

Planisphere

**City of Greater Dandenong Green Wedge Management
Plan; Land Use (Agricultural Feasibility)**

Final Technical Report

July 2013



RMCG

ABN: 35 154 629 943

Consultants for Business, Communities & Environment

Melbourne Office:

Suite 1, 357 Camberwell Road
Camberwell, Victoria 3124

T (03) 9882 2670 F (03) 9882 0996

E rm@rmcg.com.au

W www.rmcg.com.au

Contact Details:

Name: Carl Larsen
 Title: Senior Consultant
 Address: Suite 1, 357 Camberwell Road, Camberwell 3124
 P: (03) 9882 2670
 F: (03) 9882 0996
 M: 0419 622 393
 E: carll@rmcg.com.au



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Executive Summary

Drivers and purpose

The City of Greater Dandenong Green Wedge Management Plan (GWMP) is currently being developed. The Plan will provide direction for all land within the Green Wedge and propose planning scheme controls and other measures to achieve key project outcomes.

The Greater Dandenong Green Wedge is located in the middle of the broader 'South East Green Wedge' and includes many facilities and land uses of strategic importance to the surrounding region and to the wider metropolitan area.

The purpose of this report is to provide technical expertise in land use (agricultural feasibility, geology and soils) to inform the development of the Draft GWMP on behalf of the City of Greater Dandenong Council. The land use (agricultural feasibility, geology and soils) component is one of seven specialist topics in preparing a Management Plan for the Dandenong Green Wedge.

Analysis of Existing Agriculture, Geology and Soils

Agricultural land use

Agriculture represents an important land use in the study area. Approximately 1,037 hectares (ha) of land, or 28% of the study area, is used for agricultural purposes by approximately 32 businesses in 2011.¹ This is mainly comprised of horticulture and livestock production, including:

- Nurseries, cut flowers and cultivated turf: 11 businesses totalling 30 ha. Four of these businesses constituted 10.1% of Melbourne's undercover cut flower area (119,889 m²)
- Market garden vegetables: 6 businesses totalling 168 ha. Four of these businesses produced 5.2% of Melbourne's herbs (101,098 kg)
- Intensive poultry (both meat and egg): 3 businesses housing 367,949 birds. Almost three quarters of these birds (74.8%) are for meat production, while the remaining 25.2% produce over 2 millions dozen eggs per year
- Extensive beef cattle grazing: 10 businesses totalling approximately 500 ha and running approximately 955 cattle
- Horse studs, training facilities and stables: 4 businesses totalling 236 ha running approximately 98 horses.

Agricultural production and value

Agriculture is a small contributor to the City of Greater Dandenong's economy and it has declined in recent times.² The study area generates approximately \$20 million annually, or 1.7% of Melbourne's total value of agricultural production.³

Geology and soils

The geology of the region is characterised by Quaternary alluvium (gravel, sand and silt) and swamp and lagoon deposits (silt and clay) (Qa), and Tertiary gravel, sand and silt of the Hanson Plain Sand

¹ Australian Bureau of Statistics (2012) Gr. Dandenong (C) Bal SLA

² City of Greater Dandenong (2013)

³ Australian Bureau of Statistics (2012) Gr. Dandenong (C) Bal SLA

formations (Nbh). There are also small isolated areas of coastal dune deposit in the west of the study area bordering the Mornington Peninsula Freeway (Qdl).⁴

The soils are generally loamy sand to clay loam on the surface underlain by an impermeable, sodic, saline clay layer. Their slopes are level to gently inclined. Therefore, erosion, waterlogging, sodicity and salinity must be carefully managed to sustain agricultural production on these soils.⁵

The soils in the study area can be classified as Class II-IV based on previous projects undertaken by RMCG in the region and existing literature. The lighter soils are more suitable for horticulture, while the heavier soils are more suited to pastures. These are also suitable for recycled water irrigation.⁶

There is a high probability⁷ and high confidence⁸ that Coastal Acid Sulfate Soils (CASS) is located in the west of the study area in the Bangholme Lowlands and Buffers Precincts bordering the Mornington Peninsula Freeway (Class A1). These areas are most susceptible to the impacts of CASS. There is a high probability and low confidence that CASS covers the majority of the Wetlands, Bangholme Lowlands and Buffers Precincts (Class A3). There is an extremely low probability and very low confidence that CASS covers the Lyndhurst Precinct and remaining parts of the study area (Class C4).

Constraints and Opportunities Analysis

Constraints to the future of agricultural land uses

The key constraints to the future use of land for agriculture include:

- **Interface issues** such as stray domestic pets, wind blown rubbish, rubbish dumping, road safety when moving agricultural machinery on urban roads, off site impacts from agricultural activities including dust and odour and nuisance complaints
- **Fragmentation** associated with rural residential estates at Hutton Road, Keys Road and Perry Road in the Wetlands Precinct, corner Springvale Road and Mornington Peninsula Freeway in the Bangholme Lowlands Precinct, and McMahrens Road and Harwood Road in the Buffers Precinct
- **Uses incompatible with agriculture**, such as Cornish College, which may restrict some agricultural practices such as spraying and use of machinery
- **Biophysical constraints** such as drainage and flooding, particularly in the Wetlands, Bangholme Lowlands and Buffers Precincts indicated by the land subject to inundation overlay (LSIO). Current drainage infrastructure capacity will have implications for agricultural land use and flooding
- **Climate change** is likely to increase the frequency and severity of flooding events which will have an increased impact on the existing LSIO areas and elsewhere in the study area. This will largely be due to an increase in the intensity of rainfall and the low-lying nature of the study area.

While a number of physical constraints to agriculture have been noted in the report, e.g. land size, land availability for expansion, soil, access to water, degradation, CASS, groundwater and soil salinity. The overwhelming constraint to the long-term use of land for agriculture is its **lack of competitive advantage** compared to other agricultural land, the high cost of land and interface issues.

⁴ Department of Primary Industries (2011)

⁵ Agriculture Victoria Services Pty Ltd (2003)

⁶ Agriculture Victoria Services Pty Ltd (2003), RMCG (2010) and URS (2009)

⁷ Probability of occurrence: **high** (Class A; >70% of mapping unit), **low** (Class B; 6 - 70% of mapping unit), **extremely low** (Class C; 1 – 5 % of mapping unit), and **no** probability of occurrence (Class D; <1% of mapping unit; e.g. thick outcrops of hard rock, ferricrete, calcrete, silcretes)

⁸ Level of confidence: **high** (Class 1; All necessary analytical and morphological data are available), **moderate** (Class 2; Analytical data are incomplete but are sufficient to classify the soil with a reasonable degree of confidence), **low** (Class 3; No necessary analytical data are available but confidence is fair, based on a knowledge of similar soils in similar environments) and **very low** (Class 4; No necessary analytical data are available and classifier has little knowledge or experience with ASS, hence classification is provisional)

Opportunities for future agricultural land uses

The key opportunities to the future use of land for agriculture include:

- **Availability of land:** land that has high security and opportunity for expansion is favourable. However due to high land prices, land that is available for lease may be preferable as it provides potential for capital to be used for other activities and may increase the competitive advantage of the study area. Whilst land is available as previously noted this region does not have a competitive advantage over other areas. The purchase or lease of land will therefore be associated with personal preferences for establishing a business in the region
- **Access/location:** close proximity to markets, family, community and other business in the metropolitan region e.g. EastLink, Dandenong industrial nodes. This access may provide opportunities for production that is strongly linked to the local community (e.g. farmers markets, community supported agriculture). However, this would represent a very small volume of produce and should not be overstated
- **Commercial viability:** existing businesses that are currently commercially viable i.e. agriculture is the sole source of income and not supplemented from off-farm income sources. Commercially viable businesses are currently clustered in the eastern part of the Buffers Precinct and Lyndhurst Precinct
- **Alternative water supplies:** potential to utilise alternative water supplies and value add e.g. Class A recycled water from the ETP. This volume again would be a relatively small component of the recycled water available from ETP with costs expected to be high
- **Distance from residents:** reasonable distance from residents means that 'Right to Farm' is not likely to be an issue. This is assisted by the buffers from the Industrial 2 Zone to the north of the study area and the Environmental Significance Overlay around the ETP
- **Climate change and mitigation:**
 - Potential to produce food close to market may reduce carbon footprint although this will be a very small percentage of total consumption. There is also the potential to meet niche markets (e.g. farmers markets)
 - A secure supply of water (i.e. recycled water) will mean less reliance on climate related water sources
 - Climate change will have a proportionally minimal impact on this small area of production and enterprises will be able to adapt. Small-scale agriculture means that the study area will not be attractive for those looking to move from climate impacted regions.

Future Directions Plan: Summary of Recommendations

A summary of recommendations for the future directions plan are provided in Table E1-1.

Table E1-1: Summary of recommendations

Future direction	Recommendation
Future viable and suitable agricultural land uses	Maintain current agricultural land uses to: <ul style="list-style-type: none"> ▪ Provide amenity, rural landscape and recreational value ▪ Protect buffers around significant public infrastructure assets ▪ Avoid development on land that is potential CASS ▪ Avoid development requiring significant infrastructure investment or upgrades e.g. roads, drainage.
Preventing land use conflict	Assist in preventing and mitigating land use conflict by ensuring that appropriate separation distances are maintained between agriculture and other incompatible land uses. Other measures to support ongoing agricultural production include: <ul style="list-style-type: none"> ▪ Traffic management and providing for movement of heavy agricultural equipment on local roads and diverting local traffic away from areas of primary production ▪ Enforcement of local laws relating to domestic animals and rubbish dumping ▪ Ensuring that Council operations (e.g. spraying weeds on roadsides, grading roads) do not impact on adjoining primary production.
Future resource management arrangements / requirements	Facilitate the future resource management requirements of the study area through: <ul style="list-style-type: none"> ▪ Convening a forum or council reference group comprising agricultural producers, equestrian businesses and other landholders. The group could work with Council on adoption of desirable environmental activities (e.g. protection of significant biodiversity assets), to provide input on future development proposals and implementation of the GWMP. ▪ Investigating the development of an environmental significance overlay for the study area to identify CASS and ensure future development is not impacted by CASS.
Consideration of the benefits of recycled water	Acknowledge that future agricultural recycled water customers could be supplied from the EIS however further discussions with Melbourne Water (the wholesaler), Topaq and South East Water (the retailers and recycled water scheme managers) about the number of customers, demand volume and connection options would be required. Currently the number of potential customers and demand volume are low and may not be economically viable.
Commentary on new zone provisions	Current agriculture in the Bangholme Precinct provides an appropriate non-sensitive land use to protect and maintain the integrity of the buffer around significant public infrastructure assets and should be supported. However, agriculture is already compromised due to land fragmentation and other non-sensitive land uses could be considered in the long-term pending council objectives e.g. industrial. Sensitive land uses should be avoided in the future e.g. residential development, caravan parks.
Recommendations for revisions to Clause 22.02	Support, and where appropriate promote, forms of agriculture that are suited to the urban fringe in the study area by: <ul style="list-style-type: none"> ▪ Preventing further fragmentation of the area by restricting further subdivision; 1) Increase the current subdivision thresholds in the Wetlands and Bangholme Lowlands Precincts from 4 to 6 ha to 20 ha, based on the current lot size configuration; 2) Retain the current subdivision threshold of 40 ha in the Buffers and Lyndhurst Precinct. This also supports councils objectives for retaining the existing rural character and amenity and protects future opportunity for industrial land uses ▪ Limiting dwelling development ▪ Ensure that further development results in a net gain in terms of biodiversity values and landscape qualities ▪ Ensure that further development does not compromise existing agricultural businesses ▪ Avoiding land uses and development that will restrict agricultural practices and activities ▪ Managing current land use conflict issues.

1 Introduction

1.1 Background to the project and study area

The City of Greater Dandenong Green Wedge Management Plan (GWMP) is currently being developed. The Plan will provide direction for all land within the Green Wedge and propose planning scheme controls and other measures to achieve key project outcomes, which include:

- A clear vision, role and purpose for the Green Wedge
- Identification of environmental values and features that should be protected and enhanced
- A strategic direction for land use and development, consistent with government policies and strategies
- A clearly articulated strategic direction through the Planning Scheme and associated planning controls
- Sustainable land management practices and appropriate resource management for the long-term viability of the Green Wedge
- An understanding of the expectations and needs of land owners and the wider community
- A clear monitoring and review process to ensure the plan remains relevant
- Consideration of the zoning changes proposed (or introduced) by the Minister for Planning
- Integration of the Dandenong Green Wedge Management Plan with relevant plans in the Cities of Kingston, Frankston and Casey.

The Greater Dandenong Green Wedge is located in the middle of the broader 'South East Green Wedge' which extends from Clarinda in the City of Kingston, to Cranbourne South in the City of Casey. The Greater Dandenong Green Wedge comprises all land outside the Urban Growth Boundary within the City of Greater Dandenong, covering a total of 3,741.3 hectares.

The Greater Dandenong Green Wedge includes many facilities and land uses of strategic importance to the surrounding region and to the wider metropolitan area (Figure 1-1), including:

- The Eastern Treatment Plant (ETP) and related odour buffers (economic, environmental values)
- Areas of landscape and environmental significance (social, environmental values)
- Areas with potential for waste water recycling (economic, environmental values)
- Designated odour and safety buffers near Dandenong South industrial area (economic, environmental, social values)
- Locations with productive agricultural potential (economic value)
- Areas of community significance such as Cornish College, Gaelic Park, dog obedience club and equestrian centres (social values).

FIGURE 4:
LAND USE
EXISTING CONDITIONS ANALYSIS
DANDENONG GREEN WEDGE MANAGEMENT PLAN

LEGEND

- Study Area
- Urban Growth Boundary
- COGD boundary
- MSS Green Wedge Precincts
- Major waterways
- Minor waterways
- Agriculture
- Industry
- Infrastructure assets
- Surrounding urban residential
- Small lot rural residential
- Large lot rural residential
- Recreation facilities
- Education facilities
- Other uses
- Public open space
- Land subject to inundation (LSIO)
- Retarding basins
- Proposed Melbourne Water retarding basin (approximate location)
- Hard urban residential interface
- Soft green wedge interface

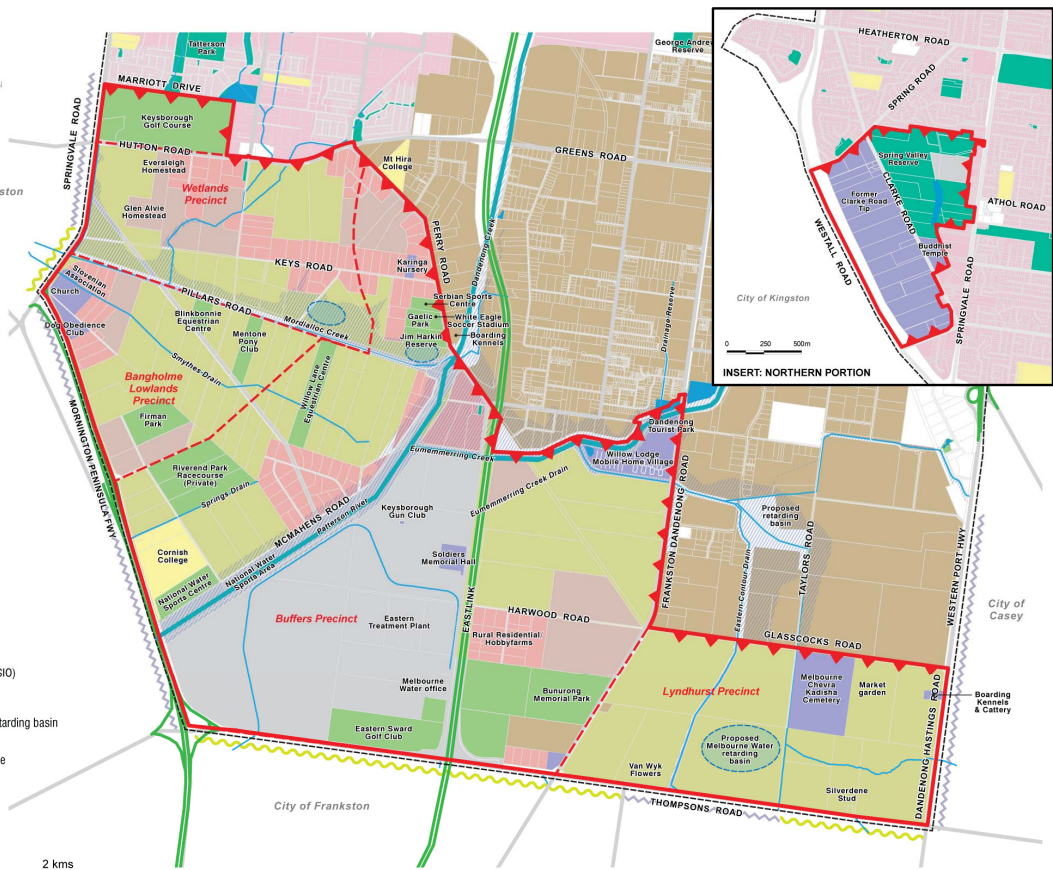


Figure 1-1: Study area and associated land use⁹

The study area is divided into four precincts:

- **Wetlands Precinct** in the north-west bound by Springvale Road, Marriott Drive, Perry Road and Pillars Road
- **Bangholme Lowlands Precinct** in the west bound by the Mornington Peninsula Freeway, Pillars Road and the Buffers Precinct
- **Buffers Precinct** in the centre with EastLink running north-south along the eastern boundary of the ETP
- **Lyndhurst Precinct** in the south-east bound by Frankston Dandenong Road, Glasscocks Road, Dandenong Hastings Road and Thompsons Road.

These precincts are established in the City of Greater Dandenong’s planning policy and provide sub-management areas for agricultural land use.

1.2 Purpose of this report

The purpose of this report is to provide technical expertise in land use (agricultural feasibility, geology and soils) to inform the development of the Draft GWMP on behalf of the City of Greater Dandenong Council. The land use (agricultural feasibility, geology and soils) component is one of seven specialist topics in preparing a Management Plan for the Dandenong Green Wedge.

⁹ Planisphere (2013)

1.3 Structure of this report

This report is structured as follows:

- **Section 1** provides an outline of the project and this report
- **Section 2** analyses the existing agriculture, geology and soils in the study area
- **Section 3** analyses the constraints and opportunities for agriculture in the study area
- **Section 4** outlines a future directions plan to address the key issues identified in sections 2 and 3.

1.4 Approach to data collection and analysis

A Preliminary Scoping Paper was developed by Planisphere.¹⁰ This Technical Report builds on the key agriculture, geology and soils land use components of the Preliminary Scoping Paper which were:

- Agriculture, particularly horticulture and grazing, is an important feature of the South East Green Wedge. The area is also acknowledged as having high quality sand and rock resources, although no quarries exist within the Dandenong Green Wedge.
- Greater Dandenong's Green Wedge area consists of relatively expansive, flat landscapes with some areas of larger lots and relatively good buffers from sensitive land uses. Most sites are too small to accommodate large commercial farming activities; however hobby farming activities are prominent throughout, as well as some specialist production such as flower growing.
- There is diversity in opinion regarding the value of South East Green Wedge land for agriculture.¹¹ Agricultural uses near urban areas can be sub-optimal, due to the potential for land use conflict (which can result in limitations being imposed on agricultural operations), weed and animal pest control issues, and difficulty in accumulating and expanding land holdings – especially where land speculation leads to 'land banking' and subdivision activity has fragmented the land in the past. Farmland in Greater Dandenong is not considered to be of strategic significance to agricultural production in the State¹² and is in parts degraded. The quality of land, air and waterways in the area is mixed, with some areas having poor quality, which impacts on the suitability and viability of agricultural uses.
- An assessment of the suitability of soils for various agricultural activities has been undertaken in part for the Green Wedge land, east of Worsley Road¹³, although analysis of the conclusions had not been undertaken. A land suitability assessment has not been undertaken for the remainder of the Green Wedge.
- Constraints on farming activity in Green Wedge areas may be compounded by land use zones that are more restrictive than generic farming zone provisions; with the latter possibly having fewer facility investment restrictions. Many of the lots in the Green Wedge are too small for economically sustainable commercial production, however the extent to which this is an issue and the options for smaller lots needed further research.
- The counter view is that non-urban land in the area is in part used successfully for agriculture and this should be maintained and protected. In addition to this, non-urban

¹⁰ Planisphere (2013)

¹¹ SGS Economics and Planning (2008)

¹² SGS Economics and Planning (2008)

¹³ Agriculture Victoria Services Pty Ltd (2003)

land in proximity to population centres is considered to be a strategic resource which can be used for novel forms of farming such as community and urban farming.

- The maintenance and encouragement of agricultural activities is sometimes seen as a way to maintain an open and green appearance of the Green Wedge. This must be countered by the realisation that intensive forms of agriculture increasingly rely on hot houses and other structures to protect produce and achieve maximum yield. Protection of landscape values therefore may not necessarily be best achieved with an agricultural use.

The approach to data collection and analysis in developing this Technical Report included:

- Background review of biophysical studies, literature, strategy and policy
- Desktop review of existing agricultural land uses, geology and soils
- Ground-truthing site visits undertaken in May 2013 (photos from which are included throughout the report)
- Discussions with key stakeholders including Melbourne Water
- Issues and opportunities analysis for agriculture in the study area
- Future directions plan and development of recommendations.

2 Analysis of Existing Agriculture, Geology and Soils

2.1 Agricultural land use

Agriculture represents an important land use in the study area. Approximately 1,037 hectares (ha) of land, or 28% of the study area, is used for agricultural purposes by approximately 32 businesses in 2011.¹⁴ This is mainly comprised of horticulture and livestock production, including:

- Nurseries, cut flowers and cultivated turf: 11 businesses totalling 30 ha. Four of these businesses constituted 10.1% of Melbourne’s undercover cut flower area (119,889 m²) (Figure 2-2)
- Market garden vegetables: 6 businesses totalling 168 ha. Four of these businesses produced 5.2% of Melbourne’s herbs (101,098 kg) (Figure 2-3)
- Intensive poultry (both meat and egg): 3 businesses housing 367,949 birds. Almost three quarters of these birds (74.8%) are for meat production, while the remaining 25.2% produce over 2 millions dozen eggs per year (Figure 2-4)
- Extensive beef cattle grazing: 10 businesses totalling approximately 500 ha and running approximately 955 cattle (Figure 2-5)
- Horse studs, training facilities and stables: 4 businesses totalling 236 ha running approximately 98 horses (Figure 2-6).

Spatial analysis of agricultural land use in 2009 is shown in Figure 2-1 and Table 2-1 below.

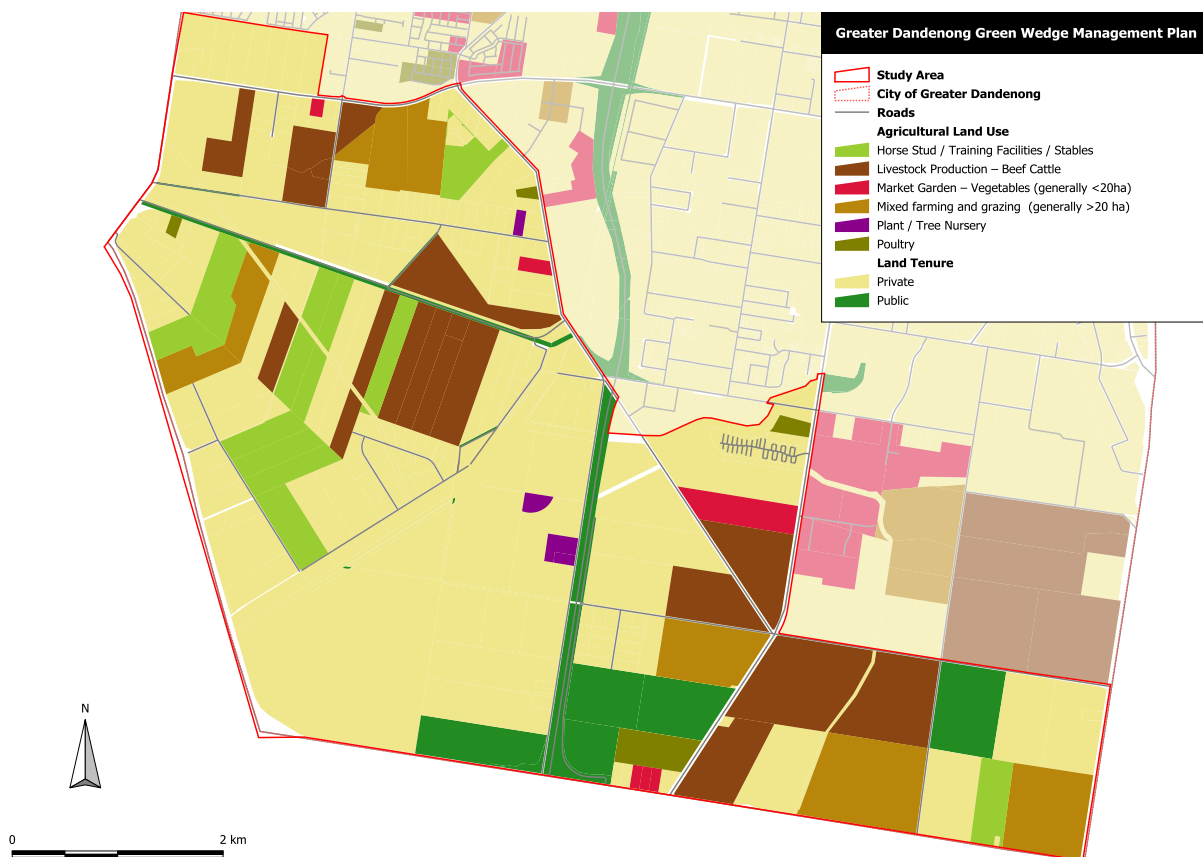


Figure 2-1: Agricultural land use in the study area in 2009¹⁵

¹⁴ Australian Bureau of Statistics (2012) Gr. Dandenong (C) Bal SLA

¹⁵ Department of Primary Industries (2010)

Table 2-1: Average agricultural parcel size in 2009¹⁶

Enterprise type	Average parcel size (ha)
Horse Stud / Training Facilities / Stables	20
Livestock Production – Beef Cattle	26
Market Garden – Vegetables (generally less than 20 ha plantings)	7
Mixed farming and grazing (generally more than 20 ha)	34
Plant / Tree Nursery	3
Poultry	8
Residential Rural / Rural Lifestyle (0.4 to 20 Hectares)	4
Average	16

Some agricultural land use change has occurred in the study area recently. This is primarily due to pressure and competition for land from residential and industrial land use. Since 2009, there has been a retraction in land used for agriculture in the south-west area of the Buffers Precinct, near the corner of Thomson and Frankston Dandenong Road, while there has been an expansion in market garden vegetables in the north-east area of Lyndhurst Precinct, corner Glasscocks Road and Westernport Highway. Agricultural land use has remained relatively constant in the Bangholme Lowlands and Wetlands Precinct during this time.¹⁷

There are also a significant number (127) of rural lifestyle properties in the study area totalling an area of approximately 500 ha.



Figure 2-2: Example of nurseries in the study area

¹⁶ Department of Primary Industries (2010)

¹⁷ Based on ground-truthing site visits of DPI VLUIS 2009 data (DPI 2010) on 31 May 2013



Figure 2-3: Example of market garden vegetables in the study area



Figure 2-4: Example of intensive poultry (both meat and egg) in the study area



Figure 2-5: Example of extensive beef cattle grazing in the study area



Figure 2-6: Example of horse studs, training facilities and stables in the study area

2.2 Agricultural production and value

Agriculture is a small contributor to the City of Greater Dandenong's economy and it has declined in recent times. Manufacturing is the largest component of the local economy responsible for over half (55%) of total output (\$15.5 billion) and accounting for almost one third (30%) of the jobs in the municipality.¹⁸

The total value of agriculture in the Melbourne region is \$1,195.8 million per year. Over half (50.1%) of this is generated from Yarra Ranges (S) – Seville, Cardinia (S) – South, Mornington P'sula (S) – East and Whittlesea (C) – North. The study area generates approximately \$20 million annually, or 1.7% of Melbourne's total value of agricultural production. Gr. Dandenong (C) Bal, the SLA that represents the study area, is 13th out of 62 Melbourne SLAs in terms of value of agricultural production (Figure 2-7 below).¹⁹ However, this has contracted by approximately one third, or \$9 million, since 1999.²⁰ Greater Dandenong City Council (\$24.4 million) ranks second in terms of value of agricultural production when compared to neighbouring municipalities Casey (\$114.1 million), Frankston (\$16.2 million) and Kingston (\$6.1 million).²¹

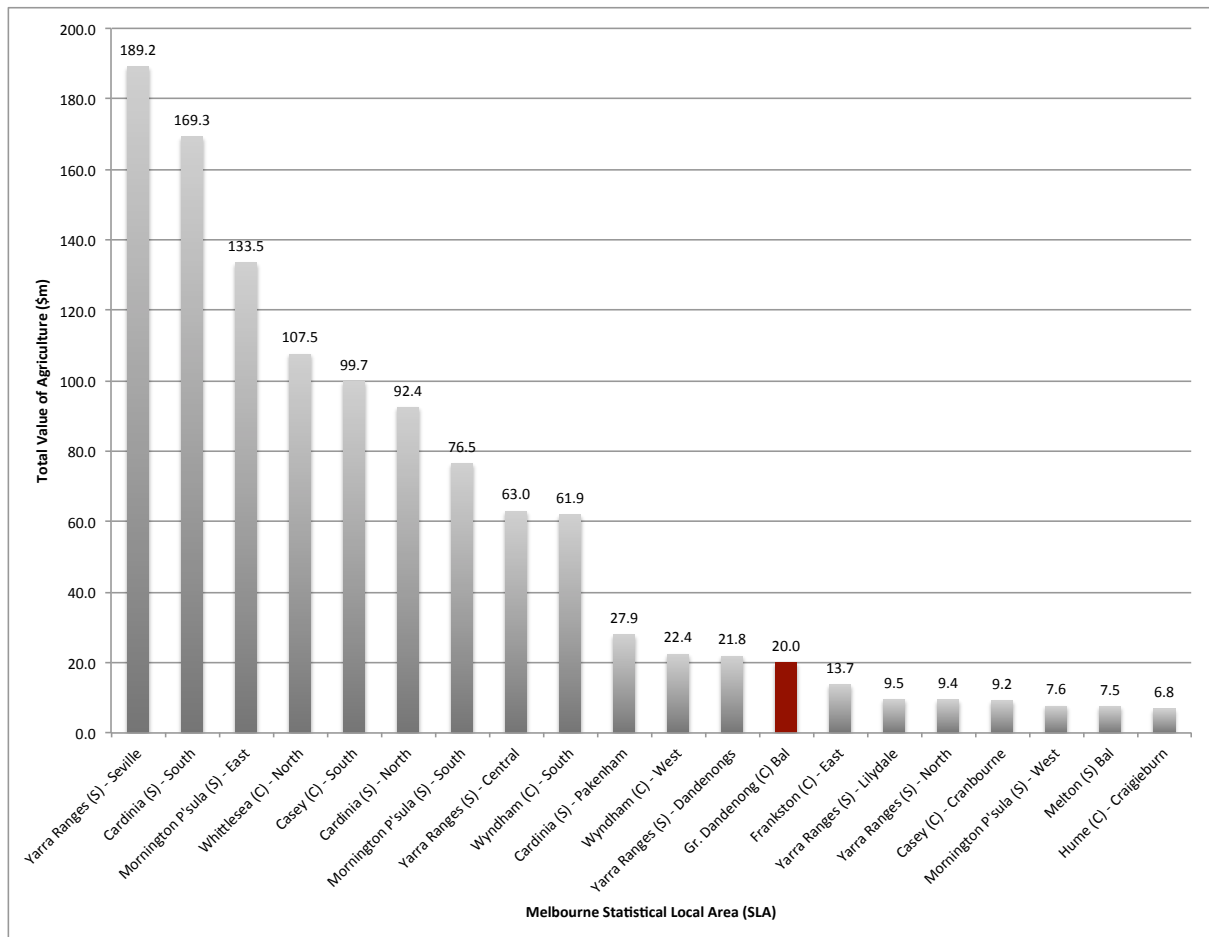


Figure 2-7: Value of agricultural production in the Melbourne region²²

There are three main commodities that contribute to the total value of agricultural production in the study area, as shown in Figure 2-8. These are:

¹⁸ City of Greater Dandenong (2013)

¹⁹ Australian Bureau of Statistics (2012)

²⁰ Agriculture Victoria Services Pty Ltd (2003)

²¹ Australian Bureau of Statistics (2012)

²² Australian Bureau of Statistics (2012)

- Livestock slaughtered and other disposals (including poultry and cattle): total value of \$8.7 million (43.5%)
- Nurseries, cut flowers and cultivated turf: total value of \$6.5 million (32.5%)
- Livestock products (including eggs): total value of \$4.0 million (20.0%).

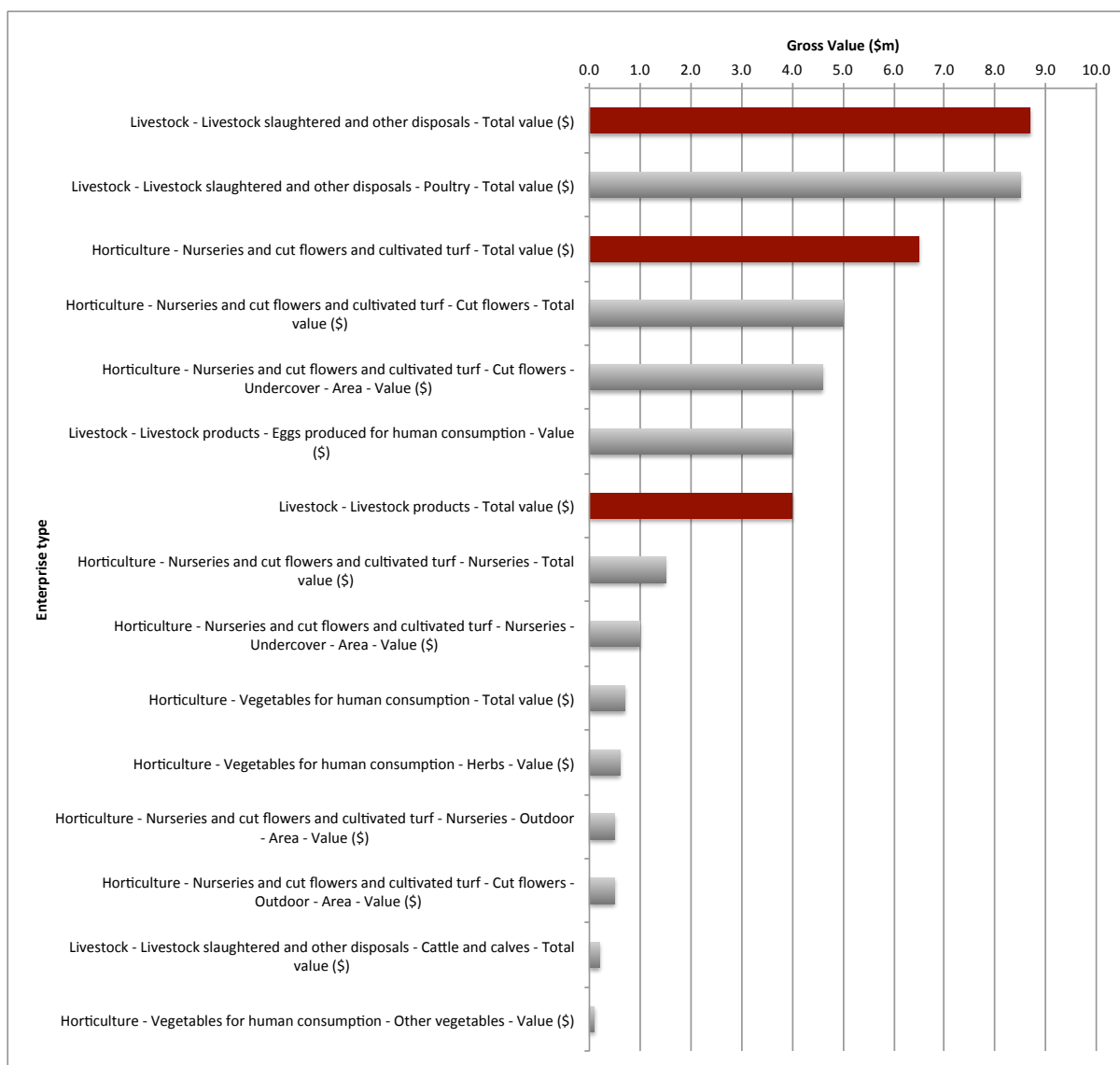


Figure 2-8: Value of agricultural commodities in the study area²³

2.3 Geology

The geology of the region is important to consider as it governs soil type and chemistry, as well as groundwater composition.

The geology of the region is characterised by Quaternary alluvium (gravel, sand and silt) and swamp and lagoon deposits (silt and clay) (Qa), and Tertiary gravel, sand and silt of the Hanson Plain Sand formations (Nbh). There are also small isolated areas of coastal dune deposit in the west of the study area bordering the Mornington Peninsula Freeway (Qdl).²⁴ During the latter part of the Tertiary period (5 to 1.6 million years ago), rivers draining eroded uplands, deposited fine sediments over the study area. These formed the Tertiary

²³ Australian Bureau of Statistics (2012)

²⁴ Department of Primary Industries (2011)

sandstones (Baxter Sandstones). The Tertiary sandstones consist of weakly cemented sandy clays containing quartz gravels.²⁵

This geology is typical of the Dandenong South region and does not impede agricultural land use. A geological map is provided in Figure 2-9 below.

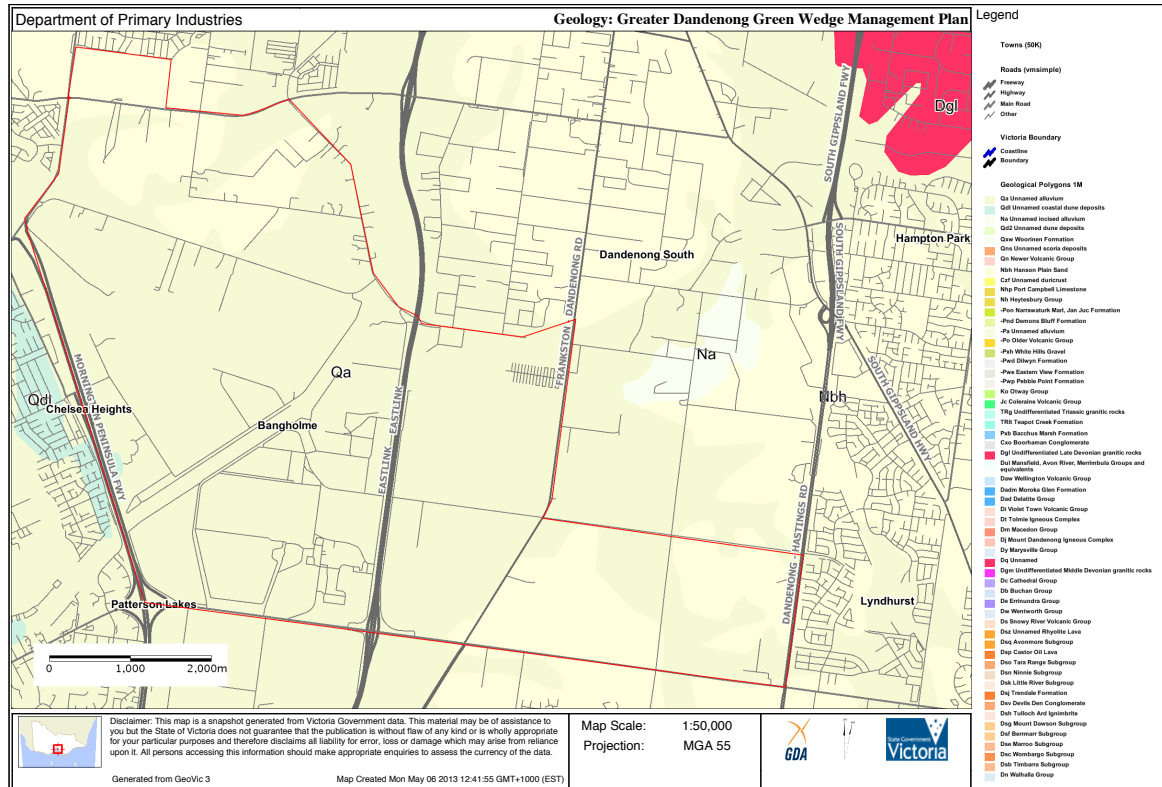


Figure 2-9: Geology of the study area²⁶

2.4 Soils

Introduction

It is important to not just understand the physical characteristics of the soil but also the chemical characteristics required to support agricultural production. Key areas of interest are salinity, sodicity, pH, soil drainage and soil nutrient levels. Both soil type (i.e. physical characteristics) and soil chemistry are discussed in more detail below.

Physical characteristics

Soils in the study area comprise Quaternary and Tertiary sediments, developed on Miocene and Pliocene sediments (~1.8-23.8 million years ago), and Holocene swamp deposits. These soils are associated with alluvial plains and sand formations.²⁷

The soils are generally loamy sand to clay loam on the surface underlain by an impermeable, sodic, saline clay layer. Their slopes are level to gently inclined. Therefore,

²⁵ Agriculture Victoria Services Pty Ltd (2003)

²⁶ Department of Primary Industries (2011)

²⁷ URS (2009)

erosion, waterlogging, sodicity and salinity must be carefully managed to sustain agricultural production on these soils.²⁸

The characteristics of the six main soil types in the region are outlined in Table 2-2.

Table 2-2: Characteristics of the main soil types in the region

Type	Characteristics
Chromosol	Soils with a strong texture contrast between the A horizons and the B horizons. The major part of the upper 0.2 m of the B2 horizon is not sodic and not strongly acidic. The soils of this order are among the most widespread soils used for agriculture in Australia, particularly those with red subsoils.
Dermosol	Soils with structured B2 horizons and lacking strong texture contrast between the A and B horizons.
Podosol	Soils developed on sand dunes are characterised by having an A horizon consisting of about 40 cm of sandy loam overlying about 40 to 90 cm of loamy sand which may be bleached.
Sodosol	Soils with a clear or abrupt textural change between the A horizons and B horizons. The top 0.2 m of the B2 horizon is sodic and not strongly acidic.
Anthroposol	Human-made soils associated with disturbance, usually associated with parent material if in situ (e.g. industrial development, drainage systems, large dams, building works, cemeteries and rubbish tips)

The broad spatial arrangement of physical soil characteristics is shown in Figure 2-10. This demonstrates that the Wetlands, Bangholme Lowlands and western half of the Buffers Precinct contain mainly Organosol on swampy plains with sand ridges. These swampy plains are very low lying relative to sea level. The eastern half of the Buffers Precinct and the Lyndhurst Precinct contain mainly Podosol on coastal plains.

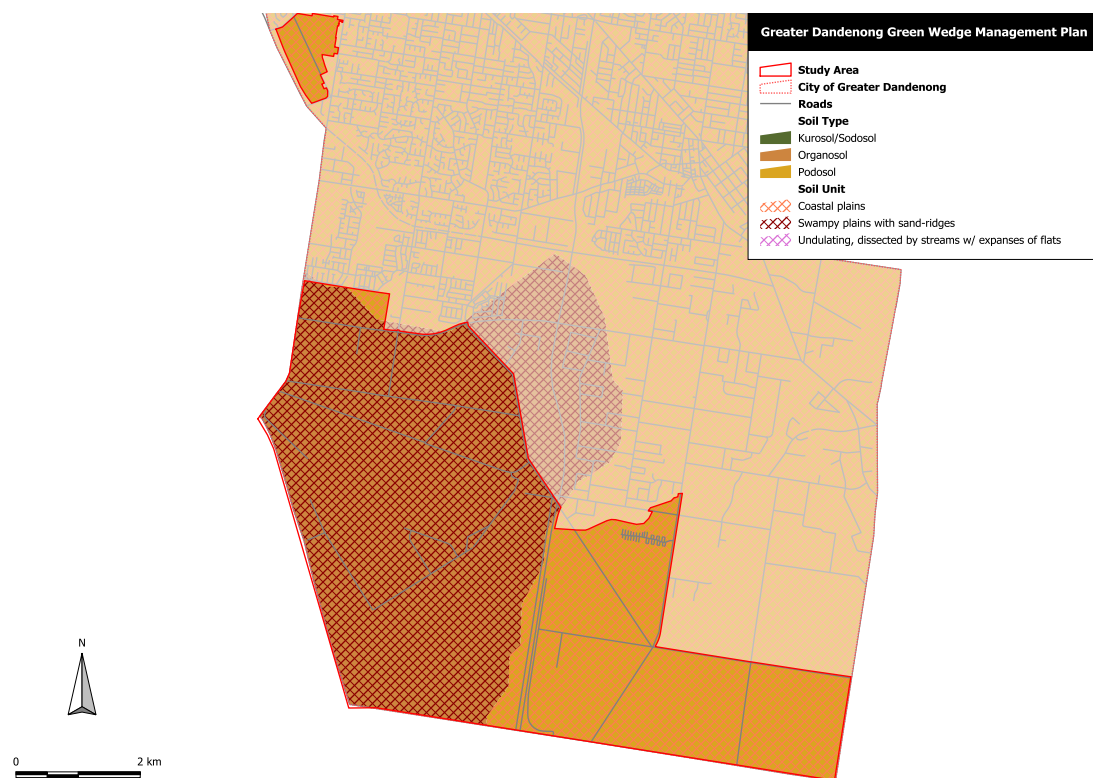


Figure 2-10: Physical soil characteristics in the study area²⁹

²⁸ Agriculture Victoria Services Pty Ltd (2003)

Soil chemistry

An assessment of soil chemistry was undertaken using the results from previous projects undertaken by RMCG in the region and existing literature. In summary:

- Soils in the study area formed from aeolian deposits are strongly acidic to slightly acidic, sandy loams in the upper A horizon and loamy sands below 40 cm deep. These soils are ideal for horticultural production although they can be eroded when exposed given their gently inclined slopes and surface soil texture.
- Soils in the study area formed on plains are generally buried, black clays which are impermeable and poorly drained. These soils are mainly used for grazing.
- Soils in the study area formed from Tertiary sandstones are generally sandy clay loams to sandy loams over grey medium clays. These soils are mainly used for grazing but are also used for horticulture in the Cranbourne-Five Ways area.³⁰

A summary of the soil chemistry results undertaken by RMCG is shown in Table 2-3. These are applicable to the northern parts of the study area in the Wetlands Precinct and northern Buffers Precinct.

Table 2-3: Summary of soil analytical results³¹

Parameter	Unit	Potential problem	Result	Comment
pH	pH units	> 8.5	5.6-6.9	Slightly acidic
Electrical Conductivity (EC _{1:5})	dS/m	> 0.42	0.07-0.14	Non-saline
Nitrate Nitrogen	mg/kg	-	3.3-3.6	Low
Phosphorus (Olsen)	mg/kg	> 40	13-13.5	Low
Exchangeable sodium percentage (ESP)	%	> 6	2.46-4.07	Low

Coastal Acid Sulfate Soils

Coastal Acid Sulfate Soil (CASS) is an acid sulfate soil (ASS) that has formed as a result of sea influence (excluding cyclic salt). Left undisturbed these soils are harmless, but if drained, excavated or exposed to air the metal sulfides react with oxygen and form sulfuric acid. Potential impacts can include acidification of waterways, degradation of ecology, corrosion or infrastructure, adverse human health effects, and irreversible change to landforms and soils.³²

There is a high probability³³ and high confidence³⁴ that CASS is located in the west of the study area in the Bangholme Lowlands and Buffers Precincts bordering the Mornington Peninsula Freeway (Class A1). These areas are most susceptible to the impacts of CASS (Figure 2-11). There is a high probability and low confidence that CASS covers the majority of the Wetlands, Bangholme Lowlands and Buffers Precincts (Class A3). There is an extremely low probability and very low confidence that CASS covers the Lyndhurst Precinct and remaining parts of the study area (Class C4).

²⁹ Adapted from CSIRO (2013)

³⁰ Agriculture Victoria Services Pty Ltd (2003)

³¹ RMCG (2010) and Wrigley & Dillon (no date)

³² Department of Sustainability and Environment (2009)

³³ Probability of occurrence: **high** (Class A; >70% of mapping unit), **low** (Class B; 6 - 70% of mapping unit), **extremely low** (Class C; 1 - 5 % of mapping unit), and **no** probability of occurrence (Class D; <1% of mapping unit; e.g. thick outcrops of hard rock, ferricrete, calcrete, silcretes)

³⁴ Level of confidence: **high** (Class 1; All necessary analytical and morphological data are available), **moderate** (Class 2; Analytical data are incomplete but are sufficient to classify the soil with a reasonable degree of confidence), **low** (Class 3; No necessary analytical data are available but confidence is fair, based on a knowledge of similar soils in similar environments) and **very low** (Class 4; No necessary analytical data are available and classifier has little knowledge or experience with ASS, hence classification is provisional)

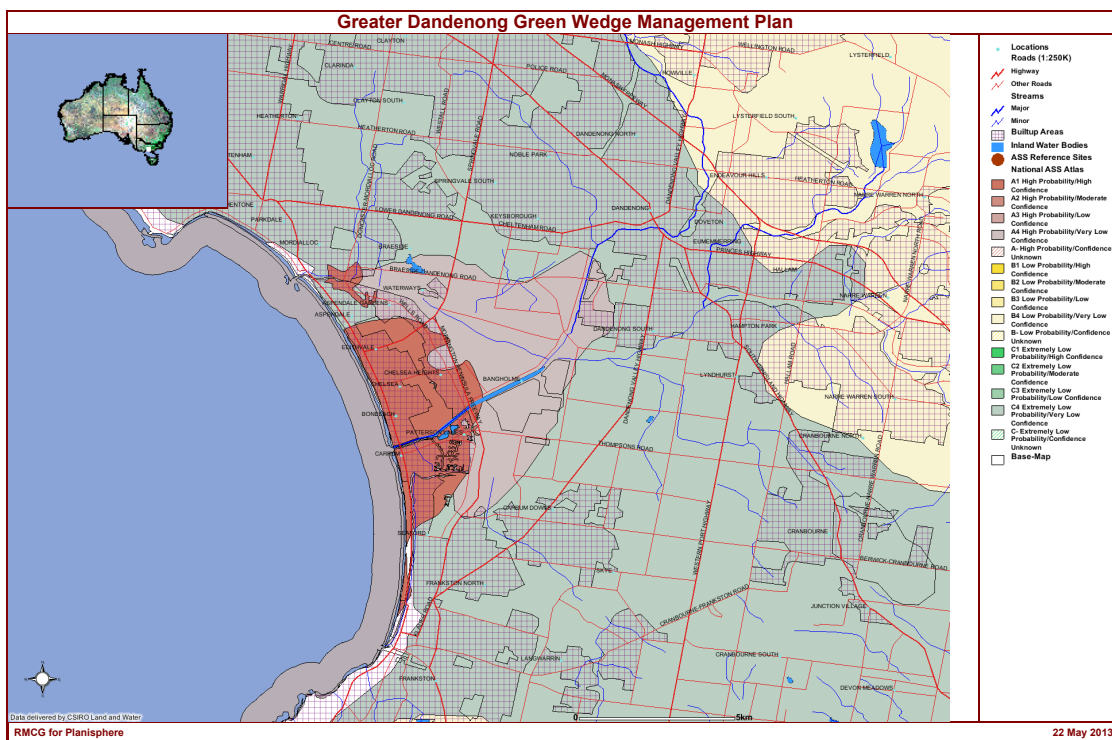


Figure 2-11: Coastal Acid Sulfate Soils in the study area³⁵

Activities that can disturb CASS include agricultural activities that involve land drainage particularly deep drainage (such as works to prevent flood and tidal inundation or lowering of the water table). The following high-risk activities that can disturb CASS should be avoided:

- Excavating soil
- Filling land
- Moving soil from its pre-activity location (horizontally or vertically)
- Temporarily or permanently dewatering soil
- Causing CASS to be temporarily or permanently bathed in oxidized water (as opposed to the low oxygen content water in which it is normally submersed).³⁶

State and National policy objectives are based on the following management principles:

- Identify and define CASS
- Avoid disturbance of CASS
- Mitigate impacts when CASS disturbance is unavoidable
- Rehabilitate disturbed CASS and acid drainage.

Climate change has the potential to increase CASS exposure, and agricultural management practices in the study area must consider the broader risk of CASS.

³⁵ CSIRO (2013)

³⁶ Department of Sustainability and Environment (2009)

Suitability to irrigated agriculture

Drainage characteristics of the soils impact on potential water logging and salinity risk to plants. There are also risks to groundwater beneficial use. Soils can be classified into six different classes based on suitability to irrigated agriculture:

- Class I: excellent productivity for all agriculture (sands) and are permeable
- Class II: very good for most agriculture (loams, sandy loams, sandy clay loams, clay loams) and are moderately permeable with good drainage characteristics
- Class III: good for a range of agriculture (loams, sandy loams, sandy clay loams, clay loams) and are moderately permeable with moderate to good drainage characteristics
- Class IV: fair for a limited range of agriculture (loams, sandy loams, sandy clay loams, clay loams) and are moderately permeable with moderate drainage characteristics and are susceptible to some waterlogging
- Class V: low yields; pasture and some crops only (clays) are generally heavy and subject to waterlogging
- Class VI (clays): unsuitable for agriculture.³⁷

The soils in the study area can be classified as Class II-IV (sandy loam to clay loam) soils based on previous projects undertaken by RMCG in the region and existing literature. The lighter soils are more suitable for horticulture, while the heavier soils are more suited to pastures. These soils are also suitable for recycled water irrigation.³⁸

The irrigation drainage classification will be important to consider on land subject to inundation (LSIO), particularly in the north-west of the study area along Pillars Road in the Wetlands Precinct.

2.5 Resources and management requirements

Resource and management requirements are important for the sustainability of agriculture in the study area. Resource management requirements include:

- Revegetation can help reduce salinisation of land and groundwater, and soil erosion. This would help ensure a sustainable environment and production in the study area
- There is a risk to infrastructure (built environment) in flood prone areas
- Rising water tables resulting from clearing vegetation and the affects of irrigation, have increased salinity levels within streams and large areas of land
- Parts of the study are situated within a Chemical Control Area that regulates the use of some pesticides and herbicides
- The visual aesthetics of the open, rural landscape is an important consideration, and is particularly relevant due to location of the study area in the Green Wedge
- Continued investigation should monitor the impacts of the landfill on agricultural land, waterways and rural residencies
- Pressures from unsustainable farming practices may have adverse impacts on the environment. This includes spray drift and odours from intensive animal and horticulture production

³⁷ Cockroft & Dillon (2004)

³⁸ Agriculture Victoria Services Pty Ltd (2003), RMCG (2010) and URS (2009)

- Sites of Aboriginal Significance, (e.g. eastern half of Lyndhurst) need to be managed according to State and Commonwealth legalisation³⁹
- The Lower Dandenong Creek and the Eumemmerring Creek water quality and flow conditions are rated poor to moderate. These conditions are assessed according to the Index of Stream Condition (ISC). Urban stormwater, barriers to the migration of aquatic life, weeds and a lack of streamside vegetation have been outlined as potential risks to the future health of the rivers.

³⁹ Agriculture Victoria Services Pty Ltd (2003)

3 Constraints and Opportunities Analysis

3.1 Key issues facing peri-urban agriculture

A summary of the key issues facing peri urban agriculture and their relevance to the study area is outlined in Table 3-1.

Table 3-1: Key issues facing peri-urban agriculture⁴⁰

Theme	Comment	Relevance to GWMP study area
1. Competition for land	<ul style="list-style-type: none"> High land price and low availability Urban growth displacing farms Relocation requires infrastructure investment in the new area 	<ul style="list-style-type: none"> Larger commercial growers may look to relocate in other nearby established areas Difficulty in accumulating and expanding land holdings – especially where land speculation leads to ‘land banking’ and subdivision activity has fragmented the land in the past
2. Sustainable land use	<ul style="list-style-type: none"> Restricted availability and increasing cost of potable and recycled water Increasing need to comply with environmental standards 	<ul style="list-style-type: none"> Recycled water from the ETP may provide a reliable alternative supply for irrigation of horticulture crops and wash-down for intensive livestock (i.e. poultry)
3. Urban-rural conflicts	<ul style="list-style-type: none"> Lack of understanding of farming by neighbouring non-farming residents Increased exposure to theft, vandalism and threats Biosecurity risks neighbouring residential areas and farms 	<ul style="list-style-type: none"> The study area has large buffer areas to the north with the Industrial 2 Zone and the Environmental Significance Overlay around the ETP Risks associated with theft and vandalism
4. Urban-rural synergies	<ul style="list-style-type: none"> Levels of regional pride and industry collaboration require improvement Jobs in farming are seen as lacking skills, status and salary Planning departments of most councils have low engagement and/or understanding of agriculture 	<ul style="list-style-type: none"> Agriculture could provide benefits to the nearby urban community. This needs to be better communicated and understood Difficulty in attracting labour to agriculture businesses
5. Lack of coordinated industry voice	<ul style="list-style-type: none"> Small farm size Diverse range of ethnic backgrounds General lack of grower collaboration and involvement in industry associations 	<ul style="list-style-type: none"> Average agricultural parcel size in the study area was 16 ha in 2009
6. Scale and commercial viability	<ul style="list-style-type: none"> Low profit margins and small scale reduces the capability to maintain multiple skills or investment levels required to run a commercial viable farm Fragmentation makes it difficult to maintain essential services to farms e.g. input suppliers, produce marketers 	<ul style="list-style-type: none"> The commercial realities of peri-urban agriculture need to be considered in conjunction with other issues listed
7. Food security	<ul style="list-style-type: none"> Urban growth results in loss of agricultural land Increasing reliance on produce imports 	<ul style="list-style-type: none"> Provides the opportunity for agriculture to occur close to Melbourne Opportunity to produce food and connect directly with the community
8. Planning issues	<ul style="list-style-type: none"> Nexus between urban growth, food production, productivity and government planning priorities is challenging Planning departments of most councils have low engagement and/or understanding of agriculture 	<ul style="list-style-type: none"> Clause 22.02 supports forms of agriculture that are suited to the urban fringe Clause 35.05 encourages use and development that is consistent with sustainable land management practices, and sustainable farming activities that provide opportunity for a variety of productive agricultural uses

⁴⁰ Adapted from Drew & McEvilly (2011)

3.2 Constraints to the future of agricultural land uses

The key constraints to the future use of land for agriculture include:

- **Interface issues** such as stray domestic pets, wind blown rubbish, rubbish dumping, road safety when moving agricultural machinery on urban roads, off site impacts from agricultural activities including dust and odour and nuisance complaints
- **Fragmentation** associated with rural residential estates at Hutton Road, Keys Road and Perry Road in the Wetlands Precinct, corner Springvale Road and Mornington Peninsula Freeway in the Bangholme Lowlands Precinct, and McMahrens Road and Harwood Road in the Buffers Precinct
- **Uses incompatible with agriculture**, such as Cornish College, which may restrict some agricultural practices such as spraying and use of machinery
- **Biophysical constraints** such as drainage and flooding, particularly in the Wetlands, Bangholme Lowlands and Buffers Precincts indicated by the land subject to inundation overlay (LSIO). Current drainage infrastructure capacity will have implications for agricultural land use and flooding
- **Climate change** is likely to increase the frequency and severity of flooding events which will have an increased impact on the existing LSIO areas and elsewhere in the study area. This will largely be due to an increase in the intensity of rainfall and the low-lying nature of the study area.

While a number of physical constraints to agriculture have been noted in the report, e.g. land size, land availability for expansion, soil, access to water, degradation, CASS, groundwater and soil salinity. The overwhelming constraint to the long-term use of land for agriculture is its **lack of competitive advantage** compared to other agricultural land, the high cost of land and interface issues.

3.3 Current and future assets and buffers

A 1,500 metre buffer exists around the Industrial 2 Zone to the north of the study area and the Environmental Significance Overlay around the ETP. The Industrial 2 Zone is one of only three such areas in Melbourne where industries requiring extensive buffers from sensitive uses can be accommodated. The ETP is one of the main plants for treatment of Melbourne's wastewater.⁴¹ Most of the buffer land is Zoned Public Use. Some Green Wedge land is within the buffer and development of sensitive uses on Green Wedge Zone land within the buffer should be avoided. Agriculture is generally appropriate for land within a buffer around a wastewater treatment facility.

Sensitive land uses include residential development, hospitals, hotels, motels, hostels, caravan parks, schools, nursing homes, childcare facilities, shopping centres, playgrounds and some public buildings. Some commercial, institutional and industrial land uses that require high levels of amenity or are sensitive to particular emissions may also be considered 'sensitive land uses'. Examples include some retail outlets, offices and training centres, and some types of storage and manufacturing.

⁴¹ Planisphere (2013)

3.4 Opportunities for future agricultural land uses

The key opportunities to the future use of land for agriculture include:

- **Availability of land:** land that has high security and opportunity for expansion is favourable. However due to high land prices, land that is available for lease may be preferable as it provides potential for capital to be used for other activities and may increase the competitive advantage of the study area. Whilst land is available as previously noted this region does not have a competitive advantage over other areas. The purchase or lease of land will therefore be associated with personal preferences for establishing a business in the region
- **Access/location:** close proximity to markets, family, community and other business in the metropolitan region e.g. EastLink, Dandenong industrial nodes. This access may provide opportunities for production that is strongly linked to the local community (e.g. farmers markets, community supported agriculture). However, this would represent a very small volume of produce and should not be overstated
- **Commercial viability:** existing businesses that are currently commercially viable i.e. agriculture is the sole source of income and not supplemented from off-farm income sources. Commercially viable businesses are currently clustered in the eastern part of the Buffers Precinct and Lyndhurst Precinct
- **Alternative water supplies:** potential to utilise alternative water supplies and value add e.g. Class A recycled water from the ETP. This volume again would be a relatively small component of the recycled water available from ETP with costs expected to be high
- **Distance from residents:** reasonable distance from residents means that 'Right to Farm' is not likely to be an issue. This is assisted by the buffers from the Industrial 2 Zone to the north of the study area and the Environmental Significance Overlay around the ETP
- **Climate change and mitigation:**
 - Potential to produce food close to market may reduce carbon footprint although this will be a very small percentage of total consumption. There is also the potential to meet niche markets (e.g. farmers markets)
 - A secure supply of water (i.e. recycled water) will mean less reliance on climate related water sources
 - Climate change will have a proportionally minimal impact on this small area of production and enterprises will be able to adapt. Small-scale agriculture means that the study area will not be attractive for those looking to move from climate impacted regions.

4 Future Directions Plan

4.1 Future viable and suitable agricultural land uses

This section assists in answering the following key question raised in the Preliminary Scoping Paper:

- What land uses are suitable in the Green Wedge, and what are not?
- What agricultural uses are viable and suitable for the Dandenong Green Wedge, or how can they be made viable?
- How do coastal acid sulphate soils impact on future land use options?

The future viable and suitable agricultural land uses should be governed by current horticulture and livestock production in the study area, as outlined in Table 4-1. This is based on a review of the available literature, data analysis and ground-truthing site visits undertaken as part of this project.

Table 4-1: Future viable and suitable agricultural land uses

Precinct	Key attributes	Current agricultural land uses	Future viable and suitable agricultural land uses
Wetlands	<ul style="list-style-type: none"> ▪ Soils: Organosol, swampy plains with sand ridges, Class II-IV (sandy loam to clay loam) ▪ Flooding and drainage issues (LSIO) along Pillars Road ▪ Potential Melbourne Water retarding basin on current agricultural land 	<ul style="list-style-type: none"> ▪ Extensive beef cattle grazing ▪ Horse studs, training facilities and stables ▪ Nurseries, cut flowers and cultivated turf ▪ Intensive poultry (both meat and egg) 	<p>Maintain current agricultural land uses to:</p> <ul style="list-style-type: none"> ▪ Provide amenity, rural landscape and recreational value ▪ Protect buffers around industrial areas
Bangholme Lowlands	<ul style="list-style-type: none"> ▪ Soils: Organosol, swampy plains with sand ridges, Class II-IV (sandy loam to clay loam) ▪ Coastal Acid Sulfate Soils (CASS) risk along Mornington Peninsula Freeway border ▪ Flooding and drainage issues (LSIO) along Pillars Road 	<ul style="list-style-type: none"> ▪ Horse studs, training facilities and stables ▪ Extensive beef cattle grazing 	<p>Maintain current agricultural land uses to:</p> <ul style="list-style-type: none"> ▪ Provide amenity, rural landscape and recreational value ▪ Protect buffers around significant public infrastructure assets ▪ Avoid development on land that is potential CASS
Buffers	<ul style="list-style-type: none"> ▪ Soils: Organosol / Podosol, coastal plains with some swampy plains with sand ridges, Class II-IV (sandy loam to clay loam) ▪ CASS risk along Mornington Peninsula Freeway border ▪ Flooding and drainage issues (LSIO) along McMahrens Road and Perry Road ▪ Contains ETP and associated 1,500 metre Environmental Significance Overlay buffer 	<ul style="list-style-type: none"> ▪ Extensive beef cattle grazing ▪ Horse studs, training facilities and stables ▪ Nurseries, cut flowers and cultivated turf ▪ Intensive poultry (both meat and egg) 	<p>Maintain current agricultural land uses to:</p> <ul style="list-style-type: none"> ▪ Provide amenity, rural landscape and recreational value ▪ Protect buffers around significant public infrastructure assets ▪ Avoid development on land that is potential CASS
Lyndhurst	<ul style="list-style-type: none"> ▪ Soils: Podosol, coastal plains, Class II-IV (sandy loam to clay loam) ▪ Potential Melbourne Water retarding basin on current agricultural land 	<ul style="list-style-type: none"> ▪ Market garden vegetables ▪ Nurseries, cut flowers and cultivated turf ▪ Extensive beef cattle grazing ▪ Horse studs, training facilities and stables 	<p>Maintain current agricultural land uses to:</p> <ul style="list-style-type: none"> ▪ Provide amenity, rural landscape and recreational value ▪ Protect buffers around industrial areas

A comprehensive study investigating the options for agriculture based on land use, commodities and market trends was undertaken in the Lyndhurst Precinct.⁴² This highlighted three main groups and seven enterprises that were moderately suitable for the study area, with some areas identified as highly suitable. This included vegetables (Brassica and artichokes – Brassica seed and summer crop, carrots and parsnips – summer crop), crops (industrial hemp fibre, turf grass), and flowers (lavender, protea, eucalypts for foliage and oil production). The key issues include:

- The soils in study area are a complex mixture of Tertiary sandstones, swamp lenses and clays. The sandy loam soils, which occur on the Tertiary sandstones, are highly suited to a range of agricultural commodities
- The most suitable commodity group, in terms of inherent biophysical suitability, is vegetables for summer production, including the Brassica family. Other commodities including lavender, eucalypts and turf grass have large areas of land suitable for production. However, Proteas and Hemp have a moderate or lower suitability
- Significant areas of the study area are not suited to intensive agriculture in the wetter winter months due to poor winter trafficability. These areas have poor quality soils, black cracking clays on the alluvial plain, which are impermeable when wet
- Vegetables have large suitable areas, floriculture is highly suitable in some areas, and Crops are moderately suitable⁴³
- Intensive glasshouse production is largely dependent on market forces rather than soil type and suitability, although should not occur in high probability and high confidence CASS areas.

Recommendation

Maintain current agricultural land uses to:

- Provide amenity, rural landscape and recreational value
- Protect buffers around significant public infrastructure assets
- Avoid development on land that is potential CASS
- Avoid development requiring significant infrastructure investment or upgrades e.g. roads, drainage.

4.2 Preventing land use conflict

The proximity of agriculture to rural residential areas, landfill sites, and sites of Aboriginal cultural significance, will require buffer areas to prevent offsite impacts of agricultural practices on non-agricultural neighbours and vice versa. Actions to minimise the risk of offsite environmental impact from agriculture include:

- Planting vegetative buffers to reduce spray drift from intensive horticulture
- Good grass coverage and vegetation also acts as a barrier to reduce soil erosion or limit contact with contaminated soil. Cover any disturbed or excavated soil
- Development of whole farm plans
- Best practice irrigation
- Improve drain management, such as revegetation of drains and waterways, or fencing

⁴² Agriculture Victoria Services Pty Ltd (2003)

⁴³ Agriculture Victoria Services Pty Ltd (2003)

- Manage pest weed and animal through control programs to reduce their impact
- Management of surface waters to address run-off, nutrients and sediments
- Manage farm livestock effluent
- Appropriate application of fertiliser (nitrogen input).⁴⁴

Note however, that adoption of such measures will increase input costs and is an additional disincentive to ongoing agricultural production in the area.

Recommendation

Assist in preventing and mitigating land use conflict by ensuring that appropriate separation distances are maintained between agriculture and other incompatible land uses. Other measures to support ongoing agricultural production include:

- Traffic management and providing for movement of heavy agricultural equipment on local roads and diverting local traffic away from areas of primary production
- Enforcement of local laws relating to domestic animals and rubbish dumping
- Ensuring that Council operations (e.g. spraying weeds on roadsides, grading roads) do not impact on adjoining primary production.

4.3 Future resource management arrangements/requirements

This section assists in answering the following key question raised in the Preliminary Scoping Paper: What is the future of the resources within the Dandenong Green Wedge and what resource management requirements need to be established?

Future resource management requirements for the study area are consistent with previous studies undertaken in the area⁴⁵, and include:

- Organic farming horticulture products can improve the environmental condition and provide a new market for horticulture in study area
- Revegetation can help reduce salinisation of land and groundwater, and prevent soil erosion caused from agricultural activities
- Sites of Aboriginal Significance (e.g. eastern half of Lyndhurst) need to be managed according to State and Commonwealth legalisation
- There is significant risk of land salinisation and waterlogging, which would affect agricultural production and infrastructure if not appropriately managed
- Adverse environmental effects of agricultural activities can be mitigated with best practice management and through consultation with landholders. The integration of economic decisions, private good production practices and biophysical processes can ensure the sustainable production and high quality of the land
- Some soil profiles in Lyndhurst require appropriate management due to the acidic nature and poor drainage ability
- Weeds need to be eradicated through control programs, which protect agriculture
- Remnant Red Gums should be protected to provide fauna habitats and to lower the water table

⁴⁴ Agriculture Victoria Services Pty Ltd (2003)

⁴⁵ Agriculture Victoria Services Pty Ltd (2003)

- The low-lying landscape of the study area makes it susceptible to overflows from drains and rivers.⁴⁶

Recommendation

Facilitate the future resource management requirements of the study area through:

- Convening a forum or council reference group comprising agricultural producers, equestrian businesses and other landholders. The group could work with Council on adoption of desirable environmental activities (e.g. protection of significant biodiversity assets), to provide input on future development proposals and implementation of the GWMP.
- Investigating the development of an environmental significance overlay for the study area to identify CASS and ensure future development is not impacted by CASS.

4.4 Consideration of the benefits of recycled water

Recycled water is a by-product of processed effluent from the ETP. Recycled water can be used as irrigation water for agricultural use and stock watering. It can also be used to augment or substitute reticulated water supply.

Recycled water is currently being used successfully in and around the study area for agricultural purposes, particularly horticulture, through the Eastern Irrigation Scheme (EIS) operated by Topaq. The EIS is supplied from an off-take of the South East Outfall (SEO) just south of the study area on Thompsons Road. It is possible that future agricultural recycled water customers could be supplied from the EIS however further discussions with Melbourne Water (the wholesaler), Topaq and South East Water (the retailers and recycled water scheme managers) about the number of customers, demand volume and connection options would be required. In addition, Melbourne Water has recently constructed a new off-take from the SEO adjacent to the EIS off-take. This was primarily built to supply the new recycled water distribution pipeline to the Logis Estate north of the study area. While Melbourne Water constructed the off-take, Places Victoria is delivering the remaining distribution infrastructure. Recycled water end users at the estate will be South East Water customers.⁴⁷

The Class A recycled water from the ETP can be used for the applications outlined in Table 4-2. Prior to 2012 the ETP produced Class C recycled water that was treated by Topaq using an interim treatment plant (ITP).

⁴⁶ Agriculture Victoria Services Pty Ltd (2003)

⁴⁷ Pers. comms. John Mieog, Team Leader, ETP Planning, Melbourne Water, 5 June 2013

Table 4-2: Use of recycled water by classification level⁴⁸

Class	Range of uses
A	<ul style="list-style-type: none"> ▪ Urban (non-potable): with uncontrolled public access ▪ Agricultural: e.g. human food crops consumed raw ▪ Industrial: open systems with worker exposure potential ▪ Plus any Class B, C and D use
B	<ul style="list-style-type: none"> ▪ Agricultural: e.g. dairy cattle grazing ▪ Industrial: e.g. wash down water ▪ Plus any Class C and D uses
C	<ul style="list-style-type: none"> ▪ Urban (non-potable) with controlled public access ▪ Agricultural: eg human food crops cooked/processed, grazing/fodder for livestock ▪ Industrial: systems with no potential worker exposure ▪ Plus any Class D uses
D	<ul style="list-style-type: none"> ▪ Agricultural: non-food crops including instant turf, woodlots, flowers

Furthermore, the nutrients in the effluent water can replace the need for, or supplement, fertiliser.⁴⁹ Hence, monitoring the quality of effluent water by the ETP is necessary to ensure that some crops and commodities will not be saturated in nutrients. The indicative salinity and nutrient levels of the Class A recycled water are presented in Table 4-3 below.

Table 4-3: Expected average and maximum salinity and nutrient concentrations⁵⁰

Element	Unit	Average	Maximum
Electrical Conductivity	uS/cm	950	1000
Sodium Adsorption Ratio (SAR)		5.5	6.2
Total Nitrogen	mg/L	17	23.2
Total Phosphorus	mg/L	7.0	8.8
Calcium	mg/L	17	22
Magnesium	mg/L	9.3	10
Sodium	mg/L	110	120
Chloride	mg/L	140	160
Alkalinity	mg/L	140	190
pH	pH units	7.5	7.8

Table 4-3 shows that the Class A recycled water is expected to contain average concentrations of nitrogen and phosphorus (for domestic sewage) and moderate levels of salinity (in terms of plant production). Previous soil chemistry results demonstrate that recycled water irrigation would be suitable. Whilst the pH is slightly low, the alkalinity of recycled water will help raise pH levels. Similarly, there is buffering capacity within the soil to take the nitrogen and phosphorus loads that will be applied through recycled water irrigation. Soil salinity and sodicity is low, which is ideal for recycled water irrigation.

This assessment is based on the average recycled water quality data presented in Table 4-3, as for salinity and nutrients it is generally long-term impacts associated with build up that are of most concern.

⁴⁸ Melbourne Water (2013)

⁴⁹ Handreck (1994)

⁵⁰ Melbourne Water (2009)

It is important to note that the 'potential problem' soil chemistry indicators in Table 2-3 are provided as a reference in order to guide the land capability assessment decision-making process, and subsequent monitoring and management techniques. Whilst it is possible for recycled water irrigation to continue if any of these levels are reached, if they are reached, it should act a trigger and instigate further investigations into the continued sustainable use of recycled water.

Topography is important to consider as it governs surface run-off and erosion risk. The sites topography is generally flat and gently undulates at 7-12 meters AHD (Australian Height Datum).⁵¹ Due to the lack of steep slopes, the topography of the area does not pose a problem for the use of Class A recycled water.

Recommendation

Acknowledge that future agricultural recycled water customers could be supplied from the EIS however further discussions with Melbourne Water (the wholesaler), Topaq and South East Water (the retailers and recycled water scheme managers) about the number of customers, demand volume and connection options would be required. Currently the number of potential customers and demand volume are low and may not be economically viable.

4.5 Commentary on new zone provisions

This section assists in answering the following key question raised in the Preliminary Scoping Paper: How will changes to the zone provisions affect the Green Wedge? Will the proposed new zones alter the options for land use in the Green Wedge?

The government recently undertook a 'Logical Inclusions' process to identify any anomalies in the Urban Growth Boundary. In April 2013, the Minister for Planning endorsed and released the Urban Growth Boundary Advisory Committee report, which recommends three areas in Springvale South be included within the Urban Growth Boundary, with the larger Bangholme Precinct not recommended for inclusion. Amendments to the Greater Dandenong Planning Scheme will be made to reflect these recommendations, and further work undertaken in the Bangholme Precinct as per the reports recommendations.⁵²

The new zone provisions from the Urban Growth Boundary Anomalies Advisory Committee report⁵³ in Springvale South are located in the small northern portion of the study area (insert) and contain no agricultural land use.

The 337 hectare area defined as the Bangholme Precinct is bounded by Eumemmerring Creek, Frankston Dandenong Road, Harwood Road and EastLink, as shown in Figure 4-1. The majority of the land is currently contained within the Green Wedge Zone. The exception to this is land owned by Melbourne Water for drainage purposes, which is contained within the Public Use 1 Zone – Service and Utility. There are 14 land owners in the Precinct.⁵⁴

Agricultural land use in the area includes:

- Two adjacent beef grazing properties on the corner of Harwood Road and Frankston-Dandenong Road

⁵¹ URS (2009)

⁵² Planisphere (2013)

⁵³ Urban Growth Boundary Anomalies Advisory Committee (2012)

⁵⁴ Urban Growth Boundary Anomalies Advisory Committee (2012)

- One cut flower business on Frankston-Dandenong Road (Figure 4-2)
- One poultry (meat and egg) producer with sales to the public on Frankston-Dandenong Road (Figure 4-3).

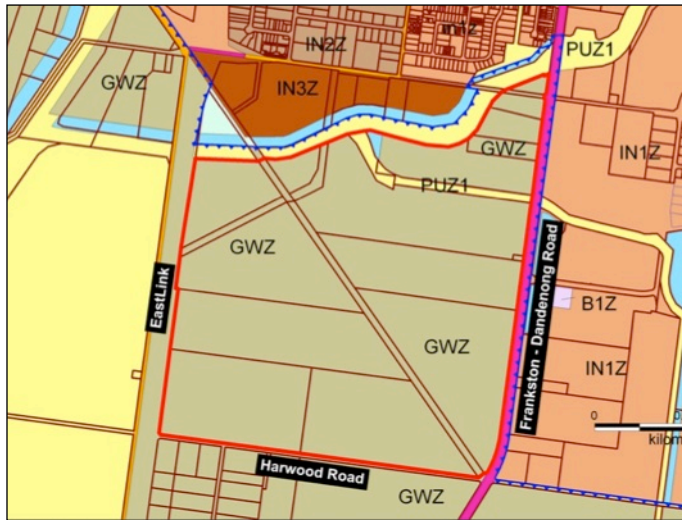


Figure 4-1: Bangholme Precinct



Figure 4-2: Cut flower business in the Bangholme Precinct



Figure 4-3: Poultry (meat and egg) producer in the Bangholme Precinct

Recommendation

Current agriculture in the Bangholme Precinct provides an appropriate non-sensitive land use to protect and maintain the integrity of the buffer around significant public infrastructure assets and should be supported. However, agriculture is already compromised due to land fragmentation and other non-sensitive land uses could be considered in the long-term pending council objectives e.g. industrial. Sensitive land uses should be avoided in the future e.g. residential development, caravan parks.

4.6 Recommendations for revisions to Clause 22.02

This section assists in answering the following key question raised in the Preliminary Scoping Paper: Does the information contained within Clause 22.02 provide an accurate picture of the existing characteristics and future vision for the Green Wedge in terms of land use? Which specific aspects may need to be evaluated?

Based on the findings of this review, it is recommended that the Clause 22.02 be revised to incorporate the following policy responses.

Recommendation

Support, and where appropriate promote, forms of agriculture that are suited to the urban fringe in the study area by:

- Preventing further fragmentation of the area by restricting further subdivision; 1) Increase the current subdivision thresholds in the Wetlands and Bangholme Lowlands Precincts from 4 to 6 ha to 20 ha, based on the current lot size configuration; 2) Retain the current subdivision threshold of 40 ha in the Buffers and Lyndhurst Precinct. This also supports councils objectives for retaining the existing rural character and amenity and protects future opportunity for industrial land uses
- Limiting dwelling development
- Ensure that further development results in a net gain in terms of biodiversity values and landscape qualities
- Ensure that further development does not compromise existing agricultural businesses
- Avoiding land uses and development that will restrict agricultural practices and activities
- Managing current land use conflict issues.

Revised policy responses for agriculture in the four Precincts of the Green Wedge Local Planning Policy (Clause 22.02) are outlined in Table 4-4.

Table 4-4: Clause 22.02 analysis

Precinct (Clause)	Green Wedge Local Planning Policy agricultural strategic directions
Wetlands (22.02-4)	<ul style="list-style-type: none"> ▪ Maintain and complement the broad landscape typology and values of the existing “rural” character of the precinct. ▪ Maintain the existing subdivision pattern within the precinct, providing for appropriate sustainable development, as well as maintain parcels which are large enough to achieve the Wetlands Sensitive Development principles set out below. It is not intended that existing smaller lots (ie. 6 ha) in the precinct be considered with the Wetlands Sensitive Development model outlined, as these assist in establishing the rural character of the precinct. ▪ Discourage subdivision of lots below that specified in zone schedules, particularly within

Precinct (Clause)	Green Wedge Local Planning Policy agricultural strategic directions
	<p>areas constrained by land liable to flooding.</p> <ul style="list-style-type: none"> ▪ Prevent further land subdivision in the precinct and increase the minimum lot size for subdivision to prevent fragmentation, maintain the current development density and protect the rural amenity and landscape ▪ Discourage small lot excisions and averaging of lot sizes below the minimum specified in the relevant zone schedule. ▪ Require management plans, in cases where permits are needed (including dwellings) to demonstrating how achievement of the “green vision” concept will be assisted by the proposed development including how biodiversity values and landscape qualities will be protected and enhanced ▪
Bangholme Lowlands (22.02-5)	<ul style="list-style-type: none"> ▪ Maintain the existing low density character of the precinct. ▪ Support the development of low density recreational, and other land extensive activities, which are consistent with the existing rural character ▪ Prevent further land subdivision in the precinct by retaining existing planning scheme provisions and discouraging small lot excision. ▪ Prevent further land subdivision in the precinct and increase the minimum lot size for subdivision to prevent fragmentation, maintain the current development density and protect the rural amenity and landscape ▪ Discourage small lot excisions and averaging of lot sizes below the minimum specified in the relevant zone schedule. ▪ Require, where permits for use or development are needed, management plans to be submitted demonstrating how achievement of the “green vision” concept will be achieved. ▪ Require management plans, in cases where permits are needed (including dwellings) to demonstrating how achievement of the “green vision” concept will be assisted by the proposed development including how biodiversity values and landscape qualities will be protected and enhanced ▪ Promote Support forms of agriculture that are suited to the urban fringe, and those that can re-use waste water.
Buffers (22.02-6)	<ul style="list-style-type: none"> ▪ Retain existing planning scheme provisions to restrict further subdivision. ▪ Prevent further land subdivision in the precinct and increase the minimum lot size for subdivision to prevent fragmentation, maintain the current development density and protect the rural amenity and landscape ▪ Discourage small lot excisions and averaging of lot sizes below the minimum specified in the relevant zone schedule. ▪ Require management plans, in cases where permits are needed (including dwellings), demonstrating how achievement of the “green vision” concept will be assisted by the proposed development. ▪ Require management plans, in cases where permits are needed (including dwellings) to demonstrating how achievement of the “green vision” concept will be assisted by the proposed development including how biodiversity values and landscape qualities will be protected and enhanced ▪ Promote Support forms of agriculture that are suited to the urban fringe, and those that can re-use waste water.
Lyndhurst (22.02-7)	<ul style="list-style-type: none"> ▪ Restrict further subdivision until future frameworks are approved and can be implemented by this policy. ▪ Prevent further land subdivision in the precinct and increase the minimum lot size for subdivision to prevent fragmentation, maintain the current development density and protect the rural amenity and landscape ▪ Discourage small lot excisions and averaging of lot sizes below the minimum specified in the relevant zone schedule. ▪ In cases where permits are required, including dwellings, require provision of management plans demonstrating how achievement of the “green vision” concept will be assisted by the proposed development including how biodiversity values and landscape qualities will be protected and enhanced ▪ Promote Support forms of agriculture that are suited to the urban fringe, and those that can re-use waste water.

4.7 Summary of recommendations

A summary of recommendations for the future directions plan are provided in Table 4-5 below.

Table 4-5: Summary of recommendations

Future direction	Recommendation
Future viable and suitable agricultural land uses	Maintain current agricultural land uses to: <ul style="list-style-type: none"> ▪ Provide amenity, rural landscape and recreational value ▪ Protect buffers around significant public infrastructure assets ▪ Avoid development on land that is potential CASS ▪ Avoid development requiring significant infrastructure investment or upgrades e.g. roads, drainage.
Preventing land use conflict	Assist in preventing and mitigating land use conflict by ensuring that appropriate separation distances are maintained between agriculture and other incompatible land uses. Other measures to support ongoing agricultural production include: <ul style="list-style-type: none"> ▪ Traffic management and providing for movement of heavy agricultural equipment on local roads and diverting local traffic away from areas of primary production ▪ Enforcement of local laws relating to domestic animals and rubbish dumping ▪ Ensuring that Council operations (e.g. spraying weeds on roadsides, grading roads) do not impact on adjoining primary production.
Future resource management arrangements / requirements	Facilitate the future resource management requirements of the study area through: <ul style="list-style-type: none"> ▪ Convening a forum or council reference group comprising agricultural producers, equestrian businesses and other landholders. The group could work with Council on adoption of desirable environmental activities (e.g. protection of significant biodiversity assets), to provide input on future development proposals and implementation of the GWMP. ▪ Investigating the development of an environmental significance overlay for the study area to identify CASS and ensure future development is not impacted by CASS.
Consideration of the benefits of recycled water	Acknowledge that future agricultural recycled water customers could be supplied from the EIS however further discussions with Melbourne Water (the wholesaler), Topaq and South East Water (the retailers and recycled water scheme managers) about the number of customers, demand volume and connection options would be required. Currently the number of potential customers and demand volume are low and may not be economically viable.
Commentary on new zone provisions	Current agriculture in the Bangholme Precinct provides an appropriate non-sensitive land use to protect and maintain the integrity of the buffer around significant public infrastructure assets and should be supported. However, agriculture is already compromised due to land fragmentation and other non-sensitive land uses could be considered in the long-term pending council objectives e.g. industrial. Sensitive land uses should be avoided in the future e.g. residential development, caravan parks.
Recommendations for revisions to Clause 22.02	Support, and where appropriate promote, forms of agriculture that are suited to the urban fringe in the study area by: <ul style="list-style-type: none"> ▪ Preventing further fragmentation of the area by restricting further subdivision; 1) Increase the current subdivision thresholds in the Wetlands and Bangholme Lowlands Precincts from 4 to 6 ha to 20 ha, based on the current lot size configuration; 2) Retain the current subdivision threshold of 40 ha in the Buffers and Lyndhurst Precinct. This also supports councils objectives for retaining the existing rural character and amenity and protects future opportunity for industrial land uses ▪ Limiting dwelling development ▪ Ensure that further development results in a net gain in terms of biodiversity values and landscape qualities ▪ Ensure that further development does not compromise existing agricultural businesses ▪ Avoiding land uses and development that will restrict agricultural practices and activities ▪ Managing current land use conflict issues.

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