BUNYIP FOOD BELT – LESSONS LEARNED

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ABSTRACT

The Bunyip Food Belt is a large region south east of Melbourne that contains some of Australia's most fertile and valuable land and produces fresh food for Melbourne's rapidly growing population. As urban growth takes over existing farmland, new food production areas will be developed.

This paper examines work undertaken in 2011 that investigated the feasibility and practicality of establishing an intensive agricultural area on the fringe of Melbourne. Issues such as urban growth, competing demands for land, productive soils, integrated water management, willingness to pay, irrigation demand profiling, access to labour and markets, and transport were all examined in determining the future prospects of using large volumes of recycled water to produce food on the urban fringe of Melbourne.

INTRODUCTION

Food production using alternative water sources for irrigation is not a new concept for the southeast region of Melbourne.

The Cranbourne area (immediately east of Clyde North - see Map 1) has been supporting market gardens for a number of years, making use of the excellent agricultural soils, close proximity to labour and markets and favorable climate to produce high value crops. In more recent years (i.e. early 2005 onwards), the availability of Class A recycled water from the Eastern Irrigation Scheme (EIS) has provided the opportunity for a number of businesses to consolidate, and in some cases expand, using a portion of the recycled water available from Melbourne's Eastern Treatment Plant (ETP) to help sustain horticultural production.

The remainder of the recycled water available from the ETP is either retained to support a range of other beneficial uses throughout the south east region (e.g. residential dual pipe supply; golf course irrigation; other forms of agriculture etc.), or is outfalled through the South East Outfall to Bass Strait.

This availability of a potentially vital resource (recycled water), desire from the community for food security, and proximity of the ETP to an existing and large agricultural sector prompted the need to consider the potential for expanded food production in the region.

THE BUNYIP FOOD BELT

The Bunyip Food Belt is a large area of land to the South East of Melbourne covering the Bunyip River Basin, and the Koo Wee Rup and Dalmore swamp districts. The area is shown in Map 1. The distance from the ETP to Lang Lang is approximately 40 km.

Agricultural and horticultural activities are common throughout the area, ranging from the production of high value salad varieties and larger vegetables (e.g. asparagus, carrots, leaks), to potatoes, dairy farming, and dryland beef grazing and cropping.

The existing horticulture producers (including potatoes) have established access to irrigation water over a number of years to help secure production. As described earlier, the market garden properties closer to Cranbourne have been able to access recycled through the EIS, while those farmers further east of Melbourne generally rely on catchment dams, surface water and groundwater entitlements for their irrigation supply. Some groundwater and surface water entitlements also exist closer to Cranbourne (see Map 2).

As a rule, the 'market gardeners' occupy the better soils, making use of the sandy soil profiles to grow a range of crops throughout the year (see Map 3 – Group I & II soils). These permeable soils not only provide good conditions for crop growth, but also allow machinery access all year round, thereby allowing continuous crop production.

The clay loam and peaty clay soils (see Map 3 – Group III and IV soils) support the larger vegetable and dairy/grazing farming. In comparison to the sandier soils, production on these heavier soils is

generally limited to the warmer months due to the risk of waterlogging.

Sand mining is also common throughout the region, particularly on the sandy soil deposits to the south east around Lang Lang. Whilst distinctly different to agricultural and horticultural production, sand mining and farming do share two important similarities:

- They require access to good soils (i.e. sand).
- They have a large demand for water (for sand washing).

Consequently, sand mining is an important industry sector that required assessment as part of the investigations.

IRRIGATED AGRICULTURE/HORTICULTURE – DRIVERS AND BARRIERS

Viable irrigated agriculture is not as simple as 'just add water'. A number of factors need to come together for an irrigated enterprise to prosper and remain viable. For the Bunyip Food Belt, the key factors that influence the potential for increased recycled water use and food production are:

1. Soil type and competing demands

Access to permeable soils is a critical input for market gardeners. The year round production and strong plant growth allows market gardeners to grow a variety of crops and generate high returns. This in turn increases the amount market gardeners are able to pay for irrigation entitlement, which can help to off-set the cost of irrigation supply infrastructure.

Map 3 shows the regions soil types from an irrigation potential perspective. Soil classes I and II are the sandier soils that are highly permeable and productive, while soil classes III and IV are the heavier clay loam and peaty soils that are prone to waterlogging in winter and reduced production. The Class V soils are very heavy clay soils, that are not generally suited to irrigated agriculture.

It can be seen that the bulk of the sandier soils are concentrated around the Cranbourne region (north west corner of the Bunyip Food Belt), with some other sandy deposits in the south east corner of the study area around Lang Lang.

The interesting points to note from this map is the:

- Distribution of soils across the study area;
- Proximity of the sandy soils to the EIS boundary (blue line – see previous comments around the supply of recycled water from the EIS to the market gardeners); and
- Proximity of the sandy soils to the Casey Urban Growth Boundary (UGB).

The UGB has been slowly but steadily moving further east and south, and as can be seen, is now encroaching on much of the better horticultural soils.

This area of Melbourne is expanding rapidly, and the harsh reality is that it can be more prosperous to grow houses than leafy salad varieties. Consequently, the potential for on-going horticultural production in this area appears limited. Those farmers wishing to continue in the industry may move, but as previously stated, they require access to sandy soils to sustain their business models.

The sandy soils around Lang Lang may provide some opportunity, but here, competition from sand miners is a major impediment, and finding available parcels of land can be difficult.

Across the rest of the Bunyip Food Belt, there is potential for other forms of irrigated agriculture on the Class III and IV soils, but their returns are less than what the market gardeners are able to generate, and consequently, their ability to pay a premium for recycled water is reduced.

This is an important point in the context of the Bunyip Food Belt. Whilst the ETP is relatively close to the study area, there is still a large infrastructure investment required to move the recycled water from the ETP to the farms. Excluding the market gardeners, this cost of supply is generally greater than what the farmers can afford to pay for the water, and therefore, without significant funding, the scheme isn't viable.

The proximity of suitable agricultural soils to the water source and competing demands for the soil resource can have a major impact on the viability of a scheme. High return crops are able to afford/off-set the cost of capital investment in infrastructure, but finding the unique combination of excellent soils, irrigation demand and available irrigation supply can be difficult.

2. Water use and availability

A large proportion of the Buyip Food Belt already has access to both groundwater and surface water entitlement for irrigation.

The existing entitlements and usage are summarised in Map 2 and Tables 1 and 2 below.

Table 1: Summary of surface water entitlement and usage

Area	Entitlement (ML)	Average Usage (07/08 to 09/10) (ML)	% Entitlement Used (ML)
B-T	6,028	2,718	45
LLR	1,488	292	20
YC	1,218	228*	24
TC	337	115*	34
DC	346	95*	27
CC	810	122*	15
CarC	719	79*	11
Total	**10,946 ML**	**3,709 ML**	**34%**

* 2009/10 data only

Table 2: Summary of groundwater entitlement and usage

Zone	Entitlement (ML)	Average Usage (07/08 to 09/10) (ML)	% Entitlement Used (ML)
1	1,089	379	35
2A	759	182	24
2B	2,930	1,106	38
3	447	109	24
4	1,669	480	29
5	1,369	146	11
6	566	127	22
7	2,746	1,675	61
N-GMA	1,337	227*	21
Total	**12,912 ML**	**4,481 ML**	**35%**

* 2009/10 data only

On 'face value', Tables 1 and 2 suggest that there is a large volume of unused irrigation entitlement available in the district. However, this is not strictly the case:

- The surface water data reflects the 'yield' of water available. That is, the volume of surface water that can be used by the farmers during the irrigation season. Whilst surface water is available all year round, the farmers can only use it if they can store it, or access it directly when the crops needs irrigating. The 34 per cent usage shown is a reflection of the surface water volume that can be practically accessed and used by the farmers.
- Groundwater entitlement reflects the value of irrigation entitlement and its impact on property values. Whilst some of the groundwater entitlement is too brackish or economically unviable to use (due to pumping costs), farmers are reluctant to sell their entitlements because it maintains or increases the value of their property. In effect, groundwater attached to land is superannuation. Again, the 35 per cent usage shown is a reflection of the volume of groundwater that is likely to be used in an average irrigation season.
- The other significant factor is that the region does not have a formalised trading system for either the surface or ground water entitlements, and both entitlements are capped (i.e. no new irrigation entitlements will be released). This means that there is limited opportunity for new or expanding farmers to access water for irrigation. Whilst some entitlement is available for lease, the bulk of this water is tied up in long-term contracts that rarely become available.

The analysis indicates that there is not large volumes of excess irrigation entitlement available that could be used to attract farmers to the region and drive economic development. This could be interpreted as providing opportunity for recycled water supply?

However, the majority of farmers within the district had built up their entitlements over time to a point where they have sufficient water. While they had some reservations about the security of their current entitlements, and consider the idea of purchasing some recycled water as 'good security' (say up to a maximum of 30% of existing entitlement), lack of irrigation availability was not a huge issue for them.

It is clearly an impediment for new farmers wishing to establish an irrigation business in the region, but no one is going to commit capital and build a multi-million dollar pipeline on the hope that farmers 'will come'. For any scheme like this to be successful, it needs commitment and guaranteed use to gain momentum and proceed, i.e. the existing farmers to commit to using recycled water prior to the pipeline being built, or new farmers purchasing land in the region and committing to using recycled water. Neither of these options has occurred with the farmers preferring to say 'if you build the pipeline we'll probably agree to access some entitlement'. This is not a sound position for the successful business case, and hence, a stalemate has occurred.

There is also the issue of climatic conditions and the impact it has on irrigation demand. The Bunyip Food Belt has quite good rainfall, and in general terms, irrigation rates are low (i.e. ≤3 ML/ha/annum), if needed at all. A number of dairy and grazing farms do not need to irrigate, and if they do, they would only irrigate small areas of the farm for the production of 'cash crops' (i.e. summer fodder crops). Not all of the regions farmers rely on

irrigation for production, and irrigation rates can be quite variable between years, which impacts on farmers' willingness to commit long-term to a given volume of water.

This last point directly influences the farmers thinking with respect to recycled water contracts. The regions farmers were reluctant to enter into a contract that requires them to pay for entitlement every year, when there is a high risk that they may not use it (due to sufficient rainfall). Overwhelmingly, the contract preference was a 'pay per use' agreement, rather than a 'take or pay' arrangement, which again, makes it difficult to build a business case and justify investment in the infrastructure necessary to supply water to the region.

3. Proximity to Melbourne and market opportunities

Close proximity to Melbourne is vital for a number of the market garden and vegetable businesses in the Bunyip Food Belt for the following reasons:

- It provides access to labour necessary for the harvesting of produce (the market garden and vegetable industries are labour intensive).
- It provides access to transportation companies necessary for domestic markets and international export.
- Driving time to Melbourne Markets is less than 1 hour, which is convenient.
- Many goods and services are easily accessible.

The previous section on soils discussed the possibility of some of the market gardeners moving their business to other suitable soils around Lang Lang due to pressures from the Urban Growth Boundary. Whilst this makes sense from a soils perspective, it can decrease business viability by altering transportation costs and lost opportunity time (i.e. extra time spent in the truck). Lang Lang was seen to be the limit of what would be acceptable without severely impacting current business models.

The issue of 'markets' and 'market demand' is always difficult to assess, but at the time, the market indicators were:

- Most industries were experiencing a stabilisation or flattening of demand for produce. This was particularly the case for the vegetable industry where increased importation of fresh or frozen products was threatening local production. The development of export markets (and by inference, greater water use) is challenging in an increasingly global market with export volumes remaining fairly steady.
- The domestic market was also fairly stable with price being sensitive to supply. Whilst the domestic market may increase with population and affluence, for many crops (e.g. salad vegetables), production can occur in many regions across Australia. A natural disaster in one region will be rapidly addressed by increased production in another.
- The development of niche products for the domestic and export markets will continue to be an opportunity. However, this will be low volumes and due to the proximity to Melbourne and high value of land, the commodities will need to be high value/return.
- Whilst there may be limited opportunity for large-scale increase in production in the region it is likely that there will be movement of businesses to the region provided that there is availability of secure water supplies and appropriate soils.

Overall, at the time of the study, the market forces did not appear to be strong. Consolidation of businesses was expected to continue, with larger and more intensive farmers increasing in size and fewer numbers of growers. This was likely to result in a similar volume of production from fewer growers, which did not indicate a strong potential for increased water use.

There was some potential for established businesses to move into the region, or a shift of farmers from the Cranbourne region to escape the UGB, but both required security of entitlement before they would commit, and no one was prepared to fund the construction of a new recycled water pipeline without guaranteed demand. This has been a major sticking point for the scheme, which remains unresolved.

4. Timing

The final issue that impacted on the likelihood of the scheme is timing.

The investigations were undertaken in 2011, at a time where Victoria (and much of Australia) had just come through the millennium drought and were now experiencing quite wet weather. Flooding was common throughout the Bunyip Food Belt, and the farmers enthusiasm for access to more water at a time when floods were impacting their crops, was low.

Had the same questions been asked 2-5 years earlier (i.e. the peak of the drought), the response to an alternative water supply would have been different and serious momentum would have been generated for the scheme to become established.

However, this was not the case, and the scheme has not gone ahead.

It could be argued that the farmers attitude to the proposed scheme was shortsighted, and that in time, access to a relatively secure irrigation source would be extremely beneficial to them. But this reinforces that the farmers within the district had worked hard over a number of years to secure other forms of irrigation entitlement and weren't prepared to financially commit to an irrigation source that they weren't confident of using every year.

Nonetheless, it is true that 'there aint nothing like a drought' to drive demand for alterative water sources, and had the scheme been proposed earlier, there is a good chance that it would now be established.

CONCLUSION

The Bunyip Food Belt has provided a fascinating opportunity to examine the drivers and barriers that can exist when trying to establish new irrigation demand on the fringe of a major city.

Understanding the potential for increased irrigation demand and food production requires examination of a number of complex and interrelated issues associated with:

- Soils and the competing demands for that resource;
- Urban encroachment;
- Access to existing irrigation sources and attitudes to securing new sources;
- Market forces and willingness/capacity to pay for irrigation entitlement and off-set the cost of infrastructure; and
- Confidence; confidence that if the scheme goes ahead it is going to be financially viable for the farmers and the supplier of the recycled water to be involved.

Ultimately, for the Bunyip Food Belt, neither the farmers or supplier of the recycled water have been able to commit to the scheme strongly enough to justify the cost of supply and see the scheme proceed.

ACKNOWLEDGMENTS

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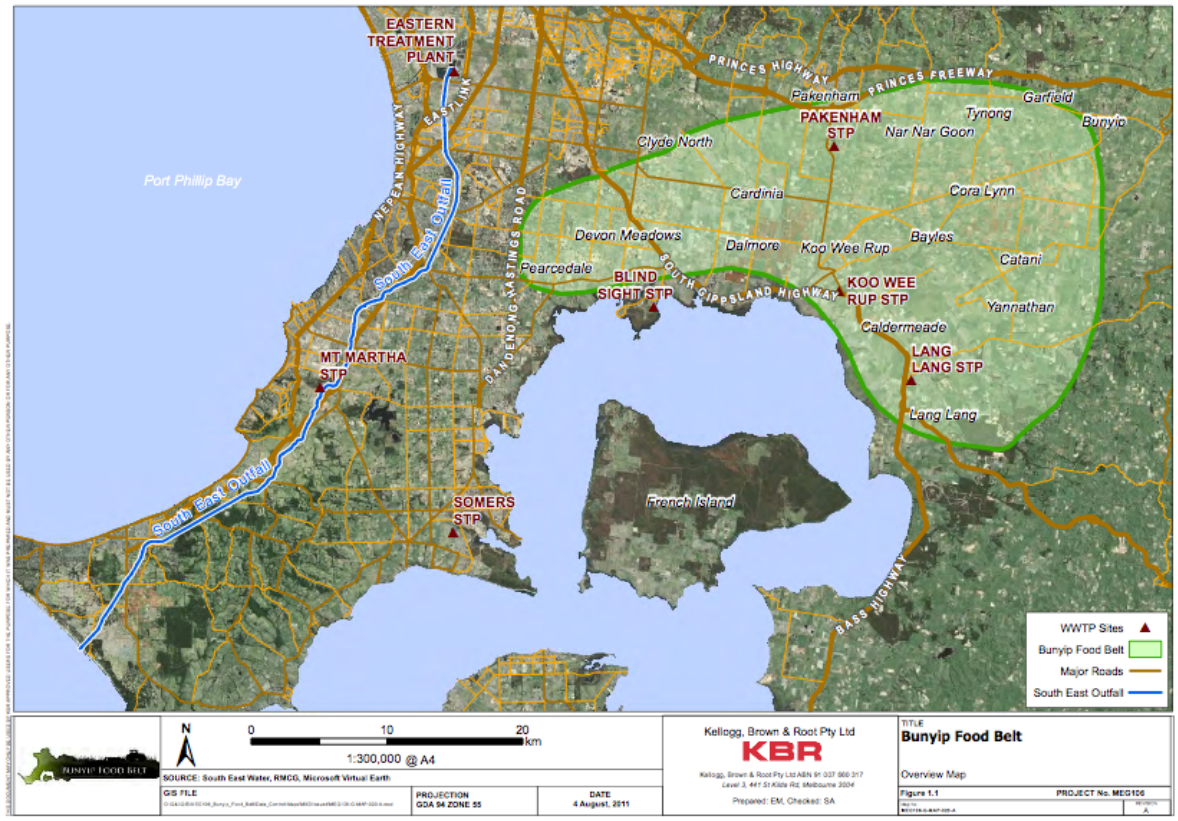
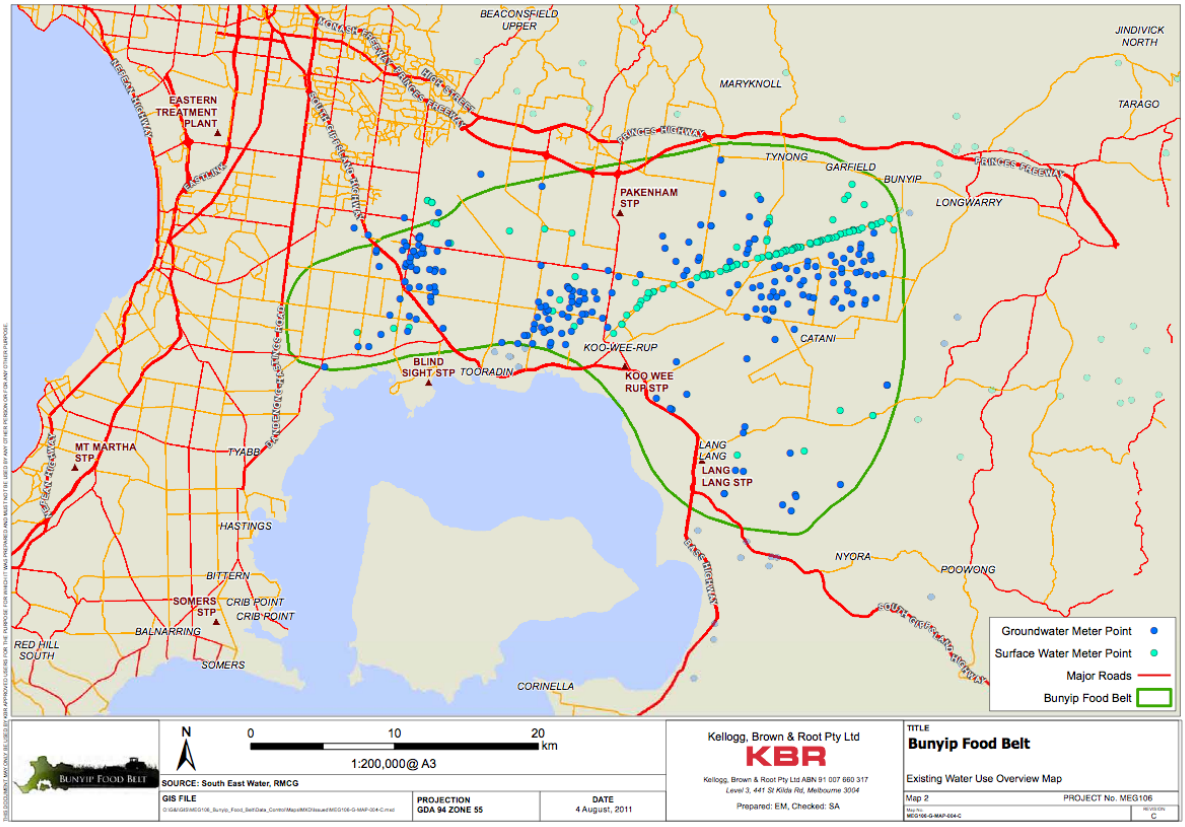
REFERENCES

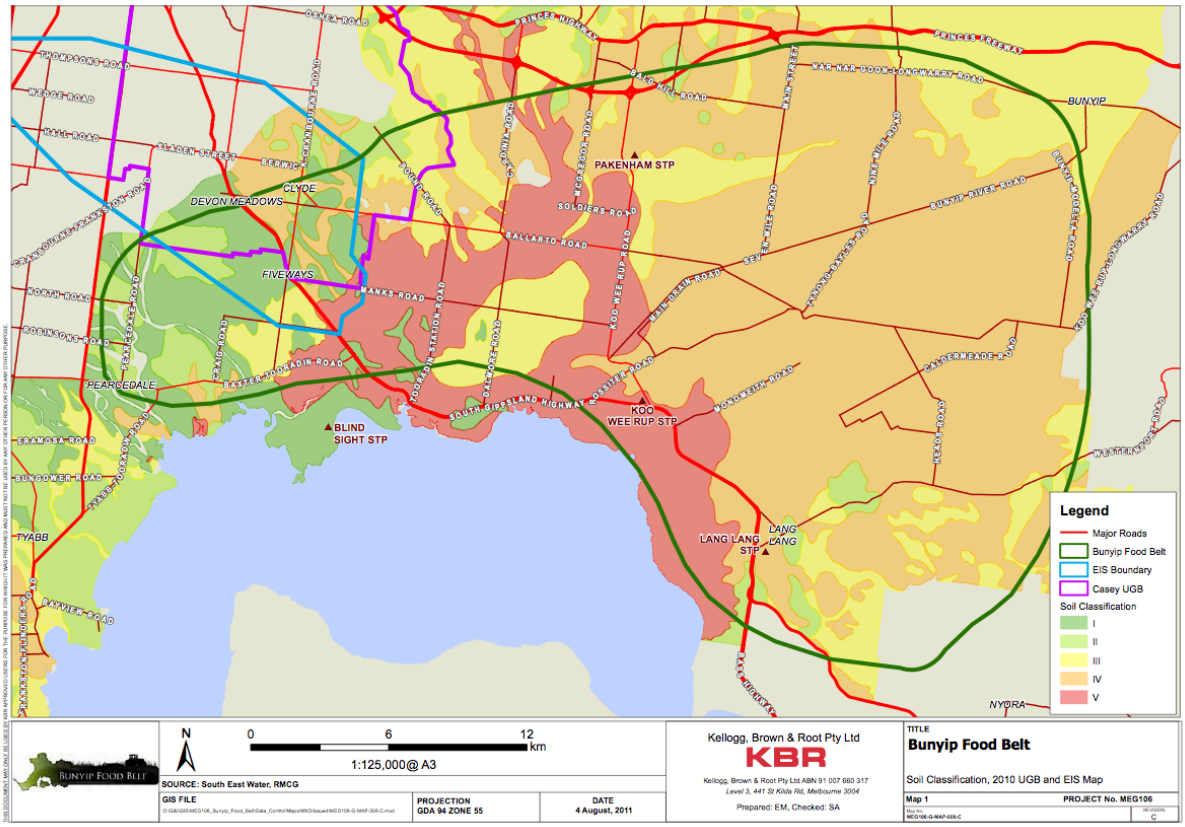
KBR & RMCG, 30 August 2011. Bunyip Food Belt: Development of Demand and Infrastructure Costing for Recycled Water Scheme Pre-feasibility Report



Map 1: Bunyip Food Belt Location



Map 2: Groundwater and Surface Water Meter Points



Map 3: Soil Type