bench is also designed for the grower who would consider growing/marketing a wide variety of commercial crops. This bench profile is well suited to all the long term plants which inevitably develop extensive root systems. These roots quickly block up the small 100 x 50 channels. The blocking of the gully inhibits the critical 1 litre per minute flow rates.

Recommended crops (depending on market viability) are beans, broccoli, brussel sprouts, cabbages, capsicum, cauliflower, celery, cucumbers, egg plant, melons, mint, passionfruit, snow peas, rhubarb, spinach, silver beet, squash, cherry tomatoes, watercress.

Crop protection

Windbreak and bird netting required.

Other crop specifications

Continental Cucumbers

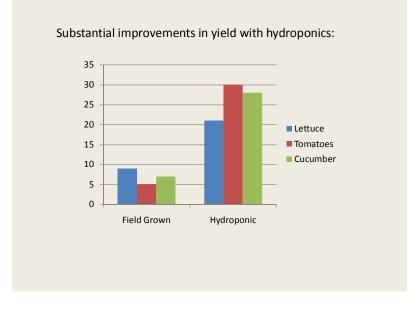
Spacing: 2 plants per square metre Expected Crops: two crops per year Yield: Summer 20 – 35 per plant Winter 10 – 15 per plant Average 20 – 45 per year (60 cucumbers per square metre)

Lebanese Cucumbers

Spacing: 2 plants per square metre Expected Crops: two crops per year Yield: 5 – 10 kgs per plant

Bell Capsicums

Spacing: 400mm centres Expected Crops: 4 crops per year Yield: 1 kilo per plant



Yield/area comparison for three crop types

Additional site considerations

TANK ROOM

Tank rooms for Nutrient Film Technique systems must be installed to comply with local council specifications.

Equipment Required

Nutrient solution pH & CF test, control equipment – automatic or manual 1 x 1000 to 3000 litre nutrient reservoir 1 x 1 1/2 HP Starite pumps 1 x complete supply of all necessary plumbing fittings and hardware

The above represents all the equipment required to recycle the optimum amount of water for a system up to 30,000 head (lettuce). Following is a list of system additions recommended by us as necessary for optimum hydroponic production.

Laboratory Water Test and Analysis Service

Hydro Masta Pty Ltd offers a professional water analysis of all elements in either your water or nutrient. This is of vital importance both before you begin, as well as during your commercial soilless venture, so that you know which elements are already present in your water supply and ensure that they don't interfere with your formula.

Nutrient and pH Control

It is ideal to maintain nutrient and pH at the correct levels. This will provide the plants with a constant balanced supply of elements which will make for consistent quality cropping.

Blue Lab Automatic Dosing Controller 'Doestronic 'L' Blue Lab pH/CF/Temp Monitor Blue Lab CF/ppm/EC Combo Meter

Crop Specific Nutrient A & B Powder Packs

There are two part nutrient mixes for any crop, system or water supply. Whether it is your formula or ours, our chemist has eighteen years experience in the hydroponic industry, analysing, formulating and mixing nutrients. All of our mixes use the purest grades of raw materials available, to give you the best results.

20kg Crop Specific powdered Nutrient

All powder packs are packaged in multiples of 20kg A & B pack each, making 400L of total stock nutrient solution concentrate

Ethylene Extraction

Plants in their respiration stage excrete waste acid and gases from their root zone. This gas/acid, if recycled, can inhibit growth, and even poison developing plants. An ethylene extraction system consists of an exhaust fan with purpose made suction pipe and is proven to add to recycling systems' efficiency.

Ethylene Extraction System \$100.00

Rain Diversion

Excessive rain can cause outdoor systems to flood. The rainwater dilutes the nutrient causing huge amounts of nutrient waste, as the Doestronic will try to keep up with the water dilution. A simple yet effective rain detection/diversion system has been invented which senses the presence of rain and automatically turns off the pumps, collects all nutrient and diverts all the troublesome rain water away from the reservoir.

NZH Rain Detection Switch AHP Flood Float Valves

\$615.00

Venturi Oxygenation Input System

Dissolved oxygen, available to the roots, is a vital ingredient in the production of plants in hydroponic systems. A simple spa pool venturi is placed in the tank, with the addition of some plumbing fittings, which draws oxygen from the air, allowing oxygen to be dissolved in the water, thus allowing plenty of oxygen rich water to reach the roots.

Venturi System

\$40.00 + pressure pipe fittings

Mains Water Supply Backup

In the case of a mains power failure, this opens the solenoid allowing mains pressure water to flow through the main pumps and onto the feed lines.

Standby pressure solenoid

\$399.00

Propagation area

This is dependent on plant numbers required. A detailed quote can be prepared on request.

Processing area

As with the propagation area the size and what equipment will be required is dependent on plant numbers as well as how much the grower wishes to automate this process.

Crop Protection

Windbreak

Windbreaks required for systems can only be determined by observation of local weather patterns of the proposed property. Cost for reinforced 5m high windbreaks is approximately \$50 per lineal metre and includes cost of installation, but does not include travel expenses, meals or accommodation.

Bird netting

Bird netting should only be required on commercial farms producing fruit or berries vulnerable to bird attack, and is also very effective in stopping the penetration of the Helothis Grub/Butterfly. White bird net (21mm x 16mm) cost after installation of windbreaks (windbreaks act as walls for bird netting), is approximately \$6.00 per square metre.

Shade cloth structures

It is recommended, particularly in sub tropical areas and areas with extreme temperatures, that a suitable shade structure be erected using a 30% or 50% multi woven cloth.

All shade houses utilise a unique pre-tensioned and on site tensioning component to allow for speedy construction and a wide flexibility in span design.

Many different types and grades of textile including shade cloth, hail cloth and bird netting may be fastened to the structure using a combination of the "Kericlip" cable holding system and Lockstrip fastening system.

Varying pole heights may also be used and shade supports have a specialised footing design which will often allow the construction to use minimal or no concrete.

All structure designs are backed by a strong engineering principle and can be supplied with a construction service or in kitset form.

Shade structures are inclusive of all posts, shackles, turnbuckles, stainless steel wire and shade cloth.

Option 1 1/4 Acre site 24 x 12m Benches 9216 plant sites

Bench package includes:

- 8 x 12m 100mm polar gullies pre-drilled at 250mm centres and staggered.
- All above ground and below ground feed and drain lines back to the tank.
- Collection or drain boxes as well as 1.45m adjustable T-bar support stands and fixings.

Tank room fit out includes:

- 3000 litre in ground polypropylene tank.
- 3hp Onga Starite pump.
- Water back up float valve.
- All 20mm and 40mm pressure pipe and fittings required.
- Blue Lab Dosetronic for nutrient, pH and temperature monitoring and adjustment.
- 40mm Venturi kit.

Additional irrigation and drain lines

- All underground 90mm drain lines plus fittings.
- All underground 40mm pressure lines including fittings.

The above feed and drain lines include all pipe and fittings from the main system back to the tank room.

Installation of hydroponic equipment includes

- Marking out of site ready for excavation.
- Installation of all hydroponic benches.
- Installation of all underground feed and drain lines.
- Installation of pump and plumbing of tank room.

Crop protection: 30% shade cloth structure to suit 28m x 30m area.

Structure includes the following

- 870sq/m of 30% shade cloth, stitched and in one piece.
- 24 x 3.5m posts pre-drilled for fixings.
- Fixings including 3mm stainless steel wire, shackles, turnbuckles and star pickets.

Total investment on equipment including installation is \$85,755.00 inc. GST

Option 2 1/2 Acre site 84 x 12m Benches 28,224 plant sites

Bench package includes:

- 8 x 12m 100mm polar gullies pre-drilled at 250mm centres and staggered.
- All above ground and below ground feed and drain lines back to the tank.
- Collection or drain boxes as well as 1.45m adjustable T-bar support stands and fixings.

Tank room fit out includes:

- 5000 litre in ground polypropylene tank.
- 3hp Onga Starite pump.
- Water back up float valve.
- All 20mm and 40mm pressure pipe and fittings required.
- Blue Lab Dosetronic for nutrient, pH and temperature monitoring and adjustment.
- 40mm Venturi kit.

Additional irrigation and drain lines

- All underground 90mm drain lines plus fittings.
- All underground 40mm pressure lines including fittings.

The above feed and drain lines include all pipe and fittings from the main system back to the tank room.

Installation of hydroponic equipment includes

- Marking out of site ready for excavation.
- Installation of all hydroponic benches.
- Installation of all underground feed and drain lines.
- Installation of pump and plumbing of tank room.

Crop protection: 30% shade cloth structure to suit 41m x 60m area.

Structure includes the following

- 2460sq/m of 30% shade cloth, stitched and in one piece.
- 48 x 3.5m posts pre-drilled for fixings.
- Fixings including 3mm stainless steel wire, shackles, turnbuckles and star pickets.

Total investment on equipment including installation is \$268,620.00 inc. GST

Option 3 1 Acre site 140 x 12m Benches 47,040 plant sites

Bench package includes:

- 8 x 12m 100mm polar gullies pre-drilled at 250mm centres and staggered.
- All above ground and below ground feed and drain lines back to the tank.
- Collection or drain boxes as well as 1.45m adjustable T-bar support stands and fixings.

Tank room fit out includes:

- 5000 litre in ground polypropylene tank.
- 3hp Onga Starite pump.
- Water back up float valve.
- All 20mm and 40mm pressure pipe and fittings required.
- Blue Lab Dosetronic for nutrient, pH and temperature monitoring and adjustment.
- 40mm Venturi kit.

Additional irrigation and drain lines

- All underground 90mm drain lines plus fittings.
- All underground 40mm pressure lines including fittings.

The above feed and drain lines include all pipe and fittings from the main system back to the tank room.

Installation of hydroponic equipment includes

- Marking out of site ready for excavation.
- Installation of all hydroponic benches.
- Installation of all underground feed and drain lines.
- Installation of pump and plumbing of tank room.

Crop protection: 30% shade cloth structure to suit 66m x 67m area.

Structure includes the following

- 4370sq/m of 30% shade cloth, stitched and in one piece.
- 96 x 3.5m posts pre-drilled for fixings.
- Fixings including 3mm stainless steel wire, shackles, turnbuckles and star pickets.

Total investment on equipment including installation is \$451,170.00 inc. GST

Please note: The three options presented in this proposal are to be used as a guide only and is not to be assumed as a formal quote. Prices are subject to changes as factors such as steel prices and manufacturing costs fluctuate. Should you wish to be presented with formal quote please contact sales@hydromasta.com.au

Site requirements

Additional costs may be incurred if the following is not provided

- Easy access to site.
- All site works to be completed prior to arrival.
- The accessible supply of 240V power.
- Access to toilets and running water.

Training and ongoing site support

Training of operators:

Initial training of operators is undertaken as part of the installation process at no additional charge to the client. Ongoing training and support can also be provided as part of follow up site visits made by Hydro Masta personnel.

Advanced training courses can be organised either on site or at a pre-arranged venue, this is dependent on numbers that will be attending. This intensive course is of particular relevance when Hydro Masta clients have plans to expand into multiple communities or growing sites.

Ongoing site support:

It is recommended that follow up site visits be made to the site to ensure the ongoing success of the project. This is made up of a monthly site visit for the first 3 months, followed then by quarterly site visits over a 9 month period. This will ensure operators are well trained in the day to day running of such a project.

Supply and Installation of hydroponic system and shade house structure terms and conditions

Listed below are the basic inclusions and exclusions.

Basic inclusions

- Supply of all labour to install the hydroponic system shade structure.
- Digging of all foundations: Note that a drilling machine is quoted for one day, but will be more if the ground is unusually hard, or is rocky.
- Travel time to site including fuel used (Sydney area only)
- Meals and accommodation if necessary.
- Clean up of site and removal of any rubbish at the conclusion of the installation.
- On-site training and familiarization with the workings of the system during the install process.

Basic exclusions (but not limited to)

- Preparation and levelling of site (including removal of any substance that hinders the construction process).
- Mains power and water to tank room.
- Excavation of the site for the tank or shed to house the tank.
- Cement slab surrounding tank.
- Council fees and applications if required.
- Concrete for shade cloth support posts (3 bags per post).
- Detection and identification of all underground services (electrical, plumbing and telecommunication cables).
- Ground cover or fabric covering of surface.
- All other materials and services not specifically listed as inclusions.

Please note the Rock Clause: in the event of rock or any other substance or physical obstructions, time, machinery and concrete will be charged at the standard rate.

Extra charges may also be incurred if delayed due to rain or bad weather.

Payment terms: 50% deposit will be required on acceptance of quote and that the balance will be due and payable prior to the delivery of equipment.

Any additional costs incurred will be paid on completion of the project.

Payment can be made via bank cheque or E.F.T. to the nominated Hydro Masta account.

All prices quoted in this proposal are in Australian dollars and are inclusive of GST.

All prices quoted are ex works Seven Hills, Sydney. Unless otherwise specified.