

Project: Brookleigh Estate East  
Date: April 2014  
Client: QUBE Property Group  
Engineer: Wave International  
Parafence™ Installer: Agrimate Fencing  
Location: Caversham, City of Swan, Western Australia



## Parafence™ Windbreak Fencing System

Half an hour from the Perth CBD is the City of Swan - a beautifully diverse area of land, collectively known as the Swan District. Stretching over 1,044 square kilometres, the City is a unique blend of residential, commercial, industrial and rural land. The region's major tourist attraction is the magnificent Swan Valley wine growing area. It is Perth's premium food and wine destination, home to more than 150 attractions including wineries, restaurants and cafes, breweries and distilleries. The City is also a thriving hub of economic growth, consisting of some of the fastest growing suburbs in Western Australia.

The interface of future residential development with adjoining rural areas was an important consideration in the development of the 'Caversham Transition Lot Management Plan.' It is intended to provide the provisions for subdivision and development of land within the interim agricultural buffer.

It is widely understood that the prescribed separation distances in the Environmental Protection Authority published Guidance Statement No. 3, are generic. In the case of broad acre viticulture, the Guidelines prescribe a 500m generic buffer distance between vineyards and residential dwellings on account of their potential to generate noise, dust, gas and odour emissions. In Caversham, a site specific analysis was undertaken to determine the likely emissions from adjoining land uses and on this basis devise a suitable separation distance to future urban development. The analysis concluded that spray drift of chemical herbicides and pesticides associated with the viticulture has the potential to impact upon the amenity of future residential areas. Special residential transition lots with a minimum depth of 85m are therefore recommended, comprising of a 55m buffer and including a 2.8m high artificial boundary screen.

Research undertaken by the University of Queensland to determine the effectiveness of artificial screening to mitigate pesticide/herbicide spray drift dispersion concluded that;



Tensioning the Parafence™ prior to connecting to the posts



Connection detail to the intermediate posts at ends of rolls



The Parafence™ webs with the vineyards in the background

- In the absence of any form of barrier, spray droplets can drift in excess of 80 metres;
- Artificial barriers can reduce spray drift potential by between 60 to 90%;
- Barriers should achieve a porosity of 50%;
- Barriers should have a minimum height of 2.8m;
- Be constructed of a durable material; and
- Be structurally sound

Parafence™ windbreak technology was investigated to check it's suitability for use on the Caversham project. Strategen Environmental Consultants concluded that, "The open spaces between the webs provides a porous barrier that allows air flow through the fence but at a greatly reduced net velocity due to the drag induced by the contact of the air with the web elements. A portion of airborne particles and aerosols are removed the air column downwind of the fence via settlement from the reduction in momentum of the lower velocity air stream as well as impaction onto the surfaces of the web. The reduction in wind velocity from the fence also reduces the likelihood of re-entrainment of dust into the air." They also stated that, "The Parafence™ (with a porosity of 45%), is expected to deliver slightly superior spray drift removal efficiencies than a fence with 50% porosity as specified by Western Australian Planning Commission."

Based on these findings, the City of Swan approved the Parafence™ windbreak fencing system for use on the Brookleigh Estate East project. Geofabrics Australasia supplied the 900m long fence in 1m and 1.8m wide rolls and Agrimate Fencing installed the Parafence™ using 3.6m long x 150mmØ treated timber poles at 3m centres. The poles were concreted 0.8m into the ground.

Agriculture Western Australia Farmnote No. 24/84 covers the features, benefits and installation of Parafence™ windbreaks. The Farmnote states that Parafence™ fences erected at the Dept. of Agriculture's Vegetable Research Station in Medina (WA), withstood the gale-force winds of Cyclone Alby in 1981.



The completed 900m long x 2.8m high Parafence Windbreak Fence

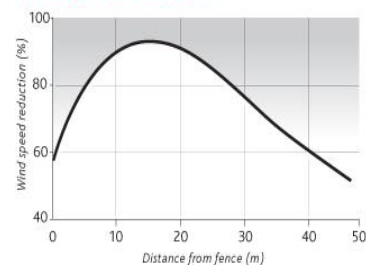
## How PARAFENCE™ Windbreak Fences work:

The system, which is manufactured from high tenacity polyester fibres encased in a durable polyethylene sheath, has been proven across the world in a wide variety of applications ranging from the protection of industrial plant and equipment, through mining and quarrying to agriculture and horticulture.

Additionally it has been widely used to provide effective windbreaks on open highways and other transport routes and its special properties have made it ideal for use as sand/snow control barriers.

The scientific key to the success of PARAFENCE™ is 'controlled porosity'. When solid structures are used as windbreaks they can have the effect of actually increasing wind damage. They cause the wind flow to rise over the structure, creating an area of low pressure and a partial vacuum to the leeward side. The vacuum tends to pull the free stream downwards, quickly negating the windbreak effect. This situation is worsened because friction between the free stream and the vacuum can generate high speed turbulence capable of causing more damage than the original wind. PARAFENCE™ is engineered to avoid this problem. It is manufactured from a series of horizontal and vertical webs, carefully designed to enable 'controlled porosity' – i.e. the design allows a diffused flow of wind to pass through to the leeward side. Although travelling at a much slower speed, this flow is closer to equilibrium with the higher energy free stream flow and the downward suction effect on the free stream is much less. As a result the problem of high speed turbulence is avoided and the wind shelter effect persists for much greater distances than those achieved with a solid structure.

### Windspeed reduction



Depending on the type of Parafence selected, the system has the ability to reduce windspeed by between 58 and 68%.

The graph opposite illustrates the results of wind tunnel trials carried out at Nottingham University, using a 1.8m high Parafence windbreak.

## PARAFENCE™ FEATURES

- Provides maximum protection
- Light weight, easy to handle and install
- Easy to relocate
- Tough and durable
- High impact & tensile strength
- Retains tension once installed
- Virtually maintenance free
- Rot proof
- Does not compete with crops for water or nutrients
- High chemical, UV and damage resistant webbing