T.O.D. OR NOT T.O.D.
HOW IS THE QUESTION

by

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B.A., The University of British Columbia, 1997

A THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE
REQUIREMENTS FOR THE DEGREE OF

MASTER OF ARTS (PLANNING)

in

THE FACULTY OF GRADUATE STUDIES

School of Community and Regional Planning

We accept this thesis as conforming
to the required standard

THE UNIVERSITY OF BRITISH COLUMBIA

August 2001

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Abstract

This thesis examines the opportunities and constraints facing the implementation of Transit Oriented Development (TOD). TOD consists of concentrated, mixed use development within walking distance of a commercial core and a transit stop that provide the focal point for the community and connect the resident to the region. Despite the fact that many planners accept TOD as a useful form of development, TOD has experienced barriers to its implementation. Neither the barriers to implementation, nor the opportunities for overcoming them have been sufficiently researched. This case study of land use planning at the four east Vancouver station areas of Joyce, 29th Avenue, Nanaimo and Broadway of the 'Expo' Advanced Light Rapid Transit (ALRT) line, known locally as 'SkyTrain', addresses this deficiency. Planning literature, planning documents, interviews with seven Vancouver planners, zoning and land use maps, and a land use survey provided the data from which conclusions were drawn.

The research suggests that the major barriers to TOD implementation along the Vancouver 'Expo' line were poor transit routing, difficulties in assembling large parcels of land, lack of coordination between public entities, separated regional land use and transportation planning, inadequate political commitment to design and mitigation measures, the setting of goals for the station areas that are not TOD goals and the intrusive nature ALRT due to its elevated guideway. Many of these barriers correspond with those identified by the TOD literature as existing in other cities, but significant barriers that were identified in the case study but not by the literature include the intrusive nature of the ALRT technology due to its elevated guideway, the decision making process that had the province make decisions (e.g. the type of rapid transit technology to be used) without local input, and the absence of sustained implementation.

Opportunities for overcoming barriers to TOD include creating more participatory decision making processes that ensure decisions that affect local communities are made at the municipal and regional, rather than provincial, level, the creation of a directly elected agency responsible for both land use and transportation planning, increased coordination between public agencies, and the creation of TOD guidelines.
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Acknowledgements

I would like to thank my advisors, Peter Boothroyd and Frank Ducote for their support in completing this thesis. I would also like to thank the planners that I interviewed for sharing their experience and expertise. Finally, thanks to Edward, Jerry, Polly, Melissa, Emily, Peter, and my friends for all of their support and advice.
Chapter 1: Introduction

1.1 Introduction

Auto-oriented land use has dominated the North American city since World War II. In recent years, motivated by concern over economic efficiency, social isolation and the environmental impact of auto dependency, decision makers have been examining ways to accommodate growth and manage transportation demand in a sustainable way. The resulting concepts, policies and designs have recognized the importance of the link between transportation and land use planning and have focused on providing access rather than mobility. One of a few concepts that embrace these principles, Transit Oriented Development (TOD) enables local and regional access by creating land use that is oriented to the pedestrian.

First articulated by Peter Calthorpe in 1993 in his book The Next American Metropolis, TOD consists of concentrated, mixed use development within walking distance of a commercial core and a transit stop that provide the focal point for the community and connect the resident to the region. Although most often characterized by its physical design, TOD also retains a social element, building community by creating a lively pedestrian atmosphere.

Despite the fact that many planners accept TOD as a useful form of development, TOD has experienced barriers to its implementation as evidenced by the relatively few real world examples. Neither the barriers to implementation, nor the opportunities planners have for overcoming them have been sufficiently researched (Boarnet and Compin, 1999). Among those that address the question, Boarnet and Compin suggest that constraints imposed by using existing rights of way, difficulties in assembling large parcels of land, local economic and fiscal circumstances, the inability of the land market to support new development projects, and the awareness of decision makers may all act as barriers to TOD implementation.

1.2 Objectives and Methods

This thesis examines the opportunities and constraints facing municipal planners as they attempt to implement TOD by studying a case of rapid transit station area land use planning in Greater Vancouver. Specifically, it will examine four station areas, Joyce, 29th Avenue, Nanaimo and Broadway, of the 'Expo' Advanced Light Rapid Transit (ALRT) line. The intent is to provide insights of use to planners in any major city but especially to planners in Vancouver where investment in rapid transit continues. Although TOD, as defined in this thesis, was not explicitly used as a concept for station area land use planning in Greater Vancouver, many of the elements of the TOD concept were part of the station area planning.
The objectives of this thesis are to:

- identify the origins of TOD
- define TOD
- identify TOD goals for land use around station areas by TOD literature
- identify goals for land use around Vancouver Station Areas (including official goals, planners' ideal goals and TOD goals) as identified in planning documents and by planners
- identify the strategies used to achieve those goals in Vancouver
- identify the outcome of Station Area planning in Vancouver and the degree to which TOD has been achieved
- identify the barriers found in Vancouver to achieving TOD goals
- identify the opportunities recognized for overcoming the barriers to TOD implementation in Vancouver.

In order to achieve these objectives, data were gathered from planning literature, planning documents, zoning and land use maps, land use surveys, and interviews with seven Vancouver municipal, regional and transportation planners. I interviewed planners who had been involved in ALRT Station Area Planning for the 'Expo' and 'Millenium' lines and transportation and land use planning in Greater Vancouver. I selected the Station Area planners because they were directly involved in the questions concerning this thesis. I selected the other planners because they have been involved with regional and citywide transportation and land use planning for a number of years. These planners were identified by word of mouth, i.e. by asking planners and academics in the field. All the planners that I asked agreed to be interviewed. The interviews lasted approximately 1 hour each and consisted of questions designed to reveal the land use goals for the Station Areas, the strategies used to achieve those goals, barriers to the goals, and opportunities to overcome those goals. For the specific objective of identifying whether Vancouver's TOD goals were achieved, I analyzed zoning and land use maps and observed current land use to identify changes between the 1987 Station Area plans and the current zoning and land use.

1.3 Scope and Limitations

The research is limited to the four East Vancouver Stations of the 'Expo' ALRT Line constructed in 1986. I did not try to prove a causal link between the presence of the ALRT line and development, but instead assume that ALRT serves as a catalyst for development and provides an opportunity to create a pedestrian oriented environment (i.e. TOD) if the conditions are right and planners take the opportunities. This thesis looks at what these conditions and opportunities are, what are the barriers to them and how they can be overcome. Much of the research in this field looks at the effects of land use on transit ridership, whereas this thesis is concerned with what are the effects of rail transit on land use.
1.4 Organization

The first chapter has outlined the purpose, methods and scope of the thesis. The second chapter will describe the origins of TOD, define TOD including some justification for the definition, and identify known opportunities and constraints to implementation of TOD. Chapter three outlines the case study providing the context within which Station Area development has occurred. Chapters four and five present the findings of the case study research. Chapter six concludes by identifying conclusions and implications.
Chapter 2: Transit Oriented Development

2.1 Introduction

TOD is a response to ineffective and inefficient forms of metropolitan development. Like most planning concepts, it has been influenced not only by the legacy of past planning decisions, but also by planning ideas of the past. TOD is part of a larger movement of the past two decades that attempts to solve problems associated with auto-oriented development by looking to traditional forms of development like the street car suburb and to historical planning concepts like Howard's 'Garden City.' This larger movement is generally termed New Urbanism.

2.2 New Urbanism an Umbrella of Ideas

Although New Urbanism seems to have as many names and definitions as it does supporters, this thesis defines New Urbanism as the umbrella concept which has certain basic principles to which concepts like Urban Villages, Compact Communities, Traditional Neighborhood Development and Transit Oriented Development, with slight variations, subscribe.

The New Urbanist concept evolved from many traditions. According to Todd Bressi, they include the City Beautiful and Town Planning movements that have their foundation in Renaissance and Classical cities, as well as Howard's Garden City movement (Katz, 1994). Although it models the 1920's pre-auto, pedestrian-oriented, street car suburban form, New Urbanism also attempts to deal with cars, telecommuting and other realities of modern life (Katz, 1994).

Community and its creation is the driving force of New Urbanism, where public values take precedence over private ones (Katz, 1994). Table 2.1 lists the basic principles of New Urbanism.

These principles evolved over many years through experimentation and discussion, at forums like the New Urbanist Congress, by practitioners, academics and other urban thinkers. Although outside the scope of this thesis, it is worth noting that debate continues on the merits of and problems with the New Urbanist concept (Talen, 2000).

<table>
<thead>
<tr>
<th>Table 2.1: Principles of New Urbanism</th>
</tr>
</thead>
<tbody>
<tr>
<td>• public spaces with civic and commercial facilities as the focus of the neighborhood</td>
</tr>
<tr>
<td>• mixed land use</td>
</tr>
<tr>
<td>• compact urban form, higher densities and smaller lots</td>
</tr>
<tr>
<td>• a range of household types that enable socioeconomic diversification</td>
</tr>
<tr>
<td>• architecture that responds to local traditions, where the street is a 'public room'</td>
</tr>
<tr>
<td>• amenities and design that focuses on the experience of alternative modes of</td>
</tr>
</tbody>
</table>
transportation, especially pedestrians
• street patterns and pathways that emphasize connectivity, often grid, narrow streets
• integration of the natural environment

Adapted from: Gabor and Lewinsky, 1997; Bookout, 1992a; Langdon, 1994.

2.3 The Evolution of TOD

Motivated by research that indicated relatively small land use impacts from public transportation improvements, academics and practitioners searched for public land use policy that would be transit supportive. One result is TOD (Boarnet and Crane, 1998). Among others, such as Michael Bernick whose work mainly focused on transit based housing, Peter Calthorpe brought the concept into the mainstream with his book The Next American Metropolis.

Calthorpe's TOD concept built on earlier concepts, e.g. from the book Sustainable Communities which tried to integrate ecological systems into communities, and the concept of Pedestrian Pockets which attempted to bring back the urban element into the design by creating mixed-use, walkable, transit supportive neighborhoods (Calthorpe, 1993). Largely a multi-family infill design, Pedestrian Pockets advocated separating pedestrians on their own paths and creating the cul-de-sacs of the 1930's Radburn model (Hodge, 1991). Evolving out of the practical experience from implementing these concepts and dealing with larger projects, TOD differs in that it makes space for pedestrians on the street, incorporates a larger range of housing types including single family dwellings, accommodates lower intensity uses in its 'Secondary Areas', and focuses on transit and its affects on regional form.

Others were involved in developing similar concepts. Although developed independently, another TOD-like concept named 'Sustainable Development' by its authors, Breheny and Rookwood, was published the same year as Calthorpe's and consists of clusters of mixed-use development along public transit corridors (Hall, 1998).

TOD has continued its evolution with each new proponent. Michael Bernick and Robert Cervero, in their book Transit Villages of the 21st Century, describe their interpretation of TOD as a Transit Village. Where Bernick and Cervero's interpretation seems to differ from Calthorpe is that, in addition to the physical dimensions, they emphasize the social and economic dimensions of Transit Villages (Bernick and Cervero 1997). Where Calthorpe gives specific design guidelines, Bernick and Cervero focus more on the history, hopes, purposes and lessons learned from experiences with Transit Villages, both past and present.

Cervero, in his book The Transit Metropolis, continues the discussion by trying to identify a framework for understanding ways to achieve a transit based regional metropolitan form by categorizing successful transit metropolises based on whether they
are city (land use) adaptive, transit adaptive or a hybrid of the two and describing the policies used to achieve their success.

### 2.4 TOD Goals

TOD aims to structure growth and communities in a more socially equitable, environmentally sustainable, and economically efficient way. More specifically, Table 2.2 gives generally agreed upon goals of TOD.

<table>
<thead>
<tr>
<th>Table 2.2: Goals of TOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>• increase transit ridership,</td>
</tr>
<tr>
<td>• reduce traffic congestion,</td>
</tr>
<tr>
<td>• reduce the number of automobile trips generated and vehicle miles traveled,</td>
</tr>
<tr>
<td>• reduce the infrastructure needed to support land uses,</td>
</tr>
<tr>
<td>• preserve rural land and environmentally sensitive areas,</td>
</tr>
<tr>
<td>• maximize the development opportunities at transit stations,</td>
</tr>
<tr>
<td>• create feelings of community belonging, security, vitality, and social diversity,</td>
</tr>
<tr>
<td>• create choice in travel, time, affordable residential, employment, and</td>
</tr>
<tr>
<td>• create a pedestrian oriented environment that supports trip combining and transit.</td>
</tr>
</tbody>
</table>

Adapted from: Bernick and Cervero, 1997; Victoria Transport Policy Institute, 2000; Calthorpe, 1993.

These goals are achieved through the following TOD guiding principles.

### 2.5 Guiding Principles of TOD

Although TOD must respond to site and regional contexts, there are some general principles guiding TOD. The following sections outline these guiding principles and their associated benefits.

#### 2.5.1 Transit is the Focal Point of the Community

What distinguishes TOD from other New Urbanist forms of development is that the transit station and its immediate surroundings are the focal point of the community. TOD must be located on a trunk transit line. This line and the station area TOD serve the region and provide a metropolitan framework for growth, further distinguishing TOD by its regional, rather than individual community or neighborhood, orientation.

*Why do it?*

In order to for TOD to truly reduce automobile dependence, land use and transportation must be coordinated at a regional scale. By organizing land uses regionally, in addition to organizing them at the community level, urban policy makers can support transit by
ensuring that residential concentrations are connected to employment concentrations (Porter, 1998). Robert Cervero finds that people living near rail transit will more likely commute if their work is in close proximity to the rail transit (Boarnet and Crane, 1997).

2.5.2 Mixed Use Development

Mixed-use development is another defining feature of TOD. Complementary civic, commercial, service, cultural, recreational, employment and residential land uses concentrated around the transit station create all day activity producing a vibrant station area that encourages residents, workers and shoppers to combine trips, drive less and use transit more. By mixing uses and intensity of use within each land use and within buildings, TOD enables diverse groups of people to live and work together to foster a vital, affordable community. The community core, consisting of commercial and public buildings immediately surrounding the station, provides a destination and activity area.

The specific type and amount of commercial and retail necessary will depend on the market demand. However, the Puget Sound Region established these mixed-use targets, which are fairly consistent with others. Their target is to have 5-15% park, public or civic space, 10-50% commercial space, 20-80% residential and 20-60% of total land area devoted to employment (Puget Sound Regional Council, 1999). This range enables TOD to respond to site-specific contexts.

Why do it?

Mixed land uses result in many transportation benefits such as encouraging walking, transit usage, shared parking, staggering of road use and bi-directional flows of people (Bernick and Cervero, 1997; Porter 1998). Holtzclaw (1990) and Neff (1996) estimated that in mixed use, dense areas 1 km of transit travel replaced 5 km of car travel that would occur in single use, spread out areas due to people combining their trips (Newman and Kenworthy, 1999). At employment centres with mixed land uses, especially retail, Bernick and Cervero found that 6.4% of commuters use transit compared to 2.9% at single-use centres. Retail land uses near residences, specifically within 300 feet, were found to induce resident commuters to walk or ride transit (Bernick and Cervero, 1997). Dagang found that residential development around transit centres reduces vehicle travel by 10%, commercial development reduced travel by 15%, residential mixed use reduced travel 15% and commercial mixed use reduced travel by 20% (Victoria Transport Policy Institute, 2000).

Many decision makers have advocated mixed use in the form of a jobs-to-housing balance in communities believing it will reduce auto dependence. Researchers like Genevieve Giuliano and Anthony Downs are skeptical of this view arguing that benefits may be offset by workers in the same household working in different locations, and other factors besides transportation having a stronger influence on housing location choice (Bernick and Cervero, 1997). In addition, balancing jobs and housing will not address the non-work trip, which accounts for three quarters of all trips in the US according to Peter Gordon and Harry Richardson (Bernick and Cervero, 1997).
Compact, Moderate to High Density Development

TOD is defined by its compact, nodal structure. TOD can be developed at green field, infill or redevelopment sites. Ideally, TOD is approximately 160 acres in size, situated within 1/4 mile radius of the station, with the highest intensity land use immediately adjacent to the station. Less intense land uses are located in Secondary Areas between 1/4-1 mile from the station. Variables such as transit frequencies will result in variations to the required densities. In general, however, residential densities should be a minimum of 10 dwelling units per acre (dua) for neighborhood TODs and 15 dua for urban TODs. Commercial densities are recommended at no less than 0.3 Floor Area Ratio (FAR), although the appropriate mix of services should be emphasized (Calthorpe, 1993).

Why do it?

Density increases transit ridership (Pushkarev and Zupan 1977; Victoria Transport Policy Institute, 2000; Bernick and Cervero, 1997). A study in San Diego found that people living within 3-5 blocks of the station use transit more than any other group (Calthorpe Associates, 1992). A similar study in San Francisco revealed that residents who lived close to the stations in transit based housing were 5 times more likely to commute by rail transit than the average person in the surrounding county (Boarnet and Crane, 1997). The National Research Council found transit ridership and population density to be very elastic at 0.592, meaning that transit usage increased 6% for every 10% increase in population (Bernick and Cervero, 1997). In Western Europe where cities are about 50% more dense, Pucher finds that transit ridership is 2 to 3 times higher, although this could be attributable to other factors like higher taxes on automobiles and higher gas prices (Cervero, 1998).

Increases from low to medium densities provide the biggest benefit. A study by Wilbur Smith shows that the number of transit trips increases most dramatically, 0.2 to 0.6 per person, when residential densities increase from 7 dua to 16 dua. At 100 dua, he found 1 transit trip per person per day (Bernick and Cervero, 1997).

Although Boarnet and Crane accede that people who live near transit commute more by transit, they argue that increased numbers of residences near transit will not necessarily increase ridership proportionately because many of the residents may have been using

1 Located on local/feeder transit lines and has moderate density land uses
2 Located on main transit lines and has high density land uses
transit to commute before they moved. This is supported by a study done by Robert Cervero that found that 42.5% of rail commuters living in transit based housing commuted by public transit before they moved to the transit based housing. However, this study also shows a huge increase in ridership as the remaining rail commuters living in the new housing, 57.5%, are now using transit where previously they did not (Boarnet and Crane, 1997).

Higher density results in lower automobile use (Newman and Kenworthy, 1999). In a study by Holzclaw of 28 California communities, Vehicle Kilometres Traveled were found to fall one quarter as densities doubled.

Acceptable distances to walk will depend on a variety of variables including weather, trip purpose and topography. Research shows that acceptable distances average between 1000 to 2000 feet (Puget Sound Regional Council, 1999). The greatest numbers of pedestrians use transit when it is within a ten minute walk, according to a study by regional transit authorities. In practice, both 1/4 mile, e.g. by the California Transit Village Development Planning Act and 2000 ft, e.g. San Diego TOD Design Guidelines, are recognized as acceptable walking distance.

In a recently published article, Randall Crane surveys the body of research that addresses the influence of urban form on travel. Although he finds disagreement over the impact of urban design features on travel behaviors, he concludes that geographic scale is important. He identifies a 1/4 mile as the appropriate walking distance to transit but maintains that it is too early to conclude any effect on the number of car trips within and between neighborhoods (Crane, 2000).

2.5.4 Pedestrian Oriented Design

Given that all transit trips start and end with walking, TOD is designed to encourage a walkable environment. To facilitate this, TOD is built to a human scale, with direct, safe and pleasant pedestrian access. TOD sites and orients buildings toward the station and sidewalks. Streetwalls consist of ground floor retail with a variety of building heights, textures and facades that enhance the walking experience and provide continuous linkages. Other amenities to enhance the pedestrian environment include landscaping, street trees, lighting, weather protection, continuous and paved sidewalks, plazas, street furniture, urban art, and screening of parking. TOD has interconnected streets with block perimeters averaging 1200 ft.

Parking and cars must be adequately managed to mitigate the negative impacts on the pedestrian. Strategies include providing on street parking and minimizing off street parking. If off street parking is provided, it is located underground, at the rear of the building or in the middle of the block. TOD carefully controls the supply of parking, encourages shared parking lots, discourages park and ride lots, and plans to convert parking lots to other uses over time. TOD provides adequate trip and end or trip facilities for alternative modes of travel, such as bike lockers. In addition, arterial streets should be located at the periphery of TOD (Calthorpe, 1993).
TODs Secondary Areas, located between ¼ and 1 mile away from the core, provide space for low density land uses, such as housing, schools, parks, and industrial and auto oriented uses.

Why do it?

Although there is not much hard evidence that travel behavior is affected by pedestrian oriented design, a 1993 survey of transit agencies shows that their guidelines uphold TOD pedestrian oriented design principles (Bernick and Cervero, 1997). The existence of such guidelines could indicate that design impacts travel behavior or at least that officials believe that it does. As well, Davidson does find that employees who work in areas with good urban design, among other things, are more likely to commute by transit and rideshare (Victoria Transport Policy Institute, 2000). Research also shows that vehicle miles traveled (VMT) can be reduced by 10-40% when streets are designed in an interconnected system of small blocks (Puget Sound Regional Council, 1999). At little extra cost, design can greatly enhance the experience of riding transit. It is the pedestrian oriented design of TOD that makes TOD feel like a community, without it, the station area is unlikely to be the community's focal point.

2.5.5 Preservation of Sensitive Habitat and High Quality Open Space

Another principle of TOD is to preserve both sensitive habitat and riparian zones, and high quality open space. The former has to do with protecting the integrity of the environment on which development occurs and protecting areas from development, e.g. with Urban Growth Boundaries. The latter has to do with making great public spaces in the station area. These public spaces are the focus of building orientation, neighborhood activity, and preserve the historic character of the development while providing a community gathering spot. Unlike Planned Unit Developments, TOD designers build with the public open space in mind using it as a formative element of the neighborhood rather than letting the left over space serve as the public open space.

Why do it?

Many neighborhood and community plans plan around the environmentally sensitive areas of their community. This practice is inspired by the desire to protect and build with the environment, a practice influenced by Ian McHarg’s ideas in his work *Design with Nature*. Calthorpe has also been influenced by the ideas of philosophic ecology, which emphasizes developing communities in a manner that recognizes the fundamental importance of diversity, interdependence and of whole systems to health (Calthorpe, 1993).

2.6 TOD Defined

For the purposes of this thesis, TOD will be assumed to be the land area within a 1/4 mile radius of the ALRT station. For the development to qualify as TOD, a minimum of 20%
of this land must be zoned residential with at least 15 dwelling units per acre, and a minimum of 10% must be zoned commercial/office. In addition, the development must in some way reflect the influence of the nearby ALRT station. These criteria are derived from a similar study of TOD implementation in San Diego County done by Boarnet and Compin in 1999 (Boarnet and Compin, 1999).

2.7 Mechanisms for Implementation

This section looks at barriers to implementing TOD and opportunities to overcome them. In order for TOD to occur, it must be encouraged, promoted and pursued (Puget Sound Regional Council, 1999). Table 2.3 outlines the conditions identified in the literature that encourage successful TOD implementation.

<table>
<thead>
<tr>
<th>Table 2.3: Conditions for Successful TOD Implementation</th>
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<tbody>
<tr>
<td>• political support/leadership/vision/champion</td>
</tr>
<tr>
<td>• community support through community involvement in the process</td>
</tr>
<tr>
<td>• a coordinated approach by local and regional government, developers, community, transit authorities</td>
</tr>
<tr>
<td>• supportive, proactive planning</td>
</tr>
<tr>
<td>• supportive financial environment</td>
</tr>
<tr>
<td>• a strong market</td>
</tr>
<tr>
<td>• space/land and time to develop</td>
</tr>
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These conditions are not always met. In fact, despite the recognition by many planners of the usefulness of TOD and the conditions necessary for its achievement, TOD has experienced many barriers. The following section identifies the barriers and possible opportunities to overcome those barriers as identified in the planning literature.

2.8 Barriers to Implementation and Opportunities to Overcome Them

2.8.1 Organizational and Structural

Fragmented jurisdictional powers and lack of coordination between government entities on land use and transportation planning can be a barrier to TOD. In many instances, municipalities control the land and the transit agencies control the transit line. Where transit agencies do control land development, they are often not committed to TOD. Perhaps as a result of transit agencies largely being dominated by engineers, they often favor such development as the building of parking garages (Porter, 1998). In other instances, lack of coordination has led to public policy that allows intensive development in areas not served by transit (Porter, 1998).
By working together, provincial, regional and local government and the transit agency can ensure that their policy statements and design guidelines complement each other (Bernick and Cervero, 1997). Experience shows that when local governments work with transit agencies to (re)develop new standards and guidelines, the potential for successful TOD implementation is increased (Porter, 1998). Regional plans help facilitate a coordinated approach by articulating growth targets, restricting growth, and designating transportation corridors throughout the region (Freilich, 1998).

Directly elected regional government to enforce and coordinate land policy and action programs can help facilitate TOD and accountability to land use decisions (Calthorpe, 1993; Porter, 1998). The creation of other bodies, such as joint power authorities, public development authorities, community development corporations or work through non-profit development organizations, can all be useful for coordinating growth and predevelopment activities like land assembly that help create TOD (Parsons & Brinckerhoff, 2001). As well, private and public sector joint development may facilitate TOD.

2.8.2 Plans

Without a land use plan, TOD is much less likely to become a reality.

As indicated above, regional, local and station area plans with market based site, implementation, and phasing plans with Capital Improvement plans, that designate the areas of growth and no growth, e.g. Urban Growth Boundary, and that outline responsibilities of the public and private sectors, are essential for successful implementation of TOD (Freilich, 1998). Plans will often have design guidelines that articulate the principles of TOD. Some U.S. states have passed legislation that requires all government projects, zoning ordinances and subdivision maps to be consistent with TOD principles. Planned Unit Development, although blamed for auto oriented development, could be used to allow design flexibility and give control over individual tracts of land (Freilich, 1998).

2.8.3 Development Control Mechanisms

Development standards and practices that have evolved to support auto oriented communities can act as huge barrier to TOD. For example, zoning often does not allow the flexibility needed to adapt to market conditions. Also, development with higher density may be forced to pay higher impact fees. In general, minimum standards often reflect poor model assumptions, past land use realities, and outdated community values (Parsons & Brinckerhoff, 2001).

Overcoming the outdated development standards and practices include revising them and/or creating new ones. Among the standards that need to be revised are those for streets, parking, and buildings setbacks, frontages and lot sizes. In addition, consideration should be made to creating maximum allowances rather than the traditional minimum allowances. Shortening and simplification of development procedures for
developments that fit TOD criteria, by removing or consolidating steps in the process, making regulations easily accessible, reviewing past procedures to identify barriers, and creating more flexible permit processes, could all help match real estate market cycles and so make TOD a reality (Parsons & Brinckerhoff, 2001; Puget Sound Regional Council, 1999).

The creation of new zones that encourage land use flexibility, compatibility and density can help facilitate TOD. These zones could include mixed use zones, zones that dictate built form and character rather than use, transit overlay zones, and zones that allow increased density around transit stations (Porter, 1998). New parking standards and systems can include encouraging shared parking, allocating it on a district wide basis, car sharing and using robotic parking systems, as in Europe (Parsons & Brinckerhoff, 2001).

Developer subsidies and incentives have been used to help ensure that intensive development occurs near transit. Where necessary, such tools as density bonusing and transfer of development rights can be used to direct and encourage growth around the transit stations. As well, some local governments participate in the private development process by using public funds to acquire, lease, or sell land for private development.

Other methods for encouraging TOD are to create Transportation Concurrency Management Areas (TCMAs) where the issuance of development permits hinges on the provision of a set level of service standard and public facilities as outlined in plans. The identification of regional transportation carrying capacity enables allocation of development where capacity exists (Freilich, 1998). Transit supportive capital improvements can be achieved through fee requirements and development agreements that excuse properties from regulations in exchange for public amenities (Freilich, 1998).

In the United States, many municipalities have zoned areas for commercial development in order to increase their tax base and zoned out less lucrative, residential development. To support regional TOD, however, TOD needs residential development. Ways to eliminate this problem is for the state/province to legislate tax base sharing and/or mandate local shares of transit based housing to municipalities (Bernick and Cervero, 1997).

2.8.4 Community Support

There has been substantial neighborhood opposition and NIMBYism in response to TOD (Boarnet and Crane, 1998). In particular, many neighborhoods have fought increases in land use density. They also fear increases in the number of people brought into their neighborhood by transit and the potential inclination towards crime of the stigmatized transit user.

Several opportunities exist to try to overcome neighborhood opposition. Some have suggested that a state mechanism could be developed that gives incentives for local government to overcome NIMBYism (Parsons & Brinckerhoff, 2001). Others advocate inclusive, proactive community processes that empower and educate by putting as many
resources and decision making powers into the hands of those affected. Education and community participation has been found to reduce community opposition to TOD projects in San Diego (Calthorpe, 1993). Bernick and Cervero have found evidence that design and increased amenities may mitigate the perception of density, and therefore opposition to it.

Some researchers have found that public support is in the process of forming for TOD (Porter, 1998). By creating opportunities, as TOD does, for community interaction and enabling people get to know their neighbors, the fear of the other has the potential to dissolve.

2.8.5 Political Support

Insufficient political support including lack of leadership, insufficient funds for infrastructure and other costs, and lack of political commitment has been a barrier to TOD (Parsons & Brinckerhoff, 2001). In many circumstances, TOD is not consistent with local goals and as a result, has not occurred.

Informing local officials about the regional and local advantages of TOD is one way to overcome the lack of political commitment (Boarnet and Compin, 1999). Another way to support TOD implementation is to reassess local goals in an effort to make them consistent with TOD goals (Boarnet and Compin, 1999). Once political support exists, methods for communicating public commitment to TOD implementation include providing public facilities in areas of higher densities, providing infrastructure in advance of TOD, and creating demonstration projects.

2.8.6 Economic and Financial

Conservative lending practices have been a barrier to TOD (Bernick and Cervero, 1997). Some developers identify securing funding for the initial project as particularly difficult. Once developers have demonstrated the economic viability of TOD, however, they report that securing funding for subsequent projects is not difficult (Parsons & Brinckerhoff, 2001).

Governments have also helped by providing loans or loan guarantees. In both instances, developers receive a relatively low interest rate because either the city charges an interest rate below market rate or the city, by decreasing the risk associated with the loan, enables the loaning institution to provide a lower interest rate (O'Sullivan, 2000).

Another barrier to TOD implementation is the perception by developers that there is a weak market, and resulting high risk, to building TOD. Experience shows that TOD projects may need to have a 'critical mass' to result in sale price or rent premiums (Parsons & Brinckerhoff, 2001). Through public investment, incentives, subsidies and locating stations in marketable areas, governments can show a commitment to TOD that encourages lenders and developers to invest in TOD (Porter, 1998).
Public investment includes government consolidation of parcels, the sale, lease or donation of public land and air rights, infrastructure financing, public facilities and site development, and underwriting of land costs in return for project revenue participation (Bernick and Cervero, 1997). Government tax abatements, where developers are exempt from paying local property tax for a fixed period, provide another incentive. Tax exempt bonds are also used in some jurisdictions, where the revenue from the sale of the bond is used by the government to purchase land and then that land is leased to a private firm. Because there are no federal taxes on the interest income from the bonds, the bond buyer has a relatively low interest rate and so the government can afford to lease the land at less than the market rental rate (O'Sullivan, 2000). In order to receive a subsidy, the City often will require equity participation where the developer must have some equity involved in the project. Joint public and private sector development is another method of public investment where the public sector also tries to recover some of the expense of the construction and operation of the transit system (Puget Sound Regional Council, 1999).

Market acceptance has been a barrier to TOD. People generally lead car oriented lives, and perceive transit areas as unsafe. As a result, transit is not a significant location factor in major real estate decisions (Parsons & Brinckerhoff, 2001). However, lifestyle preferences are starting to favour TOD (Parsons & Brinckerhoff, 2001). As people become more familiar with TOD and find that it satisfies their lifestyle needs, then community support will increase. Developers in California report high market acceptance, with demand exceeding supply, based on such evidence that property appreciation is up to 30%.

Development fees imposed by governments, e.g. Development Cost Charges, have posed a barrier to TOD. Higher construction costs cited for design, construction and liability insurance have also been a barrier to TOD. In La Mesa Village, California, the presence of transit raised operating costs in security, repairs and maintenance that were not offset by increases in property values (Bernick and Cervero, 1997).

Governments can waive, reduce, or control fees for developments that meet TOD criteria and conform to guidelines, in order to overcome this barrier. For example, in Oregon, they use System Development Charges that are based on the estimated number of automobile trips that a new development will generate, with resulting lower fees for TOD (1000 Friends of Oregon, 2000). Governments can also cover the cost of market analysis for a site or developing a pro forma to demonstrate development feasibility.

Justification for these subsidies lies in the fact that TOD reduces the impacts on local roads and often saves money on infrastructure costs. In addition, TOD results in societal and environmental benefits from reduced automobile dependence. Leniency in qualifying for home mortgage loans can also be justified by the fact that, with fewer cars, more of the household income can go towards housing (Bernick and Cervero, 1997).
2.8.7 Land Assembly

Difficulties in assembling land can be a barrier to creating TOD. Often existing land use patterns, largely auto oriented and with limited redevelopable land, restrict TOD opportunities. In addition, private property owners' resistance to sell, and neighborhood opposition make TOD more difficult to achieve (Boarnet and Compin 1999; Parsons & Brinckerhoff, 2001). If the transit line is located along growth corridors in areas without an existing right of way, assembling land can be very expensive. As a result, many rail transit lines have been located along existing rights of way. Unfortunately, without site remediation, these areas, many of which are old industrial areas, are often unsuitable for residential development and TOD (Boarnet and Compin, 1998).

In order to overcome these barriers, researchers have identified utility in identifying areas of urban concentration and building transit to serve these areas (Parsons & Brinckerhoff, 2001). By acquiring and banking land where future transit lines may go, governments can help facilitate TOD (Bernick and Cervero, 1997).
Chapter 3: Context for TOD in Vancouver

3.1 Introduction

Chapter three outlines the political, economic, and historical context of land use and transportation planning in Greater Vancouver, with particular regard to the four Station Areas. This context is important to understand because, as the literature has indicated, it is often the context that may act as a barrier to intended land use, especially transit oriented development at station areas.

3.2 Political Structure

Vancouver, unlike most other British Columbia municipalities that are governed by the Local Government Act, is governed by its own Charter. The Charter legislates the powers of the City of Vancouver. The City of Vancouver is part of the Greater Vancouver Regional District (GVRD), which is made up of 21 municipalities and one electoral area.

Previous to the creation of Translink in 1998, transportation planning and operation fell under the jurisdiction of the Provincial agency BC Transit with some involvement from the GVRD. Translink is now responsible for regional transportation in Greater Vancouver including the major road network, the transit system, cycling, transportation demand management, and AirCare.

3.3 Regional Policy

The Livable Region Strategic Plan (LRSP), adopted by the GVRD in 1996 in response to growing fears about diminishing green space and the livability of the region, provides the vision for the future of Greater Vancouver and identifies four fundamental strategies for managing its growth. They are to protect the green zone, build complete communities, achieve a compact metropolitan region and increase transportation choice. To achieve these ends, the LRSP identified growth targets and a multinucleated metropolitan regional framework with Regional Town Centres (RTCs) and Municipal Town Centres (MTCs), only a few of which are connected by a rail transit system. Past regional plans also addressed growth management including the Official Regional Plan (1966), the Livable Region 1976/1986 (LRP)(1975), the Plan for the Lower Mainland of British Columbia (1980), and Creating Our Future (1990, 1993, 1996).

In 1994, the GVRD approved Transport 2021, the long range regional transportation plan. To achieve its goals, including reduced auto dependency, it has three key strategies, that are to manage land use, transportation demand and transportation supply. The City
of Vancouver's Transportation Plan, adopted in 1997, incorporates the principles of the Transport 2021 and supports the LRSP's strategy to increase transportation choice.

The Strategic Transportation Plan created by Translink, the GVRD and its member municipalities now serves as the region's transportation plan. Its guiding vision for transportation in Greater Vancouver is, "enhanced livability through managed mobility," (Translink, STP, 2000).

3.4 The City of Vancouver's General Land Use and ALRT Goals

A Regional Context Statement (RCS), required by every municipality, articulates how a municipality will meet regional goals. Vancouver's RCS identifies a preference for increasing residential land use density, rather than employment, at Joyce, Nanaimo, 29th Avenue and Broadway Stations. It also states that new residential growth should be accommodated in ground oriented e.g. townhouses, affordable housing in areas with zoned residential capacity, e.g. on the industrial lands of Joyce-Vanness (City of Vancouver, RCS, 1999).

The City's general goals for ALRT are to increase access, especially to downtown employment, increase ALRT ridership, and decrease auto dependence (City of Vancouver, 1987a). As articulated in the RCS, the major strategy by which to achieve these goals is to increase residential densities near the stations. Other general goals include minimizing public and private cost of living and doing business in Vancouver, creating interesting and comfortable places to live and work, and conserving Greater Vancouver's scarce land resource. The City hoped that the ALRT line and its stations would act as a catalyst and focus for population growth.

3.5 Economic Context

During the mid-1980's, Greater Vancouver experienced a lot of residential, commercial and industrial growth. Despite the economic slowdown in many other Canadian cities during the 1990's, the Greater Vancouver regional economy has had high rates of growth in population, employment, investment and trade encouraged by its significant position in the Pacific Rim (Hutton, 1998).

A study by Coriolis Consultants, which proved to be wrong, anticipated the economy and population growth of Vancouver to slow down over the 1985-1995 period (City of Vancouver, 1987a). It emphasized that ALRT would not create, but rather focus development. They predicted that ALRT would help facilitate the market for commercial development at Broadway but that there would not be the market for residential or commercial development in industrial areas like Vanness (City of Vancouver, 1987a). In fact, the opposite has occurred and the Vanness industrial site has been rezoned from industrial to multifamily and demand for housing there has continued to be strong.
3.6 The History of ALRT in Vancouver

Built in 1887, the Main Street streetcar, the first electric streetcar in Canada, marked the beginning of an expansive public transit system that carried a million rides in 1945 and shaped Vancouver's early growth. After WW II, electric trolley buses replaced streetcars and soon after that, highway and roadway construction and use expanded. Community opposition to neighborhood destruction in the 1970's halted freeway construction in Vancouver and led to the consideration by the GVRD and its municipalities of Conventional Light Rapid Transit (referred to hereinafter as LRT) to serve and concentrate expected growth (Poulton, 1980).

In June of 1980, Vancouver's City Council agreed to the alignment, proposed by the GVRD, along the Burlington Northern Railway (Grandview) Cut, the BC Hydro Right of Way running in a partial tunnel, and on the surface at Commercial Drive. The Provincial government, in the spring of 1981, declared that ALRT, not LRT that was preferred by local governments, would be used. Some reasons cited for the switch to ALRT include opportunities to take advantage of Canadian developed technology and federal funding linked to the it, and to maximize the economic benefits from a locally constructed system (Kellas, 1982). The decision to use ALRT technology has always been controversial in Vancouver because of its cost relative to surface LRT, double if elevated and four times more expensive if tunneled, and because of its intrusive nature if elevated.

In late 1982 and early 1983, the City mailed invitations to an information meeting, one for each planning area, to all households and businesses in the three planning areas. All of those who attended, some 825 people, were invited to be part of their respective Station Area Planning Advisory Committee. The role of the Advisory Committee was to prepare and recommend a community plan, including policies and implementation strategies, to guide the future of the Station Area in response to the ALRT and to act as the voice of the community throughout the decision making process. Public meetings were intended to enable broad public participation. The Collingwood community at Joyce Station was particularly involved in Station Area planning.

3.7 What and Where is the ALRT?

ALRT, known in Vancouver as 'SkyTrain', differs from LRT in that it is a driverless, totally automated system that is powered by a linear induction motor at track level. Unlike LRT, which is powered by an overhead wire enabling it to mix with traffic, ALRT must be grade separated on an elevated guideway or an open cut. Circulating enforcement and security staff, closed circuit television, electronic security devices, intercoms, and electronic ticket dispensers are all part of the ALRT system in Vancouver.

Opened in January 1986, the first phase of the 'Expo Line' covered the 21.4 kilometres between downtown Vancouver and New Westminster (See Map 3.a.). It now extends to King George Station in Surrey. Currently under construction, is a second ALRT line, the 'Millenium Line', extending from Columbia station in New Westminster to Vancouver.
Community College. Extensions to Coquitlam and along West Broadway to Granville are committed to varying degrees. A third rapid rail transit line is under discussion from downtown Vancouver to the airport and Richmond.

Map 3.a. SkyTrain Route (Phase One), 1986

Source: City of Vancouver, 1987a

3.8 The History of the Station Areas

The focus of this research is on the four east Vancouver stations of Broadway, Nanaimo, 29th Avenue and Joyce. The ALRT along this section is elevated except east of Commercial Drive until 29th Avenue Station where it is almost entirely at grade.

The Broadway Station is located between Broadway and 10th Avenue in the block east of Commercial Drive. The intersection of Commercial and Broadway is the focal point of the Station Area. Cedar Cottage, originally farmland then single family small lots, and Grandview, an historic urban neighborhood that developed mostly as a result of the streetcar and tram line, are the two historic neighborhoods that make up the Station Area (City of Vancouver, 1987c).

Today, the arterial streets of Commercial Drive, Victoria, Broadway, 12th Avenue, and the manmade Grandview Cut transect the Station Area. The residential grid iron street pattern and Victorian-style single family homes, many of which have been converted to house more than one household, create the dominant character of the community.

Nanaimo Station is located at Nanaimo and 24th Avenue on a slope rising to the south. Many of the properties in the Station Area have excellent views. The Station Area is bisected by Nanaimo Street and the ALRT line. As well, 22nd Avenue carries a substantial amount of traffic. The 29th Avenue Station is located at grade on 29th Avenue at Earles Street. The major roadways of 29th, Slocan and Rupert all transect the Station Area. Two distinguishing features of 29th Avenue Station area are the Renfrew Ravine and Slocan Park, both located adjacent to the Station.
These two Station Areas were part of the two old farming communities of Cedar Cottage and Renfrew Collingwood. In the early 1900s, the Areas were redeveloped into single family, working class neighborhoods. The location at the terminus of the streetcar and tramline played an important part in the creation of the neighborhood but with the advent of the automobile, Kingsway Avenue grew in importance for transportation, commerce and the Cedar Cottage community (City of Vancouver, 1987b).

The Joyce Station is located at the intersection of Joyce and Vanness. The Interurban Railway's regular passenger trains between Vancouver and New Westminster shaped the early development around the station that included a store, school, theatre and library, as well as around New Westminster Road (now Kingsway). The dominance of Kingsway increased from 1913 on, when the streetcar went in, and continues today as the major commercial focus for the neighborhood (City of Vancouver, 1987a).

3.9 **Context identified by planners**

Because of the auto-oriented low density residential development that makes up large parts of Greater Vancouver, the economic viability of commercial development that is located away from major road corridors, and is dependent on transit, may be compromised according to one planner. Another planner argues that in fact Vancouver's residential density is fairly dense with between 11 dua and 22 dua in the RS-1S zone. On average only 11% of trips are made on transit in Greater Vancouver, 16% in Vancouver proper notes another planner. Car-oriented Big Box retail, Office Parks and Megatheatres are major trends in development. At the same time, however, increasing numbers of people are choosing an urban lifestyle in Vancouver. As a result, an increasing number of people commute from downtown to the suburbs for jobs.

In general, in Vancouver, government investment in transit has not been a guarantor of increased land development surrounding transit stations. Residential construction has boomed everywhere that conversion from low cost industrial land to high density residential is made possible through rezoning regardless of whether or not the area is connected to transit. At Broadway Station, where anticipated development has not occurred, land is already zoned commercial. As a result, conversion to another use does not create equivalent profits as conversion from industrial to high density residential. This may have caused the lack of anticipated development at Broadway Station, according to one planner.
Chapter 4: Research Findings-Goals, Strategies and Outcome

4.1 Study Method

4.1.1 Choice of Study Area

This thesis examines the land use surrounding four stations (Joyce, 29th Avenue, Nanaimo and Broadway) along the 'Expo' ALRT in east Vancouver. These four stations were chosen because they are located in urban neighborhoods, but not downtown. In addition, they were chosen because Area Plans of these Stations from the 1980s were available. These plans enabled comparisons to be made between the land use that was planned and the land use that has been achieved. This also facilitated data collection. The station area as defined in this study (1/4 mile radius or five minute walking distance of the stations) is smaller than the area defined in the Station Area Plans (five to seven minute walking distance of the stations with significant streets providing the defining boundary) (See Maps 4.a., 4.b. and 4.c.). The Nanaimo and 29th Avenue Stations are combined into one Station Area Plan.

4.1.2 Information Sources

Zoning and land use maps, land use surveys, planning documents, and interviews with seven Vancouver municipal, regional and transportation planners provided the data for the analysis. For the specific objective of identifying whether Vancouver's TOD goals were achieved, I analyzed zoning and land use maps and observed current land use to identify changes between the 1987 Station Area plans and the current zoning and land use. Planning document analysis and the interviews were designed to reveal the land use goals for the Station Areas, the strategies used to achieve those goals, barriers to the goals, and opportunities to overcome those barriers.

4.2 Goals at the Four Station Areas

4.2.1 General

4.2.1.a. According to Planning Documents

The general Station Area goals were to minimize the negative impacts of the ALRT and new development on existing residential development, maintain and enhance the existing neighborhood character, and encourage citizen input in Station Area planning.

Broadly, the goals for land use around the Station Areas were that it be predominantly residential with a variety of housing types to the maximum density including housing suitable for commuters and families. It would provide local serving commercial that serves the daily needs of local residents, with larger commercial components and
densities at Joyce and Broadway, while being sensitive to the existing local commercial centres. Regionally significant commercial activities would be directed to the Regional Town Centres as identified in the Livable Region Plan 1976-1986 and in the LRSP in 1996. It was also a goal to increase mixed use development in order to encourage peak and non-peak ridership.

The focus of each of the Station Area Plans can be seen in the chapter headings. All three have chapters on traffic and transportation, community facilities and services, and ALRT impacts and mitigation measures with goals that are common to all stations. Each Station, however, has unique land use goals.

The goals for traffic and transportation are to reduce the impact of non-residential parking and traffic on residential streets, to facilitate smooth arterial traffic flow by increasing street capacity, to maintain bus transit service, and to provide safe and convenient pedestrian access to ALRT station and across arterial streets. In addition, at Broadway and Joyce, the goals included maintaining on-street parking and providing off-street parking for local businesses (City of Vancouver, 1987c). At Joyce Station Area only, the goals were to improve the physical appearance and quality of streets and boulevards in the community, and provide cost efficient, unobtrusive, adequate utility service.

The goals for community facilities and services were to increase recreational facilities to meet new growth, ensure and promote the use of adequate public facilities, and maintain and increase social programs as needs dictated. At Joyce station, the goals also include providing an ongoing organizational focus for identifying and articulating community needs, increasing accessibility to formal education and providing other educational services like community college programs, and encouraging programs and activities that respond to and encourage the area’s ethnic diversity.

The Station Area Plans aimed to mitigate the noise and other negative impacts of the ALRT on the Station Areas. The need to mitigate negative impacts of ALRT was founded on belief that the public has a responsibility to ensure that achieving public benefit does not occur at the expense of a few.

A common goal for land use was to ensure that the supply of developable land and development opportunities did not exceed demand.

4.2.1.b According to Planners

Despite being guided by the regional goals that promote concentrating activities at transit-accessible sites, the land use shaping objectives for the 'Expo' line were not as clear as for the 'Millenium Line' which has been influenced by the policy objectives of Transport 2021 and the LRSP (Greater Vancouver Regional District, 1975). The current overriding City of Vancouver policy is that transportation serves land use, since Vancouver is already built up at a reasonable density, in comparison to suburban municipalities.
The impact of the City's policy to only change land use because of transportation when there is local consent is shown by the preservation of the status quo at 29\textsuperscript{th} Avenue and Nanaimo Stations, although there has been some infill development. The impact of the community voice on policy is further shown by the fact that more industrial land has been converted into high rise development at Joyce Station than was planned.

The major goals identified by the planners, in addition to those already outlined by the Planning Documents, were that the Station Areas should not have parking lots around the Stations and that the ALRT right-of-way should be planned as a linear parkway. Where the major goals stated by the planners differ from those in the Planning Documents are that according to some of the planners, commercial activity was discouraged at the stations. One planner says this policy was a result of evidence from the Paris Metro that theft resulted from commercial activity at the stations. Other planners maintained that the planners and the neighborhoods were not interested in having mixed use development at the station areas, especially at 29\textsuperscript{th} Avenue and Nanaimo.

4.2.2 Joyce

4.2.2.a. According to the Station Area Plan

Specific goals for the Joyce Station residential areas include retention of the family oriented character of the residential streets while encouraging medium density residential in designated areas. New residential development encouraged the development of alternative housing forms and additional affordable housing. In addition, the new residential development would be constructed to mitigate the negative impacts of ALRT, the Industrial District, and major truck routes, and provide legal accommodation in response to illegal secondary suites.

Commercial goals include reinforcing the intersection of Joyce and Vanness as a pedestrian oriented, local-serving, secondary commercial area and focal point of the community. Multiple family residential was to be allowed above the commercial enterprises to increase commercial viability and ALRT ridership. Kingsway would be reinforced as the main commercial district. In addition, the Plan called for the development of a concept plan to encourage private development of a 'town square' design near the Joyce Station with a landscaped seating area.

The plan for the Vanness industrial district was to retain the eastern portion of the site for industrial use while redeveloping northwest and southeast of the Station to medium density residential with recreational facilities. The goals for the Vanness industrial district were to ensure the compatibility of the industrial area with surrounding residential and commercial land use, minimize the impacts of new development on the viability of industries, establish a process for clear future development, encourage the development of a variety of housing opportunities, and take advantage of improved accessibility offered by ALRT.

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3 See Map 4.a.
Map 4.a. Joyce Station Area Defined

Source: City of Vancouver, 1987a
4.2.2.3. According to Planners

Due to the presence of large areas of former industrial land available for redevelopment, the Joyce station area was identified for the greatest amount of change. Originally, only part of the former industrial land was to be developed into high-rise residential with some supporting public facilities and neighborhood serving retail. Subsequently, however, all of the industrial land has been slated for high density residential. Due to the original concept of Joyce as a neighborhood-serving, local station, two planners considered the station to be undersized given the huge amount of residential growth that has occurred there.

4.2.3. 29th/Nanaimo

4.2.3.a. According to Planning Documents

The goals for new development focus on residential development at 29th Avenue and Nanaimo stations. The residential goals are to maintain the predominately family character of the Station Areas, deal with illegal secondary suites and promote more sensitive single-family housing designs. In addition, new residential development was to be of high quality design, transit tolerant, and built so that it did not create instability. Medium density housing was also planned near the Stations with housing for families and ALRT riders.

The major goal for commercial development at both stations was to maintain Kingsway as the community's primary shopping area. Only at Nanaimo Station, were neighborhood commercial uses considered.

4.2.3.b. According to Planners

The goals for the 29th Avenue and Nanaimo Station Areas were to preserve existing single family land use, with selective infill, mostly townhouses, with some apartments, on vacant lots. At these two stations, the goal was to connect the ALRT to bus routes, rather than to change and concentrate land use around the stations. By leaving lower densities at Nanaimo station, the area would be available for future more intensive development.

4.2.4. Broadway

4.2.4.a. According to Planning Documents

The goals for Broadway Station Area residential land use were to protect and enhance the affordable housing opportunities in the area. New development was to be of high quality design providing a range of housing, including family oriented, types and was to increase the intensity of development within walking distance of the station. In areas of redevelopment, incentives were to be provided that encouraged land assembly and the

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4 See Map 4.b.
5 See Map 4.c.
Map 4.b. Nanaimo/29th Avenue Station Areas Defined

Source: City of Vancouver, 1987b
Map 4.c. Broadway Station Area Defined

Source: City of Vancouver, 1987c
provision of new residential units (City of Vancouver, 1987c).

Recognizing Broadway's commercial importance, the Station Area Plan aimed to strengthen the intersection of Broadway and Commercial as the community's core and focal point through higher density development and increased pedestrian orientation, retail continuity and diversity of businesses to enhance the area's social and physical character. Other goals included incorporating residential uses above commercial to increase residential capacity and commercial vitality, promoting the viability of small-scale retail, and locating auto oriented commercial at the fringe of the Station Area (City of Vancouver, 1987c).

4.2.4.b. According to Planners

The goals for Broadway were for modest change.

4.3 Ideal Goals According to Planners

4.3.1. General

Given the level of public investment, four of the planners agreed that there should have been more aggressive land use changes, i.e. redevelopment to higher densities, attempted at the Station Areas, especially at Broadway, Nanaimo, and 29th Avenue. In particular, two planners felt that not having commercial development around stations was a missed opportunity to create transportation choice, increase ridership and promote trip linking. Another planner felt that the goal should have been to have as many people and jobs within walking distance of the ALRT and that everything possible should have been done to encourage that.

On the opposite side of the spectrum are those planners who feel that the Stations did not, and do not need more commercial development. Four planners agreed that, especially at 29th Avenue and Nanaimo Stations, mixed use development is unnecessary and that the market does not exist for it. Instead, they argue that there was the need for housing near the stations to facilitate a transit oriented lifestyle. One planner believed in supporting and building on the existing structure of development, i.e. single family residential and also the existing commercial hubs that are located outside of the Station Areas.

Some planners agreed that more effort should have been paid to making the best use of the space underneath the guideway and increasing the attractiveness of the BC Parkway.

There was disagreement over the decision to not allow parking at the Station Areas. Most agreed with the goal to not allow park-and-rides lots at the Station Areas. One planner felt, however, that park-and-ride lots should have been provided because people in this region use their cars.
4.3.2 Joyce

In general, the planners thought that medium to high density residential development was appropriate for the Joyce Station Area due to its easy access to major employment. The decision to allow conversion of the entire industrial site to residential development was supported by one planner, whereas another was concerned over the loss of jobs.

The goal to have the Joyce Station commercial district secondary to the commercial district along Kingsway, where there is an active Business Improvement Association, a lot of investment and a good tax base for the City, was supported by one planner. Where three other planners felt that this policy was too accommodating to the Kingsway merchants.

4.3.3 29th/Nanaimo

It was generally agreed that Nanaimo and 29th Station Areas are appropriate for medium to high density residential development because of their easy access by ALRT to downtown employment. Many of the planners felt that commercial and office development at Nanaimo and 29th is not needed.

4.3.4 Broadway

Broadway had the potential for more mixed use, as well as higher, density housing. One planner feels that they should have applied more intensive zoning, with more RM (multifamily, 1.45 FSR) rather than RT (townhouses with ground oriented access, FSR 0.75). Most agreed that more could have been done to support the commercial aspect of Broadway. One planner suggests building on the medical element that already exists there.

4.4 Strategies at the Four Station Areas

The Station Area Plans, land use strategies themselves, set out land use goals and policies with action items, or strategies, to achieve them. These strategies are applied to particular parcels selected because of their suitability for redevelopment or because they have been adversely impacted by the ALRT.

4.4.1 According to Planning Documents

a. Public Consultation

Public consultation was to be used in order to develop procedures for enforcement and zoning of secondary suites at Joyce, Nanaimo and 29th Avenue. In addition, the existence of Advisory Committees for each Station Area, as well as public meetings facilitated

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6 The Broadway Station Area Plan, Nanaimo/29th Avenue Station Areas Plan, and the Joyce Station Area Plan provide the sources for this section.
citizen influence in the creation of the Plans. Local residents and the Citizens Transit Advisory Committee were also involved with BC Transit regarding bus linkages and routes.

b. Plans

The Station Area Plans were created to guide future land use decisions around the Station Areas. At Joyce Station, a concept plan was intended to provide incentives to private developers for a pedestrian oriented 'town square'. A market growth study was incorporated into the plans to ensure phased development as growth occurred. As well, at Joyce, the City Engineer and Manager of the Economic Development Office was to encourage a request by business owners for designation of the area as a 'downtown revitalization area' in order to upgrade the pedestrian environment.

c. Rezoning

Rezoning, undertaken by the Director of Planning, was one of the main strategies used to achieve the land use goals. The general intent of the rezoning was to permit higher residential densities, and in the commercial areas, to facilitate pedestrian orientation. Industrial areas were generally rezoned to reflect the surrounding character or, in the case of the Vanness Industrial District, to the Comprehensive Development district zone (CD-1\(^7\)) to enable a mix of multifamily housing and recreational areas.

In general, sites that were identified for rezoning were either vacant, heavily impacted by noise from the ALRT or traffic, underutilized or derelict properties, or publicly owned (City of Vancouver, 1987b).

The rezoning was usually accompanied by guidelines that specified form and character.

d. Design Guidelines

The Urban Design guidelines, including general design considerations, site planning and design elements, for each Station Area Plan outline the form and character intended for future development. The general guidelines address neighborhood character for all Station Areas and, at the Joyce Station, they also address neighborhood focus, scale, entrances, linkages, vehicular and pedestrian movement, height, and view and topography. The site planning guidelines give direction for orientation, views, noise, privacy, frontage, height, and front and rear yard setbacks. The design element guidelines articulate the form and character of windows, entrances, roofs, finishing materials, open space, landscaping, and parking.

The guidelines aim to strengthen and emulate the existing character, create visual interest and identity, and create a smooth transition between the existing and new development.

\(^7\) Many of the parcels were rezoned CD-1 because they were shaped, sited or located in a manner that necessitated the individual definition enabled by this zoning category, e.g. near the guideway.
Specifics include the use of tall buildings around the Broadway and Joyce Station Areas to create a focal point with decreasing heights as distance from the station increases.

e. **Transportation Measures**

These strategies include traffic calming on residential streets, protective parking systems, monitoring and enforcement on streets in the Station Areas, providing off street parking for shoppers and local employees, removing street parking, installing left turn bays and traffic signals to deal with increases in traffic, building kiss-and-ride facilities at Station Area, providing space for pedestrians, and linking bus routes to ALRT.

f. **Land Acquisition, Assembly and Consolidation**

Many of the action statements involved the city retaining or acquiring property in order to achieve its land use goals. To facilitate this, the owners of important parcels for redevelopment were to be notified that the City would enter into negotiations for the parcel. Another strategy was to propose a high density for a site to encourage site assembly. While waiting for the appropriate amount of land to be assembled, the parcels in City ownership would be maintained. The City also aimed to lease land if necessary.

In response to the negative impacts of the ALRT, the City petitioned BC Transit to buy property along the transit corridor. In addition, the transfer of the BC Hydro right-of-way to BC Transit was to occur in order to facilitate the BC Parkway.

g. **Impact Mitigation**

The strategies used to mitigate noise and other negative impacts of ALRT included landscaping, noise fencing, and replacement of pedestrian linkages on the ALRT alignment and on adjacent properties, property acquisition with relocation assistance for those severely affected, dedicating lanes and designing buildings to act as noise barriers, and the use of new zoning and public investment in facilities. The City Council and BC Transit's strategies mainly focused on the treatment of the ALRT right of way, the treatment of adjacent properties, and property acquisition. The City petitioned BC Transit to retrofit impacted properties to mitigate noise.

h. **Coordination and Cooperation with Other Government Entities**

Especially in order to achieve the community services and facilities goals, the City intended to work with, and communicate the goals for the Station Areas to various levels of government, non-profit and community organizations. Some examples include working with the School Board to ensure the fewest number of arterial crossings when catchment areas are drawn, with the Provincial Liquor Distribution Branch to get pre-clearance for a pub at Joyce Station, and with the BC Parkway Society to ensure completion and maintenance of the BC Parkway.
i. Monitoring

The Director of Planning and Director of Social Planning were to monitor population increases in order to ensure adequate provision of parks and community services. The intent was also for the Director of Planning and the Manager of the Economic Development Office to monitor the industrial uses on the Vanness Industrial site to encourage industrial uses that would create more jobs.

j. Funding Allocation

Requests were to be made for various public entities to allocate funds to make community services possible. A local improvement program at Broadway was to enable the upgrading of sidewalks, and provide design features in the core shopping areas. Another strategy was to have money allocated in the Capital Plan for a library and community meeting space at Broadway.

4.4.2 According to Planners

a. Public Consultation

The City planners worked with an Advisory Committee who took part in creating and reviewing the Station Area Plans. At Joyce, the community was heavily involved in the planning process. The City also communicated with the owners of the industrial land at Joyce, who realized there would be high profits, to facilitate the building of high density residential development at Joyce. At Broadway, community outrage over the elevated guideway and burnout resulted in many members of the Advisory Committee leaving. The Committee that the City ended up working with was not representative members of the community, according to one planner. The public process included tours, having professionals brought into the community, focus groups, and charrettes.

b. Plans

Station Area Plans outlined the land use directions for each Station Area; at Joyce Station this Plan was basically a master plan for the Collingwood neighborhood. The policy statements in the Station Area Plans enabled the staff to identify for developers the land uses that would most likely be supported by Council. The Station Area planners also wrote an important policy document to Council to establish the scope of new housing that would be contemplated around the stations and developed criteria for it. Work programs and phasing plans were a part of the plan. The planners conducted a study of service and amenity deficiencies and worked with the community, particularly at Joyce, to improve facilities.

Bus routes were redesigned to tie in with the ALRT service. A Greenways Program was later introduced to achieve the linear parkway along the ALRT line and to reclaim the Renfrew Ravine at the 29th Avenue Station. After the contentious decision to not have parking around the station areas, a major parking strategy was done to address the
problem of hide-and-rides through an innovative parking permit system that has subsequently been used in many other neighborhoods.

c. Rezoning

Rezoning was planned in order to create the desired land use around the stations as well as to mitigate the ALRT impacts. New zoning categories were created to ensure noise mitigation, such as the RM-5N zone.

d. New Development Standards and Incentives

At Joyce, despite established goals and formulas for densities and amenities, the City and the community negotiated for more amenities and facilities in exchange for higher densities. This was facilitated by the fact that the entire land area was consolidated in the hands of one developer. As well, the City encouraged ground floor retail/commercial by allowing higher densities.

Years later, the City reduced the minimum parking requirements for commercial and residential at Joyce and recently at Broadway. The result at Joyce was more development and more financially viable development that meant that savings or amenities could potentially be passed on to the residents, according to one planner. Even after the reductions were made to the parking requirement, the developments still have had an oversupply of parking due to low car ownership in this area.

e. Impact Mitigation

The Planning Department undertook impact and mitigation assessments. Although not as successful as intended, especially due to BC Transit's reluctance to buy affected properties, the strategies to deal with noise mitigation included fixing the squealing of wheels on the curves, planting, noise fencing, property acquisition and slating areas for redevelopment, and rezoning. At 29th Avenue and Nanaimo Stations, housing was used as a mitigation tool to screen the ALRT rather than to provide a supply of housing.

f. Coordination and Cooperation with Other Government Entities

The City negotiated with BC Transit for them to buy affected properties, and to put the ALRT at grade between Commercial Drive and 29th Avenue station. To achieve the BC Parkway, the City worked with private businesses, public entities and non-profit groups. For example, at 29th Avenue Station, negotiations with the Parks Board led to the clean up and reclamation of the Renfrew Ravine and the innovation of the Greenways Program.
4.5 **Outcome-Land Use and Zoning**

4.5.1 **General Outcome**

4.5.1.a. *According to Planners*

Each Station Area has had unique land development opportunities. The planners acknowledged some success in achieving denser residential development at the four Station Areas, especially at Joyce Station. Although land use has not changed to have the highest land use densities near the stations and decreasing densities as distance from the stations increases, one planner believes that the market will eventually reflect that policy. One of the planners attributed the lack of expected commercial development around some of the Station Areas to the car-oriented nature of the City of Vancouver maintaining that the stations are not major nodes and are unlikely to be. Another planner discussed how the rezoning was very successful and attributed the success to the process, albeit slow and incremental. It was noted that there were many early successes, in the mid 1980s and early 1990s, but since then there have not been a lot of achievements.

Despite the planning efforts to mitigate the noise and visual impact of the ALRT line on the surrounding neighborhood before it went in, noise at curves had to be mitigated afterwards. The line passed fairly close to existing residential, while new development was located at a further distance taking into account the noise. As well, according to one planner, the BC Parkway street crossings were not well designed and the Parkway lacks the amenities needed to create a sociable place.

4.5.2 **Joyce Station**

Immediately surrounding the station, the land use is primarily mixed use with ground floor retail, and offices and apartments above. Although the overall station area land use is predominantly single family residential, there is a substantial amount of land devoted to multi family high rise residential towers and recreational facilities including a Neighborhood House and playing fields on the former Vanness industrial site that play an important role in the community.

4.5.2.a. *Result of Strategies*

At Joyce Station Area, as I have defined it, there were twelve sites identified for action.

Seven residential sites were identified. Two were rezoned to the recommended rezoning, from RS-1 (single family) zone to CD-1 (that enables intended development to be tailor made to each site) and two were intended to be rezoned from RS-1 to RM-3A1 (multiple dwelling) but instead were rezoned to CD-1. Three of the remaining sites were not identified for rezoning but were rezoned from RS-1 to RS-1S (single family with secondary suite) and RT-4AN (two family with evidence of noise mitigation), except one portion that remained RS-1.
An inventory of the current land use reveals that despite the rezoning and intention for multifamily dwellings, many of the sites still remain single-family homes. Where change has occurred, it has occurred in accordance with the zoning and reflects the massing sketches provided in the Station Area Plan, e.g. higher density, four storey apartment buildings, face the guideway, and lower density, two-storey townhouses, away from the guideway on residential streets.

Of the two originally commercial sites, rezoning has occurred on the majority of one site to the recommended C-2C (pedestrian oriented commercial with increased residential) from C-1 (local serving commercial), but the other site was rezoned from C-1 not to the recommended RM-3A1 but to RM-4N (multiple dwelling with evidence of noise mitigation). Current land survey reveals that the there is mixed use on the majority of the commercially zoned sites within the Station Area with the highest density close to the station.

Of the originally industrially zoned sites, all have been rezoned from M-1 (industrial uses that are not dangerous or environmentally incompatible with residential districts in close proximity) to CD-1, even though one section was recommended to be rezoned to IC-1 (light industrial). The land use survey reveals that these sites have been developed to their intended use of multifamily residential with some commercial and recreational services. The highest density is located near the Station and guideway with decreasing densities away from the Station creating a transition to the single-family areas. The eastern section of the Vanness industrial district, although originally intended to remain industrial, has been slated for redevelopment to high density residential.

<table>
<thead>
<tr>
<th>Zoning</th>
<th>1987⁸</th>
<th>1990s⁹</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD-1</td>
<td>4%</td>
<td>39%</td>
</tr>
<tr>
<td>RS-1</td>
<td>69%</td>
<td>35%</td>
</tr>
<tr>
<td>RS-1S</td>
<td>17%</td>
<td></td>
</tr>
<tr>
<td>RT-4AN</td>
<td></td>
<td>0.4%</td>
</tr>
<tr>
<td>RM-4N</td>
<td></td>
<td>4%</td>
</tr>
<tr>
<td>C-1</td>
<td>7%</td>
<td>0.4%</td>
</tr>
<tr>
<td>C-2C</td>
<td></td>
<td>4.7%</td>
</tr>
<tr>
<td>M-1</td>
<td>20%</td>
<td>0.4%</td>
</tr>
</tbody>
</table>

4.5.2.b. According to Planners

It was generally agreed that the land development has been a success at Joyce Station and that ALRT has facilitated that development. Residential densities have increased significantly due to the conversion of industrial land to multifamily high-density

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⁸ Source: City of Vancouver, 1987a
⁹ Source: City of Vancouver Planning Department, Zoning Maps, 2001
development. In fact, more land has been converted to high-rise residential than originally planned, a good thing according to one planner. The community negotiated with the developer for increased amenities and facilities including a community policing centre, park, school, and neighborhood house. New development has enabled the building of transit tolerant housing along the guideway and at the Station. Tree plantings along Earles and Vanness also have been successful in mitigating the impacts of the guideway, according to one planner.

The success at the former Vanness industrial site has been attributed to the fact that a single developer was responsible for development which meant that there was continuity in the process, a simplified negotiation process, phasing of development that enabled planners to guide development and an opportunity to build community support and amenities. The result has been that the community has accepted higher density development and ALRT ridership has increased. However, in the process of conversion, industrial jobs have been lost to residential development.

4.5.3 29th Avenue

The 29th Avenue Station Area remains a predominantly single family neighborhood. It has abundant open space, i.e. Slocan Park and the Renfrew Ravine. Since the ALRT has gone in, a small number of multifamily units have been built near the station.

4.5.3.a Result of Strategies

The rezoning at 29th Avenue Station has been entirely successful. All of the six sites identified have been rezoned from RS-1 to CD-1. The intent of the rezoning was to encourage multiple family housing that fit into the existing single-family neighborhoods and dealt with ALRT impacts. Despite this intention, only one site has completely been converted to multiple family housing and only two others have seen partial change to multiple family housing. The remaining sites have seen no change from the existing single family and some remain vacant.

Much of the remaining land in the Station Area has been rezoned from RS-1 to RS-1S to allow for secondary suites.

<table>
<thead>
<tr>
<th>Zoning</th>
<th>1987\textsuperscript{10}</th>
<th>1990s\textsuperscript{11}</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD-1</td>
<td></td>
<td>15%</td>
</tr>
<tr>
<td>RS-1</td>
<td>99%</td>
<td>39%</td>
</tr>
<tr>
<td>RS-1S</td>
<td></td>
<td>46%</td>
</tr>
<tr>
<td>C-1</td>
<td>1%</td>
<td>1%</td>
</tr>
</tbody>
</table>

\textsuperscript{10} Source: City of Vancouver, 1987b
\textsuperscript{11} Source: City of Vancouver Planning Department, Zoning Maps, 2001
4.5.3. According to Planners

Most planners have not been surprised by the small amount of redevelopment that has occurred. They attribute the outcome at 29th Avenue Station area to the resistance by the neighborhood to any land use change despite the large impact of the ALRT guideway on many adjacent properties. However, some maintain that the single family residential that has been preserved remains viable and that the new townhouse development has been successfully oriented to the community.

Perhaps the greatest success at 29th Avenue Station is the reclaimed urban wilderness that is the Renfrew Ravine.

4.5.4. Nanaimo

The general character of the Nanaimo Station Area remains single family residential. Some multiple family housing has been built adjacent to the Station.

4.5.4. Result of Strategies

Of the seven sites identified in the Station Area Plan for new development opportunities, only two have been rezoned to the recommended zoning, from RS-1 to CD-1. Only at one of these two sites has the intended land use, multiple family housing, gone in. The other site has remained single family residential. Three of the sites have been rezoned from RS-1 to RS-1S, despite the recommendation to keep the RS-1 zoning for these sites. Originally, many of these sites were vacant City owned land, with some single-family housing and one had a daycare. The existing land use has remained on these sites. The final two sites have partially completed the recommended rezoning from RS-1, C-1 and M-2 (general industrial) to CD-1. My land use survey reveals that one of the sites remains unchanged, partly vacant and partly single family, while at the other, the single family homes remain but the vacant, City owned parcel has been mostly converted to multiple family housing.

Much of the remaining land area within the Station Area has been rezoned from RS-1 to RS-1S to allow secondary suites.

<table>
<thead>
<tr>
<th>Zoning</th>
<th>198712</th>
<th>1990s13</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD-1</td>
<td>2%</td>
<td>13%</td>
</tr>
<tr>
<td>RS-1</td>
<td>94%</td>
<td>20%</td>
</tr>
<tr>
<td>RS-1S</td>
<td></td>
<td>67%</td>
</tr>
<tr>
<td>C-1</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>M-2</td>
<td>3%</td>
<td></td>
</tr>
</tbody>
</table>

12 Source: City of Vancouver, 1987b
13 Source: City of Vancouver Planning Department, Zoning Maps, 2001
4.5.4. b According to Planners

Despite the fact that many of the sites have been impacted by the ALRT guideway and the large number of vacant parcels around Nanaimo Station, the Station area has not seen a lot of development and redevelopment. Resident reluctance to redevelopment in the area is a possible explanation for this outcome. The single family that has remained is viable and the townhouses that have been built are considered to be successfully oriented.

4.5.5 Broadway

The Broadway Station Area is a crossroad of major transportation corridors. The predominant land use in the area is of single family conversions but a good section of the Station Area is also composed of apartment style multiple family housing and commercial land use which is largely concentrated on the arterial roadways that transect the Area.

4.5.5. a Result of Actions

Because of the complexity of its land use, the Broadway Station Area, as I have defined it, has some twenty sites that were identified for new residential and commercial development. Much of the residential rezoning was intended to allow increased densities, i.e. from single family (RS-1) to townhouse (RT-2A). However, instead of RT-2 and RT-2A zoning, these areas were generally rezoned to RT-5, RT-5N and RT-5AN (two family dwelling district, the latter two with noise mitigation). Recommendations to rezone from RM-3 to RM-3A1 were replaced with rezoning to the RM-4 and RM-4N zone. The main intent of the rezoning was to create housing that minimized the negative impacts of arterial traffic and ALRT. Generally, from the land use survey, it is impossible to say exactly the sorts of changes that have occurred in the Station Area but, because there is little outward evidence of change, they appear to be minimal.

All of the commercial rezoning was achieved from C-2 (general commercial) to C-2C, C-2C1 or C-3A (ground floor retail required) and from CD-1 to C3A, with the exception of one that went from C-2 to CD-1 despite the intention for C-3A. This last site, located directly across from the Broadway station, is still vacant despite the policy to create a pedestrian oriented business there and make it a focal point for the Broadway Station Area. Recently, this site has been rezoned and approved for office and retail development. Since most of the area was already developed as commercial, the intention of rezoning was to create a pedestrian oriented character, a core shopping district and a focal point at the station area. The land use survey reveals that these goals have not been achieved. The shopping district is not oriented to the pedestrian and the station is not the focal point of the area.
Table 4.4: Broadway Station Area Zoning

<table>
<thead>
<tr>
<th>Zoning</th>
<th>1987(^{14})</th>
<th>1990s(^{15})</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD-1</td>
<td>2%</td>
<td>7%</td>
</tr>
<tr>
<td>RS-1</td>
<td>16%</td>
<td>11%</td>
</tr>
<tr>
<td>RT-2</td>
<td>26%</td>
<td></td>
</tr>
<tr>
<td>RT-2A</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td>RT-4</td>
<td>0.5%</td>
<td></td>
</tr>
<tr>
<td>RT-5</td>
<td></td>
<td>24%</td>
</tr>
<tr>
<td>RT-5N</td>
<td></td>
<td>6%</td>
</tr>
<tr>
<td>RT-5AN</td>
<td></td>
<td>3%</td>
</tr>
<tr>
<td>RM-3</td>
<td>9%</td>
<td></td>
</tr>
<tr>
<td>RM-4</td>
<td></td>
<td>13%</td>
</tr>
<tr>
<td>RM-4N</td>
<td></td>
<td>12%</td>
</tr>
<tr>
<td>C-1</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>C-2</td>
<td>22%</td>
<td>1%</td>
</tr>
<tr>
<td>C-2C</td>
<td></td>
<td>6%</td>
</tr>
<tr>
<td>C-2C1</td>
<td>1%</td>
<td>3%</td>
</tr>
<tr>
<td>C-3A</td>
<td></td>
<td>13%</td>
</tr>
<tr>
<td>M-1</td>
<td>2%</td>
<td></td>
</tr>
</tbody>
</table>

4.5.5.b According to Planners

Most planners identified the development that occurred in the Broadway Station Area as unsuccessful. Less development occurred than was desired and the development that has occurred was not in the form that was intended. Although they identify some areas where housing development occurred, from converted houses to apartments, largely this development has occurred near the Station rather than adjacent to the Station. The area still lacks the necessary amenities. Despite rezoning, there was not a strong rate of take up in terms of development, especially with respect to the commercial rezoning. However, one planner says that the rezoning essentially did work.

4.6 Does TOD Exist at the Four Station Areas?

4.6.1. Enough Residential and at the Densities Necessary?

The evidence from the zoning data reveals that all four Station Areas have at least 20% of the land within a 1/4 mile radius dedicated to residential development. In fact, they have a substantial amount more.

\(^{14}\) Source: City of Vancouver, 1987c

\(^{15}\) Source: City of Vancouver Planning Department, Zoning Maps, 2001
<table>
<thead>
<tr>
<th></th>
<th>Single Family</th>
<th>Multi Family (&gt;1 unit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joyce</td>
<td>52%</td>
<td>24%</td>
</tr>
<tr>
<td>Broadway</td>
<td>11%</td>
<td>58%</td>
</tr>
<tr>
<td>Nanaimo</td>
<td>87%</td>
<td>13%</td>
</tr>
<tr>
<td>29th Avenue</td>
<td>85%</td>
<td>15%</td>
</tr>
</tbody>
</table>

The average lot size at Joyce, 29th Avenue and Nanaimo Stations is 33' X 110'. The lots around Broadway Station average slightly longer, 33' X 127'. Considering that when the Plans were completed, the City estimated an average of 25% of the single family dwellings contained illegal secondary suites, all the station areas have densities at above 15 dwelling units per acre (dua) which is the necessary density identified in the TOD literature for an urban TOD. In addition, the RS-1S district, to which most of the RS-1 zone was rezoned, conditionally permits two family dwellings and allows secondary suites. Much of the Station Areas are zoned to more than a single family density (CD-1, RT-5, RT-5N, RT-5AN, RM-4, RM-4N, RT4-AN), which also ensure 15 dwelling units per acre required for an urban TOD.

4.6.2 Enough Commercial?

The zoning data shows that only the Broadway Station area meets the criterion of the commercial component for TOD (greater than 10% of land zoned commercial). Nanaimo Station currently has no land zoned commercial within a 1/4 mile radius and 29th only has 1%. Joyce Station has close to the required amount of 10% zoned commercial (C-1, C-2C and CD-1) to meet TOD commercial criteria.

<table>
<thead>
<tr>
<th></th>
<th>Commercial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joyce</td>
<td>7.7%</td>
</tr>
<tr>
<td>Broadway</td>
<td>24%</td>
</tr>
<tr>
<td>Nanaimo</td>
<td>0%</td>
</tr>
<tr>
<td>29th Avenue</td>
<td>1%</td>
</tr>
</tbody>
</table>

4.6.3 Conclusion about TOD at Stations

According to the residential and commercial criteria by which the stations have been evaluated, only Broadway has TOD. After spending time observing land use and activity in the Station Areas, however, Joyce Station seems to have attributes of TOD, despite not meeting the commercial criterion. It is possible to conclude, therefore, that in order to determine the existence of TOD, criteria in addition to the residential and commercial criteria may need to be considered.

The residential and commercial criteria from above reveal the degree of density and mixture of uses of station area development. They are useful criteria, as they provided enough information to conclude that TOD does not exist at Nanaimo and 29th Avenue Stations. To fully assess whether TOD exists, however, criteria need to be developed that
also address the other guiding principles of TOD, from Chapter 2, that have not been assessed up to this point in this case study, i.e. pedestrian oriented design, open space and transit as a focal point.

4.6.4 Other Criteria

A comparison of the Joyce and Broadway Station Areas for TOD characteristics reveals some of the importance of the three other TOD elements. Both Joyce and Broadway station have commercial and residential development clustered around the Stations. At Joyce, however, this commercial district is the focal point of the Station Area, whereas at Broadway, the main focus of commercial activity is located further down Commercial Drive. Perhaps the reason for this is that, at Broadway, the noise and the barrier to pedestrian crossings created by heavy traffic on the arterial streets of 12th Avenue, Broadway and Commercial Drive act as major impediments to creating pedestrian oriented streets. Joyce Station is located on much less busy arterial streets. While neither Station Area is oriented around a plaza with public buildings, the Neighborhood House located in close proximity to Joyce Station provides a public space where people can meet. Broadway does not have an equivalent public space nearby.
Chapter 5: Research Findings—Barriers and Opportunities

5.1 Introduction

This chapter identifies the barriers faced by planners in their attempts to achieve the Station Area land use goals, both official and ideal, and the opportunities they perceive for overcoming those barriers.

5.2 Barriers

5.2.1 From Planning Documents

a. Community Resistance

The Broadway Station Area Advisory Committee opposed some of the proposed densities.

b. Existing Land Use

Existing land use impeded the consolidation of land for proposed development. This was a common problem faced at Nanaimo and 29th Avenue Stations where existing landowners were unwilling to sell. The small size of existing land parcels, each with separate ownership also made consolidation difficult.

Major arterial roadways, the ALRT guideway and the Grandview Cut divide the Broadway Station neighborhood creating instability in the community. Redevelopment may not occur on sites located on busy arterial roadways, as developers may favor sites located away from these locations (City of Vancouver, 1987a). Arterial roads separate children from their schools making travel difficult (City of Vancouver, 1987c). Absentee ownership is high along busy arterial roads due to the environmental impacts that affect the residents.

Development and redevelopment of some parcels may be precluded due to the large amount of space dedicated to lanes to meet utility and fire access requirements (City of Vancouver, 1987c).

c. ALRT Impacts

The impact of the construction and operation of the ALRT and its guideway has been a major consideration in planning surrounding land use. Identified impacts include noise, shadowing, loss of privacy, views and parking spaces, disruption and loss of businesses, homes and access, increased congestion at Stations and on nearby streets, changing
community character, increased pressure for new development, and the mismatch of the growth with the level of service (City of Vancouver, 1987c).

d. The Market

Because of the increased economic activity anticipated to be generated by the presence of the ALRT Stations, commercial rents and lease rates may increase which could drive existing businesses from the areas, especially along Commercial Drive.

5.2.2 Identified by Planners

a. ALRT Technology

Five of the planners agreed that ALRT technology, because it is grade separated and often elevated, acts as a major barrier to land use development around the Stations. Its intrusive nature makes integration of the ALRT into the existing fabric of the community close to impossible. One planner described it as 'urban vandalism.' Another planner says that support for ALRT increases with distance from the ALRT.

b. Existing Land Use

Existing land use can act as a barrier to intended land use development. In order to develop land in the manner designed, vacant or redevelopable land needs to be available. In the case of 29th Avenue, Nanaimo and Broadway Station areas, land adjacent to the stations already had an established form, including major arterial roadways that can impede people's ability to cross the street and so act as barriers to neighborhood continuity. In many instances, the redevelopment potential of these areas was defeated by the fact that owners did not want to sell their land, and also by the complicated negotiations that would be necessary to assemble enough parcels, especially due to the many small parcels in the Station Areas, for the desired development. Even still, if the land were available for purchase, the cost of acquiring the land may have acted as a barrier.

The car orientation of existing land use is not transit supportive. Many areas are only served by car. As a result, many people rely on their cars. Because of Greater Vancouver's car-oriented nature, large-scale commercial centres that are entirely transit oriented, without parking, may not be economically viable. For example, one planner identifies Nanaimo and 29th Avenue Stations as geographically not well suited to commercial development because the Stations do not have easy road access. According to some planners, road access is needed for shoppers due to the region's heavy reliance on cars.

c. Use of Existing Right of Way

The use of an existing transportation right-of-way for public transit can act as a barrier to land development. These right-of-ways are often located at a distance from population
concentrations and community centres. They are frequently surrounded by old industrial lands that are in need of major investment to rehabilitate buildings, build infrastructure such as roads, and for site remediation prior to development.

d. Existing Land Value

If the developers are making a good income from the use of the existing land, then they are less likely to risk speculative redevelopment. As well, if land values do not stand to rise significantly from rezoning, then developers are less likely to redevelop.

e. Community Resistance

There was general resistance by existing residents to land use change, especially to introducing mixed land use and increased housing densities. This resistance was particularly strong at the largely residential stations of 29th Avenue and Nanaimo. The residents feared more people (especially ones who loiter), traffic, and crime fueled by media reports. There was also resistance by Kingsway merchants to having competitive commercial centres at the Station Areas, especially at Joyce Station.

There was major resistance to the elevated guideway by those who felt that it would impact negatively on their property values and quality of life. At Broadway, the anger over the decision to have the guideway elevated resulted in a divided planning process in an area already experiencing lack of development take up, and social and crime problems. The composition of the Advisory Committee changed at Broadway. One planner attributes this to disillusionment with the process, while another attributes it to the length of the process.

Because of the degree of the ALRT's impact on surrounding land uses one planner explained that it was difficult to concentrate on conceptualizing land use in the Station Areas that would enhance the sense of community, rather, the task became one of mitigating the impacts of the ALRT.

f. Decision Making Process

The unilateral decision made by the provincial government to use ALRT technology instead of LRT has affected the form and character of development and resulted in fractured community support. Subsequent decisions made by the province and its transit agency, BC Transit, about the ALRT line, and the surrounding land use, indicate a general disregard and disinterest in land use planning and the affects of transportation infrastructure on land use, according to one planner. According to another planner, BC Transit argued that it had no time, inclination or expertise to develop land.

Compromised by the tight time and budget constraints placed on the project, both the decision making process, which did not involve all the stakeholders, and the resulting decisions made about land use around the Stations and how to make the system less intrusive were less than ideal according to four of the planners.
g. Political Structure

The political structure within Greater Vancouver has led to coordination problems in land use and transportation planning. Despite the existence of the GVRD and the fact that the LRSP indicates the regional land use goals, each municipality often acts in its own self-interest by welcoming unplanned development. For example, despite the fact that in the LRP Richmond was not to be a Town Centre, Richmond built a Town Centre. Interviewed planners suggested that an implementation plan and enforcement policies for the LRSP would help achieve the land use goals. They identify that the current loose overarching vision of the LRSP does not stand up against the individual concerns of the municipalities. In addition, fractured jurisdictional power and lack of coordination between local government and BC Transit has been a barrier to land use planning. For example, BC Transit, according to one planner, built the ALRT system without regard for the impacts on land use, exemplified by their refusal to buy affected properties.

h. Areas Politically Unimportant

Two of the planners cite the political unimportance of the neighborhoods to explain decisions, such as elevating the ALRT along Commercial Drive and devoting insufficient funding and creative energy for noise mitigation and planting that resulted in negative impacts on land use. Communities raised the majority of funds to create the small parks located along the line. The fact that the proposed ALRT to the airport will most likely be tunneled, where little consideration was given to tunneling the Millenium line at Broadway, is more evidence to support this theory. This suggests that consideration should be given to the way people are elected so that there is political accountability for decision-making.

Since the line went in, there have been opportunities for the City and the Province to correct the mistakes made at Broadway Station, but this has not happened according to two planners. For example, the neighborhood Community Links project at Broadway has proposed linking parks together but the City has not acted in support.

i. Implementation

Planners identified a lack of commitment to implementation and action plans as a major barrier to land use development around the station areas, with the possible exception of Joyce. At Broadway, for example, after the area was rezoned, planners left the area to evolve as the market decided. Few attempts were made to assemble land. Despite the existence of the Station Area Plans, the current planning model of City Plans which plans based on neighborhoods does not centre its planning around the Stations. For example, in the Kensington Cedar Cottage Neighborhood Plan, the Broadway Station Area is only dealt with in a limited fashion.
j. Wrong Goals For Land Use

Many of the planners felt that the land use goals for the Station Areas were not aggressive enough in terms of density. Given the public investment in the transit line, some planners felt that anticipated neighborhood conflict over densities was avoided at a cost to the public good.

The plan to use the Grandview Cut as a highway and truck route is another example of misguided goals, according to one planner. The planners and engineers agreed to this use based on data provided by a computer model that had made some mistaken assumptions, suggests one planner.

One planner identifies disagreement among various City departments over the appropriate land use as a barrier to achieving land use goals: i.e. planners advocated for mixed use development on the eastern section of the Vanness Industrial site where the Office of Economic Development and the industrial managers wanted to maintain the industrial function.

k. Lack of Developer Incentives

The lack of developer incentives has been a barrier to achieving the land use goals, according to one planner. Current City practice is to have the developers pay 75% of the cost of providing services while taxpayers subsidize the rest. Developers may have to pay for amenities and Station development costs, which may deter them from developing.

l. The Cost of Meeting Parking Standards

Parking standards can be a huge barrier to development. Developers are often not aware that substantially less parking is generally required at development in the Station Areas. Since the Station has gone in, parking requirements have been reduced twice at Joyce.

m. Prezoning

By prezoning, planners lost the ability to negotiate with developers for amenities, facilities and designs that ensure appropriate land use and character. By prezoning, planners cannot assure the land use outcome and type of development. In addition, development cost charges that are appropriate to the type of development cannot be levied on the developer.

n. The Market

The consumers in the market are also a barrier to transit supportive development. For example, according to one planner, as the number of wage earners increases in some households, these households often no longer choose residential location based on minimizing transportation, i.e. to work. Because the two wage earners will usually work
in different location often at great distances from one another, they instead choose their residential location based on lifestyle.

o. Costs

Until people start paying the full cost of cars, they will not value, and create demand for, areas with land uses in close proximity, e.g. TOD.

p. Provincial Policy

Changes in provincial policy are needed. During the building of the 'Expo' line it was provincial policy to not encourage commercial development around the Station Areas, where around the 'Millenium' line commercial development is encouraged. It was also provincial policy to minimize land take around the line, using old Rail lines and the Hydro right-of-way under the guideway as a greenway. Policy was for the ALRT corridors to enhance the environment by having greenways rather than provide commercial land use.

5.3 Opportunities to Overcome Barriers

5.3.1 Opportunities identified by planners

a. Plans with Vision

Some planners identified the need for a vision to build support for land use development, while others felt that there was a clear land use vision for the Stations. The land use objectives for the Station Areas need to be clear and need to be communicated to developers through acceptance of proposals that meet those objectives and rejection of those that do not. Burnaby redirected a development originally proposal for Lougheed Highway to the planned ALRT Station. By giving clear signals and focusing change in a few select locations, the risks are reduced for developers and the likelihood of having desired development occur is increased. As well, according to one planner, if land use policies are in place and clearly define the kind of desired development, Council is more likely to support these policies, even if they are unpopular.

b. Implementation Strategy

The planners identified a need for a sustained implementation strategy that identifies short and long-term goals and involves planners, the Station Area Advisory Committees and local community and business groups. Despite the land use visions articulated in the Station Area Plans, there was only sustained involvement by City planners at Joyce, because of the Vanness Industrial District development project. One planner underscores the importance of keeping planners involved in actively encouraging appropriate development and working with key property owners. For example, the Safeway store at Broadway has been remodeled twice but neither times has it been reoriented to the
Station. By purchasing property, swapping land or by simply requiring parking to go underground and Safeway to be reoriented to face either Broadway or the Station, the City could have had a positive impact on implementing the land use goal of creating Broadway and Commercial as the focal point.

Successful implementation of land use changes, according to one planner, needs a phasing strategy to identify the short and long planning goals and mechanisms for assessing whether they are being achieved. Another planner says that way-markers would only be useful, if the City or another government agency is doing the development because of the unpredictability of the market.

c. Community Involvement

Public input and involvement in the planning and decision making process is important for implementing land use development. Community involvement can result in many more community amenities, e.g. at Joyce, where the community negotiated with the developer for more amenities in exchange for increased residential densities. As well, it can result in innovative ideas from those who live in the community, for example, a proposal by a citizen at 29th Avenue Station to build a pedestrian oriented plaza and park with a mixture of uses over the Station.

d. Community Education

One planner suggests touring with community leaders to destinations with land use that could be modeled, e.g. Portland, in order to inspire ideas, vision and acceptance for new land use development forms. The planning community needs to recognize that the model of land use that segregates land uses has created social and environmental problems. Another planner identifies the necessity for planners to be more familiar with the benefits, like trip combining, associated with having commercial and other mixed-use development.

e. Rapid Transit Technology

Most planners agreed that choosing a different rapid transit technology like LRT or RapidBus would have enabled transit to be more easily incorporated into the neighborhood. However, given the selection of ALRT, some suggested a need for more innovative ways to use the air space beside and under the guideway.

f. Political Organization and Coordination

A coordinated approach is needed between different agencies to achieve land use and transportation goals. Some suggestions include a mega-city political organization that would solve the problem of tax base competition and enable planning of incremental expansion.
g. Development Control Mechanisms

In order to encourage new forms of development, planners identify the need to change the system of land use controls and perhaps, use performance standards that regulate intensity of development rather than dictating lot size, setback and housing type regulations as with traditional zoning (Frank, 1982). According to one planner, rezoning should be owner initiated because it gives the City more control, compared to prezoning, over whether to approve the development, the form the development will take and the amenities that the developer will provide. New development that is located in close proximity to transit should have reduced parking requirements. These reductions would translate into huge savings for the developer. One planner suggests that some of the profits from the reductions could then be used to finance infrastructure for cyclists and pedestrians, and other amenities for the community that would support its TOD nature.

h. Developer Incentives

Local governments need to work harder and invest more money in Station Areas, providing money for parks and planting for mitigation to attract development to stations. Another possibility would be to use Development Cost Charges at all locations in the City accept along transit lines. This would make developing along the transit line and at stations relatively less expensive than other locations thus encouraging development to locate there.

i. Design

Investing in more sensitive design and infrastructure was identified as a way to overcome some of the barriers to implementing the intended land use. Retail, office, live/work and other flexible mixtures of uses have been identified as the most attractive uses for around the Station Areas. Investments should be made to make communities near transit more attractive, for example by improving sidewalks, streetlights, infrastructure, street furniture and bus bulges. Even arterial roadways could have an exciting feel with careful design.
Chapter 6: Conclusions and Implications

6.1 Conclusions

The purpose of this thesis has been to identify the opportunities and constraints facing planners' attempts to implement TOD. In order to answer this question, I have reviewed the TOD literature and conducted research to identify the barriers to achieving the Station Area land use goals, and the opportunities to overcome them, at four east Vancouver stations of the 'Expo' ALRT line. The following section concludes the findings of this research.

The information gathered from the interviews and planning documents regarding the barriers planners faced when implementing TOD indicates that the problem of station area development was not conceived of as a problem of TOD. The number one barrier to implementing TOD at these four stations was that TOD, as defined in Chapter 2, was not fully attempted. Although the TOD concept itself was not in currency at the time of the station area plans, the components of TOD like compact, mixed use, pedestrian oriented built form connected by transit have existed for a long time, even in regional plans like the Livable Region Plan 1976-1986.

The Station Area goals reflect only some of the TOD goals as identified in TOD literature. Although increased residential densities and an increased pedestrian orientation of commercial land use were part of the Plans, the main thrust was to preserve and enhance the existing single-family residential character of the neighborhoods and preserve the commercial viability of existing retail development, which was located at a distance from the Stations. Those who believe that TOD can have residential-only or employment-only land use at a station, as long as a balance of residential and employment is maintained regionally along the rapid transit line, may disagree with the contention that TOD did not fully exist at the Stations of this case study. The evidence provided in Chapter 2, however, supports a more complex vision of TOD as the economic and social focal point of the community and a gathering place for its residents. This vision of TOD as a unifying, cohesive, holistic community structure was not realized.

What kept planners from attempting this vision of TOD? From my analysis, it would seem that the goals for the system were not entirely TOD goals. This was largely a result of the fact that those who decided on and built the ALRT line, i.e. the Province, were not the ones who would be living and working with it, i.e. the local community and its planners. This system was initially built as a showpiece for the world fair, rather than as a system to increase access and accessibility for the people of a region.

The barrier to achieving TOD at the Station Areas could also be attributed to the planners' concept of TOD and Station Area planning in general. While many of the planners appear to be familiar with TOD and the benefits of mixed-use development at Station
Areas, they still maintain that at 29th and Nanaimo Stations mixed use was inappropriate. At Joyce as well, some of the planners show an inclination to build on the strengths of the opportunities, where ALRT is not identified as a community opportunity, that were available and support existing development, especially the car oriented commercial development on Kingsway. Most of the areas that have been identified as neighborhood centres were pre-existing shopping districts where proximity to a rapid transit line, especially ALRT line, was not a criterion for a neighborhood centre. One planner maintained that the market and society will determine where to put commercial development and that it is the role of the community (i.e. business interests?) to drive this process, with the planner as facilitator. However, there are those planners who take issue with this view, arguing that it is the planners' role to guide decisions that benefit the public good, especially in a situation where such a large public investment as the ALRT has been made. Some felt that preserving and enhancing the predominantly single family character of Station Areas was unrealistic and represented a huge cost to society for such a large public investment. In my estimation, based on the fact that there was such a large investment, the goals should have been to direct growth away from car oriented locations to the station areas in order to create TOD nodes, as defined in the literature, at all stations. A survey done by Parsons & Brinckerhoff found that lack of leadership in regards to TOD has been a barrier to its implementation. Another barrier to TOD is that some planners seem to misunderstand TOD. They equate it with condos next to transit stations. According to the literature, densities do not have to be that great in order to support rapid transit.

What were the barriers to achieving the Station Area goals? The political structure that put the decision making power in the hands of the Province, lack of coordination between government entities and the resulting decision making process have all been major barriers to achieving the land use goals at the Station Areas in Vancouver. These barriers are responsible for the decision to use ALRT technology. This decision led to a divided community process, especially at Broadway Station, and to a large part of the planning process being devoted to mitigating the negative impacts of ALRT. Had the decision making process at the provincial level been inclusive and reflected all the interests of those affected, the time and energy spent on mitigation could have been spent on creating a positive community process and land use orientation. The literature supports these findings identifying fractured jurisdictional powers and lack of coordination between government entities as barriers to TOD. Porter found that lack of coordination is especially problematic when intensive development is allowed in areas not served by transit. Interviewed planners mentioned this as being a problem in Vancouver as well.

The decision to use ALRT technology is indicative of the problem of separated land use and transportation planning in the region. Although transportation and land use planning are divided in our current structure, the reality is that they are connected. Decisions about one are, in fact, decisions about the other. Unfortunately, separate professions have held dominion over each, the engineers over transportation planning and the planners over land use. The literature recognizes this separation as a barrier to TOD (see 2.8.1). As recognition grows about the importance of the connection between land use and transportation planning in order to create livability and decrease sprawling land use
patterns, planners seem to be increasingly more involved with transportation planning. Where transportation should serve land use, often and in this case, it is the other way around. In essence, TOD is about land use. It is said that a successful TOD can operate without transit, because in essence, it is a complete community (Calthorpe, 1993). The importance of transit in the equation, however, is that it connects the community to the region, thus providing access without dependence on the car.

Existing land use and difficulty in assembling land have posed barriers to TOD at the four Station Areas of the case study. Commercial development at Joyce, 29th and Nanaimo Stations was resisted by existing businesses along Kingsway. As well, existing neighborhoods resisted increased residential density, especially at 29th Avenue and Nanaimo Stations. Arguably the most successful, Joyce Station Area had large amounts of available land that could be developed at a profit. At the other Stations, the small size of most lots made land assembly more difficult. At Nanaimo Station, in particular, and to a lesser degree 29th Avenue and Broadway, a number of vacant parcels have still not been developed. This could be attributed to the value of existing land or fear by developers over getting high enough returns on a speculative investment. Arterial roadways acted as a barrier to pedestrian oriented land use development by making pedestrian crossings difficult. Boarnet and Compin, in their study of San Diego TOD, identified existing land use patterns and resulting resistance by residents to sell their property, and neighborhood opposition as barriers to TOD. Boarnet and Crane also identified neighborhood opposition and NIMBYism as barriers to TOD, although Porter found that public support for TOD is forming.

The use of the existing right of way for the ALRT was a barrier to land use development, despite its being a convenient and affordable option. Major transportation infrastructure investments represent an opportunity to create new populations or serve existing ones. By placing the ALRT line along the existing right of way, the opportunity to serve major existing population centres was lost. Although the line was intended to focus growth at Joyce and Broadway, this was never the intention at 29th Avenue and Nanaimo.

Other barriers include the market for residential and commercial properties. The market could have been stronger by having developer incentives and updated standards. This is supported by the survey work done by Parsons & Brinckerhoff. The lack of a sustained Station Area planning implementation strategy, especially at Broadway, as well as, the lack of political and financial commitment to design and mitigation measures, all acted as barriers to creating land use that was oriented to TOD. Freilich and Parsons & Brinckerhoff also found these to be barriers to TOD implementation.

Interestingly, many of the barriers to implementation articulated by Vancouver planners correspond with the barriers identified by the TOD literature, as observed throughout this section. Significant barriers that were identified in the case study but not in the literature, include the ALRT technology, the decision-making process, and absence of sustained implementation.
6.2 Implications for Future Planning of TOD at Rapid Transit Stations

On the basis of this research, I conclude that there are several ways that barriers to TOD can be overcome in the future. First, participatory decision making processes are needed if transportation infrastructure decisions are to be made that support the desired land use. Participatory decision making processes could help create public support for TOD. For example at 29th Avenue and Nanaimo Stations, public support favored minimal changes to land use, however, if TOD is to occur then there should have been higher density housing and even some commercial uses in those areas. Participatory decision-making can provide the residents with greater control over the type of transit that will serve them, a greater understanding of what new development in the community might mean and an ability to judge acceptable tradeoffs between public and individual concerns, assuming they are in conflict. By participating in decision making processes at all levels, citizens can gain an increased awareness of the implications of individual choices, e.g. residential location, on community wellbeing. Calthorpe found that education and community participation reduces community opposition to TOD projects in San Diego.

TOD literature supports a reorganization of government to create a directly elected regional agency that is responsible for land use and transportation planning (Porter, 1998; Calthorpe, 1993). At the very minimum, coordination between public entities, especially between those responsible for land use and those responsible for transportation, is necessary to support TOD implementation. Bernick and Cervero found that by working together government agencies can ensure that their policy statements and design guidelines complement each other and thus encourage implementation of TOD. In addition, consideration should be given to the political dynamics likely to arise when implementing TOD in areas with existing land uses, exemplified by the Kingsway merchants in this case study.

Increasing consideration needs to be taken when making decisions about where to locate the line. Decisions should be motivated by the ultimate goal of increasing accessibility and the attractiveness of transit not by the convenience of an available right-of-way. One way to accomplish this, as suggested by TOD literature, would be to write specific TOD guidelines that make explicit the sort of land use development necessary to achieve TOD goals around transit stations. Many areas have these sorts of policies, for example San Diego. Developing incentive strategies, for example reducing the development cost charges for higher density development around transit lines that adheres to established TOD guidelines, could also help implementation.

We need to create urban form that makes social and economic opportunities accessible to people and reduces their dependence on the automobile. TOD is one way to achieve this kind of community.
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Appendix

Interview Questions\textsuperscript{16}

1. What were the goals for the existing rail transit station area development?

2. What were the strategies used by the Planning Department to reach these official goals?

3. What have been the barriers to development around the rail transit stations?

4. How do you think these barriers can be overcome?

\textsuperscript{16} These questions formed the basis of the interviews. Some more specific questions were asked during some of the interviews for the sole purpose of enriching the understanding of the original questions.