TG DRAINS

AGRICULTURAL DRAINAGE CONTRACTORS

TG Drains is an agricultural drainage company founded by Tim and Gea Beets in 1997. After having worked for an Australian drainage contractor for 5 years, they decided to start their own business and imported an Italian rotary ditcher.

Initially just concentrating on digging open drains the company soon expanded to include mole drainage and open drains dug with a "V" shaped bucket on their excavator.

In 2005 they built their own tracked tractor. Initially to work the rotary ditcher, this machine was later converted into a subsurface drainage machine. In 2009 they imported a purpose built subsurface drainage machine from England to expand their drainage business and are able to offer the full range of drainage solutions.

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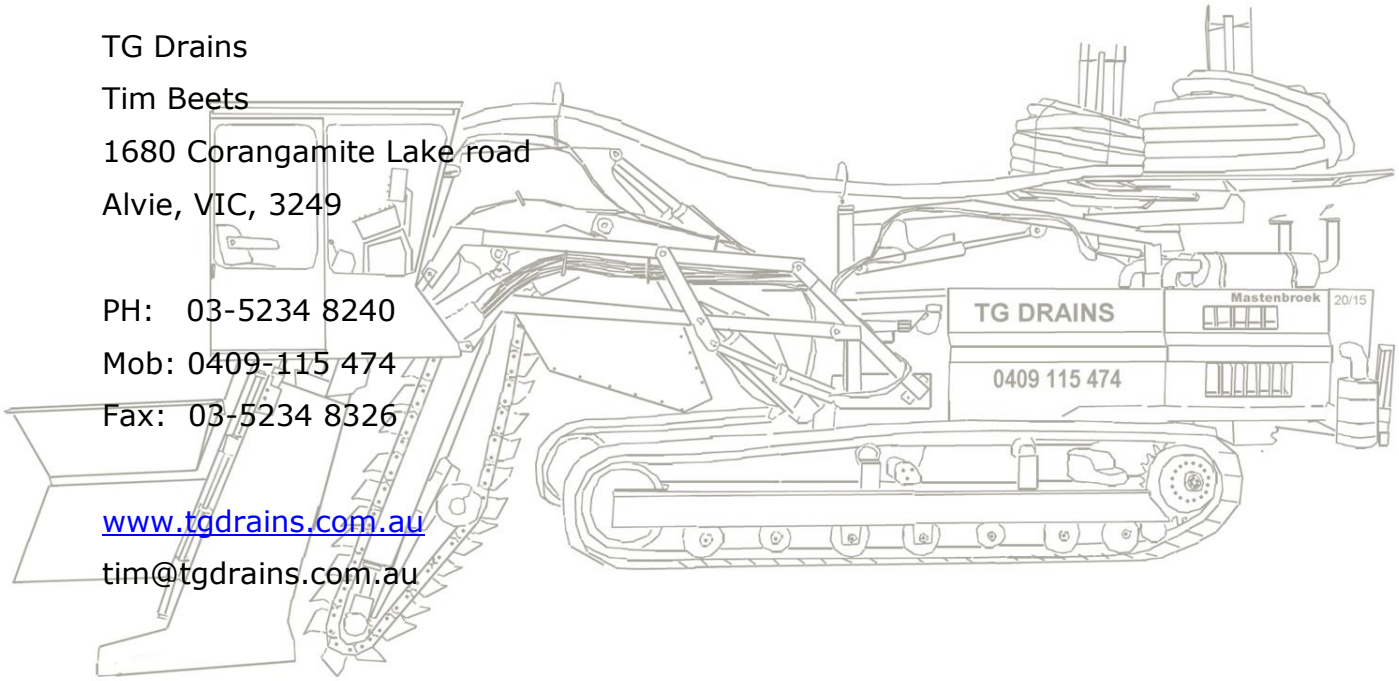


DEVELOPMENT OF……

DRAINAGE PROBLEMS

Drainage problems occur where groundwater rises close to the land surface. This happens as a result of our heavy Wet-season rains or where underground features such as dense clay or rock prevents water from infiltrating into the subsoils. Problems may also occur where there is little or no available outfall for surface drainage, where steeper slopes flatten out, or where soil type changes from adequately drained soils on the higher terrain to more poorly drained soils on the lower, flatter land.

Elevated watertables cause the soil to become water-logged and may result in mobilisation of stored salt when the saline water comes close to the soil surface. Soil degradation will inevitably result, with detrimental effects on agricultural production.

Waterlogging causes oxygen starvation in the root zone, retarding root development and resulting in stunted root systems and low nutrient uptake from the soil.

Waterlogged crop

Waterlogged soils are prone to structural damage if worked when wet or if compacted by livestock or vehicles. Waterlogging can cause increased soil erosion problems because the saturated soil cannot absorb more water.

PURPOSE OF DRAINAGE

The purpose of subsurface drainage is to remove excess water from the soil in order to aerate the root zone, promoting increased soil biota, improving root development and thereby enhancing crop production. In deep, well-structured or friable soils, the natural drainage processes are adequate to allow healthy root growth and successful production of agricultural crops. However, in many shallow or more marginal soils, artificial drainage is needed to prevent water-logging of fields and orchards which causes direct loss of production and waste of chemical, energy, irrigation water and human resources. Additionally, the producer suffers indirect losses due to poor trafficability and bogged machinery, soil compaction and disease out-breaks due to the inability to apply preventative chemicals in the affected areas.

Surface drainage is the removal of water that collects on the land surface. Many fields have low spots or depressions where water ponds. Surface drainage techniques such as land levelling, constructing surface inlets to subsurface drains, and the construction of shallow ditches or waterways can allow the water to leave the field rather than causing prolonged wet areas.

Poorly drained area in crop field will reduce yields or crops cannot be harvested

Subsurface drainage removes excess water from the soil profile, through a network of perforated corrugated polythene pipe drains installed anywhere from 60 centimetres to 210 centimetres below the soil surface.

These corrugated polydrains are commonly called "tiles" because they were originally made from short lengths of clay pipes known as tiles. Water would seep into the small spaces between the tiles and drains away.

Polydrain outlet to a drainage ditch

When the water table in the soil is higher than the polydrains, water flows under gravity into the slots of the corrugated polydrains. This lowers the water table to the depth of the drains over the course of several days or weeks in the case of a prolonged wet season such as 2008 and 2009. Subsurface drains allow excess water to leave the field and once the water table has been lowered to the elevation of the drains, the flow ceases.

INSTALLATION OF
SUBSURFACE DRAINAGE

TG Drains installs subsurface drainage using a laser controlled purpose built drainage machine. The machine, a Mastenbroek 20/15 imported from England, can cut a trench up to 2.2 metres deep. The digging chain of the machine cuts a trench on the design grade and the drainage pipe is laid with fine gravel filter in one single operation. The Mastenbroek machine is able to lay either 100mm or 160mm polydrains.

A tractor hauling a gravel trailer equipped with a conveyor belt drives alongside the Mastenbroek machine to deliver a continuous flow of clean, fine gravel into the machine's hopper. This avoids slumping of the trench walls and prevents excavated material falling on the pipe and possibly blocking the drainage slots. The elevation of the gravel hopper at the back of the Mastenbroek machine can be altered hydraulically, allowing the thickness of the permeable gravel backfill to be varied according to soil type.

Installing subsurface drainage

TG Drains can use different methods for delivering gravel into the machine's hopper depending on where the drainage is installed. For vineyards we use a gravel trailer with an elevator belt to bring the gravel up and over the rows of vines.

Installing subsurface drainage in vineyard

When installing subsurface drainage in orchards or plantations we use our self-propelled gravel trailer on tracks. This allows drainage to be installed under more
The cart drives behind the machine to deposit a continuous flow of gravel into the hopper of the machine. Another benefit when installing drainage in existing cane crops is that the gravel trailer drives in the same tracks made by the drainage machine, therefore minimising the area that is disturbed.
After installation, the drains are GPS mapped for future reference. (See sample of produced map at the end of this booklet.)

Backfilling with self propelled gravel trailer

SURFACE DRAINS

Surface drainage is the removal of excess water from the surface of the land in a controlled manner and as quickly as possible. This is normally accomplished by either shallow spoon drains or open "V" shaped drains. It is important to realise that surface drains will only remove surface water.

Surface drains can also be used in conjunction with subsurface drains. The outlets of the subsurface drains discharge in the open drains.

TG Drains has 2 purpose built buckets for the 12 tonne excavator that can dig a spoondrain or a "V" shaped drain. The excavator is laser guided ensuring an even grade in the drain.

Spoondrain

Spoondrain bucket

MOLE DRAINAGE

Mole drains are used in heavy soils, with low rates of soil-water movement. This requires a closely spaced (2-6 m apart) subsoil drainage systems to provide sufficient water movements to control the effects of salinity and waterlogging in the fields. Such close spacing using a polydrain subsurface drainage system is impractical and costly.

Mole drains are unlined channels formed in the clay subsoil by pulling a ripperleg with a cylindrical foot on the bottom and an expander through the subsoil. The expander is used to compact the channel wall.

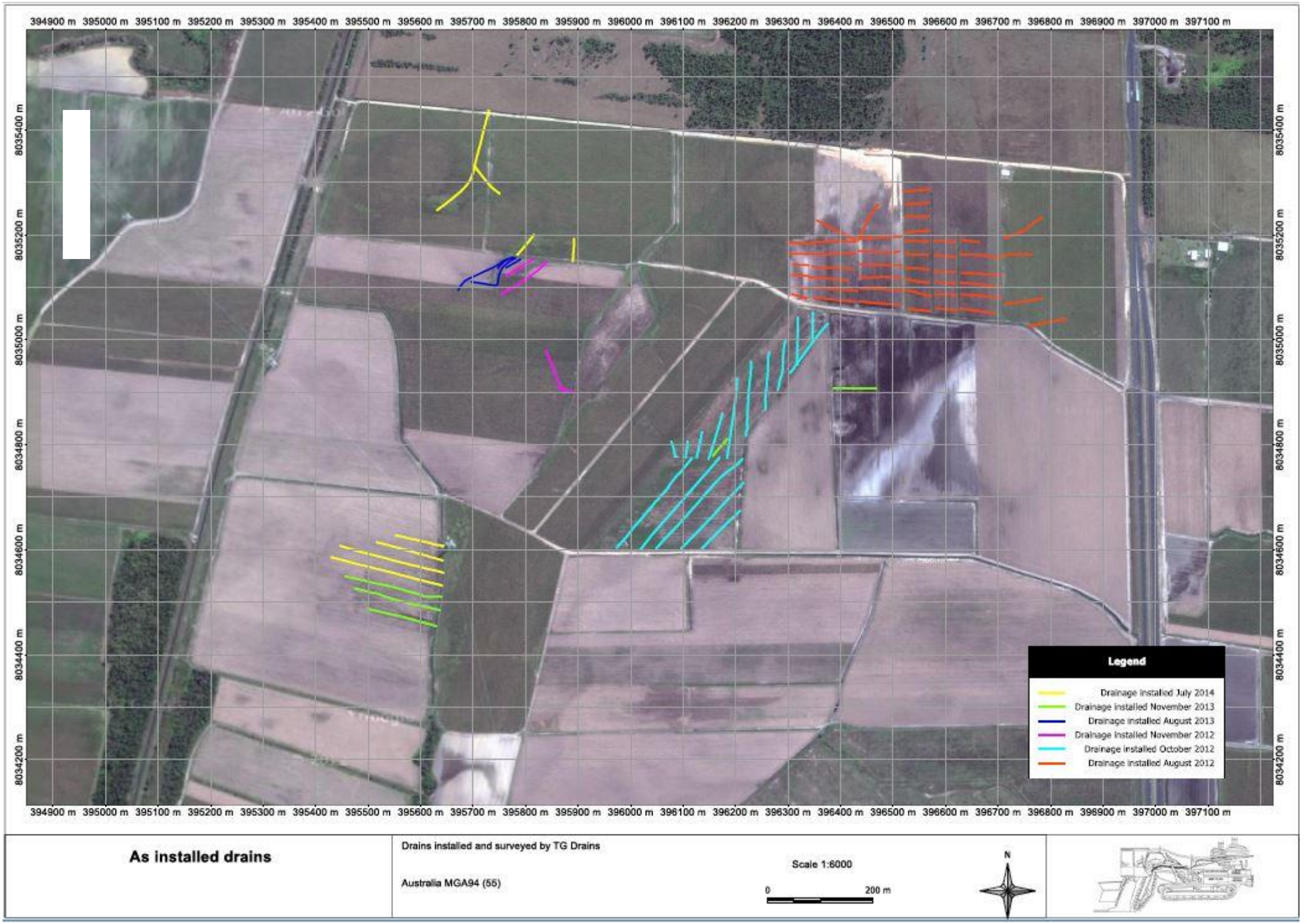
Newly installed mole drain

Ripper leg with cylindrical foot and expander

Creating the mole drains results in the formation of a series of fine fissures or cracks in the soil above the mole channel. This provides the major flow paths for the soil water to move into the mole drain. Mole drains are installed across the subsurface drainage system so that the expander of the mole plough is being pulled trough the permeable backfill of the polydrains. Excess water then flows through the soil fissures to and along the mole drain, then drains into the permeable backfill above the polydrains, and is quickly removed.

Mole channels must have an even, gentle grade, with minimal grade changes. TG Drains uses a floating beam mole plough to install the mole drains. A floating beam mole plough allows the expander to maintain itself at the set depth irrespectively of small ground surface irregularities and allows the ripperleg and the expander to produce a smooth gradient to the mole channels.

Sample of a map showing installed subsurface drains.



BENEFITS OF DRAINAGE

A well drained soil increases plant nutrient uptake. This is because in waterlogged soils with associated low oxygen levels, plants produce less of the energy that is required to uptake nutrients from the soil solution. Improved drainage results in a greater soil store for roots, increasing the pool of nutrients available.

Subsurface drainage systems are usually installed on high value crops which are sensitive to waterlogging and salinity, such as perennial horticulture (grapevines, citrus, fruit trees), cotton, pineapples, bananas, avocados, sugar cane and perennial pasture for dairying.

The installation of appropriate, well-designed and carefully installed drainage systems reduces the length of time that soils remain saturated, resulting in the following benefits:

- Increased crop yields.
- Improved trafficability for spraying harvesting and transport equipment operations during and after the Wet.
- Subsurface drainage combats the problems of land degradation and salinity resulting from high watertables.
- Drainage also improves the timeliness of many farming operations as waterlogging of the soil limits the time available for crop sowing and ground based weed and insect pest control.
- Subsurface drainage can also lessen the incidence of soil borne diseases such as Fusarium and Phytophthora root rots.

Quotes from satisfied customers:

"Wet areas in paddocks are costly, especially under pivot irrigation where infrastructure costs are spread over the entire irrigated area, whether or not the area is entirely productive. Not only do wet areas cause lost production, they also disrupt planting, fertilising, cultivation and harvesting.
The best solution I have found for returning these wet areas to full production is through the laser-guided drainage systems installed by TG Drains. From the design phase, through installation to the final GPS plotted maps, TG Drains provide a professional, efficient operation that pays for itself quickly through increased production."

Tableland district grower Tom Maisel

"TG Drains conducts their business in a very professional manner. Having many years' experience in the drainage business, they were able to advise on the best drainage layout required.
With the trencher using GPS and laser guidance and satellite mapping, we know exactly where the pipe is laid. TG Drains has laid many kilometres of sub-surface drainage on the company farms and it has been very successful in eliminating our drainage problems.
Their system is very efficient resulting in minimal time between installing the poly-drains and getting back into the paddock."

Alan Cross, Operation manager Northern Farms for MSF Sugar.

For further information:

Please feel free to contact Tim Beets to discuss any drainage issues you might have on **0409-115 474**.
This is obligation free and will give producers a better understanding of possible solutions to their particular drainage problem and an estimate of likely costs involved.
Alternatively you can visit our website on**: www.tgdrains.com.au** for additional information and photos.