Main Road Transit Corridor

Stage Two – Identification of Corridor Improvement Options

Developable Sites Analysis

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Department of Infrastructure,
Energy and Resources

Tasmania
Explore the possibilities

CONTENTS

1 KEY POINTS

- Research shows that compact and mixed use development creates more sustainable travel behaviour, with higher levels of public transport use, walking and cycling. Increasing density and mixed use development along high frequency public transport corridors and close to activity centres will enable more people to use sustainable transport options.
- The first step in increasing density along major public transport corridors is to determine if suitable sites are available within close proximity to the Main Road Transit Corridor.
- A GIS model was developed to identify prospective sites for infill development adjacent (within 800 metres) to the Main Road Transit Corridor. This approach enables prospective sites to be easily identified at a spatial level based on certain characteristics such as zoning or lot size. These sites were validated through a 'ground-truthing' exercise between DIER and Council officers to determine if sites were actually considered suitable for infill development.
- The site identification analysis included identification of two scenarios:
    - Residential land scenario: land considered suitable for residential development or mixed use excluding land zoned Recreation and Open Space.
    - Industrial land scenario: including all industrial land which could be redeveloped for residential or mixed use excluding land zoned Major Impact Industry (land predominantly around Derwent Park).
- The supply of land identified as suitable for infill development was as follows:
    - Residential land scenario (also includes land suitable for partial development): 56 hectares with a dwelling yield of 1405 houses (based on 25 dwellings per hectare).
    - Residential and industrial land scenario (includes only industrial land considered suitable for development ie not part of a cluster): 93 hectares with a dwelling yield of 2626 houses (based on 25 dwellings per hectare).
- The supply of land in the residential land scenario, only meets 16 percent of the dwelling yield required in Glenorchy and Hobart for infill areas (based on 25 dwellings per hectare).
- Not all of this required infill development will be along the Main Road Transit Corridor, however it would be expected that the Corridor would yield a significant supply of infill development, given that it is one of the core public transport routes in Glenorchy and Hobart.
- In order to achieve a modal shift towards sustainable transport options, development in the form of new housing and key trip attractors needs to be located close to the Main Road Transit Corridor and activity centres. These areas should be priority areas for infill residential and commercial development.
- In order to yield a higher supply of land for infill development adjacent to the Transit Corridor, particularly around Glenorchy and Moonah activity centres, it is highly likely that either:
    - Density will need to be significantly increased (eg a dwelling yield of 60 dwellings per hectare) or;

    - A proportion of industrial land within Glenorchy will need to be converted to residential or mixed use development.
- The approach should be to develop non-industrial land in the first instance and only convert industrial land which has certain characteristics, such as land within 400 metres of the Transit Corridor and activity centres, fragmented sites and sites which are poorly utilised with buildings of low capital value.
- The provision of infill development is a challenge. The development process can be complex, lengthy and more costly to the developer than Greenfield development. Mechanisms may need to be implemented in order to achieve infill targets.
- More work is required to investigate the best means of progressing infill development and assessing the most appropriate intervention mechanisms within the Tasmanian context.

2 CONTEXT

Strategic planning documents are already in place to guide future settlement patterns within Greater Hobart. The *Southern Tasmania Regional Land Use Strategy* reflects the concept of Transit Corridors by encouraging residential density to be increased along high frequency public transport routes and around activity centres.

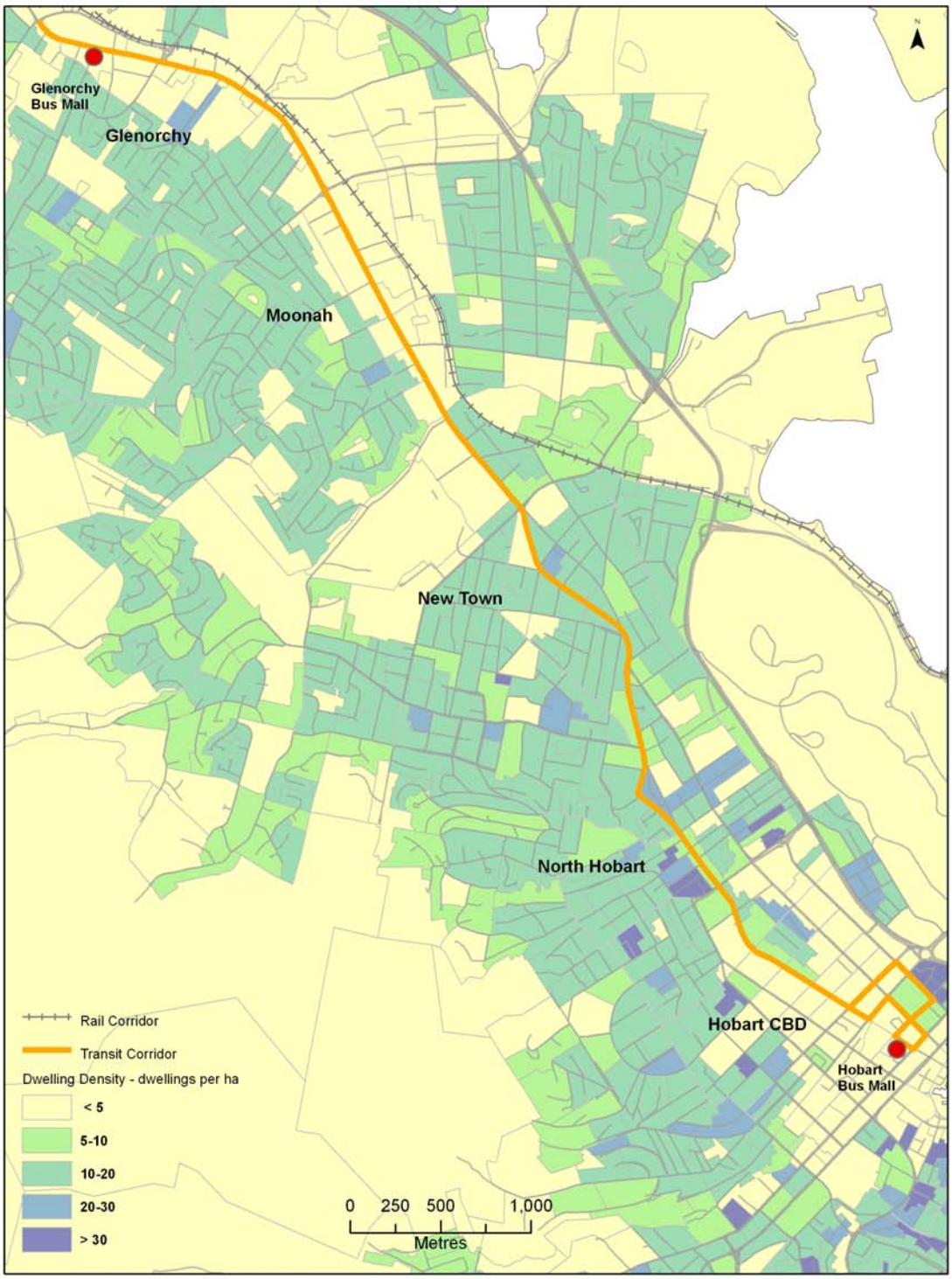
The Regional Strategy has recommended a minium density target of 25 dwellings (gross net density) per hectare for infill development. Infill development is defined as the following within the Regional Strategy:

- *Development within existing urban areas through:*
    - *Small scale subdivision or unit development on existing residential lots; or*
    - *Redevelopment of brownfield or greyfield sites.*
    - *May involve increases in density.*

The typical built form of a density of 25 dwellings per hectare is terrace housing, mixed with residential multi-apartment buildings of generally three storeys. Examples of similar densities in Hobart include unit developments along Sandy Bay Road between Hampden Road and St Georges Terrace and along Brooker Avenue at Glebe. There are already areas within Hobart that have densities greater than 30 dwellings per hectare; examples include St Georges Terrace in Battery Point, Wapping and North Hobart between Burnett Street and Mount Stuart Road.

Figure 1 shows the existing dwelling density adjacent to the Transit Corridor.

Figure 1 Dwelling density along the Transit Corridor



Source: ABS 2006

The Strategy sets the following targets for infill development across the existing urban area within Greater Hobart:

- Glenorchy City Council: 40 percent infill (5300 dwellings).
- Hobart City Council: 25 percent infill (3312 dwellings).

The percentages above relate to the overall regional infill target for Greater Hobart.

The infill area for Hobart and Glenorchy identified in the Strategy is predominantly focused on the Main Road Transit Corridor, with smaller areas identified just beyond the Corridor around Montrose/Rosetta, further out to Claremont and Sandy Bay around UTAS. It should be noted that infill development is also encouraged throughout the Greater Hobart urban area but higher densities are encouraged around activity centres and key public transport corridors.

The first step is to identify sites along the Corridor that could potentially be developed for higher density residential or residential mixed use. This enables a clearer understanding of what the future dwelling density and population capacity of the Transit Corridor could be. Ideally, high density residential development and mixed use should be located close to activity centres and around major public transport stops.

The approach outlined in the *Tasmanian Urban Passenger Transport Framework* is to build demand within existing public transport corridors by improving the existing bus-based system and facilitating land use change. By increasing density and locating activity intensive attractors along the Corridor this will enable people to use public transport more often and drive less.

Building demand along Main Road is seen as an essential step in creating a critical mass of potential patronage to justify future investment in larger scale passenger transport solutions. As the Transit Corridor runs in close proximity to the rail corridor between New Town and Glenorchy, supportive land use change along the Corridor is critical to justifying any investment in a mass transit system through this area of Greater Hobart.

There are other benefits to encouraging infill development from an economic and social perspective. Increasing densities in urban areas has advantages in terms of maximising the use of existing infrastructure such as water, sewerage, electricity, schools and community facilities. Density also provides economies of scale to support new commercial developments, thus leading to economic renewal in inner urban areas.

Infill development is more suitable in terms of providing for a diversity of housing needs and meeting the challenges of demographic change, as it provides opportunities for smaller housing close to services rather than building new dwellings in Greenfield sites remote from services.

3 IDENTIFICATION OF HIGH RESIDENTIAL DENSITY OPPORTUNITIES

A GIS model has been developed by DIER to identify prospective sites for infill development adjacent to the Transit Corridor. The methodology for this model is based on the City of Melbourne's *Transforming Australian Cities* project, which investigated the potential yield (in terms of public transport patronage) of intensifying development along urban public transport corridors. This approach enables prospective sites to be easily identified at a spatial level based on certain characteristics such as zoning or lot size. With any modelling exercise, the outputs need to be verified to determine whether the identified areas are actually suitable for development.

The process of developing the model was:

1. Identify the number of potentially developable sites along the Corridor (within walking distance 0 to 800 metres);
2. Calculate the potential dwelling density and population capacity of the Corridor; and
3. Prioritise the sites for development which support the Transit Corridor approach.

3.1 Developable Sites Model methodology

The methodology for the model is as follows:

1. Identify Transit Corridor buffer (Glenorchy to Hobart CBD along Main Road) based on zero to 400 metres and zero to 800 metres walking distance to Corridor using the public road network.
2. Site selection criteria:
    - Identify sites over 2000m² (determined by Working Group as being the minimum size for infill redevelopment); and
    - Remove sites with the following zones: Recreation and Open Space: (ie. no change to sites which are for recreational use).
3. Zoning scenarios: scenarios were developed based on planning zone classifications, which included conversion of land currently zoned as industrial to residential development. The scenarios were as follows:
    - Residential land scenario: no conversion of land which is zoned industrial; and
    - Industrial land scenario: conversion of select industrial zones for infill development, these zones were Limited Impact Industry, Service Industry and Infrastructure/Utility zones and all industrial zones within the *Sullivans Cove Planning Scheme 1997*. The Major Impact Industry zone (predominantly around Derwent Park) was excluded, as this is a large area of industrial activity which is orientated towards heavy industry.
4. Draft model outputs (Stage 4a) and validation (Stage 4b): the draft model outputs were validated by Council officers and DIER. This process involved 'ground-truthing' the site through a desk top assessment based on spatial information (Council GIS, the LIST, Google) and Council property and Development Application records.

    The process used to determine if the site was considered suitable for infill development included:

    - Identifying the use of the site;
    - Assessment of whether the site is capable of being redeveloped for residential or mixed use:
        - Is the use more appropriately located elsewhere eg is the current use inappropriate within an activity centre?
        - Is the site underutilised, eg poorly utilised space in form of car parking or vacant land. Are buildings in poor condition or of low capital value eg. prefabricated sheds/workshops/warehouses. Can existing buildings be converted to residential use?
        - Are private dwelling lots capable of being subdivided or form part of a larger development with similar adjacent properties.
    - Identify any likely constraints, eg heritage listed, adjacent to waterways and easements;

- Identify if sites have dual frontage or access. Sites with multiple accesses are more conducive to residential infill development;
- Exclude sites which have undergone major recent development or under planning approval for a major refurbishment;
- Exclude sites which are already high density eg some existing public housing developments have high density;

5. Update the model based on Council officer validation: the model was re-run based on whether the sites were considered suitable for infill development. The following steps were taken to determine the dwelling yield of the validated sites:
   - Determine land availability in hectares to enable dwelling density and population capacity of the Corridor to be calculated;
   - Development of various capacity scenarios based on dwelling density and proximity to the Transit Corridor. This provides for diversity in housing choice and urban form. Densities include:
     - 25 dwellings per hectare: based on STCA minimum average infill density target;
     - 40 dwellings per hectare: typical two-storey detached dwellings and unit developments;
     - 60 dwellings per hectare: typical three storey apartments.
   - Calculations for dwelling density are based on the concept of 'net density'. The definition of net density is based on the *Southern Tasmania Regional Land Use Strategy* which is *the number of dwellings per hectare on land devoted solely to residential development. While it includes private driveways and private open space, it does not include public infrastructure such as roads, streets and public open space.* Based on this definition 10 percent is subtracted from the site area to account for local roads. Twenty percent is the standard used for net density calculations for Greenfield development, particularly where there are larger subdivisions. A lower percentage is applied for infill development as sites are generally smaller and are less likely to have internal local road networks.
   - Population density calculations are based on the average household size in Glenorchy and Hobart City Councils, which is 2.3 people (ABS 2006).
6. Map outputs at a high conceptual level, due to sensitivities in identifying sites in certain ownership.

4 MODEL OUTPUTS

4.1 Draft model outputs

The draft model outputs (Stage 4a) identified the following sites:

Industrial land scenario:

- Hobart City Council: 11 sites, 30.21 ha.
- Glenorchy City Council: 75 sites, 71.17 ha.
- Total: 86 sites, 101.38 ha.

Residential land scenario:

- Hobart City Council: 207 sites, 172.72 ha.
- Glenorchy City Council: 87 sites, 113.23 ha.
- Total: 294 sites, 285.95 ha.

4.2 Model validation

Sites were validated based on the methodology described above (Stage 4b). Sites were classified as one of the following:

- Suitable for redevelopment;
- Suitable for partial development, eg. contained a heritage building, but rear of site could be redeveloped;
- Suitable for development, but would need to be developed as part of a cluster. This applied only to industrial land, whereby the redevelopment of one parcel of land for residential use would lead to the fragmentation of adjacent parcels of industrial land and possible amenity conflicts; and
- Unsuitable for redevelopment.

The results are as follows:

Industrial land scenario:

- Hobart City Council:
    - Potential sites: 6 sites, 10.13ha.
- Glenorchy City Council:
    - Potential sites: 39 sites, 44.15 ha.
    - Potential sites that need to be developed as part of a cluster: 13 sites, 13.30 ha.
- Total potential sites: 45 sites, 54.28 ha (note does not include potential sites that need to be developed as part of a cluster).

Residential land scenario:

- Hobart City Council:
    - Potential sites: 40 sites, 24.36 ha.
    - Potential sites which could be partially developed: 33 sites, 6.89 ha.
- Glenorchy City Council:
    - Potential sites: 32 sites, 19.62 ha.
    - Potential sites which could be partially developed: 13 sites, 11.57 ha.
- Total potential sites: 118 sites, 62.44 ha (note includes sites which could be partially developed).

A map showing the validated sites at a conceptual level is located at **Appendix A.**

4.3 Dwelling yield capacity and population growth

Based on the methodology described above, the table below shows the results of the dwelling yield of the validated parcels of land.

Figure 2 Dwelling yield capacity based on residential and industrial scenarios

Planning Scenarios	Total ha	Net density ha	Dwelling yield (25 per ha)	Dwelling yield (40 per ha)	Dwelling yield (60 per ha)
Residential land scenario (including land identified as being suitable for partial development).	62	56	1405	2248	3372
Residential and industrial land scenario (includes only industrial land considered suitable for development ie not part of a cluster).	117	105	2626	4202	6303
Residential and industrial land scenarios (including industrial land that requires development as a cluster).	130	117	2925	4681	7021

It should be noted that the above figures do not include sites less than 2000m². This potentially excludes redevelopment of 'greyfield' sites less than 2000m² which could be amalgamated with adjacent titles to form a larger development site. Therefore the amount of land available for infill development adjacent to the Transit Corridor could be much larger.

Density is used as an averaging statistic and therefore suffers from the drawbacks of any average calculation. An area with an average density of 25 dwellings per hectare may have many different building types and the actual density found in that location may range from 10 to 50 dwellings per hectare. An overall residential density target should not be used to derive blanket planning controls for individual sites, which may lead to monotonous building types. Similarly, a higher residential density does not always mean three storey plus buildings; this can vary based on site coverage, dwelling size and street layout.

The Regional Model Planning Scheme provisions for Southern Tasmania, which are currently under development, are anticipated to include variable density controls that allow for densities significantly higher than 25 dwellings per hectare on sites close to major activity centres and key public transport corridors.

The infill targets for Hobart and Glenorchy will not be met solely through the redevelopment of sites adjacent to the Main Road Transit Corridor, however it would be expected that the Corridor would yield a significant supply of infill development, given that it is one of the core public transport routes in Glenorchy and Hobart.

In order to achieve a modal shift towards public transport, development in the form of new housing and key trip attractors needs to be located close to high frequency public transport corridors and activity centres. It is well recognised that the following leads to more sustainable and liveable communities:

- Access to public transport;
- Walking and cycling links; and
- Being located close to basic services (such as shops and schools).

Areas adjacent to Transit Corridors and activity centres should be priority areas for infill residential and commercial development. This is not a new trend; other Australian cities are planning to increase density along key transport corridors and close to activity centres.

The supply of land identified as suitable for infill development in the residential scenario only meets 16 percent of the infill target required in Glenorchy and Hobart for infill areas (based on 25 dwellings per hectare). When Hobart and Glenorchy are considered individually,

Hobart can meet a greater percentage of the infill target within the Transit Corridor at 21 percent compared to Glenorchy at 13 percent (see table below). Note the percentage of land identified as being suitable for infill could be much larger if sites less than 2000m² were included.

If higher densities are applied (within Hobart and Glenorchy combined), such as 60 dwellings per hectare, this will increase the percentage of the infill target to be met within the Corridor to 39 percent. Achieving a higher density of 60 dwellings per hectare is unlikely to be achievable for all sites, without significantly altering the appearance of the urban form. Changing the urban form could be desirable if amenity was improved and good urban design was in place.

Figure 3 Percentage of infill development targets identified under the Residential land scenario

Infill target areas	Dwelling yield (25 per ha)	Dwelling yield (40 per ha)	Dwelling yield (60 per ha)
Glenorchy and Hobart	16%	26%	39%
Glenorchy	13%	21%	31%
Hobart	21%	34%	51%

The Regional Strategy's infill target will have to be met through a combination of a general (but relatively low increase) in density across all of suburbia, and a higher increase in density in targeted areas close to major activity centres and key public transport corridors.

Some of the sites that were identified as suitable for redevelopment are more likely to be suitable for wholly commercial development (eg retail or office developments), rather than residential or mixed use, as they are prime sites within activity centres. Therefore the amount of land available for residential infill is likely to be less than what is indicated in Figure 2.

In order to yield a higher supply of land for infill development adjacent to the Transit Corridor without a significant increase in density (eg a dwelling yield of 60 dwellings per hectare), it is highly likely that a proportion of industrial land within Glenorchy will need to be converted to residential development.

If industrial land identified in both Hobart (10 ha) and Glenorchy (44 ha) was converted to residential use, this would result in an additional 1221 dwellings (25 dwellings per ha) or 30 percent of the infill target for Hobart and Glenorchy. If higher densities are applied, such as 40 dwellings per hectare, 48 percent of the infill target could be achieved within close proximity to the Transit Corridor.

Industrial land identified within the industrial scenario for Hobart is located at the Macquarie Point Railyards and Macquarie Wharf which is already earmarked for residential and mixed use. Identified industrial land within Glenorchy represents approximately 10 percent of the industrial land supply in Glenorchy.

There are also alternative scenarios not considered in the Developable Sites Model, which could be investigated to increase the supply of land available for residential infill such as 'greyfield' development. These are discussed below.

The table below shows the level of population growth that could be achieved with infill development based on 2.3 persons per dwelling. Development of all land identified as suitable within the residential and industrial scenario (excluding land that requires to be developed as part of a cluster), would yield an increase of 6 040 to 14 497 people, depending on the level of density. It is unlikely that an increase of 14 497 could be attained in practice, as this would require a significant change in the existing level of density and urban form.

Figure 4 Population growth based on residential and industrial land scenarios

Planning Scenarios	Population based on dwelling yield (25 per ha)	Population based on dwelling yield (40 per ha)	Population based on dwelling yield (60 per ha)
Residential land scenario (including land identified as being suitable for partial development).	3231	5170	7755
Residential and industrial land scenario (includes only industrial land considered suitable for development ie not part of a cluster).	6040	9664	14 497
Residential and industrial land scenarios (including industrial land that requires development as a cluster).	6729	10 766	16 148

5 DISCUSSION OF RESULTS

5.1 Industrial land scenario

The focus of large scale urban renewal projects in major Australian cities has predominately been on underutilised industrial land known as 'brownfield' development. Brownfield development has emerged as a means of revitalising inner areas on old industrial sites which have outlived their previous functions, such as land adjacent to ports, rail inter-modals and obsolete manufacturing sites. Typically these sites occupy prime locations in terms of proximity to inner residential areas and waterfront settings.

These sites are attractive to develop as they are typically:

- Owned by a single entity, usually Government or industry;
- Large parcels of land, a size which is comparable to Greenfield sites; and
- Unoccupied, reducing the need for extensive community engagement.

Examples of brownfield development include Docklands and Federation Square (Melbourne), Darling Harbour in Sydney, Newport Quays in Port Adelaide and Southbank in Brisbane. Tasmanian examples include the Inveresk railyards and the Macquarie Point railyards (identified as a site for redevelopment by the Department of Economic Development).

The disadvantage of brownfield development is that the land is usually contaminated from previous industrial activity, which can increase remediation and development costs. The supply of brownfield sites is usually insufficient to meet the total demand for new housing.

The majority of industrial land identified in the Developable Sites Model is located within Glenorchy. Industrial land which is considered suitable for redevelopment within Hobart is centred around the Macquarie Point railyards site. This site is seen as an opportunity to further develop the Antarctic and science and research sector, enhance Hobart's cultural precinct and increase infill residential development.

The conversion of industrial land within Glenorchy to residential, is partly dependent on the supply and demand of industrial land within the Southern Region. The Southern Tasmania Councils Authority is currently managing a study on industrial land demand which is expected to be completed by the end of 2012.

5.1.1 Southern Tasmania Industrial Land Study

The intent of the *Southern Tasmania Industrial Land Study* is to provide for a 15 year supply of industrially zoned land within the Southern Region to incorporate into new Planning Schemes and to identify longer-term industrial land within strategic land use plans.

The first stage of the study identifies the following demand for industrial land within the Southern Region:

- **Low scenario:** demand for 47ha within the next five years (2011-2016) to 328ha within 30 years (2011-2041); and
- **High scenario:** demand for 66ha within the next five years (2011-2016) to 467ha within 30 years (2011-2041).

The current supply of land within the Southern Region is sufficient to meet demand over the next five years. In the medium-term (five to 15 years), however, there is a projected shortfall of industrial land.

Within Glenorchy and Hobart there is insufficient land to meet local service industry demand within the next 15 years, as most industrial land in Hobart and Glenorchy is almost fully occupied and there is limited scope for new industrial areas. Local service industry is typically industry that delivers trades and goods to the local population such as building and construction supplies, car repairs etc. Local service industry typically needs to be located within urban areas so that it is accessible to the majority of the population.

5.1.2 Role and function of Glenorchy as an industrial hub

Glenorchy has the largest concentration of industrial land in the Southern Region (455ha) and over 1000 industrial businesses. While large in area, the land is highly fragmented with 14 different industrial areas of various sizes and functions. There is little buffering between industry and residential uses, with residual residential occurring in industrial zones. This has resulted in a history of amenity conflicts.

Research undertaken by the Glenorchy City Council indicates that from 1998 to 2008, there has been a reduction in the land vacancy rate for industrial land, which suggests that there is still strong demand for industrial land with sites being quickly reoccupied with industrial uses.

There have been changes to the industrial structure in Glenorchy over the last ten years where several medium-sized manufacturing businesses have closed or restructured. The warehousing and transport distribution sectors are the dominant users of industrial land, with both these sectors growing from 1998 to 2008 (Glenorchy City Council 2010). The local service sector is also an important use of industrial land within Glenorchy, as it has the advantage of being in a central location to service Greater Hobart's population.

The nature of industrial activities is also changing. Newer industries produce fewer emissions and are likely to have less amenity conflicts. There is also a growing trend for businesses to co-locate their activities on one site eg. manufacturing, warehousing, administration and wholesale and retail sales.

It is difficult to predict what impact the Brighton Transport Hub will have on Glenorchy's industrial function and the extent to which businesses will relocate from Glenorchy to Brighton. Glenorchy will still possess advantages in terms of its central location from a transport and warehousing distribution perspective and also because of its industrial agglomeration affect. It is anticipated that there will be some relocation of industrial uses to Brighton, where land is more affordable, larger in size, and possesses fewer constraints in terms of hours of operation and has a road-rail interface.

As there will be a shortage of industrial land in five years and a strong demand for industrial land within Glenorchy, it is likely that (without any form of intervention) land vacated by businesses moving to Brighton would be taken over by other industrial uses.

5.1.3 Options to increase the supply of industrial land

The second stage of the *Southern Tasmania Industrial Land Study* investigated potential areas for new and/or expanded industrial areas to meet the forecast shortfall of industrial land. Most of this investigation has focused on identification of new sites in Brighton and Clarence local Government areas. The scope of the study does not include the identification of existing industrial sites which could be redeveloped or used more intensely for industrial purposes.

The Glenorchy City Council's *Interim Land Use Strategy* acknowledges that there is unlikely to be new industrial land identified within Glenorchy and that industrial land within Glenorchy should be used more efficiently.

Analysis undertaken in the *Southern Tasmania Industrial Land Study* indicated that underutilisation of industrial land may be a key issue in the Southern Region, especially in older industrial areas, such as Glenorchy. It was calculated that if the building-to-site ratio was 50 percent in Glenorchy (the standard building-to-site ratio in industrial areas), there would still be 26 hectares of vacant industrial land available (SGS, 2011). Initial recommendations of the study state that there is a need to properly investigate the underutilisation of industrial land in established urban areas, and to form a strategic approach to improve land use in these areas.

Non-conforming uses, fragmented land ownership and historical urban growth patterns are causes of inefficient land use. If better use of existing land can be achieved, there may be less demand for industrial Greenfield sites. An oversupply of Greenfield sites can also discourage redevelopment of derelict and underused industrial areas.

Better use of existing industrial land within Glenorchy has the potential to increase the wider supply of land, especially for local service industries which need to be centrally located. The key issue is how to achieve more efficient utilisation of industrial land when sites are privately owned. There are no land use planning controls to ensure existing industries use their sites more efficiently. Controls can only really be applied where there is a planning application for a new use or development. These controls could include 'vertical stacking' which is the concentration of industrial activities within one site, usually through multiple storeys, a trend that was common in the nineteenth century and is remerging in Europe.

Car parking integration within existing buildings can also be used to make more land available for industrial development, as land taken up by at-grade 'open air' car parking would become available for industrial development. However the integration of car parking within buildings is more expensive than the provision of at-grade parking.

Some of the trends occurring in Glenorchy which have resulted in the more efficient use of industrial land have been the decline of non-confirming uses (eg residential uses in industrial areas) and the more intensive use of former large scale industrial sites eg former Humes site in Lampton Avenue.

The supply of land is also a mechanism to ensure industrial land is used more efficiently. If industrial land supply is low and demand is high, the value of land will be higher which should encourage land to be used more efficiently. The supply of land needs to be carefully balanced to ensure that there is an adequate supply of land to encourage economic growth. Mechanisms to encourage more efficient utilisation of industrial land need to be investigated in more detail.

More efficient utilisation of industrial land could also enable conversion of industrial land close to the Transit Corridor and activity centres to be used for residential or mixed use. This land would need to have certain land use characteristics and be rezoned.

The *Southern Regional Land Use Strategy* aims to maintain and protect a well-planned and serviced supply of land for industrial purposes. The Strategy identifies that it is important to accommodate clusters of industrial activity and to reinforce the benefits of co-location. It is

particularly important to retain industrial activities and employment within Greater Hobart itself from an economic perspective.

Any conversion of industrial land to residential (or mixed use) needs to be carefully planned because of the potential amenity impacts and site contamination issues. One option is to increase mixed use which accommodates residential development in close proximity to industry. However, mixing industrial activities with residential is a contentious issue because of potential amenity conflicts (noise and air pollution and heavy vehicle traffic). Industrial areas are also not seen as attractive places for people to live from a liveability and market perspective.

5.1.4 Potential conversion of industrial sites

The Developable Sites Model validation process investigated parcels of land zoned industrial (Limited Impact Industry) that were considered suitable for residential development. Suitable sites were considered to have the following characteristics:

- Older industrial activities in inappropriate locations, eg close to activity centres;
- Located in close proximity to the Transit Corridor and rail corridor;
- Fragmented sites, eg. sites on the edge of industrial areas, or surrounded by residential or commercial zoning;
- Poorly utilised eg. large areas of car parks and vacant land; and
- Buildings in poor condition or of low capital value eg. prefabricated sheds, workshops and warehouses.

The validation process also identified industrial sites that could be developed for infill, but only as part of a cluster, meaning that adjacent parcels would also have to be developed for infill; otherwise this would lead to further fragmentation of industrial land. These clusters were identified around the Gormanston Road/Sunderland Street area.

5.2 Residential land scenario

5.2.1 Heritage listed sites

Hobart City Council in particular is rich in European cultural heritage, with many sites being heritage listed, in a heritage area or adjacent to a heritage listed property. Glenorchy has substantially less heritage sites identified in the Developable Sites Model. A Glenorchy Heritage Place Assessment undertaken in 2004/05 has recommended eight heritage character precincts be considered along the Transit Corridor. The Council will need to consider how best to address these precincts in the development of its new Planning Scheme. The introduction of these precincts should affect a number of sites identified in the developable sites analysis.

A heritage listed site or heritage precinct does not necessarily mean that the site cannot be adapted for residential reuse or the density increased, but that any changes will need to be thoroughly assessed to ensure that significant heritage values of the site are not lost or that the development is sympathetic to the desired character of the area.

Adaptive reuse is one of the development examples listed in the Tasmanian *Draft Residential Strategy 2011* for refurbishment of existing underutilised buildings, including heritage properties. Adaptive reuse has benefits in terms of retaining the existing characteristics and values of a site, while providing opportunities for urban renewal and increased activation. It can also reduce construction costs, as the existing shell of the building is largely retained.

A mix of heritage sites are identified in the Developable Sites Model, including:

- Public buildings, which already have established uses eg. Treasury Offices, Town Hall, old Hobart Gaol;
- Commercial buildings eg. former Hobart High School site, Elwick Hotel, Club Hotel; and
- Private dwellings with large established gardens.

The majority of heritage listed public and commercial sites contain established uses and although they could be adapted for residential use, they are not considered under-utilised sites in terms of the use and activity they generate. Therefore they were not considered suitable for infill development and have been excluded from this analysis of potential infill development.

Private heritage listed dwellings represent 10.64 ha of land identified in the Developable Sites Model, including:

- Hobart: 5.91 ha.
- Glenorchy: 4.73 ha.

After heritage listed private dwelling sites were validated, the amount of land that could be developed for infill decreased to a total of 3.33 hectares. Utilisation of sites with heritage listed private dwellings is limited predominately to one additional dwelling such as a 'unit up the back' or 'granny flat'. This approach does not deliver a high dwelling yield and is unlikely to result in a higher density along the Transit Corridor.

However, this approach does have advantages in terms of:

- Providing residents with an additional source of income, eg rent or subdivision;
- Source of affordable housing; and
- Enables people to downsize or age in place.

5.2.2 Car-related industry sites

The Housing and Community Research Unit (UTAS, 2007) quantified the area of land utilised by car-related industry within the Hobart CBD in 2007. Car-related industry included car retailers eg purchase, rental, parts and service and off-street public car parks. Car-related land use is a low density form of development and is viewed as an inefficient use of land within the CBD because it occupies large sites as a single storey form of development with at-grade car parking. Potentially this land could be better utilised for other forms of retail development, office space or residential development.

The report found that within the area bounded by Bathurst, Harrington, Warwick and Campbell Streets, the amount of land devoted to car-related industry was five hectares or 12 percent of the area, comprising more than 45 different car-related businesses.

The Developable Sites Model identified 4.51 hectares of land used for car-related industry (car sales and repair only, sites over 2000m^2) within the Hobart City Council area. The majority of these sites are located within the CBD and on the CBD fringe, particularly in the area between Campbell, Argyle, Brisbane and Burnett Streets. This area is currently zoned Central Service, with the Planning Scheme stating that the area is a location for activities inappropriate to the core CBD, but would benefit from being centrally located such as small offices, retail, wholesale, light industry and car-related uses.

Most of these sites have recently been refurbished for car-related uses, which is likely to make them uneconomical for infill redevelopment. For example the DJ Motors site at 1A Brisbane Street has recently undergone a $7M refurbishment including development of two car showrooms, service centre, spare parts and office accommodation.

Car-related industry (particularly industry associated with new cars) is located within the CBD and CBD fringe because of the advantages of being centrally located and the agglomeration benefits of being located close to other car-related businesses. Within retailing generally, the higher the value of the good, the more firms benefit from agglomeration. This explains why car retailers cluster together in almost all cities (State of Australian Cities 2012).

If these businesses did relocate, it is likely that they would relocate to Glenorchy (because of its relatively central location within Greater Hobart), occupying industrial land in close proximity to the Transit Corridor that could otherwise be developed for residential infill.

5.2.3 Off-street car parking sites

Large areas of off-street at-grade car parking, particularly within activity centres can result in an inefficient use of land and an unattractive urban environment. The *Hobart 2010 Public Spaces and Public Life Report* (Gehl Report) states that Hobart has a high number of car parking spaces for its size and that at-grade parking especially around the Hobart waterfront occupies space that could be devoted to higher order land uses which contribute to improving urban amenity.

Integrating car parking within buildings (such as multi-storey, underground or ground floor car parking) can result in increased land use efficiency and higher densities, whilst also improving urban amenity.

Managing the demand for car parking through pricing, availability and location is an effective measure to encourage alternatives to car trips and increase the use of public transport, walking and cycling. Increasing parking supply, particularly through the provision of low cost or free parking, encourages people to use their cars more often, which also increases congestion and reinforces a low density development pattern. This then exacerbates the difficulties faced by public transport in providing a viable alternative.

Managing the supply of car parking in activity centres is a sensitive issue for Councils and business owners, as there is a strong belief that the availability and low cost of parking ensures that the centre remains viable and competitive.

The Hobart City Council's *Sustainable Transport Strategy 2009-14* contains actions to:

- Develop a transitional parking strategy for the Hobart CBD which considers planned developments, adopting as a basic tenet no net increase in available parking.
- Developing Planning Scheme controls to control CBD parking, including the unregulated conversion of vacant CBD and fringe areas for all day parking.

The Glenorchy City Council's *Commercial Precincts Car Parking Plan, 2010* states that the demand for off-street car parking in Glenorchy and Moonah continues to increase, with all-day off-street parking well utilised throughout the day. The plan lists implementation measures to assist Council in managing their car parking over the next 20 years, including increasing car parking supply, reducing demand and using parking more efficiently.

Most of the sites identified for redevelopment are located within activity centres or on Main Road and therefore more likely to be developed for commercial uses, with potential for residential above ground floor level.

The Regional Model Planning Scheme has a zoning framework which facilitates high density residential development within the General Business and Central Business Zones (zones applying to Hobart and Glenorchy activity centres) above the ground floor level. Therefore it is more likely that these sites will be developed for solely commercial use or mixed use rather than residential.

The land value and the need to maximise the efficiency of the site will principally drive whether car parking spaces are incorporated into a building. Providing at-grade car parking

is substantially cheaper than the construction of underground car parking, or car parking decks. As part of the development of its *Commercial Precincts Car Parking Plan, 2010*, Glenorchy City Council undertook some analysis on car parking costs which indicated that:

- Cost of open car park (1 level) 1000 m^2 concrete slab: $2770 per space.
- Above ground multi-level car park (2 to 3 levels) 1000 m^2 per level: $18 500 per space.
- Basement car park (2 to 3 levels) 1000 m^2 per level: $22 125 per space.

The cost of incorporating car parking into a building may have an adverse impact on the viability of the development. For residential developments, these costs are often passed onto the purchaser, which affects housing affordability.

Removal of on-street parking spaces on the Transit Corridor to facilitate bus priority and cycling infrastructure may result in increased demand for more off-street parking in activity centres, especially if this is used to placate local residents and businesses who are concerned about losing on-street car parks. Therefore the supply of parking will need to be carefully managed with any infill strategy that proposes redevelopment of off-street at-grade car parking sites.

5.3 Redevelopment of greyfield residential properties

Another scenario, which has not been considered as part of the Developable Sites Model is the redevelopment of residential 'greyfield' sites, less than 2000m². Residential greyfield development is defined as under-utilised residential properties, usually occupied and privately owned sites, typical of urban development undertaken from the 1950s to the 1970s consisting of a detached dwelling on a standard residential lot (Newton 2010). The suburbs of Moonah and Glenorchy are typical examples of residential greyfield development. Redevelopment of greyfield sites requires the amalgamation of adjacent properties to form a larger parcel of land for infill development.

The catalyst for determining whether sites are suitable for redevelopment from an economic perspective is the property redevelopment potential index (PRPI), which is determined by dividing the land value by the capital value. If a site has a PRPI greater than 0.5 it may indicate that a site has redevelopment potential.

In its current form, infill development is piecemeal and of inadequate density to contribute to the regeneration of established residential areas. Examples of infill development occurring in Hobart and Glenorchy include:

- One lot subdivision such as a 'unit up the back', which does not achieve an overall higher level of density; and
- Market-specific developments, such as public or affordable housing developments and aged care accommodation, which are often completed to minimum construction standards with little consideration of design principles.

Monash University (2012) has proposed a greyfield redevelopment model that involves the assembly of infill sites for coordinated redevelopment by a single entity. This approach can either utilise consolidated parcels of land, or non-contiguous lots. Managing infill redevelopment through multiple parcels of lots, creates an economy of scale that could increase the viability, affordability and quality of higher density development. It could also encourage targeted infrastructure upgrades to a defined area.

This approach has the following advantages:

- Enables suburbs to be regenerated, enabling higher densities to be achieved whilst still maintaining the character of suburbs;

- Enables a broad range of dwelling types to meet demand and enables people to age in place;
- Usually no need for site remediation, therefore potentially cheaper than brownfield redevelopment; and
- Provides opportunity to package up infrastructure upgrades (bicycle lanes, upgraded bus stops), shared community and open space.

The main challenges faced by this approach are:

- Multiple individual ownership of lots makes assembly of appropriate sites difficult;
- A new approach, which is untried and untested in Australia and requires creation of a land development authority to assemble and facilitate the subsequent development of sites;
- Requires Government to commit to targeting infrastructure upgrades to a defined area; and
- Community resistance to infill development in established residential areas.

5.3.1 Example greyfield precinct

Glenorchy City Council has undertaken some initial investigation on determining if sites could be redeveloped using the PRPI approach. The investigation area was located between Barry, Terry and Eady Streets.

Figure 5 location of potential greyfield residential development

Barry, Terry and Eady Streets

- Total site area 8761m².
- Government valuation: $3.2M.
- Mixture of ownership: Housing Tasmania, Council and private.
- 13 dwellings.
- Terry Street Reserve.
- Vacant parcel of land.
- Close proximity to Transit Corridor (300m) and Glenorchy activity centre.

If the Terry Street Reserve and vacant lot are included, collectively the total area represents a PRPI of 0.5, meaning that it would be economical to redevelop the site. The economic margins could be increased if the density on the site was significantly higher. The table below demonstrates how the cost of land per dwelling decreases as density increases. The Terry Street Reserve could be redeveloped to make the open space more useable and attractive as part of the overall site development, providing benefit to the surrounding community.

Figure 6 Cost of land per dwelling if site is redeveloped

Number of new	Land area per	Cost of land per	Increase in total	Density/ha (site

dwellings	dwelling m²	dwelling	number of dwellings	area only included)
20	438 m²	$161 750	7	22
25	350 m²	$129 400	12	28
30	292 m²	$107 833	17	34
35	250 m²	$92 428	22	39
40	219 m²	$80 875	27	45
45	194 m²	$71 888	32	51
50	175 m²	$64 700	37	57
55	159 m²	$58 818	42	62
60	146 m²	$53 916	47	68

Source: Glenorchy City Council, 2011

6 RECOMMENDED APPROACH

In order to yield a higher supply of land for infill development adjacent to the Transit Corridor, particularly around Glenorchy and Moonah activity centres, there will either need to be much higher densities around the Transit Corridor (for example 60 dwellings per hectare), or conversion of selected parcels of industrial land to residential or mixed use.

Achieving a much higher density is unlikely to be feasible without significantly changing the urban form along the Corridor.

The approach should be to develop non-industrial land in the first instance and only convert industrial land which has the following characteristics:

- Industrial land which is located within close proximity (ideally within 400m) to the Transit Corridor and activity centres.
- Fragmented sites, eg sites on the edge of industrial areas or surrounded by residential or commercial zoning.
- Poorly utilised sites and buildings of low capital value.

This represents around 10 percent of industrial land supply across the Glenorchy City Council municipality and therefore does not represent a major change to the industrial fabric of Glenorchy.

The draft Stage Two report of the *Southern Tasmania Industrial Land Study* contains strategies to better manage the industrial land which is under-utilised; this particularly appears to be the case in Glenorchy. More effective utilisation of industrial land could increase the supply of industrial land within Glenorchy and partially off-set the loss of land which is converted to residential use. The Study recommends that this form of management could be achieved through Planning Schemes and by a land development authority.

Development of brownfield industrial sites has advantages, as such sites are usually larger lots in one ownership and therefore easier to assemble and develop. The main disadvantage is that sites could be contaminated and costly to remediate for residential use.

Other alternatives include redeveloping at-grade car parking sites. This is largely dependent on the land value and should be targeted at areas where land value is likely to be higher, such as activity centres. Redevelopment of car-related industry sites within the Hobart CBD

and CBD fringe is likely to be uneconomic at this point in time, due to these sites being recently refurbished.

Redevelopment of greyfield sites could assist in renewing the suburbs of Glenorchy and Moonah. However, this is likely to be difficult to achieve as it requires the assembly of multiple sites in individual ownership.

7 IMPLEMENTATION

The *Southern Regional Land Use Strategy* identifies that significant amounts of infill development will not occur unless active measures to encourage and facilitate development are applied. The Strategy recommends a specific Infill Development Program to be developed, implemented and maintained, to be managed either by State Government or a Land Development Authority.

Figure 7 Infill Development Program requirements

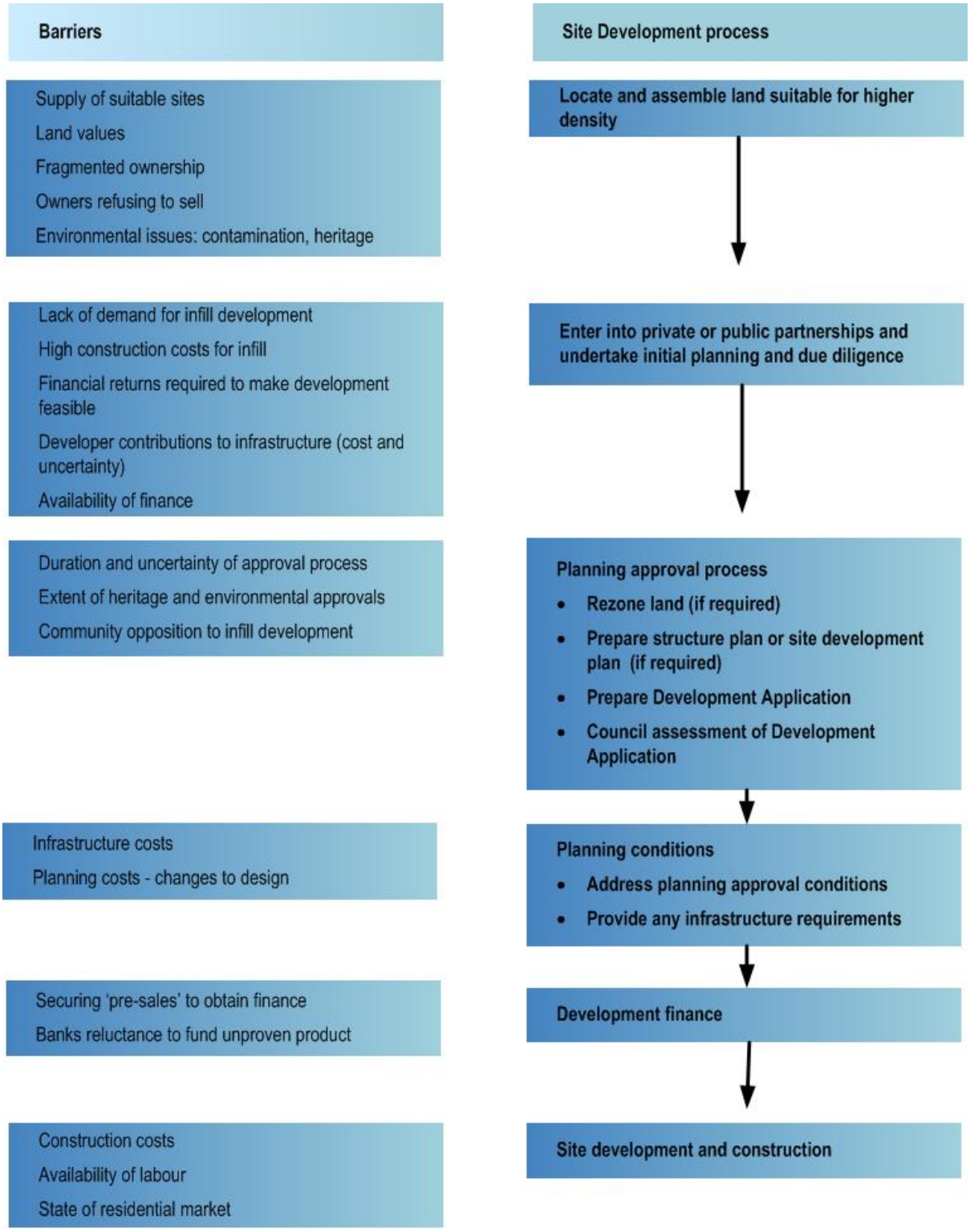
Urban growth boundary - control of low density, rural and environmental living opportunities outside of the Urban Growth Boundary, particularly within 'commutable' distance.	**Provision of high quality open spaces -** to support the amenity of higher density living.
Reduction in regulatory barriers - to multiple dwellings and higher density development within Planning Schemes.	**Crown land coordination** - the coordination of use and development of Crown Land within Greater Hobart.
Identification of high density residential opportunities - particularly on greyfield and brownfield sites.	**Community education -** to dispel common negative myths about multiple dwelling development and promoting the importance of higher urban densities.
Cooperation between the public and private sector - to develop major greyfield and brownfield sites.	**Consistent developer charges** - for physical infrastructure that reflects long term cost benefits of higher densities and developing existing serviced areas.
Affordable housing - specific Government initiatives to assist in increasing the stock of affordable housing.	**Minimising construction costs -** of infill development by reviewing State and local Government taxes, fees and charges that contribute to development costs.
Non-government regulated influences - measures to encourage financial institutions to lend money for infill development.	**Monitoring and review** - achievement of the Greenfield and infill targets will require regular monitoring and review.

Source: Based on *Southern Regional Land Use Strategy*, 2011

The development of infill areas is a challenge. The process for developing a site can be a complex and lengthy process. The figure below shows the generic process for developing infill sites. This process is likely to take up to ten years to achieve development of a single site (Productivity Commission 2011).

The key barriers to infill development are the cost of developing sites compared to Greenfield development. The development industry, unless involved in a public or not-for-profit partnership, must make a return on its investment. Without financial assistance, typically a developer will assess many sites and reject a large proportion because they are financially unfeasible.

Figure 8 Land supply process for infill development



Source: adapted from Productivity Commission, 2011 and Australian Housing and Urban Research Institute, 2012

Tasmania is the only state or territory in Australia that does not have a Land Development Agency. The role of a Land Development Agency is to plan, carry out and/or coordinate the development of land, including the coordination of infrastructure requirements. Land Development Agencies have the capacity to undertake the development themselves or work with the private sector to complete projects. Their level of market intervention in respect of

pursuing different development opportunities varies depending on the level or type of market failure that exists which is preventing the particular opportunity from being realised.

Land Development Agencies are typically established under an Act and can operate within a specific area, or a capital city, or across a State.

There are other forms of intervention that could also be implemented as an alternative to a Land Development Agency, or as complementary initiatives. These vary in terms of their level of intervention.

Examples of Local Government initiatives could include:

- Developing urban design frameworks to guide infill development.
- A marketing strategy to encourage infill development.
- Assistance with guiding developers through the planning approval process.
- Rates relief for infill development over a certain density, reduction of car parking requirements.
- Provision of local infrastructure eg walking and cycling connections, public open space improvements, community facilities.

State Government examples:

- Development of an infill affordable housing strategy that seeks to maximise opportunities from the various State and Commonwealth funding programs.
- Facilitation of Crown Land sites for infill development.
- Planning and targeting of infrastructure upgrades to infill areas eg. provision of public transport infrastructure and improved services such as improved frequency, and upgraded bus stop infrastructure, such as the Main Road Transit Corridor.
- Development of targeted travel behaviour change programs for infill areas.
- State Government taxes and charges relief eg. stamp duty relief for infill development.

More work is required to investigate the best means of progressing infill development and assessing the most appropriate intervention mechanisms within the Tasmanian context. The Australian Housing and Urban Research Institute has undertaken some recent research in identifying barriers and possible solutions in delivering infill development in mainland capital cities. However, more work is required in terms of what could be effective in smaller regional cities such as Hobart.

It is an imperative that this work commences as soon as possible, as the development of infill sites is a lengthy process and it is important that opportunities are not lost.

Recommendations:

1. Through a research project in consultation with industry, identify and recommend a range of intervention opportunities to encourage infill development which State and local Government can control or influence. These should be assessed against the following criteria:
    - Ease and practicality of intervention.
    - Effectiveness of implementation eg value, benefit.
    - Cost to implement.

As part of this process, State and local Government should work together on a pilot project to trial an approach for infill development. The pilot project should select a parcel of land which had been identified as a priority for development.

2. Implement the strategies contained with the draft *Southern Tasmania Industrial Land Study* to better manage urban industrial land which is under-utilised and monitor industrial land supply. This will help inform if industrial land can be developed for residential infill within Glenorchy.

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