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Transit Oriented Sustainable Developments

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NGS 5.3 Project 5b

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Executive Summary

The cultural, social and economic structure of Australian society would appear ready to encompass the concept of Transit Oriented Developments (TODs) into the main stream of urban living. The changing nature of the typical household, employment patterns and how households spend their leisure time have created a new market segment. This market segment is willing to sacrifice living on the typical suburban residential block in exchange for a well-designed dwelling on a small block or in part of a unit complex. This residence needs to be in close proximity to good public transport and have convenient access to a mix of retail, personal services, health and recreational facilities. The clear advantage offered by a TOD is that it can be a focal point for a community where immediate needs can be provided locally.

To date, the concept of TOD in Australia has mainly been limited to small pockets of town houses and mixed-use developments. These have incorporated new urbanism principles that have been applied around existing station sites. These areas have been subject to local governments trying to promote urban renewal in areas where the urban fabric has deteriorated.

Away from the more typical inner and middle suburban areas, where local government has been keen to foster infill and urban renewal with TOD principles, are the large greenfield sites. These greenfield sites offer the greatest potential for urban Australia to really encompass the concept. The development industry sees these greenfield sites as offering the main potential to plan and design a number of TODs with a clear community focus. The main barrier holding the development market back from fully encompassing these sites is a lack of clear commitment from Federal and State governments. They need to provide a high quality, fixed guideway, public transport system with station sites into these greenfield areas.

Greenfield sites offer a clear opportunity to plan a TOD that incorporates the main features demanded by the buying public.

The potential for large-scale adoption of TODs does not need to be the exclusive domain of the greenfield site. Inner city infill sites can offer an ideal setting to promote TOD but require the clear political will to establish a development style corporation that can amass large land holdings under one common ownership.

It is acknowledged that further research is still required to cover all the sustainable aspects of a Transit Oriented Sustainable Development (TOSD). This report, within the constraints of time and budget, has covered the main research aspects. It concentrates on the barriers and opportunities towards integrating land-use and transport planning around public transport interchanges, as presented to the National Taskforce (NGS5.3) on stages 1 & 2 of the original Approved Brief. Stages 3 & 4 will be the subject of further research to scope and investigate aspects such as air quality, water and energy conservation and waste management. This will lead to a package approach to reduce greenhouse gas and pollution within the built environment. In addition, phases 3 & 4 will investigate the incorporation of some of the key integrated land-use and transport planning greenhouse gas mitigation techniques and methodologies investigated in projects 1, 2, 3, 4, 5a, 6 and 8, as presented to the National Taskforce (NGS 5.3).

These wider, sustainable aspects of the project will then culminate in a fully integrated project with one or two key demonstration projects emerging in urban Australia, subject to political will and funding provisions.

The key research findings from phases 1 & 2 have established the following main integrated land-use and transport planning recommendations. These will help to realize TODs in urban Australia.

Key recommendations for the successful introduction of a TOD in urban Australia:

- Provision or a clear commitment by governments to provide a high quality, fixed guideway transit system (heavy rail, light rail or busway) and station infrastructure within the chosen TOD site;
- Land ownership/tenure around a TOD parcelled under one controlling entity;
- A high quality transit system with regular service connections to the CBD and other TODs/regional centres;
- An existing or planned future urban area which has been identified as a TOD. This area must be subject to demographic growth, mixed household sizes and flexible lifestyle patterns;
- A local area planning scheme supportive of the TOD concept;
- A transit system, station facility and surrounding TOD plaza that is safe and feels so; and
- Access to national loan or grant funding to facilitate a TOD and a supportive, high quality transit system.

Supporting recommendations for the successful introduction of a TOD in urban Australia:

- Access to a local champion with time, vision and resources to drive the TOD agenda;
- The TOD should fall within an area covered by integrated ticketing and integrated public transport modal transfers;
- Reduce the supply and availability of cheap Early Bird parking at key regional centres and in the CBD as these may compete with the viability of a TOD.
- Flexibility within bank lending criteria for higher home loan approvals where the borrower is prepared to sacrifice the need for a second car in exchange for closer proximity to public transport.

The Australian TOD should also include:

- A market plaza around the rail station which is a focus point;
- A cafe, convenience retail store, child care facility, aged care facility, clinic, newsagent, pharmacy and ATM;
- Office employment facilities around the main market plaza;
- The provision of mixed-use employment attached to dwellings within residential areas;
- A network of well lit and overlooked footpaths/cycle-ways connecting with the main plaza;
- The use of trees and buildings along all footpaths to give pedestrians and cyclists a feeling of intimacy and security.
- The provision of a network of natural walking trails and recreational areas around the TOD;
- A few short cul-de-sacs, within the residential TOD area, to accommodate young families with children;
- Full and ready access for people with disabilities and the elderly; and
- The provision of a park & ride facility near the station. This would accommodate patrons living beyond the TOD where no close alternative station site exists with an exclusive park & ride.

The purpose of this report

The purpose of this report is to give the reader an understanding of Transit Oriented Developments (TODs) as a concept. These types of development can help minimise the greenhouse gas emissions associated with car trips, but there are many barriers, as well as opportunities, that have prevailed in the Australian urban setting and that surround the implementation of the concept to date.

In Section One, the report describes the problems caused by road vehicles, the greenhouse issue, the need for the integration of land-use and transport, and the importance of funding to support initiatives such as TODs that can integrate the aforementioned.

The report, in Section Two, provides a detailed description of the typical components of a TOD and a comprehensive analysis of various case studies around the world.

Section Three examines the key barriers and opportunities that have prevailed in North America where the TOD concept has been applied with varying degrees of success.

In Section Four, the report describes the results of discussions with developers, councils and transit operators around Australia on the barriers and opportunities for TODs in this country. The results of a public attitudinal survey to the concept are also examined.

Finally, in Section Five, the report outlines the key guiding principles required to facilitate a TOD in urban Australia, followed by some general conclusions.

It is acknowledged that further research is still required before presenting a report that covers all aspects of Transit Oriented Sustainable Developments (TOSDs). This report, within the constraints of time and budget, has covered the main research aspects into the barriers and opportunities towards integrating land-use and transport planning around public transport interchanges. This covers the requirements of stages 1 and 2 of the original approved Brief. Stages 3 & 4 will be the subject of further research to scope and investigate further aspects such as air quality, water and energy conservation, and waste management leading to greenhouse gas and pollution reduction within the built environment. These wider sustainable aspects of the project will then culminate in a fully integrated project with one or two key demonstration projects emerging in urban Australia, subject to political will and funding provisions.

Section 1

1.1 The Problem – Too Many Car Based Trips

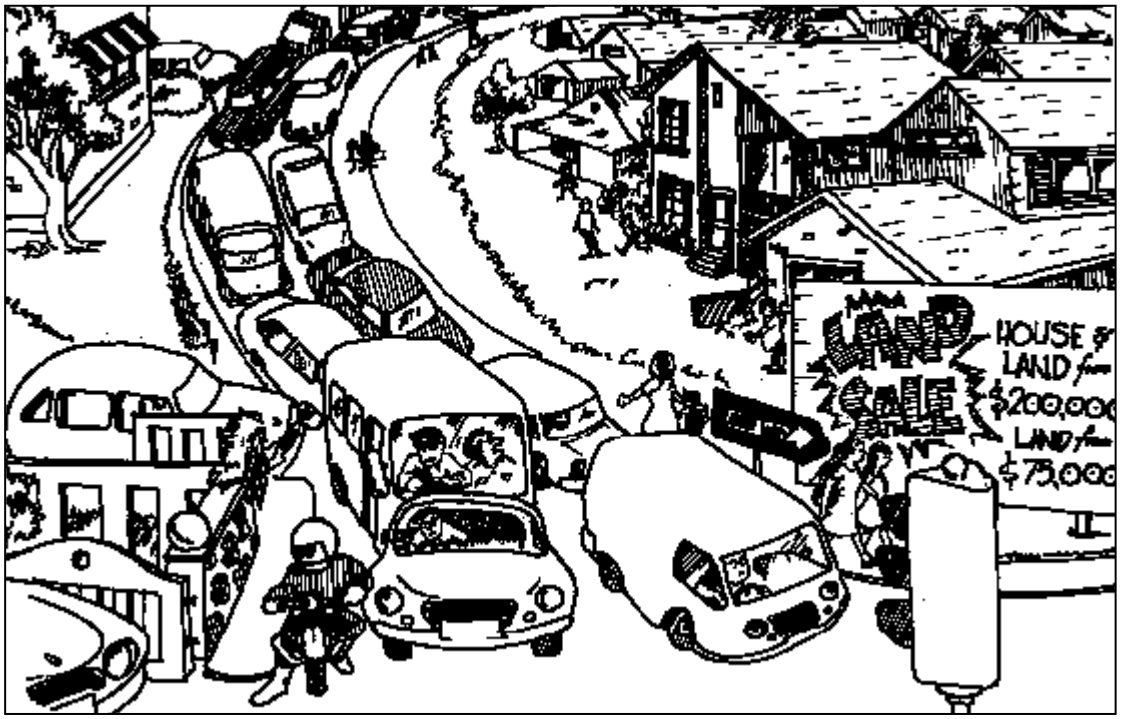
In 1923, Henry Ford produced the first of many mass produced model T Ford passenger vehicles aimed at the general USA household market. Today, average car ownership in the USA exceeds one car per household, with many households having two or three cars. Similar patterns prevail around the developed world, with many emerging nations soon to achieve similar car ownership levels. In the USA, the advent of the car has seen patronage of public transport fall to single percentage figures, whilst car based trips commonly exceed 70%. This pattern is mirrored in Australia. Growth in car ownership has allowed our urban cities to continue to sprawl. With sprawl has come further increases in the demand for car ownership, and so the spiral continues. Within the Australian urban setting of lower density housing and dispersed employment nodes, access to a car is still a major factor requirement for mobility, further aiding urban sprawl and increasing vehicle travel.

In Newman and Kenworthy's work, they cite the twenty years from 1961 to 1981 where Australian capital cities have seen:

- car ownership per capita double;
- public transport usage per capita halved;
- fuel consumption (petrol) increase by 74%; and
- average urban densities fall from 19 to 14 persons per hectare (Glazebrook 1993).

One of the challenges now facing these growing, existing and emerging new cities will be how to manage the demand for travel within them. From past experience, the solution would appear to be better direction in urban land-use and transport planning, plus a greater orientation towards public transport.

Picture 1 (Source: Peter Pritchard, 2000)
Urban sprawl in the outer suburbs and the resultant traffic congestion



This can aid cities to better manage travel demand within them (Ginn 2000).

Building on this theme, Zitter (1998) sees one option for our cities: our suburbs and neighbourhoods (for residential and work purposes) to be more transit-oriented. This would, effectively, make public transport more accessible. It is anticipated, however, that the political, administrative and policy changes needed to concentrate urban forms around transit nodes with higher densities will be difficult to sell to the public and politicians. Even with changes to urban living and work activities around transit nodes, public transport still needs to address the major growth area in demand, namely the leisure, shopping and personal business market.

1.2 The Issue of Greenhouse Gas Emissions

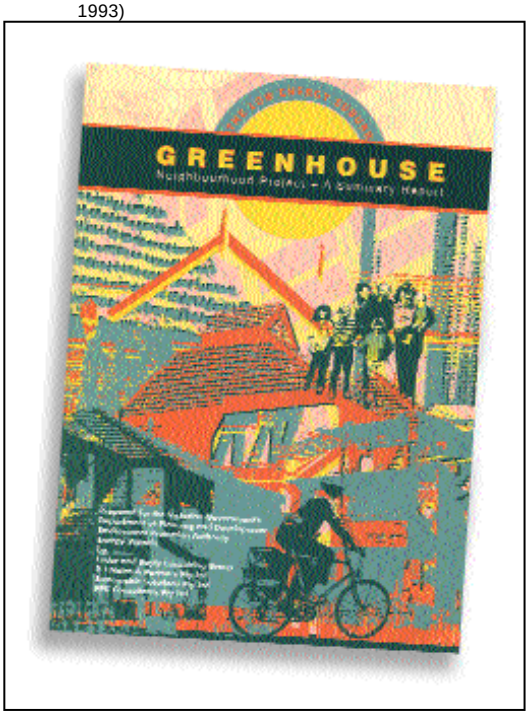
The continual drive towards bigger metropolitan cities with lower density, increasing congestion through more car based trips, is now starting to emerge as a global issue that will impact on existing and future generations. This trend contributes to vehicle emissions thus accentuating global warming which brings with it the need for clean air policies (Ginn 2000). The ICESD (1997) states that, to deliver on the reduction of Greenhouse gas emissions, targets need to be established for public transport. These targets are to be set with respect to a base year for major urban centres over 100,000 population (e.g. - 8 per cent in 1995, 9 per cent in 2000, 12 per cent in 2010, 15 per cent in 2020)'. For Australia to help reduce its future greenhouse gas emissions, the report states that there is a need to reduce growth in the number and length of car trips and the reliance on the car. They recommend that the alternatives to motorized travel are promoted. One measure which can be taken to achieve this is 'integrating land-use and transport strategies... to encourage transit-oriented and mixed use urban land-use development' (ICESD 1997).

'The key principles of this approach include:

- promotion of development near public transport systems which incorporates higher residential and commercial densities and appropriate mixed use development (including residential, commercial, retail and other employment activities);
- regional retailing and office centres and other substantial trip-attracting land-uses such as educational institutions and hospitals to be developed as part of an appropriate mixed use environment, located on major public transport routes, and surrounded by medium density residential development rather than as single uses separate from residential development and dependent on car access;
- decisions on public transport provisions to be made with regard to the positive influence such provisions can have on encouraging land-use and travel patterns that reduce trip length and reliance on the private car' (ICESD 1997).

This recommendation is further supported by the National Greenhouse Strategy - NGS (1998) which, under measure 5.3, promotes best practice in land-use and transport integration and, under measure 5.2, will encourage the 'promotion of development near public transport systems which incorporates higher residential and commercial densities and appropriate mixed uses (including residential, commercial, retail and other employment activities).' Work by the Victorian Government, Australia, in a report entitled 'Greenhouse Neighbourhood Project' in 1993, showed that the estimated annual car related

Picture 2(Source: Department of Planning and Development, Environment Protection Authority, Energy Victoria, 1993)



greenhouse gas emissions (tonnes of CO_2 equivalent) per dwelling could be reduced from 3.3 tonnes per annum to 1.4 tonnes per annum. This could happen where urban forms followed the new urbanism/transit oriented principles and increased local densities from 10 dwellings per hectare to 25 dwellings per hectare. The report, effectively, signalled that a Transit Oriented Development had the potential to represent a 57% reduction in annual car based greenhouse gas emissions compared to more conventional urban settlement patterns. The report also indicated that a further 0.8 tonnes of greenhouse gas emissions per dwelling could be saved in heating and cooling of dwellings with this form of urban configuration. Since this publication went to print, some questions have been raised as to whether the levels indicated are achievable.

1.3 The Need to Integrate Land-Use and Transport

The need for close land-use and public transport integration has grown in recognition around the world over the last ten to fifteen years. A mass of policy directions has emerged. In the UK, Planning Policy Guidelines No 13 (PPG 13), a national planning policy guideline, provides clear Central Government direction to local councils considering town planning applications that promote non-car based travel. In the USA, the Intermodal Surface Transportation Efficiency Act (ISTEA) influences federal funding towards transport projects that help minimize the environmental disruption of car based trips and maximize land-use and transport integration, especially where public transport can be promoted. The Dutch have a land-use category system, known as the Dutch ABC policy, which gives higher development plot ratio benefits to developers that promote transit friendly land-uses near or adjacent to public transport nodes. Here in Australia, cities like Brisbane have seen the emergence of state transport policy and guidance frameworks such as the Integrated Regional Transport Plan for South East Queensland and 'Shaping Up' (Queensland Transport 1998). These promote reduced car trips and encourage residential and employment land-uses around public transport nodes. In Western Australia, in keeping with this theme, the Western Australian Planning Commission (1998) published a review of world integrated land-use and transport planning policies (Curtis 2000). At a national level, Austroads published work by Hans Westerman, Cities for Tomorrow: Integrating Land-Use, Transport and the Environment; a Guide to Better Practice.

1.4 Funding: The Key to Implementing Land Use and Transport Integration

In 1993, the UK Department of Transport changed its method of funding local transport. They now require local authorities to develop local management strategies "which would be funded as a package of measures covering all forms of transport" (Quinn 1996). These strategies were similar in principle to the USA Intermodal Surface Transport Efficiency Act of 1991 which promoted the connection between transport and land use to reduce car-based trips. In the UK, there are now 53 local transport packages receiving 20% of the national capital funding on local transport issues. Alternative modes, such as light rail and guided busways with their close integration with land uses, have been relatively successful in obtaining funding, especially when linked to a private input of funds. On the other hand, in the UK in 1996/7, only four new local road schemes were approved where they divert traffic.

Quinn (1996) further emphases that "a typical package will seek to encourage modal shift and improve air quality and will feature central area pedestrianisation, edge of town park and ride, parking controls and pricing to reduce car commuting, bus priority measures, and cycle provision."

In the US, the Intermodal Surface Transportation Efficiency Act 1991 (ISTEA) did much to facilitate public involvement in the urban transportation planning process, bringing with it new ideas, such as how rail transit can help build good quality urban neighbourhoods. Systems such as those in San Diego, Sacramento, San Jose, Portland, Los Angeles, St Louis and Baltimore have built up a local appreciation of the benefits that transit and land use working together can bestow on neighbourhoods around stations (Ginn 2000).

On 9 June 1998, the Transportation Equity Act for the 21st Century (TEA-21) was

enacted in the USA. TEA-21 leaves much of the past law and policy regarding The New Transit Starts Program intact, including the basic project justification criteria and the multiple-measure method of project evaluation under ISTEA. In mid 1999, TEA-21 incorporated some new fundamental changes to better integrate and fund land use and public transport (Ginn 2000).

The 1999 amendment to TEA-21 requires that transit-supportive local land-use policies be incorporated in all project justifications for transit funding. This would, effectively, target the need to put in place future planned Transit Oriented Developments (TODs) around all major projects going up to the Federal Department of Transport for funding. Failure to incorporate TODs within a funding submission would lead to it not being considered. The full implications of this policy direction by the US Federal Government have still to unfold. What is certain is that all USA state and local governments know that Transit-Oriented Developments are no longer an issue to be avoided if they wish to gain access to the Federal pool of money for 'New Start' transit systems (Ginn 2000).

In addition to the access of funding for new start transit programs, communities across the USA also have access to a multi-billion dollar fund known as 'The Federal Transit Administration Livable Communities Initiative.' This was set up to facilitate TOD's and other transit friendly community programs being built that can reduce car trips and help contain sprawl. Between both the 'New Start Program' and 'Livable Communities Initiative' the USA Federal Administration is clearly putting the integration of land use and transport as a high agenda item, with TODs as a clear focus objective.

1.5 Conclusion

The challenge facing our developed and developing cities is now to manage the demand for travel as urban growth promotes urban sprawl and the resultant car use. Normally, with this sprawl comes lower density and more dispersed settlement patterns, that encourage car accessibility out of perceived need and discourages large scale public transport operations from serving these new areas along all, but a few, defined corridors. Transit-Oriented Developments as a travel demand management tool offer one potential solution to re-address this imbalance. Such a solution, if planned appropriately, can have very long-term, sustainable outcomes that contribute to a reduction in greenhouse gas emissions.

Since the mid 1990's, North American cities have started to build on the successes that cities such as Vancouver, Portland and San Francisco have had with planning and implementation of TODs to further promote the whole concept of integrating land use and transportation. At a policy level in the USA, TEA 21 is building on the successes and similar planning policy frameworks of the UK and Holland. The main difference with TEA 21, compared to Europe, is the funding link to the New Starts program to drive integration. The initial key to getting a future transit oriented development up and operational may be dependent on access to appropriate funds to provide transit infrastructure as a driver.

Section 2

2.1 The Emergence of Transit Oriented Developments (TOD) as a Concept

'Historically, transit helped foster community, just as the automobile helps undermine it. The reason is that when most people took transit, they normally walked from their homes to the bus or streetcar stop. Other people from the neighbourhood were doing the same, and as they walked and at the tramcar stop they met face to face. Since commuters tend to be creatures of habit they saw many of the same people each day. They met, talked, and got to know each other. They found a shared interest in the well being of the neighbourhood. Transit itself was part of that well being; people had a common interest in seeing that it offered good service. Often shops and maybe a bar or cafe opened near the shop, and a mini-community developed around it. All these influences helped a neighbourhood become a community' (Weyrich and Lind 1996).

'We need to start creating real neighbourhoods rather than subdivisions, urban quarters rather than projects, diverse communities rather than segregated master plans, quite simply, towns rather than sprawl... the pedestrian is the catalyst that makes the essential qualities of towns' (Calthorpe 1991). These new towns, when configured as transit-oriented towns, help reinforce a region's CBD city focus and reduce the need for travel by car between towns and the CBD.

In the last fifty years, ready access to the car has seen communities divided by road infrastructure and limited local social interaction to around focal points such as the market, village square and transit stations. The new urbanism movement promotes a return to good neighbourhood design and values, and a focus towards public transport (Ginn 2000).

The late 1980's saw New Urbanism emerge as a new approach to community planning that incorporated some of the development concepts in use prior to World War II. New Urbanism seeks to bring together modern lifestyles, housing, and places of employment, retail activity and leisure time in a compact pedestrian dominated neighbourhood with linkages by transit to other regional centres and neighbourhoods (Congress for the New Urbanism – Web Site 2000).

In many ways, the emergence of the TOD concept has coincided with the resurgence of the tram as a modern and sophisticated urban light rail transit system designed to keep the public away from their cars and use public transport. Light rail transit offers all the advantages of easy access to the very heart of residential communities with minimal environmental and social disturbance, whilst providing high quality links to the main central business districts. Within North America, both concepts have been given US Federal financial support to link up through the New Starts Program and Livable Communities Initiative (described in Section 1.4)

Picture 3 (Source: Ginn,1999)
Light Rail Transit System running on street within the middle suburbs of Sheffield, England, helping to develop a sense of community.

The new urbanists consider that planned communities reduce car dependency and promote social contact. They believe that this will encourage a more sustaining social fabric within our communities where people can live, work, shop and socialize better through walking and cycling within local areas. One idea put forward by the New Urbanism movement is to reduce car dependent communities through the use of narrow tree lined streets, designed in grid patterns, linking areas of commercial activity and parks. This also aims to bring about cultural diversity and a sense of community presence in place of people being confined to their cars and dwellings (Cervero 1995a).

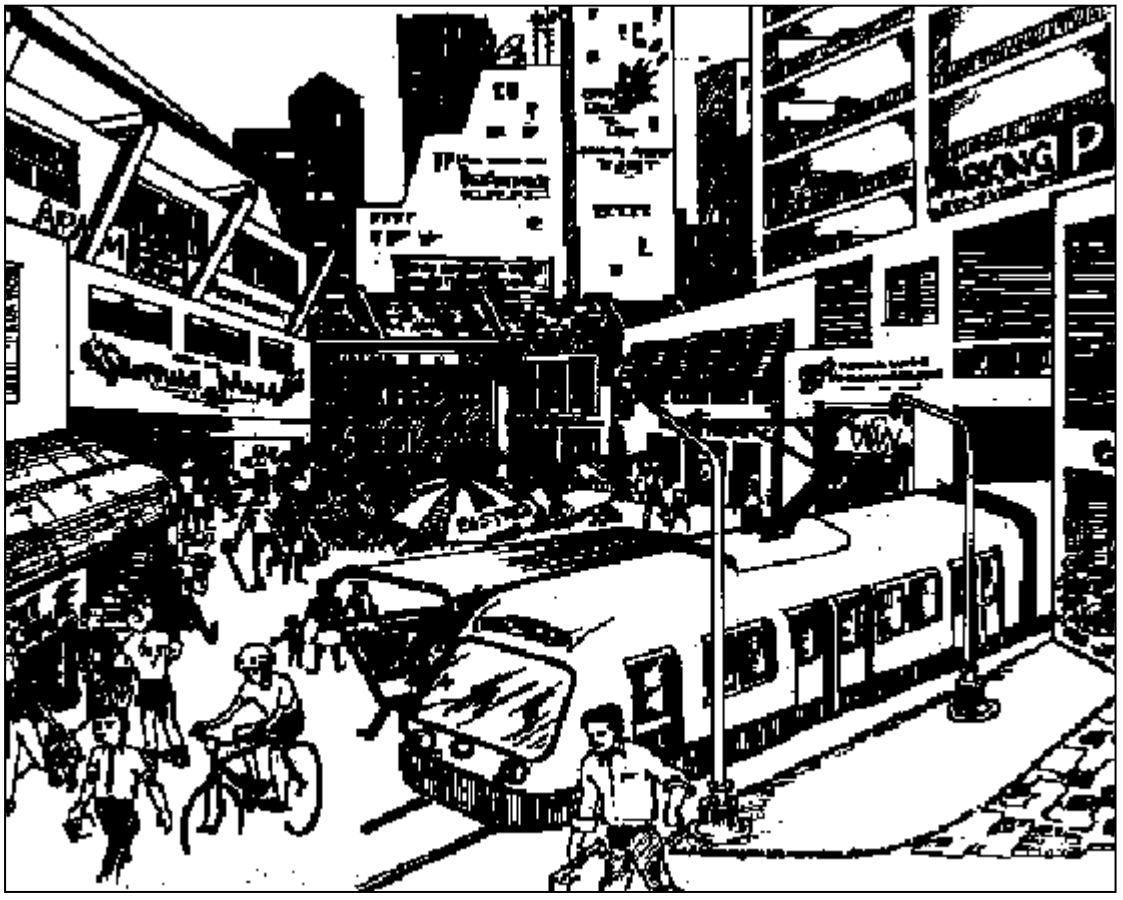
"The evolution of the new urbanist movement over the past decade suggests the existence of deep-seated dissatisfaction with the existing direction of development in the United States" (Thompson and Audirac 1999).

The term "new urbanism" incorporates the ideas and concepts of Transit Villages, Urban Villages and Transit Oriented Developments. The birth of this new urbanism movement would appear to have emerged in Toronto.

Sewell (1995) provides a vivid account of how, in the early 1970's, Toronto saw a new force in urban planning emerge from the downtown suburbs to challenge the continual extension of low density suburbs on the city fringe which were accessed by building more freeways. This challenge was driven by professionals moving into the older, inner suburbs and questioning the need for new freeways to be built though these inner suburbs solely to provide the new car-dependent, low-density outer suburbs with speedy vehicular access to the city. Out of this movement, the redevelopment of parts of the inner suburbs took place. This revitalization adopted concepts of street grids, red tiled roofs, corner shops and services to blend the old with the new and install a sense of community.

Calthorpe (1993) states that "at the turn of the century and during the great depression, the theory of new towns evolved in several directions. Ebenezer Howard... followed the idea of small towns built for workers encircled by greenbelts". The rail stations formed the civic centre of these towns with a strong

Picture 4 (Source: Peter Pritchard, 2000)
The TOD concept illustrated in broad principle



feeling of place. He continues that "in the same period, Tony Garnier developed the first modernist approach to town planning, segregating industry, isolating different uses, and freeing buildings from the street". In the great depression, Le Corbusier and Frank Lloyd Wright expanded Tony Garnier's and other's view of modern town planning to cover the emerging suburban love for the car. The results of the works of Le Corbusier and Frank Lloyd Wright are, very much, the car based suburban sprawl of today.

"Modern suburbs and new towns clearly lack a real centre, definitive edges, or significant common ground" (Calthorpe 1993).

By contrast, Calthorpe infers that TODs are a return to neighbourhoods with a sense of community and civic pride with an emphasis on pedestrian-friendly streets and a lower car dependency (Calthorpe 1993).

The concept of transit villages is not new, drawing on the ideas of planners such as Ebenezer Howard from England and Frederic Law Olmstead and Edward Bellany from the USA. In the USA, original rail based urban settlements provided a range of housing, designed with grid street patterns, with a central civic area at, or near, the station for community gatherings and interactions (Cervero 1996b).

2.2 Definitions of TODs

In 1992, the City of San Diego launched its famous "Transit-Oriented Development Design Guidelines" know as TOD. These guidelines emerged out of the City's Mobility Planning Program aimed at moving people as well as cars. Peter Calthorpe, an architect, was asked to work with San Diego City staff in preparing the guidelines.

A TOD is defined as 'a mixed-use community within an average... walking distance of a transit stop and core commercial area. The design, configuration and mix of uses emphasize a pedestrian-oriented environment and reinforce the use of public transportation. TODs mix residential, retail, office, open space and public uses within a comfortable walking distance, making it convenient for residents and employees to travel by transit, bicycle or foot as well as by car. Every TOD has a commercial core area that provides residents and employees with the opportunity to walk or ride a bike to obtain their basic goods and services' (Corbett 1993).

Calthorpe's guidelines refer to two specific different development patterns, Urban TODs and Neighbourhood TODs:

An Urban TOD 'may be developed at high commercial and residential densities and can consist of offices, large-scale shopping centres, and moderate-to high-density housing (12-60 units in a four-storey building is considered moderate). They are located near light rail and bus stops to allow users to get to many locations using transit.'

Neighbourhood TOD's 'have a residential or shopping focus with a mix of single-family houses and apartments. They must be on a bus line with frequent service or within ten minutes of transit travel time from a light rail or express bus stop. By being compact and promoting active streetscapes and central public spaces, neighbourhood TODs encourage walking, provide densities adequate to support a transit system, and create distinct, identifiable neighbourhoods. The mix of housing types also contributes to making communities affordable to people of many ages, incomes and backgrounds' (Corbett 1993).

Cervero (1996a) emphasizes that economists will argue that issues such as the New Urbanism, transit-oriented developments, working from home and working closer to one's work location can be brought about through pricing policies. Increases in travel costs to the consumer will encourage people to reduce travel, promoting work places, shops, etc, to establish closer. Recent price rises in fuel, so far, has hardly seen any mass movements away from the sprawling suburbs, rather a move towards more fuel-efficient vehicles.

In outer areas, development of more compact and transit-oriented suburbs are advocated to accommodate new family households in attractive settlements with reduced levels of consumption of land and fuel (Heywood 1997).

In a perfect world of open knowledge and understanding, pricing policies may promote less travel and sustain new urbanism, TODs, etc. The reality, however, is that the outer suburbs offer cheaper housing for young families, supported by a mortgage lending framework from banking institutions that does not calculate the savings to be achieved in travel costs. Living in higher priced, more accessible suburbs may, for many families in the medium to long run, be cheaper. Running

a second car can be more expensive than an extra $50,000 mortgage (Ginn 2000).

The concept of 'Transit Oriented Developments' (TODs), also known as 'Transit Villages' or 'Urban Villages,' is a mix of residential and commercial developments surrounding a public transport node where residents and workers can walk to and from their place of residency/employment to public transport. This 'Transit Village' concept is designed to support public transport by encouraging appropriate developments to locate within easy walking distance of a station or bus interchange, thus reducing car dependency and its associated problems of pollution and traffic congestion (Ginn 1996a).

'Under California's Transit Village Act, transit villages extend roughly a quarter mile from a transit station, a distance that can be covered by foot in about five minutes. Beyond this distance, suburbanites are far more likely to drive to their destinations rather than walk to a station to access a train. The centrepiece of the transit village is the station itself and the civic and public spaces that surround it. The transit station is what connects village residents and workers to the rest of the region, providing convenient and ready access to downtown, major activity centres (e.g., sports stadium, college campuses), and other popular destinations. The surrounding public square or open area serves the very important function of being a communal gathering place and a site of special events and celebrations - a modern-day agora. What is important is that the transit station functions as a window, or gateway, to the rest of the region and is physically tied to and associated with the village's major gathering place' (Cervero 1996b).

Within the Australian urban setting, a walking distance of up to 1km away from a fixed guideway station is perceived as a reasonable definition of the area falling within a TOD. The mix of facilities need to be as given above and those described later in this report.

2.3 A Few Cautionary Words

Whilst many professionals are promoting the concept of urban villages, traditional neighbourhoods and TODs as a way land uses can influence travel behaviour and trip modes towards transit, there is a small group of skeptics such as Ewing (1995). These skeptics are questioning the actual ability of land use itself to influence travel modes. They cite the denser communities of today. Often, these are composed of households which are smaller and/or poorer than nearby suburban communities. Consequently, these households make less car trips, and this situation would prevail wherever these communities are situated. Effectively, Ewing is arguing that TOD land-use configurations do not, in themselves, promote transit use, rather the household composition is the factor that determines mode choice.

Another skeptic is Black (1995) who expresses the concern that 'we should not try to recreate the 19th century city; no one wants this except a few benighted planners... The majority of people in the United States have cast their votes for low-density suburbs.' Black, however, indicates that, for transit to boost its patronage, some changes in development patterns may be required.

Before embarking on medium to higher density housing around our transit facilities, we should also consider Coleman' view. Sewell (1995) refers to Coleman's 'Utopia on Trial' (1985) which questioned the design of low rise public housing in London as giving rise to littering, graffiti, and vandalism due to a lack of private space. He argued that it is not high density of tower blocks that has generated the problem but 'confused space' as no-one owns the parks and play areas adjacent to public housing.

These skeptics' concerns and issues may need to be more fully investigated as TODs and new urbanism starts to emerge in the new worlds (N.America, S.America and Australia). There is not enough evidence yet as to long term social consequences of such urban forms outside the older European models (Ginn 2000).

2.4 Case Studies of TODs from Around the World

Newman and Kenworthy (1992a) considered that the best examples of transit - oriented urban villages prevailed in Europe, with good examples also appearing in the USA and Canada. Cervero (1996a) refers to the cities of Stockholm, Copenhagen and Toronto as examples of sustainable cities contained by greenbelts with compact urban centres oriented around rail stations. The following descriptions provide detailed examples of case studies from around the world.

Munich, Germany

Arabella Park in Munich, Germany, was built over ten years ago and is an excellent example of an urban village built on a greenfield site, 5kms from Munich's CBD. The Park comprises 10,000 residents, 18,000 employees and 2,000 hotel rooms on a 22 hectare site. It emphases walking and cycling modes with limited car facilities, promoting traffic free public meeting places (Newman and Kenworthy 1992a).

Stockholm, Sweden

In Stockholm, there is a policy of concentrating high-density, urban development focusing around rail stations radiating out from the city. These urban villages emphasize residential and mixed-use activity. These centres are characterized by:

- employment close to residential dwellings;
- personal services that are easily accessible;
- shops close to residential areas;
- residential density higher near stations then radiating out:
- all multi-occupancy units, etc, within 500 metres of a rail station;
- all family dwellings within 300 metres of a bus stop;
- a bus-rail interchange in all centres; and
- a good network of pedestrian and cycle ways within and between centres with special facilities for the disabled (Newman and Kenworthy 1992a).

The intention in Stockholm has been to create traffic free centres that help integrate communities and foster the use of feeder bus services and rail to provide connections into the CBD and other satellite centres, rather than reliance on the car. In his survey of Global Cities, Newman (1997) cites Stockholm as the only city to show an absolute fall in car use during the 1980's. During this same period, public transport trips rose from 302 to 348 per person. This growth can be attributed to the city's planning framework which has favoured developments around transit stations that promote higher density and pedestrian movement. This has seen the building of urban villages in the inner and outer suburbs and has achieved one of the highest transit levels in the world.

Holland

Cervero (1996a) identifies the Dutch move towards planning their cities' business land uses according to accessibility (known as the Dutch ABC policy). This is followed by encouraging other appropriate places of employment to set up. In this way, an area with good public transport, bikeways and local shops/services attracts government offices, educational facilities, and shopping plazas.

Vancouver, Canada

In Vancouver, Canada, the Skytrain system was noted by Newman and Kenworthy (1992) for promoting urban development around station sites, in particular New Westminster which was originally a terminus 22 kms from downtown. A variety of housing types, including tower blocks, low/medium apartment blocks and town houses, with a good mix of commercial office space and a pubic market were built within close proximity to the station (Newman and Kenworthy, 1992).

Toronto, Canada

Toronto is referred to by Brindle (1992) as the model of transit and land use interdependence. This symbiosis of high density and rail transit along Toronto's subway system and concentration of high density around the stations, however, may be due to other effects. Meyer and Gomez-Ibanez (1981) show that various economic, social, and high European immigration trends contributed to the land use concentrations and high transit demand. These coincided with public policies to facilitate land use around subway stations.

Ottawa, Canada

Cervero (1995b) cites his work in 1986 and that of Bonsall in 1995, when they carried out a survey of developers in Ottawa. They were asked about the apartment and office growth that has occurred around Ottawa's busway. It was concluded that such growth was already planned for these areas by the authorities and the busway merely speeded up the process.

San Francisco, USA

Since the opening of the BART system in 1973, population growth has grown faster in suburbs away from the BART stations than in those adjacent. Overall employment growth, however, has been higher around BART stations particularly in downtown San Francisco. The downtown BART stations of Embarcadero, Montgomery, Powell, and Civic Center gained 28 million square feet in office space between 1973 - 1993, greater than all the other BART stations together. Cervero and Landis (1997) do not see the BART system as the decisive factor in influencing the above growth but as a vital ingredient to facilitate such growth. They stated 'BART's influence on development patterns over the past 20 years have been highly uneven, certainly more so than BART's planners had envisaged. Some areas, notably downtown San Francisco and the outer portions of the Concord and Fremont lines, have witnessed significant land -use changes, while others, such as the Daly City and Richmond corridors, have experienced little new development' (Cervero and Landis 1997).

The same authors further cited research into how population and employment growth had been unfavourable to station sites served by BART between 1970-90. The research found that, over the twenty years since BART opened, '35.2 percent of the population growth occurred in 25 superdistricts not served by BART and only 17.1 percent in the nine BART served superdistricts'. In a similar vein: 'employment grew 84.5 percent in non-BART superdistricts compared to 38.9 percent in the BART served ones, mirroring the trend of job decentralization that was occurring through the US' (Cervero and Landis 1997). Job growth, however, was higher around BART stations in downtown San Francisco.

Research by Cervero and Landis (1997) also looked at the price of homes in 1990 near BART stations. They concentrated on those in Alameda and Contra Costa counties. In Contra Costa, home sales showed prices rose $1.96 per metre distance the closer the proximity to a BART station. This was similar in Alameda County where the price rose $2.29 per metre. In contrast, prices fell $2.80 and $3.41 per metre in Alameda and Contra Costa counties respectively, the closer the property was situated to a major highway.

Even though the previous analysis shows that growth has mainly occurred away from the BART stations, there have been some successes.

Cervero and Landis (1997) refer to the development around the station of Pleasant Hill as the best example of a 'suburban transit-oriented development in the US.' This has happened even though it has BART's largest park & ride, with 3245 spaces, surrounding it. Cervero and Landis comment that the BART rail line has had both pro- and anti-development supporters for the construction of apartments and commercial buildings in the area. This has led to good examples of station development around Walnut Creek, Concord and Pleasant Hill but with limited development around the more affluent communities of Rockridge, Orinda and Lafayette.

The authors emphasize that, in their opinion, Pleasant Hill is the best TOD in the US yet it accommodates a large park & ride facility. This shows the need for TOD's to provide a flexible approach to land-use and transit planning, whilst still providing access for car based patrons from the middle and outer suburbs.

Over 1,800 dwellings and 1.5 million square feet of office space was built between 1988-93 within a quarter mile of the BART Pleasant Hill station. The success of this TOD was put down to:

1. an early 1980's plan to redirect growth around the station;
2. a progressive redevelopment authority that gathered developable land parcels;
3. tax exempt bond financing; and
4. a local political leader who rigorously promoted the cause (Cervero 1996b).

In addition, Pleasant Hill station is now proposing to convert two at-grade surface parking areas into restaurants, retail shops, and cultural entertainment to help build a more village style community. This surface parking will be replaced with more multi-storey carpark facilities. After further

research, Cervero commented that residents near rail stations in California tend to work downtown or in other areas well catered for by rail services. At Pleasant Hill, for example, it is estimated that over 50% of the residents, who live in the 1,800 units, work in downtown San Francisco or Oakland.

Audirac & Thompson (1998) also refer to Pleasant Hill, Fremont and El Cerrito del Norte BART stations. They state that good examples of multi-family housing have been built near these stations. This was supported by aggressive local redevelopment authorities which amassed land and provided infrastructure incentives for development partners.

As Cervero and Landis had, so Audirac & Thompson (1998) cite Pleasant Hill station as an excellent example of a TOD that now has 2000 housing units and 1 million square feet of class 'A' office/commercial space, supported by a local planning scheme. They state that this has worked even though a six-storey park and ride also prevails near the station to accommodate patrons from beyond the TOD catchment.

According to Olsen (2000), another successful BART station is Fruitvale. This has succeeded where many others have not because, according to Michael Bernick, a member of the BART Board of directors, "the Spanish speaking Unity council mobilized neighbourhood and political support from the onset of the project and... they generated federal money to match private capital."

The degree of community involvement at Fruitvale Station, Oakland, has driven the TOD to succeed according to Burrington & Bennett in 1998. The project initially started as a proposed large parking facility around Fruitvale Station, which brought concerns from the local Spanish speaking community. In response, a non-profit community development corporation, Unity Council, was formed to oppose the proposal. With the provision of an $185,000 planning grant from the City of Oakland, Unity Council challenged both the community and architects to design a pedestrian plaza around the station and integrate local neighbourhood redevelopment. The alternative plan, which is now in its final stages of implementation, includes a day care centre, health clinic, senior citizens' centre, local shops and affordable housing in close proximity to the station.

Janss Corporation (1995) cites Del Norte Place as a good mixed-use apartment and retail development in El Cerrito, appropriately one block from the Del Norte BART station. Retail outlets are situated on the ground floor with apartments above,

Picture 5 (Source: Ferreira, 1999)

Park & Ride lots around the BART system are under review for leasing for redevelopment as housing.

forming an arcade. This is enhanced with landscaped courtyards. The development was completed in 1992 with 135 apartments and 20,000 sq feet of retail space. The units have either one or two bedrooms. 71% of the residents use the BART, 50% of these trips are for work. More than 40% of the residents are over 62. The development is a joint venture between the El Cerrito Redevelopment Agency and Del Norte Place Ltd Partnership.

Funding for the project comes from three sources:

1. a 40 year tax exempt mortgage revenue bond from Contra Costa County;
2. a $200,000 loan from the County; and
3. $1.8 million from the partnership.

Work by Cervero around the BART system shows a high concentration of singles and couples with no dependent children living there (Ginn 2000). This may be a sign as to the social and market limitations of expanding the TOD concept into the newer outer family suburbs. Conversely, however, such TOD's could add a new cultural diversity to these outer suburbs. Furthermore, it could be a sign that, for young couples, a TOD is no more than a transitional urban dwelling for 2–5 years before they move to the outer and middle suburbs to have families. TODs also have the potential for many young singles and couples to see these urban forms as transition areas thus having limited interest in the local neighbourhood.

Finally, in their guidelines to Transit Oriented Developments, Puget Sound Regional Council (1999) have made an interesting point. They state that 'in the San Francisco Bay Area, after 25 years of little influence on land use, Bay Area Rapid Transit (BART) is now actively involved in a number of transit-oriented development projects which utilize park-and-ride lots. Currently BART is actively seeking to lease its parking lots at some stations for private housing development, particularly affordable housing. Direct revenue to BART is cited as only a secondary goal. Increased ridership, station area security, and station area attractiveness are described among the primary goals of the transit-oriented development program.'

San Diego, USA

In the mid 1990's, San Diego's downtown area had some of the best early examples of TODs in the USA (Ginn 1996c).

In 1992, the City of San Diego approved its "Transit - Oriented Development Design Guidelines" to encourage urban growth around and adjacent to transit stations and to reduce the travelling public's reliance on the car. These policy guidelines are expected to have a significant impact on the proposed 18.8 km Mission Valley Light Rail Transit (LRT) extension which is under construction. Rio Vista West is just one example of the application of the San Diego TOD guidelines. It will be a major development designed around the Mission Valley LRT station. It should incorporate townhouses, apartments, offices and retail businesses covering over 90 acres. According to Don Cerone of CalMat Properties Co, the developer, *"It's a development that's not just totally geared to the automobile. It provides.... a shared environment between the pedestrian and the automobile that promotes other forms of transportation, in this case mass - transit and the San Diego Trolley."*

Puget Sound Regional Council (1999), in their guidelines to Transit Oriented Developments, refers to how "in San Diego, residential developments have been built at a number of new rail stations and planning is underway to convert more surface parking into housing."

Sacramento, USA

The Environmental Council of Sacramento has incorporated Calthorpe's principles to facilitate new mixed-use growth and pedestrian access to station sites along the city's light rail system (Newman and Kenworthy 1992a). Sacramento's General Plan aims to use development incentives such as higher densities, lower parking provisions, and cheaper tax and loan initiatives to facilitate development around its 13 Light Rail stations (Cervero 1996b).

Picture 6 (Source: Ginn, 1995)
Apartments in downtown San Diego adjacent to a Light Rail Station.

Pasadena, USA

Janss Corporation's (1995) "The Holly Street Village Apartments" in Pasadena, California, is an extensive redevelopment providing 374 apartments in an air rights development over a planned LRT station in Downtown Pasadena. The complex also includes 11,000 sq feet of retail shopping, a market and restaurant. The new station is part of the planned Pasadena Blue LRT project, which will run NE out of Los Angeles and was planned for completion in 1998.

Los Angeles, USA

Puget Sound Regional Council (1999) cites that 'in Los Angeles, station area development is supported by state legislation, called the Transit Village Act, which promotes transit-friendly development around stations'.

San Jose, USA

A new, 250 multi-family block of units is to be developed next to the Almaden LRT station in San Jose. The complex will comprise of two and three storey buildings with 375 parking spaces and a 2,500 sq feet recreation centre. The development is being jointly funded and developed with Santa Clara County Transit District (Janss Corporation 1995).

Washington, DC, USA

Puget Sound Regional Council (1999), in their guidelines to Transit Oriented Developments, refers to how "in Washington D.C., the transit agency and local governments have assembled land and provided developers incentives to achieve mixed-use developments at a number of station locations".

Portland, USA

Portland is considered a leader in planning urban land uses in association with its light rail stations (Sirmans & Gatzlaff 1999). Much of Portland's high profile can be, in part, attributed to the existence of the only elected regional government in the USA. This body promotes land use and transport integration around public transport. Orski (1999) supports these comments by saying that, to date, only a few TODs have been attempted in the USA, most of them in light rail corridors. Portland is one such case.

In Oregon, along the existing eastern LRT line out of Portland's CBD, some TOD principles have been applied. These have been influenced by local planners. No TOD policies were in place, at the time of the eastern line's construction, to direct TODs around the stations. This local influence, however, saw commercial developments such as a major medical centre locate adjacent to a LRT station. In 1995, the State of Oregon decided to help further promote the concept of transit - oriented developments by passing a

new law on local tax relief to developers establishing residential development adjacent to transit systems. Up until 1995, local tax relief was only allowed for multi-dwelling developments in the central city areas. Now, such tax relief applies to other developments, such as those along LRT alignments and station areas outside the city hub. This new legislation will allow councils in Oregon to provide local tax relief to developers for up to 10 years. This tax relief is hoped to significantly aid the private sector in developing multi-dwelling buildings around each station along the new Hillsborough Western extension. The need for an LRT extension westward has been fuelled by the creation of 35,000 computer jobs in the area (Ginn 1996c).

Thompson & Audirac (1999) build on comments by Ginn (1996a) finding very limited TOD development on the Eastside, the exception being those areas subsidized by government. The major concentration of the TOD development is at the Lloyd Commercial & Shopping Centre.

The same authors refer to a twelve year gap from the opening of the Eastside line to that of the Westside line. Since opening, the Westside Line has seen a greater intensity of TOD development than the Eastside Line has. They cite this variance to the fact that 'the Eastside line passes through the region's first shopping centre, then through streetcar-era suburbs, and finally through built-out working and lower middle-class low density suburbs developed in the 1940s to 60s, terminating in Gresham.' In many ways, the line to Gresham depicts the typical car based suburbs built after WWII that emerged at the time of the urban car revolution. Thompson & Aurdirac (1999) continue this by stating that 'the Westside line passes through even lower-density, but high-crime suburbs still in the process of development, characterized by large green fields and campus-like hi-tech factories set amongst broad lawns and expansive forests. Much of Oregon's recent population growth has occurred in the territory served by the Westside line, and because of the urban growth boundary, the best places where it can go are near the line.'

Portland's regional elected government, Metro, has used the Transit Station Area Program to promote TOD's in the city. Along the east side, they have allowed higher density rezoning near stations and, more successfully, along the west side while assembling land, moving stations and preparing detailed master plans (Sirmans & Gatzlaff 1999). Where feasible, and in association with the Portland Development Commission, private sector involvement is encouraged.

Arrington (1995) refers to how Portland's new western MAX line moved the initial proposed location of Beaverton Creek Station to be near to Nike's world headquarters. They used Nike's existence and profile to help develop adjacent vacant land. In Portland, local development plans around stations still need local planning staff to follow up developers. These local plans need to be supported with incentives for development, such as land consolidation under one ownership, and less regulations.

He then tells us that, prior to community plans being developed around each new LRT station for the MAX Westside extension, zoning regulations were passed. These regulations prohibit certain uses around the proposed stations, restrict parking, set density levels for residential and commercial activities, plus set standards for pedestrian connections and building orientation towards the stations.

In Portland, the new western extension of MAX has seen each local planning authority develop a land-use planning scheme within a 1/2 mile radius of each new station to promote the TOD concept. One proposed station, Sunset, used a 'Charrettee' public participation process to bring developers, land owners, residents and government agencies together. This took place over a few days and from this they managed to work up an agreed land use that would encourage utilization of the LRT system (Ginn 1996c).

In their study, Thompson & Audirac (1999) found that a considerable amount of TOD style development features occurred around the Westside stations, typically in the form of town houses and often at densities of 25-35 units per acre. Pedestrian footpaths radiating out from the light rail stations connected these developments. To a limited extent, retail convenience stores where built into complexes near the stations.

One of the stations at Beaverton incorporated both up-market town houses and high profile offices attached to a retail shopping mall. According to Thompson & Audirac (1999), once built, the whole development faced bankruptcy. It had cost them $100 million, including a $10 million government subsidy. Part of the reason for their financial problems

was that the banking institutions appeared concerned about lending for town houses and apartments that overlook shopping strip malls and parking areas.

Arrington (1996) provides examples of transit-oriented developments planned for the Westside line. Intel is investing $2.2 billion in a new silicon chip plant for 1,400 employees on 190 acres north of Orenco Max station. Tri-Met, the City of Hillsborough and Pac Trust, a land developer, have a vision to create a community within this 190 acres. They plan for it to have pedestrian links to the station which will be lined by parks. They also hope to build high density residential and commercial neighbourhoods with residential above along the routes. At Beaverton Creek Max Station, Tri-Met is preparing a master plan for a 122 acre site, with a TOD, to include 1,325 dwellings plus retail, office areas and parklands, that link to Nike's World Headquarters to the north. Tri-Met (Website 2000) cites that the Westside MAX line 'has become a magnet, attracting nearly 7000 housing units and more than $500 million in new transit-oriented communities within an easy walk of the stations.' Evidence of the impact that these developments are having can be found in the fact that patronage on the light rail system has gone from high 20,000's to over 60,000 passengers per day since the opening of the MAX line west in late 1997 (Tri-Met Web site 2000).

Much of the success in attracting interest in TODs along the Westside comes from planning the light rail extension and associated stations in a mainly greenfield corridor. This provided the right framework to attract developers when the market was right to build (Thompson & Audirac 1999). The important lesson here would appear to be the need for governments to build, and have in place, the right infrastructure to attract developers when the market has up-turns. Another important lesson may be that greenfield sites do not present developers with existing community concerns, site limitations and high levels of design criteria. This view is partly supported by comments cited by Thompson & Audirac (1999) who refer to work by Bernick & Cervero (1997). They state that, in New York, redevelopment around rail stations has been held back by nimbyism.

Whilst the new station sites along the West Max corridor are being heralded as model examples of TOD planning, the eastern corridor MAX line, through the older suburbs to Gresham, has been far less successful. In response, the City of Gresham (Website 2000) cites how, within the eastern suburbs of Portland, it is using a 'Transit-Oriented Tax Exemption' (TOTE) which gives property holders 10 years of tax-free ownership. It is hoped that this will attract the right types of TOD into key chosen sites in the area.

This TOTE is subject to the following criteria:

1) that housing be a minimum of 10 dwellings units;
2) that it must be financially accessible to the wider general public;
3) that it incorporate a Gresham crime prevention plan; and
4) that it incorporates certain elements: public daycare facilities, pedestrian links or park improvements, for example.

The development needs the TOTE exemption to make it viable.

To the north of Portland's CBD, lies Portland International Airport where a new MAX light rail spur line is currently under construction to connect the city with the airport. The line is due to open in late 2001. Along this spur line, a new commercial TOD has been designated to accommodate a maximum of 1,325,000 square feet of office space, 1,200 hotel rooms, 400,000 square feet of retail space and a new 24 screen cinema. The site is expected to provide 10,000 jobs within the TOD (Cascade Station Development Company 2000).

Within the Portland area, the success of much of the TOD development is closely aligned to its regional policy and management direction. In the Portland Metropolitan Region, it is stated that new or extended communities, that can facilitate pedestrian access and that are within half a mile of light rail or transit stations, will be promoted. Densities will average 45 persons per acre, which will be achieved by zoning ordinances around the Eastside and Westside MAX stations. The intent of this is that, by 2040, these rail corridors and station communities will accommodate 27 percent of the households in the region and 15 percent of the employment. Based on 1990 densities, currently there are only approximately 22 persons per acre around stations (Metro 1994).

At the strategic regional level, 'Oregon's Transportation Planning Rule (TPR)… mandates that in the state and metropolitan areas, cities and counties adopt transportation

system plans (TSP) that achieve by the year 2025 a 30% reduction in vehicle miles travelled per person. It specifically requires that consideration be given among other things to... increasing residential densities... along transit corridors (1/4 mile of transit lines)' (Aurdirac & Thompson 1998).

'The goal is an ambitious one, assuring that a majority of new housing and jobs is served within a 5 minute walk of the primary transit network. It cannot be achieved overnight. Rather, the percentage of housing and jobs near transit must gradually increase over time, boosted by the timing of transit investments and changes in land use plans. If current trends continue, only 16 percent of all growth in the region from now until 2005 will be within a 5 minute walk of a transit corridor, as opposed to a majority of growth stated in Tri-Met's goal by 1998' (Tri-Met 1993).

Portland's MAX LRT system is central to the region's future transportation and land use plans. The 2040 Regional Plan for the Portland area proposes that, by 2040, 9% of all urban land will be within walking distance of a LRT station, and 16% of all households and 43% of all jobs will be served by LRT. The TOD concept is a key focus of the plan (Ginn 1996c).

Thompson & Audirac (1999) refer to work by Markus (1998) which indicates that however significant the success of the TOD model coming from Portland, it still assumes a potential that only 10 percent of the residents living within existing and future TODs will use transit.

In their guidelines on Transit Oriented Developments (1999), Puget Sound Regional Council talks about how in "Portland, Tri-Met has used transit-oriented land use development at station locations as a major element in securing additional federal transit funding."

As part of the whole travel demand management package, Portland has a parking strategy to support its land use and transportation integration. Sirmans & Gatzlaff (1999) refer to downtown parking supply to a maximum of 0.7 – 1.0 space per 1000 square feet of floor area and restrictions on new parking garages and the use of vacant land for parking. Sirmans & Gatzlaff (1999) conclude their comments on Portland by reference to the Eastern Line where they believe the government must consider significant purchasing of privately owned land. They believe that, to make TODs happen here, the land must then be resold to developers, at a discount, in large amassed parcels.

USA: General

In the mid 1990's, although transit villages had the potential to promote public transport and reduce car dependency, few examples existed in the USA. Issues of real estate market demand for more dense communities near transit stations, restrictive home lending and local opposition to multi-family dwellings were holding the adoption back. "Presently, the entire transit village movement seems caught in a 'Catch-22': there are few examples, in part, because of questionable market feasibility, and the market potential of transit villages is questionable because there are few examples" (Cervero 1996b). Even the renown Laguna West in Sacramento, designed by Peter Calthorpe, has been constrained financially and only incorporates modest transit facilities. Cervero's view on the limited nature of TODs, up to the mid-1990's within the USA, would support the findings of research by Ginn in 1995. The tide, however, has now changed (Ginn 2000). Portland and San Francisco, in particular, have developed and implemented model examples of how TODs can work.

This 'Catch–22' situation, referred to by Cervero to describe North America up to the mid 1990's, is clearly now the case in Australia and requires a good demonstration project composed of public and private joint venture development to build confidence by example.

Singapore

The Singapore Government has proposed, in its White Paper for a 'World Class Land Transport System,' that a high magnitude of all passenger trips over the next 10 to15 years will be provided by a good quality public transport system. This will be in keeping with cities such as Zurich where 75% of trips to the CBD are undertaken by public transport. The White Paper proposed that, under the Land Transport Authority, a full integration of land-use and transport planning would occur. Each Mass Rapid Transit (MRT) station will provide, within its locality, a mix of "employment, housing, leisure and other social activities... to ensure maximum accessibility" through the application of high densities of such facilities in close proximity. In some instances, high-density developments will be immediately adjacent to, or occupy air rights above, MRT stations (Land Transport Authority 1996).

Tokyo, Japan

In Japan, the private rail companies have been keen to venture into real estate developments (Bernick and Cervero 1996). For example, housing, shopping centres, entertainment, etc, around stations are used to expand their businesses and ensure maximum use of their rail networks and infrastructure. Associated with these developments has been high land value increases close to stations that has encouraged rail companies to acquire vast areas of land along proposed rail extensions prior to any development.

Tama New Town is such an example and is a joint venture of the Tokyo metropolitan government and the nation's Housing and Urban Development Corporation. It is planned to hold 360,000 people in 21 residential areas around a number of new rail stations on the two major rail lines serving the area. Tama centre is the largest station and is flanked by office towers, a shopping plaza and nearby residential areas. The Tama District was designed with a number of town centres and housing developments adjacent to rail stations. The stations were on private rail lines extending west out of Tokyo. The region contains two of the largest rail-oriented new towns: Tama Denin Toshi, a private development, and Tama New Town, a joint public development.

Tama Denin Toshi has new town centres and housing developments adjacent to most of the 19 stations along the Tama Denin Toshi private rail line which runs through the District. Most suburban rail systems, that link transit and new town developments, have been privately developed by large industry consortiums. This trend mirrors Japan's lack

Picture 7 (Source: Ginn, 1999)
High density apartments adjacent to an MRT station in Singapore

of land and chronic traffic problems which have seen the need for urban development to follow transit rail lines as the only practical means of transport access to central Tokyo.

The National and local government policies in Japan have helped promote the Tokyo metropolitan's region rail-oriented developments. Vehicles, fuel and toll-way taxes are very high by North American standards. Tax free threshold incentives are given to commuters who use transit instead of the car (Ginn 2000).

Taiwan

In Taiwan, the government has given out contracts for the construction of a high-speed rail corridor between Taipei and Kaohsiung in the south, a distance of 345 kilometres. Along this corridor will be five stations with associated development areas: Taoyuan, Hsinchu, Taichung, Chiaya and Tainan. Station development plans allow for over 135,000 people to be located in close proximity to the stations, supported by associated commercial, industrial and public facilities. Although the development areas around the stations are not specifically marketed by the Taiwanese government web site as TODs, the potential is quite clear.

Australia

Newman and Kenworthy (1992a) comment that, in Australia, a suburban rail station could capture approximately 3,000 residents within a radius of 620 metres, living at a density of 25 persons per ha. This figure would be even lower for cities such as Brisbane. They also refer to the Better Cities project in Australia, formulated in the early 1990's, where urban villages were proposed for transit stations such as Pyrmont, in Sydney, and Fortitude Valley, in Brisbane. The success of such schemes, however, is seen to hinge on the quality of their urban design and how well they blend with the local environment.

In many ways, the Better Cities Program of the early 1990's presented Australia with a number of well-focused urban management projects. In some areas, these encompassed the basic principles of land use and transport integration around major public transport interchanges. Today, these projects have been the direct and indirect catalyst of a number of TOD elements emerging in our urban cities. Unfortunately, the demise of the Better Cities Program, and its lack of replacement by any similar funding body, has stopped the appropriate provision of key transport infrastructure and land parcelling required to allow TODs to emerge as a major urban land form in Australia.

Cities such as Sydney and Melbourne have achieved over 40% modal split in access to work by public transport or via walking within their inner residential city areas (Cervero 1996a). These inner residential areas have become sought after neighbourhood locations, which are less car dependent. The question here is do these inner city neighbourhoods attract people that can help sustain and add to a local community or do they view these areas as transitional prior to starting a young family or moving into a retirement village complex? (Ginn 2000)

For several years in Victoria, the Urban Village Concept, with its TOD element, has been the subject of much discussion by government agencies, developers and the community. Today, many local authorities within the metropolitan areas of Melbourne and Geelong have adopted the principles into their strategic statements and planning schemes. In the mid 1990's, Energy Victoria, the Victorian Environmental Protection Authority and various local authorities explored the feasibility of applying the Urban Village Concept. Eight case studies were chosen for investigation and over 1,000 potential sites in Metropolitan Melbourne were identified for potential urban villages, many close to rail stations (Urban Villages 1998).

In Melbourne, thirteen councils have adopted the urban village concept into their Municipal Strategic Statements since the idea was promoted in the mid 1990's. Public response to the concept has varied. In Manningham, a large degree of community opposition followed the use of the term 'urban village' due to misunderstanding, resulting in the council changing the name to an 'activity centre' (Davis 2000). In Moreland City, the community reacted to concerns over the concept of 'higher density.' Once explained with examples, the community's understanding grew and opposition fell and acceptance followed. In the Moonee Valley, opposition only occurred as the concept entered the building phase. In contrast, Davis (2000) cites the St Kilda Railway Station redevelopment as an urban village. In the Sunday Age on 30 January 2000, it was stated that the project has 'won local support with

the inclusion of 18 retail and service outlets.' This happened even though over the 'past five years many retail and service outlets were squeezed out by restaurants and locals were keen to see a return of services, particularly the supermarket'.

Interestingly, Davis (2000) refers to comments by Associate Professor Michael Buxton from Royal Melbourne Institute of Technology (RMIT). He states that local opposition to the urban village concept would have been greater if the concept had been promoted by the State Government rather than by local governments.

In Western Australia, a community design code, known as 'Liveable Neighbourhoods,' was published in 1997. This promotes living neighbourhoods where, ideally, 60% of all residents can access a rail station safely on foot within 10 minutes if they live within an 800 metre radius.

2.5 Conclusion

The concepts of new urbanism and transit-oriented developments have emerged in the last 10-15 years as a platform for urban and transport planners to hang a common 'hat' around. Both professional disciplines appear to be commonly united, often blindingly so, by the fact that closely associated residential and commercial urban forms around public transport interchanges will facilitate a modal shift towards public transport and represent good urban planning and design. Examples of new urbanism and transit-oriented developments are well documented. The means, however, by which these new urban forms have emerged often fails to examine the degree of government agency intervention in land massing, funding and establishing a regulatory framework to facilitate these projects. Recent evidence from North America, however, is starting to question whether the whole concept of Transit Oriented Developments may need to be expanded to allow for some degree of park & ride. This would cater for those living beyond a reasonable walking distance of a TOD where no nearby suitable park & ride station facility can be provided. In contrast, though, some established station park & ride areas in the USA are being converted for TOD.

On a world scale, nations such as Taiwan, Singapore, Hong Kong and Japan are moving towards fully and quietly encompassing the TOD concept for increasingly large numbers of their population. Outside of Asia, the Europeans continue to build on the village concept and public support for public transport. This is making TODs naturally appear. In the USA, the concept is gathering significant momentum, supported by large federal funding and numerous lobby groups and urban reform associations. Here in Australia, the concept is awaiting a key catalyst to foster emerging market pressures.

Section 3

3.1 Barriers to Implementing TODs in North America

In North America, a wealth of published material has been produced over the last five years looking at the barriers and opportunities that have occurred in trying to implement TODs. The following statements identify some of the key barriers described in restricting TODs.

Barriers working against transit villages are:

- questionable market potential for higher density housing;
- higher construction costs for taller structures (not helped by recent court cases against condominium builders for faulty construction);
- financial institutions hesitating on providing funding for multi-unit buildings; and
- local opposition to higher density housing. They are afraid of changing the character of the area and attracting low-income families, etc. In 1996, Cervero stated that the "Hunt Valley, Maryland, a major employment hub north of Baltimore that had recently received light rail services, experienced NIMBY pressures that resulted in the rezoning of prime land that was originally proposed for some 1,500 apartment units to a rural-conservation designation, despite the presence of light rail and an imbalance of more than three jobs for every available housing unit in the area."

The efforts undertaken, in the USA, to embrace TODs have often been constrained by strong opposition from existing local residents and commercial retail interests. These interests are being well organized and given political support. They raise concerns that planners and decision-makers in the USA still see TODs as 'a planner's version' which is difficult to translate and quantify on the ground. Limited modelling of the impacts of TODs prevails within a regional context (Nelson and Niles 1999a).

Nelson and Niles argue that a single TOD can only serve a limited group of retail choices deemed appropriate by the buying public. To satisfy more, they need to provide parking for the shopper coming from further afield seeking to access, or experience, a unique mix of retail activities. The provision of such parking could work against the TOD concept of promoting transit and non-car based trips. Nelson and Niles, however, consider coffee shops, fast food restaurants, newsagents, gift shops, dry cleaners, shoe repairers, banks and health gyms as uses compatible with a TOD. In their discussions, though, on the mix of retail activities appropriate around a TOD, they infer that many retailers cluster together to gain a market advantage. Additionally, the concept of a TOD may be difficult to sell to retailers as it fails to offer such an advantage.

According to the Congress for the New Urbanism (web site 2000), a reason for the slow adoption of New Urbanism principles is that it requires developers to have 'a more holistic approach to community-building than the real-estate industry is currently structured to deliver.' Unfortunately, the development industry is broken up into companies that construct either housing, retail or commercial developments, but not normally all three. Similarly, the banks adopt this strategy in terms of lending criteria.

Cervero (Web site 1997) points out that many of the new urbanism projects, that came on line in the late 1980's and early 1990's with a TOD component, did not achieve their goals. This happened because the whole real estate and job market went flat during this period. Caution should, therefore, have prevailed when reviewing the impacts of TOD developments over the late 1980s and early 1990's in North America as the overall economy was in a down turn.

IISTPS (Web Site 2000) refers to how transportation agencies in the USA are using surplus government land to encourage

partnerships with private developers. This overcomes concerns about market potential for higher density developments around transit interchanges. Unfortunately, a study of ten TOD private-government partnership style developments found that developers are concerned about the government's role. They feel that the government has limited understanding of the budget, cash flow and financial issues that control them. These types of concerns limit the potential for a successful TOD.

The following anti-TOD views act as good moderators when considering a TOD.

'There is much that is appealing in the vision of neotraditional planners, but the reality is that their ideas have had little influence on the housing market. Only a few examples of transit villages have been attempted to date, most of them in the light rail corridors of Portland, Oregon and San Diego, California. In a great many suburban locations, community opposition to high-density development makes transit villages difficult to implement. In addition, developers and real estate analysts question the extent of the market demand for this type of housing.

"Most prospective homebuyers, particularly those with children, are not interested in living in concentrated cluster-type housing development, regardless of how desirable it might appear from a planning perspective," one analyst working for a nationwide real estate firm told us. Nor is proximity to a transit station necessarily considered an asset.

"People do not choose where to live to minimize their commute. They do so to improve their overall quality of life," noted a local planning official, commenting on the explosive growth of residential housing in Washington DC's auto-dominated outer suburbs, despite a superb regional Metrorail system.

"They may be looking for a bigger house to live in, better schools to send their children to, safer streets and a more tranquil environment. Sure, it might mean a longer car commute, but it's a trade off they find worth making" (Orski 1999).

The presumption that transit stations will attract development in inner city neighbourhoods is equally questionable. Two University of California urban planning researchers found an example of this. They say that the Blue Line, connecting downtown Los Angeles to Long Beach through the depressed neighbourhoods of South Central Los Angeles, has failed to stimulate any visible improvement or development in the areas around the rail stations. The researchers state that 'after six years, areas around stations remain unchanged disinvested, forsaken and decaying denying planners' dreams of transit villages.'

Orski concludes that 'most people will not follow the prescriptions of a planner but the dictates of their own self interests and that means most likely a perpetuation of the low-density suburban development pattern that for a vast majority of people still represents the American dream.'

3.2 Opportunities for Implementing TODs in North America

The following statements identify some of the key opportunities described in promoting TODs.

Niles and Nelson (1999b) identified a number of factors that help constitute the success of a TOD. These include:

- The number of TODs (and station areas) along a transit corridor;
- The quality of transit system servicing the TOD(s);
- The level of technology presented in the transit system;
- The street pattern;
- The provision of an area at the station for parking;
- The provision of appropriate employment and housing density;
- A commercial mix of uses;
- A flexible zoning system within the TOD; and
- Supportive government policies.

Puget Sound Regional Council (1999) list the following factors as components to promote a successful TOD:

- "Preparing a regional demographic and economic forecast that is broken down to the corridor or station level;
- Establishing supportive intergovernmental agreements;
- Working with decision-makers to draft enabling legislation to support transit-oriented development;
- Writing model policy and codes for adoption by local governments;
- Supporting public relations and advertising to promote desired projects;
- Removing regulatory barriers from existing local codes;
- Investing public dollars strategically to effect changes, including infrastructure and utilities;
- Removing other barriers, such as derelict buildings, unkempt properties, and crime;
- Providing on-going advertising and public relations efforts to publicise successful transit-oriented developments;
- Conducting educational programs at the local level for lenders, developers, and others;
- A strong overall market. A stronger market for development, particularly higher density residential and office space, will help create the critical mass of development at station area locations;
- Land-use and transportation planning coordinated at the regional and local levels;
- Land use regulations that permit higher density residential and commercial development at station areas; and
- The public sector actively involved in development partnerships with the private sector. Public sector actions can include investment in pedestrian and transit improvements, land assembly, site preparation, and development subsidies".

The following features can promote the successful provision of a TOD on the ground and were drawn from examples in the US:

- A local champion with time, creativity and resources to drive the cause;
- Private corporations and communities driving the agenda rather than relying on government controlled by red tape;
- Funding from a wide range of sources and not just government;
- The use of government money to draw out funding;
- The involvement of development corporations; and
- Ensuring the local planning zoning will allow TOD developments (Burrington and Bennett 1998).

Cervero (1995b) refers to the work of Wilson and Anderson (1993) who examined the cities of San Diego and Vancouver to understand what preconditions are required to make transit-oriented developments implementable:

- a policy framework to support this style of development;
- effective implementation processes;
- an established urban form and transport system that can facilitate transit; and
- a route alignment that maximizes land use opportunities.

Three market opportunities that work in favour of transit-oriented developments in California are:

- demographic changes in the population towards childless households, retirees, young couples and migrants seeking affordable housing. These all encourage a push towards compact housing and the potential for it to be around public transport interchanges;
- an interest from transit agencies and local government to facilitate land assembly and redevelopment around stations; and
- policy frameworks, such as ISTEA (the 1991 National Surface Transportation Act) and CAAA (clean air act amendments), all help promote reduced car dependency and promote the principles of TOD's (Cervero 1996b).

The issue here again, with the first of Cervero's points, is whether young couples are able to add to a sense of community if they only plan to be transitional.

He goes on to indicate that one of the factors behind the success of cities such as Toronto and Stockholm, that encourage urban growth around stations, is the ability of government agencies to acquire land in excess of station needs and sell it for urban growth. The redevelopment, however, of station park & ride spaces is allowed in the USA, as shown by the example at Ballston Station, Arlington, Virginia, where the relocation of the park & ride and bus interchange has allowed a 28 storey office, residential and retail centre above the station. The redevelopment of station park & rides need not, however, mean their displacement from the site. Cervero and Landis (1997) earlier referred to Pleasant Hill being the best example of a TOD, yet still having 3245 park & ride spaces accommodated on the same site. The TOD concept, as generally promoted, needs to be adjusted to incorporate a park and ride component to service outer lying areas beyond those accessing the facility by walking or cycling. Failure to provide park & ride facilities at TOD could, in certain situations, lead to many potential park & riders opting to complete their whole journey by car. This would be to the detriment of local travel demand management issues.

The successful provision of a TOD requires building upon the development of areas that already show a market trend towards urban densification. This would be followed by introducing a transit system to meet potential demand (Thompson and Audirac 1999). To date, however, the general trend has been to place a transit system and subsequently design TODs.

Many metro and local areas in the USA have incorporated TOD's into their growth plans to help rationalize expensive transit investments through future land use patterns that will promote increased transit patronage. To gain public support for TOD's, the benefits prevailing must demonstrate reductions in road congestion and improved regional air quality at a corridor level rather than the small local confines of a TOD. The more subjective qualities of life style and sense of community proposed by proponents of New Urbanism are too limited in coverage (Nelson and Niles 1999a).

The potential success of a TOD may be linked to the presence of non-work based activities derived from personal travel. The problem is that there is limited direct data in this area. The provision of a day care facility within a TOD is typical of an activity generating many family trips , as is a local convenience store. The problem in the USA is that no particular national survey collects information specific enough on the nature of such non-work trips (Nelson and Niles 1999b). The same authors go on to refer to some interesting data coming out of national surveys such as those by the market research company Fannie Mae. In 1998, Fannie Mae conducted a survey of Baby Boomers which showed that, by 2020, the percentage of US population aged 55 plus would grow from 21% to 29% and that 35% of this group would seek new types of accommodation.

'Architects and planners who support TODs believe that Americans will look favourably on detached houses on smaller lots, perhaps even to smaller and attached housing, if attractive amenities such as parks, other public spaces, and stores are located in close proximity. They also believe that the design elements of dense housing can be voiced and made attractive' (Nelson and Niles1999b).

In Dallas, Garrison (1998) writes that Mickey Ashmore, president and CEO of United

Commercial Realty, says the following about the Knox Street TOD development:

"It's a place where you can shop, eat, live and work, all in the same vicinity".

"The storefronts are right there on the sidewalk. Use of the buildings overlap".

"It's a place where you want to get out of your car and walk around. Somewhere with a real sense of place, not a generic strip mall".

In a paper given at the Urban Design, Telecommunication and Travel Forecasting Conference, Cervero (Web site 1997) advocates the provision of convenient stores, such as grocery shops, and services providers, such as dry cleaners, within neighbourhoods serviced by transit. This will induce workers to use transit. Similarly, neighbourhoods with ATMs around the transit interchange promote the feeling that all local needs are provided close at hand and a car trip is not required to access cash, etc.

In their guidelines to Transit Oriented Developments, Puget Sound Regional Council (1999) refers to an interesting break-through in home loan funding which has a great potential to drive the market for TODs. They state that "research in Chicago showed that residents near a major transit facility were likely to own just one car per household and drive fewer than 900 miles per month. The research also found that monthly transportation costs were just $380 per month for residents near stations compared to about $660 per month for a typical suburban dweller. These cost savings will be able to be put toward housing costs under a new program initiated by the National Resources Defence Council in cooperation with Fannie Mae. The program, called Location Efficient Mortgages or LEM, enables banks to grant households living in close proximity to transit services a higher loan to debt ratio. The lower transportation costs of station community households are subtracted from principal, interest, taxes, and insurance when calculating mortgage qualifications. This program could help low-moderate income and first-time homebuyers break into the home ownership market. Market tests are being conducted in Chicago, San Francisco, and Seattle".

3.3 Conclusion

The TOD movement in North America has been aided by a level of Federal support for transit and related land uses. The provision of appropriate high quality transit infrastructure is a clear prerequisite. The lack of it is a fundamental barrier. Recent and emerging changes in the demographic household structure are opening up a largely untapped market for TODs although this, by its very design, may preclude families with active dependent children. The presence of good quality planning instruments can either promote or stifle the TOD concept. The local amenity and service provided by a TOD will continue to be its major draw card for the public to take up residence. Local opposition to infill developments will continue to make virgin greenfield sites the most attractive for developers, unless the infill land is part of some land massing development corporation site. The final key barrier that needs to be addressed is that of encouraging financial institutions to lend money to developers and the buying public to build on and purchase land and property in this urban form.

Section 4

4.1 Discussions with Councils, Developers and Transit Operators on the Barriers & Opportunities for TOD in Australia

Between May and November 2000, discussions were held with key councils, developers and transit operators to gauge their opinions as to the barriers and opportunities surrounding the introduction of TODs into Australia.

Discussions were held with:

Maroochy Shire Council (QLD)

Pine Rivers (QLD)

Gold Coast City Council (QLD)

South Sydney City Council (NSW)

Liverpool City Council (NSW)

Energy Victoria (VIC)

Moreland City Council (VIC)

Department of Infrastructure (VIC)

Bayside City Council (VIC)

The Stafford Group (NSW)

Urban Renewal Taskforce – Brisbane (QLD)

Delfin Property Group Limited – Varsity Lakes (QLD)

Miller Property Corporation (QLD)

Lend Lease – Northlakes (QLD)

Lend Lease – Head Office (NSW)

Westfield – Head Office (NSW)

Landcom (NSW)

Land Management Corporation – Mawson Lakes (SA)

Queensland Rail (QLD)

State Transit (NSW)

The outcomes of these discussions showed a general commitment by councils to promote higher housing densities and TOD style urban renewal around existing rail stations within town planning schemes. The take-up rate by the development market around existing rail stations, however, has been limited by the more fragmented nature, land tenure and size of blocks available. It has also been hindered by a lack of understanding by builders and smaller developers of the concept, and an underlying concern about consumer market demand and local public opposition. Public opposition to higher density infill has left some councils adopting a more cautious approach to TODs. Victoria and NSW have some of the best examples of where elements of TODs have been, or are in the process of being, implemented. A clear commitment in the form of a Government Lead Initiative is required to parcel land blocks into sizable areas for redevelopment.

At the developer level, the concept is well supported with a high degree of enthusiasm towards its implementation on large greenfield sites that are supported by appropriate government-provided rail infrastructure. The general trend is towards greenfield sites where large parcels of land are available under one ownership. There tends to be less opposition from the local community to these sites compared to the smaller, infill developments. The larger, forward thinking developers are keen to move towards the implementation of higher densities and the whole concept of a planned community with residential, commercial and retail focused around rail stations. The main limiting factor holding the development industry back is clear commitment by government to provide rail based and station infrastructure to service large planned developments on greenfield or large infill sites.

Within the development industry, the general perception is that the social/demographic mix for TOD is now right. They believe that this is so as there is a strong rental market for townhouses and apartments in close proximity

to rail stations. On the commercial office front, a TOD development would need government offices to drive tenants towards a general office development component.

To make a large scale TOD happen in Australia, there is a general perceived need for the appearance of a major political champion and a pool of government funding to seed the appropriate institutional and infrastructural processes around a preferred site. Another clear advantage would be for financial institutions to follow the lead set in North America. In the USA, there are higher lending margins for residential housing consumers based on their accessibility to public transport and the reduced need to own and maintain a second car.

4.2 Results of Public Survey towards TOD Concept conducted in South East Queensland

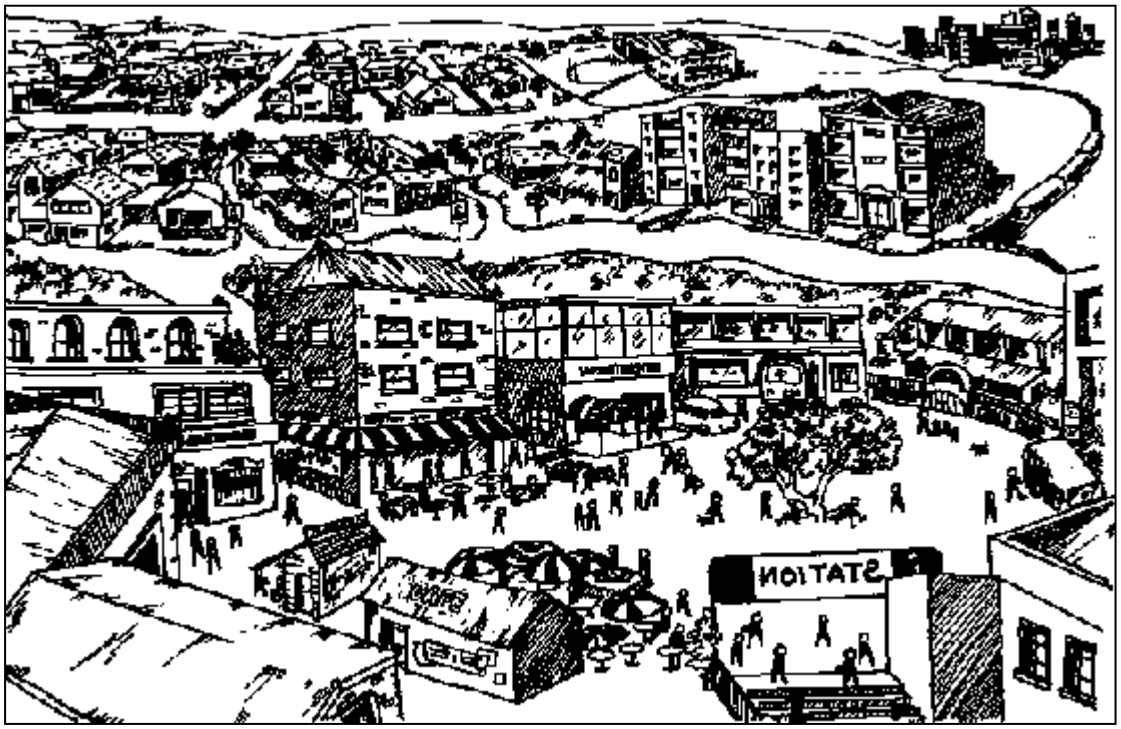
To gauge the general level of public acceptance towards living in a Transit Oriented Development, a survey was conducted of households north of the Brisbane River in SE Queensland. A survey sample frame was derived from 6,208 telephone numbers, randomly selected, by Telephone Exchange Random Number Dial, in the Greater Northern suburbs of Brisbane. After calling 4,623 telephone numbers, 321 households agreed to the survey (1,024 numbers called were disconnected, 1,202 no answer, 260 business numbers, 261 fax machine, 131 engaged, 73 Answer phone, 458 unknown, 893 refused, 321 agreed). Out of the original 321 households agreeing to be part of a 45-50 minute home based survey, only 241 were successfully completed.

The survey technique used an initial demographic profile to determine each households characteristics, followed by a State Preference survey using statements on travel and living characteristics. This was concluded with an image based survey where the TOD concept was introduced and examined in terms of its public appeal.

The following pictures show how the whole concept of a Transit Oriented Development was introduced and presented to the public:

Picture 8 shows an overview of a Transit Oriented Development with an express rail connection to the CBD in the distance.

Picture 8 (Source: Peter Pritchard, 2000)

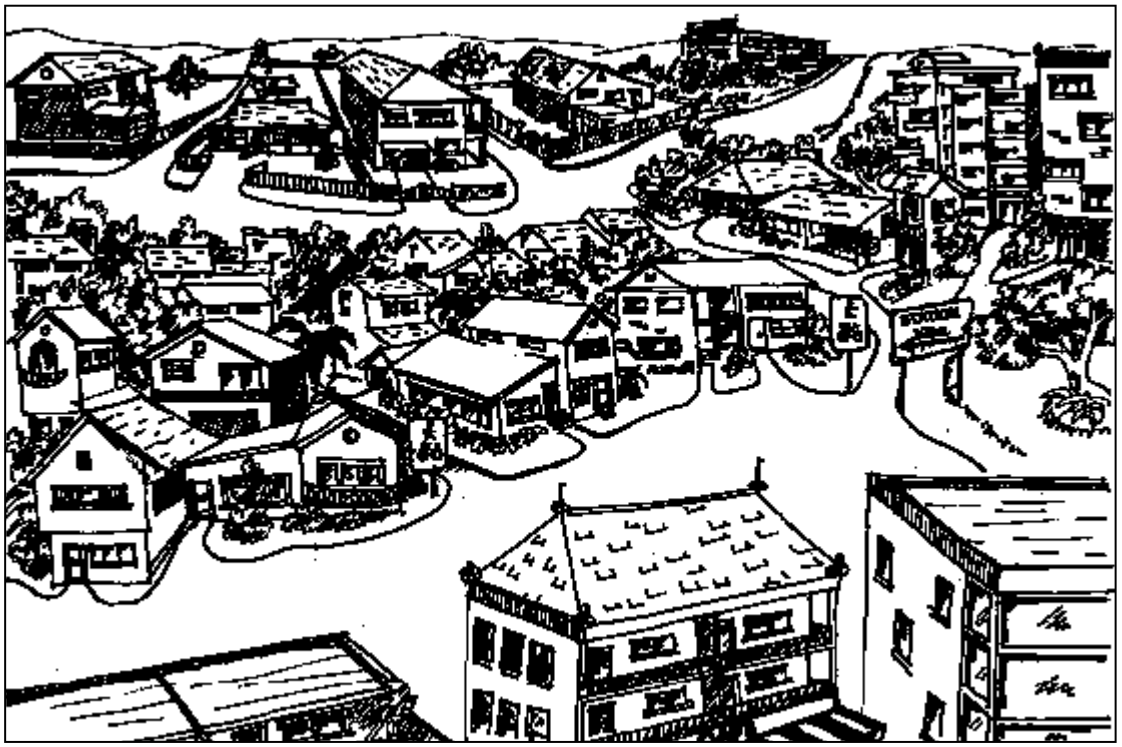


Picture 9 (Source: Peter Pritchard, 2000)

Picture 9 shows a close-up of the market plaza area around a station and steps down to the station platform. Local facilities, such as a café, health club, flower shop, clothes boutique and child care, are emphasized.

Picture 10 portrays a mix of townhouses, apartments and small single dwelling blocks within easy walking access of the main rail station plaza.

Picture 10 (Source: Peter Pritchard, 2000)



Picture 11 (Source: Peter Pritchard, 2000)

Picture 11 focuses on a part of Picture 10. It shows an area of about 200/300 metres from the main station/plaza, which has townhouses, apartments, a corner store and a small park area.

Finally, **Picture 12** shows a network of natural walkways that run within the Transit Oriented Development and around its edge, all aimed at enhancing the visual and lifestyle amenity of local residents.

Picture 12 (Source: Peter Pritchard, 2000)

Table 1, below, shows the key research finding derived from the household survey. 75% of households interviewed were of the opinion that they could support the TOD concept as a suitable form of living arrangement for themselves or members of their family either now or in the foreseeable future.

Table 1 - Support for TOD concept, now or in the future

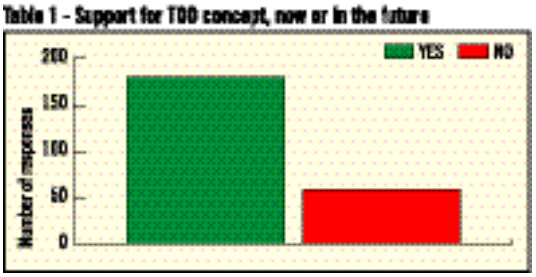


Table 2 indicates that the high level of support (75%) shown in Table 1 is consistent across gender.

Table 2 - Support for TOD concept by gender

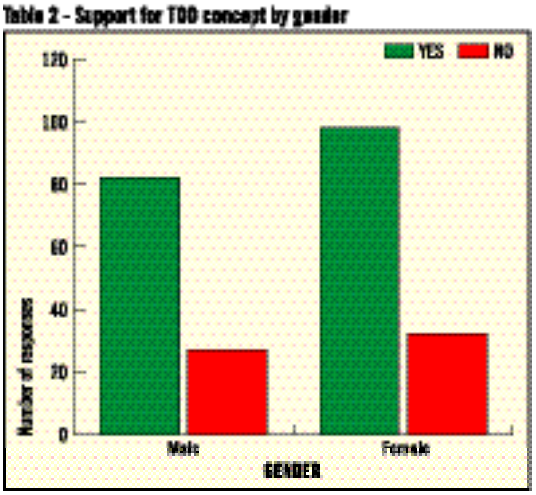


Table 3 indicates that the high level of support shown (75%) in Table 1 is consistent across age groups.

Table 3 - Support for TOD concept by age

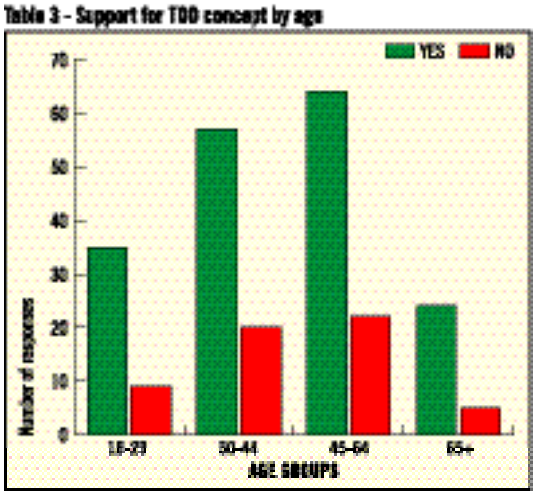


Table 4 indicates that the level of support shown in Table 1 is fairly consistent across households according to the level of car ownership. The exception is households with no cars where, not surprising, they showed very high relative support for the concept.

Table 4 - Support for TOD concept according to household car ownership

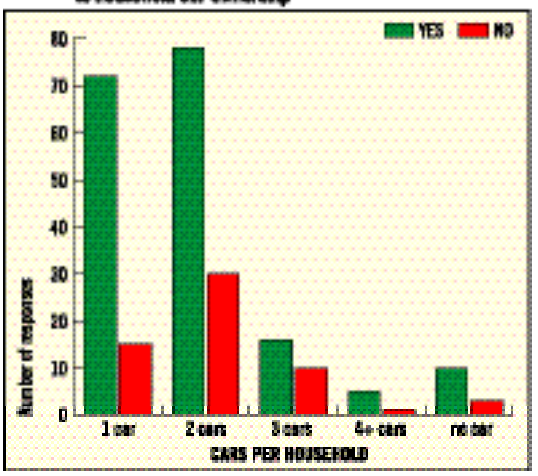


Table 5 indicates that the level of support shown in Table 1 is consistent across all households by suburb location. This result is a little surprising, as it was expected that the inner suburbs would have shown strong support based on familiarity with higher density living, with weaker support coming from the outer suburbs. The results here point towards an acceptance by all groups to a TOD style of living now or in the future.

Table 5 - Support for TOD concept according to current home suburb in Brisbane

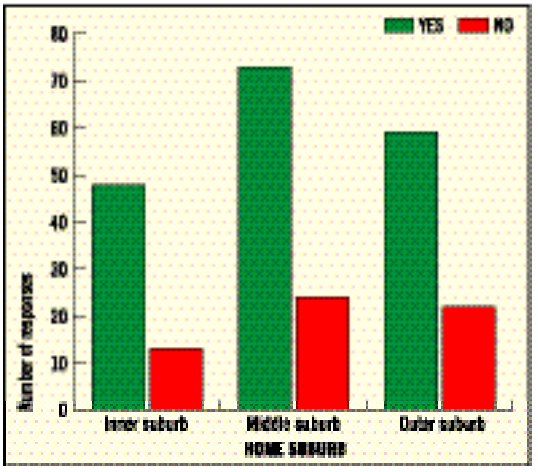
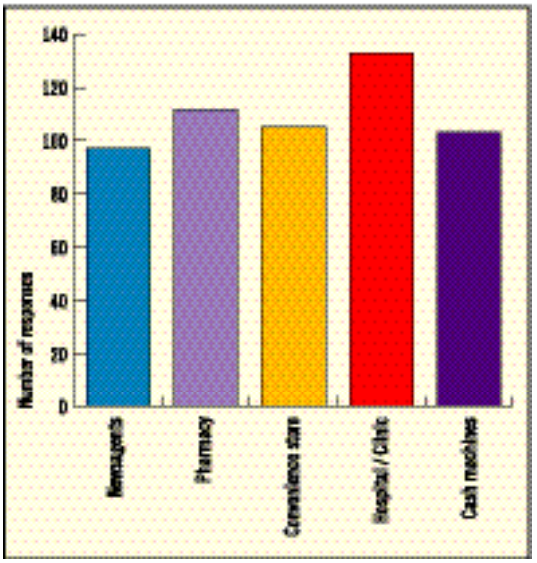


Table 6 shows that, when each respondent household was asked to indicate from a multiple list any additional facilities required within a TOD, the following facilities scored highly:

Table 6 - Support for TODs to include the following additional facilities



The householders were asked to indicate the key advantages of a TOD from a multiple list. The following facilities in **Table 7** scored highly. The emphasis here was on walkability and community well-being.

Table 7 - Support the idea that within a TOD

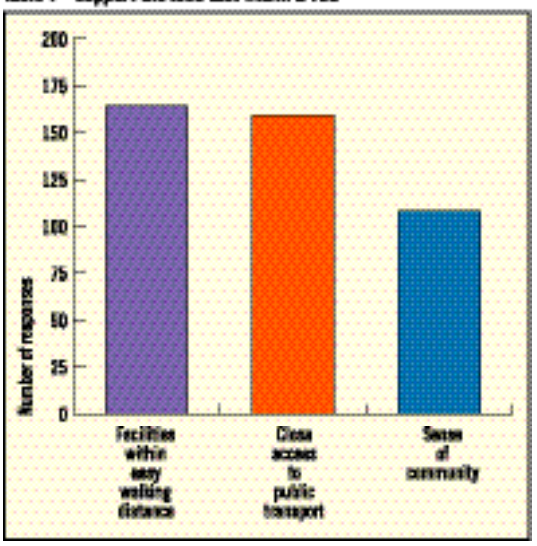


Table 8 shows the respondents' high level of stated preference towards having retirement villages close to shops and services. This stated preference question was designed to determine just how important it might be to incorporate retirement villages into a TOD. 73% of the respondent households either strongly agreed or agreed with the proposal.

Table 8 - Prefer to have retirement villages close to shops/services

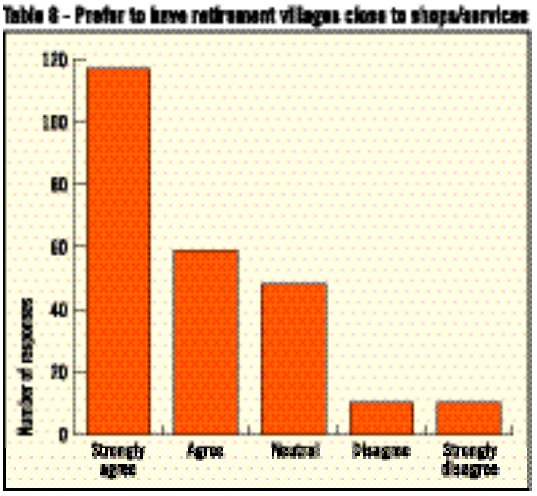
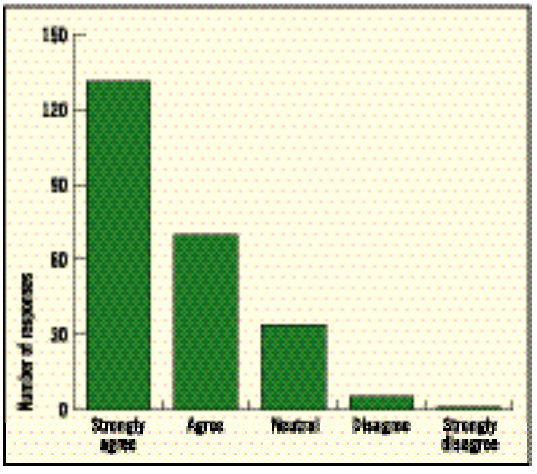


Table 9 shows the respondents' high level of stated preference (83% agreed or strongly agreed) towards access of nature walks near home. This Stated Preference question was designed to determine how important the incorporation of natural walkways could be as a potential TOD feature.

Table 9 - Access to nature walks near home



Other survey results showed a preference towards incorporating some small cul de sacs in TODs for privacy and child safety. The provision of park and ride facilities within a TOD where no other nearby station alternative prevails was also highly regarded.

The results of this survey point towards the emergence of a new household market segment. This household market segment is seeking ready access to a whole range of personal, leisure, health and retail services within close and convenient proximity to home. The home itself is, for some, no longer a castle but a smaller unit or town house which can be easily maintained and act as a point of access to local facilities, including public transport. It is believed that this new market segment has emerged as a result of the global changes that Western economies have seen occur in the family unit over the last twenty years, with later marriages, more single families and people living longer. The survey noted that even those households that could be described as the typical family unit could foresee the need for the TOD concept approach to living for when they entered the retirement phase of life.

Picture 13 (Source: Peter Pritchard, 1999)
Australia's Changing Patterns of Household Composition has opened up New Market Predisposition towards Transit

4.3 Conclusion

The survey analysis showed that 75 percent of householders interviewed saw the TOD concept as a favourable form of living for themselves, either now or in the future. This support was consistent across all levels of gender, age groups and location of home suburb. Such high support would appear linked to continual changing demographic patterns in Australian society.

For an Australian TOD to succeed, it would need to be built on the more typical North American model plus provide good access to convenience food outlets, walking trails, cash machines and health/aged care facilities.

Section 5

5.1 Guiding Principles for Promoting TODs in Australia

The key research findings, from the work conducted into the barriers and opportunities for potential TODs in Australia, have established the following main principles to consider when evaluating a potential TOD site:

Key guiding principles for a successful introduction of a TOD in urban Australia:

- Provision or a clear commitment by Government to provide a high quality, fixed guideway transit system (heavy rail, light rail or busway) and station infrastructure within the chosen TOD site;
- Land ownership/tenure around a TOD parcelled under one controlling entity;
- A high quality transit system with regular service connections to the CBD and other TODs/regional centres;
- An existing or planned future urban area which has been identified as a TOD. This area must be subject to demographic growth, mixed household sizes and flexible lifestyle patterns;
- A local area planning scheme supportive of the TOD concept;
- A transit system, station facility and surrounding TOD plaza that is safe and feels so; and
- Access to national loan or grant funding to facilitate a TOD and a supportive, high quality transit system.

Supporting principles for the successful introduction of a TOD in urban Australia:

- Access to a local champion with time, vision and resources to drive the TOD agenda;
- The TOD should fall within an area covered by integrated ticketing and integrated public transport modal transfers;
- Reduce the supply and availability of cheap Early Bird parking at key regional centres and in the CBD as this may compete with the viability of a TOD.
- Flexibility within bank lending criteria for higher home loan approvals where the borrower is prepared to sacrifice the need for a second car in exchange for closer proximity to public transport.

The Australian TOD should include:

- A market plaza around the rail station which is a focus point;
- A cafe, convenience retail store, child care facility, aged care facilities, clinic, newsagent, pharmacy, and ATM;
- Office employment facilities around the main market plaza;
- The provision of mixed-use employment attached to dwellings within residential areas;
- A network of well lit and overlooked footpaths/cycle ways connecting with the main plaza;
- The use of trees and buildings along all footpaths to give pedestrians and cyclists a feeling of intimacy and security.
- The provision of a network of natural walking trails and recreation areas around the TOD;
- A few short cul-de-sacs within the residential TOD area to accommodate young families with children;
- Full and ready access for people with disabilities and the elderly; and
- The provision of a park & ride facility near the station. This would accommodate patrons living beyond the TOD where no close alternative station site exists for park & riders.

5.2 Conclusions

The cultural, social and economic structure of Australian society would appear poised to encompass the concept of Transit Oriented Developments into the main stream of urban living. The changing nature of the typical household, their employment patterns and how households spend their leisure time have created a new market segment. This market segment is willing to sacrifice living on the typical suburban residential block in exchange for a well-designed dwelling on a small block or in part of a unit complex. This residence needs to be in close proximity to good public transport and have convenient access to a mix of retail, health, personal services and recreational facilities. The clear advantage offered by a TOD is that it can be a focal point for a community where immediate needs can be provided locally.

To date, the concept of Transit Oriented Developments focus in Australia has largely been limited to small pockets of town houses and mixed-use developments. These have incorporated new urbanism principles and have been applied around existing station sites. These areas have been subject to local governments trying to promote urban renewal where the urban fabric has deteriorated.

Away from the more typical inner and middle suburban areas, where local government has been keen to foster infill and urban renewal with TOD principles, are the large greenfield sites. These greenfield sites offer the greatest potential for urban Australia to really encompass the concept. The development industry sees these greenfield sites as offering the main potential to plan and design a number of TODs with a clear community focus. The main barrier holding the development market back from fully encompassing these sites is a lack of clear commitment from Federal and State governments. They need to provide a high quality, fixed guideway, public transport system with station sites into these greenfield areas.

Greenfield sites offer a clear opportunity to plan a TOD that incorporates the main features demanded by the buying public.

The potential for large-scale adoption of TODs does not need to be the exclusive domain of the greenfield site. Inner city infill sites can offer an ideal setting to promote TODs but require the clear political will to establish a development style corporation that can amass large land holdings under one common ownership.

In Australia, consumer market mix and developer intent are now poised to see Transit Oriented Developments emerge as a new form of urban development. They feel that TODs can accommodate communities around public transport interchanges (or stations) which will reduce greenhouse gas emissions by having less car-based trips. The clear barrier for greenfield sites is the lack of strong commitment by government to provide rail/busway infrastructure, station facilities and a high quality, public transport service. Within infill areas, the primary barrier is the need to amass appropriate sizes of land parcels under common ownership. In both cases, appropriate support planning schemes and institutional support will be required.

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