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1.0 Planning Policy

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1.1 Vision

The Mahogany community is located south of Highway 22x and east of the Deerfoot Trail in Calgary, Alberta. Home to a vibrant and diverse community, several wetlands, a farm-site, a range of services, located near a regional commercial center and health centre, there is life and vitality in Mahogany that is fostered by the urban form. Mahogany is not a typical suburban development made of uniformity, but contains a diversity of expression that fosters social cohesion. It is a community in which a resident can walk to services, can enjoy recreation opportunities and amenities, can start their careers and can grow through their years. People come to Mahogany because it offers a range of opportunities for a range of incomes and is a place in which residents and their families can relax from their busy lives and enjoy their surroundings.

Policy Goals

With an eye for creating a vital community over the long-term, the designers of Mahogany have promoted a range of good practices that improve the quality of life, of resident wellness, and of environmental stewardship that will make Mahogany the development of choice. These goals include:

- Commercial Development – To create an urban village through the development of vital and diverse commercial and retail areas that are well integrated, mixed use and pedestrian oriented.
- Housing – To create a healthy, vibrant and strong community that is consistent with Smart Growth objectives by providing a diversity of housing types that meets the needs of and is affordable to varying income groups with varying lifestyles.
- Environment – To enhance and protect the natural environment with pro-active, education-based approaches which are integrated into the framework of Mahogany to foster sustainable development.
- Transportation – To create an efficient, effective, and safe network of roads and paths that provides an equitable, convenient choice between travel modes.

- Municipal Infrastructure – To coordinate an adaptable, reliable, and ecologically-integrated system of hard and social infrastructure as the community of Mahogany grows and matures.

Policy Instruments

Policy instruments are those tools that use the existing policy framework to ensure or encourage certain outcomes. These instruments work to achieve the goals and objectives of the Mahogany community plan through the regulation of government and public involvement in any given objective (See Table 7.1). Those objectives that are crucial to the success of the project need high state involvement and require the use of compulsory instruments. Compulsory instruments take existing policy frameworks and ensure that certain types of developments occur. In the Mahogany project, these instruments create the provision of schools, parkland, infrastructure, environmental measures and essential services as mandated by the City of Calgary. These types of policy instruments might include creating park space for a public garden or zoning areas for multifamily housing in and around the wetland amenities. These compulsory instruments lay the foundation upon which Mahogany can become and vibrant and interesting community.

On the other side of the spectrum, voluntary instruments are the ways that private interests work to establish services and amenities within the community. They have little or no government involvement, relying on community members and market interests to fulfill policy objectives. In Mahogany, these might include the formation of a community garden society to manage land allocated for a public garden or the establishment of a babysitters club through the community center. The amount of community participation within the community is fostered by urban designs that promote social interaction and cohesion.

Mixed instruments require a moderate level of government or state involvement to achieve certain policy outcomes through such incentives as subsidies, tax breaks or user fees. These instruments create an environment that encourages certain developments and services that are not directly provided by the economic market, the government or the community. In

Mahogany, for example, encouraging the development of non-essential, community-supportive services before they are provided by the market can affect the location choice of individuals.

Table 1.1- Spectrum of Policy Instruments		
Voluntary Instruments	**Mixed Instruments**	Compulsory Instruments
- Family and community - Voluntary organizations - Private markets	- Information and exhortation - Subsidies - Tax and user charges	**- Regulation** **- Public enterprises** **- Direct provision**
Low	← *Level of State Involvement* →	***High***

1.2 Introduction to Mahogany

Location

The site for Mahogany is in the far southeast of the City of Calgary. The community will be bordered to the north by Highway 22X, to the east by the Alberta East Freeway (which is also the eastern city limit), to the south by 196th Avenue SE, and to the west by 52nd Street SE (see Figure 7.1). The total area of Mahogany is 1108 acres.

Topography

There is some topographical variation, but Mahogany is essentially set on a flat piece of land with few natural landmarks. There are many wetlands on the site, 6 of which are dominant. Presently, there are two large wetlands in the northeast quadrant of the community.

Environmental and Natural Considerations

The site has been under intense cultivation for cereal crops and cattle have heavily grazed the pastureland areas. The result is that the only remaining natural vegetation communities are within the more established wetland areas and along the fence and section lines. Cattle, roadways and agriculture have significantly impacted all the wetland areas (EnviroConsult 2004, 4).

There are six predominant wetlands in the project area, most of which are of low environmental significance; however, Wetland Complex #3 is described as significant by the City of Calgary due to the salicornia community that is present. It should be noted that the salicornia community is outside of the plant's range of distribution, which may cause the species to be more sensitive to change.

Since the area is actively farmed, the native vegetation in the project area is sporadic, small and disturbed. As a result, the occurrence of rare plants is low, so the development will have little impact on these rare native plant communities. Due to vegetative disturbance, the wetland vegetation does not provide cover or other habitat characteristics, and the likelihood occurrence of rare wildlife species is considered low.

Land Ownership

Most of the land designated for Mahogany is currently owned by Hopewell Homesteads Inc. and Ollerenshaw Ranch Ltd; however, Danube Farming Ltd. owns a small part of the southwest part of the community.

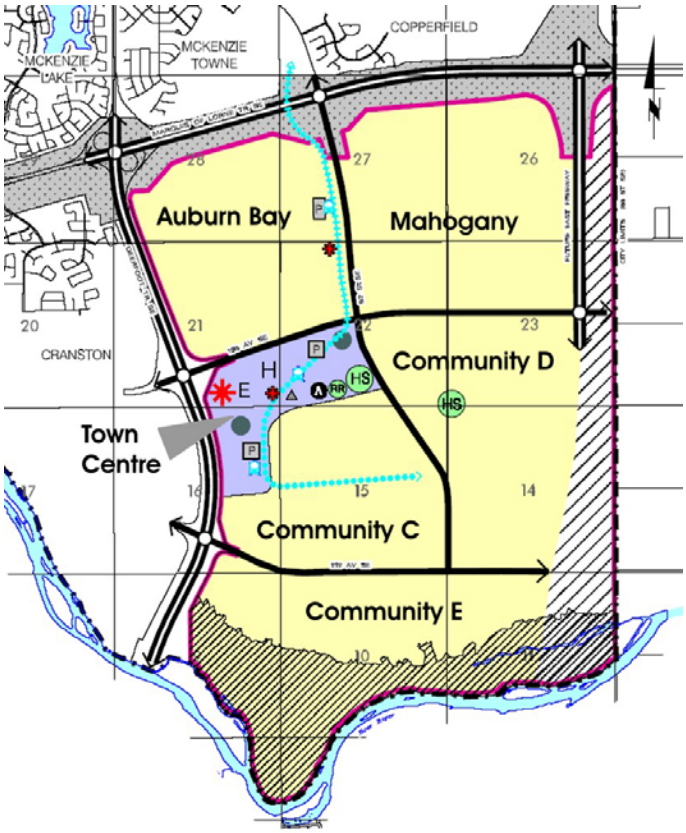
Land Uses

At present, the land to be developed as Mahogany is vacant with open areas to the east, south, and west. The new community of Copperfield is directly north of the site and McKenzie Towne lies to the northwest. These land uses are almost exclusively residential on their southern edges. The land to the east of Mahogany includes the right of way for the Alberta East Freeway. Further east, there is undeveloped land, outside of the city limits.

The vacant land to the south and west of Mahogany is also part of the Southeast Planning Area (see Figure 7.1). The Plan envisioned the development of a residential community with a higher density "transit station planning area" centered on 52nd Street SE. To the south and west of Mahogany will be developed as the Town Centre of the Southeast Planning Area, and

will consist of a regional health centre, large scale commercial areas, a regional employment centre (non-retail), public open space, and residential areas.

FIGURE 1.1- MAP OF THE SOUTHEAST PLANNING AREA



Source: City of Calgary "Southeast Planning Area Regional Policy Plan"

Transportation

Mahogany will be well-integrated to the regional transportation network of southern Alberta and the local transportation network of the Southeast Planning Area. Grade separated interchanges are planned for the northwest (52nd Street SE) and northeast (Alberta East Freeway) corners of the community along Highway 22X, as well as for the southeast junction of 196th Avenue SE and the Alberta East Freeway. The junction of 196th Avenue SE and 52nd Street SE will be at grade.

The access points to the community are dispersed around its perimetre. There will be four at grade access points along 52nd Street, mirroring the access points to Auburn Bay. Three further access points are planned along 196th Avenue SE. There will be no industrial or light rail service in Mahogany; however, the LRT will eventually run on the west side of 52nd Street with a neighbourhood stop midway between Highway 22X and 196th Avenue. This LRT stop will be integrated into Mahogany through the use of a transit station planning area. Between the development of Mahogany and the arrival of LRT service, bus rapid transit will operate along the proposed LRT alignment.

Municipal Servicing

Mahogany will be serviced with the rest of the Southeast Planning Area, as laid out in the Southeast Planning Area Regional Policy Plan (City of Calgary 2004). Water distribution will be through mains running along the Deerfoot Trail SE. Sanitary sewer will be provided by the new Pine Creek Treatment Plant, located to the southwest of the community. Stormwater management will use the existing wetlands in an environmentally compatible manner. Ideally, Wetland Complex #3 in the northeast quadrant of Mahogany would be used as a major stormwater retention wetland. Eventually, stormwater will drain into the municipal system in the northeast of the community, near this wetland.

Specific Policy Areas

Table 1.2- Matrix of Policy Goals and Objectives

Sector		Objectives
Mixed Use Development	Goal: To create an urban village through the development of vital and diverse commercial and retail areas that are well integrated, mixed use, pedestrian oriented and support the needs of Community B.	

	Mixed Use	**- To create neighbourhood retail that is well-integrated into the urban fabric.** **- To design local commercial and retail areas that are transit-oriented.** **- To encourage a range of services and facilities such as daycares and seniors facilities that work to improve the quality of life.**
	Diversity and Vitality	**- To create community legacies and identities.** **- To promote movement through parking standards, sidewalk allowances and public areas.** **- To use creative urban design including architectural standards that are thematic but diverse by designing with an eye for children and elderly, creating the unexpected, and reflecting community diversity**
Housing	Goal: To create a healthy, vibrant and strong community that is consistent with Smart Growth objectives by providing a diversity of housing types that meets the needs of and is affordable to varying income groups with varying lifestyles.	
	Density	**- Ensure that residential development occurs between 7 and 8 units per acre for the entire site (or 12 to 14 units per gross developable acre) in order to reduce land consumption and servicing costs and to promote transit use.**
	Diversity	**- To encourage a mix of housing types that meets the needs a wide range of income ranges and diverse lifestyles.**
	Rental and Senior Citizens' Housing	**- To encourage the development of affordable rental housing that will accommodate the needs of lower income groups.**
Environment	**Goal: To enhance and protect the natural environment with pro-active, education-based approaches which are integrated into the framework of Mahogany to foster sustainable development.**	
	Open Space	- To design aesthetically pleasing open spaces for public use by creating environments that allow community members to feel comfortable and thus stimulate community interaction.

	Water Quality	- To preserve and enhance the existing water quality found in the hydrological features on the property through the development of functional ecological systems.
	Land Stewardship	-To recognize, value and enhance the landscape to encourage appreciation of the gently rolling plains.
	Air Quality	- To preserve and enhance air quality by encouraging the community to engage in sustainable practices.
	Energy and Waste Reduction	- To reduce and limit energy consumption and solid waste by providing an infrastructure for sustainable practices.
Transportation	Goal: To create an efficient, effective, and safe network of roads and paths that provides an equitable, convenient choice between travel modes.	
	Regional Road Network	**Incorporate efficient, effective linkages from Mahogany to other communities in the Southeast Planning Area, as well as to the wider road network of the City of Calgary.**
	Local Road Network	**Create a local network of linked roads within Mahogany which will move vehicles in a safe and efficient manner, without sacrificing the use of this network by public transit, pedestrians, and cyclists.**
	Pedestrians and Cyclists	**To encourage the use of transportation alternatives, design the roads and paths to create a safe, direct, and convenient network for pedestrians and cyclists.**
	Public Transit	**Use a transit station planning area to emphasize the link between Mahogany and the transit hub (future LRT station) in Auburn Bay.** **Create a network of local bus stops which are convenient, reliable, and well-integrated into the community.**
	Parking	**Encourage a decrease in the amount of visible parking in front of businesses and homes, by creating lanes and 'hidden' parking.**
Infrastructure	Goal: To coordinate an adaptable, reliable, and ecologically-integrated system of hard and social infrastructure as the community grows and matures.	
	Phasing of Development	**To phase the development of Mahogany such that a strong sense of place and community are fostered, while providing infrastructure as needed.**

	Hard Infrastructure	**As required, the City of Calgary and the developer shall coordinate to provide the community with required utilities in an adaptable, reliable, and ecologically-integrated manner.** **Use the northeast wetland as a major stormwater retention pond, as well as an amenity feature and habitat area.**
	Social Infrastructure	**To provide social infrastructure, such as a community centre, places of worship, public open spaces, elementary schools, and public transit in a timely manner.**

1.3 Commercial Development

Context

As part of the land use strategy in the Calgary Plan, the southeast sector has been identified as the location of Calgary's future suburban growth. To promote better transit use and to create a more integrated urban fabric within Calgary, the City of Calgary has set policy goals and objectives that promote suburban employment at the local and regional level. Under policy direction from the Calgary Plan, Calgary Transportation Plan (CTP) and Jobs/ Housing Balance Strategy (J/ HB Strategy), the City of Calgary has approved plans for a Southeast Centre (SEC) that will serve the Southeast Planning Area and surrounding region. The SEC is designed to bring non-retail employment, retail employment, and regional and local community members through this southeast hub. The SEC is anchored by a regional health care facility that is expected to create 2,500 to 3,000 jobs during its first phase that, when combined with other non-retail developments, increases the ability of people to live and work in the region (City of Calgary 2004f).

Attracting non-retail employment to Southeast Planning Area is a central policy target of the City's employment strategy, providing Mahogany the opportunity to benefit from its close proximity to the SEC and regional health facility. The demand for increased suburban

offices, encouraged by lower costs and the City of Calgary policies, is increasing, up from 1.2 million ft^2 in 1996 to 8.3 million ft^2 in 2000 (Price Waterhouse Coopers 2001). Promoting a range of non-retail and of retail employment has many advantages for Mahogany in the long term, including:

- Diversifying the economic base of the region,
- Increasing the diversity of the urban form through a variety of building types (retail, non-retail, mixed-use, etc.),
- Creating a proximity of housing and employment provisions,
- Diversifying the range of age and social groups, and
- Promoting population stability by encouraging a range of services.

To help the City to achieve its policy of non-retail employment, the Southeast Planning Area will need to offer a variety of attractions and services within its communities. Because the south-southeast labour market is characterized by young, highly educated population, encouraging individuals to live and work within their communities creates a synergy between existing conditions and the policy targets set by the City. By adding vitality and diversity to the community, Mahogany has an opportunity to promote economic well-being while becoming a vibrant urban village that fosters a connection between the urban form and its residents.

1.3.1 Policy Goal

To create an urban village through the development of vital and diverse commercial and retail areas that are well integrated, mixed use, pedestrian oriented and support the needs of Mahogany.

1.3.2 Objectives and Policies

1.0 Commercial Areas Objective: To create neighbourhood retail, non-retail and commercial areas that are well-integrated into the urban fabric.

1.1 Policy Use flexible zoning in commercial nodes within Mahogany. *Providing ample lands (13 – 25 acres) in strategic areas that are zoned as Direct Control (DC) allows those areas to be more flexible and responsive to the changing economic and social conditions of*

Mahogany. This zoning is designed to allow for a range of developments that create mixed-use areas that function as community focal points.

1.2 Limit the amount of retail in areas designed to include non-retail development to a minimum of 10 per cent of the total floor space of those areas. *To encourage more mixed-use developments. Other commercial uses might include business services, restaurants and personal services.*

1.3 Encourage the construction of mixed-use buildings that include medium-high density housing or offices with at grade retail developments or community-supportive services. *This includes the provision of housing above local retail and commercial businesses.*

2.0 Transit Orientation Objective: To design local commercial and retail areas that are transit-oriented.

2.1 Encourage the growth of transit-supportive services around transit nodes. *To make best use of transit provisions in Community B, retail and commercial developments should be transit supportive for a minimum of 600 meters around the light-rail transit station and 400 meters in neighbourhood nodes.*

3.0 Diversity Objective: To encourage the development of a range of commercial developments, services and facilities that foster diversity within Mahogany.

3.1 Promote the growth of special, community supportive services through public-private partnerships. *The well-timed presence of supportive services such as local daycare facilities, arts facilities, and seniors' facilities may help determine market advantage and may require additional support in the form of grants, incentives and tax breaks. These types of developments are a major factor in location decisions and enable a diversity of individuals to live, work and play within Community B.*

4.0 Pedestrian Orientation Objective: To create pedestrian movement within Mahogany through alternative parking standards and design considerations.

4.1 Encourage parking areas that are hidden behind buildings and away from public areas. *In Community B, parking on the Main Streets should be limited in order to create a sense of safety and increase their pedestrian orientation.*

4.2 Encourage multi-level parkades and other methods that encourage parking density. *Incentives programs and tax-allowances should be considered for those businesses and services that increase parking density. Parkades are one way to minimize the parking impact, increase the density of development and open more continuous space for landscaping and pedestrian movement.*

4.3 Reward innovative parking designs by relaxing parking stall requirements. *In the pedestrian-oriented Mahogany, design innovation rather than parking requirements may be major factor in creating life within retail and commercial areas.*

4.4 Create a coordinated and interconnected network of public open spaces, pathways, streets, and sidewalks. *Linking alternative transportation provisions creates a true emphasis on alternative modes of transportation.*

5.0 Community Identity Objective: To create community legacies and identities.

5.1 Encourage the growth of community activities on the existing farm site. *The existing farm site provides a unique space within Mahogany that could facilitate a range of activities including farmers markets, teaching opportunities, interpretive centres or small farm experiences.*

5.2 Create community identity with art, landscaping and other urban design features. *By creating features that are unique to Mahogany, focal points can create both visual interest and identity within a community.*

6.0 Urban Design Objective: To use creative urban design standards that work to encourage vitality within mixed use areas.

6.1 Encourage designs that reflect the diversity of the urban fabric in the southeast. *Although the identity of a community is important, allowing for a diversity of urban expression creates a unique and interesting community and reflects the diversity of its residents.*

6.2 Encourage businesses to have patios or open displays along the Main Streets. *Creating wide pedestrian sidewalks allows for easier pedestrian access, while patios and shop displays provide excitement and interest. Small vendors may be considered during the summer.*

6.3 Allow for small but strategically located squares that encourage social interaction by working within a human scale. *Smaller spaces encourage gathering and social interaction more than larger areas where their boundaries cannot be perceived.*

6.4 Design with an eye for children and the elderly. *Children and the elderly generally move through a community at different rates and may have different perceptions of the urban form than do purpose-oriented adults. To accommodate these needs, such things as spatial proximity, design features located at different height levels, benches and tables located in busy areas, design features that inspire creativity, landscaping variety and unexpected visual interests, for example, are part of designing for a diverse community.*

1.4 Affordable Housing

Context

Suburban development has been the main response to growth in North American cities and Calgary has been no exception. As a result several 'Smart Growth' principles have been developed to guide and manage growth and development. A key principle in Smart Growth

is providing a mix of housing options that are suited to meet the needs of people from a wide range of income groups. The result is healthy communities and strong neighborhoods.

Affordable Housing in a Suburban Context

The standard definition of affordable housing is housing that does not exceed 30 percent of household income (Canada Mortgage and Housing Corporation 2004). For the purposes of this study affordable refers to rental housing, senior citizens housing and lower-end market housing such as, but not limited, to condominiums and townhouses.

It has been recognized that it is challenging to develop housing in the suburbs that is considered affordable For the purposes of this report, much of the focus will be on the provision of co-op housing, assisted senior citizens housing, market rental housing, and ownership of lower end market housing. The study conducted by the housing group as part of this report recommends that the community will consist of 70 percent single family dwellings, and the remainder will be multi-family housing in the form of a combination of the following:

- Rental housing
- Coop Housing
- Apartments (Owned)
- Rowhouses or townhouses
- Small Single Family

1.4.1 Affordable Housing Policy Goal

To create a healthy, vibrant and strong community that is consistent with Smart Growth objectives by providing a diversity of housing types that meets the needs of and is affordable to varying income groups with varying lifestyles.

1.4.2 Objectives and Policies

1.0 Density Objective: To ensure that residential development within the community of Mahogany occurs within an acceptable density range in order to encourage Smart Growth, affordability, transit use and the creation of a vibrant and diverse community.

1.1 The required residential density to be achieved in the community of Mahogany should be a minimum of 7.2 units per gross developable acre. *7.2 is the density set by the housing group as part of this study. The purpose of a minimum density is to allow development to occur in a manner that promotes the objectives and visions for the community of Mahogany.*

1.2 Lower density residential policy areas are:

- Neighborhood 3 in the Lower Eastern Section surrounding the wetland should have a minimum density of 8.9 upa.
- Neighborhood 4 in the Northwest portion directly south of Marquis of Lorne Trail should have a minimum density of 8.9 upa.

The purpose of these residential areas are to provide small, medium, large and very large single family homes in the lower eastern and northwestern portions of Mahogany as recommended by the housing group as part of this study.

1.3 Medium density residential policy areas are:

- Neighborhood 2 located in the South Central Section of Mahogany should have a minimum density of 9.6 upa.
- Neighborhood 5 in the Northeast Section of Mahogany should have a minimum density of 10 upa.

The purpose of these residential areas are to provide mixed single family and multi family uses in the south central and northeast portions of Mahogany as recommended by the housing group as part of this study.

1.4 Higher density residential policy areas are:

- Neighborhood 1 which is located immediately East of the Commercial Area should have a minimum density of 13.7 upa.
- Neighborhood 6 is located in and around the commercial and transit area and should have a minimum density of 21.5 upa.

The purpose of these residential areas is to provide townhouses/rowhomes, condominiums, rental and co-op homes at and near the commercial and transit area of Mahogany as recommended by the housing group as part of this study.

1.5 Multi-family housing should, wherever possible, be located at or near transit nodes, and in close proximity to neighborhood nodes, transit nodes, schools, parks, open space and near the Ollrenshaw farm site. These should include:

Higher densities and mixed uses are more viable and practical around transit nodes as this encourages and supports transit use. Higher density in neighborhood nodes, open spaces, parks and school adds to the diversity of the community and is essential part of creating the social fabric of the community.

1.6 Where appropriate the City of Calgary should consider Special Density Areas that fit within the overall community context and vision for the community near schools, parks, and open space and at the Ollrenshaw farm site. *Special density areas in the above areas will help to create the social fabric of the community and achieve the overall vision for the community.*

2.0 Diversity Objective: Accommodate a wide range of income ranges and diverse lifestyles by providing diversity in housing options, including senior citizens homes within the six communities in Mahogany.

2.1 Predominantly single family residential policy areas are:

- Neighborhood 3 (Lower Eastern Section Surrounding the Wetland)
- Neighborhood 4 (Northwest portion directly south of Marquis of Lorne Trail)

2.2 Single family/multi family mixed residential policy areas are:

- Neighborhood 2 (South Central Section)
- Neighborhood 5 (Northeast Section)

2.3 Predominantly multi family residential policy areas are:

- Neighborhood 1 (Immediately East of the Commercial Area)
- Neighborhood 6 (Located in and around the commercial and transit area)

2.4 Special needs housing, specifically senior citizens housing should be incorporated into the community through public/private partnerships to consider life cycles and allow for diversity. *Consistent with Smart Growth principles and sustainable development, housing that encourages diversity and promotes affordability is a goal of the community.*

2.5 The City of Calgary should consider partnerships with senior governments to provide affordable senior citizens housing. *Partnerships will ensure that affordable senior citizens housing is created in the community.*

2.6 Encourage and promote housing above retail shops and offices in the commercial core to promote housing diversity. *Encouraging housing above retail shops adds vitality the community and promotes affordability.*

2.7 Where ever possible and practical, allow flexible zoning that will attract residential development in the commercial core.

- Consider relaxing parking requirements.
- Consider relaxing amenity space requirements.
- Consider the use of direct control zoning.

Flexible zoning and relaxing certain regulatory requirements will make the development of residential in the commercial core a reality.

Objective: Incorporate principles of sustainable development and reduce the environmental impacts through community and building design.

2.7.1 Encourage diversity in housing types by offering sustainable design alternatives to promote sustainable development and smart growth principles. *To set this community apart from other communities and to meet the increasing demands for green and sustainable building design, measures such as these can be implemented.*

- Adaptable design that will accommodate the change in housing requirements over time.
- Efficient energy use and alternative energy sources to alleviate rising energy costs and promote long term affordability.
- Reduce the amount of landscaping required and promote xeriscaping.
- Water conservation and rain water recycling.

2.7.2 Encourage innovatively designed building form that aims to promote affordability and minimize impacts on the environment. *To meet the increasing demand for sustainable homes that are economically viable, flexible and able to respond to changing demographics and lifestyles over time.*

3.0 Affordable Housing Objective: To encourage the development of affordable rental housing that will accommodate the needs of lower income groups.

3.1 Promote partnerships between the private and public sector to reduce the costs and risks involved with the provision of affordable rental housing. *Partnerships between the public and private sector will encourage the development of affordable housing. It is a challenge to provide affordable housing in any context especially a suburban context, partnerships will make this less of a challenge.*

3.2 The City of Calgary should provide incentives through development and permit-fee exemptions for the development of affordable rental housing within the community. *Incentives such as these have the potential to decrease development costs and make*

affordable housing projects more attractive to developers. Savings can be passed along to the renters in the form of reduced rents.

3.3 The City of Calgary should consider streamlining the approval process for affordable rental housing on a case-by-case basis to encourage the development of affordable rental housing. *Streamlining approval processes reduces the costs and risks associated with the development of affordable rental housing. Savings can then be passed on the renter in the form of reduced rents.*

3.4 Secondary suites and basement suites should be permitted in single family detached dwellings through direct control zoning to promote an additional alternative form of affordable housing. *Allowing for secondary suites and basement suites is a way to provide affordable housing. This has been done in many other cities in Canada and has proven to be a successful way of adding affordable housing to the market.*

3.5 Encourage small lot zoning to promote the provision of affordable single detached dwellings. *Small lot zoning reduces the costs of land, a major cost associated with the development of affordable housing. By changing zoning to allow for small lots, development costs can be reduced which makes housing more affordable to the user, in this case it is more likely to be the owner. Small lot zoning encourages affordable home ownership.*

3.6 The City of Calgary should consider density bonusing on a case by case basis to encourage development of affordable housing. *Density bonusing is a tool that can be used to encourage developers to create affordable housing. It provides added extra incentive that makes the development of affordable housing within the reach of more developers.*

3.7 The City of Calgary should consider purchasing land from the developer to provide co-operative housing within the community of Mahogany. *Co-operative housing will allow the lower income groups (as recommended in housing study of this report) to be included in the community.*

1.5 Environmental Considerations

Context

A Biophysical Impact Assessment and Wetland Evaluation Report have been compiled by EnviroConsult Inc. to compile and review the biophysical characteristics within the project area, and outline environmental issues and concerns. It is based on background information and air photo interpretation, and is supplemented by field surveys to confirm vegetation communities, obtain soils information, evaluate wetlands and environmentally sensitive areas, and review wildlife use and movement in and through the area. Mitigation measures have also been compiled for this project based on the sensitivities of the project area and construction methodology (EnviroConsult, 2004, page 1). It should be noted that there is no Environmental Reserve in the Southeast Planning Area Regional Policy Plan.

Hydrological Features

The proposed Mahogany project area is dotted by several wetlands as displayed in Figure 1.2. The majority of the wetlands were classified as Class II – Temporary Ponds and Class III- Seasonal Ponds and Lakes, with one large connected wetland complex and an additional wetland being identified as Class VI- Alkali Ponds and Lakes. Six wetland areas were evaluated based on the City of Calgary Environmental Sensitive Area Study (ESAS) and classified according to Stewart and Kantrud (EnviroConsult, 2004):

- Wetlands 1 and 2 are not within the project area.
- Wetlands 3, 4, 5, 6, are within the project area.

Wetland Complex 3

Wetland complex 3 consisting of two large hyper-saline wetlands within the proposed Mahogany area are designated by the City of Calgary as wetlands number 5 and 6 in the Southeast Planning Area Regional Policy Plan (City of Calgary, 2004). These wetlands are

described as having a high level of significance and several bird species are listed as occurring in this location.

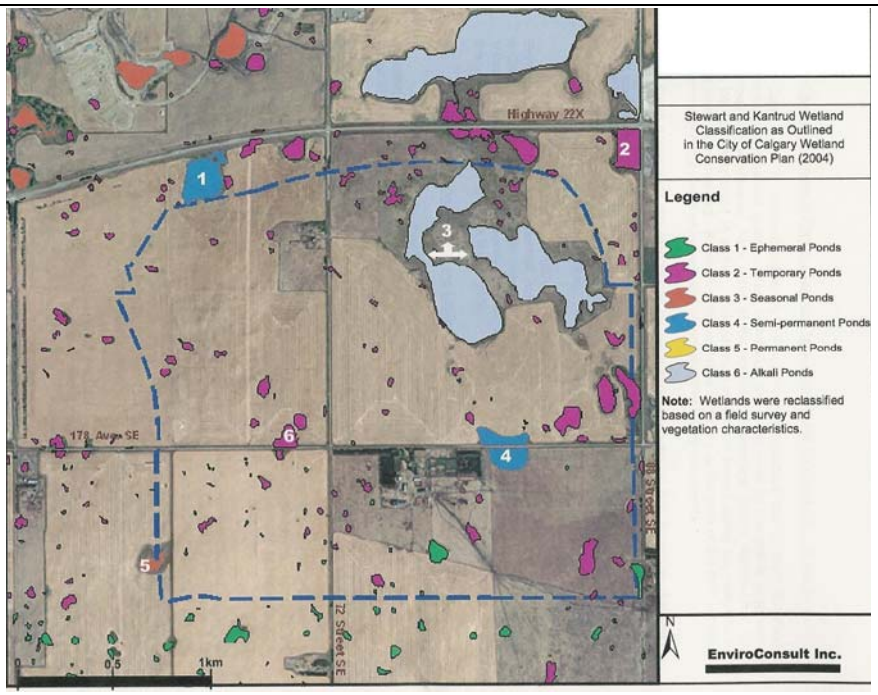
Wetland 4

The City of Calgary Wetlands Conservation Plan classifies Wetland 4 as a Class IV Semi-permanent Pond. Through field observations, EcoConsult classified pond as a Class II Temporary Pond. Class II Wetlands are categorized by wet-meadow vegetation that dominates this class with a low-prairie zone in the peripheral zone. These areas provide limited habitat capability for terrestrial wildlife species and waterfowl or aquatic species, and offer little aesthetic or interpretative value. (EcoConsult, 2004, page 32)

Wetlands 5, 6

The City of Calgary Wetlands Conservation Plan classifies Wetland 5 and 6 as Class 2 – Temporary Pond, while EnviroConsult classified the ponds as Class 3 Seasonal Ponds Sub-class B (EcoConsult, 2004, page 32). The City of Calgary Wetlands Conservation Plan classifies Wetland 3 as Class 6 Alkali pond by the City of Calgary Wetlands Conservation Plan (City of Calgary, 2004), as the wetland does offer limited species as vegetation growth is limited and diversity is low. The City of Calgary, Wetlands Conservation Plan identifies that “wetlands that are in proximity to each other (i.e. wetland complexes) generally have higher significance to wildlife habitat” (City of Calgary, 2004).Class 6 pond offer limited habitat to birds and small mammals.

FIGURE 1.2- WETLAND LOCATIONS WITHIN MAHOGANY



Landscape Features

Generally there is a paucity of native vegetation communities within the project area. Since the majority of the project area is under cultivation, the vegetation communities are disturbed and no rare plants occur in the remaining natural areas. The wetland vegetation does not provide cover or other habitat characteristics, and the likelihood of rare wildlife species is considered low, with the exception of a Salicornia community (EcoConsult, 2004, page 32).

Air Quality

In the past 10 years, there have been many deliberations about climate change, sustainable development and other principles at local, provincial and national levels. The City of Calgary has encouraged community members to be mindful of their contribution to sustainable development and has constructed policies that encourage such principles at the community

level. It is developers, buyers, community associations that are have the greatest opportunity to limit greenhouse gas emissions and build more sustainable communities.

Some concerns surrounding air quality include the possibility for odors from wetlands, the sour gas patches that exist in the south – southeast region, and the change in air quality as more people move to an area, through automobile and other emissions. Presently, there is minimal concern for air quality, so it is encouraged that proactive measures are taken to preserve and enhance the air quality over time.

1.5.1 Policy Goal

To enhance and protect the natural environment with pro-active, educational based approaches which are integrated into the framework of Mahogany to foster sustainable development.

1.5.2 Objectives and Policies

1.0 Open Space Objective: To design aesthetically pleasing open spaces for public use by creating environments that allow community members to feel comfortable and thus stimulate community interaction.

1.1 The City of Calgary is entitled to acquire a Municipal Reserve under sections 661-670 of the *Municipal Government Act.* Dedication of a Municipal Reserve will be 10% as part of the subdivision process this land will be dedicated to supply schools, public parks or recreation areas.

1.2 The City of Calgary, should designate lands through the 5 per cent public utility lot designation for the use of storm water management to ensure the Municipal Reserve will not be encumbered by more than one third of its acreage. *The enhancement of wetlands is considered important, and thus, the designation of additional lands is proposed to balance the needs for storm management and the demand of amenities in the community.*

1.3 Encourage walkability by design and construction of a fused grid road system in most of the development (the northeast wetland area will be serviced by a curvilinear road pattern). T*his design solution is the best for our community's connectivity thereby increasing walkability.*

1.4 Encourage development of joint-use sites in community facilities, in order to balance the need of essential services and demands for amenities by community residents.

- Designation of land as school space and other municipally allocated space should be designated in adjacent lots. *Having joint use sites helps to work mitigate any possible land shortage.*

1.5 Locate parks, within a reasonable (400m) walking distance in conformity with the Open Spaces Hierarchy:

- Neighborhood parks should be used to supplement larger parks.
- Community Parks should be considered as part of joint-use sites in Mahogany, and the provisions for services available in Community Parks will be provided by independent or joint-use school or community centre sites.
- Linear parks should be integrated as necessary into the regional trail system, with provision for 'unstructured' recreational possibilities that provide links to 'recreational, educational and natural open space features.

1.6 Encourage design and construction of pathways to connect otherwise fragmented open spaces and other amenities, services and facilities in the community, providing both recreational and transportation facility.

- Paths should integrate with the Regional Pathway System in the area.
- Local pathways should provide secondary routes within communities, linking residential areas to facilities as well as serve as linkages to the Regional Pathway system.
- Trails should be used wetland areas to act as a frontage to private property to create shared private/public space, utilizing granular surfaces.

Pathway systems should play an important role in encouraging a healthy, low-cost, environmentally sustainable choice for recreation and transportation and should therefore be protected, enhanced, expanded and promoted.

2.0 Water Quality Objective: To preserve and enhance the existing water quality found in the hydrological features on the property through the development of functional ecological systems.

2.1 Recognize the value of natural watercourses and encourage development that respects the resource and realizes the potential amenity value.

2.2 Integrate the larger wetlands systems (3, 4, and 6) and natural drainage patterns of the area into a storm water management plan that will give built technological form to the human-ecological synergies.

2.3 Prior to enhancement of wetlands, a detailed storm water master plan should be designed prior to any servicing in the area. *This will identify drainage basins, flow volumes, storage requirements, treatment pond sizes and locations as well as discharge points.*

2.4 Act in accordance with Mitigation measures for Wetland complex 3 identified in the Biophysical Impact Assessment (BIA).

- Enhance Wetland Complex 3 into an engineered storm pond.
- Add Gypsum to increase the soils ability to infiltrate water and sustain vegetation.

By enhancing wetland, there will be more consistent water levels and increase the areas value for wildlife and aesthetics. As well there will be an increase the biodiversity and habitat capability of the area for a greater number of plant and animal species.

2.5 Enhance Wetlands 4 and 6 to treat flows from the south-central portion of Mahogany. *Although Wetlands 4 and 6 are not permanent ponds, they can be utilized to develop functional ecological systems.*

2.6 Encourage school sites and community centers to locate adjacent to wetland systems to support community ownership of the resource. *Schools and community centres can utilize wetlands as educational sites, and provide recreation amenities.*

2.7 Recognize the complex nature of wetlands and provide incentives that encourage the community to rigorously monitor the health of key wetland systems within the area. Use the mitigation measures from the BIA as a benchmark. *There will be better opportunity for long term sustainability of wetlands, if there are active users that can ensure upkeep of system.*

2.8 Encourage public participation in the development and updating of best management practices for the operations, maintenance, lifecycle and programming of wetlands. *Participation will allow for empowerment and ownership of public amenity, open space*.

2.9 Provide incentives that encourage the community to develop education and interpretation programs for residents with regards to water conservation and habitat protection. *As general population increases, and resources such as water decrease, conservation and protection measures will be of great importance.*

2.10 Encourage the development and use of Design Guidelines that enhance water quality, protect hydrological habitat, and conserve water. Examples include the following:

- Use of permeable surfaces (e.g. unit pavers) to allow more water to percolate back into the ground water.
- Use of rain barrels to collect and use rain water (provide rain barrels).
- Use of shared driveways to reduce the amount of paved surfaces.
- Use of xeriscaping to reduce amount of water required for gardens and yards.
- Use of water meters to ensure community is aware of amount of water used.
- Use of Storm water from City's storm ponds is encouraged for parks irrigation.

Practice of innovative measures to enhance water quality and protection of habitat and conservation of water will become cultural norm, once people learn the benefits of practice of techniques.

3.0 Land Stewardship Objective: To recognize, value and enhance the landscape to encourage appreciation of the gently rolling plains.

3.1 Directly protect wildlife habitat by recognizing and enforcing federal and provincial legislation; including but not limited to the following:

- Federal: Migratory Bird Convention Act, 1994, Species at Risk Act, 2002
- Provincial: Wildlife Act, 1984, Public Lands Act, 1980.

Although there is no major concern about wildlife habitat, the respective legislation must be adhered to in any type of development.

3.2 Create Design Guidelines for landscaping including:

- Incorporating Foothills Fescue Grass that is natural to the Sub region of the Grassland Natural Region of Alberta around wetlands.
- Use of natural vegetation when landscaping to provide microhabitat for wildlife.
- Allow major topographical features and natural wetlands of vegetation to be primary determinants of design (SSS).
- Xeriscaping around housing, public spaces.
- Encourage use of organic fertilizer from local farms.

A diversity of landscaping, will compliment the various environments within the community.

3.3 Require the use of setbacks and buffers around wetlands to ensure protection of the resource.

- Dimensions of the setback and buffers are not fixed for the area, but will be established while enhancement of Wetlands in recognition of their unique nature.
- As per section EV 1.6 Regional paths and trails, should be used as buffers and should be routed along the edges of the natural resource.

Land Stewardship policies work in cooperation with protection of natural environment, water quality

3.4 Encourage public participation in the development and updating of the natural area management plan for Mahogany. *Public participation fosters empowerment and ownership of community amenities.*

3.5 Encourage the development of a community garden, by providing land and other incentives, such as a place for a marketplace to sell fresh produce on the farm property. *By providing community interaction resulting in healthy choices is an advantageous strategy to enhance community involvement and sustainability principles.*

4.0 Air Quality Objective: To preserve and enhance air quality by encouraging the community to engage in sustainable practices.

4.1 Encourage community members to become educated about greenhouse gas (GHG) emissions and encourage community action to reduce GHG Emissions in daily activities *Contribution by individual community members can influence change within community, city and so on.*

4.2 Monitor Sour Gas Wells in the south-southeast and establish setbacks to remedy any air quality concerns, if necessary. *It was noted in the Calgary Plan that some sour gas wells do exist not far from Mahogany; this should be monitored in a proactive manner, for the safety of community residents.*

4.3 Improve atmospheric air quality by encouraging transit use and discouraging automobile use by developing design guidelines that make the public transit connection between the

- Neighborhood /community level,
- Community /region, and
- Region /downtown level.

If more Calgarians use public transit, there are numerous advantages including air quality – a very important factor in sustainable practices.

4.4 Improve atmospheric air quality by encouraging walking and biking and discouraging automobile use by developing design guidelines that:

- Ensure the regional path system is integrated with commercial/retail areas to encourage bicycle use and walking.
- Use enhanced sidewalk design, including use of street trees, to enhance the pedestrian experience.

If more Calgarians walk and bike there are numerous advantages, air quality being one very important factor in engaging in sustainable practices.

4.5 Encourage a wide range of employment within the community in order to reduce the emissions created from work home commute. *If more people can work in close vicinity, it will naturally allow people to utilize other means of travel than the automobile.*

4.6 Prior to the arrival of the LRT, provide incentives that encourage the community to establish a carpooling organization within the community. *By having people travel together, and bring down the number of automobiles, will assist in bringing emissions down.*

4.7 Provide incentives that encourage the community to develop education and interpretation programs for residents that increase public awareness of individual choices and improve air quality, e.g. carpooling, alternative modes of transport etc. *Education fosters participation, empowerment and greater opportunity to make sustainable choices.*

5.0 Energy and Waste Reduction Objective: To reduce and limit energy consumption and solid waste by providing an infrastructure for sustainable practices.

5.1 Encourage the use of renewable forms of energy to exceed the target that the City Calgary has set for 25 per cent of all public buildings to be powered by renewable energy sources. *It should be possible to exceed this target through innovative design and energy-saving programs.*

5.2 Adopt the City of Calgary's 'EnviroSmart' streetlight program. *This program was initiated by Calgary Roads in 2002 to provide more energy efficient street lamps.*

5.3 Adopt the City of Calgary Roads "Traffic signal head replacement program" which utilizes Light Emitting Diode (LED) technology.

5.4 Adopt the Leadership in Energy and Environmental Design (LEED) Guidelines to meet or exceed the Silver Level Rating of the green building rating system. *Having "greener" building guidelines will assist community in working towards goal of sustainability.*

5.5 Encourage the use of Energy Performance Contracting (EPC) to ensure energy savings as well as reduce Greenhouse Gas Emissions
Sustainable practices will assist in working towards goal of sustainability

5.6 Encourage that homes built to Natural Resources Canada's R-2000 standard which meets the Green Home standard.

5.7 Encourage the development and use of Architectural Design Guidelines that reduce the amount of energy consumption. Examples include:

- Energy efficient appliances
- Building placement that considers aspect (south vs. north facing windows etc).
- Larger windows on south side of house, to capture more solar energy.

Although initial input costs will be 10-15 per cent more than typical costs for development, the homeowner will save in the long run.

5.8 Encourage the development and use of Design Guidelines that reduce the amount of solid waste in city landfills. Examples include:

- Ensuring all community buildings are equipped with an area for recycling bins.
- Providing recycling venues on every block to encourage recycling and community ownership programs.

Recycling has been taking place for over five years, but venues have not always been accessible for all community members.

5.9 Provide incentives that encourage the community association to monitor the recycling program within their community, set recycling goals for their community, and regularly inform the community of the estimated totals and goals of recycled materials. *By providing incentives community members will be apt to participate, and through participation community members become educated, empowered, and more willing to work towards goals*

5.10 Recognize the complex and labour intensive nature of composting and provide incentives that encourage community associations to start and operate large scale composting systems at a community level. *Provide assistance to allow for composting efforts to take place.*

5.11 Provide incentives that encourage the community to develop education and interpretation programs for residents that increase public awareness of individual choices that reduce both energy consumption and solid waster (e.g. photo voltaic cells, composting etc.) *By providing incentives community members will be apt to participate, and through participation community members become educated, empowered, and more willing to work in programs.*

1.6 Transportation

Context

Transportation systems are essential for connecting residents and communities on a local and regional scale. Ideally, transportation systems that are well-integrated into the community will give residents a choice of modes of transportation. In the case of Mahogany, the suburban nature of the community calls for extra attention to transportation systems.

A great help in this move towards more sustainable transportation will be the future LRT station planned for Auburn Bay, the community to the west of Mahogany. The LRT station

will be located just west of 52nd Street SE, and is subject to special planning regulations in Auburn Bay. Mahogany will mirror the 600 metre special density area radiating east from the Auburn Bay LRT station. The transit station planning area will be special zoning which encourages higher density residential development, live-work arrangements, pedestrian-friendly urban design, and convenient and pervasive transit service.

The LRT station and its surrounding transit station planning area should be developed using principles of transit-oriented development and Smart Growth. Links for pedestrians and cyclists will nested in Mahogany, allowing easy access to neighbourhood nodes. For the transportation system in Mahogany, policies are grouped into five areas – the regional road network, the local road network, pedestrians and cyclists, public transit, and parking.

1.6.1 Policy Goal

The goal for transportation policy in Mahogany is to create an efficient, effective, and safe network of roads and paths that provides an equitable, convenient choice between travel modes.

1.6.2 Objectives and Policies

1.0 Regional Transportation Network Objective: Incorporate efficient, effective linkages from Mahogany to other communities in the Southeast Planning Area, as well as to the wider road network of the City of Calgary.

1.1 Direct vehicle entries to Mahogany via the northern-most access point off 52nd Street SE and via the access points along 196th Avenue SE. *The northern-most access point will provide a clear sense of place for residents and visitors who arrive by automobile. In addition, most automobile traffic will be diverted from the pedestrian-oriented transit station planning area located at the midpoint of 52nd Street SE.*

1.2 *Use the regional pathway system to link pedestrians and cyclists to Auburn Bay, the Town Centre, the Bow River, and points beyond.* The regional path system is a unique part of the City of Calgary and residents of the city have come to depend on it for commuting and recreation. With the proximity of the Bow River to Mahogany, it is essential to link the community to this asset.

2.0 Local Transportation Network Objective: Create a local network of linked roads within Mahogany which will move vehicles in a safe and efficient manner, without sacrificing the use of this network by public transit, pedestrians, and cyclists.

2.1 For all transit modes, provide multiple routes to important destinations, such as the LRT station, the community centre, the Town Centre, schools, neighbourhood nodes, and places of recreation. *This should encourage people to consolidate trips, whichever mode they are traveling by. In addition, these routes should be specifically planned to keep through traffic on appropriate arterials, and to minimize vehicle shortcutting through low density residential areas.*

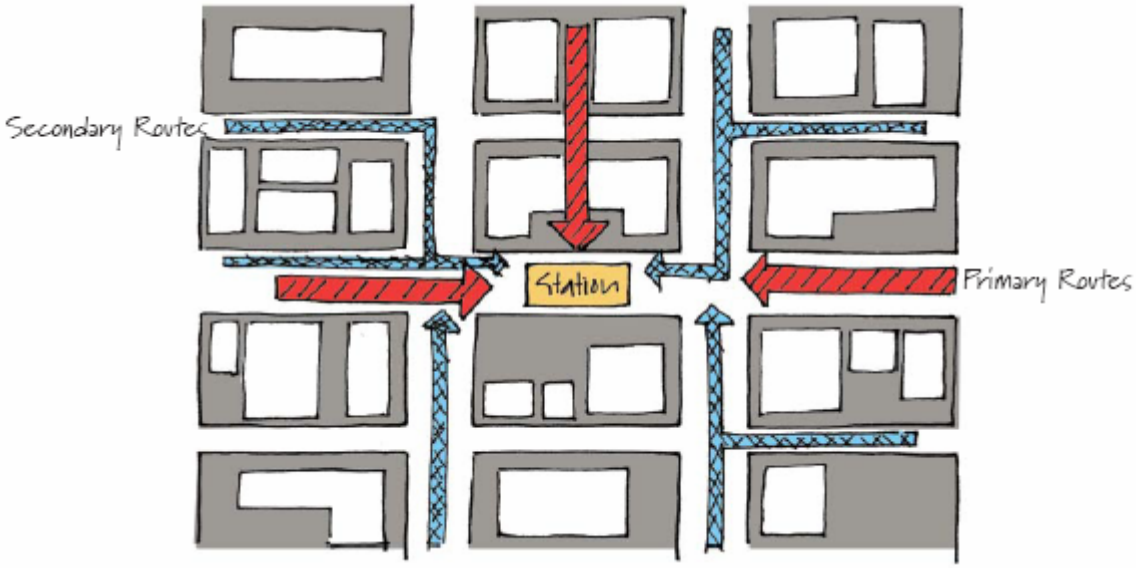
2.2 Especially in the transit station planning area, use the fused grid system of street layout. *Although this layout system uses more land than the curvilinear system, it is especially appropriate in this type of medium-density, pedestrian-oriented area. The fused grid system provides clear routes, and encourages walking through short links through small public spaces. Since much of the open space in the community is listed as public utility lots, there will be some municipal reserve available to link the fused grid system for pedestrians and cyclists.*

3.0 Pedestrians and Cyclists Objective: To encourage the use of transportation alternatives, design the roads and paths to create a safe, direct, and convenient network for pedestrians and cyclists.

3.1 Create a network of pedestrian and cyclist pathways that follow safe and convenient routes to focal points in the community, such as parks, elementary schools, the community

centre, and bus stops, as well as linking to the LRT station, the Town Centre, high schools, and the regional path system. *It is important to remove inconveniences from pedestrians and cyclists, so as to encourage the use of these sustainable modes of transportation. For example, pedestrian street crossings should also be accessible to cyclists and pedestrians with strollers. Also, pedestrian paths should incorporate the principles of Crime Prevention through Environmental Design, so residents are comfortable to walk off the street at all times of day.*

FIGURE 1.3- PROVIDING MULTIPLE ROUTES FOR PEDESTRIANS TO KEY DESTINATIONS



Source: City of Calgary Transit Oriented Development Policy Guidelines

3.3 Use separated sidewalks, as well as paved and gravel paths, to separate pedestrians from automobiles. *Separating pedestrians from vehicles contributes to a feeling of safety, and also gives the sidewalk or path a more human scale. In addition, the space between the street and the sidewalk should be used for trees, to provide visual interest, amenity, and protection from the elements.*

3.3 Incorporate cyclist-friendly features for cyclists along major roads and along convenient routes, such as:

a) labeled bicycle routes along quieter roads,

b) bicycle lanes along major roads, and

c) protected bicycle storage at important destination and community focal points.

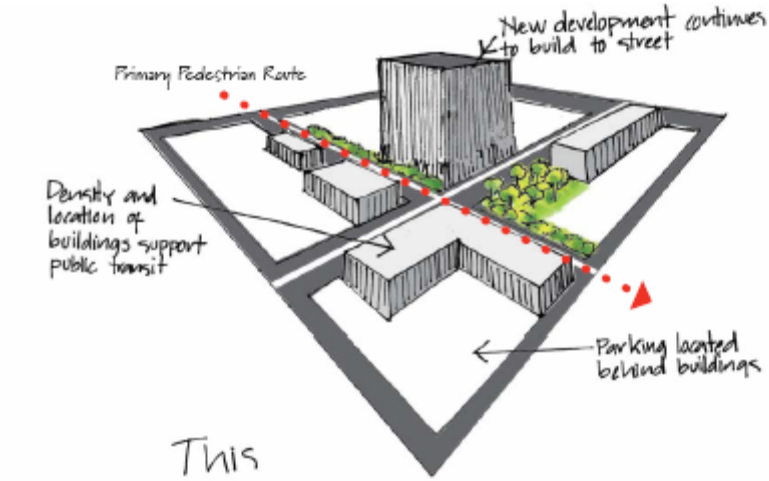
Providing bicycle routes along quieter streets provides routes for recreational cyclists and some commuters, whereas bicycle lanes along major roads are focused more on commuting cyclists. By providing bicycle racks in the public eye at common destinations, cyclists will have a convenient and safe area to park bicycles, out of the way of vehicles and pedestrians.

4.0 Public Transit Objective: Use a transit station planning area to emphasize the link between Mahogany and the transit hub (future LRT station) in Auburn Bay.

4.1 Strongly encourage the use of transit-oriented design in a 600 m radius from the Auburn Bay LRT station. *Goals and objectives for this type of development are outlined in the City of Calgary's Transit Oriented Development Policy Guidelines. Three key components of TOD are to:*

- *encourage mixed-use, higher-density, transit-supportive land uses,*
    - *Land uses which operate at extended hours and draw customers opposite to the peak commuting flow are especially welcome.*
- *discourage non-transit-supportive land uses,*
    - *These include businesses such as big box retail and grocery, gas stations, car washes, and bottle depots.*
- *provide a pedestrian-oriented urban design,*
    - *This should include a human scale to buildings and architecture, as well as a compact urban form to make distances seem more walkable.*

FIGURE 1.5- COMPACT URBAN FORM



Source: City of Calgary Transit Oriented Development Policy Guidelines

4.2 Provide a park 'n' ride facility to increase the number of workers who use public transit for part of their commute. *This will also decrease the stress on transportation infrastructure north of Mahogany by taking workers off the roads at peak times. This park 'n' ride facility should also fulfill another function, such as weekend parking for commercial businesses, small businesses, or a fitness facility.*

5.0 Public Transit Objective: Create a network of local bus stops which are convenient, reliable, and well-integrated into the community.

5.1 Provide a transit stop within 400 meters walking distance of 95 per cent of Mahogany's single-family housing and 100 per cent of Mahogany's multi-family housing. *This expands on typical City of Calgary policy to make the use of transit even more convenient to those who live in multi-family housing, since they are often users of transit.*

5.2 Coordinate the location of transit stops with focal points in the community, especially neighbourhood commercial nodes and multi-family housing. *By placing transit stops in strategic locations, the use of these stops as gathering places can be emphasized. For example, if there is to be a transit stop outside a multi-family unit, the mailboxes for this unit*

could also be located there, as well as a bench or small public space, and the culmination of a typical pedestrian route.

6.0 Parking Objective: Encourage a decrease in the amount of visible parking in front of businesses and homes, by creating lanes and 'hidden' parking.

6.1 Encourage the construction of lanes and side or rear parking. *In residential areas, this moves garages from the streetscape, providing a more interesting view for pedestrians, and allows for rear detached garages, which are ideal for secondary suites. In mixed use and commercial areas, this compacts the urban form, shrinking it to a human, walkable scale.*

6.2 In the transit station planning area, design parking lots or structures so they have more than one function and serve more than one group of drivers. *As with the park 'n' ride facility, parking areas should function for different users at different times of the day or week.*

6.3 Provide incentives for small parking bays off the street, especially to provide parking for live-work arrangements, small businesses, and multi-family developments. *These one-way loops off of major streets provide angled parking for the surrounding land uses. They can be extremely useful because they protect vehicles and drivers from fast-moving traffic. This is convenient around multi-family developments where people are often coming and going and on-street parking may be dangerous.*

1.7 Municipal Infrastructure

Context

Before Mahogany can begin to grow as a community, infrastructure must be provided by the City of Calgary and the developer. For this greenfield development, it is important that the phasing of the development and the provision of hard and social infrastructure are

coordinated. The municipal infrastructure systems include water distribution, sanitary sewer, and stormwater sewer, and may be provided by the developer through an agreement with the City. In addition to these forms of hard infrastructure, the developer has to provide gas, electric, and telecommunications systems. Social infrastructure, such as community centres and open spaces, will be provided through an agreement between the City and the developer.

The municipal infrastructure systems will be in place by the time construction begins in Mahogany. Water distribution is already planned. Sanitary sewer will be provided by the new Pine Creek Sewage Treatment Plant, scheduled for completion in 2006. Stormwater sewer systems are already in place, but Mahogany will use source controls of stormwater, to lessen the impact and the dependence on the municipal system.

The developer will be encouraged to look at innovative ways of providing infrastructure which may cost less to construct or may have less of an impact on municipal systems. The City of Calgary would also be encouraged to be open to changes in development standards for innovative infrastructure.

1.7.1 Policy Goal

The goal for infrastructure policy in Mahogany is to coordinate an adaptable, reliable, and ecologically-integrated system of hard and social infrastructure as the community grows and matures.

1.7.2 Objectives and Policies

1.0 Phasing of Development Objective: To phase the development of Mahogany such that a strong sense of place and community are fostered, while providing infrastructure as needed.

1.1 The first phase of the development should incorporate the transit station planning area and the community centre. *Since the transit station planning area and community centre are defining features for Mahogany, their significance – and the developer's commitment to this significance – should be emphasized at the beginning of development.*

1.2 The first phase of the community should include several forms of multi-family housing, as well as single-family detached homes of varying densities. *To establish the diverse nature of the community at its beginning will help to fix a sense of place, and to show a commitment to the community vision.*

1.3 Retail and non-retail commercial construction should be encouraged during all phases of development. *From the community's beginnings, it is important to provide residents with a variety of services and amenities to foster a well-rounded, vibrant community.*

2.0 Hard Infrastructure Objective: As required, the City of Calgary and the developer shall coordinate to provide the community with required utilities in an adaptable, reliable, and ecologically-integrated manner.

2.1 The City of Calgary shall either provide municipal utilities (water distribution, sanitary sewer, and stormwater management) for the community or, if a mutual agreement exists, the developer may provide these utilities in accordance with City of Calgary standards. *Although the City of Calgary states that they are responsible for providing these utilities, often an agreement is made between the City and the developer for the developer to finance these utilities in order to offset future infrastructure costs. It is recommended that both municipal and shallow utilities should be provided in a flexible manner, so they can grow with the community and adapt to changing needs as the community matures.*

2.2 The developer shall provide shallow utilities (gas, electric, and telecommunications) for the community in accordance with City of Calgary standards.

2.3 Insofar as it is possible, the provision of utilities should respect planned open spaces and existing areas of environmental or historical consideration. *In the case of Mahogany, utility infrastructure should avoid the farm site so it will maintain its amenity as it develops into a major piece of community social infrastructure.*

3.0 Hard Infrastructure Objective: Use the northeast wetland as a major stormwater retention pond, as well as an amenity feature and habitat area.

3.1 The stormwater management system should endeavour to use source controls for flow, as opposed to controls at mid-sewer or output points. *Using source controls allows downstream sewers to carry a lower, more constant level of runoff, which are more economical to build than sewers which can manage 200 year events.*

3.2 As much as possible, the stormwater management system should not affect existing wetlands in the community. *In the case of Wetland Complex 3, the development of Mahogany will inevitably change the wetland's chemistry. In this case, recommendations are to convert this area to a functional stormwater retention wetland in order to provide this utility function, as well as creating amenity and habitat. This also allows this area to be listed as a public utility lot, saving the municipal reserve for other public open space.*

4.0 Social Infrastructure Objective: To provide social infrastructure, such as a community centre, places of worship, public open spaces, elementary schools, and public transit in a timely manner.

4.1 Through mutual agreement, the City of Calgary and the developer should coordinate their efforts to provide appropriate social infrastructure for the phase of the development. *Facilities such as a community centre are essential for the health and balance of a community, and as such, should be provided early in development to become an integral focal point of the community. In addition, places of worship and parks will also contribute to a sense of place and attract new residents as the development continues.*

4.2 Since Mahogany incorporates the principles of transit oriented design, public transit service should be provided early in the development process, both locally and connecting to the regional community. *To get as much use as possible out of the public transit system and the transit station planning area, public transit should be provided as early as feasible to create a habit of using alternative modes of transportation.*

2.0 Housing

Paul Guenther

Robert Miles

Chen Peng

Demian Reuter

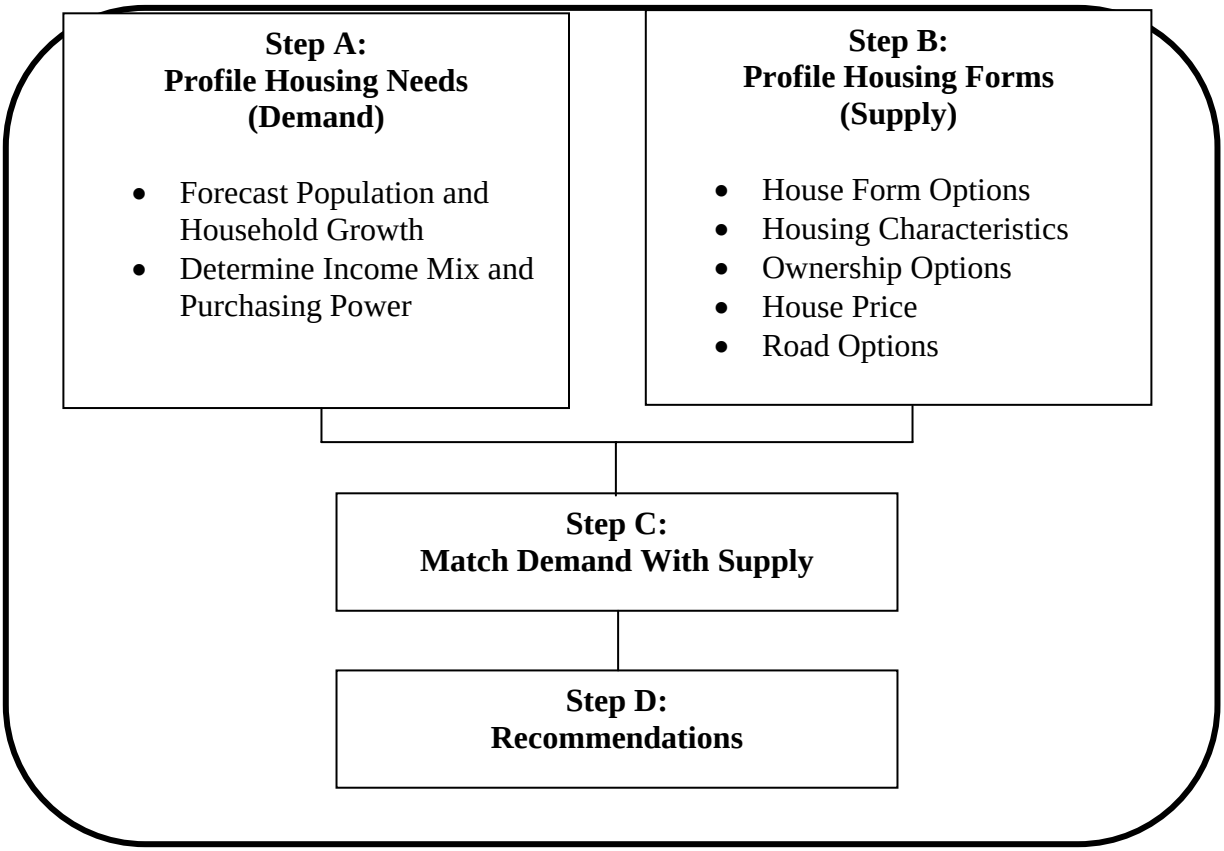
2.1 Methodology

The objectives for housing are as follows:

- Create a better income mix than currently exists in surrounding communities
- Provide a better mix of housing types throughout the community
- Create a compact, walkable community with higher densities and a legible streetscape
- Design a more connected community, both internally and externally
- Allow for the development of a vibrant, adaptable community

The process of developing the recommendations with regards to housing involved reconciling demand with supply. Figure 2.1 below outlines the general process that was used in developing the projections for Mahogany.

FIGURE 2.1- METHODOLOGY CHART



The analysis is guided by the following assumptions:

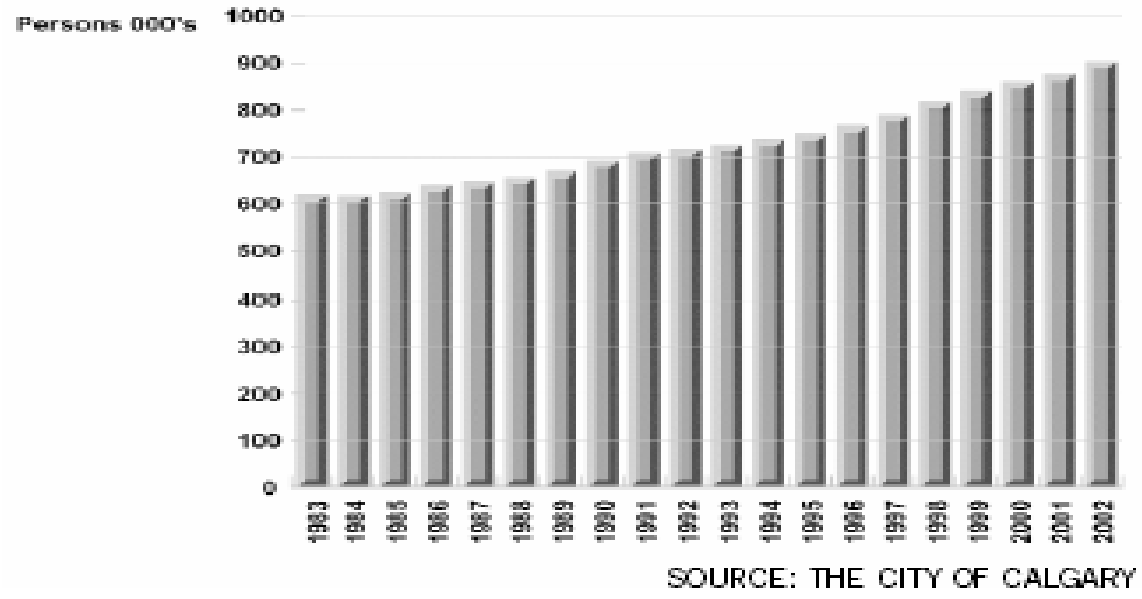
- Income is the largest determinate in selecting housing type.
- Chaparral and McKenzie Towne are used to represent other new SE communities.

2.2 Demographics

2.2.1 Population

The City of Calgary continues to be one of Canada's primary growth poles due to a number of factors: the economy, employment, and quality of life offered within the city. Figure 2.2 displays the continual of population growth that Calgary has accommodated. Today, Calgary's population is close to nearly one million people, and this growth is expected to continue-reaching an estimated 1,231,000 people by the year 2033 (Accommodating Growth, 2003).

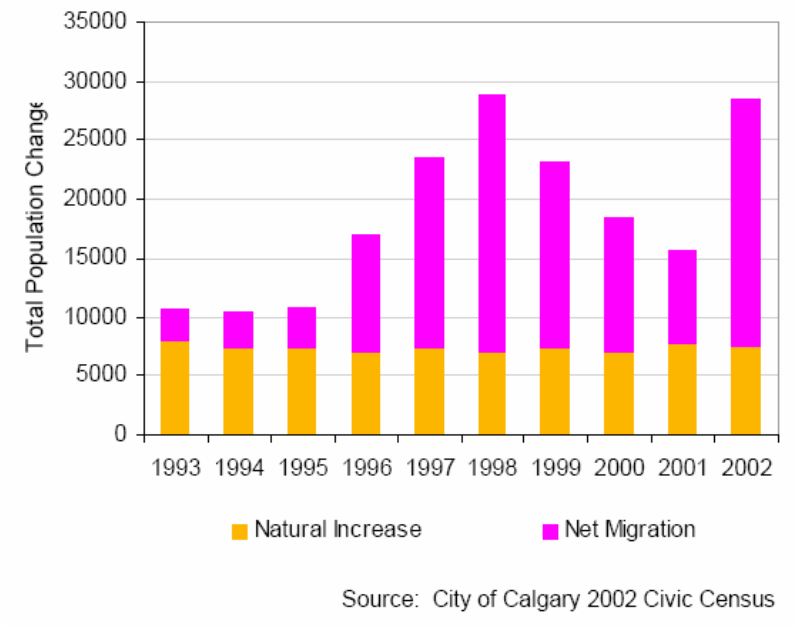
FIGURE 2.2- CALGARY POPULATION GROWTH



Source: Socio-Econ Outlook, 2003

The population growth that Calgary experiences is primarily a result of a strong economy and net migration.[1] Figure 2.3 represents the role that net migration has played in Calgary's population growth.

FIGURE 2.3- CALGARY'S POPULATION CHANGE BY SOURCE



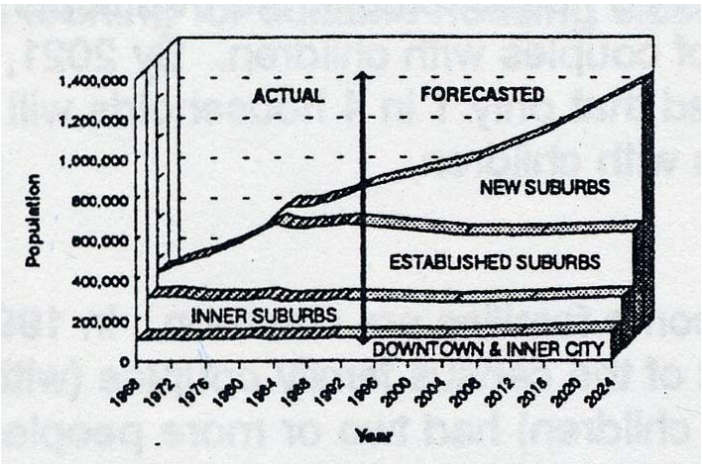
Source: Accommodating Growth, 2003

"Due to a tighter labour market, fewer people from other provinces may move to the Calgary region. As a result, international immigration will become increasingly important to Calgary's population and labour force growth. In 2002, 53 per cent of immigrants to Calgary were under the skilled workers category" (Socio-Econ Outlook, 2003). This statement suggests that (1) future immigrants will likely join the working class labour market and have the disposable income necessary to locate in the outer suburbs, and (2) the role of future immigrants to the city will likely increase-resulting in a more culturally and ethnically diverse community.

[1] In 2002 Calgary's rate of natural growth was 2.2%, by 2023 it is expected to drop to 1.1%, and 0.5% by 2033 (Accommodating Growt[1]h, 2003).

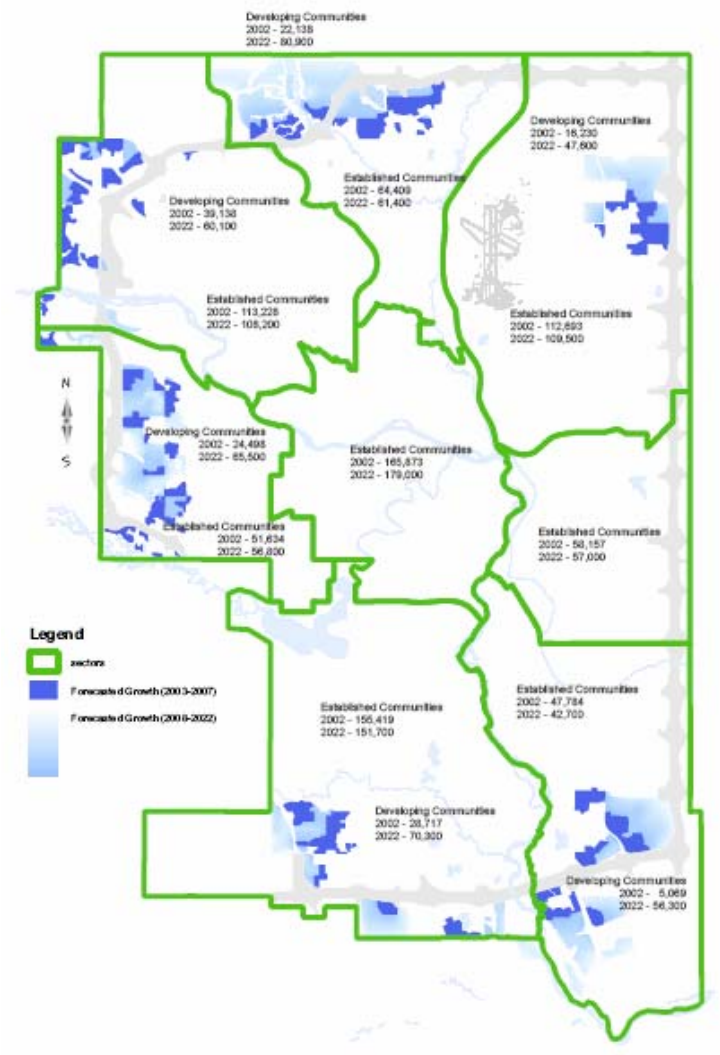
This incoming population will have to be accommodated within the city; mostly through new suburban development (Figure 2.4). These primary centres of new residential growth are on the edge of the city (Figure 2.5) have absorbed 99% of the total population growth during the past five years (Accommodating Growth, 2003). Mahogany is located in one of these identified growth centres, the South East which seeks to rapidly expand its population base over the next 15 years (Table 2.1).

FIGURE 2.4- ANTICIPATED LOCATIONS OF NEW CALGARY RESIDENTS



Source: Sustainable Suburbs Study, 1995

FIGURE 2.5- CALGARY DEVELOPING AND ESTABLISHED COMMUNITIES POPULATION PROJECTIONS 2002-2022



Source: Accommodating Growth, 2003

Table 2.1- Southeast Sector Population Projection

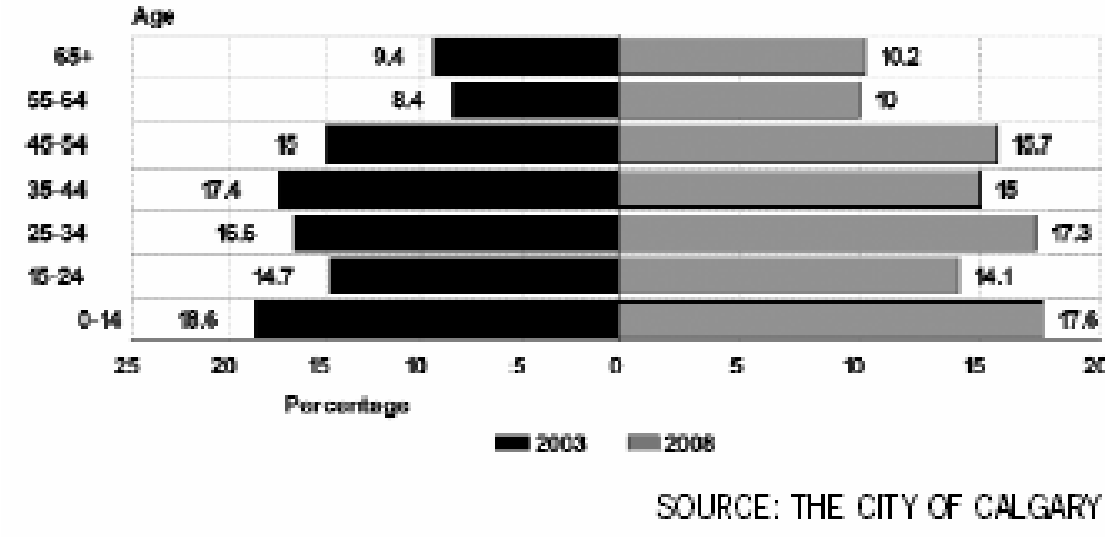
Year	Population
2002	52,853
2007	68,300
2012	77,100
2022	99,000

Source: Accommodating Growth, 2003

2.2.2 Population Distribution

Calgary's population, like the majority of Western nations and cities, is experiencing a widespread aging process caused by the aging of the 'baby boom' generation (Figure 2.6). "The average age of Calgary's population is expected to increase over the next five years. This will be driven largely by increases in the 45-64 age cohorts as baby boomers move closer to retirement. While the most significant growth will be in the pre-retirement age group, the senior population is also expected to grow, with the 65+ age group growing by 21 per cent and the 75+ age group by 27 per cent. The number of children age 5-14, however, is expected to decrease by five per cent, while the number of youth age 15-24 is expected to increase marginally by six per cent. The number of preschool children (age 0-4) is expected to increase by 25 per cent (Table 2.2). Reduced net migration will contribute to the process of population aging as fewer young people move to Calgary. Historically, migrants have been, on average, less than 35 years of age" (Socio-Econ Outlook, 2003).

FIGURE 2.6- CALGARY POPULATION DISTRIBUTION BY AGE 2003-2008



Source: Socio-Econ Outlook, 2003

Table 2.2- Calgary Population Distribution by Age 2003-2008

	2003	2004	2005	2006	2007	2008	Percent Change
0-4	54,414	56,400	58,700	61,600	64,600	67,900	24.8%
5-14	117,518	116,500	114,900	113,600	112,300	111,400	-5.2%
15-24	135,278	138,200	140,800	142,200	143,000	143,100	5.8%
25-44	313,415	315,300	318,000	320,800	324,700	328,700	4.9%
45-64	215,415	225,400	234,800	244,000	252,500	260,600	21.0%
65+	86,275	89,800	93,100	96,400	100,100	104,100	20.7%
TOTAL	**922,315**	**941,600**	**960,300**	**978,600**	**997,200**	**1,015,800**	**10.1%**
65-74	48,550	50,000	51,300	52,600	54,100	56,200	15.8%
75+	37,725	39,800	41,800	43,800	46,000	47,900	27.0%

Source: City of Calgary, Corporate Studies and Economics

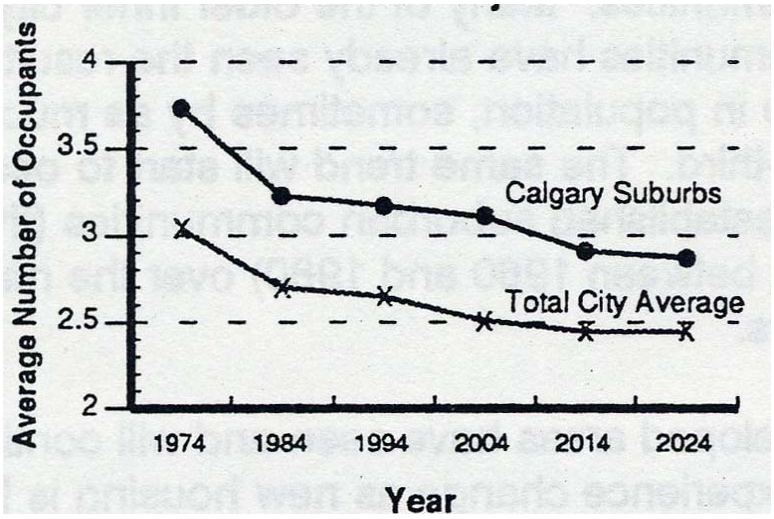
Source: Socio-Econ Outlook, 2003

2.2.3 Household Composition

Average household size has declined within the city due to a number of factors: the aging population, the change in family values, the strong economy and employment market, as well as the property market. The aging population creates a demographic with fewer families living together and therefore fewer children. Family values have changed in the fact that families are now often smaller, or started later than in the past. There is also a high number

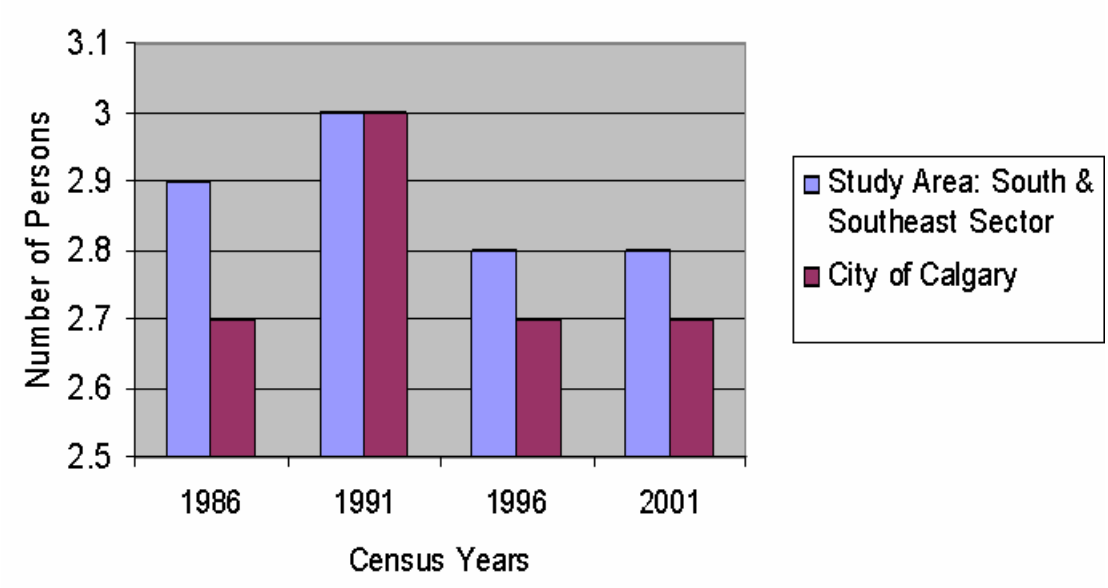
of divorces and single person households in today's societal structure. The strong economy along with the real estate market have made the purchase of a home more viable to a large portion of the population, resulting in a large number of singles and young adults living away from their family. Figure 2.7 displays the actual and projected decline in the average household size of Calgary and the suburbs. Today the city average is 2.65 persons per household and this is forecasted to decline to 2.4. The suburban average is higher at 3.2 persons per household but also expected to decline to 2.9 (Sustainable Suburbs Study, 1995). Household on average are larger in the South/Southeast sectors (Figure 2.8).

FIGURE 2.7- CALGARY PRESENT AND PROJECTED HOUSEHOLD SIZES



Source: Sustainable Suburbs Study, 1995

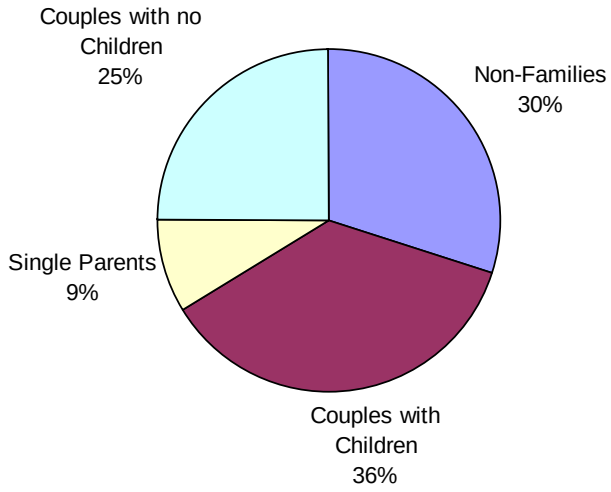
FIGURE 2.8- AVERAGE NUMBER OF PEOPLE PER HOUSEHOLD



Source: Community Profiles, 2005

Household composition is also changing; previously the typical household would contain a couple with children, today this group comprises only 36% of all households (Figure 2.9). It is expected to decline further to 25% of the household types by 2021 (Calgary Plan, 1998). Other categories (couples with no children, non-families, and single parents) are expected to increase in proportion. These changes will affect future development by suggesting that there will be a need for a larger number of homes, but with decreased need for space; in other words, future development will require higher density than what is presently encouraged.

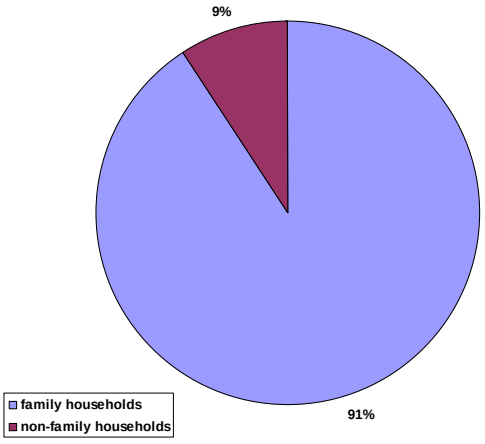
FIGURE 2.9- CALGARY HOUSEHOLD TYPES



Source: Sustainable Suburbs Study, 1995

Household typology within the proposed development will likely be comparable to nearby new South-Calgary Communities (Chaparral and McKenzie Towne) which are dominated by family households (Figure 2.10). This is a typical characteristic of suburban communities as young families are attracted by the space and safety of the suburbs.

FIGURE 2.10- SOUTH-CALGARY COMMUNITY HOUSEHOLD TYPES

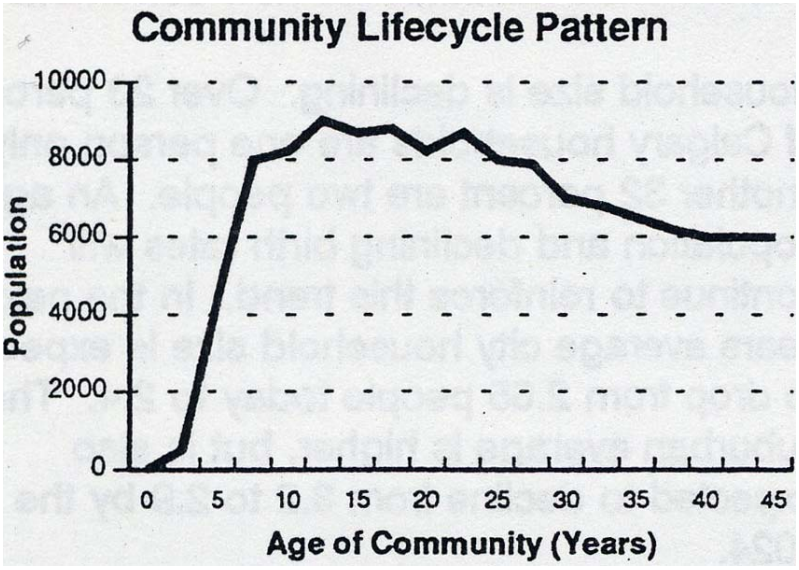


Source: Calgary Community Profiles, 2004\

2.2.4 Community Lifecycle

All communities undergo changes and developments in terms of their demographics as they age. Initially a typical suburb community (depending on the design) is expected to have a high population as young families locate there due to the price, location, and their mobility. As the community ages, children leave home and the community household size, along with the population, declines. Communities need to be well designed with flexibility in mind for the demographic transition that will occur after 20 years (Figure 2.11).

FIGURE 2.11- CALGARY COMMUNITY LIFECYCLE PATTERN



Source: Sustainable Suburbs Study, 1995

2.3 Income Mix Guidelines

2.3.1 Key Issues

Creating a community that has an income mix and is accessible to all households is one of the key goals of the Mahogany community plan. In reaching this goal, the project team used the Affordable Housing Continuum applied by the City of Calgary in its affordable housing policy (City of Calgary, 2004a):

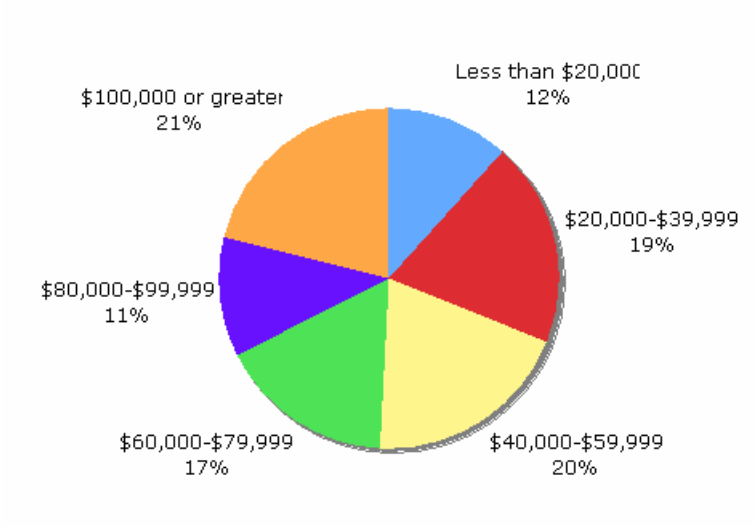
- Emergency shelters
- Transitional housing
- Subsidized / social housing
- Formal or informal rental housing (market)
- Affordable home ownership (market)

The income mix of the southeastern areas of Calgary has a higher share of households with higher incomes. The Mahogany community will address affordable housing provision through the two market mechanisms available: the rental housing market and affordable home ownership.

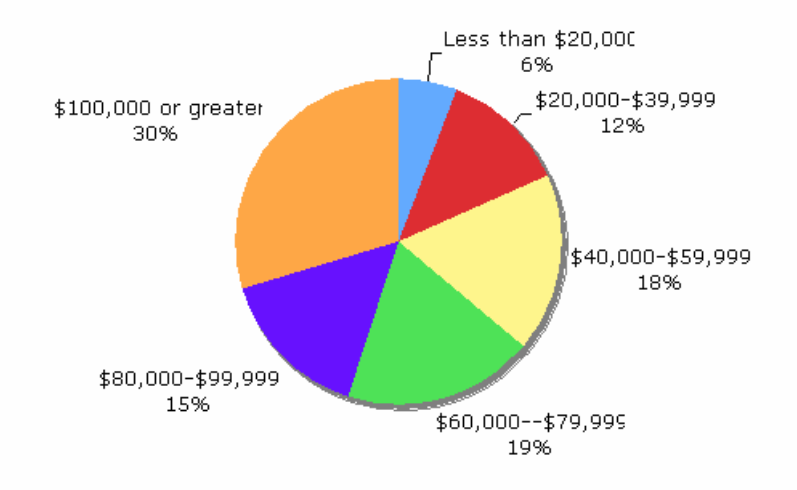
2.3.2 Affordable Home Ownership

There are many options to provide more affordable housing in the Mahogany community. Building a range of housing types makes it easier for households with different income to choose homes in the community. Accomplishing the provision of diverse housing types meant setting targets for households in a particular income group. Figure 2.12 presents the income mix of southeastern suburbs compared to the city average.

FIGURE 2.12- HOUSEHOLD INCOME IN CALGARY CMA AND SOUTHEASTERN SUBURBS



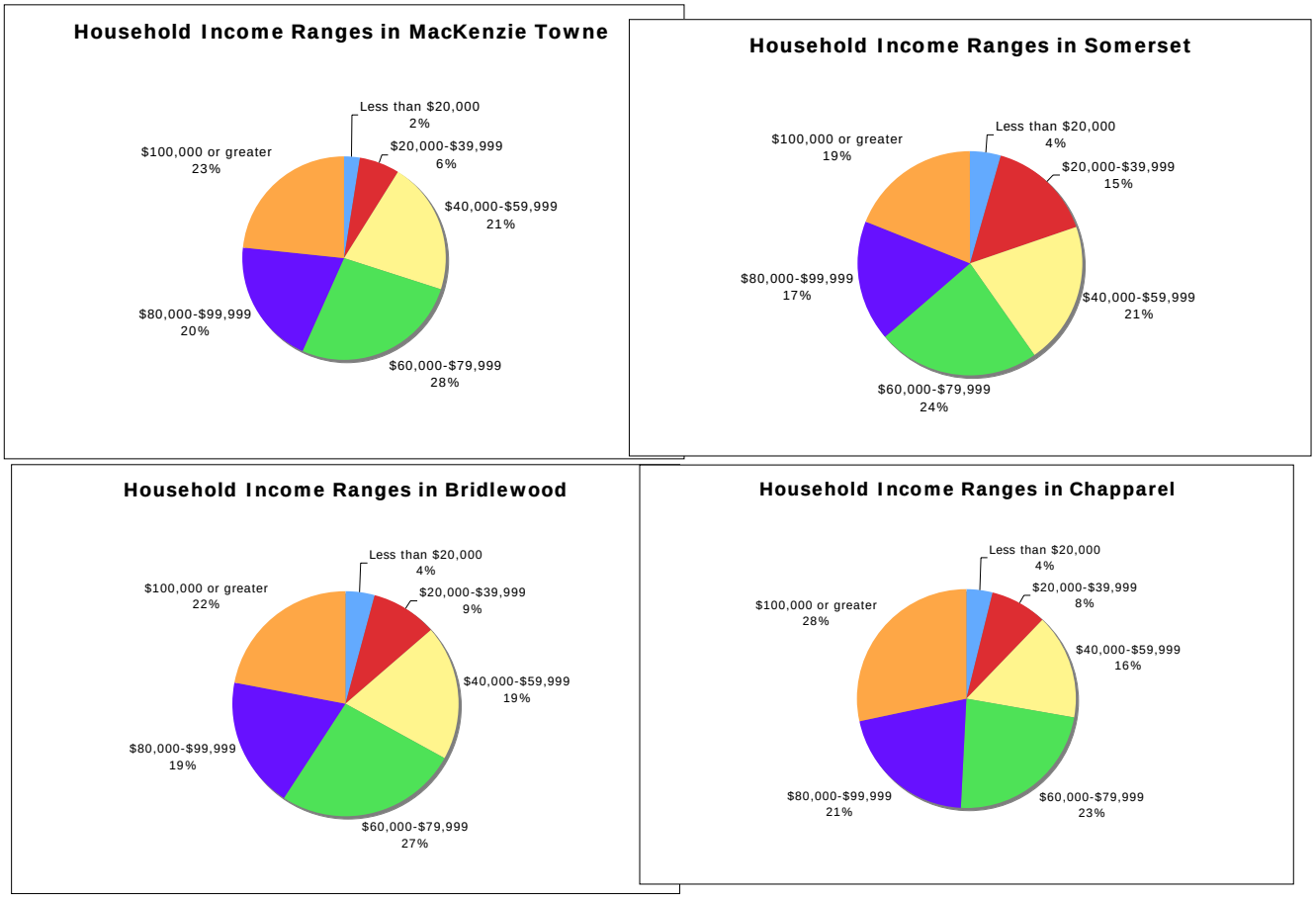
Household Income in Calgary's Southeastern Suburbs



Source: Statistics Canada, 2001.

The southeastern suburban area has a much higher proportion of households in the upper income ranges. Households that earn more than $100,000 per year make up 30% of all households, with households in the income range of $60,000 to $79,999 being 19%. Low income households are underrepresented and constitute 18%.

FIGURE 2.13- HOUSEHOLD INCOME IN SELECTED COMMUNITIES



Source: City of Calgary. 2001.

Four new communities in south and southeast Calgary were examined as case studies to illustrate the income mix of the newer communities in the south and southeastern suburbs of Calgary is even less balanced that the southeastern edge of the city as a whole. These newer communities contain less than 20% low income households.

2.3.3 Income Mix Targets

The vision for the Mahogany community is to provide a greater range of affordable options to encourage a greater income mix throughout the community. Mahogany's income mix targets would fall somewhere between Calgary's overall mix and that of the southeastern communities. Using the income mix of the four case study communities, some projections were made to create a more inclusive community within the limits of feasible implementation

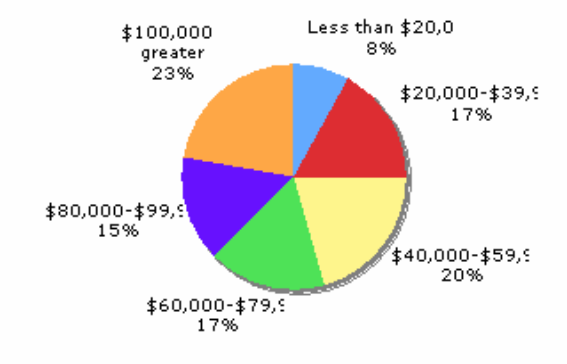
but not move the income targets so far that the implementation of targets would become unfeasible.

Table 2.3- Mahogany Income Mix Targets Compared with Calgary and Sotutheastern Communities

Proportion of Total Households

	Less than $20,000	*$20,000-$39,999*	*$40,000-$59,999*	*$60,000-$79,999*	*$80,000-$99,999*	*$100,000 or greater*
Calgary CMA	12%	19%	20%	17%	11%	21%
Southeastern Suburbs	6%	12%	18%	19%	15%	30%
Mahogany Targets	8%	17%	20%	17%	15%	22%

FIGURE 2.14- HOUSEHOLD INCOME MIX TARGETS FOR THE MAHOGANY COMMUNITY

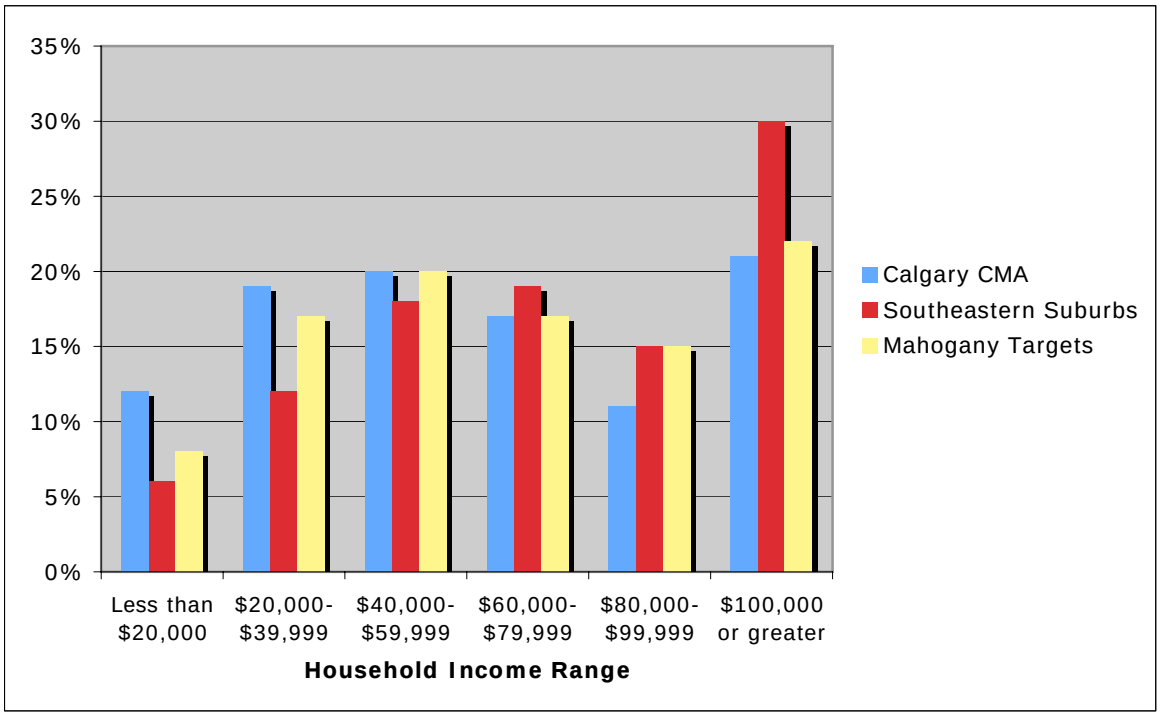


The targets for Mahogany were determined by employing the following criteria:

- Broaden the range of incomes than currently exists in the Southeastern suburbs; and
- Maintain an income mix that does not affect the profitability of the project.

The income ranges are compared below:

FIGURE 2.15- PROPORTION OF HOUSEHOLD INCOME RANGES BY AREA



In supporting this income mix through market housing, the types of housing that each income group would be able to purchase would need to be determined. The size of the mortgage that would be allowed to a household of a particular income can be used to determine the amounts of a particular type of housing in the neighbourhood.

Table 2.4- Income Mix and Available Housing Types

	Mix	*Price Range*	*Possible Housing Type*
Less than $20,000	8%	-	Apartments: Co-operative, Rental
$20,000-$39,999	17%	$63,000-$120,000	Small Townhouses, Condos
$40,000-$59,999	20%	$120,000-$196,000	Medium to high-end Townhouses, Condos, Small to Medium Single Family
$60,000-$79,999	17%	$196,000-$272,000	Medium Single Family
$80,000-$99,999	15%	$272,000-$348,000	Medium, Large Single Family
$100,000+	23%	$348,000+	Large, Very Large Single Family

Approximately 60% of those households that earn less than $20,000 per year would live in apartment dwellings, rental, co-op or non-market housing. The remaining would live in secondary suites in the single family homes. These would most likely be students or elderly

parents living with their children. Secondary suites will house 3% of the households in Mahogany.

Households with an income between $20,000-$40,000 will be able to borrow for modest housing of either apartments or small townhouses. Of this group it was estimated that about 70% would choose apartment living for the following reasons:

- The proximity of the hospital would be attractive to support staff whose incomes would we at this level;
- The price of townhouses is at this high end of this price range – townhouses would not likely sell for under $100,000; and
- Some households between $20,000 and $25,000 may opt to rent instead of buy.

The remainder will likely choose townhouse living.

Those households that bring in between $40,000 and $60,000 can afford townhouses at the lower end and small single family homes at the high end. Single family homes in the some of the neighbouring communities sell for as low as $160,000. As family sizes are larger in the suburbs, it is more likely that if a household could afford a single family home over a townhouse, they would purchase it. It is estimated that about 75% of households in this range would purchase the small single-family homes and the remaining 25% would purchase townhouses.

Households with income in the $60,000 - $80,000 range would likely be able to afford the medium single family homes in Mahogany. Medium and large single family homes are within reach of households that earn between $80,000 and $100,000, although medium single family homes are going to be purchased by those households closer to $80,000.

Many of the households that earn more than $100,000 per year are going to be able to afford the largest homes in Mahogany, although those households on the lower end of the income

level will likely stick to the large single family. Overall, it is expected that 70% will opt for the very large housing, leaving 30% for large single family homes.

Different housing types overlap with different income groups, but using the income mix above, the project team was able to develop the following targets:

Table 2.5- Recommended Housing Type Targets

Housing Type	*Percent of Mahogany Housing Stock*
Rental Housing or Co-op	5%
Apartments, Owned	15%
Rowhouses, Townhouses	10%
Small Single Family	15%
Medium Single Family	21%
Large Single Family	18%
Very Large Single Family	16%

Lot sizes for the single family units of housing were determined using templates from the Copperfield development as a starting point. The lot sizes are as follows:

- Small single family: 9.1 metres by 25 metres (0.056 acres)
- Medium single family: 11 metres by 25 metres (0.068 acres)
- Large single family: 13 metres by 36 metres (0.116 acres)
- Very large single family: 14.5 metres by 40 metres (0.143 acres)

Determining the size and density of the multi-family units required the setting of density goals at the beginning and working out the required space based on the number of units. The UPA was modified somewhat from the original goals.

- Townhouses and rowhouses: 26.3 units per acre
- Apartments: average of 58.8 units per acre

Lot sizes were determined and the following figure developed:

Table 2.6- Housing Units and Net Residential Density for Mahogany

Housing Type	% of Total	Units	Unit Space (acres)	Total Space	Net Res. Density
Apartments: Condo, Co-op, and Rental	20%	1586	0.017	27.0	58.8
Townhouses/Rowhouses	10%	793	0.038	30.1	26.3
Small Single Family	15%	1190	0.056	66.6	12.3
Medium Single Family	21%	1666	0.068	113.3	10.3
Large Single Family	18%	1428	0.116	165.6	7.0
Very Large Single Family	16%	1269	0.143	181.5	6.3
			Total Space	**584**	
			Net Res. Density	**13.6**	
Population	23000		**% of Land**	**53.1%**	
People per Household	2.9				
Total Number of Units	7931				
Total Land Area	1100				

2.3.4 Low Income Housing Options

The capacity for planners to plan for non-market housing is limited in Calgary. There are some options that can be recommended.

Rental Housing

It is very difficult for households that earn less than $20,000 per year to get a mortgage. These household need access to rental housing. While some people buy regular market housing and rent it out, a stable stock of rental housing must be available in Mahogany to maintain reasonable access to low income households.

Cooperative Housing

In rental co-op housing, tenants pay less rent than the market would offer, but are also required to perform maintenance work around the building, often putting in a few hours of work per week or month (Roseland, 1998: 151, 152). Having the tenants perform these tasks minimizes the costs of maintenance, keeping the low rents feasible. While it is difficult to predict who much co-op housing would be made available, it is hoped that at least 100 units would be available in this form.

Secondary Suites

Building secondary suites into a certain percentage of the single family homes will not only increase the vitality of the neighbourhood with higher density, but will also provide affordable housing for low income households. The challenge with secondary suites is that the City of Calgary requires significant investment in the house to maintain the secondary suite, adding to its cost. Secondary suites will be an option in all types of single family homes. The secondary suites will add to the size of the home, but additional lot sizes will not be required.

Assisted Senior's Housing

Given the community's proximity to the planned regional hospital, there is an opportunity to provide housing to senior citizens who would benefit from being able to live near the hospital. While providing subsidized housing may not be within the capacity of a private developer, there is an opportunity to work with a provider of assisted housing to allow for this sort of development.

It is critical that the location for the senior's housing be located somewhere in the southwestern portion of the site or near the future light rail transit station, as some senior citizens could have trouble getting around. They need easy access to the facilities that the

hospital offers. Taking senior's housing from the total stock of affordable units, it is hoped that approximately 160 housing units would be made available.

2.4 Distribution of Housing Types

Density levels throughout the community must also be modified so as to be able to achieve the proper densities in the mixed use core to be able to support business and the planning rapid transit. The community was roughly divided into 6 areas and a different housing was applied to each one.

FIGURE 2.16- SUB-COMMUNITIES

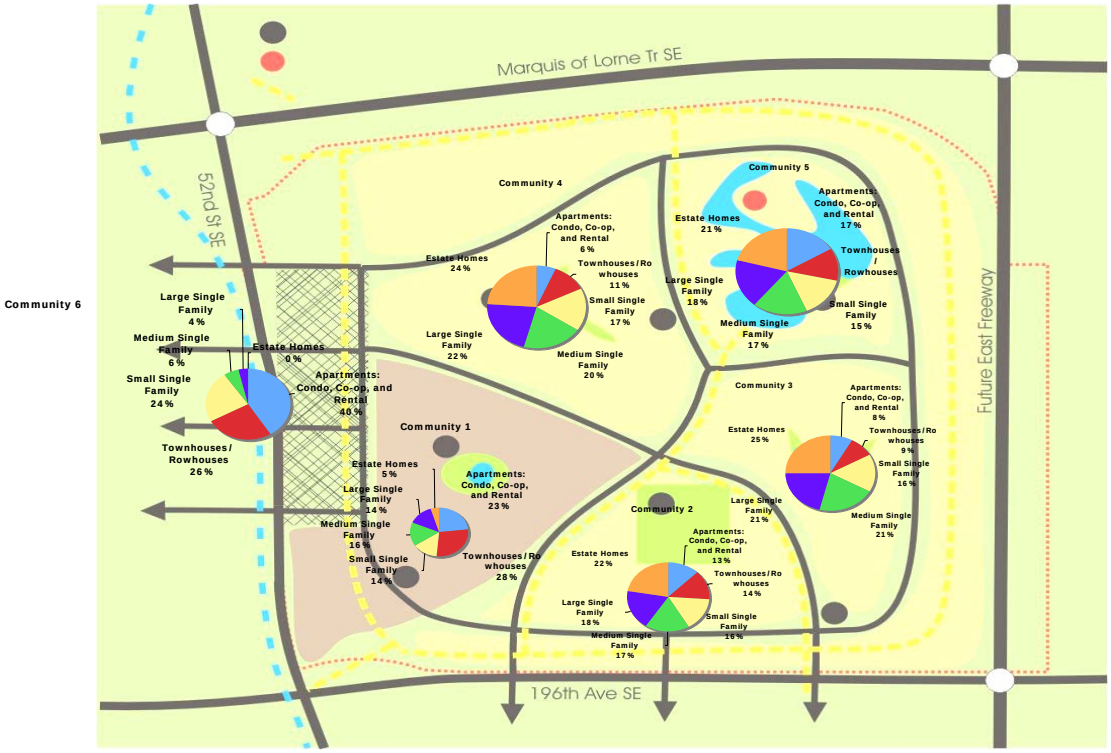


Table 2.7- Sub-community Breakdown

Community 1: Higher Density Area

	% of Total Stock	Units	Space (acres)	Total Space
Apartments: Condo, Co-op, and Rental	0.25	397	0.017	6.7
Townhouses/Rowhouses	0.3	238	0.038	9.0
Small Single Family	0.15	178	0.056	10.0
Medium Single Family	0.17	283	0.068	19.3
Large Single Family	0.15	214	0.116	24.8
Very Large Single Family	0.05	63	0.143	9.1

Units	1374	Res Space	78.9
Population	3984	Total Space	100.3
		UPA	13.7

Community 2: Lower Res Area 1

	% of Total Stock	Units	Space (acres)	Total Space
Apartments: Condo, Co-op, and Rental	0.13	206	0.017	3.5
Townhouses/Rowhouses	0.14	111	0.038	4.2
Small Single Family	0.16	190	0.056	10.7
Medium Single Family	0.18	300	0.068	20.4
Large Single Family	0.19	271	0.116	31.5
Very Large Single Family	0.23	292	0.143	41.7

Units	1370	Res Space	112.0
Population	3974.4	Total Space	142.2
		UPA	9.6

Community 3: Lower Res Area 2

	% of Total Stock	Units	Space (acres)	Total Space
Apartments: Condo, Co-op, and Rental	0.08	127	0.017	2.2
Townhouses/Rowhouses	0.09	71	0.038	2.7
Small Single Family	0.16	190	0.056	10.7
Medium Single Family	0.21	350	0.068	23.8
Large Single Family	0.21	300	0.116	34.8
Very Large Single Family	0.25	317	0.143	45.4

Units	1355	Res Space	119.5
Population	3931	Total Space	151.7
		UPA	8.9

Community 4: Lower Res Area 3

	% of Total Stock	Units	Space (acres)	Total Space
Apartments: Condo, Co-op, and Rental	0.06	95	0.017	1.6
Townhouses/Rowhouses	0.11	87	0.038	3.3
Small Single Family	0.16	190	0.056	10.7
Medium Single Family	0.19	316	0.068	21.5
Large Single Family	0.21	300	0.116	34.8
Very Large Single Family	0.23	292	0.143	41.7

Units	1281	Res Space	113.6
Population	3715	Total Space	144.3
		UPA	8.9

Community 5: Lake Area

	% of Total Stock	Units	Space (acres)	Total Space
Apartments: Condo, Co-op, and Rental	0.19	301	0.017	5.1
Townhouses/Rowhouses	0.14	111	0.038	4.2
Small Single Family	0.17	202	0.056	11.3
Medium Single Family	0.2	333	0.068	22.7
Large Single Family	0.21	300	0.116	34.8
Very Large Single Family	0.24	305	0.143	43.6

Units	1552	Res Space	121.6
Population	4501	Total Space	154.5
		UPA	10.0

Community 6: TOD Area

	% of Total Stock	Units	Space (acres)	Total Space
Apartments: Condo, Co-op, and Rental	0.35	555	0.017	9.4
Townhouses/Rowhouses	0.22	174	0.038	6.6
Small Single Family	0.2	238	0.056	13.3
Medium Single Family	0.05	83	0.068	5.7
Large Single Family	0.03	43	0.116	5.0
Very Large Single Family	0	0	0.143	0.0

Units	1094	Res Space	40.0
Population	3172	Total Space	50.8
		UPA	21.5

2.5 Housing Types

2.5.1 Inventory of Housing Types

The housing types in Calgary can be roughly divided into single family detached and multi-family house, which includes semi-detached, duplex, townhouse and apartment building.

Definitions (The Calgary Land Use Bylaw)**:**

S**ingle-detached dwelling** means a single residential building containing one dwelling unit only but does not include a mobile home.

semi-detached dwelling means a single building designed and built to contain two side-by-side dwelling units, separated from each other by a party-wall extending from foundation to roof;

Duplex means a single building containing two dwelling units, one above the other, each having a separate entrance;

Townhouse means a single building comprised of three or more dwelling units separated one from another by party-walls extending from foundation to roof, with each dwelling unit have a separate, direct entrance from grade and includes all row, linked, patio, garden court or other housing which meet such criteria;

Apartment building means a single building comprised of three or more dwelling units with shared entrance facilities, where none of the dwelling units are rented or are available for rent or occupation for periods of less than 30 days;

2.5.2 Distribution of Housing Types

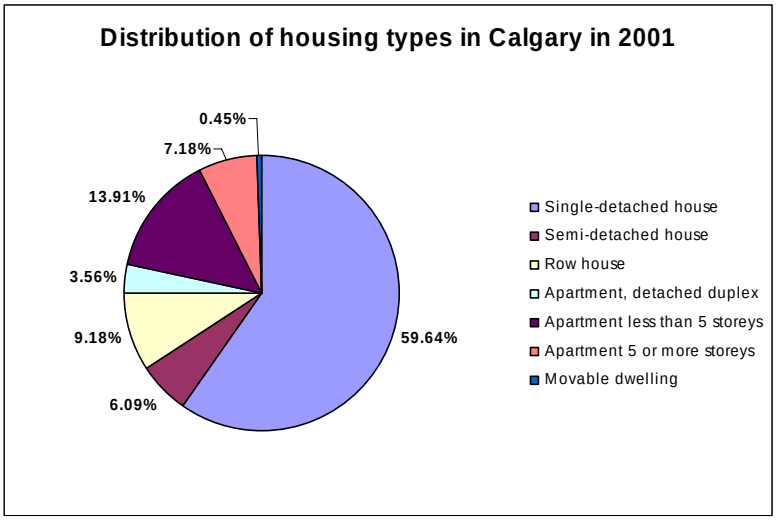
Analysis of the distribution of housing types in Calgary and the communities around Mahogany, such as McKenzie Towne and Chaparral, informs the community planning targets for Mahogany.

Table 2.8- Distribution of housing types in Calgary, 2001

Housing Types	Single-detached house	Semi-detached house	Row house	Apartment, detached duplex	Apartment less than 5 storeys	Apartment 5 or more storeys	Movable dwelling	Total
Units	198530	20260	30550	11850	46290	23915	1500	332895
%	59.64%	6.09%	9.18%	3.56%	13.91%	7.18%	0.45%	100.00%
Average dwelling value								189275

Source: EVDP 636 Community Profile's data

FIGURE 2.17- DISTRIBUTION OF HOUSING TYPES IN CALGARY IN 2001



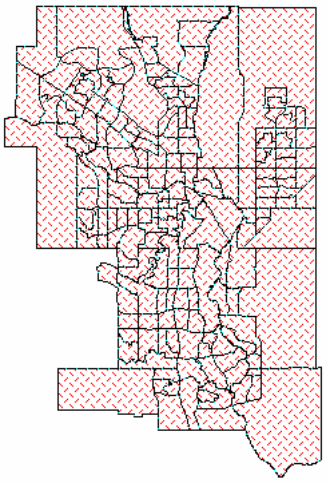
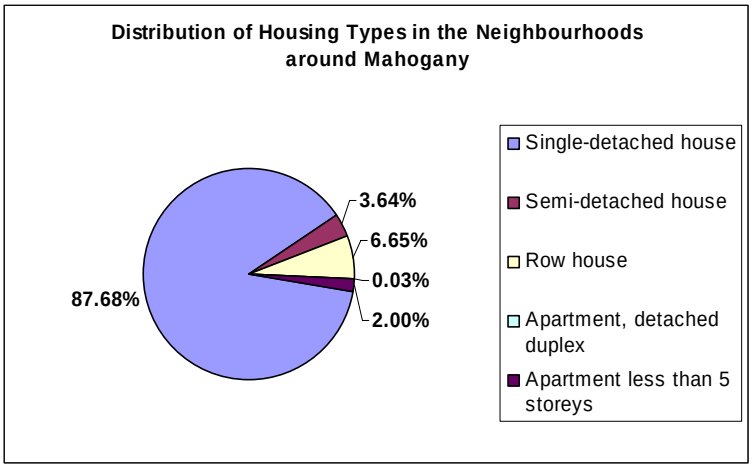


Table 2.9- Distribution of housing types in neighbourhoods around Mahogany, 2001

Housing types	Single-detached house	Semi-detached house	Row house	Apartment, detached duplex	Apartment less than 5 storeys	Total
Units	15155	630	1150	5	345	17285
% of Total	87.68%	3.64%	6.65%	0.03%	2.00%	100.00%
Average Dwelling Value						$221,924

Source: EVDP 636 Community Profile's data

FIGURE 2.18- DISTRIBUTION OF HOUSING TYPES IN THE NEIGHBOURHOODS AROUND MAHOGANY



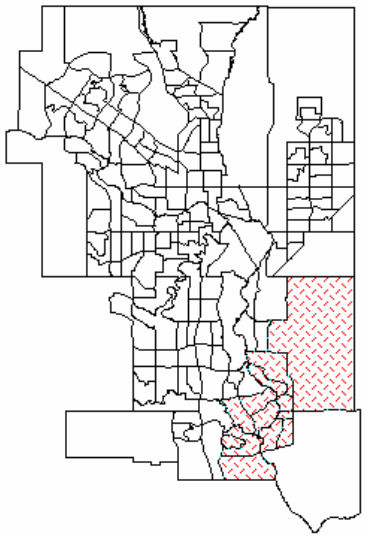


Table 2.10- Distribution Housing Types in McKenzie Towne, 2003

Housing Types	Unit	% of Total
Single-detached house	955	76.71%
Row house	180	14.46%
Apartment, building that has fewer than five storeys	110	8.84%
Total	1245	100.00%
Average number of bedrooms per dwelling		2.9

FIGURE 2.19- DISTRIBUTION OF HOUSING TYPES IN MCKENZIE TOWNE

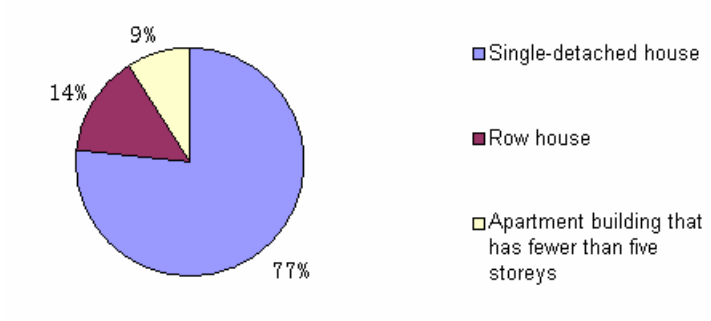
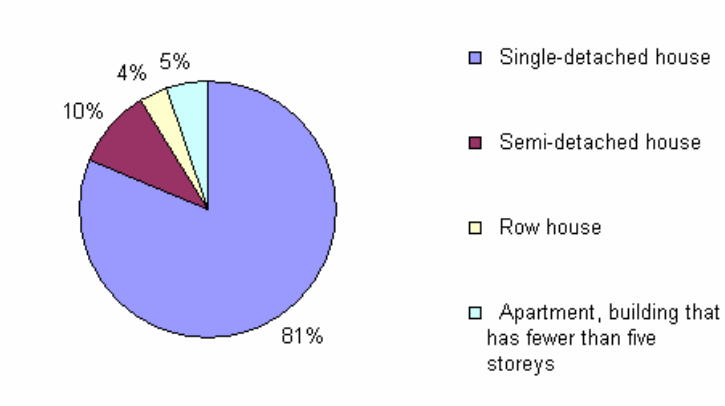


Table 2.11- Distribution Housing Types in Chaparral, 2003

Housing Types/units	Units	% of Total
Single-detached house	1170	81.25%
Semi-detached house	140	9.72%
Row house	55	3.82%
Apartment, building that has fewer than five storeys	75	5.21%
Total	1440	100.00%
Average number of bedrooms per dwelling		3

FIGURE 2.20- DISTRIBUTION OF HOUSING TYPES IN CHAPARRAL



2.5.3 Mahogany Housing Example:

FIGURE 2.21- APARTMENTS: RENTED, CO-OP, OWNED

Source: www.remax.ca

FIGURE 2.22- TOWNHOUSE: SMALL, MIDDLE AND HIGH-RISE

Source: www.remax.ca

FIGURE 2.23- SINGLE, MEDIUM AND LARGE SINGLE FAMILY

Source: www.remax.ca

FIGURE 2.24- VERY LARGE SINGLE FAMILY HOME

2.5.4 Housing supply forecast and affordable house price

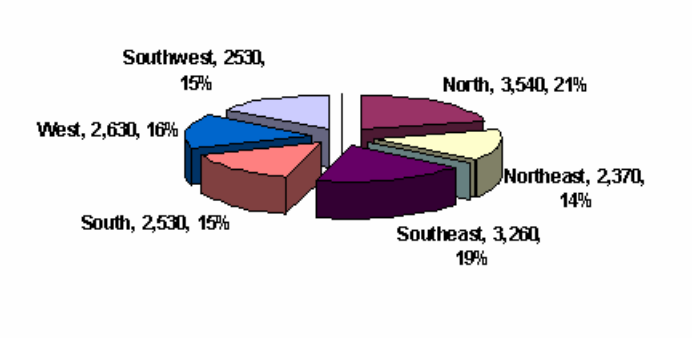
The demand for new housing in the next few years in Calgary is driven by both an increase in the number of households and changes in consumer housing needs/preferences. It is projected that single family house will still dominate the housing market in the next few years. The demand for new single family/duplex units is expected to add an average of 6,100 units per year to 2007 (Short-Term Growth Management Strategy: Residential Information Update 2003-2007). This will result in an increase of approximately 17,000 new units (city-wide) between 2005 and 2007.

According to Short-Term Growth Management Strategy: Residential Information Update 2003-2007, the distribution of housing supply by sector in the next three years will be:

Table 2.12- Probable Housing Supply, By Sector (2005-2007)

Year/Sector	2005		2006		2077		Average %	Total Units	Total Land Area
	%	Units	%	Units	%	Units			
North	20%	1,130	21%	1,190	22%	1,220	22%	3,540	590
Northeast	14%	790	14%	790	14%	790	14%	2,370	395
East	0%	-	0%	-	0%	-	0%	-	-
Southeast	18%	1,020	19%	1,070	21%	1,170	21%	3,260	543
South	15%	850	15%	850	15%	830	15%	2,530	422
West	16%	900	16%	900	15%	830	15%	2,630	438
Southwest	17%	960	15%	850	13%	720	13%	2530	422
Total	100%	5,650	100%	5,650	100%	5,560	100%	16,860	2810

FIGURE 2.25- HOUSING SUPPLY FORECAST (2005-2007)



In Calgary, affordable housing projects are targeted to households with 65 percent or less of the area median income, and it means the households with a before-tax income of $37,621 per year or less. Affordable ownership limit ranges are based on 32 percent of gross household income (Affordable housing Calgary Research Summary #01, 2004), with a mortgage to income ratio of 3 to 1. Assuming that the average down payment is 10% of the house price, we can calculate average affordable house prices for different income groups.

Table 2.13- Average affordable house prices for different income groups

Income groups	Average Income	Eligible for the mortgage	Affordable house price
Individual	$34,522	$103,566	$115,073
Family	$63,161	$189,483	$210,537
Family Income for Female Single Parent Families	$37,008	$111,024	$123,360
Single Persons	$30,154	$90,462	$100,513

Source: Calgary and Region Socio-Economic Outlook 2003–2008

2.5.5 Residential Density

Table 2.14- Density for Various Building Forms

Low Density	5-8 upa	Medium Density	11-18 upa	High Density	20+ upa
Single detached on:		Small Singles on 30' lots	11 upa	Stacked Townhouses	20-25 upa
60' lots	5 upa	Semi-detached on 30' lots	11 upa	Walk-up Apartments	20-25 upa
50' lots	6 upa	Semi-detached on 27' lots	12 upa	Low-rise Apartments	30-40 upa
40' lots	8 upa	Street Townhouses	15 upa	Four to eight storey	40-80 upa
		Courtyard Townhouses	18 upa	Eight + storeys	80+ upa

Source: Increasing Density through Lot Size and Design - How the Strategy Works n.d.

- **Recommendation of Land Use Zoning:**

To maximize the opportunity for affordable housing, we should increase density and reduce the infrastructure cost per unit, and these can be achieved by applying small lot zoning (RS-1 and RS-2) for single-detached and promote Residential Medium Density Multi-dwelling (RM-4) zoning in Mahogany.

- **Outline of related land use zoning** (The Calgary Land Use Bylaw):

  Residential Single-detached (R-1)

  - Building Height: maximum of 10 metres.
  - Lot Width: minimum of 12 metres for lots
  - Lot Depth: minimum lot depth of 22.75 metres.
  - Lot Area: minimum of 330 square metres for lots subdivided

Residential Small Lot (RS-1&RS-2)

- single-detached or semi-detached dwellings on small lots
- Building Height: maximum of 10 metres
- Lot Depth: minimum lot depth of 22.75 metres
- Lot Area (minimum):
    - Single-detached - 233 square metres

      - Semi-detached - 466 square metres per building with a minimum of 186 square metres for one of the two dwelling units.

      - Duplex - 466 square metres

Residential Low Density Multi-dwelling (RM-1)

- Building Height: (maximum) three storeys, 9 metres
- Density: maximum of 44 units per hectare (18 units per acre)

Residential Medium Density Multi-dwelling (RM-3)

- Building Height: (maximum) three storeys, 9 metres
- Lot Width: minimum of 7.5 metres.
- Density: maximum of 111 units per hectare (45 units per acre)

Residential Medium Density Multi-dwelling (RM-4)

- Building Height: (maximum) three storeys, 9 metres
- Density (maximum)
    - RM-4: 60 units per acre
    - RM-4/125: 50 units per acre
    - RM-4/100: 40 units per acre
    - RM-4/75: 30 units per acre

- **Lot Size of Single Detached**

We use the lot size design of Copperfield as a reference.

Table 2.15- Lot Size of Single Detached In Copperfield

(meter)	Min.	Max.	Average
Width	8	12	11

Depth	30	48	36

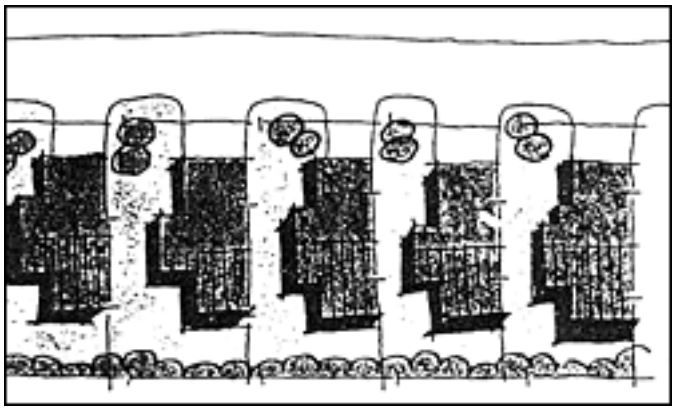
Source: www.copperfield.ca

- **Approaches to increase density** (CMHC n.d.)

In order to increase density and improve affordability, we can modify lot size applying the approaches listed below:

- *Conventional Layout using Narrower Lots:* By reducing the width of the frontage, narrow lots not only increase higher densities but also retain conventional housing patterns.
- *Zero Lot Line:* The zero lot line approach takes advantage of limited space on small lots by allowing the house to be situated on one of the side lot lines, and in some instances the rear and/or front lot line as well. Shifting the house in these ways places all of the open yard space into one area, which gives the small lot the appearance of being much larger. One of the major thrusts behind the zero lot line design creation was to preserve some of the privacy and yard usage that is generally afforded to more conventional single-detached dwellings.

FIGURE 2.26- ZERO LOT LINE

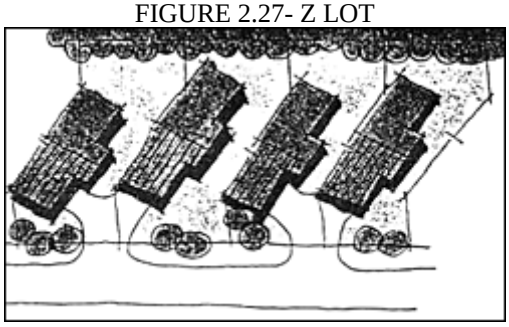


Source: Progressive Architecture

- *Z Lot:* The Z lot was a response to concerns associated with reduced privacy and reduced street presence in the narrow lot design of zero lot line layouts. In Z lots, the axis of the house is rotated 30 to 45 degrees. More of the house's perimeter, therefore,

is exposed to the street and garages do not dominate the frontage. The diagonal positioning of the housing also provides the perception of a larger yard area.

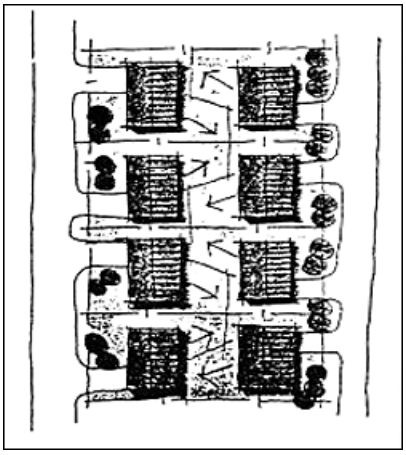
FIGURE 2.27- Z LOT



Source: Progressive Architecture

- *Zipper Lot:* In zipper lots the rear lot line alternately jogs back and forth to create open space in one portion of the lot as shown below.

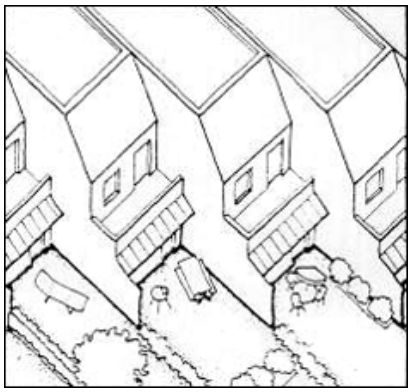
FIGURE 2.28- ZIPPER LOT CONFIGURATION



Source: Progressive Architecture

Variations on the zipper lot accommodate different types of housing. For example, when rows of units are staggered to improve privacy between adjacent outdoor areas (below) a zipper formation may be created with the rear yards on the neighboring street.

FIGURE 2.29- STAGGERED ROW HOUSES



Source: Henry Fliess (1980) Site Planning Guidelines for Medium Density Housing, prepared for the Ontario Ministry of Housing

2.6 Street Layout

2.6.1 Effects of Street Layout on Housing

The way in which streets are configured in new developments has a direct effect on the planning and design of housing. There are three key elements in how this relationship is manifested. First, streets often consume large amounts of land: often over 30%. This land consumption is costly to developers both in terms of raw materials needed to pave these roads (asphalt) and in that it consumes land which could be used for development. The second factor is that the widths and types of roads used also have an effect on the net developable land. If the design is one which requires a large percentage of arterial and collector roads, more developable land will be consumed as these types or roads are required to be of a greater width. Moreover, different road standards are available and decisions regarding which standards to follow will have an effect upon the net developable area. The third, and quite possibly most important factor is that different layouts and standards directly affect both the quality of life and the character of residential neighbourhoods. Some layout types allow for easy connections and legibility but at the cost of traffic congestion and a lack of privacy. Conversely, some layouts create safe, traffic free places for children to play, but are so difficult to understand that they act as virtual mazes. A balance needs to be struck between connectivity/legibility with safety/privacy. Moreover, roads need to be properly

defined to bring them down to a more human scale. All of these factors are important to consider in looking at a neighbourhood road structure. In investigating these areas we hope to create a functional and aesthetically engaging vision for Community B.

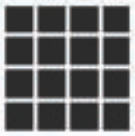
2.6.2 Benefits of different layout systems

In considering how to layout the streets in Mahogany it will be useful to consider three main alternatives: the grid, the hierarchical system and the modified grid.

Most developments in North America follow a variant of one of the first two systems. It is important to note that different systems consume different amounts of land as illustrated by the following chart:

FIGURE 2.30- CMHC LAYOUT INFORMATION

Figure 1: Comparison of area used for streets, among five typical patterns

	 **Square grid** (Miletus, Houston, Portland, etc.)	 **Oblong grid** (most cities with a grid)	 **Oblong grid 2** (some cities or in certain areas)	 **Loops** (Subdivisions - 1950 to now)	 **Culs-de-sac** (Radburn - 1932 to now)
Percentage of area for streets	36.0%	35.0%	31.4%	27.4%	23.7%
Percentage of buildable area	64.0%	65.0%	68.6%	72.6%	76.3%

Source – CMHC 2002

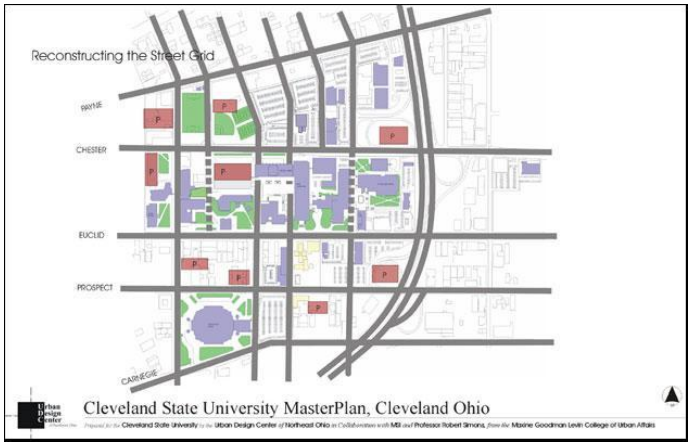
Thus we may ask what the advantages are to each of these systems.

The Grid

The grid system has been with us since the time of the Romans, and with good reason! It is easily adaptable and provides a standard, which can be applied anywhere. The grid layout makes it simple to get around a neighbourhood as it offers many different choices of routes.

Moreover, orientation in a grid is relatively simple due to the legibility and predictability of the network.

FIGURE 2.31- A TYPICAL GRID PATTERN



Source: Cleveland State University

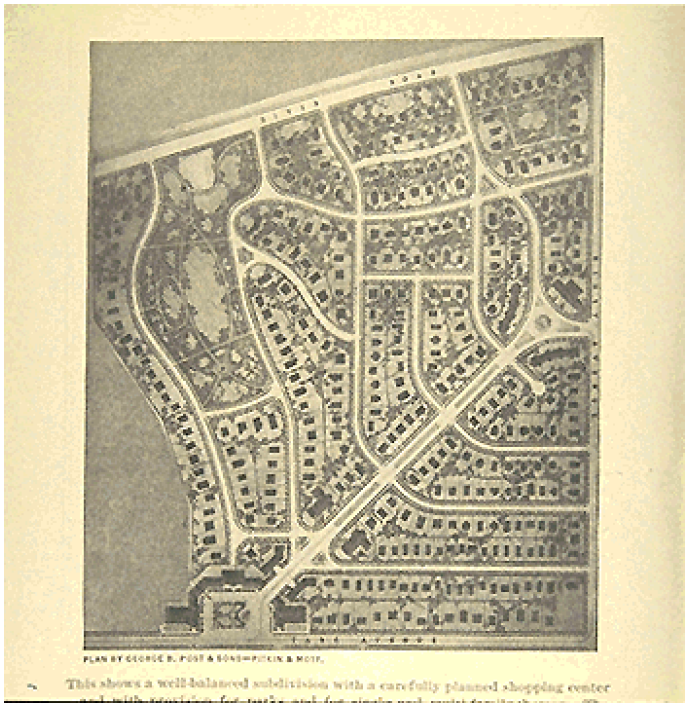
Despite the benefits of this system it has two major drawbacks. First, the repeating patterns are usually very expensive and consume large amounts of land that could have been developed. The other problem is that the grid system, in creating many different options for vehicles, can lead to traffic problems on residential streets. Drivers often shortcut through residential streets which can lead to problems such as poor safety, noise pollution and lack of privacy. For these reasons the majority of suburban development in North America generally follows a version of the hierarchical system.

The Hierarchical System

After the 1950s a new layout form took over suburbia: the hierarchical system (also known as the curvilinear system and the branching system). This system is typical of Calgary's suburbs. The familiar layout creates a hierarchy of roads which branch out into smaller roads, eventually dead-ending at cul-de-sacs. This pattern is useful in that it directs traffic away from residential areas and thus (theoretically) mitigating conflicts between pedestrians and automobiles and lessens the effects of the automobile such as pollution and noise.

Moreover, the hierarchical system consumes a much smaller amount of space for roads and thus, allows for a greater profit for developers.

FIGURE 2.32- HIERARCHICAL PATTERN



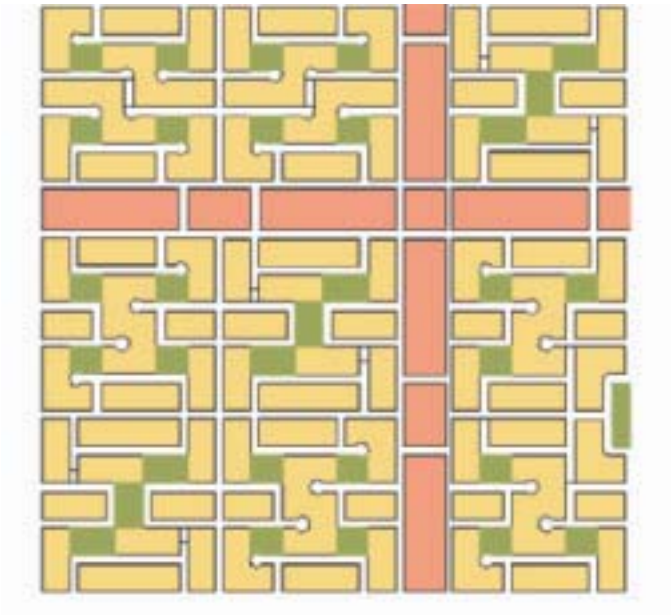
Source – Technical Bulletin Number 5

The problem with this structure is that it is very confusing and difficult to orient oneself. The street pattern, often seems to evolve and change at random. Also, the funnelling of traffic onto major arterials, often puts too much pressure on these roads. Therefore, these roads are either congested, or are built at a large scale making them difficult to negotiate for pedestrians. This brings us to perhaps the biggest problem for this type of system: it almost completely neglects the pedestrian. The road system is designed to force automobiles to detour around residential areas, however, while this detour may cost a car driver an extra 2 minutes it can take a pedestrian ten times as long, and due to the hierarchical nature of the streets there are often no other route options as there are in a grid.

The Fused Grid

The challenge for planners was to come up with a system that has the legibility and connectivity of the grid and the privacy and traffic isolation of the hierarchical system. Thus a new street form is beginning to gain acceptance as a viable third alternative: the fused grid.

FIGURE 2.33- FUSED GRID



Source CMHC 2002

This system has a number of important features, which we feel make it worth considering as a model for Mahogany:

- The grid pattern makes the layout legible, understandable and predicable
- The street layout avoids short cutting by vehicles, however allows routes for pedestrians that are not open to automobiles
- The grid allows for easy walking and cycling
- The straight arterial streets allow easy integration of transit (bus routes)
- The pattern is considerably lower cost than a traditional grid and allows almost as much land to be developed as a hierarchical system.

Table 2.16- Comparison of Land Use

Table 1: Comparison of land use distribution among three alternative site plans						
	Conventional loop and cul-de-sac		Traditional grid		Residential quadrant	
	acres	percentage	acres	percentage	acres	percentage
Residential	454.5	54.5	390.3	46.8	435.3	52.2
Commercial and institutional	31.7	3.8	55.0	6.6	55.0	6.6
Recreation and open space	84.2	10.1	100.9	12.1	100.9	12.1
Streets	240.2	28.8	264.4	31.7	220.2	26.4
Vacant land	22.5	2.7	22.5	2.7	22.5	2.7
TOTAL LAND AREA	834.0	100.0	834.0	100.0	834.0	100

Source: CMHC 2002

As shown above the fused grid (residential quadrant) model actually allows for a greater portion of developable land than the conventional cul-de-sac (28.8% for cul-de-sac and 26.4 percent for residential quadrant). As such we recommend that the bulk of the development follow a fused grid system.

It has been suggested that the fused grid model may be difficult to implement in Calgary, due to the city's tendency to create large parks for ease maintenance. As such, the city may resist the creation of several small parks creating the same connectivity problems as the hierarchical system. Despite these potential difficulties, we believe that the developer should still pursue the fused grid model for two reasons. First, a key consideration for a developer should be: 'how is our development going to stand out from the rest?'. The fused grid model has had limited applications thus far in Stratford Ontario and East Clayton (CMHC) and has yet to be applied in Alberta. Thus, the unique layout could set Community B apart from other communities. Second, in applying the fused grid it is not necessary to create a large number of one-acre parks, rather the key is to provide the type of connections that the grid would provide. These connections could be provided by pathways as well as parks. Since pedestrian pathways are common in Calgary, this should help to mitigate resistance from the city.

Although we are recommending the use of the fused grid for most of Community B, due to the existence of a wetland in the north-western portion of the property, this section should follow a more curvilinear pattern in order to preserve the wetland. Moreover, the preservation of this area would allow for the creation of a park/amenity space for the enjoyment of all of the residents.

2.6.3 Road standards

Current road standards in Calgary require that roads, regardless of the layout type chosen, consume much of the land. The standards used in most Calgary development are as follows:

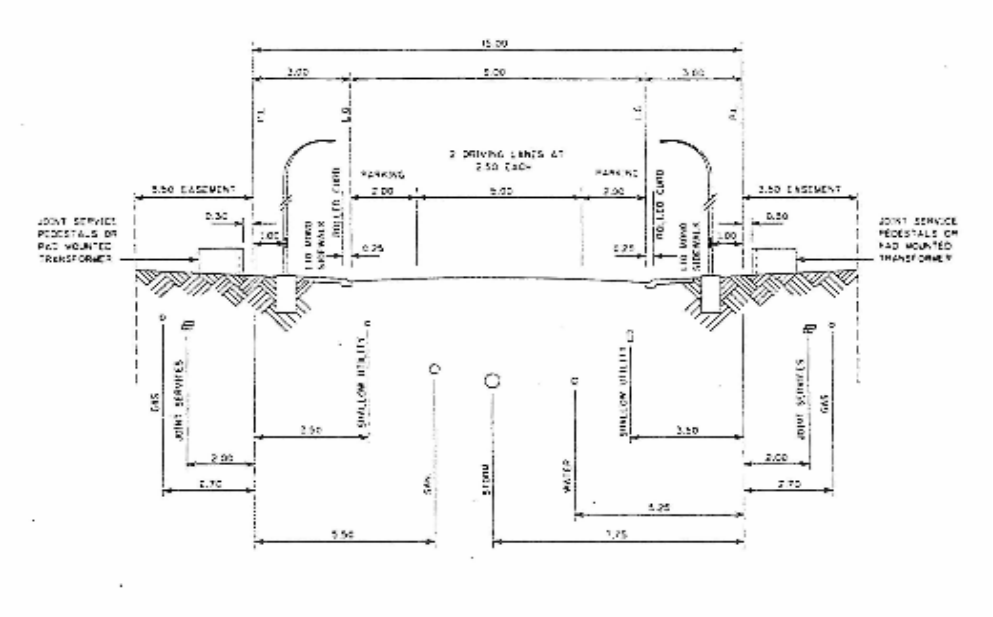
Table 2.17- Residential street widths

Street Type	Right-of-way size (m)	Carriageway size (m)
Residential – Parking both sides	15	9
Collector – Parking one side	19	9.5
Collector – Parking both sides	21	11.5
Residential Entrance Street	22.5	13
Undivided primary Collector	23.5	14
Primary Collector	27	14
Primary collector	32	19
Local Major	27	14
Undivided Major	30	14.8

Source: Design Guidelines for Subdivision Servicing

Below is a cross section of a typical residential street:

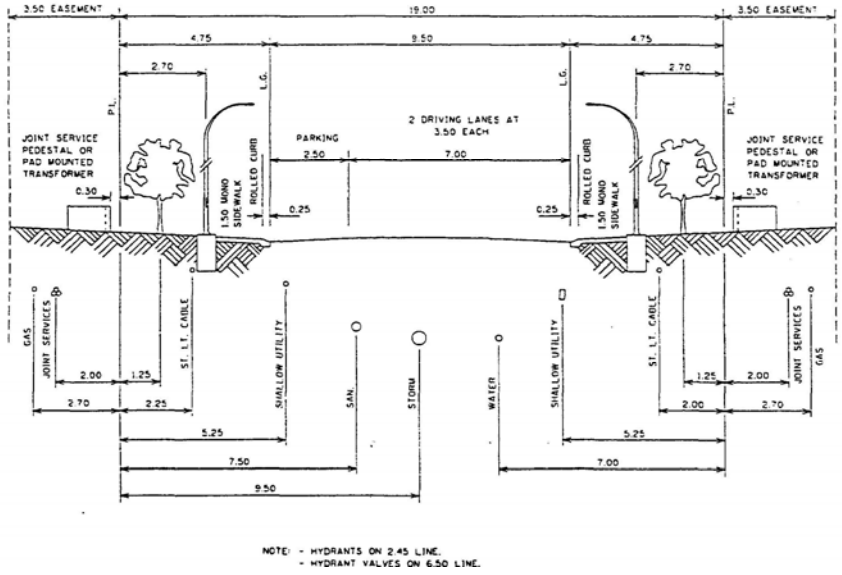
FIGURE 2.34- RESIDENTIAL STREET



Source - Design Guidelines for Subdivision Servicing

And of a typical collector street:

FIGURE 2.35- COLLECTOR STREET

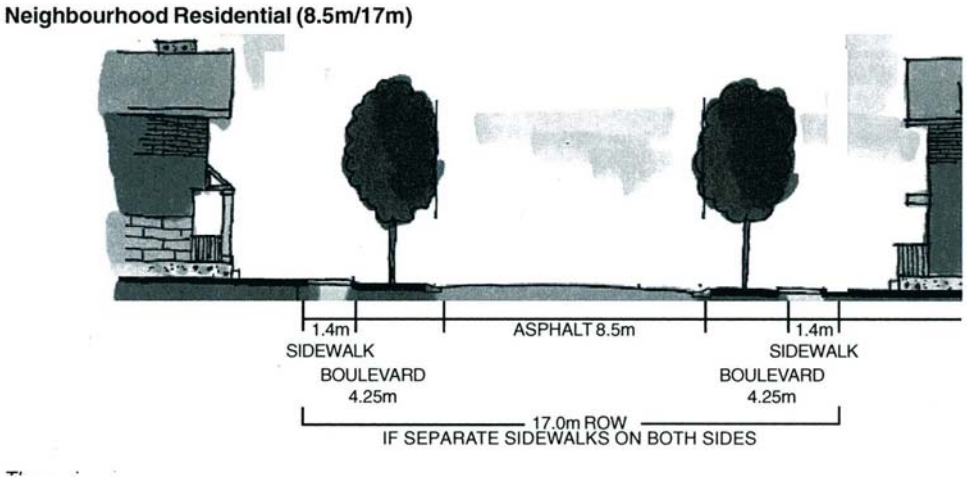


Source - Design Guidelines for Subdivision Servicing

Alternative road standards

The engineering road standards discussed above are not set in stone. Garrison Woods and McKenzie Town are two communities which have successfully lobbied to create reduced street widths.

FIGURE 2.36- GARRISON WOODS RESIDENTIAL STREET

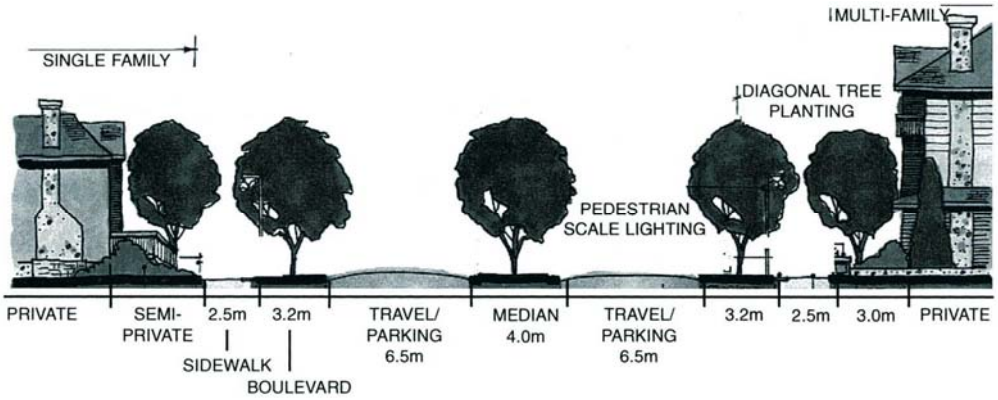


Source: City of Calgary 1998

Since precedent has been set for this model in Garrison Woods, and the variation is small, it should be possible to get this width of streets within Mahogany. Moreover, further variation may be possible. The above model includes space for parking on both sides of the street and allowing parking only one side could further reduce street widths.

In terms of arterials the grand boulevard concept, successfully used in Garrison Woods is a model worthy of consideration. Although this road type consumes a bit more land, it is more aesthetically engaging and should bring some charm and character to a normally bland and unwalkable street type.

FIGURE 2.37- GARRISON WOODS GRAND BOULEVARD



Source: City of Calgary 1998

2.6.4 Housing setbacks

People feel more comfortable in neighbourhoods where buildings and landscaping frame the street. Developments that feature wide roads with no sidewalks and which contain large front setbacks with massive parking lots do not encourage pedestrian use. Buildings that are closer to the lot line give the street definition, which calms traffic and makes the street more inviting to pedestrians (Montgomery Planning Commission). For these reasons, setbacks should be reduced in Mahogany. This would create a more aesthetically engaging experience and could help to foster community interaction.

FIGURE 2.38- NEW URBANIST STREET

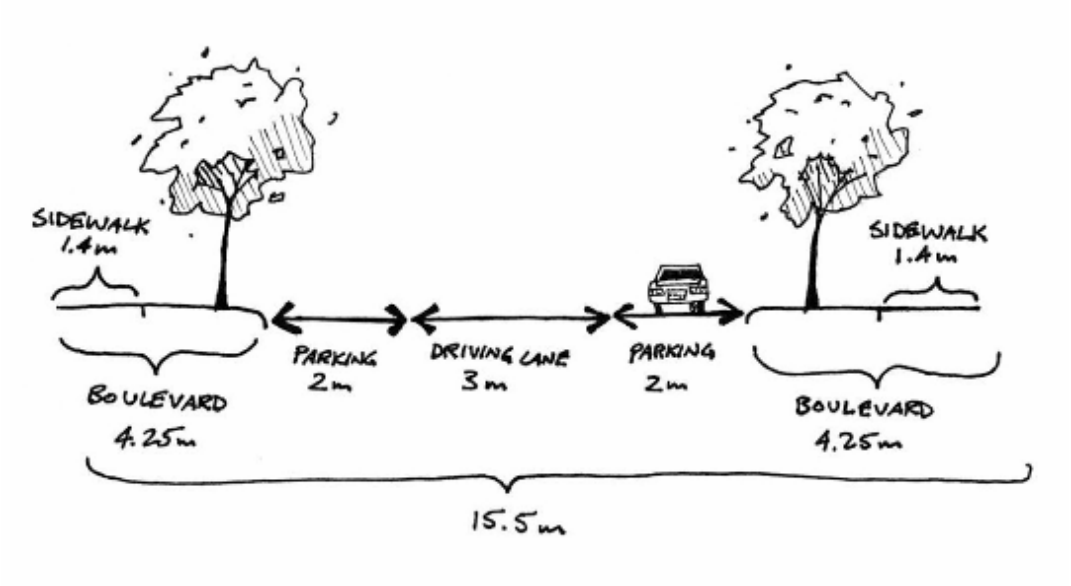
Source: New Urbanist News

2.6.5 Unique Features

One way streets

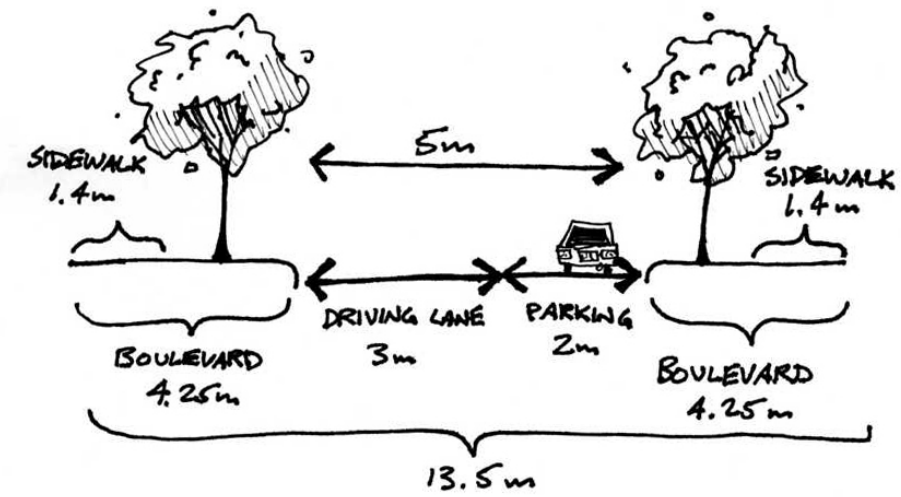
One way streets are not often used in Calgary suburbs but could be used to justify reduced street widths.

FIGURE 2.39- ONE WAY STREET (PARKING BOTH SIDES)



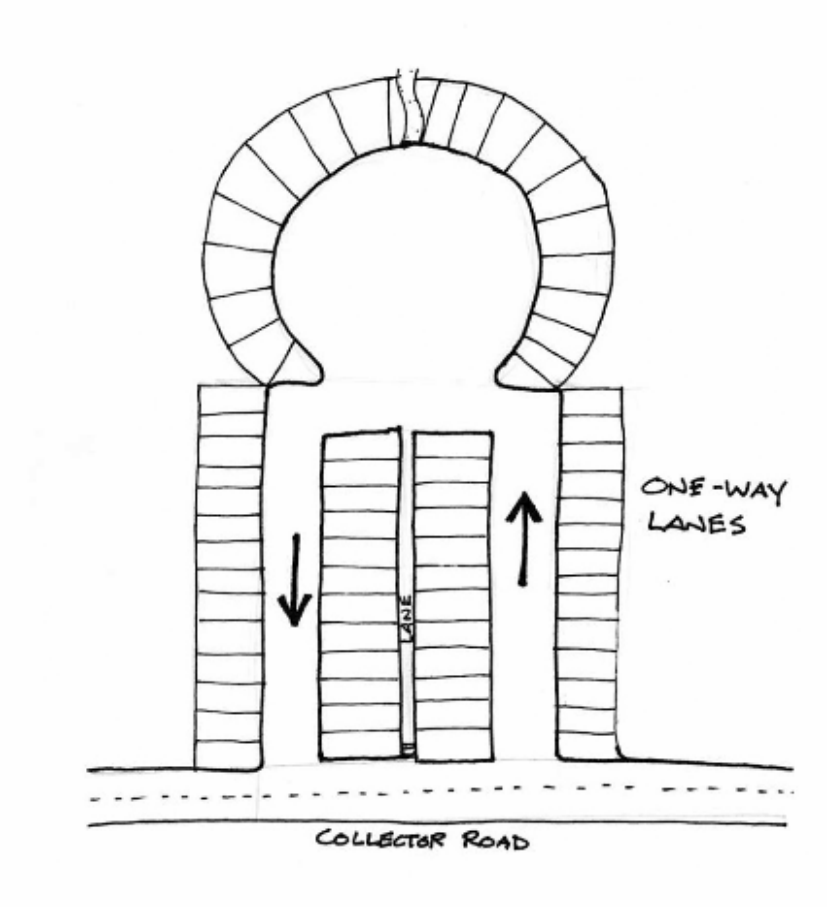
Considering that these streets will not carry a lot of traffic and that the homes and townhomes will include onsite parking. It may be possible to have parking only on one side of the street. The side of the street on which the parking is located would change periodically so that one side does not suffer from reduced property values because of the existence of the parked cars.

FIGURE 2.40- ONE WAY STREET (PARKING ONE SIDE)



Also, since the fused grid makes extensive use of loops, this street type should integrate well with this system. The loop could be accessed from one street and exited via another. A two-way lane way could also be used to complement the traffic. However, the use of laneways will be discussed later in this document.

FIGURE 2.41- ONE WAY LOOP WITH CUL-DE-SAC



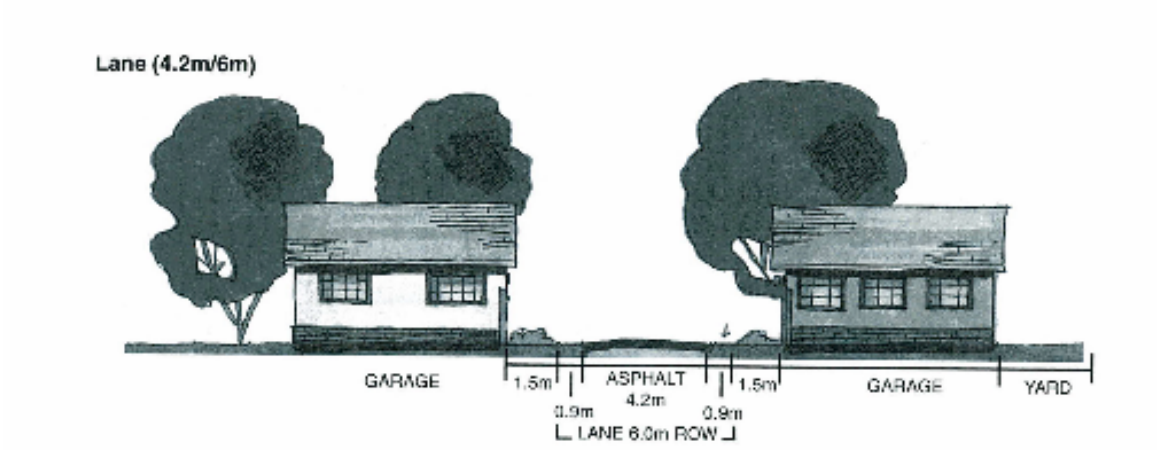
Roundabouts

The concept of the roundabout is not often used in North American planning but has been recently included in McKenzie Towne. In McKenzie Town the roundabout serves as an effective distributor of traffic, a landmark and an unique focal entrance to the community (McKenzie Towne). A roundabout near the mixed use transit village should provide an attractive entranceway to the community and would be an ideal location to place a landmark bronze statue (similar to the one employed in Coperfield) to help bring character to the community.

2.6.6 Use of Laneways

Laneways are employed in many urban areas of Calgary. The inclusion of laneways, reduces the visual effect of the garage in the front of the house and allows for a larger amount of green space at the front of the house which can contribute to sociable neighbourhoods with a sense of place. While laneways consume a fair amount of land, they should be employed in some sections of the community where appropriate. The use of laneways is most appropriate where mult-family housing and small lot single family is prevalent. By using a laneway the unit parking for townhouses can be brought to the back and can greatly improve the visual image of the street. Moreover, use of laneways will also help to define the street and allow for on-street visitor parking. The laneway has been successfully been used in the Garrison Woods area:

FIGURE 2.42- GARRISON WOODS LANEWAY



Source: City of Calgary 1998

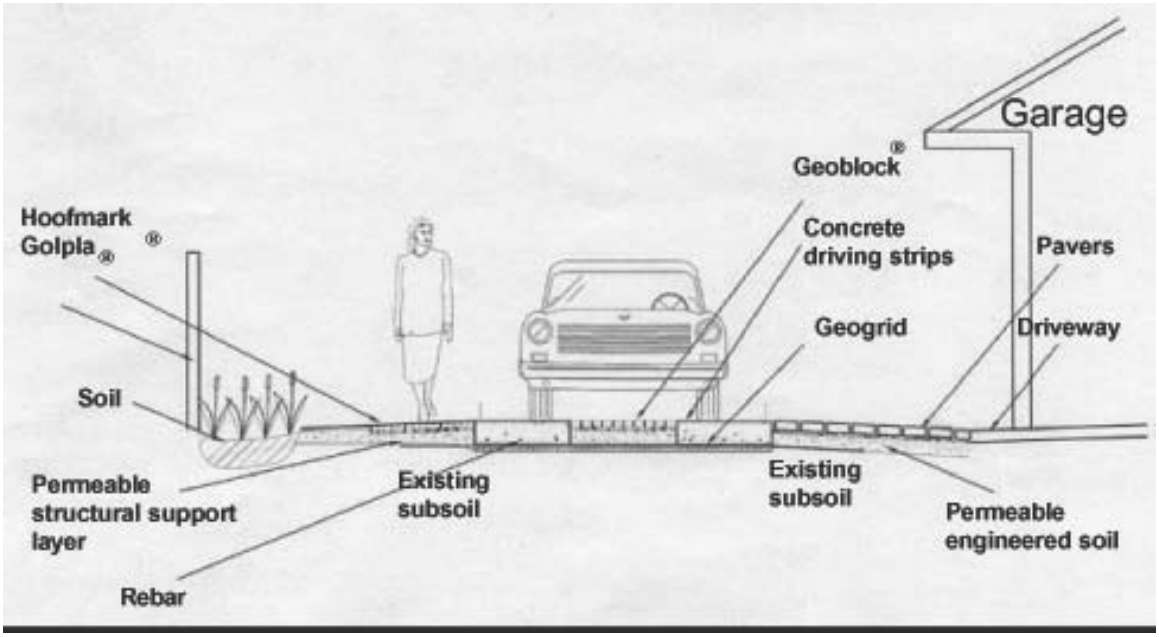
Alternative Laneways

Two concepts worth considering are the use of one-way lanes which could reduce the amount of land that these laneways consume. If the laneway is meant only for parking of vehicles (not garbage service for example) and is unidirectional then it would be reasonable to request

a smaller width of carriage way from 4.2m above to 2.5m. However, a reduction of both residential street and rear lane may not be desirable in areas of higher density.

The other concept worth considering is that of the 'Country Lane' used in the Greater Vancouver Area. This street type is relatively low cost and allows rainwater to infiltrate in to the ground while providing a durable surface for vehicles to drive on. It also aesthetically pleasing and calms traffic effectively.

FIGURE 2.43- COUNTRY LANE



Source: City of Vancouver Engineering Services 2002

2.6.7 Parking

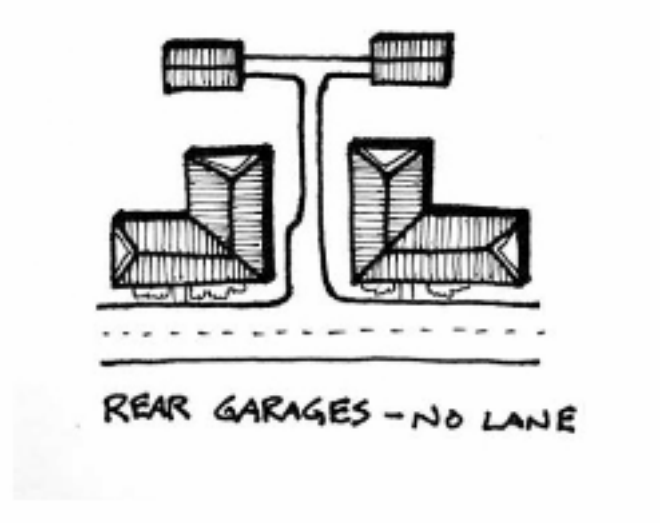
Residential Parking

Parking in a garage at the front of the housing should be avoided for aesthetic and social reasons. Aesthetically, if the garage is located at the front of the house the streetscape becomes dominated by the garage. This can result in the phenomena common to suburbia where 'everything looks the same'. In order to combat this phenomena rear laneways should

be used where possible. In other areas side garages or rear garages accessed via a common laneway between two houses should be used.

FIGURE 2.44- SIDE LOADING GARAGE

FIGURE 2.45- REAR GARAGES – NO LANE



On street Parking

Where possible on-street parking should be used as it contributes to walkability in two key manners.

- On street parking provides an additional buffer between traffic and pedestrians
- On-street parking has positive calming effects as it adds elements to distract the drivers attention (as opposed to a straight open road which encourages speeding)

Alternative on-street parking arrangements

If possible some of the residential streets in Community B should have parking only on one side of the street. In this practice, common in other urban areas in North America (such as Toronto) the parking switches from side to side, and as such a smaller carriageway is required.

2.6.8 Walkability

One of the key elements of healthy and vibrant neighbourhood is a street layout that is readily walkable. Suburban areas are often much less walkable than inner-city neighbourhoods and a recent study by the Heart and Stroke Foundation of Canada has shown that the reduced amount of walking typical to suburbia has resulted in higher obesity levels in suburban and rural tracts, compared to major urban centres.

The keys to walkability are as follows:

- Use the preferred sequence of: street, on street parking, sidewalk, building
- Meet the user's need for enclosure while providing safe, comfortable and interesting places
- Pedestrian ways should be integral circulation routes to specific community destinations
- Create alternate routes to the same desitnation
- Create unique locations

(Potterfield and Hall 1995, 92-93)

2.6.9 Integrations with recreational trails and bicycle trails

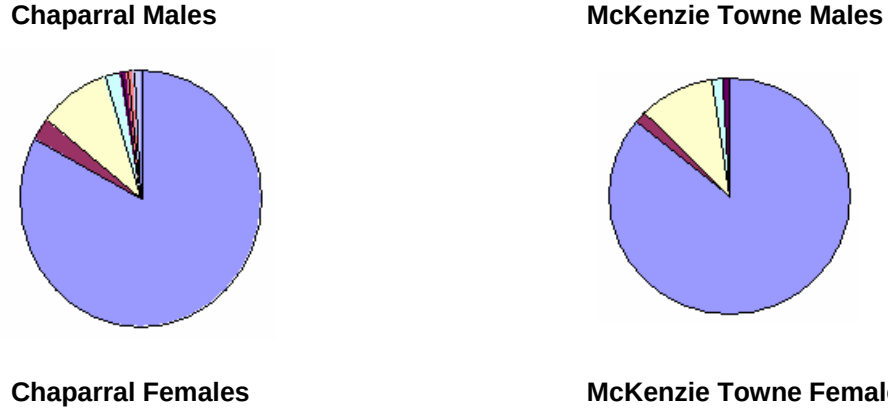
In order to encourage use of the bicycle it is preferable to create a street layout that restricts vehicle use but allows for bicycle and walking traffic. This can be done by integrating walking and bicycling paths with the street network.

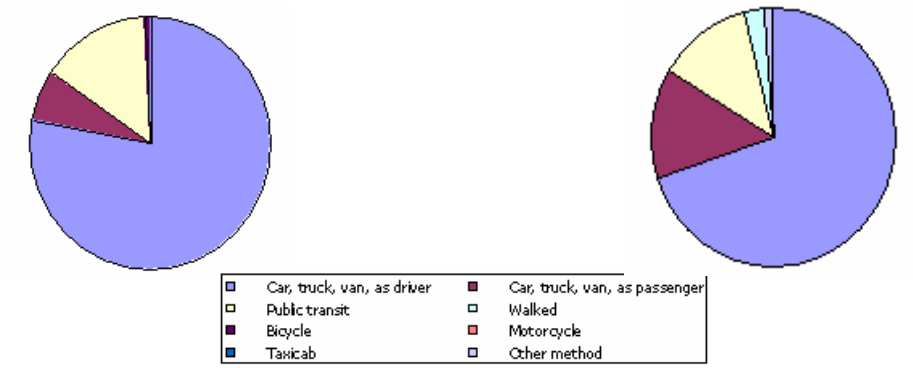
2.6.10 Transit Oriented Development

It is preferable that the street layout implemented in Community B will be compatible with the larger vision of the community as a Transit Oriented Development. An LRT extension is planned on the western edge of the community and as such the road network should be set up to support a transit village around this station and appropriate nodes of density to ensure he long-tern viability of both the LRT and the community as a whole. However, due to the large size of the community, many people will greater than a five minute walk away from the LRT station. Therefore, the road system will need to be conducive to bus service which should focus on talking citizens to the main transit node and to transport them to the planned employment centre to the south west of the community.

As the graphics bellow illustrate, the residents of two adjacent communities (Chaparal and McKenzie Towne) currently use the private automobile for an overwhelming percentage of the trips.

FIGURE 2.46- TRANSIT SHARE FOR CHAPARRAL AND MCKENZIE TOWNE





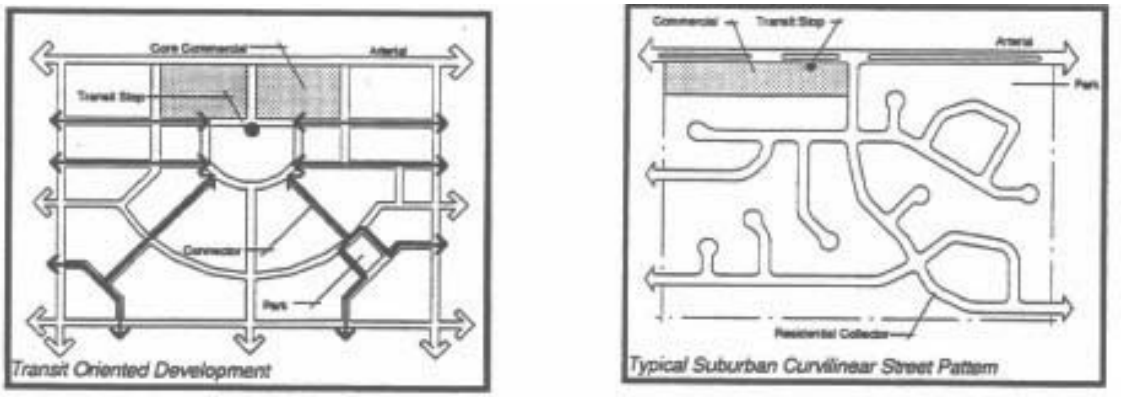
Source: City of Calgary

If we truly want to create a transit oriented development in Mahogany, this is a trend that we need to reverse. In order to make transit viable we need to develop in clusters so that everyone is within a 5 minute walk to a transit stop. A study by Newman and Kenworthy (1989) concluded that bellow 8-10 units per acre (upa) there is a marked increase in driving and that bellow 12 upa the bus service becomes poor. They recommend densities of at least 12-20 upa for transit oriented lifestyles.

Unfortunately, the market might not tolerate such density for the entire community. As such, we would recommend that the area within 600 meters of the LRT stop and transit village be build at a density of at least 12-20 upa. In order to allow workable bus service in Mahogany, the remainder of the residential area should be built at a density at least 8 upa. Bus stops should be located at lest every 800 meters and there should be some clustering around potential bus stops. The Bus routes should concentrate on bringing transit users to the LRT stop and to the planned employment centre to the south.

The development will not be permitted to have a direct connection with Highway 22X to the north. However, in order to facilitate the delivery of transit service a number of connections should be made to different surrounding communities within this limitation.

FIGURE 2.47- TRANSIT ORIENTED DEVELOPMENT



Source: City of Calgary 1995

Nodes of higher density

In order to create a viable transit oriented development, nodes of density will need to be created. Obviously, the main node will be around the future LRT stations, but other nodes should be interspersed throughout the community.

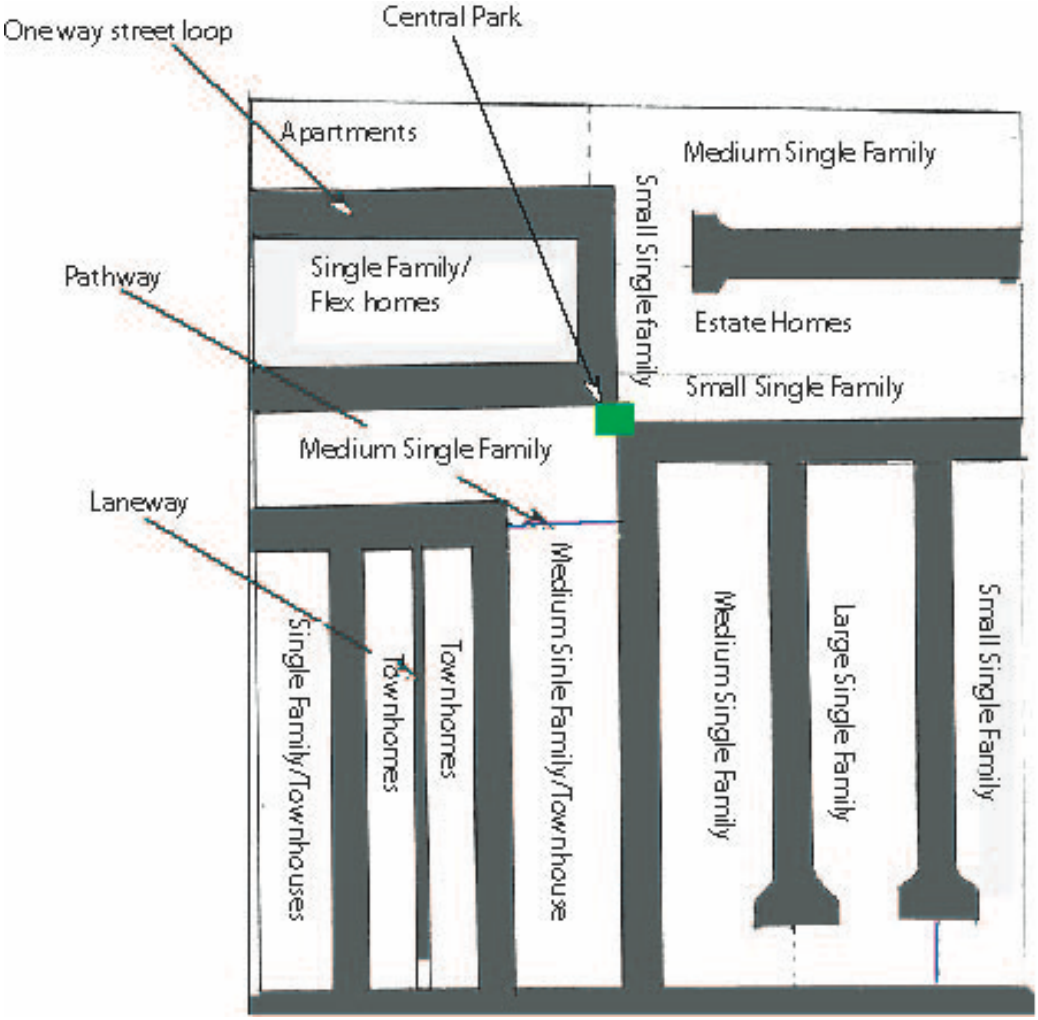
2.6.11 Suggested Layout

The layout we are suggesting is that of the modified grid. First, it allows for the development of alternative road standards including reduced road widths and the inclusion of one-way streets. The straight lines of the pattern should make it somewhat easier to define the street. Moreover, the modified grid layout is conducive to alternative forms of transportation such as cycling, walking and transit.

One aspect of the grid model that we have not mentioned thus far is that it is considerably easier to use different housing types. Earlier in this document, we recommended a variety of different housing types in Mahogany, and the fused grid will help to accommodate this. Moreover, although different housing types can be accommodated in a curvilinear model, it is considerably easier to have different housing types close together in a grid. Bellow is a theoretical drawing of how the housing might work with a modified grid. The housing type

indicated is not necessarily exclusive but rather the dominant type. Strict segregation of types should generally be avoided.

FIGURE 2.48- CONCEPTUAL ROAD LAYOUT WITH HOUSING TYPES



2.7 Recommendations

- Encourage adaptability in the community a needs change over the years;
- Increase affordability by providing a range of housing types and sizes;
- Employ smaller lot sizes (RS1 & RS2 zoning) for single detached area and RM-4 zoning for multi-family areas of the community;
- Allow for secondary suites in some single family homes;
- Use the modified grid layout to allow for connectivity;
- Create nodes of density to support transit; and
- Reduce Road Width.

3.0 Employment and Retail Land Uses

Stephen Dykstra

Iris Li

Carol Mak

3.1 Introduction

The City of Calgary has been constantly experiencing growth in terms of population and size. New employment has continued to fuel growth in the city. In the Southeast context, the significance of promoting the area as both an "Employment Base" – a viable and successful non-retail employment base – and a "Commercial Core," or a retail, social and recreational core within each community, are the goals the City of Calgary has set to achieve (City of Calgary 2004b).

3.2 Objectives

Objectives for employment and retail projections in Mahogany are as follows:

- Meeting community retail needs without exceeding the community needs due to Mahogany's proximity to the Regional Southeast Town Centre.
- Making community retail easily accessible with emphasis on the pedestrian, vehicle and transit oriented development considerations as well as mixed use design.
- Encouraging "live-work" units, although they will be a very small percentage of overall jobs in the area.
- Providing primary services in the retail node that will support the Regional Southeast Employment Center, encouraging employment in the South sector and creating a greater balance of residency and employment in the area.

3.3 Methodologies and Assumptions

The primary methodology that was utilized was essentially a general review of policy and economic/social documents, key informant interviews, and research on past, present, and future trends. The key documents that were utilized in the background research as well as the analysis and synthesis of employment strategies include: *The Calgary Plan (1998), Employment Centers Strategy (1999), Calgary GoPlan (1995), Labour Market Overview: Calgary and Area Annual Report (2003-04), Alberta Careers Update (2004)* and *Calgary*

and Region Socio-Economic Outlook 2003-2008 (2003). The projections are based on assumptions primarily found in the *Southeast Plan: Regional Area Policy (2004)* and *Southeast Centre Area Structure Plan (2003).* However, the projections were modified using benchmarks from consulting studies, primarily Harris Hudema Consulting Group Ltd.'s *McKenzi*e *South Lands Retail Demand Assessment* (1999) and Carma Developers Ltd. / Price Waterhouse Coopers's *South Macleod Trail (2001).*

Local employment in the Mahogany area will predominantly be in the community retail node. Due to Mahogany's close proximity to the Southeast Regional Employment Centre, in which retail will consist 23 acres of main street retail and 65 acres of regional retail, along with 43 to 89 acres designated for other employment intensive related jobs, it is very unlikely that a significant number of office jobs will be located in the Mahogany area (City of Calgary 2003d, Sustainable Suburbs Study, 1995). Further, it is apparent that not all the working population in the area will be working in the Southeast area. The *Work-Travel Study* displayed percentages of jobs in a sector, compared with jobs in the city overall, and the percentage of people working and living in the same area. For the Southeast sector, it was noted to be 7% and 6% respectively, which indicates that the majority of people who live in the South would still commute to other areas in the city to work. Further, the consulting report done by Harris Hudema for Carma Developers states how the major retail and service services for the southern areas of Calgary are largely provided by the establishments in the Macleod Trail Corridor. Due to these factors, major employment in the office sector in Mahogany will probably not be very significant. Retail will be the primary employment found in the community commercial node in Mahogany complimented by live-work employment. Therefore, the following projections for the Mahogany area will focus on the retail and live-work employment components.

3.3.1 Retail Centre Methodology

The retail methodology was used to establish the following projections. The projections will have 2 scenarios based on the different density -- units per acre (8 UPA, and 10 UPA) -- that

will determine the number of dwellings in the area. "Innovative" versus "standard" scenarios will be also considered. The detailed steps of the methodology are:

- Establish the demand of retail floor area (RFA) that will be needed in Mahogany to support the immediate neighborhood area;
- Determine the distribution of RFA that is estimated to be needed in the area; and
- Determine the total developable land needed for the amount of RFA needed, which includes the amount land needed for parking.

Retail Floor Area (RFA) Calculations

- Retail Floor Area = Amount of Developable Land for Dwellings (based on the Southeast Plan: Regional Policy) / number of dwellings * Units Per Acre (8, or 10) * Household Size (3) * Square Feet Per Person located in the area
- The RFA will be mainly be concerned with a Community Commercial Node in Mahogany. This type of retail will be servicing the individual communities in the immediate area. They are to serve the residents within a half-mile radius and serve a highly localized trading area with an immediate residential population of 10,000 to 20,000 persons. (PriceWaterhouseCoopers 2001)
- By basing the projections on the requirements for a retail base of 10 square feet per person, as recognized by the different scales of retail expenditures that occur over regional, neighbourhood and local levels, this demand of retail space should be used for all scenarios

3.3.2 Number of Jobs Methodology

The Number of Jobs methodology was used to establish the following projections in terms of the number of jobs that will be in the area as well as the number of people that will be in the labour force and the distribution of people working in the community and elsewhere in the city. The detailed steps of the methodology are:

- Establish the total number of employment, in terms of jobs, that will be generated from the retail demand;
- Determine the number of people in the labour force in Mahogany based on two density scenarios (8 UPA and 10 UPA);
- Determine the number of people that will work in the community as well as the number of people who will work elsewhere in the city;
- Establish the total number of jobs that will be generated from the live-work precincts in the community.

Number of Jobs Calculations

- Number of Jobs = 1 job for every 250 sf RFA (for retail development more intense in nature)
- Number of People in Labour Force in Mahogany = Projected Population * 55% (based on future projections; ratio of population to labour force, Socio-Economic Outlook 2004-2008)
- Number of People Working in Area = Labour Force * 10% (based on 6% as in Travel to Work Study 1999, with increase of 4% due to Regional Health Centre)
- Number of People working in Live-Work Units = Labour Force * 5% (this is on top of the 10% as stated previously, totaling 15% of the labour force working in the community)

3.4 Trends

3.4.1 Calgary Employment Growth

Calgary's annual unemployment rates between 2001-08 are predicted to remain around 5% and employment growth rates between 1995-02 are predicted to be at 4.5%. Professional, scientific, and technical jobs (i.e. accounting, engineering) showed the most growth between 1995-2002 at 89.2% (see table below) (City of Calgary 2003a).

Table 3.2- Employment by Industry in the Calgary Economic Region: 1995-2002

Description	1995	Dist %	2002	Dist %	% Change	Annual Growth	LQ95	LQ02
All Industries: ANNUAL	454.6	100.0	617.4	100.0	35.8	4.5	1.0	1.0
Goods-Producing Sector: ANNUAL	**115.1**	**25.3**	**152.4**	**24.7**	**32.4**	**4.1**	**0.0**	**2.5**
Agriculture	7.1	1.6	4.7	0.8	-34.3	-5.8	0.5	0.4
Forestry, Fishing, Mining, Oil and Gas	32.3	7.1	35.5	5.8	9.8	1.4	3.2	3.2
Utilities	3.9	0.9	8.4	1.4	116.4	11.7	0.9	1.6
Construction	33.8	7.4	49.0	7.9	44.9	5.4	1.4	1.4
Manufacturing	38.1	8.4	54.9	8.9	44.2	5.4	0.6	0.6
Service-Producing Sector: ANNUAL	**339.5**	**74.7**	**464.9**	**75.3**	**36.9**	**4.6**	**1.0**	**1.0**
Trade	68.8	15.1	91.4	14.8	32.8	4.1	1.0	0.9
Transportation and Warehousing	27.0	5.9	42.6	6.9	57.7	6.7	1.2	1.4
Finance, Insurance, Real Estate and Leasing	30.6	6.7	35.0	5.7	14.3	1.9	1.1	1.0
Professional, Scientific and Technical Services	34.8	7.7	65.8	10.7	89.2	9.5	1.5	1.7
Management, Administrative and Other Support	17.7	3.9	24.6	4.0	38.8	4.8	1.3	1.0
Educational Services	28.1	6.2	33.2	5.4	18.2	2.4	0.9	0.8
Health Care and Social Assistance	39.4	8.7	52.1	8.4	32.3	4.1	0.8	0.8
Information, Culture and Recreation	23.4	5.1	31.4	5.1	34.4	4.3	1.2	1.1
Accommodation and Food Services	28.5	6.3	40.0	6.5	40.3	5.0	1.0	1.0
Other Services	22.6	5.0	29.5	4.8	30.5	3.9	1.0	1.1
Public Administration	18.5	4.1	19.2	3.1	3.8	0.5	0.7	0.6

Source: Statistics Canada and Corporate Studies & Economics

However, steady employment growth is predicted in the following industries as well:

- Health
- Financial and Business
- Consulting
- Information Technologies
- Geomatics
- Arts and Culture (International Results Group 2004)

These are all types of employment that could be well-accommodated to the work-live structure we propose for Mahogany especially since 68% of the working age population in the South-Southeast sector already works in the Finance/Business/Insurance and Business/Retail industries.

As mentioned in the "Population Growth Trends" section of this report, labour shortages are expected by 2008 due to less inter-provincial migration, highly-educated immigrants with unrecognized foreign credentials, and an increased numbers of baby boomers leaving the full-time job market. However, the Southeast sector (including Mahogany) may not be impacted as significantly by this labour shortage due to:

- Its higher proportion of finance, insurance, and communications workers in comparison to the rest of the city (41% compared to 38% in 2001)
- Its rapidly growing retirement-age population may result in more part-time jobs being filled as seniors cope with income challenges (City of Calgary 2003a)

3.4.2 Suburban Office / Live-Work Unit Trends

Suburban offices in Calgary are becoming increasingly popular alternatives to downtown offices due to their lower rents, lower construction times and costs, availability of parking, placement in low traffic areas, and better communication systems. High tech sector weaknesses and mergers in the energy sector have decreased the need for office space in the downtown area (City of Calgary 1999a). It is important to note however that overall office space growth is expected to slow down from 2003-08 due to "higher interest rates, moderation in population and employment growth, and corporate mergers and acquisitions" (City of Calgary 2003a, 5).

As well, the number of Calgarians working at home has increased slightly from 5.0 to 5.8% between 1999-2001. Concurrently, the number of people working at a fixed placed outside home dropped from 82.4 to 80%. (City of Calgary 1999b).

The South and Southeast sectors of Calgary contain 11% and 7% of the number of jobs in the city. Only 21% and 6% of South and Southeast area residents, respectively, live and work in the same area (City of Calgary 1999b). Live-work units in Mahogany would be beneficial not only because they would promote working and living in the same area of the city but also because they:

- Are an affordable housing option (decreasing construction, utility, transportation, and potentially, childcare costs)
- Create community viability as the long-term nature of the live-work unit promotes community stability

- Make effective use of existing infrastructure
- Promote mixed-use and medium density of land (The Headwaters Project 2000)

Recently, several Southwest/South-Southeast communities have included live-work units in their Area Structure Plans. Some examples include the Auburn Bay and Garrison Green communities.

3.4.2 Suburban Retail Trends

Retail construction in Calgary is rising due to higher incomes, population growth and low interest and low retail vacancy rates.

As well power centers and niche marketing are gaining popularity over traditional retail department stores with new communities such as Auburn Bay opting for the town centre format, which includes increased pedestrian linkages and provision for on-site parking.

Higher consumer spending in South-Southeast sector (including Mahogany) may result from residents having more disposable income -- 50% of the residents of land tracts in this sector have an income range of greater $70,000. Studies have shown that in the past (1986-2001), the South-Southeast sector has had a greater proportion of high income earners compared to the rest of the city (EVDP 636 Community Profile: Income and Employment).

3.5 Policy Assumptions

In order to create a viable commercial community node in Mahogany and ensure the viability of a retail development will be successful in the community, there are some policy assumptions and projections that the retail design will be based upon.

3.5.1 Employment Assumptions for Mahogany

- **Retail Focused** - The success of the a retail development in Mahogany must include the following attributes:
    - **Accessibility**. Access to the site should be easily achieved by a variety of modes potential consumers will travel by. There would be an emphasis on LRT and pedestrian transit, but vehicular traffic must also have easy access to the site to promote shopper clientele from other areas of the city.
    - **Visibility**. The retail center should also be in a location that is out in the open and can be visibly seen in the community, acting as a major focal point for the community.
    - **Typologies**. The type of retail development that should be considered for a community retail node is a mixed-use type that will provide a "high street" format. This will provide a "form of fun, excitement and satisfaction into the shopping experience" for residents, creating a distinct experience that will differ from all other retail regional centers. (Hudema and Hudsons, 1999, 8). Anchor tenants, along with smaller retail establishments, should be interspersed to create diversity within the commercial node.
    - **Amenities.** The retail node not only should be attractive to consumers in terms of providing a range of primary services that will attract the resident to the commercial node. The emphasis on a friendly pedestrian environment should be key to a more "attractive commercial concentrations which feature medium format stores and smaller, service-oriented shops" (Hudema and Hudsons 1999, 9).
- **Live-Work Focused**. Mahogany will provide employment that does not duplicate what will be in the regional Town Centre - the main employment precinct and the regional health centre in the Southeast. The live-work unit will serve as an alternative and innovative form of employment that could establish the long-term stability and

vitality for Mahogany. This would include entrepreneurs and telecommuters in the community.

- **Special Retail Nodes**. There certainly will be emphasis on focusing on the "main street" typology that will dominantly provide the primary retail format in Mahogany but a special type of retail in the area can also be promoted to provide further attraction and vitality to the area, such as a seasonal farmers' market. This complements the notion of providing a distinct retail experience in Mahogany that will promote local spending and create a unique commercial opportunity in the area.

3.6 Retail Demand Projections

The community node should function as the key shopping and public use attraction in Mahogany. The intent of a mixed-use public activity centre that would entail a retail component, will help infuse a sense of place and allow residents to conveniently walk from their homes to meet the daily needs without driving outside the area.

The retail projections that the City used for the retail demand of the town centre was 1 person requiring approximately 21.7 square feet of retail space (City of Calgary 2004b). This projected demand entails that retail spending occurs at various scales of retail: regional, community, and local-based. As a result, if taking into account these retail expenditures across different levels, the demand for a community retail node would be significantly less than the current 21.7 square feet per person. The *Sustainable Suburbs Study* suggests that "commercial development per resident in a community should be kept at 10 square feet (approximately 1 sq metre) per person" .

In examining the current plans for the Southeast area, primarily the key documents *Southeast Area Plan: Regional Policy* and *Southeast Town Centre Area Structure Plan,* there are some other assumptions that the City of Calgary uses in its projections for retail demand. For retail development in the suburbs, the City uses the current Floor to Area Ratio (FAR) of 0.25, meaning that 25% of the developable land will be built upon. The remainder of the

developable land would be designated for parking requirements, which in Calgary is 1 stall to 425 square feet of retail. (Land Use Bylaw 2P80 - Section 18, 62). However, if the objectives of the community centre are to reemphasize the walkability and pedestrian-oriented environment that the retail node is suppose to aim for, then a higher FAR should be considered to take up less space for parking and create a higher intensity of retail. For the "innovative" approach, the use of a higher FAR of 0.4 will be implemented.

Table 3.3- Summary of the Modification of RFA Projections in 4 scenarios

	UPA	Square Feet Per Person	Floor to Area Ratio	Parking to Retail Space
Scenario 1a	8	1 to 10	0.25	1 to 495 sf
Scenario 1b	8	1 to 10	0.4	1 to 495 sf
Scenario 2a	10	1 to 10	0.25	1 to 495 sf
Scenario 2b	10	1 to 10	0.4	1 to 495 sf

Source: Sustainable Suburbs Study

3.6.1 RFA Projections and Calculations

Given the pervious assumptions that will be used for the four scenarios, Scenario 1a and Scenario 2a are considered to be more of the "status quo" implementation of commercial retail while Scenario 1b and Scenario 2b are considered to be more of the "innovative" implementations of commercial retail due to a higher floor to area ratio, in which a increased intensity of development will suit a "main street" configuration that will allow building frontage to be continuous and avoid unfriendly gaps that are often designated as wide parking lots (City of Calgary 1995). The calculations for the four different scenarios are as follows:

Table 3.4- RFA Calculations in 4 Scenarios							
Commercial Demand (1 to 10 sf)				**Developable Land for Retail**			
	Population (Dwellings)	**RFA Sq. Feet**	**Acres**	**Total**	**Retail**	**Parking**	**Landscape/ Roads**
Scenario 1a	23,200 (7,700)	232,000	5.3	21.3	5.3	3.5	12.5
Scenario 2a	28,875 (9,625)	288,750	6.6	26.5	6.6	4.3	15.6
Scenario 1b	23,200 (7,700)	232,000	5.3	13.3	5.3	3.5	4.5
Scenario 2b	28,875 (9,625)	288,750	6.6	16.5	6.6	4.3	5.6

By basing the projections on the requirements for a retail base of 10 square feet per person, as recognized by the different scales of retail expenditures that occur over a regional, neighbourhood and local levels, this demand of retail space was used for all scenarios. The different FARs, as well as designated parking requirements, were altered for a more innovative approach. For instance, the total developable land in Scenario 1a is around 21 acres. However, the actual retail development will only cover 25% of the land, leaving 16 acres to be designated as parking, landscaping and roads to service the development. In Scenario 1b, the FAR ratio is much higher, meaning that the square feet of retail space covers up to 40% of the land. This makes the developable land needed to decrease overall meaning more land will be available for other functions in the community such as open and green space.

3.6.2 Makeup of Retail

The primary retail will be located at the Transit Oriented Station. The special retail node will be located at the existing farm in Mahogany, in which a special retail development of a farmers' market can be developed. This is part of the local spending that residents will incur in the community.

If taking Scenario 1a as the primary basis for commercial development in Mahogany, all 5.3 acres of retail floor area should be allocated to the transit oriented development node since small convenience stores interspersed in the neighbourhood with such a low density and the increasing dominance of large chain retailers would not be able to support the “corner store” typology (Hudema and Hudsons 1999, 8). Clustering the retail space will allow a “main street” type development to be more intensive as well as bring an interesting mix to the area.

3.7 Retail Design Recommendations and Guidelines

3.7.1 Walkability

The concept of this development is based greatly upon the notion that the Mahogany community ought to be walkable. The location of retail should allow for a majority of the population to achieve this goal. Retail cannot be located for *every* individual to be within walkable distance. The retail, however, should allow for the *majority* of the residents to be within a 400 to 500 metre radius.

3.7.2 Location and Types

There are two major types of retail in Mahogany: neighborhood retail and community retail. The location of the community retail should be near the LRT line, as well as integrated into the high density residential. This area is in the western portion of Mahogany. The decision has been made by the employment design team to locate the community retail node slightly away from the highway. This increases the amount of residents that will have more direct access to the retail. Most people shopping at the community retail node will be local residents due to the proximity of the regional retail.

There may be some provision for retail along the highway, but it will be limited. The second type of retail is neighborhood retail. Local conveniences are recognized as part of the overall concept to include a more walkable and friendly community. The businesses located within

these local retail nodes will most likely consist of establishments such as convenient stores, hair parlours, video stores, and pizzerias. The locations of these retail nodes are such that they are centralized as much as possible to transportation access points as well as the center of the neighborhood. If the retail is located centrally within the neighborhood this maximizes the catchment area as well as an increase of potential walkers / bicyclists.

3.7.3 Types of Retail

The development has allowed for three to four large "big box" locations to service such opportunities as groceries, hardware and home appliance needs. Within the central retail community retail centre, these larger retail establishments are used as anchors with smaller establishments interspersed in-between. The smaller retail businesses are not all in one segment, but are split intermittently with residential units. This will hopefully create a more dynamic atmosphere, and a greater variety of retail businesses.

Farmers' Market

The Mahogany development team is excited about the opportunity to integrate the present existing farm into the retail concept. The success of the Marda Loop Farmers' Market demonstrates that Calgarians are intrigued by this format of shopping. A more authentic experience may in fact, attract more Calgarians to the Mahogany Farmers' Market. Similar to the farmers' market located at Marda Loop, the Mahogany farmers' market may have similar days of operation. There is also the possibility that some establishments may be open throughout the week. This would create a Saturday/Sunday market, as well as small permanent retail establishments. The uniqueness of the farm may attract people from outside of the community. This would upgrade the classification of this node from a neighborhood node to a community node, not by standards of square footage, but by its catchment area.

Design standards for the farmers' market will be much different comparatively to the rest of the community. There is the opportunity for the market to be completely sheltered, partially

sheltered, adjacent to other facilities, a stand alone structure, or other alternatives. The main imperative with regards to the design of the farmers' market should be that it reflects the image of the original farm as much as possible, as well as containing retail that relates to the concept.

Neighborhood Retail Nodes

Neighborhood nodes are traditionally designed to meet the needs of a limited residential trade/catchment area of 2,500 to 40,000 individuals (Porterfield, 126). In these scenarios our population within the catchment areas will be in the lower portion of this range. This will be done in order to fulfill the ambition of creating more walkable and community-oriented retail centers.

Community Retail Nodes

Ranging in size from 100,000 to 300,000 sq ft, community retail nodes offer the community retail needs that cannot be met via smaller neighborhood nodes (Porterfield, 127). The sites generally serve a trade population of 40,000 to 150,000 people, and are located near collector roads. The Mahogany community node will be designed to serve a population of approximately 23,000 to 29,000 people, and will be located near to the future LRT station.

The average neighborhood retail node suggested by Porterfield in *A Concise Guide to Community Planning* suggests a range from 30,000 to 100,000 sq ft of retail space. The lowest figure is still excessive perhaps when considering the configuration and the format of the Mahogany community. Therefore it is the suggestion of this research group to lower the average neighborhood retail node to approximately 10,000 to 20,000 sq ft. per node. This reconfiguration allows for smaller, more neighborhood oriented retail.

Projections suggest that there should be neighborhood retail centers every 400-500 meter radius. This implies that there will likely be 6 neighborhood retail centers in the Mahogany Community as well as a farmers' market which will simultaneously act as a neighborhood

node. This does not include the community retail center which has a catchment radius of 600 meters. The total number of retail nodes will therefore be 8.

These estimates are based on the concept that for a community node to be successful it mush achieve a benchmark figure of 100,000 sq. ft. For there to be 6 neighborhood nodes, along with the farmers' market, at least 10,000 sq. ft. must be provided for these retail nodes to be viable.

Table 3.5- Retail Dispersal (square footage)

	Community Node	Neighborhood Node(s)	Total
Scenario 1	155,000	77,000	232,000
Scenario 2	200,000	88,750	288,750

The opportunities for live-work establishments are be located primarily within the Community Node. Other clusters of live-work units can be located close to neighbourhood nodes to have some separate units. These separate units are organized in a block fashion. Several units will be separated from the collector road by an access road on which there will be on-street parking. This innovative development has been achieved in Ladera Ranch in Orange County, California. The units can be integrated within the retail frontages (ground floor and second level).

3.8 Employment /Job Projections

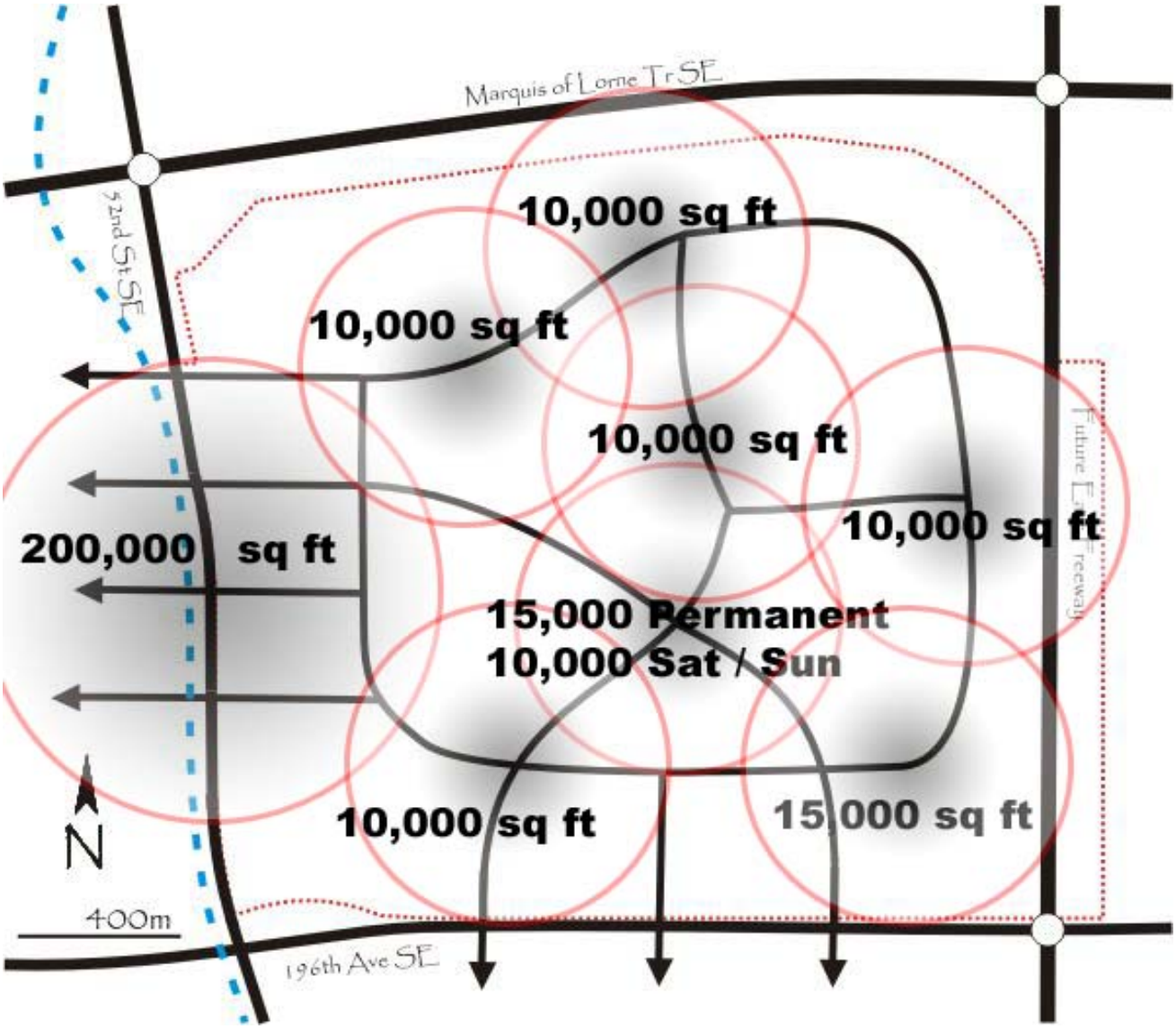
The Town Centre that is planned for the Southeast area is within a 10 km radius away from the Mahogany area and will act as a major regional centre that will encompass various types of employment. In the *Southeast Centre Area Structure Plan*, the Town Centre is projected to have several precincts of employment: a retail or main street precinct, which will provide a mixed-use development of a variety of retail, personal service businesses, restaurants, public services and facilities; employment intensive businesses precinct, which will accommodate a range of employment-intensive businesses such as research and development facilities; and a regional health care facility, which will accommodate a regional health care facility, public

services and facilities, associated facilities and developments, including medical clinics, laboratories, research and development facilities, and special care facilities. In recognition of this regional employment node some projections for local employment in Mahogany are presented in Table 3.6. The job projections that are to be calculated for the area will be given in 2 scenarios that will be based on different densities and assumptions.

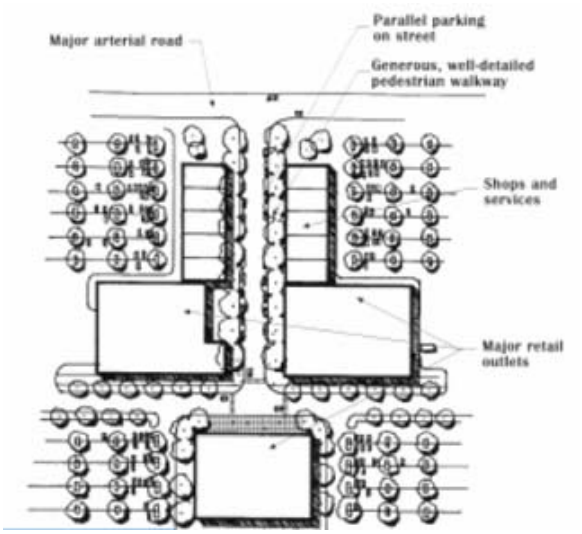
Table 3.6- Employment Job Calculations in 2 Scenarios

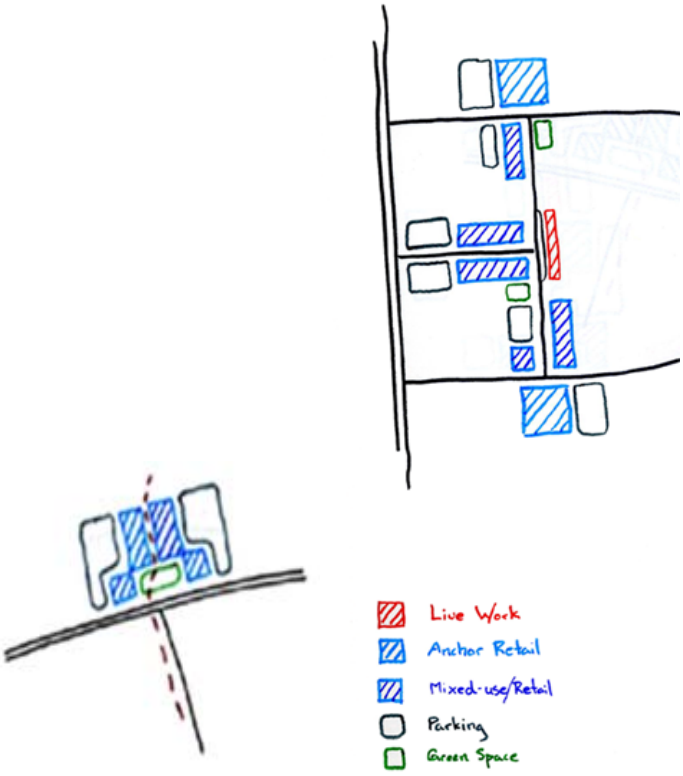
	Population (Dwellings)	Retail Jobs Created by demand	Number of People in Labour Force	Working in the Community (Town Centre, Neighbourhood Node)	Working in Live-Work
Scenario 1 (8 UPA)	23,200 (7,700)	928	12760	1276	638
Scenario 2 (10 UPA)	28,875 (9,625)	1155	15881	1581	794

Design Scenario 1



Design Ideas





4.0 Community Facilities, Parks, and Transport

James Davison

Shawni Lo

Colleen Renne

Greg Sauer

4.1 Objectives and Approach

In planning Mahogany, the major goal is to meet the evolving needs of a diverse community in an environment that fosters awareness of natural systems. This community will also encourage residents to become actively engaged through recreational opportunities within their natural and built environments.

4.1.1 Objectives

The success of Mahogany's community services and facilities rests on a number of key objectives which have been considered in preparing the plan. These objectives include:

- to create a vibrant, sustainable community in Mahogany
- to preserve the natural spaces within Mahogany
- to create public spaces and facilities which will encourage community interaction
- to incorporate TOD principles into the design of the transportation network
- to make community services accessible to all residents of Mahogany by creating well-connected road, transit, bike and pedestrian routes
- to promote efficient land-use by implementing joint-use sites

Through the study of the implemented programs and analysis of the current trends and innovative practices, recommendations were made for two scenarios: descriptive and normative. Descriptive scenario indicates the current trend and common approach, whereas normative scenario represents the innovative, joint-use practice. Land requirements for both scenarios were calculated for comparison of the two planning approaches.

4.1.2 Methods

A number of city documents and relevant literatures were analyzed for the projections and recommendations in the planning of community services for Mahogany. Policies from key documents for the Southeast Planning Area including the 2004 Southeast Planning Area Regional Policy Plan and the 2003 City of Calgary Proposed Southeast Planning Area

Community ‘A’ Community Plan were reviewed and followed. Guidelines from city documents such as the 1995 City of Calgary Sustainable Suburbs Study and the 1998 Calgary Plan were used as the underlying principles for the planning of Mahogany. Specific studies and reports were also followed for each component of community service (i.e. Open Space Plan 2003 for open space; City of Calgary Future School Site Study 2003 for schools; City of Calgary Transit Oriented Development Best Practices Handbook 2004 for transportation; Calgary GRAMP: Land Use, Infrastructure & Servicing Framework 1999 for community services). In addition, analysis of case studies on the planning of other Calgary communities and North American cities helped determine some of the successful planning and design techniques that are transferable to Mahogany. Moreover, to determine the future demand for community services, collaboration was made with other teams regarding the projections on residents and employees. Brainstorming sessions among teams and information gathering from guest lectures were also used for the planning of community services.

Mahogany is expected to develop into a vibrant community located in close proximity to the Southeast Employment Centre. The population is projected to reach 23,000 residents, resulting in a steady demand of all the necessary community services. As a consequence, it is important to consider the needs of future community residents and properly plan for such demand ahead of time. Guidelines and policies from the 1995 City of Calgary Sustainable Suburbs Study and the 1998 Calgary Plan are essential in the planning of a sustainable community. Transit Oriented Development and joint-use approaches are extensively applied and discussed for the planning of community services in Mahogany.

4.2 Assumptions

- Demographics in the community of Mahogany will follow the trends established by surrounding communities such as East McKenzie and Cranston.
- Community and neighbourhood development will be completed in a coherent manner that ensures development is not dispersed among the community.
- Demand and new home construction will reflect trends observed in recent years, resulting in an approximately 25 year build out for the community of Mahogany.

- Housing densities will not drop below 8 units per acre (based on net developable area) and will not exceed 12 units per acre. This will result in a net population between 23,000 and 34,000.

Table 4.1- Mahogany Land Use Allocation		
	Ac	*Ha*
Gross Area Community B	1108	448
Minus Environmental Reserve	0	0
Gross Developable Area	**1108**	**448**
Minus Municipal Reserve (10%)	110	44.5
Minus Transportation Req. (27%)	299	121
Minus Public Utility Lots (5%)	55	22
Net Developable Area	**644**	**260.5**

4.3 Schools

4.3.1 Introduction

Schools in developing communities should be regarded as a primary resource available to all residents regardless of age. In Calgary, the Calgary Board of Education (CBE) and Calgary Catholic School Board (CCSB) are the authorities with respect to the provision of elementary and junior high schools, while high schools remain outside the board's mandate. As a result, this discussion focuses primarily on elementary and junior high schools.

The respective school boards, along with the City of Calgary, have been the key stakeholders ensuring that schools contribute to healthy neighbourhoods and communities. As a result of financial constraints, education authorities have been unable to cope with the demand for new facilities in rapidly growing communities. The schools section provides an understanding of relevant policies and enabling legislation, along with emerging trends contributing to the timely delivery of schools for Mahogany. While most developers have continued along the traditional path with respect to the provision of schools, a number of

opportunities are available. With schools being a key determinant in where families choose to live in the future, recognizing and designing for this reality can result in an enormous competitive advantage for developers as they market their communities.

4.3.2 Assumptions

- Reserve land is only provided once and is the primary mechanism for creating both open space and locating school sites. If reserve land is lost or misallocated it can be very difficult and perhaps impossible to remedy.
- The Municipal Government Act (MGA) enables municipalities and school boards to enter into agreements with respect to reserve allocations. Furthermore, the Act provides that reserve lands may take on the following three forms: municipal reserve (MR), school reserve (SR), and municipal and school reserve (MSR).
- School authorities in possession of reserve lands can only dispose of reserve land through the municipality.
- Schools in Alberta will continue to be funded primarily by the provincial government.
- Funding for schools in Alberta will continue to lag behind demand throughout the build-out of Mahogany for both the CBE and CCSB.
- School boards will continue their land-rich and cash-poor tradition, and not be permitted to incur debt.
- School sites will continue to be withdrawn from the MR allocation and will be given primacy with respect to location and size, and, further, that MR allocation remains at 10% of the Gross Developable Area.
- School boards will continue to ensure that neighbouring schools continue at peak enrolment capacities and that funding for new school construction is allocated based on a criterion that measures relative needs versus a system of first come, first served.

4.3.3 Joint-use Sites and Agreements

It is imperative that there is a clear understanding of the meanings of ‘Shared’ and ‘Joint-use’ Sites, (JUS) with respect to reserve land. The City of Calgary currently employs a joint-use agreement for the land allocated from the MR. The purpose of joint-use sites is to provide areas on sites dedicated as creditable reserve land and jointly owned by the city and the respective school boards for the “development of public and separate schools together with sports fields and recreational areas” (Auburn Bay 2004, 13). The defining point of joint-use sites in the City of Calgary is that they are agreements between the City and the respective school boards. The agreement does not, however, extend to the joint occupation of sites by the CBE and CCSB. This model has served the City of Calgary for many years providing for public access to joint-use sites, while the school authority remains the primary user of the reserve land. The joint-use agreement ensures school sites are recognized as a community asset that should benefit the entire community to the extent possible to do so.

The joint-use agreement in Calgary does not, however, go far enough in its present form. The current model fails to adequately meet the needs of parents and students in developing communities. In Edmonton, the City of Edmonton, Edmonton Public Schools and Edmonton Catholic Schools have developed a better-defined Joint-use Agreement. The Edmonton agreement deems ‘Shared Use Sites’ to be comparable to Calgary’s depiction of Joint-use Sites. In their agreement shared use indicates, “school sites and parks and recreation sites, facilities and resources be shared” (Edmonton Joint Use Agreement 1996, 6). Edmonton’s Joint-use Agreement has gone a step further, however, to provide for joint ownership through policy 8.3, which states, “the City and the Boards shall consider the feasibility of the concept of the joint ownership of school sites and parks and recreation sites by the City and the Boards” (Edmonton Joint Use Agreement 1996, 19).

4.3.4 The Descriptive School Scenario

The first scenario that will be used to illustrate the possible siting of schools in Mahogany deals with the descriptive (as is) method that is currently being practiced in the City of Calgary. This scenario assumes that schools act as the primary open space feature and that school boards have a right to the vast majority of reserve land, up to 70% of total MR.

Auburn Bay is a developing community located on the western edge of Mahogany. When the community plan was completed for this community in 2004, a typical configuration of joint-use sites was used throughout that community to meet their school and open space needs. Auburn Bay is an 887 acre (359 ha) site that is expected to yield 4,600 to 6,100 dwelling units and 13,800 to 18,400 residents (Auburn Bay 2004, 13). Based on a 10% MR, the amount of reserve available to this community is 88 acres. The community plan notes that they will require 54 acres of this reserve for schools (61% MR) and a further three or four acres for a community center for a total of 58 acres (65% MR). The requirement is for five joint-use sites of which three are elementary, one is a combined elementary/junior high and the final school is a stand-alone junior high school. In contrast to other communities, which have allocated upwards of 70% of MR to joint-use sites, Auburn Bay benefits from a population that is at the threshold of five schools with maximum enrolment. This practice is not always available or recommended, as a small population increase through higher densities could result in the need for one or two additional schools in the community using student targets provided in Table 4.2.

Table 4.2- Threshold Populations and Student Targets for Schools				
School Type	**Population Threshold (CBE)**	**Core / Maximum Enrolment (*)**	**Population Threshold (CCSB)**	**Core / Maximum Enrolment (*)**
Elementary	6,000	250 / 450	8-10,000	300 / 700
Junior High	12-15,000	500 / 900	**	N/A
Elementary / JHS	*	N/A	12-13,000	425 / 750
Senior High	30-50,000	1500 / 2200	100-120,000	1500 / 2200

(The South Macleod Trail Community and Employment Centre:
2003 Community Facilities 2004, 19)

* The CBE's policy is to construct stand alone elementary and junior high schools.

** The CCSB's policy combines junior high and elementary schools as a rule with separate elementary schools if required.

(*) Maximum enrolment provisions for the use of portables in addition to core facilities.

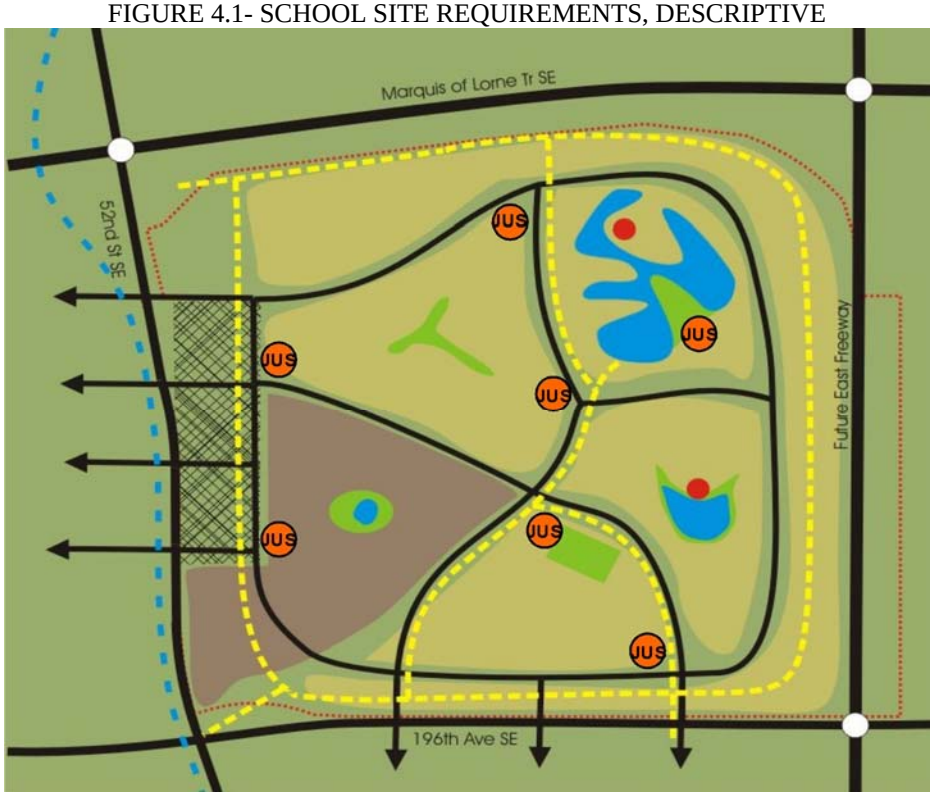
Using a similar approach that used in Auburn Bay, it is possible to determine the joint-use requirements for Mahogany. These results are illustrated in Table 4.3.

Table 4.3- Scenario A-1: Descriptive School and Land Requirements for Mahogany			
School Type	**Number of Schools Required**	**Land per school (acres / ha)**	**Total Land required (acres / ha)**
Elementary (CBE)	3	10 / 4.1	30 / 12.3
Elementary (CCSB)	0	10 / 4.1	0 / 0
Junior High (CBE)	2	12 / 4.9	24 / 9.8
Elementary / Junior High	2	12 / 4.9	24 / 9.8
		Total Acres / Hectares	**78 / 31.9**
		% Of Municipal Reserve	**71%**

This traditional joint-use allocation requires that seven sites and 78 acres be allocated from Mahogany's MR. This removal leaves Mahogany with approximately 32 acres to satisfy the

community's remaining open space requirements. There are at least two major problems with the method of siting schools that has just been described. First, the amount of land consumed by the current designations for separate schools for both the CBE and CCSB represents the majority of the 10% MR designation. Although most if not all residents will acknowledge that schools are one of the cornerstones of neighbourhoods and communities, there is a growing recognition that the current allotment to schools is excessive and limits other open space opportunities. Secondly, with the sheer number of schools that have been provisioned for in the City of Calgary's growth area, practical realities suggest that many of these sites will never be constructed on.

FIGURE 4.1- SCHOOL SITE REQUIREMENTS, DESCRIPTIVE



Based upon the experience of developing communities such as East McKenzie (which has provisioned for nine school sites in the community, but has realized none to date) it is felt that the current school model is both flawed and outdated (East McKenzie Area Structure Plan 2004, 19). Given that communities evolve over time, the demand for school facilities is

greatest in the early years and demand tapers off as the community ages. Provisioning for school sites that will never be used for their designated purpose and removing up to 70% of land available to public open space has negative implications for the community for the duration of its existence. For this reason, the descriptive is not recommended as a model to pursue in Mahogany.

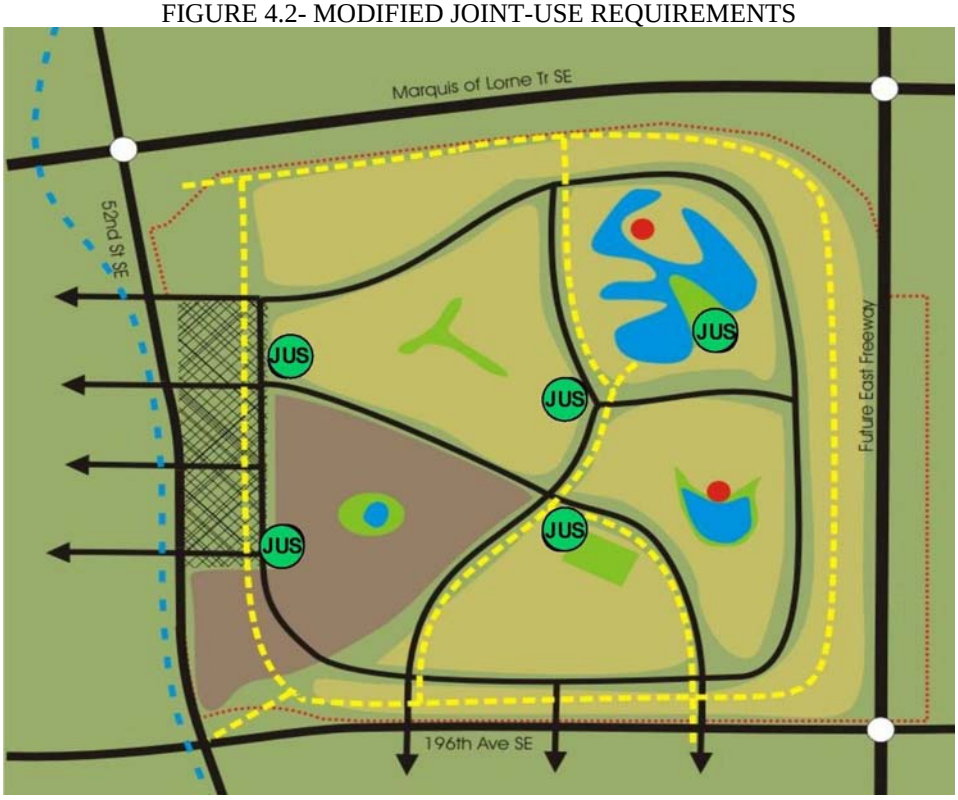
A second scenario calls for a consolidation of elementary and junior high schools. This model is currently being employed by the CCSB on some of its new school sites and has been used for decades. In planning for elementary/junior high schools that target a maximum enrolment, the community can reduce the joint use requirements by two from a total of seven to five; see Table 4.4, below. This modification alters the land use requirement for schools from 78 to 72 acres, or a 6% overall reduction. Although not momentous, the redistribution of six acres from schools to public open space can add significant value to the community and also create capital and operating savings for the public school board with two fewer schools.

Table 4.4- Scenario A-2: Revised School and Land Requirements for Mahogany

School Type	**Number of Schools Required**	**Land per school (acres / ha)**	**Total Land (acres / ha)**
Elementary / Junior High (CBE)	3	16 / 5.7	48 / 17.1
Elementary / Junior High (CCSB)	2	12 / 5.7	24 / 11.4
		Total Acres / Hectares	**72 / 28.5**
		% Of Municipal Reserve	**65%**

The layout for the five joint-use sites capitalizes upon what are considered to be the best and most central sites for the entire community's needs (see Figure 4.2). The primary difference between the combined elementary/junior high school is that the land use requirements for the CBE school is anticipated to be 16 acres per site versus the 10 and 12 acre sites for stand alone sites. This scenario limits flexibility for school siting as swing sites based on demand will not be possible, as the CBE and CCSB will now have different land use requirements.

FIGURE 4.2- MODIFIED JOINT-USE REQUIREMENTS



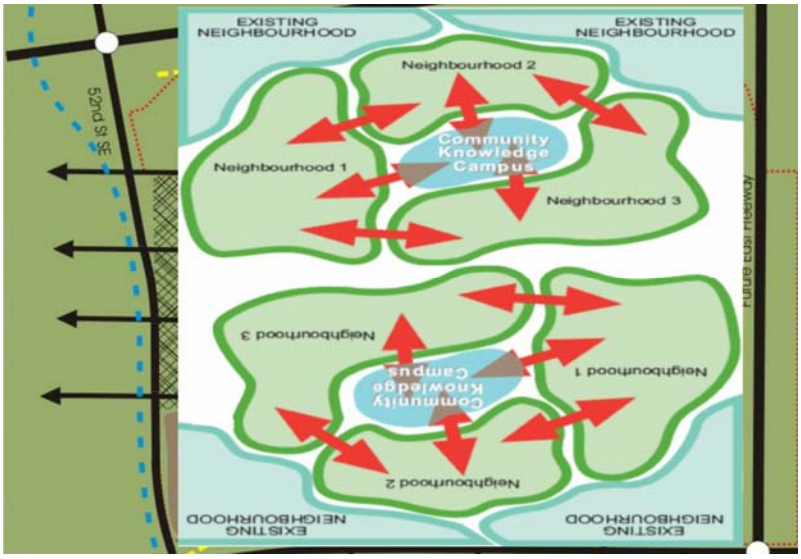
4.3.5 The Normative School Scenario for Mahogany

Community Knowledge Campuses

The use of school sites as joint-use sites is a marginally better means of planning for schools and community open space as has been demonstrated. Incrementally better may not, however, be satisfactory to those residents and students dealing with long commutes to schools half way across the city. A simple needs assessment for new schools in developing areas within the city's boundaries illustrates an acute need for schools to house learners of all ages. To achieve the goal of establishing new schools in Mahogany will require a slightly more radical departure from the conventional provision of schools to alternative methods of delivery.

Unfortunately, school boards and municipalities have continued with the same standards that worked in the past without compensating for differences in numbers, use and the overall demands of communities. The siting and design of schools should be done with a broader vision of the community in mind, as opposed to the single use methodology that continues to prevail in Calgary. The strategy required is a shift away from neighbourhood to community school sites with much larger catchment areas. Figure 4.3 illustrates the meaning of enhanced catchment areas. These catchment areas are based upon entire communities versus individual neighbourhoods.

FIGURE 4.3- CATCHMENT AREAS FOR COMMUNITY SCHOOLS



The goal for Mahogany, with respect to education facilities, is the timely delivery of schools in a community while concurrently optimizing available land resources. Moreover, plans shall not be seen as static. The build out of Mahogany will occur over a 20-30 year time frame, depending on a number factors that are often uncontrollable for developers. Throughout this extended time frame, one can be certain that demands and trends will change for the community. Opportunities should be made available for all stakeholders, and especially the residents, to revisit and amend plans at various stages throughout development to ensure they are consistent with the community's present and future needs.

The shift away from neighbourhood schools has the potential to satisfy a number of important and relevant objectives, and this includes the need to ensure schools are constructed on sites dedicated from the MR. The amount of MR dedicated to schools is reduced from current levels, with the recognition that schools are a significant focal point for new communities. To ensure these requirements are met, a new type of school is proposed. The Community Knowledge Campus (CKC) has been suggested as a "desirable means of enhancing community focal point", while also meeting the defined needs of reducing land allocation and ensuring schools are built (Future School Site Study 2003, 3). The Future School Sites Study Working Committee recognizes that the needs of schools have changed and have reflected these needs in the following statement.

> School sites in communities of the future will be centrally located, multi-use "community knowledge campuses" that serve students and learners of all ages and house a range of complementary recreational community and public services. They will be "beacons" at the heart of the community that are relevant, adaptive, flexible and accessible. (Future School Site Study 2003, 2).

There are a number of guidelines that must be considered by all stakeholders with respect to siting and design of CKC's as the community plan takes shape and evolves. These central tenets must be adhered to and respected if the mandate for schools that contribute to better communities is to be realized in Mahogany. A first requirement is that sites be located such that they can be serviced early on in the phasing of the community. A second requirement of a CKC is that schools should be located on sites that are central to a cluster of neighbourhood nodes rather than a single node common to traditional school siting. Given that the normative site layout will, overall, require that students travel farther from their homes to attend their schools, a properly sited campus seeks to minimize the average distance for all students. The site needs to be highly accessible to both pedestrian and bicycle traffic. Connectivity within the community can be promoted through a path system that uses the school site as a hub. This connectivity can help establish the community as a walkable environment and can benefit students and community members who regularly access the campus. With respect to automobile access, the site is considered better if it is double fronting a collector roadway or

other significant thoroughfare. Although this may not always be possible, siting schools along primary roadways will enhance their ability to be serviced by transit and create better proximity to other community services.

With respect to on-site guidelines, it is suggested that each of the two Community Knowledge Campuses cover a 24 acre parcel of land. The site shall be configured such that it is capable of accommodating a range of future community needs. The Alberta School Boards Association has noted, “Schools are no longer just houses of learning. Those days are long past” (Alberta School Boards Association 2002, 15 in Alberta Government 2003, 77). Proponents of Community Knowledge Campuses recognize this need for the provision of multiple services and the school as a first and primary point of contact. The CKC can build upon synergies that exist between a child’s education and other services that are required by young learners, parents and the public. The CKC also acknowledges that lifelong learning is a reality and should, to the extent possible, strive to make opportunities available locally. As an example, it has been suggested that parenting centers be established in communities with a link to elementary schools (Alberta Government 2003, 46). The parenting center, located on campus, can provide this kind of service and is an opportunity that makes sense. The parenting center could generate revenues for the construction and maintenance of the campus facilities.

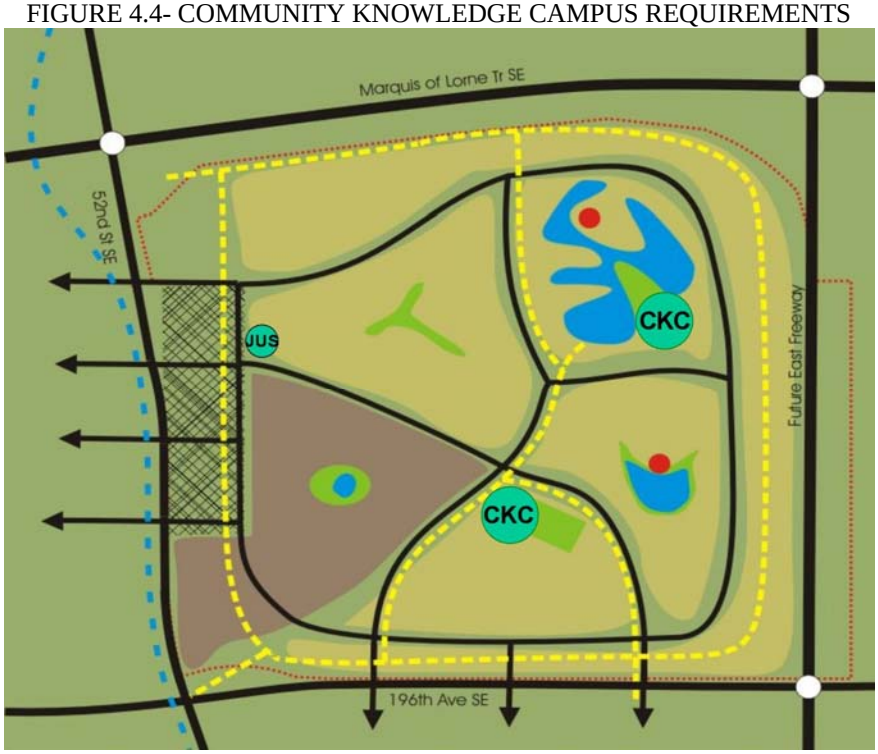
These additional, unique requirements place an additional responsibility on designers and planners to ensure that the new facilities are constructed to meet these evolving needs through site and building design. The new primacy placed on schools as focal points of their community will undoubtedly alter the ways and times that campus facilities are accessed by students and public. Given that the site is to be ideally located fronting collector roadways, safe and sufficient access and egress will need to be addressed. Traffic signaling and traffic calming measures will be crucial along these collector roadways. A separate loading and unloading laneway will also be beneficial along one or both collectors. Further, the site and building should be designed with Crime Prevention Through Environmental Design (CPTED) principles in mind. The campus concept lends itself to function as a shared parking site with other community facilities and should be oriented to maximize these synergies.

Innovative design of schools will be paramount in the satisfactory delivery of schools in new communities. A campus concept delivering services to K-9 students of both the public and separate school boards in addition to acting as a focal point for communities will require a significant departure from contemporary design. The belief that it is acceptable and desirable to use 70% of MR land for school sites has led to much inefficiency. Among the most significant changes will be the implementation of multi-storey schools that contributes to a more efficient use of reserve land. In a campus scenario, two 24-acre sites have been suggested as adequate to facilitate the needs of competing interests (see Table 4.5 and Figure 4.4, below). The belief of 24 acres as an adequate land base to support the needs of 2500 K-9 students is contingent upon a revised building footprint using a multi-storey primary facility for each school authority. Sites and structures should continue to make provisions for the addition of portables, which make economic sense given a school's lifecycle and early peak demand. In addition to sharing land, the campus structure will share substantial infrastructure and services that will reduce capital and operating costs.

Table 4.5- Community Knowledge Campus Land Requirements for Mahogany

School Type	**Number of Schools Required**	**Land per school (acres / ha)**	**Total Land required (acres / ha)**
CKC (CBE & CCSB)	2	24 / 9.7	48 / 19.4
Swing / Flex Site	1	10 / 4.1	10 / 4.1
		Total Acres / Hectares	**58 / 23.5**
		% Of Municipal Reserve	**53%**

FIGURE 4.4- COMMUNITY KNOWLEDGE CAMPUS REQUIREMENTS



It has been demonstrated that using a CKC concept will result in far fewer sites allocated to the community, as is the case with joint-use school sites and thus fewer sites are available to meet resident needs. Although this may seem to be a problem, the reality is that residents will benefit by the reduction in school sites designated from the reserve. In addition to having two schools that provide enhanced opportunities over the conventional joint-use sites, through services such as outdoor tracks and community oriented services, residents will continue to enjoy the same 10% MR. The reallocation of land, however, will result in added efficiency and greater proximity to open space for all residents. Now that most individual neighbourhoods will not have a school, the recreational needs of residents will now have to be met through alternative means such as a local park. This becomes far easier to provision for in communities employing a CKC versus joint-use sites. The land savings that will be reallocated to open space is as much as 20 acres. How this significant land mass will be reallocated will be addressed in the open space component of this chapter.

Flex and Swing Sites

The normative plan for schools calls for a third school, which is not of the campus type described above. Although the provision of two Community Knowledge Campuses with a capacity of 2,500 each or 5,000 total should provide for the needs of Mahogany with a population of 23,000 residents, the normative design also provides for extra capacity if the community realizes higher densities. The plan for Mahogany calls for a single joint-use site to be designated from the municipal reserve in addition to the two CKC's as illustrated in Figure 4.4, above.

The joint-use site will act as a safety valve and will be used only in the event that the two CKC's are at maximum capacity when there is sufficient demand demonstrated by either the CBE or CCSB to construct an additional school. This alternative to designating sites for the use of either school board based upon demand has been referred to as a swing site. The 10-acre site could facilitate the development of a K-4, K-9, or Gr. 5-9 (CBE), or K-6, K-9 (CCSB) consistent with more conventional school requirements.

The location of this site has been established based upon its proximity to the higher density community nodes, which could notice the highest revised densities. Additionally, the site has been chosen based upon its proximity to other uses and its ability to function as an alternative use. The ability to function as either a school site or alternatively another use agreed to by the Boards, the City and the community refers to a school design principle known as flex sites. In this scenario, a school site is designed and constructed to function as open space until such time as the demand for a new school has been met. If demand for a new school is never met then the school reserve site could avail itself to alternative uses.

Funding New Schools

The possibility for an alternative use on school reserves is made possible under Alberta's current Municipal Government Act (MGA), which "enables municipalities and school

authorities to enter into an agreement respecting the allocation of reserves" (Minister's Symposium on Schools Implementation Plan 2003, 3). For a "non-allowable use" to be permitted, a temporary or permanent disposition of land by the Board's would need to occur. The Symposium recommended that the MGA also be amended to allow the temporary suspension of reserve status for a 25-year period with no provision for automatic renewal, with the lands leased at market value with proceeds contributed to the reserve fund.

The reserve fund allows for a diversity of opportunities to help meet the needs of a developing community's requirement for schools. The opportunity to fund schools using a variety of mechanisms at the community level is an increasing reality and the reserve fund shows promise. In this scenario, lands that are leased will contribute funding to a community reserve fund, which can be used to jumpstart a proposal or make a proforma for a school more competitive relative to rival communities also seeking new schools. In addition, Alberta's Commission on Learning has suggested other possibilities of funding schools locally. Included is allowing school boards the opportunity to raise limited funds from their residents. The Commission suggested that up to 10% of the amount currently raised through provincial education property taxes could be raised through the community (Alberta's Commission on Learning: Every Child Learns. Every Child Succeeds 2003, 19).

CKC's have the additional ability to tap into a variety of funding sources. As an example, the Grande Prairie Community Knowledge Campus in Grande Prairie has managed to engage a number of external sources in the P3 (public-private partnership) delivery of that campus. P3's are allowable under Alberta's MGA provided that they do not give equity interest to any organization outside the school authority and municipality (Minister's Symposium on Schools Implementation Plan 2003, 1). The funding formula for the Grande Prairie CKC is as illustrated in Table 4.6. This formula would seen to suggest that opening up schools to the possibility of public-private partnerships enables school authorities to tap into additional provincial Ministry's such as Alberta Infrastructure, which is a strong proponent of alternative delivery methods.

Table 4.6- Funding Formula for Grande Prairie CKC		
Organization	**Total Contribution**	**Contribution as a % of Total**
Grande Prairie Public Schools	$20,300,000	26.36%
Grande Prairie Catholic Schools	$19,600,000	25.45%
City of Grande Prairie	$16,600,000	21.56%
Additional Provincial Support	$14,500,000	18.83%
Private Sector Support	$6,000,000	7.79%
Total Cost of Project (est.)	$77,000,000	100%

4.3.6 High Schools

There are no provisions for land to accommodate a high school in Community B / Mahogany. With respect to land use in Mahogany, there will be no impact on municipal reserve to accommodate public, separate, or private high school sites. The Southeast Planning Area Regional Policy Plan (Part 2) suggests that for a population base of 25,000 to 50,000 a public school will be required and a separate school will be required for a population nearing 120,000 each requiring 23 acres (p.44). The City of Calgary's Regional Plan (Part 1), Map 3 shows that two high schools have been planned for the Southeast Planning Area with one being located within the Town Center Planning Area and the second in Community/Cell 'D'.

Given that students and residents from Mahogany will be accessing the high school(s) constructed outside of the Mahogany Planning Area, we are compelled to briefly address this matter. Access to high schools is of great importance to the residents of Mahogany. Given that no high schools will be located within the Mahogany study area, the city, province and school boards are encouraged to develop the planned high school in the Town Center first. Access to the Town Center provides the best opportunity for students as it minimizes the time and distance to school. This accessibility will be further enhanced with the extension of light rail transit (LRT) to the Towne Center. Further, the close proximity to amenities such as the recreation center and library can enhance the educational experiences of students.

The following are the provisions for high schools noted in the Southeast Planning Area Regional Policy Plan. These provisions are not consistent with the recommendations for Mahogany, which is not surprising given the CBE and CCSB's unwillingness to work together to date. Despite this reality, it is suggested that the developer and community work with the City and the Boards towards an agreement that could foster both the public and separate school boards to agree on a high school CKC that benefits residents, parents and students, along with the Board and City of Calgary.

Table 4.7- Senior High School Site Information

Criteria	**CBE**	**CCSB**
Population Base	25,000 to 50,000	120,000 to 125,000
Students per School	1,500	1,000 to 1,500
Employee Base	n/a	100
Site Size (Acres)	23 (10 for building envelope and 13 for sportsfield)	23 (10 for building envelope and 13 for sportsfield)
Synergies	No single model exists, although it is preferable to locate adjacent to, or develop in partnership with, a regional recreation center, library, skating rink, swimming pool, retail, LRT/ Transit Facility, and/or community hall.	

(Southeast Planning Area Regional Policy Plan 2004, p.44)

By working toward a Community Knowledge Campus, both rather than one school can benefit from these synergies. The current plan calls for one site in the Towne Center planning area with a second site planned for Cell "D". A CKC will take advantage of shared infrastructure noted earlier and create a savings in land. Rather than 46 acres for two separate sites, a CKC can, through shared parking, sports fields, and other facilities, generate considerable land and infrastructure savings along with reduced operating costs. Most significant, however, is that these facilities may be built sooner if a cooperative effort is coupled with greater demand and savings potential.

4.3.7 Recommendations

- It is suggested that all partners will need to be consulted and subsequently work toward a common goal of the early provision of schools to meet the needs of Mahogany residents.
- Stakeholders that need to be included in the discussions are: Calgary Board of Education, Calgary Catholic School Board, The City of Calgary, Hopewell Development Corporation, the community association, and the Province to the extent possible.
- Look to Edmonton and the 1996 Joint Use Agreement and subsequent cooperation as a model of the joint ownership possibilities for school sites.
- Community Knowledge Centers should provide first for core school services and secondly, provide an opportunity to a limited range of complementary uses enhancing its role as a focal point for the community.
- Because of the innovation and new opportunities for funding partners, a well-developed CKC format will result in an improved proforma and the timely development of schools on reserve sites.
- It is suggested that the City of Calgary should take a proactive role in encouraging the shared use of sites between the public and private school boards. This role may include a mediation and facilitation role, as the two boards have, to date, been able to reconcile their differences for the benefit of communities and users.

4.4 Public Open Space

4.4.1 Introduction

A highly valued feature of the West, Alberta and Calgary, in particular, is the abundance of natural areas and open space. The values which Calgarians ascribe to their natural heritage and open spaces is visible in almost every aspect of life here, from the Rockies in the West, to the rivers snaking through our communities, to the regional parks in various parts of the

city. As such, it is imperative that the development in Mahogany reflects these values and affords the residents ample open space in both passive and active recreational opportunities, in addition to linking the community to these larger systems. In much the same way that rivers are living, organic, connected systems providing transportation, ecological function and recreational possibilities, open spaces must also be flowing, living, connected systems providing residents with sustainable linkage both within their own community and beyond. These spaces will be designed to integrate social, economic and environmental functions in the community to create sustainability through the growth of the community from its infancy through to its maturity.

We look at the open spaces in Mahogany as a system, with important objectives.

Open space in Mahogany must:

- provide for active and passive recreation
- enable diversity in transportation modes
- create connection with larger open spaces
- create an aesthetically pleasing environment
- facilitate ecological processes
- stimulate community interaction
- preserve unique and/or valued natural features
- represent the cultural heritage of the area
- promote awareness and education

4.4.2 Acquisition

Open spaces in Calgary communities compete with land allotted for elementary schools and community centers. School space typically accounts for 60-70% of the 10% MR allocation, and a community such as Mahogany will contain one community center, with a unique integrated community farm facility. “The City acquires open space lands primarily through the 10% Municipal Reserve dedication as part of the subdivision process, and through direct

purchase on an opportunity basis. The majority of the 10% dedication is used in supplying for the local and community park needs and, therefore, land for district, regional and city-wide parks are generally purchased out of the Joint-use Reserve Fund." (Open Space Plan 2003, 6).

Land allocation, in addition to the MR, can come from an Environmental Reserve (ER), though any land designated for an ER must, according to the Municipal Government Act, consist of:

- swamp, gully, ravine, coulee or natural drainage course,
- land that is subject to flooding or is, in the opinion of the subdivision authority, unstable, or
- a strip of land, not less than 6 metres in width, abutting the bed and shore of any lake, river, stream or other body of water for the purpose of preventing pollution, or providing public access to and beside the bed and shore (MGA).

"The designation of Environmental Reserve is given to un-developable land, and is not based on the quality of the natural area" (Open Space Plan, 2003, 43). According to Map D of the Southeast Planning Area Regional Policy Plan's background information (Southeast Area Regional Policy Plan Part 2, 2004), there are no environmentally significant areas in Community "B". Furthermore, the land in the Mahogany development does not have any features which would be deemed sufficiently un-developable. The upland area is generally level with a low relief of undulating land…similar to the rest of the southeast Calgary region." (Southeast Area Regional Policy Plan Part 2 2004, 8). As a result, ER designation is not expected.

The City, in accordance with the Municipal Government Act, may consider any of the following options to ensure the provision of open space:

- Owner dedication as Environmental Reserve
- Owner dedication as credit Municipal Reserve
- Density transfers both within developments and between developments (subject to negotiation)

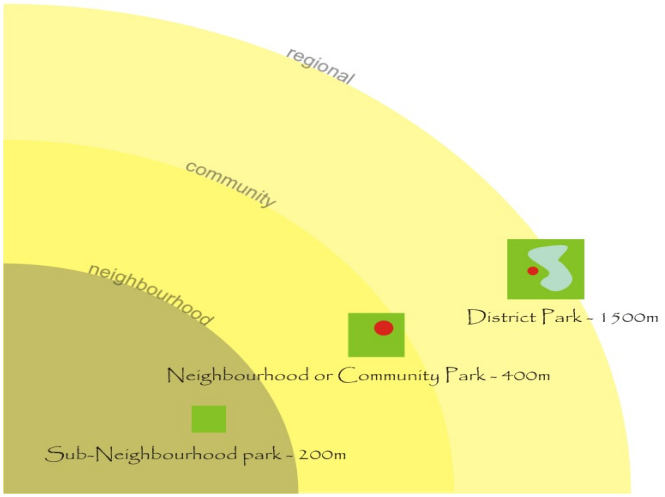
- Required development setback zones on private land (Note: public access is not permitted)
- Donations to appropriate not-for-profit agencies, Land Trusts or the City (subject to negotiation)
- Outright purchase (subject to negotiation)
- Land swapping and transfer of credit reserve (subject to negotiation)
- Bonusing (subject to negotiation)
- Conservation easements and associated caveats to restrict development on private land, as per the provisions of the Environmental Protection and Enhancement Act (Note: public access is not permitted)
- Environmental reserve easements as per the provisions of the MGA (MGA).

These methods of acquiring open spaces are typically used in extenuating circumstances, and as such compelling arguments and/or urgent need not addressed by the 10% MR or 5% PUT allocations (with which wet pond areas are acquired) are expected.

4.4.3 Assumptions

The concepts of walkability and connectivity are of chief concern in the design of open spaces in Mahogany. A three-tiered open space hierarchy (Figure 4.5) is used in the context of accessibility of parks, derived from the Sustainable Settlements Guide of the University of West England, and adapted to prioritize open space use into neighbourhood, community, and regional needs as specified by the city (Calgary Plan 1998).

FIGURE 4.5- OPEN SPACES HIERARCHY



The means by which this walkability will be managed lies in the recommendation of a modified grid road system (See Figures 4.6 and 4.7) in most of the development (the northeast wetland area will be serviced by a curvilinear road pattern) designed to favour walking and calm traffic, operating under the assumption that this design solution is the best for our community's connectivity. The figures provided do not show comprehensive coverage of the pathways or describe a specific design solution in Mahogany, but are provided to illustrate a land use policy at the neighbourhood level, showing relative and normative locations of parks, schools and pathways in both scenarios.

Creativity in designing joint-use sites in community facilities helps to mitigate the burden of additional land required in the modified grid system. Reducing the gross area required for schools by using joint-use sites is part of the City's mandate (Calgary Plan 1998, 34) and will be the normative recommendation in the second of two scenarios. This will be in addition to a recommendation which will be closer to reflecting the current design practices of the client with regards to school sites. It is assumed that, while separated in land designation by policy, residents will not make a significant distinction between school space and other municipally allocated space.

Distribution of open spaces by land use is of paramount importance and the land savings in joint-use land uses will be employed as a compelling argument for the adoption of the

increased demands on open spaces (and resulting increases in amenity) which the modified grid provides.

FIGURE 4.6- MODIFIED GRID, DESCRIPTIVE

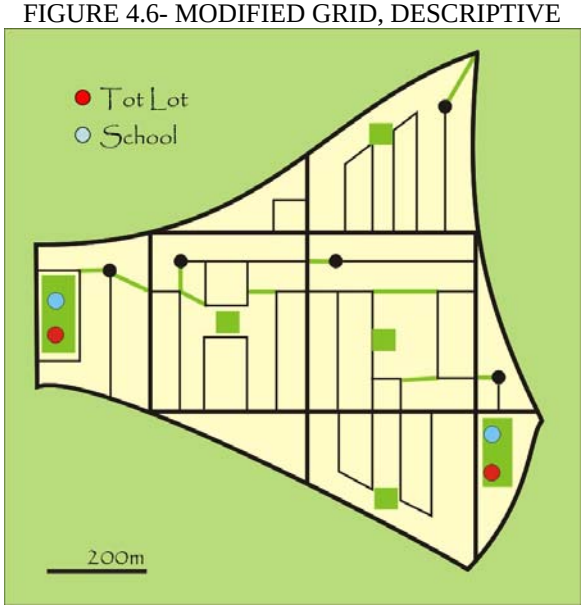
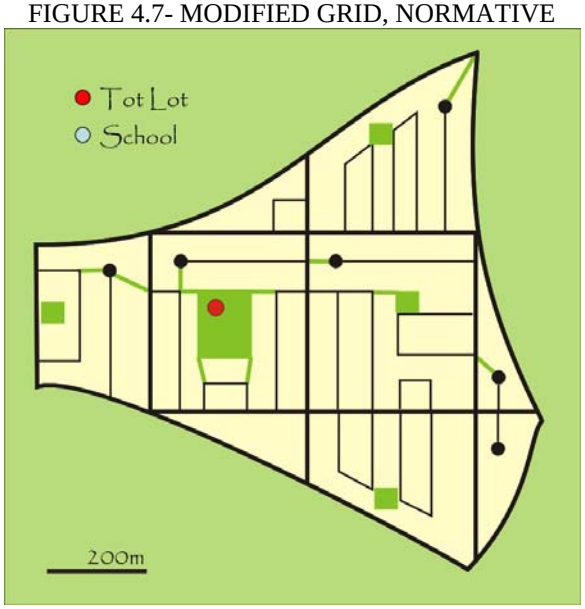


FIGURE 4.7- MODIFIED GRID, NORMATIVE



4.4.4 Open Spaces Design Solutions

The City of Calgary identifies open space systems as including “natural environment parks, city-wide and neighbourhood parks, pathways, linear parks, school sites, tot lots, built green spaces, and more” (Open Space Plan 2003, 13). The three major land uses considered for open space preservation in the MR are parks, pathways and wetlands. Provision for an urban plaza will also be made.

Parks

The City of Calgary identifies five park types: Sub-Neighbourhood, Neighbourhood, Community, District and Linear parks (Open Space Plan, 2003). Our two considered scenarios (normative recommendations and current practices) will dictate how these parks are used.

Sub-neighbourhood parks are the smallest open space unit recommended for development in Mahogany, approximately 0.5 acres in size, and as per the recommendations of the Sustainable Settlements Guide, will be located within a 200m walk of any household. These parks “usually function as a play area for small children or a passive park” (Open Space Plan 2003, 99). While Calgary’s Sustainable Suburbs Study recommends that these parks, designed for 0-5 year olds, outgrow their needs as a community matures in as little as seven years after community occupancy (Open Space Plan, 2003), they are still recommended in smaller or awkwardly-shaped neighbourhoods, or for placement adjacent to multi-family housing. As such, it is recommended that sub-neighbourhood parks be implemented on a case-by-case basis, and that the developer defer to the recommendations of the Sustainable Suburbs Study and amalgamate these parks into larger neighbourhood parks in areas which do not meet the recommended criteria.

Neighbourhood parks are recommended in Mahogany as a higher-level park, within a reasonable 400m walking distance in conformity with the Open Spaces Hierarchy, and as per

the recommendation of the city, will be 1 to 2.5 acres in size. It is recommended that these parks, containing ”tot lots” and ”play opportunities for elementary-age children….areas for informal sports, relaxation and decorative areas, youth-oriented facilities, event areas for neighbourhood programming, protection of natural environment zones and opportunities for community-specific developments” (Open Space Plan 2003, 28), be used to supplement larger parks as the walk-able park in the community, not more than 400m away if no higher-order park is close by.

Community parks will be the central focus of joint-use in Mahogany. Our normative recommendations will be that, wherever possible, the provisions for services available in Community Parks will be provided by independent or joint-use school or community centre sites as recommended by the City of Calgary’s Open Space Plan. The typical Community Park provides “community-level sports fields and other active and passive recreation opportunities. Furthermore, the area generally contains a community lease site, and an elementary and/or junior high school” (Open Space Plan 2003, 28).

Allocation for a District Park will not be made in Mahogany, as the Southeast Area Regional Policy Plan (South East Area Regional Policy Plan 2004, 15) indicates that a regional (district) park will be located in the Town Centre Planning Area to the southwest of Community B. The design of Mahogany’s open spaces will, however, reflect these larger areas and facilities for the integration of larger outside open spaces is assumed within the concept of connectivity in the regional pathway system.

Linear parks are to be integrated as necessary into the regional trail system snaking through the community, with provision for ‘unstructured’ recreational possibilities and that they provide links to “recreational, educational and natural open space features” (Open Space Plan 2003, 28). In accordance with the Open Spaces Plan, it is recommended that they be between 10 and 20 metres in width.

Urban Plaza

An Urban Plaza in Mahogany will "act as a focal point and provide a purpose, usefulness and/or function at the heart of the community" (Open Space Plan 2003) and allow for an enhanced feeling of place in close proximity to a community gateway boulevard. The Open Space Plan also recommends that Community squares will be part of the 10% reserve dedication only when the neighbourhood and community needs for MR lands are being met within the subdivision as per the Joint Use Agreement's priorities of use with respect to all reserve land (Open Space Plan 2003, 55). As such, it is recommended that any Urban Plaza in Mahogany be privately purchased.

Pathways

Pathways in Mahogany will serve to connect otherwise fragmented open spaces and other amenities, services and facilities in the community, providing for both recreational and transportation needs. Open space pathways in Mahogany will consist of open space pathways, local pathways and trails, as defined by the 2000 Calgary Bikeway and Pathway Report. The pathway system should "play an important role in encouraging a healthy, low-cost, environmentally sustainable choice for recreation and transportation and should therefore be protected, enhanced, expanded and promoted" (Open Space Plan 2003, 20).

Open space pathways will integrate with the Regional Pathway System in the area, consisting of a paved surface and a 3m right-of-way separated from bikeways and roadways, to enable "multiple users and a range of recreational activity and abilities. [The] regional pathway system should be designed to accommodate walkers, strollers, runners/joggers, people with disabilities, cyclists, in-line skaters and skateboarders" (Open Space Plan 2003, 20). The regional pathway system will run through the utility right-of-way to the north of the Mahogany development, as the 2000 Calgary Bikeway and Pathway Report states that "opportunities to use existing rail, utility rights-of-way and other corridors as part of the

regional pathway system should be considered" (Calgary Bikeway and Pathway Report 2000, 12).

A local pathway is "a pathway that provides secondary routes within communities, linking residential areas to facilities such as neighbourhood parks, schools and other local community destinations. Local pathways may also serve as linkages to the Regional Pathway system" (Calgary Bikeway and Pathway Report 2000, 4). The modified grid system will use local pathways as linkage at the neighbourhood level, and will integrate with sidewalks to create direct travel route through neighbourhoods.

Trails will be used around managed wetland areas in Mahogany as a frontage to private property to create shared private/public space, utilizing granular surfaces. "As a management tool they identify intended public routing and can formalize desire lines to minimize impact on the natural environment" (Calgary Bikeway and Pathway Report, 4).

Wetlands

As stated in section 4.4.2 (Acquisition) there will be no expectation of environmental reserve designation in Mahogany due to the uniform and developable nature of the land therein. However, as per the recommendations of the Mahogany Policy Group and the 2004 Wetland Conservation Plan (ESAS), there are three main wetland areas recommended for retention. As these areas are not up to the standard of preservation as set by the MGA's recommendations for Environmental Reserve designation, it is recommended that these three wetland areas be retained, reshaped and dredged as wet ponds to maximise aesthetic amenity and ecological functionality. It is recommended that these wetland areas be encircled, wherever possible, with granular trails above the high water mark and, that wherever possible, the land designation comes out of the 5% public utility lot designation. The Open Space Plan recommends, "MR lands in a community should not be more than one-third encumbered by a storm water management facility. Should storm water management in a community require additional land, the balance would be PUL (public utility lot)" (Open

Space Plan 2003, 59). Furthermore, the Open Space Plan specifies that areas designated for wet ponds are not to be taken out of the MR, but are to be taken from the PUT (Open Space Plan 2003, 60).

In the case of the northeastern wetland area (Wetland Area 3), it is recommended that, as per recommendation of the housing group, the wetland be fronted by mainly multi-family housing and that it be redesigned to maximize the shoreline for both amenity and for storm water management purposes. As well, the linkage between the various communities on different shorelines should be connected by trails and foot bridges to maintain the connectivity in the neighbourhood.

4.4.5 Recommendations

Recommendations made for open space land use lie in the range between current practices (descriptive) and recommended (normative) suggestions for open space development in Mahogany. The differences in descriptive recommendations and the normative recommendations lie in the savings of land designated in the MR by the difference in the descriptive use of seven elementary school sites, which afford the open spaces with 33 acres of open space, and the normative use of Community Knowledge Campuses described in section 4.3 which allow 52 acres to be designated to open spaces. The housing group's recommendation for the use of the modified grid system of roads to increase walk-ability and connectivity in the community, is justified by the savings of land resulting from these joint-use sites.

Table 4.8- Open Space Land Use Scenarios		
Open Space Type	**A (Descriptive, acres)**	**B (Normative, acres)**
Sub-neighbourhood Parks	3	3
Neighbourhood Parks	8	8
Community Parks	0	15
Linear Parks	0	5
Pathways	8	8
Farm	8	8
Community Centre	3	2
Wetland Paths	2	2
Miscellaneous Pathways	1	1
Total Available Acres	**33**	**53**
Wetlands (PUT designation)	**29**	**29**

This table is based on irregular, site-specific use of sub-neighbourhood parks in each of the five neighbourhoods. It is clear from these figures that the savings in space needed by the schools and community services makes a significant difference in the amount and variety of open spaces. It affords a doubling in the amount of neighbourhood park space, and allows community parks to exist independent of the joint-use sites. This independence allows for areas not limited by school site requirements, such as fences, and enables creativity and better integration with the neighbourhood by not being so constrained. The normative option also allows for the creation of linear parks to augment the regional pathway system, and increases the land allocation for community centres, and wider or more pathways.

The allowances in MR only cover 2 of the 29 acre requirement for the three wetland areas, which is designed to cover the open space for the trails surrounding the wetlands, and it is recommended that the remaining acres come from the available 5% Public Utility Lot allowance for functional wetland areas.

In summary, it is recommended that:

- walk-ability is placed in the highest of priorities, as described in the Open Spaces Hierarchy System, and that neighbourhood facilities be within a 400m radius of any home in the area.
- the modified grid road system be adopted.
- joint-use sites be utilized wherever possible to ease the burden on MR land.
- land for wet pond areas be taken from the PUT reserves.
- an integrated pathway system runs through utility right-of-ways where possible, and seamlessly connect to one another.
- a community plaza be located near the gateway to the community, and be privately funded.

FIGURE 4.8- SCENARIO A, DESCRIPTIVE

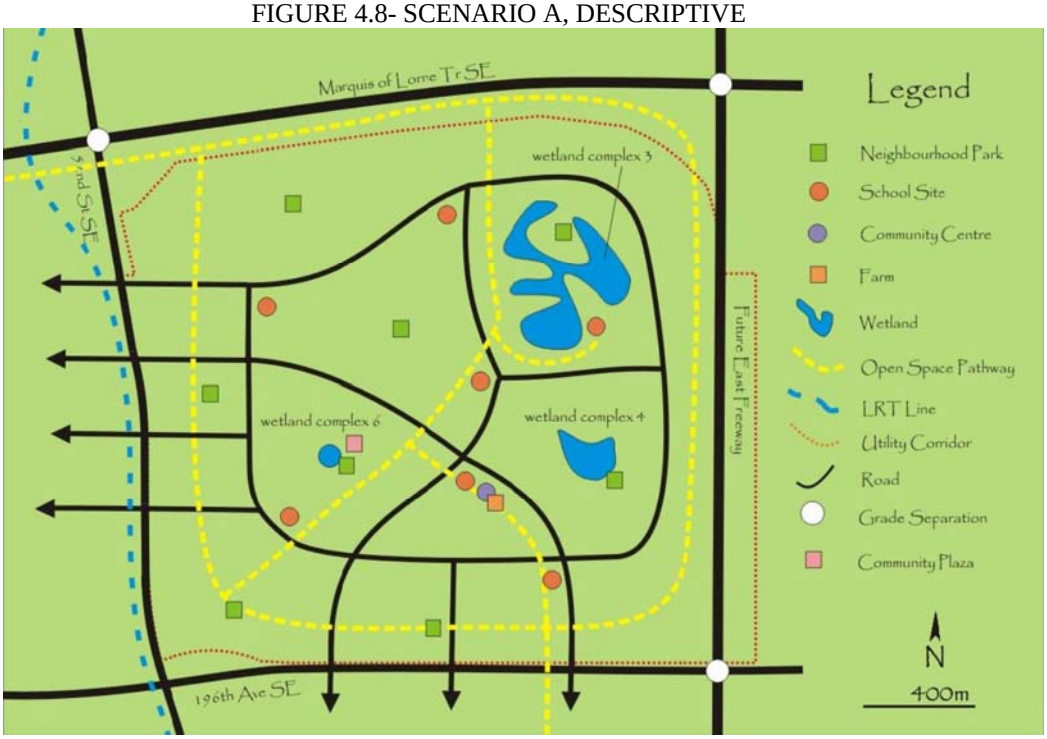
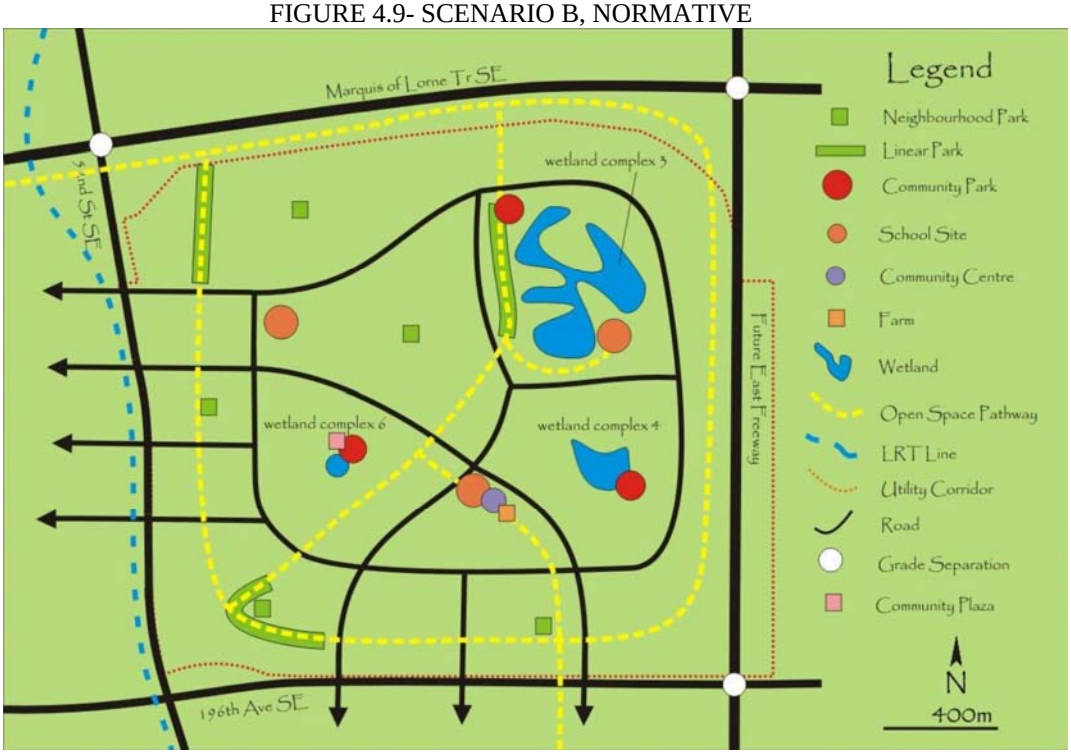


FIGURE 4.9- SCENARIO B, NORMATIVE



4.5 Transportation/Transit

4.5.1 Introduction

As more emphasis is placed on the necessity of mobility and convenience of access, the design of transportation and transit becomes an essential component of community planning. Road networks function as the backbone of transportation design, influencing route choice, transit location and traffic volume. An interconnected road network between the community node, neighbourhood nodes, parks, and schools is essential to allow easy and convenient access for residents living in different areas of the community. To reduce the environmental impact from transportation, Transit Oriented Development (TOD) guidelines have been extensively adopted for the planning of public transit. By creating a walkable, mixed-use form of development around a transit station, a safe and identifiable community is established. The use of alternative modes of transportation such as public transit, walking, and cycling is also encouraged through the creation of a pedestrian-friendly environment.

4.5.2 Assumptions

- Access to Mahogany via 52nd Street SE and 196th Avenue SE.
- A projected LRT station in the Community "A", west of 52nd Street SE. The LRT station will serve as a major transit hub containing a Park-N-Ride and bus terminal facilities for both Community "A" and Mahogany (City of Calgary Southeast Planning Area Regional Policy Plan 2004).
- Two major roads and two collector roads extends from Community "A" to Mahogany, crossing 52nd Street SE.
- Transit services will be implemented and adjusted based on ridership, finance, and population and employment thresholds.

4.5.3 Roads

External Road Network

Two major roads allow access to Mahogany from the west and south: 52nd Street SE through two major roads and two collector roads, and from 196th Avenue SE through on major road and two collector roads (City of Calgary Southeast Planning Area Regional Policy Plan 2004).

- A grade separated interchange will be constructed at the intersection of Marquis of Lorne Trail SE and 52nd Street SE to allow access from Marquis of Lorne Trail SE via 52nd Street SE to Mahogany through two major roads and two collector roads. The roads will be major routes for bus crossing, since they intersect 52nd Street SE to connect Mahogany and the future LRT station in Community "A".
- A grade separated interchange will be constructed at the intersection of the future east freeway and 196th Avenue SE. Traffic can access the community from the freeway via 196th Avenue SE to one major road and two collector roads.

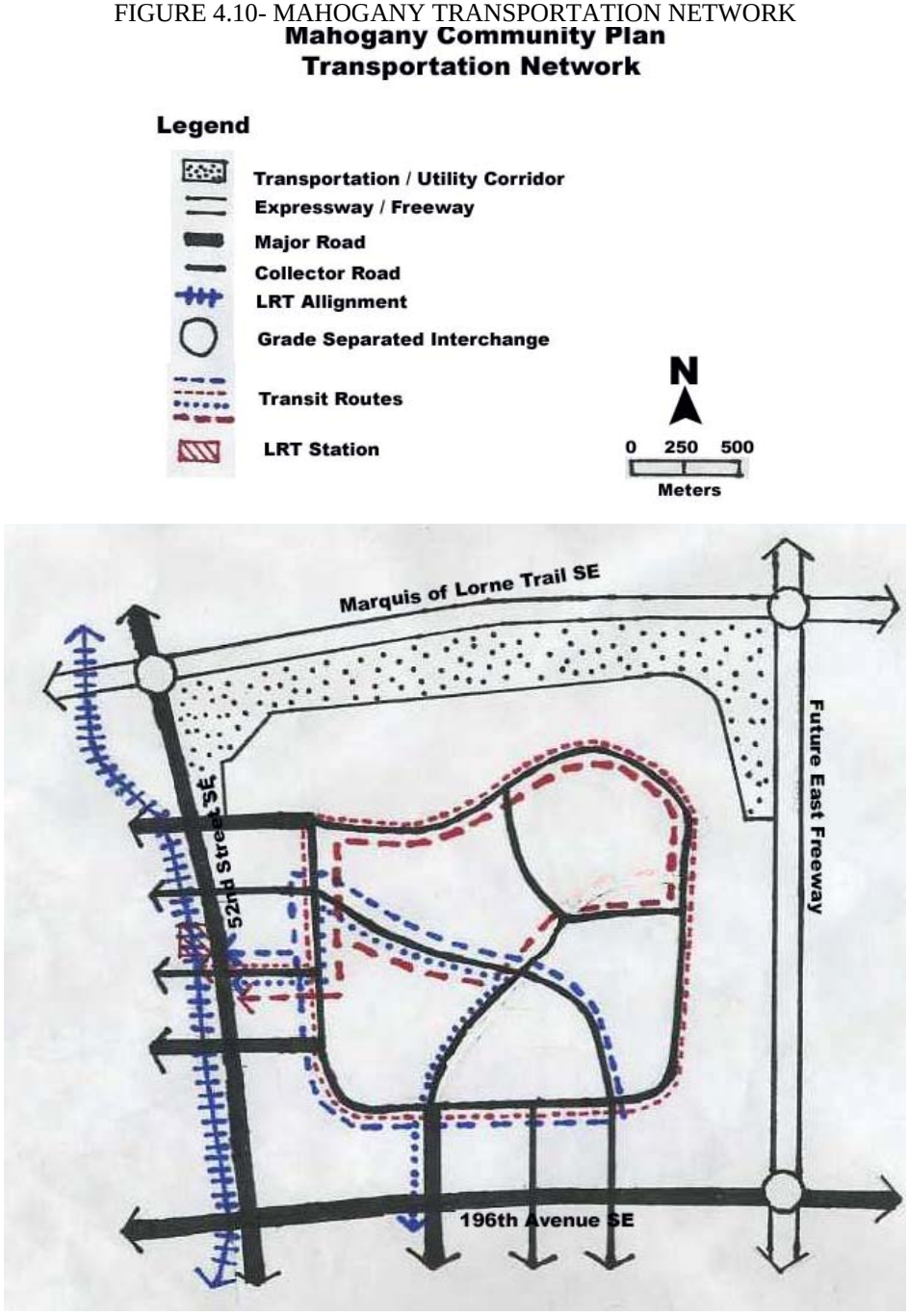
- The Future East Freeway, South of Marquis of Lorne Trail SE, has been converted to a major road. A number of possible collector roads can be planned to allow additional direct access to the community from the east.

Internal Road Network

The road system of Mahogany is illustrated in Figure 4.10. It is designed with two objectives in mind:

1. To enable safe and convenient movement of goods and services and personal travel between major destinations.
2. To promote the use of transit, walking and cycling as alternative travel modes.

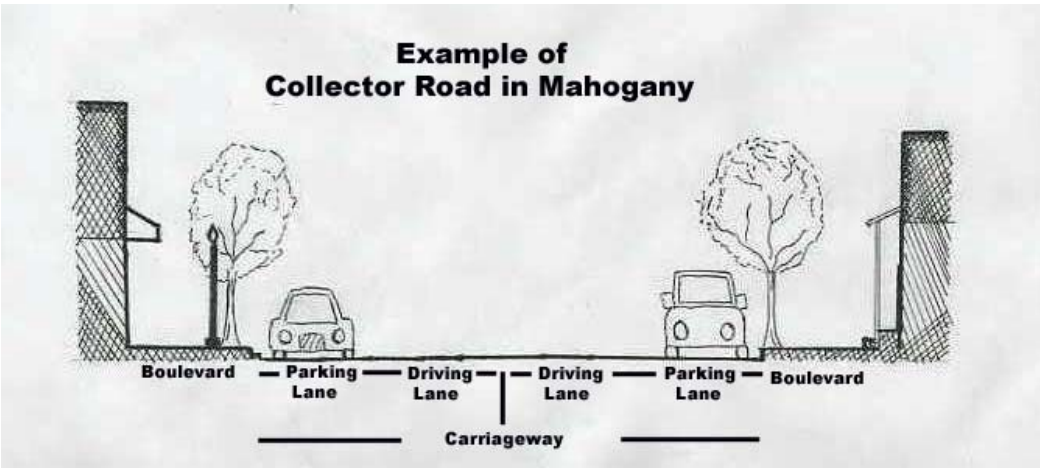
FIGURE 4.10- MAHOGANY TRANSPORTATION NETWORK



A number of interconnected and crossing collector roads link the community centre, schools, parks, and neighbourhood nodes within Mahogany. Permeability is achieved through direct and multiple routes which disperse traffic, allow for alternative routing options, and reduce travel time. The main access across the community is provided by a Northeast-Southwest collector road and a Northwest-Southeast collector road. The two roads intersect at the

community centre, which forms a central neighbourhood node and a key building landmark in the community. The Northeast-Southwest road leading to the wetland terminates with a vista of amenity features, providing a focal point. The Northwest-Southeast road runs through the major neighbourhood node of Mahogany from Community "A" to Community "D", serving as the main access road to the community. To create an aesthetic gateway that represents the unique identity of Mahogany, urban design elements such as lighting, benches and trees can be incorporated to convert the collector road into an urban boulevard. Physical features including paths, nodes, and landmarks help transform Mahogany into a successful and legible community (Lynch 1984). A cross-section drawing of collector roads is shown in Figure 4.11.

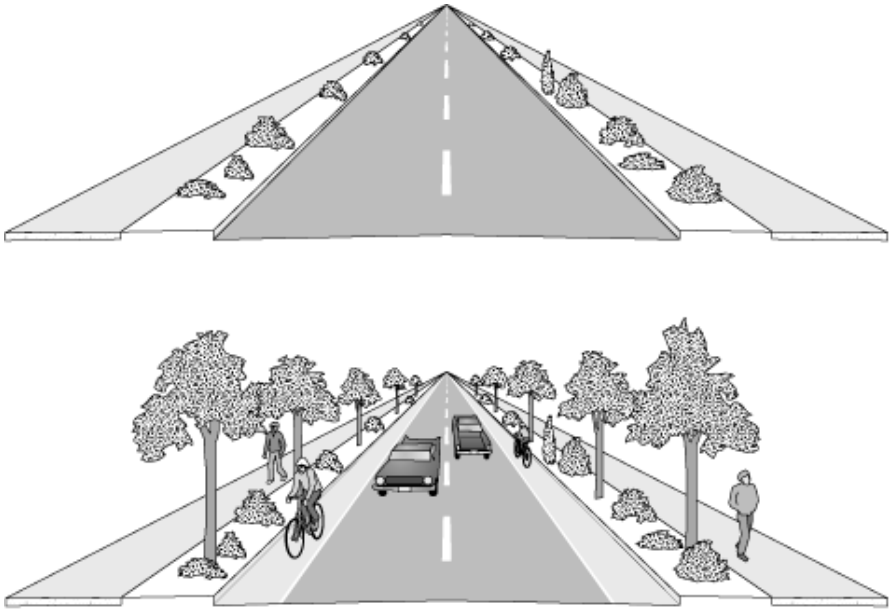
FIGURE 4.11- EXAMPLE OF COLLECTOR ROAD IN MAHOGANY



There are two types of traffic calming measures available: speed-control and volume-control. Since Mahogany is a suburban community with low traffic volumes, speed-control measures are encouraged for traffic calming. Collector roads with on-street parking and landscaping not only effectively reduce speeds, but also enhance the aesthetic appearance of the roadway. These features act as a buffer between pedestrians and vehicular traffic, creating a safer walking environment. By adding tall street trees and bringing buildings and sidewalks to the edges, an illusion of narrower roads is further enhanced. Another recommended speed-control measure is chicanes, which alternate parking and other physical features from one side of the road to the other. Chicanes force drivers to slow down and manoeuvre between

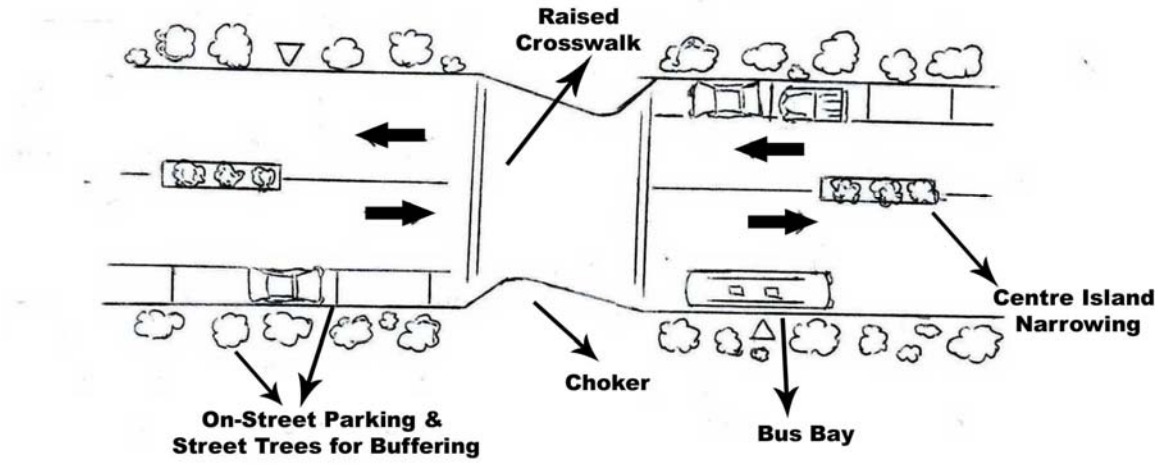
the physical structures (Oregon Department of Transportation Traffic Calming 2005). In Mahogany, these physical features are recommended to be used in combination with road narrowing. Narrowing of the collector roads can be implemented at mid-block locations with chokers from the curbs or on the centreline using centre island narrowings (TrafficCalming.Org 2005). Near the locations of transit stations, on-street parking can be alternated to bus stop zones. Raised crosswalks can be put in place close to the bus stops to improve safety for both pedestrians and vehicles. The chokers extend from the curbs to create bus bays that separate on-street parking and bus stops and buffer-stopped buses from travel lanes. Advantages of bus bays include minimizing delay to through traffic and buffering passengers from through traffic (Transit Cooperative Research Program 2004). Illustrations of these measures are shown in Figure 4.12, where trees and bike lanes make a roadway appear narrower**,** and Figure 4.13.

FIGURE 4.12- TRAFFIC CALMING



(Oregon Department of Transportation Traffic Calming 2005)

FIGURE 4.13- TRAFFIC CALMING



Pathways are shared by pedestrians and cyclists for recreational and travel purposes. The regional pathway runs along 52nd Street SE and 196th Avenue to parallel the projected pathway system of Community "A". Local pathways link parks, schools and the community centre together. The pathway loop allows for direct connections between neighbourhood destinations and provides pedestrian access and circulation. The open spaces incorporated in the pathway system create safe, interesting, and enjoyable pedestrian and cycling journeys.

Table 4.9- Road Hierarchy			
	Expressway/Freeway	**Major Road**	**Collector Road (For the purpose of this plan: includes primary collector or collector roads)**
Definition	Divided highway with full control of access	A roadway designed to collect and distribute traffic to and from freeways and expressways to less important streets, to major traffic generators, and from subdivision to subdivision.	A divided or undivided roadway designed to collect and distribute traffic from major roads to streets of a lesser standard and to serve secondary traffic generators and traffic within a community
Typical Speed Limit	80 km/h	60 km/h	50km/h
Examples	Marquis of Lorne Trail SE and the future east freeway	52nd Street SE and 196th Avenue SE	The projected internal road network of Mahogany

(City of Calgary Sustainable Suburbs Study 1995, City of Calgary Traffic Control Policy Manual 2005)

4.5.4 Transit Oriented Development

Transit Oriented Development (TOD) is defined as a walkable, mixed-use form of development focused around a transit station. The efficient use of land around Light Rail Transit (LRT) stations and high volume bus stops are essential for TOD. Transit supportive uses such as multi-dwelling residential, retail shops, offices, personal services, etc should be encouraged around the stations. The efficient use of land around the stations not only creates an identifiable neighbourhood and a safer station environment, but also increases non-peak direction and off-peak transit trips.

In Mahogany, transit stations will be located at the commercial core, neighbourhood nodes, and the community centre. All residential areas should have a transit station within 400 – 600 meters, which is equivalent to a 5-minute walk radius (City of Calgary Transit Oriented Development Best Practices Handbook 2004). Since research has shown that commuters are willing to walk farther to reach a LRT station than a bus stop, the proposed catchment area is 600m for the LRT and 400m for buses (Morrall and O'Sullivan 2003). In Mahogany, there will be a community node east of 52nd Street SE around the LRT station, a major neighbourhood node next to the community centre and the school, and four small neighbourhood nodes, comprised of two in the west and two in the east of the community. All neighbourhood nodes have bus stops and are located at the convergence of roads and pathways for convenient access. Between neighbourhood nodes, bus stops should be spaced at 200m to 250m intervals (Figure 4.14).

FIGURE 4.14- TRANSIT ORIENTED DESIGN

The decisions on maximum tolerable walking distance and mode of transportation made by passengers are strongly affected by the quality of the walking environment. Delays and inconveniences during the commute, such as lack of sidewalks, dangerous walkways and unaesthetic appearance, can discourage passengers from using the public transit. Improvements to the designed environment and reducing pedestrian walking distances are important to encourage the use of public transit (Morrall and O'Sullivan 2003). The optimal

locations of the transit stations in Mahogany will be at intersections of collector roads and close to parks or schools, which can create neighbourhood nodes. The convergence of roads and pathways on the nodes will allow direct access to the stations. A study found that benches, shelters and trees significantly increase passengers' preferences for the bus stops. On the other hand, the presence of advertising on benches and shelters elicits negative reactions (Ewing 2000). Consequently, a number of design elements will be included to create attractive structures and comfortable places for bus waiting. The stations should provide shelter and seating for pedestrians, telephones, adequate lighting, and bicycle racks.

4.5.5 Transit Services

Types of Transit Services

In the Southeast planning area, a future LRT station has been determined to be located in Community "A", along 52nd Street SE. Although the minimum standard for an LRT station to be constructed is 25,000 residents or 10,000 job catchments, the threshold for a full extension of the LRT line to the SE is 100,000 residents, which will not likely be reached until the year 2015 (City of Calgary Southeast Planning Area SE LRT Line Feasibility Study - Draft 2004). Different types of transit services are required at different stages of the development, depending on population and finance (Calgary Transit 2005).

Prior to the construction of the LRT:

- BRT – A limited stop, higher capacity bus service that parallels the future LRT line. A direct, limited stop bus to downtown and other regional destinations for residents in the SE. Based on the employment projection, more than 5,000 employees will be commuting to work. To ensure rapid transit services, possible destinations for the BRT include downtown, Anderson Station, and Chinook Station, which will likely become major employment centre and attractions for residents in Mahogany. BRT will operate on regular roads with transit priority at traffic signals. Prior to the construction of LRT, BRT is the low-cost alternative mode of transportation. The bus can accommodate 5,000 to 8,000 passengers during the peak hour/direction.

- Express bus – A peak period bus from the community transit hub in the commercial core to downtown and Somerset/Bridlewood Station. An example is the regular express bus services from Mackenzie Town to downtown and Anderson Station. The bus requires a threshold of 12,000 residents or 5,000 jobs. Express service will be removed when LRT is extended and the communities fall within the 20 minute feeder bus travel times.
- Shuttle Bus – These small-sized buses will be used until the population threshold is reached and demand for larger buses is determined.

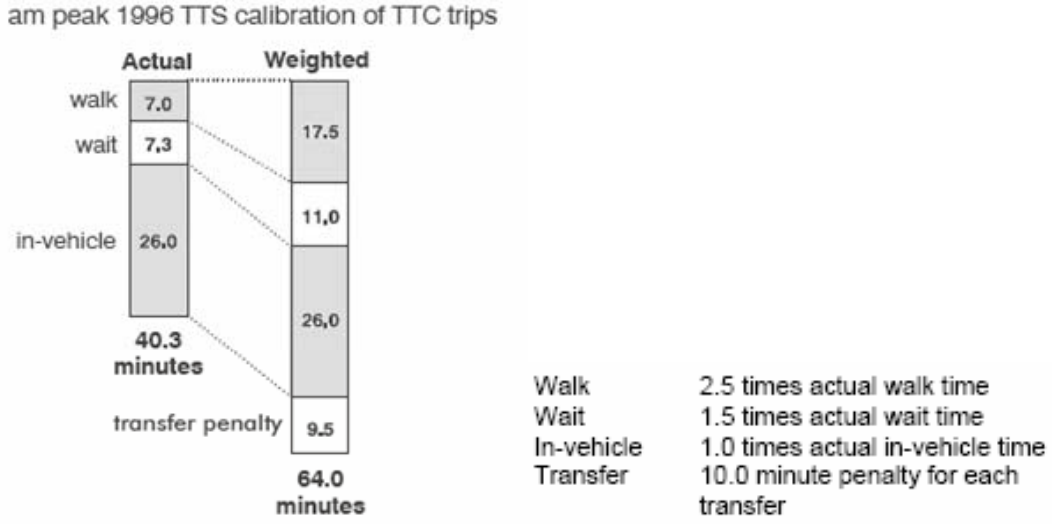
At the later stages of development:

- LRT – An extension of the Southeast LRT line will serve the area once the population reaches the LRT threshold of 25,000 residents or 10,000 job catchments. During the peak hour/ direction, the train carries about 6,000 passengers
- Feeder Bus – Regular-sized buses that can accommodate large number of commuters during peak hours.

Transit Ridership

One of the main objectives of transportation planning is to make transit an attractive and practical alternative to private vehicles (City of Calgary Sustainable Suburbs Study 1995). A number of exogenous and endogenous factors affect transit ridership. Exogenous factors such as car ownership, fuel prices, and demographics are uncontrollable. However, controllable endogenous factors, including wait time and route structure, can be manipulated to increase ridership in Mahogany (Wilson 2003). Research has found that the amount of time spent on walking, waiting, and transferring is heavily weighted by passengers. However, in-vehicle travel time is perceived as the same as the actual time, suggesting a limited impact on the ridership from reducing the route network (Dawson 1999). The average weighted travel time for different components is illustrated in Figure 4.15.

FIGURE 4.15- AVERAGE WEIGHTED TRAVEL TIME



(Dawson 1999)

Recommendations:

- Encourage ridership through direct pedestrian path connections to transit stations and minimal wait time (15-20 minutes throughout the day).
- Improve connections to major destinations and minimize the number of transfers.
- The use of low-cost, energy efficient, small-sized vehicles, such as shuttle buses.
- Once certain population threshold and transit demand are reached, High Volume Occupancy lanes (HOV) can be incorporated in the collector road connecting directly to the LRT station in Community A in order to improve the efficiency of roadway and transit. The HOV lanes are reserved for buses, taxis and carpools to help move commuters through congested areas. Road signs will indicate the hours of operation and numbers of occupants required per vehicle (City of Calgary High Occupancy Vehicle Lanes 2005). A more detailed pilot study should be conducted prior to the establishment of the HOV lanes and the possibility of extending the lanes.

Bus Routes

There are four primary bus routes serving the community (Figure 4.5.1). Additional bus routes can be put in place when the population threshold is reached and the need for additional transit services is determined.

- The outer roadway loop will be used as the primary bus route for residents living at the periphery of the community to commute to the commercial core and the LRT station.
- A north bus loop serves residents living in the north and connects the LRT station to the community centre.
- A south bus loop provides connections between the LRT station, the community centre, and destinations in the south.
- A bus route provides direct service from Mahogany to Community “A” and Community “C”. It connects the LRT station, the community centre, and the employment centre.

4.5.6 Conclusion and Recommendations

The transportation system is designed according to the principles and guidelines of transit oriented development.

- An interconnected network of collector roads and pathways link together the major destinations in Mahogany.
- The use of an urban boulevard for the gateway to Mahogany helps create an identifiable community.
- The design of a pedestrian-friendly road system should incorporate urban design elements and traffic-calming measures.
- Transit stops are located at community and neighbourhood nodes, which are easily accessible from various roads and pathways.
- The catchment area is 600m for the LRT and 400m for buses. All residential areas should have a transit station within 400 – 600 meters.

- All transit stations should incorporate benches, shelters, and trees to create attractive structures and comfortable places for bus waiting.
- Different types of transit services at different stages of the development: BRT, Express Buses, and Shuttle Buses at the beginning stage vs. LRT and Feeder Buses at the later stage.
- Encourage ridership through direct pedestrian path connections to transit stations, minimum transfers and reduced wait time (15-20 minutes throughout the day).
- The incorporation of High Volume Occupancy lanes on the collector road connecting to the LRT station.
- Four bus routes: an outer bus loop, a northern bus loop, a southern bus loop, and a direct route from the LRT station to the Southeast Employment Centre.

4.6 Community Facilities

4.6.1 Introduction

There is an important link between the vibrancy and health of a community and the quality of life enjoyed by the residents of that community. In order for a high quality of life to be maintained, there are certain basic pre-requisites which must be met, such as access to housing, food and employment. However, there are other needs of residents required within a community to maintain their high quality of life. These needs include recreational, security and health needs, as well as child-care provision and a sense of community (Calgary Plan 1998). Therefore, it is for these reasons that the provision of community facilities for any new community is vital. The presence of these community facilities is intended to serve the social, recreational, educational, security, health and spiritual needs of the residents (City of Calgary Southwest Community "A" and Employment Centre ASP 2004). Similarly, these community facilities are the key amenities providing the public space which facilitates interaction among the residents of a community.

4.6.2 Assumptions

In addition to the general assumptions for Community Services, there are specific assumptions which pertain to Community Facilities.

- Proposed community facilities in the Towne Centre will be built as planned.
- Mahogany will be supported by nearby existing facilities until such time as the population in the community warrants the building of new facilities.
- Mahogany will support only one community centre, although the population threshold would suggest that the community requires two centers.

4.6.3 Community Facilities Considered

There are numerous community facilities which must be considered for inclusion into Mahogany. However, because of the close proximity of the Towne Centre, many of the required community services which would be needed in Mahogany have already been proposed for the Towne Centre (Figure 4.16). These facilities in the Towne Centre are intended to serve the adjacent communities (City of Calgary Southeast Planning Area Regional Policy Plan 2004). These facilities include:

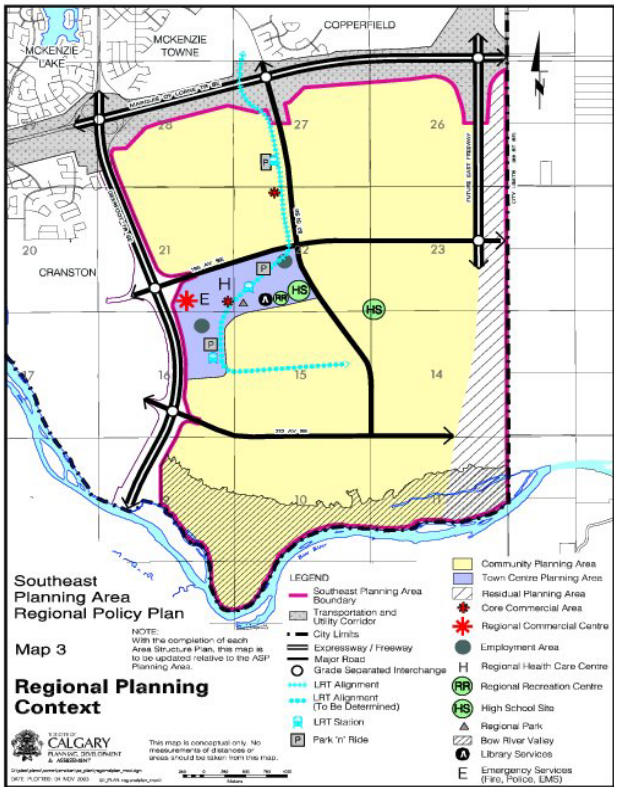
- EMS / Police / Fire Station
- Regional Public Library
- Regional Recreation Centre
- Regional Health Care Centre
- High School

Therefore, the community facilities which will be considered for Community "B" include:

- Community Centre
- Day-Care Facilities
- Recycling Facilities
- Medical Facilities

- Social Services
- Churches / Faith Facilities
- Senior's Residence
- Community Gardens
- Organic Farm

FIGURE 4.16- SOUTHEAST TOWNE CENTRE FACILITIES



(Southeast Planning Area Regional Policy Plan 2004)

4.6.4 Towne Centre Facilities

It is important to first consider the community facilities which will be located in the Towne Centre. Because of the threshold populations required for these facilities and other site requirements, it is unnecessary to duplicate these services in Mahogany.

Fire Station

The principle goal of the Calgary Fire Department is to "improve the quality of life to our customers through the reduction and/or elimination of the negative effects of fires, environmental spills, accidents and disasters" (Calgary Fire Department 2004). The spacing of fire stations is based on a maximum response time of between five and seven minutes. Other factors are considered when determining the optimal location of fire stations, such as access from two directions, a corner location and proximity to a major roadway (City of Calgary Southeast Planning Area Regional Policy Plan 2004).

Existing Facility

- Fire protection is provided to the Southeast planning area by Fire Station No. 30 (6 McKenzie Towne Gate SE) (City of Calgary Southeast Planning Area Regional Policy Plan 2004).

Proposed Facility

- A regional emergency services site, including police, fire and EMS services, is proposed for the Towne Centre. However, there may be a temporary fire station erected before the completion of the permanent facility. This will depend on the rate of growth in the Southeast Planning Area.

Land Requirement

- 3.0 – 4.0 acres of land with a building size of between 8,000-12,000 square feet, depending on whether it is part of a single or multi-use facility (City of Calgary Southeast Planning Area Regional Policy Plan 2004).
- Temporary facility requires 1 acre of land
- Land for a fire station is bought by the City of Calgary and deducted from the budget of this group (Doug McDonald).

Emergency Medical Services

The Calgary Emergency Medical Services (EMS) is "committed to promoting the safety and well-being of citizens." It serves as "the front-line of our emergency health care system and plays a critical role in the provision of emergency care and treatment" (Emergency Medical Services 2004). The location of EMS sites is based on a maximum response time of eight minutes. As well, EMS sites should be easily accessible and located on a major roadway.

Existing Facilities

- The Southeast Planning Area is being served by Station 30 (6 McKenzie Towne Gate SE), a Fire/EMS facility. Additional service is provided from a tri-services facility in Midnapore (450 Midpark Way SE) (City of Calgary Southeast Planning Area Regional Policy Plan 2004).

Proposed Facility

- An EMS station is planned in the Towne Centre as part of a tri-services facility with a police and fire station.

Land Requirement

- 1/3 of an acre with a 3,000 square foot building and parking bays. However, this is typically built along with a fire station, or with both a fire and police station (City of Calgary Southeast Planning Area Regional Policy Plan 2004).
- Land for an EMS station is bought by the City of Calgary and comes out of the budget of this group (Doug McDonald).

Police Services

A core value of the Calgary Police Service includes, "preserving the quality of life in our community by maintaining Calgary as a secure place in which to live" (Calgary Police Service 2004). In order to achieve this, the police service focuses on crime prevention, crime

detection and apprehension and traffic safety. The location of a police station is based on criteria such as accessibility and proximity to major roadways.

Existing Facilities

- Police services for the southern portion of the city are currently being provided by the Police District 6 office (8325 Bonaventure Dr. SE) and by the Midnapore Satellite Station (670, 22 Midlake Boulevard SE) (City of Calgary Southeast Planning Area Regional Policy Plan 2004).

Proposed Facility

- A police district office is planned for the Towne Centre as part of a tri-services facility with an EMS and Fire Station.

Population Threshold

- 80,000 people.

Land Requirement

- Stand-alone facility requires 3 acres of land for a 20,000 square foot building.
- Police Station built in conjunction with Fire and EMS Station, the land requirement is 4 acres with a 35,000 square foot building.
- Land for this facility is bought by the City of Calgary and comes from the budget allotted for this group (Doug McDonald).

Regional Public Library

The Calgary Public Library's mission statement is to "serve Calgarians by providing access to library resources for information, inspiration, and enrichment" (City of Calgary Southeast Planning Area Regional Policy Plan 2004, 41). It is the responsibility of the Calgary Public Library to plan and deliver library services that respond to community needs and are readily accessible to all Calgarians. The location of public libraries is based on several factors. For example, a library must have a highly visible and convenient location, and be placed near the

focal point of a community and along public transit routes. The library should be readily accessible for vehicles as well as for pedestrians. There are two types of libraries which can be built, a community library or a regional library. Population and distance to the closest library are determining factors when considering building a new library facility.

Existing Facility

- The closest library to the Southeast Planning Area is the Fish Creek Branch Library (11161 Bonaventure Dr. SE) and the Fish Creek Recreation, Education, Library Complex by the Shawnessy Towne Centre (333 Shawville Boulevard SW).

Proposed Facility

- A regional library has been planned for the Towne Centre.

Population Threshold and Commuting Distance

- 40,000 people for a community library
- 100,000 people for a regional library.
- Average travel distance of 3.5 km for a community library.
- Average travel distance of 4.0 – 5.0+ km for a regional library.

Land Requirement

- A community library requires approximately one square acre for an 18,000 square foot building.
- A regional library requires approximately two acres of land for a 25,000 square foot building.
- The land required for a library facility is purchased for this purpose (Doug McDonald).

Regional Recreation Centre

A recent trend in the development of recreational facilities is to incorporate them into a multi-use facility including, for example, a high school and library. These facilities have many related services and customers. Therefore, by incorporating them into one location, this allows them to maximize their capital and operating budgets and provides a stronger customer draw (Calgary GRAMP 1999).

Existing Facility

- The recreational needs of residents in the Southeast Planning area would be served by the South Fish Creek Regional Recreation Centre. This facility, located in the Shawnessy Towne Centre, includes a Catholic senior high school, a public library, twin ice arenas, community gymnasium, public education space, and a full service YMCA (South Fish Creek Regional Recreation Centre 2004).

Proposed Facility

- There has been a regional recreation facility proposed for the Towne Centre. Specifics as to what facilities will be integrated with the regional recreation centre have yet to be determined.

Population Threshold

- 100,000 people

Land Requirement

- Details as to the land requirement needed for construction of a regional recreational facility has yet to be determined for the Towne Centre.
- The land for a regional recreation centre is bought by the City of Calgary and comes out of the budget allotted for this group (Doug McDonald). New ways of providing recreational facilities for Calgary have been explored by the City. Since 1996, the City of Calgary has partnered with not-for-profit community based groups in order to provide recreational facilities. The City secures the land and provides the capital

funding. The not-for-profit group operates the buildings and raises the funds to furnish, staff and maintain the facility for the long-term (Calgary Parks and Recreation 2005).

Regional Health Facility

There are several factors to consider when determining the best location for a major regional health facility. This type of facility requires a highly visible location, good connections to major transit routes and easy access for EMS vehicles. As well, there should be unconstrained access for helicopters. A regional health facility is often located in close proximity to a pharmacy, long-term care facilities, senior's housing and medical offices (Calgary Plan 1998).

Proposed Facility

- The South Diagnostic and Treatment Centre, a regional health facility (hospital), is planned for the Towne Centre.

Land Requirement

- A regional health facility requires 25 acres of land with a possible additional land requirement of 15 acres.

High School

The provision of high schools in communities is essential. High schools can be owned and operated by either the Calgary Board of Education (CBE) or the Calgary Catholic School District (CCSD). No model exists as to the best location for high schools or the best facilities to build in cooperation with high schools. However, it is common for these schools to locate adjacent to a regional recreation centre, a library, a transit hub or retail areas (City of Calgary Southeast Planning Area Regional Policy Plan 2004).

Proposed Facility

- There is one high school planned for the Towne Centre.

Population Threshold

- CBE – 25 000 to 50 000
- CCSD – 120 000 – 125 000

Land Requirement

- CBE and the CCSD – 23 acres of land (10 acres for the building and 13 acres for sports-fields).

4.6.5 Community Facilities in Mahogany

Community Centre

A community centre is a fundamental facility for every community. It is there to serve the "physical, social and recreational needs of the community" (City of Calgary Southeast Planning Area Regional Policy Plan 2004, 28). According to the Calgary Plan (Municipal Development Plan) from 1998, a growing trend is for community centers to incoporate 'multipurpose' facilities to provide for the "learning, social, recreational and public service needs of the area" (21). The community centre provides a public space for communication and interaction among members of a community. Therefore, it acts as a focal point for the entire community and should be centrally located and accessible for all residents.

Projection

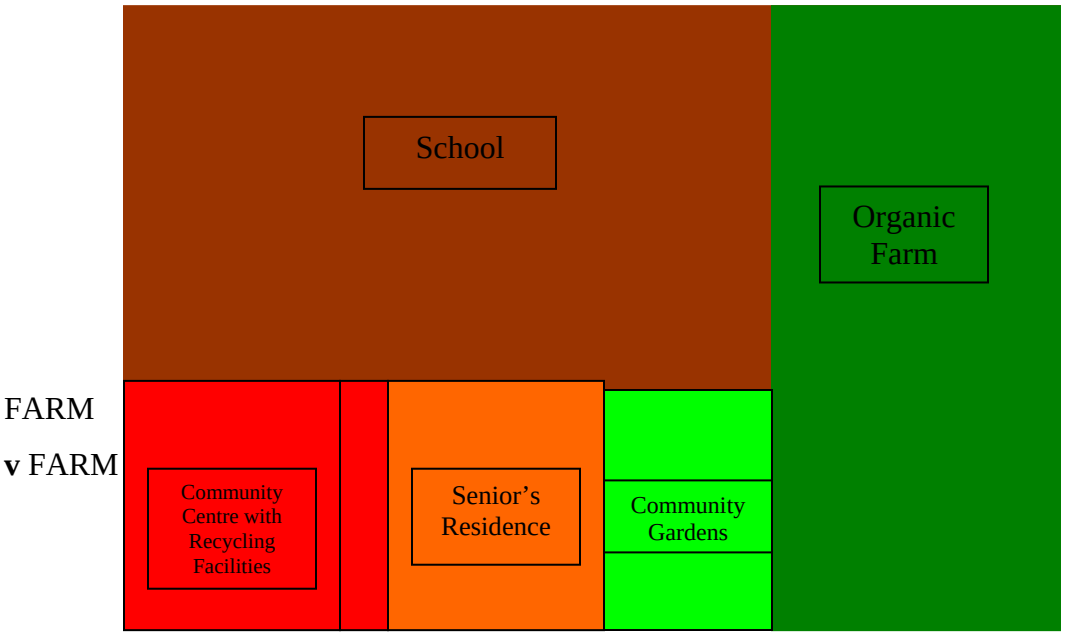
- One community centre in Mahogany centrally located on the site of the existing farm
- Multi-use facility with numerous amenities such as recreational spaces (gym, hockey/skating rinks, outdoor courts), meeting rooms and day-care facilities.
- Well connected to the entire community by the road network and accessible to transit routes and bike paths.

- Part of a joint-use site.

Joint-use Site

The Mahogany Community Centre will be part of a joint-use site. The purpose of a joint-use site is to "provide for the development of public and separate schools together with sports fields and recreational areas" (City of Calgary Southwest Community "A" and Employment Centre ASP 2004, 27). However, it is common for other amenities to be located in a joint-use site along with schools and green space. Therefore, the Mahogany Community Centre will be part of a joint-use site, including a school, along with other community facilities such as community gardens, a recycling depot, an organic farm and a senior's residence (Figure 4.17). By incorporating these facilities into a joint-use site, this will greatly reduce the land requirement for each facility. This will also encourage interaction between residents of Mahogany and act as a central focus for the entire community.

FIGURE 4.17- PROPOSED JOINT-USE SITE



Neighbourhood Node

This proposed joint-use site is also a central neighbourhood node. The purpose of a neighbourhood node is to "provide a transit and/or social focus for the surrounding residential area" (City of Calgary Southwest Community "A" and Employment Centre ASP, 2004, 23). There are two main types of neighbourhood nodes, a "transit-oriented" node and an "activity-oriented" node. The joint-use site could be categorized as both types of neighbourhood node. It is an activity oriented node, for it "creates a social focus for the neighbourhood," and it is centrally located with public space, a community centre and a school (City of Calgary Southwest Community "A" and Employment Centre ASP, 2004, 24). However, this site also displays features of a 'transit-oriented' node, for it will "encourage and support public-transit use" (City of Calgary Southwest Community "A" and Employment Centre ASP, 2004, 24). Similarly, the road pattern and pedestrian routes will converge at the node, providing a connection for vehicle, pedestrian and bicycle traffic.

Population Threshold

A community must have between 10,000 to 12,000 residents in order to support a community centre. As predicted, the population of Mahogany will be in the neighbourhood of 23,000 people (City of Calgary Southeast Planning Area Regional Policy Plan 2004). When considering that the population of Mahogany may reach well over 23,000 people, it appears that there may be enough people in this community to support two community centers. However, it has been suggested that it is difficult enough making one community centre viable, let alone two community centers (Bela Syal 2005). Therefore, Mahogany will have only one community centre.

Land Requirement

The land for a community centre is provided from the municipal reserve. Two scenarios have been considered when determining the land requirement for the Mahogany Community Centre. Scenario A considers the amount of land used if the centre were not part of a joint-use site. Scenario B considers the land requirement if the Mahogany Community Centre is part of a joint-use site.

- Scenario A – land requirement of between 3.0 – 4.0 acres, the building requires approximately two acres and the surrounding green space requires two acres (Doug McDonald).
- Scenario B – land requirement is between 2 – 2.5 acres

Day-Care Facilities

These facilities are often located in neighbourhood nodes or in community centres. Day-care facilities are proposed to be included in the community centre, and, would therefore, not require any additional land space.

Recycling Facilities

The City of Calgary is committed to recycling. Their long term goal is to reduce the amount of waste headed for landfill to 20% and increase recycling and recovery to 80% by 2020. The 48 neighbourhood recycling depots are a key part of the City's recycling effort (Waste and Recycling Services 2005).

Existing Facilities

- The nearest recycling facilities to the Southeast Planning area are the depots in McKenzie Towne (20 McKenzie Towne Ave. S.E.) and in Shawnessy by the Home Depot (390 Shawville Blvd. S.E.).

Projection

- A recycling depot should be located in Mahogany, with the proposed facility adjacent to the community centre. This would provide a central location for recycling services and easy access for residents.

Land Requirement

- Recycling depots are usually located in parking lots of existing retail/commercial outlets. Therefore, by locating adjacent to the community centre, there would be minimal additional land required to accommodate the recycling depot.

Medical Facilities

Although a regional health care facility (hospital) is planned for the Towne Centre, Mahogany will require community-level health services. These facilities provide for basic health-care needs, as well as offer wellness and other programs targeted to address particular health issues.

Existing Facility

- The South Calgary Health Centre (31 Sunpark Plaza SE) currently provides health services to the south part of Calgary such as vaccinations, adult wellness programs and family planning clinics.

Projection

- A community level medical clinic should be provided for Mahogany. The best location for such a facility is in a central location on major roadways and accessible by transit, vehicles and pedestrians.

Threshold

- One medical clinic for every two to three communities

Land Requirement

- A medical clinic requires one acre of land which is purchased for this purpose.

Social Services

The goal of the Community and Neighbourhood Services Department at the City of Calgary is to "provide leadership in cooperative development of quality social services, based on the principles of social justice, equity and economy which contribute to the social well being of people in Calgary" (Calgary Plan 1999, 47). Some services provided through this department include community liaison, assessment and evaluation and social development. Currently, there are twelve area and neighbourhood offices in five regions throughout the city to better respond to the specific needs of each geographic area (Community and Neighbourhood Services, 2005).

Existing Facility

- The South Area Office (502 Heritage Drive SW) is the nearest regional scale social service provider for the Southeast Planning Area.

Projection

- Community based social services for Mahogany will be located in the community centre, where community partners will work with Community Social Workers and Program Specialists to provide the necessary social services for Mahogany.

Land Requirement

- Because community social services will be provided in the community centre, there is no additional land required.

Churches / Faith Facilities

Communities must provide for the spiritual needs of their residents. Faith facilities and churches contribute to the vibrancy of communities and often provide an important source of social assistance within a community. These facilities should be located close to neighbourhood nodes in a community.

Projection

- As the population of Mahogany grows, churches will be built based upon the needs of the community. A minimum of two churches should be built in the neighbourhood nodes in Mahogany.

Land Requirement

- Church groups may often meet in pre-existing facilities, such as in community centres, which would require no additional land space. Stand alone facilities may require anywhere from 2.0 – 3.0 acres of land. This land must be purchased for this purpose.

Community Gardens

According to the Calgary Horticultural Society, "community gardens offer people from diverse cultures and socio-economic groups to interact together", and allows for "friendships and a sense of community to grow" (Calgary Horticultural Society 2005). As well, people become educated "about the environment and growing techniques in Calgary's climate" (Calgary Horticultural Society 2005). Community gardens are becoming increasingly popular. Currently, there are approximately fifteen community gardens operating in Calgary and several more are planned for this year's growing season (Calgary Horticultural Society 2005).

Projection

The community gardens will be part of the joint-use site on the existing farm site. This is an optimal location because it will allow for a high degree of community interaction. As well, because of the close proximity of the community gardens to the planned school site, these gardens will become an important educational tool for teaching school age children about growing plants and the natural environment. The North East Burnaby Organic Community

Gardens provide an excellent example of the positive relationship between community gardens and a school. This facility is located adjacent to an elementary school. Sixteen of the garden plots are school owned and have been used as an important learning tool (North East Burnaby Community Association 2004). Within Mahogany, the community gardens should be located adjacent to the senior's residence in the joint-use site. This will be an important service provided for use by the seniors as well as the other residents of Mahogany. As the example of the Cliff-Bungalow-Mission Community Gardens show, 40% of their garden plots are senior owned, indicating that this service would be important for seniors (Cliff Bungalow-Mission Community n.d.).

Land Requirement

- The land requirement for community gardens is quite variable. Research suggests that the number of garden plots and their sizes can vary considerably. Therefore, there could be approximately 30 community garden plots in Mahogany at around 25 feet by 25 feet. This would cover about 0.4 acres of land. As a result, the total land required for this facility would be one acre, considering the walking paths between the plots and some room for expansion in the future. This land would be an extension of the organic farm, and, would therefore, come from the municipal reserve under the acreage required for the organic farm.

Senior's Residence

According to the Calgary Plan (Municipal Development Plan), as the population in Calgary ages, the need for affordable housing for senior citizens will become a major priority (Calgary Plan 1998). Senior citizen housing should be located close to a neighbourhood node, along public transit routes, near open space and should be built in conjunction with other community facilities, such as a community centre (City of Calgary Southwest Community "A" and Employment Centre ASP, 2004).

Projection

- The proposed site for a senior's residence in Mahogany is within the joint-use site on the existing farm site. This location is well connected to transit routes and will be built in conjunction with several other community facilities, allowing for community interaction. As well, this site is in fairly close proximity to the planned hospital in the Towne Centre, which is another factor to suggest the benefits of this location in Mahogany.

Land Requirement

- Scenario A – 3 acres
- Scenario B – 1. 5 acres

Organic Farm

Within Mahogany, the existing farm site is a distinctive feature which should be preserved. By preserving the farm site, this will ensure that Mahogany is unique from the surrounding communities. This distinct feature may become an attractive element to draw residents to Mahogany.

Projection

In order to preserve the farm, an organic farm is proposed to replace it. This organic farm will be partially modeled after an organic farm located in Prairie Crossing, a suburban development outside of Chicago. Prairie Crossing is a fully functioning suburban community, but with a unique conservation element. Along with housing and retail development, this community includes an organic farm, a hands-on-learning farm and community gardens (Prairie Crossing 2001). In Mahogany, the closeness of the farm to the school in the joint-use site will allow for excellent learning opportunities for the school children.

Land Requirement

- The organic farm requires between 7.0 – 8.0 acres of land. This land will come out of the municipal reserve land.
- Funding for this farm may come from many sources, such as the sale of the produce grown on the farm. As well, there could be riding facilities/horse stables on the farm as an additional source of funding.

4.6.6 Conclusions and Recommendations

The inclusion of the community facilities which have been recommended for Mahogany will ensure that this community becomes a thriving and vibrant part of the Southeast Planning Area. These are the facilities which will provide for the recreational and social needs of the residents and will also provide significant public spaces which will help to encourage interaction among Mahogany residents. The proposed joint-use site will be a central focus for the community, bringing together diverse community facilities into one common area. As well, by maintaining the unique feature of the existing farm-site in Mahogany, this will help to preserve the natural heritage of the area. As we move further into the twenty-first century, the proposed organic farm will become a living memorial to Alberta's early farming history.

5.0 Case Studies

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5.1 Objectives

Our ultimate goal was to identify communities that satisfied or surpassed criteria measuring different aspects of sustainability at the community level. We applied two approaches when examining case studies of different communities. For some, we used a holistic approach, examining all aspects we deemed important. In other communities, we examined only specific aspects of policy innovation or design excellence. These aspects are discussed further in our *Framework* section. The specific objectives that we considered pertinent to the evaluation included the following:

1. Establish a list of measurable criteria to evaluate the success of different communities;
2. Identify several communities who have received praise and attention for effective planning practices;
3. Conduct extensive background research on each community to gain a complete understanding of:
    - The initial plan or vision the planner attempted to implement;
    - How the developer implemented the planner's vision;
    - The success (or lack of) after implementation;
4. Measure critical aspects of each community against our framework and compare results against other communities;
5. Highlight successful aspects that could potentially be incorporated into Mahogany.

5.2 Methodology

In establishing a list of criteria to evaluate different developments, we sought to emulate the method in which international organizations examine, evaluate, and acknowledge excellence for planners and developers. These organizations are responsible for awarding individual communities and developments for design, sustainability, and innovation. We then added to the list criteria we felt would be critical to the creation of smart communities.

Through the internet, local libraries, and personal communication with industry leaders, we then developed an extensive list of case study examples that could potentially be a source of inspiration. Finally, we applied the matrix of evaluation to all case studies to determine well-planned communities. The matrix also yielded certain elements that stood out for distinction, and that could easily be applied to Mahogany.

5.3 Framework of Evaluation

5.3.1 Matrix Development

In order to summarize the overarching vision for the Mahogany Development in a clear concise manner a matrix of indicators was developed. This framework of evaluation served as a method to assess the suitability of case studies and can also serve as a method of evaluating the Mahogany development upon completion.

The actual process of matrix creation had its beginnings in an EVDP 636 Community Planning brainstorming and discussion session held in early January 2005. A vision for the future of the Community B/Mahogany development site was determined in this session. It is this vision, articulated by class members that will effectively guide and direct the design of development. The goals listed in the evaluation matrix are closely related to the vision created in the brainstorming session but are also informed by and reflective of sustainability indicators from such groups and organizations as Canadian Mortgage and Housing Company (CMHC) and the U.S. Environmental Protection Agency (EPA). Goals are also reflective of the principles used by various groups when handing out awards to communities such as smart growth, new urbanist, and transit oriented development principles. Once formulated these overall goals were expanded into outcomes and finally a set of indicators were developed as a means to measure the stated goals and outcomes. It must be noted that both objective and subjective indicators are included in the matrix in order to capture quantitative and qualitative information related to the case study sites. Also it is important to recognize that the search for and development of indicators is an evolutionary process that will require examination and revision.

5.3.2 The Matrix

Each of the major goals listed in the matrix (see Annex for a full matrix) is based on an underlying concept, which serves as a foundation for the goal. The purpose of this section is to review the six major goals and provide a brief description of the underlying concepts.

1. Alternative Transportation Methods

   Underlying Concept: Auto use creates negative externalities including congestion, air pollution, energy use, stress and unsafe neighbourhoods. Congestion is one of the most wasteful phenomena (Fleissig and Jacobsen 2002; 12). Therefore, alternative transportation methods such as walking and public transit are necessary for the health of the community.

2. Increased Density

   Underlying Concept: Traditional sprawling development consumes large amounts of land and creates an unwalkable environment. Higher densities allow for more vibrant streets providing residents with greater route choices and destinations and more opportunities for walking and cycling. Additionally, compact development is cheaper to service in the long run. Open space is preserved because living and working environments are intermingled. Close neighbours naturally create relationships of friendship and trust.

3. Mixed-Use Center

   Underlying Concept: Areas that mix commercial and residential uses create lively streetscapes and vital centers. The provision of jobs within the community reduces the need for travel to other areas of the city, reducing congestion and air pollution.

4. Increased Social Interaction

   Underlying Concept: A strong community evolves from the experiences and interactions of the residents. Open spaces and recreational opportunities allow for unplanned as well as planned meetings of people on walks or partaking in sports. Open spaces provide the opportunity for personal-oriented needs such

as relaxation or play areas for children. Sidewalk widths should be a minimum of 1.5 m to allow for comfortable use and passing.

5. Mix of Housing

   Underlying Concept: Variations in housing style, type, tenure, and cost creates a community that does not exclude certain socio-economic or ethno-cultural groups. These criteria foster social well-being and create a more viable local economy (Fleissig and Jacobsen 2002; 18).

6. Environmental Preservation

   Underlying Principle: Unplanned, rapid growth contributes to the loss of open space and natural habitats while creating large amounts of construction waste at the same time. These peripheral communities require large amounts of energy and infrastructure in order to be sufficiently serviced (Fleissig and Jacobsen 2002, 17). Sensitive development will preserve natural areas and habitats and even incorporate them into the community. Compact community planning has the benefits of reducing construction waste and energy use.

5.3.3 Case Study Selection Process

International organizations dealing with urban issues and the examination of development projects were consulted when drawing up a preliminary list of possible case studies. Organizations consulted in this selection process were: Canadian Mortgage and Housing Company, Canadian Institute of Planners, American Institute of Planning, Smart Growth Network, Environmental Protection Agency, New Urbanism Organization, Urban Land Institute, and the International Center For Sustainable Cities.

We turned to these agencies and organizations as a source for case study examples as they work with, recognize, or grant awards to individual communities and developments for design, sustainability, and innovation. Application of the matrix of evaluation will allow the group to determine which case studies will be used to inform the Mahogany design team.

5.3.4 The Matrix Applied

Once the initial list was generated each of the case studies was then reviewed from the perspective of the evaluation matrix. Each indicator was assessed in the context of the case study and was judged as fully met, partially met, or not met. In some instances indicators could not be evaluated as certain phases or aspects of the development have yet to be completed.

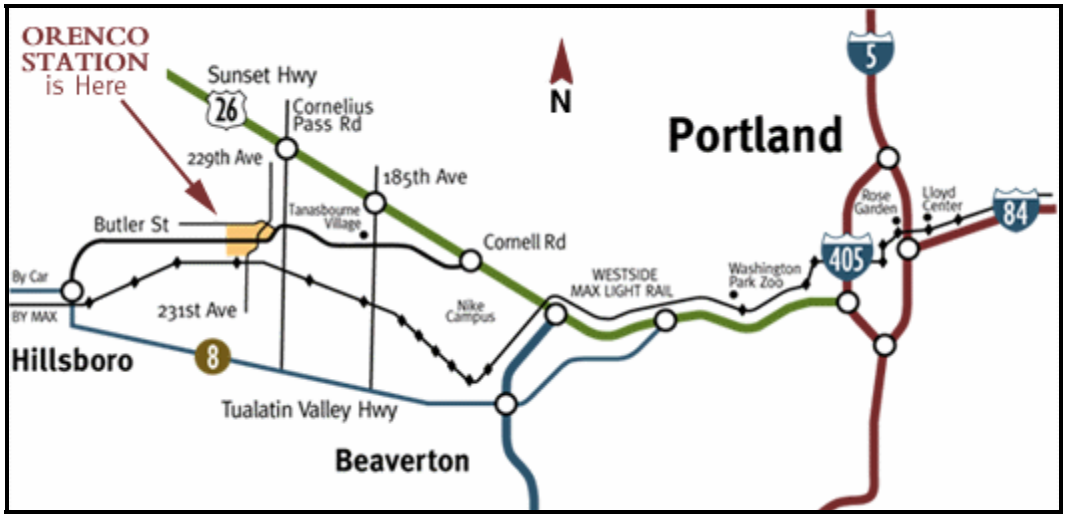
Applying the matrix to each case study allowed us to select those case studies that met all or a majority of the identified indicators. In total, three major case studies were selected; East Clayton, Orenco Station, and Kentlands. All three of these case studies are examples of holistic communities that strive to achieve an important balance of increased density, open space, housing diversity, and an assortment of land uses that blend together to form a sustainable, tight knit community where residents have a greater opportunity to form connections with their neighbours. Refer to Annex for the matrix applied to the major case studies of East Clayton, Orenco Station, and Kentlands.

5.4 Orenco Station

5.4.1 Context

Orenco Station, a New Urbanist community, is located just outside of Portland, Oregon in the Town of Hillsboro (Figure 5.1). The 190-acre site is nearing full build out at this time. Numerous employment opportunities in the high-tech profession located nearby area known as the Silicon Forest has helped to make the Orenco Station development a success. Originally designated as a commercial and industrial area, the site was rezoned in the early 1990's in order to acquire funding and secure an extension of Portland's MAX Light Rail transit line to the Town of Hillsboro. Redesignating the parcel of land to accommodate mixed-used compact development set the stage for the construction of Orenco Station to begin in 1997 (O'Neill *et. al* 2000).

FIGURE 5.1- ORENCO STATION AREA MAP



Source: http://www.orencostation.com.areamaps.htm

5.4.2 Case Study Selection

Orenco Station was chosen as a case study as it is a comprehensive, sustainable, development meeting a majority of the criteria within our matrix of evaluation. Located just outside of Portland, Orenco Station has been developed in a suburban context similar to that of Mahogany. Many characteristics that have worked together to make the Orenco Station development an award winning community can be applied to of the Mahogany site.

5.4.3 Development Foundations

Several frameworks or policy plans influence the direction and development of Orenco Station. The Regional Framework is an overarching set of policies that guides the future growth of the whole Portland Region including the case study area (Metro 1997). The Portland Metro Area 2040 Plan (PMA) outlines land use and transportation policies that will help manage growth, protect natural resources, improve infrastructure, and maintain quality of life in the 24 cities that surround the City Of Portland (Metro 2003). The most applicable set of policies to the Orenco Station development are the City of Hillsboro Zoning Ordinances, more specifically Station Community Planning Areas (SCPA). Developed out

of the PMA 2040 Plan, SCPA's are comprised of a set of policies and standards specific to development areas along the Portland area MAX Light Rail line (City of Hillsboro 2003a, c).

5.4.4 Development Features

Given that Orenco Station met a large majority of the requirements outlined in our evaluation matrix the features most useful in the context of Mahogany, Transit Oriented Development and Mixed Use Development, were selected and will be highlighted in this section. As discussed earlier Orenco Station's design is directly driven by the existence of the Light Rail Transit and the City of Hillsboro Zoning Ordinances, more specifically the Station Community Planning Areas. Each Station Community Planning Area is comprised of different zoning or land use districts which are distinct but at the same time work together to create a mixed use neighbourhood less reliant on the personal automobile with a lively mix of employment, housing, commercial and recreational choices.

Six characteristics define the Station Community Planning Area and would be a useful guide for the Mahogany site. The six characteristics are as follows (City of Hillsboro 2003a);

1. Streets, buildings, and public areas that are pedestrian oriented but do not exclude the automobile.
2. Housing and jobs concentrated in centers to encourage residents to live near transit stations
3. Open spaces such as parks and plazas and other community amenities and services throughout development
4. Link pedestrian, bike, transit, van/auto pool, through a connected multi-modal circulation system
5. Circulation system strives to provides access to light rail transit station while overcoming both physical and psychological barriers
6. Automobile intensive land uses are located in areas where the use will not negatively affect transit oriented uses and have an existing road system capable of supporting the use.

Another essential policy framework to the formation of the case study area is the Station Community Residential Village (SCR-V). Features of SCR-V include multi–use streets to connect residential areas to neighbourhood retail, larger commercial areas, and light rail transit stations, innovative urban design to create a sense of place, distinctness as well as vertical and horizontal integration, and a valuable use of natural or created amenities (City of Hillsboro 2003a).

The policies and standards that comprise the Station Community Planning Areas work to promote transit-supportive and pedestrian sensitive mixed-use developments near light rail stations (City of Hillsboro Sec 136, 2003a). Transit oriented design is achieved through established street design requirements which foster compact community design, the provision of parks within walking distance of resident's homes, and strong system of interconnected pathways allowing residents to safely walk to various destinations throughout the development. In order to achieve the desired densities and associated increased light rail ridership minimum density requirements were set. This density policy calls for a gradient of residential density targets at varying distances from light-rail transit stops (Table 5.1).

Table 5.1- Orenco Station Residential Density Target Gradients

1,300 feet or less	24 dwelling units per acre
1,301 feet – 2,599 feet	15 dwelling units per acre
2,600 feet or more	7 dwelling units per acre

Source: City of Hillsboro 2003, b

Locating higher density multi family housing closest to the light-rail stop and providing all residents with free light-rail pass for their first year in Orenco station has proved to be an effective approach to support the regional transit system. (Benfied and Terris 2001) (Figure 5.2).

FIGURE 5.2- ORENCO STATION CONCEPT PLAN SHOWING DENSITY GRADIENTS

Source: Fletcher 1997

Policies within SCR-V also promote the creation of mixed-use town centers. SCR-V's are designed to bring together a mix and range of residential options with a variety of local commercial uses to create and maintain a self-reliant neighbourhood. Minimum floor area ratios are set to ensure the desired levels of non-residential uses are realized. Setting minimum floor area ratios also helps to make certain that sufficient local employment opportunities and services are in place to meet the needs of local residents (City of Hillsboro 2003, c). Table 5.2 briefly summarizes the target square footage for the mixed-use town centre upon completion.

Table 5.2- Orenco Station Spatial Targets For Mixed Use Town Center

46, 000 square feet of retail space
41,000 square feet of office space
22 loft residences and 28 live/work units

Orenco Station's Main Street, or Mixed Use Town Center was designed to function as center or the heart of the community. This mixed-use area has retail shops and services on street level with a mix of townhouses and office space on the second and third floors (Figure 5.3)

(Figure 5.4). The nature of this mixed-use design strategy has resulted in a vibrant urban area that increases social interaction, reduces the need for the personal automobile and promotes 24 hour activity and therefore security (Podobnik 2002).

FIGURE 5.3- ORENCO STATION CONCEPTUAL DESIGN MIXED USE TOWN CENTER

Source: Fletcher 2002

FIGURE 5.4- ORENCO STATION MIXED USE TOWN CENTER

Source: Fletcher 2002

5.4.5 Application to Mahogany

Although a smaller site than that of Mahogany, Orenco Station has several elements relevant to the Mahogany development most importantly, the mixed use and Transit Oriented Development policies highlighted above. Applying Transit Oriented Development policies in conjunction with mixed use development policies Mahogany site can be an innovative compact, pedestrian orientated community providing an attractive mix of jobs, services, housing options, and amenity features.

5.5 Kentlands

5.5.1 Context

The community of Kentlands is located in Gaithersburg, Maryland, about 20 miles from Washington, D.C. The development, a former farm estate began in 1988, and is currently at build out. Much attention has been drawn to Kentlands because at 358 acres in size, it is one of the largest neo-traditional New Urbanist project in North America (Figure 5.5). Kentlands was designed by Duany Plater-Zyberk, and is regarded as one of the best and most well designed examples of New Urbanism.

FIGURE 5.5- AERIAL VIEW OF KENTLANDS

Source: www.kentlandusa.com

5.5.2 Case Study Selection

Kentlands was chosen as case study not only because it met a large number of our evaluation indicators but also because it is in a suburban context similar to that of Mahogany. Refer to the Annex for the full matrix. It is a fully functioning community that has incorporated

distinct residential neighbourhoods with commercial and recreational land uses (Miller 2000).

5.5.3 Development Foundations

The City of Gaithersburg Master Landuse Plan applies to the development of Kentlands. Policies have produced a development that is composed of a great mix of housing products, open amenity space, and serviced by a mixed-use local retail area.

5.5.4 Development Features

Kentlands is considered to be a remarkable community because its design has remained consistent with many of the principles that are utilized in traditional neighborhood development. Kentlands has been praised for its higher density, easy walkability, and greater connectivity. However, there were two features that should be highlighted and promoted that could be incorporated in Mahogany: an abundance of public open space, and a thriving economic centre.

The four neighborhoods of Kentlands were developed around the physical features of the landscape such as the hills and lakes. Major natural features were preserved as public spaces instead of privatizing by placing them in private backyards. The site of Kentlands was developed to maximize the preservation of specimen trees by locating greens and parks as tree save areas (Kentlands Community Foundation 2003). Green spaces in Kentlands range from quiet parks and active playgrounds to lakes, gardens, a village green, paths and nature trails. Fences serve as both boundaries and markers, delineating private and common areas. Open spaces are connected into continuous natural corridors as green belts passing through neighborhoods or greenways within neighborhoods (Figure 5.6).

FIGURE 5.6- KENTLANDS OPEN SPACE AND TRAILS

Source: http://pages.montgomerycountymd.com

The Kentlands park system consists of 100 acres (28% of the site), making the mean walking distance to parks only 120 meters (Lee & Ahn 2003). All the public and green space varies in size, shape, and usage. A majority of open spaces open up to streets and are designed to function much like the squares in European cities. Developing Kentlands with a significant amount of green space has promoted an increased sense of community cohesion and vitality. It preserves much of the original natural habitat of the area creating at the same time a community that is more aesthetically pleasing for its residents.

Kentlands has relegated retail and office activities to the edge of the development. At first inspection, this may seem like it would increase dependence on vehicles since the mean walking distance to the retail and commercial area is increased for residents living on the opposite side of the development. However, by placing the commercial centre at the edge of the development, it becomes accessible by adjacent communities, thereby substantially increasing the size of market it serves. The commercial and retail centre on the edge of Kentlands also serves nearby Lakelands, a development close in size to that of Kentlands.

Kentlands' commercial district, Market Square, is a pedestrian-friendly main street with a variety a shops, services, restaurants, and entertainment activities (Bohl 2002). By increasing the size of its market, the Market Square retail area has grown from a neighbourhood retail center into a regional shopping district. The number of retail establishments has increased

while the type of establishments has diversified, able to satisfy all needs of Kentlands residents. Also, by servicing a larger market, it is easy for small businesses to thrive, thereby decreasing vacancy and turnover in the district.

Although mean walking distance to the retail center is increased by locating the commercial area on the fringe of Kentlands, planners have moved the majority of residents closer by surrounding the commercial area with high-density dwellings such as mixed-use and multi-family units.

5.5.5 Application to Mahogany

Kentlands provides an excellent example how an interconnected system of open spaces and pathways can link the residents of the small distinct neighbourhoods together giving a larger development like Mahogany sense of cohesion usually only found in smaller developments. Kentlands also is an example of how a larger commercial center on the edge of the development, such as the one to be developed on the Mahogany site, can be used as a bridge to connect two neighbouring communities and how those two communities can work together to support the commercial endeavor.

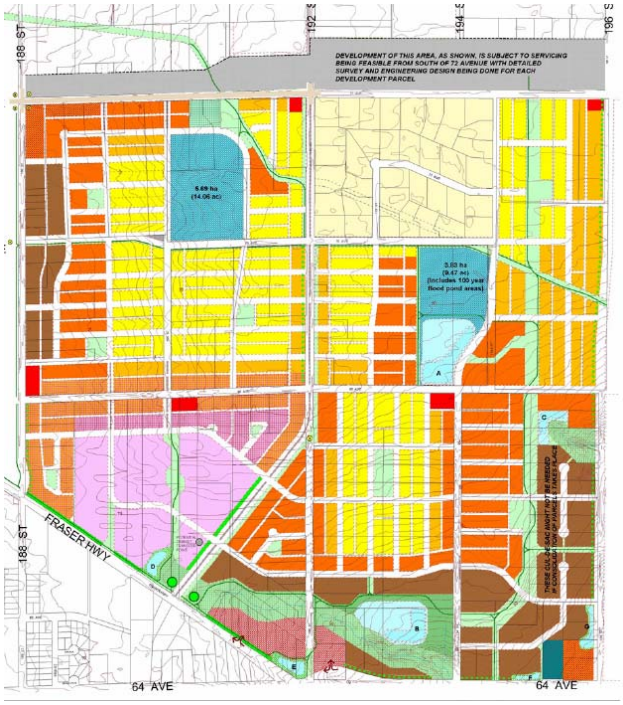
5.6 East Clayton

5.6.1 Context

The East Clayton Neighbourhood Concept Plan (NCP) is part of a larger scheme called The Headwaters Project. The project is designed as a demonstration of sustainable development principles and performance standards (CMHC 2001, 4). The East Clayton NCP (Figure 5.7) is the first part of the project to be implemented in Surrey, BC. The NCP showcases green infrastructure and environmental design on a 250-hectare site with a population of approximately 13,000 at build-out. Methods and designs will be tested in the first phase of

the project and then upgraded or modified before implementation in future development. The NCP was initiated in 1998 and took a year and half to develop in conjunction with stakeholders. The City of Surrey initiated the process with the help of the University of British Columbia James Taylor Chair in Landscape and Liveable Environments and many more organizations. An integral part of the NCP was "public involvement and an integrated, consultative process" (CMHC 2001, 1). Public consultation was integrated into the process at three levels: the Citizen Advisory Committee, direct involvement in the Design Team and general public sessions (Affordability and Choice Today (ACT) 2003, 6). The draft East Clayton NCP was issued to the public in July 1999 and approved by Surrey City Council in November of the same year.

FIGURE 5.7- EAST CLAYTON NEIGHBOURHOOD CONCEPT PLAN



Source: Surrey 2004

5.6.2 Case Study Selection

The land use and development concepts outlined in the NCP are based on seven principles of sustainability: Increase density and conserve energy; provide different dwelling types; dwellings should present a friendly face to the street; car storage and services are located at the back of dwellings; provide an interconnected street network and public transit; provide narrow, shaded streets; preserve the natural environment and promote natural drainage systems. The design of the community utilizes existing waterways creating "an integrated and multifaceted network of streams, green streets, greenways, self mitigating parcels and park and riparian areas (ACT 2003, 2). Integrating natural systems into the built environment maintains infiltration rates at pre-development conditions, insuring neighbouring streams are not adversely affected by storm water runoff. Additionally, green infrastructure in the neighbourhood creates a more walkable community and is less expensive to build and maintain (ACT 2003, 2), leading to lower housing and infrastructure maintenance costs.

5.6.3 Development Foundations

Surrey is a member municipality of the Greater Vancouver Regional District (GVRD). As a member, the city is dedicated to planning for growth based on the four main principles of the GVRD's Livable Region Strategic Plan (GVRD 1999, 9):

1. *protecting the green zone (a long-term boundary for urban growth intended to protect the region's natural assets such as parks, farmland and watersheds);*
2. *building complete, sustainable communities;*
3. *achieving a compact metropolitan region; and*
4. *increasing transportation choices*

An important aspect of the Livable Region Strategic Plan (LRSP) is effective implementation and monitoring. The policy outlines how the principles are to be achieved through implementation and the effectiveness of the plan is continuously monitored with a major review every five years.

Surrey's Official Community Plan (By-law No.12900) calls for "complete and sustainable communities" (Surrey 2004, 15) that offer a wide range of housing types and tenures, services and employment at densities that can support transit and walkable neighbourhoods. The document also reiterates the importance of protecting and maintaining natural systems and managing storm water using best practices.

The South Newton Design Charrette brought together an international team of urban designers. Their goal was to create a more livable and sustainable community in Surrey. The seven sustainability principles that informed East Clayton's design came out of the charrette.

The Clayton General Land Use Plan is the first step towards implementing the principles created during the design charrette. The first stage of the plan outlines a vision for the entire community. The second stage outlines a detailed plan for East Clayton called the Neighbourhood Concept Plan, which is similar to an Area Structure Plan in Calgary.
The East Clayton Neighbourhood Concept Plan (NCP) details the community's design guidelines and ecological infrastructure. Surrey City Council directed staff to investigate and implement the application of sustainability principles in the NCP.

5.6.4 Development Features

East Clayton's proximity to sensitive waterways (Serpentine, Nicolmekle and Fraser Rivers) and productive agricultural land led to the need for a storm water management system that mimicked natural, pre-development infiltration rates. East Clayton utilizes an innovative natural drainage system that eliminates downstream flooding and protects waterways from suspended solids and harmful runoff (Gilliard 2003, 15).

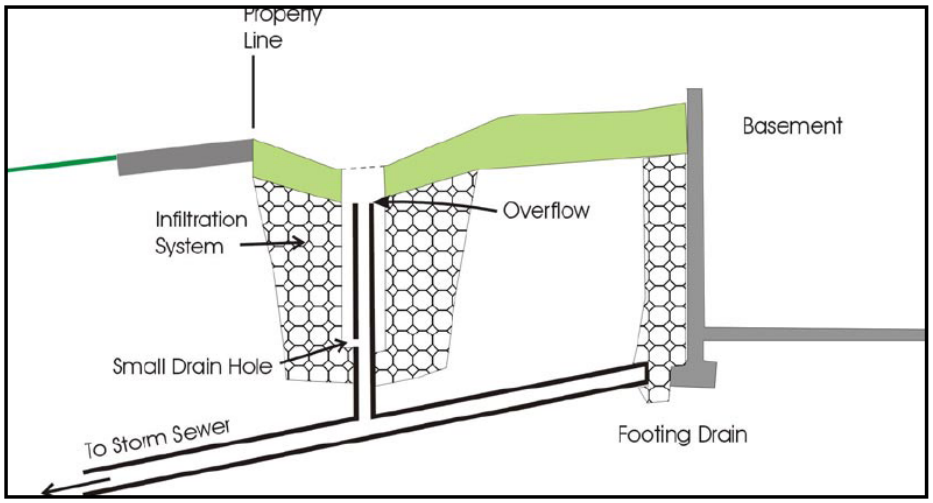
The NCP design guidelines recommend reducing the amount of impervious surfaces, such as driveways and back lanes, by using pervious materials such as gravel or environmental paving options (Figure 5.8).

FIGURE 5.8- EAST CLAYTON IMPERVIOUS PAVING MATERIALS

Source: unilock.com

The provision of pervious surfaces reduces the amount of runoff generated by the development, reducing the infrastructure needed to handle storm water. Furthermore, each property is equipped with on-site filtration devices (Figure 5.9). The devices are buried in the front yard of each property and allow precipitation to readily infiltrate into the ground. Designing a successful system in an area with high groundwater and low infiltration rates was complicated; however, systems installed in East Clayton will be monitored to verify their performance (Dumont 2003, 1).

FIGURE 5.9- EAST CLAYTON ON-SITE INFILTRATION DEVICE



Source: Dumont 2003

To further reduce runoff directed to Stormwater sewers the NCP guidelines demand a system of grassy swales to accept runoff from impervious surfaces such as roadways. Elimination of the traditional curb and gutter system allows runoff to travel directly to grassy swales where up to 48mm/day (24mm/day in winter conditions) of runoff will be absorbed (ACT 2003, 22). Additionally, a naturalised wetland on the site provides habitat and retention/biofiltration capabilities (Figure 5.10). The wetland is designed to easily accept a 5-year storm with adjacent playing fields accepting overflow in the case of a 100-year storm event (ACT 2003, 24). Smaller neighbourhood parks are equipped with deep well infiltrators to convey peak flows to regional groundwater aquifers.

FIGURE 5.10- NATURALISED STORM WATER POND

Source: James Davison

The community is ordered around a fine-grained, modified grid street system that provides various routes to a number of destinations (ACT 2003, 9). The interconnected road network disperses traffic congestion while ensuring convenient routes for public transit. It is expected that the community commercial area will become one of the most important destinations for residents in the area. A mix of housing types and tenures affords each street with a unique appearance, enhancing the pedestrian experience. Additionally, “all dwellings present a friendly face to the street to promote social interaction” (Surrey 2000, 34). Placement of

lanes and garages behind houses further enhances the streetscape and prevents building fronts from being obscured by garages.

The design principles also call for street widths for local and collectors to range from 6m to 11.3m. Narrow streets reduce construction and maintenance costs, decrease the amount of runoff and create "a greener and friendlier environment" (ACT 2003, 11).

5.6.5 Application to Mahogany

Many of the innovative design principles enacted in East Clayton are transferable to Hopewell's Mahogany community. The application of green infrastructure will not only preserve the natural environment, it will save developers, homeowners and local governments money on construction and maintenance. Peter Smith (2000, 323) writes :

> "Environmental considerations aside, the unit cost of low-density suburban development is already high when all the related costs for land and infrastructure are factored in. The situation is at its worst under conditions of unstructured sprawl such as prevail around most of the largest cities, but even moderately intensive, contiguous suburbs like those of Edmonton consume more in public expenditures than they generate in property tax revenues. This means that the suburban way of life, a privileged way of life in many eyes, is actually being subsidized by other taxpayers".

The following text will investigate East Clayton's principles of sustainability and how they should be applied to Mahogany.

Principle 1: Increased density to conserve energy by the design of compact, walkable neighbourhoods to encourage pedestrian activities where basic services (e.g. schools, parks, transit, shops, etc.) are within a 5 to 6 minute walking distance from their homes.

In the paper The Headwaters Project – East Clayton Neighbourhood Concept Plan, CMHC (2001; 4) outlines the expected reduction in greenhouse gas (GHG) emissions when East Clayton is compared to a typical suburban development. In the short term, East Clayton households will produce 6,100 kilograms of $C0_2$ equivalent per year from urban travel – 3,200 kilograms less than the typical suburban dweller. If the East Clayton model is replicated in surrounding areas it is expected that by the year 2040, GHGs from East Clayton residents will be reduced further because of increased transit service, lower vehicle ownership and the creation of a regional job and service centre (CMHC, 2001; 4). In 2040, CMHC estimates East Clayton residents will produce 4,600 kilograms of $C0_2$ equivalent per year from urban travel compared to 7,700 kilograms for typical urban dwellers – a reduction of 40%.

The student planners of Mahogany propose to increase densities over most traditional suburbs in the Calgary area. Additionally, good planning will create a neighbourhood that is not only enjoyable to walk in, but has connections for pedestrians to easily reach their destinations. Because of the location of Mahogany's retail area it is difficult to ensure residents are within a 5 to 6 minute walk of all basic services, however, well planned pathways and enjoyable streetscapes will increase the walkability of the area.

Principle 2: Different dwelling types (a mix of housing types, a broad range of densities from single family homes to apartment buildings) in the same neighbourhood and even on the same street.

This principle is demonstrated in Hopewell's Copperfield community where townhouses and single family units can be found on the same street. Innovative architectural guidelines and a variety of housing types create interesting "street music" and visually appealing streetscapes.

Principle 3: Communities are designed for people; therefore, all dwellings should present a friendly face to the street in order to promote social interaction.

Provision of a fine-grained street grid and short blocks insures automobile traffic is spread evenly throughout the community and pedestrians and cyclists are afforded a multitude of route choices. Reduced setbacks increase the eyes on the street and allow for larger, private spaces behind houses.

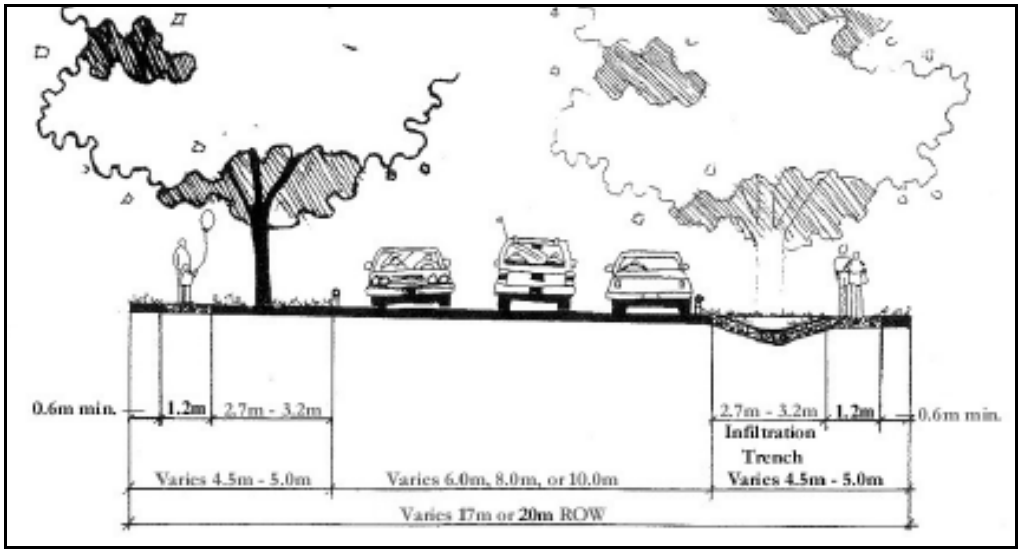
Principle 4: Ensure that car storage and services are handled at the rear of dwellings.

Rear lanes should be encouraged whenever possible to remove garages from the front of houses. Again, reduced setbacks require rear-loading garages so cars don't block sidewalks. The principle façade of houses with front garages should be forward of the garage as to present a friendly face to the street.

Principle 5: Provide an interconnected street network, in a grid or modified grid pattern, to ensure a variety of itineraries and to disperse traffic congestion; and provide public transit to connect East Clayton with the surrounding region.

There is limited relief in Mahogany, however, designing roads, pathways and ecological infrastructure to take advantage of existing natural systems is encouraged. Elbow Valley is an excellent example of how natural systems can be utilized to enhance the community and provide additional green space in its preserved, natural state. East Clayton utilizes the natural topography of the area to provide for storm water movement and transportation - roads, blocks and pathways correspond to the existing topography and sub-watersheds.

FIGURE 5.11- CROSS-SECTION OF LOCAL RESIDENTIAL ROAD IN EAST CLAYTON



Source: Surrey 2000

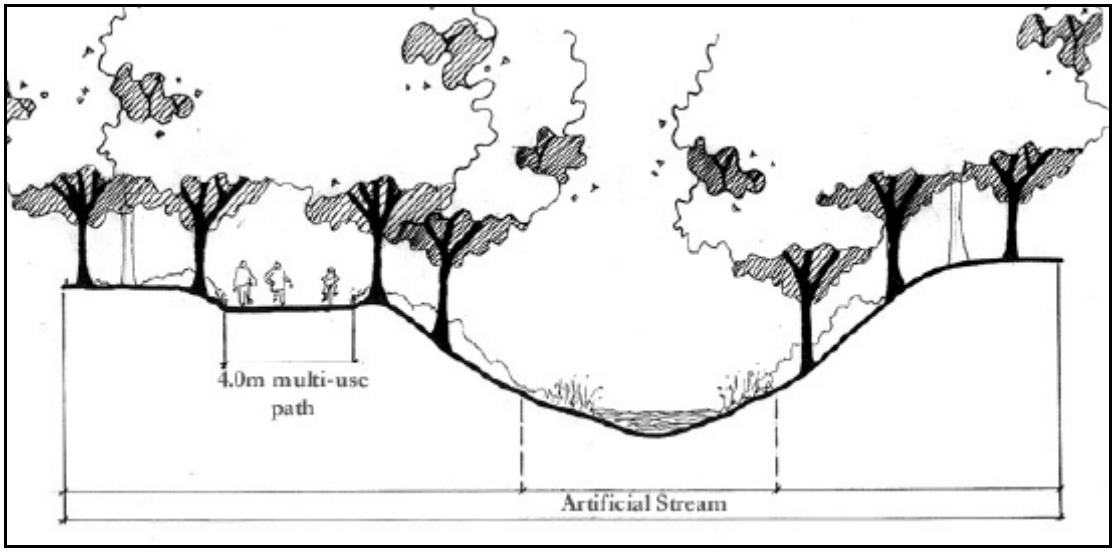
Principle 6: Provide narrow streets shaded by rows of trees in order to save costs and to provide a greener, friendlier environment.

Reduced street widths create a natural traffic calming effect and reduce the amount of runoff from impervious surfaces (Figure 5.11).

Principle 7: Preserve the natural environment and promote natural drainage systems (in which storm water is held on the surface and permitted to seep naturally into the ground).

East Clayton's ecological infrastructure is based on a system of linked streets and open space (including streets, parks, schools, riparian areas and tree preservation areas) that satisfies social, recreational and educational demands (ACT 2003). Natural drainage systems allow for approximately 80-90% of storm water to infiltrate naturally.

FIGURE 5.12- EAST CLAYTON ARTIFICIAL AND NATURAL STREAMS BECOME NATURAL AMENITIES.



Source: Surrey 2000

5.7 Feature Case Studies

5.7.1 Purpose

During the investigative process to find case studies that suited our matrix of sustainability, there were several that met certain criteria but lacked the overall commitment to sustainable planning principles.

The following four case studies are provided to highlight interesting features of their development. The examples were obtained from web searches and through presentations given in class by the project developers. Although their overall implementation does not meet the criteria in our matrix, they can nonetheless provide valuable lessons for the Mahogany development.

5.7.2 Prairie Crossing

The community of Prairie Crossing is located one hour by train outside of Chicago, Illinois. It is a 677-acre development that has been designed to reinforce a connection to the land and the history of the area. To promote this type of lifestyle 60% of the development area has been protected from development, and remains as open space, trails, lakes, community farms, and the primary focus of the 90-acre working farm (Prairie Crossing, 2005). The community meets the matrix of sustainability with respect to 1) Increased Social Interaction and 2) Environmental Preservation. There are major reasons why it does not holistically meet our criteria framework, most notably because of the high housing prices that the community demands. It is an option only to those whom can afford home prices that are well above $500,000 USD.

The Byron Colby Farm has been at the site since 1885 and was preserved by the developers as a centre to meet the needs of the community in three ways:

1. as an educational tool,
2. as an economic tool, and
3. as a social tool.

Firstly, as an educational tool the farm provides an authentic environment for school children to further their classroom studies, as they learn to take care of animals, plants, and soil. In addition, there are adult programs to encourage their education in caring for the farm animals and growing vegetables for the local farmers market.

Secondly, as an economic tool, the products of the farm are sold weekly in a farmers market that includes materials from surrounding farms and communities. Thirdly, as a social tool, the farm provides a location to keep large animals such as horses, and a network of trails on which to ride and interact. In addition, there are programs for community gardening and the raising of chickens to produce fresh eggs. The historic buildings have been restored and now provide locations for public and private gatherings that promote social interaction.

It is an unfortunate side note that the developer who created Prairie Crossing in fact declared bankruptcy following the completion of the project, however this situation need not be repeated if the Ollerenshaw farm is incorporated into the Mahogany community, as there are factors external to the retention of the farm that may have influenced the fiscal difficulties of Prairie Crossing.

5.7.3 Baldwin Park

Based approximately two miles from the city centre of Orlando, Florida Baldwin Park is a re-development located on 1100 acres that were previously used as a Naval Training Centre (Baldwin Park, 2005). It is home to nearly 8000 residents and features a mixture of residential and business developments near the central commercial district.

Baldwin Park partially meets the sustainability matrix in the categories of 1) Alternative Transportation Methods, 2) Increased Density, 3) Mixed-Use Centre, 4) Increased Social Interaction, and 5) Mix of Housing.

The purposeful development style of Baldwin Park that mixes the uses is the particular feature that could be adapted easily in the community of Mahogany. The designers of Baldwin Park consciously provided for buildings that house commercial businesses on the main floor, executive offices on the second floor with residential units above. There are several live/work units and residential units purposefully located beside commercial developments. This design has the benefit of increasing the dynamics of the area, and the walkability for residents who may live, work, and shop within a central district. In addition, the building design established rear parking, allowing for a pedestrian-friendly and visually stimulating building frontage. These design ideas could be incorporated in to the Mahogany development, in proximity to the central commercial district at the west of the community.

5.7.4 Laguna West

Laguna West is a community located in Sacramento, California that is constructed with a lake as the central amenity (Calthorpe Associates, 2005). The community is designed to

allow full access to the lakefront for all residents, not just the ones who are able to afford the lakefront property. Construction of visually enticing pathways with extensive vegetation and attractive places for sitting separate the waterfront housing units from the actual waterline, and provide a feeling of public ownership for the community as a whole.

This design partially fits the sustainability matrix in that it promotes 1) Increased Social Interaction and 2) Environmental Preservation by establishing green capital that increases the desirability to reside in the area.

5.7.5 Ladera Ranch

Ladera Ranch is located in Orange County in Southern California and is a 4000-acre multi-phase development that includes 8100 residential units in 9 sub-communities (Ladera Ranch, 2005). The project has promoted the sense of community within the larger development by creating a series of central "village cores" that include commercial and community services such as shopping and recreational clubs. In order to meet sustainability initiatives, the design facilitates a maximum walk of 12 minutes from any house to a village core. In this way, Ladera Ranch partially meets the sustainability matrix by 1) Encouraging Alternative Transportation Methods and 2) Increased Social Interaction.

An additional design feature which is notable and applicable to Mahogany project, is the design used to create attractive alleys for vehicle parking. The houses are designed to include above-garage apartments with balconies, surrounded by attractive landscaping. The design of the alleys is such that they almost appear to be street frontage in quality. This encourages residents to use the alleys for storing their vehicles, and minimizes the safety concerns that are often associated with rarely-used alleys. It is possible to include some of these design aspects in the Mahogany community.

5.8 Performance Evaluation

Many of the new communities being built in Calgary today are constrained by municipal policies and guidelines that severely restrict the developer's ability to implement creative, functional plans that differ from the usual. Each of the case studies explored in this document were chosen because of their unique characteristics that are important for creating vibrant, complete communities that encourage alternative modes of transportation and natural preservation.

Orenco Station's transit oriented design highlights the need for more emphasis on public transit in new communities. Our current reliance on private automobiles needs to be complemented by other modes of transportation that are reliable, fast and frequent. Orenco Station and Kentlands incorporate a mixed-use town centre that provides residents with a community focal point for socializing and purchasing goods. The town centres combine commercial and residential uses to create lively street scenes. Kentlands' abundance of greenspace provides recreational areas for the community to enjoy. Additionally, greenspace provides connectivity for pedestrian and cyclists to allow for movement throughout the community.

The innovative policies introduced by each of the case studies are an example of what can be applied in Mahogany. Orenco Station and other communities have proven the market can bear development oriented towards transit use to complement the mobility offered by the private automobile. The six characteristics that define the Station Community Planning Area are very similar to the principles introduced in the Kentlands and East Clayton studies.

Kentlands is well known for its public open spaces that provide a natural amenity for residents. By preserving 28% of the development for open space the community enjoys increased walkability and connectivity for pedestrians and cyclists. Similar to Mahogany, the community commercial area is located on the edge of the site. Although this does increase the distance to some residences it keeps shopping traffic away from most of the community.

East Clayton's seven principles of sustainability set a standard for every new community to strive for. East Clayton was an experimental development, therefore the principles were not able to be fully met in the construction of the community. However, Surrey must be lauded for their vision and willingness to take a risk to push the boundaries of design and planning beyond the accepted norm.

Prairie Crossing creates a community that connects urban living and the importance of agriculture and history. As in Mahogany, the site for Prairie Crossing included an historic farm. The farm was preserved and now serves as an educational, economic and social tool. Baldwin Park incorporates live/work units that house commercial business on the main floor, executive offices on the second floor with residential units above. Laguna West is an exciting community that preserves lakefront property in the public realm for all to enjoy. Ladera Ranch uses a system of "village cores" to provide commercial and community services within short distances of residents.

5.9 Recommendations for the Planning and Design of Mahogany

Surrey has embraced change and taken a step forward to implement a system that is different and better than the existing model of development. New methods are never without risk, and that is why the City Council, in conjunction with regional, provincial and federal agencies are working towards minimizing, and hopefully eliminating, the risk that comes with innovative solutions. Wendy Whellen of Surrey's Planning Department states: "Everything is a special bylaw including zoning, subdivision bylaw, development works bylaw – everything's new" (Gilliard 2003, 16). Calgary's Land Use Bylaw (2P80) restricts certain types of development such as mixed residential and commercial uses. Also, ecological infrastructure is relatively new and unproven on a large scale. However, alternative development standards, such as those used in Garrison Woods and ecological infrastructure, such as the system used in Elbow Valley, indicate the city is willing to incrementally move towards sustainable design.

Below we outline our recommendations for the planning and design of Mahogany.

1. Alternative Transportation Methods
    - Pedestrian-oriented neighbourhood requires walkable distance to shops/activities
    - Interconnected street network (route choice)
    - Fine-grained, modified grid to accommodate bikes, pedestrians and automobiles
    - Schools and parks are centrally located
    - Smaller neighbourhoods based around central green space
    - Commercial area should be the most important commercial destination for residents.

2. Increased Density
    - Conserves energy
    - Allows for efficient provision of services (transit, commerce, mail delivery, waste pick-up)
    - Conserves space for other uses such as parks, historic farm
    - Creates vibrant community.

3. Mixed-Use Center
    - Provides a destination for residents
    - Focal point of the community
    - Integrates people who like to live near commercial areas.

4. Increased Social Interaction
    - Short blocks, fine-grained network
        - Allows homes to front onto streets and have porches
        - Blocks with lanes are encouraged
    - Reduced setbacks: more eyes on the street, more backyard space, more neighbourhood social interaction, safer walking environment
        - Rear lanes allow for reduced front setbacks

- Street trees, boulevards and street parking create pedestrian-friendly environment.

5. Mix of Housing
    - Accommodate a variety of household types/tenures
    - Integration between different family types
    - Coach-house or “mortgage-aid” dwelling units to provide income
    - Multi-residential: apartments, townhouses
    - Single-family: small and medium sized lots, live/work, mixed-use commercial/residential
    - Front garages to be placed beside and behind principle façade to allow for front door access to street.

6. Environmental Preservation
    - Street trees closely spaced to provide shade
    - Narrow streets to reduce traffic speeds and rainwater runoff
    - Ecological infrastructure should link streets, parks, schools and riparian areas,
    - Ecological infrastructure will satisfy social, recreational and educational demands
    - Increase use of permeable paving materials
    - Water features will provide an amenity to residents
    - Curbless streets and alternative drainage systems should be used.

6.0 Consumer Market Analysis

Kevin Krakowski

Ann Peters

6.1 Objectives and Methodology

When planning developments in existing neighbourhoods the residents are consulted to find out what their needs are. In the planning of a new community, an understanding of future residents' needs and aspirations is particularly challenging. For the planning of the Mahogany project we have looked to urban sociology to guide us in imagining how people will live in the community, and how the built environment will support their needs. Our objectives are:

- To use sociology to inform design.
- To study how people use and interact with space.
- To identify opportunities to enhance the social fabric and promote our vision for this community.

The relationship between social and spatial structures are not always carefully considered in community design (La Gory, M., Pipkin, J. 1981. pg 296). To make things more difficult, social reality is constantly changing. Places designed to meet the needs of one social structure will be used by future generations whose patterns of living may have completely changed. Residential suburbs, for example, reflect the needs of the post-war family made up of working father, stay at home mother and 3 to 4 children. Community designs are now slowly changing to reflect a more contemporary norm of two working parents with 1 or 2 children.

In order to study how people are living and using space, urban sociologists may rely on different research methods. Quantitative research can be conducted to document current activities, patterns and practices. Data can then be analyzed to reach conclusions about probabilities or averages, and is well suited to projects whose aim is to appeal to an existing market. Qualitative techniques such as interviews, surveys, and cognitive mapping are needed to find out how people construct meaning and define social reality. This type of research relies on more inductive reasoning and is better suited to a future planning study, as it can give us a basis from which we can infer behavior patterns or reactions.

The vision for the Mahogany project reflects an increasing desire in the consumer market to belong to communities where concepts of sustainability and vitality are embraced. Planning a supportive environment that symbolizes these changing values and behaviors begins with an understanding of these future residents.

6.2 Exploratory analysis of the daily suburban experience

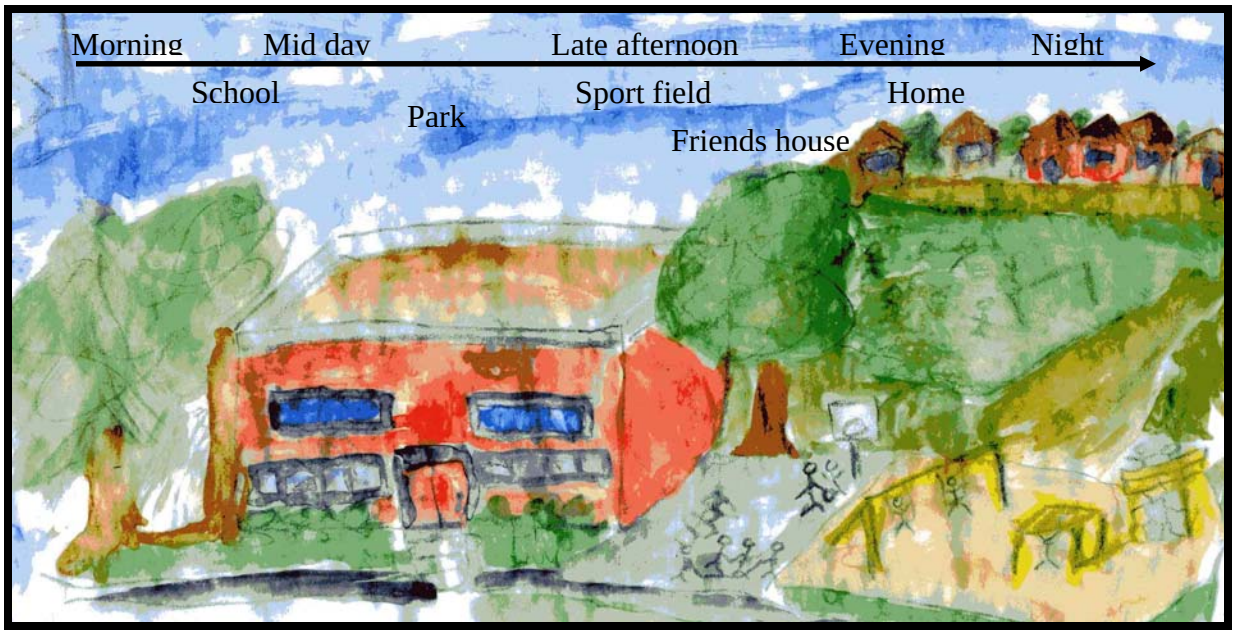
For the purpose of this project, we considered a "day in the life" of each of four types of future residents:

- children aged 3 to 13
- teens aged 14 to 18
- working aged adults aged 25 to 45
- retired adults aged 55 to 75

Cognitive maps were constructed for each type, and this allowed us to consider how and when opportunities for community interaction could be enhanced.

6.2.1 Children

FIGURE 6.1- CHILDREN



The typical day of children aged 3 to 13 in the suburbs starts as a routine that continues through the weekdays. As a precursor to the routine one usually starts with a shower, straightening up for the day, family socialization, and breakfast. This occurs in the house as a ritual, getting one ready for the day outside of the home. This step outside of the home is very important for children, as it is more then just a trip to school or elsewhere. Children play an important role in community as they spend most of their time within their neighbourhood or local community. The neighbourhood and area near the home is the dominant location for forming children's' interactions with the physical and social world (Christensen and O'Brien, 2003). This is not to say that the interactions in the home and neighbourhood are not closely connected, as studies show they maintain close correlations. Many perceptions and fears that parents have about cities, like traffic risk, stranger danger, risk of drugs or the feared encounters with older teens and young people in the streets are often passed intergenerational onto the children (Scott et al, 1998). Many adults see the structure of the house as a physical barrier protecting them and their family from the dangers of the "city". This leads to the protection of kids from the neighbourhood or "city" through controlled interactions orchestrated by the parents.

Children are often driven by private vehicle from the home to the school. There are many different ways for children to get to school and this has a large effect on social interactions for children, families, and community. If children are driven to school, there is less opportunity for “en route” meetings. The idea we are promoting in Mahogany is one where children can walk to school, either alone, or with an adult. Building houses within walking distance to schools, and designing pathways that are safe and direct promotes a choice in lifestyle. Adults or older children may be able to walk the younger children to and from school, pick up other children up along the way, and form a “walking school bus”. This is done by an adult, on foot, who "picks up" each student, house by house. The group of students then walk to school together along a set route, all the while enjoying fresh air, exercise and friendly conversation. It strengthens communities by getting parents, students, and community to work together for a common good. A community designed at scale is required to ensure the success of the “walking school bus” concept. (www.walkingbus.com)

School is where the majority of the child’s day time is spent. Once at school they are allowed to deviate from the rigid structure of class for 15 minutes in the morning and afternoon, with an hour or a half hour during midday. This time allotted for playing and socializing in the schoolyard is well monitored in a way that keeps the children guarded from outside influences that may be perceived as a threat or less desirable. This institutionalization brings about patterns both formal and informal. Children, because of the provision of a safe, expectant environment, often are forced to find their own alternatives for exploration and self-building. Without this exploration they may become clones, replicated in the same medium. If left with little societal options, not attended by the adult gaze, or in a proximity known to be entirely safe, a pattern of extremes in behaviour may become one of the options if children follow their natural tendencies to explore, learn, and self-build. As the main path directly outside of the acceptable limits for safety and exposure to the “deviant” behaviours is the first to be monitored or blocked, a pattern of extreme choice may become one of the only available choices. This creates a gap between the monitored safe environment provided by parents or institutions, and the other end of the spectrum where the things feared occur. The natural progression of social learning along with physical and cognitive exploration associated with the built environment is thwarted by a gap, and an intermediate bridge is

taken away through the protective measures. This brings forth the debate of how to reduce the risks in communities and neighbourhoods while creating diversity in an area where people of all ages and types are integrated.

It is during the time directly after school and early in the evening that youngsters have an opportunity to explore and use their local areas. Generally, they do not have the means to travel large distances from home, so their perception of the unknown and distance is developed within a smaller sphere. After school and early in the evening, children may play at the schoolyard, or at the house of a friend, who lives on the same block or close by in the neighbourhood. Often, when going out further from the community, it is to private lessons, shopping, or to events where they are transported by an adult, giving a disassociation between places and distance. This disassociation means that most of the exploration and social interactions of the kids occurs locally at a block or neighbourhood level.

6.2.2 Teens

FIGURE 6.2- TEENS

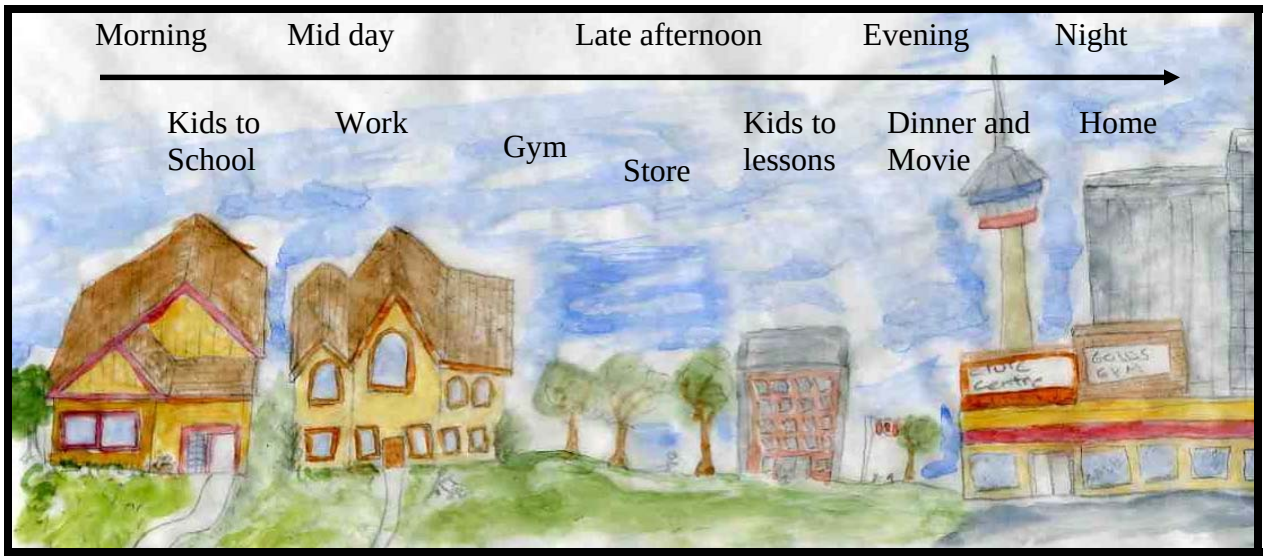
Teens tend to start their day similar to younger children as they get ready at home, and employ the same social interactions and routine as they make their way to school. Typically, teens are given more freedom to go to school on their own. This may be by walking, bus, driving self, or being driven. Often, teens in Junior High or High School have further distances to travel on their way to school, resulting in an expansion of “their territory.” With the varied modes of getting to school, a chance for a variety of social meetings occurs where

relations to people in the community can be built. Similar to children aged 3 to 13, teens aged 14 to 18 spend the main part of their day at school, facing the same issues of restraint and supervision, although they have slightly more freedom. Lunch breaks are usually not supervised to the extent of elementary school, and the student has an option to go home to eat. Some schools may offer extra-curricular activities in which the student can participate. It is the time after school and into the evening where most exploration and adventures occur outside of the close community. Aside from school and associated events, there is a gradual increase outward to cultural events, theatre, sport, the mall, friends and the like, and an increasingly large and varied network forms. This step outwards from the neighbourhood becomes broader as the range of exploration increases with youths' ability to feel comfortable with new modes of transit, along with unfamiliar areas and situations. (Christensen and O'Brien, 2003) As well, the time spent farther away from home and the community later spills over into the evening giving energy and vitality to the neighbourhood and community as teens flow through the streets, parks, and pathways. This age group is active in the community as they play games, sports, bike, skateboard, and socialize in their familiar territory.

Teenaged youth may have part-time jobs in the evening and on weekends. The new environment broadens their scope as they are exposed to more experiences and a wider spectrum of people than they would normally associate with at school or in their immediate neighbourhoods. Many of the teens have started post-secondary education and are in contact with a myriad of cultures, opinions, and environments. Weekends are similar to the younger children's routine, but are now a little more diverse. Jobs, movies, parties, and socializing take up large portions of teen time. They are evident on the streets, in malls, shops, restaurants, parks, movie theatres, cars, and public transportation. Teens have disposable income and they make themselves visible and heard.

6.2.3 Working Aged Adults

FIGURE 6.3- WORKING AGED ADULTS



The typical day in the suburbs, of working aged adults aged 25 to 45, probably remains fairly consistent throughout the week. After the initial readying for the day, and family socialization in the home, most people leave for work early in the morning. Although, some people work from or stay at home during the day, many are employed away from the community. People working away from their community usually have an early start to the day, unless they do shift work. Morning routine may involve dropping kids off at school or day-care, driving, or taking public transit away from the community to the work place. This commute to and from work is generally a time of little interaction with outsiders in the world as people tend to be self-contained in their little bubbles of transport, although, there are options to carpool or take alternative transportation like bicycles or public transportation. Once at work, which is usually downtown or in a district designated for employment, most of the day is spent within the workplace environment. Approximately an hour is spent outside of the workplace eating lunch, socializing with colleagues, walking, or doing errands. After the workday has ended the commute back home begins again. This commute is the same as in the morning except stops along the way to pick up children from day-care, do errands, workout at the gym, or shop for groceries are more common. As well, many people stay in the central areas to attend cultural events, movies, or go to the gym. Many of the evenings are

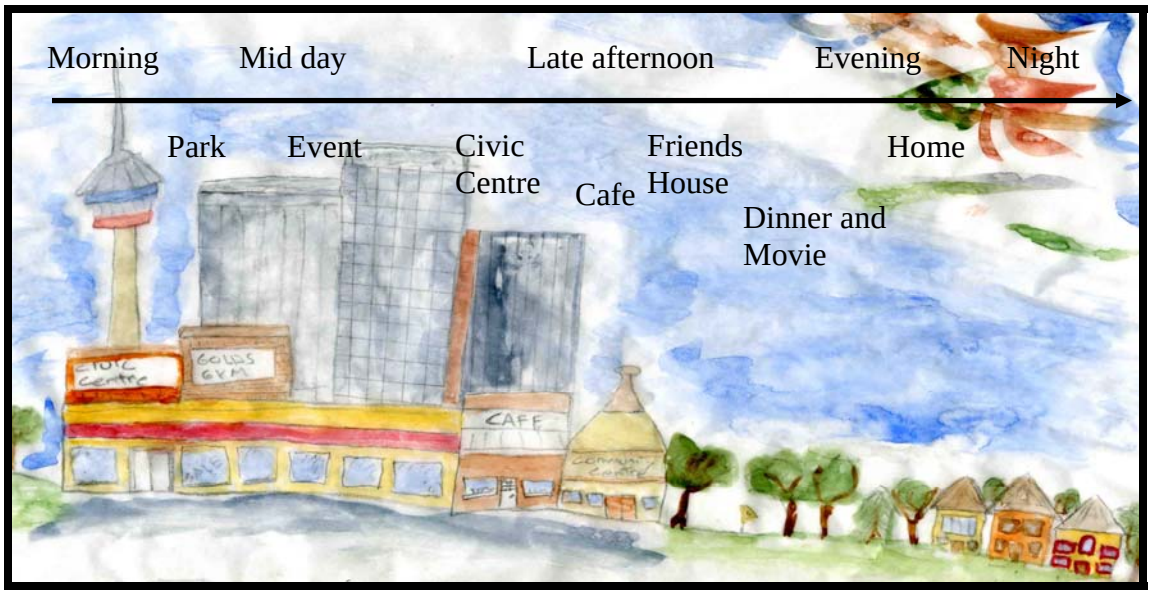
spent at home, or involve short trips in the community to take kids to lessons, sports, organized clubs, or entertainment events.

The evening involves time spent in the house, along with some outdoor activity performing seasonally-generated chores such mowing grass, gardening, or shovelling snow. Evenings, until dark, find families or couples out in the neighbourhood on pathways, in yards and parks, walking the dog, jogging, strolling, biking, or playing with the children.

Events on the weekends vary widely, but have some similarities. Often, the day outside of the house will begin later in the morning. The pace may be slower and involve greater group movement as individuals or the family are likely to be out in the community playing, walking, going to events, sports, or going to activities around the city. As well, much of the weekend days may be spent out in the yard doing maintenance, yard work, playing with kids, and relaxing. Opportunities for casual interaction with neighbours or passers-by are probably greater at this time than any other time of the week. More activity is likely to occur as adults typically leave the home to attend family functions, entertainment or sporting events, religious venues, or have friends and neighbours over to their house.

6.2.4 Retired Adults

FIGURE 6.4- RETIRED ADULTS



Retired adults aged 55 to 75 in ten years will be children of the “baby boom”, meaning many will have money, and be able to retire at a young age, perhaps not fitting the general stereotype of the older “retired” person. The typical day for this type of individual varies widely, with habits, interests, and preferences. There is not a typical time that these people leave in the morning, if they leave at all. Their schedule varies as they are randomly coming and going through the neighbourhood to events in the community and around the city. The daily events may change often, unlike working people, as they have the freedom to do various things at different times of the day. Their diverse interest and freedom allow them to take part in a variety of activities around the city ranging from recreation activities, shopping, attending and giving talks, to volunteering. They may spend time in the community at the civic centre, library, park, walking ways, or around town at the theatre, shows, dinners, and other social outings. They may also have a home business or part-time job. Flexible life-style and disposable income are major factors. (Tinker, 1992)

Travel may be by car, public transit, or walking depending on the distance and weather. Most of the outings occur during daylight hours, and sometimes later into the evening. Often, people having this lifestyle spend many hours of the day at home, reading, doing hobbies, yard work or other chores. Evenings especially, are likely to be spent in the home, or in the home of friends and family, and usually not taking part in public activities. Opportunities for casual contact with neighbours can be limited for those living in apartment-style condominiums, or special-care homes. Interaction with neighbours and passers-by are more frequent for those who have the opportunity to be outdoors, whether they are working, or sitting and relaxing on the front porch.

Age, health and available opportunities have an effect on how public space is used by retired adults. Social networks, feelings of safety, local opportunities, traffic, or icy sidewalks are often a concern of this group, particularly as people age. Retirees may tend to want to avoid using public facilities or public transportation when they are busy with other groups because they feel it is too much of an inconvenience or unsafe. The “walking school bus” concept could be integrated into the community in order to assist the elderly and special needs population. As with the younger people, this concept may establish a more friendly and

street-safe environment. As previously mentioned, the area would have to be built to scale for successful accommodation.

Another factor for retired adults may be long, temporary absences due to travel or winter residences.

FIGURE 6.5

6.3 How Residents Move Around

Thinking about how residents will move around the community can indicate how and where space planning can best influence opportunities for social interaction which is essential to achieving a vision of community vitality.

An important factor will be to consider how people will be moving around. A future with increased pedestrian traffic allows us to envision a community with more opportunities for casual social interaction “en route”. As places of interaction the “in between” places will become as important as the destinations. The following illustrations demonstrate how the location of some key community destinations will influence opportunities for “paths to cross”.

Figure 6.6 shows a school and park located apart from retail and public transport hubs. Even without taking time into consideration, it is clear that trajectories selected by individuals are less likely to intersect.

FIGURE 6.6- PATHS TO CROSS 1

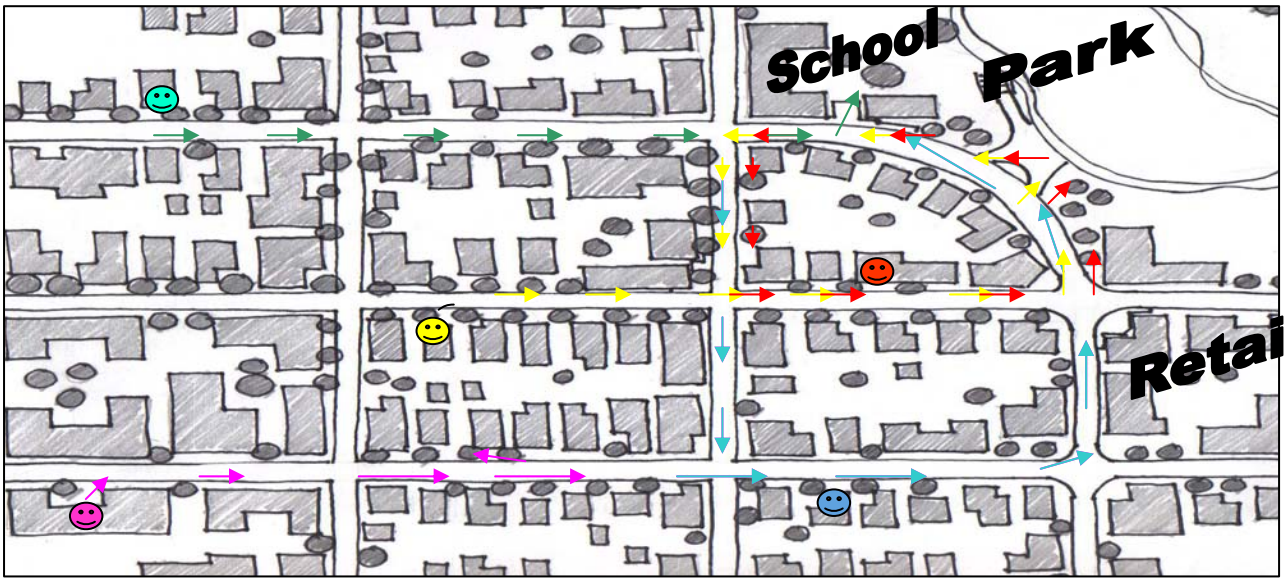
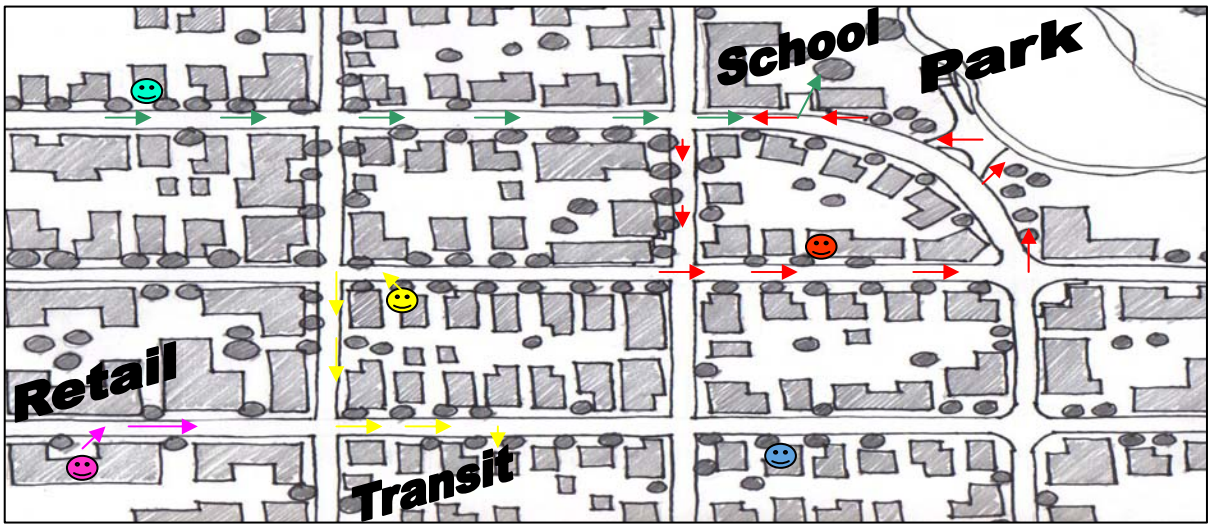


Figure 6.7, where these major destinations are placed along a route. Obviously, this is a simplistic demonstration, but the reader can trace out any number of potential routes and imagine how the dispersal of destinations would influence opportunities for interaction. One can also imagine how different age groups will be travelling, in time, to the different destinations. Interaction potential is limited further, and creates a real challenge in a community primarily planned for residential use.

FIGURE 6.7- PATHS TO CROSS 2



6.4 Building Mental Maps

Knowing how people think about space affects how they will use and participate in it. The mental perceptions and use of space is a development evolving over time in a person's life. There is a vast difference in how people perceive space through the different ages as people grow, use priori experience, expand territories, and gain a variety of perceptions about the urban world. Looking at the world through the "lens" of different people's perspectives allows us to evaluate what they find to be engaging or alienating places in an urban setting. People with "different academic training, occupations, social backgrounds, or interests" tend to see the city differently. (Philips, 1996 Pg 30) Many studies have looked into understanding what conditions make people want to be engaged and satisfied with the areas in which they live, and why others feel marginalized and behave ascetically in theirs. What becomes interesting is how widely shared needs and values present themselves across many cultures, and through time. (Chawla, 2002) Cities and suburbs enable "social economies" through locally controlled non-profit initiatives, community organizations, sport associations, interest or hobby clubs. This type of social capital has much need and plays an important role in strengthening a community, while providing leadership and positive place. Although the heterogeneity associated with a new area like Mahogany can cause tension, it also adds to the

diversity, innovation, and vitality of the community. Investment into the social and physical infrastructure seems to be important for the sustainability of people's health and future.

As adults we know how to create community, and an environment where we are fulfilled and happy, although, sometimes other factors affect our choices. Even though we know what the general criteria are, many people who are physically healthy, well educated, and economically privileged still remain unfulfilled and unhappy. (Chawla, 2002)

Children have less choice in where and how they live; leaving the decisions promoting "better places" to people who have the power to provide the criteria needed for youth to grow in an environment that will foster, not hinder their development. By providing criteria needed to enhance children's experiences in the public realm.

> "Children have the opportunities to grow into new roles and competencies. In the long term, the experiences of childhood form a foundation for the "habits of the heart" of adulthood, in the sense of people's accustomed relationships to their community, public life, and public space."(Chawla, 2002 Pg. 221)

This is an important concept in terms of "investing in our youth". The way people act, feel, and use the space around them will be carried with them as they grow throughout their lives. A recent study of youth aged 10 to 15 years of age revealed common trends in low to medium mixed income urban settlements in eight different cities around the world. What the study found was that sources of satisfaction came dominantly from six areas: safety and freedom of movement, social integration, a variety of interesting activity settings, peer gathering places, cohesive community identity, and green areas. (Chawla, 2002)

Safety and freedom of movement does not mean that the community was free of all risks, but rather that the youth felt safe and comfortable using public and semi-public spaces. The children learned to avoid troublesome areas, and used them during times of the day when they felt safe. This seems to be a learned process, where individuals form ideas and notions of safety gradually as they expand their territory and amount of time spent exploring on their own away from guardian supervision, although other adults could often be present. Social

integration played an important role as the youth were expected to be obedient, and follow rules. Given real responsibility they felt a part of the societal system, enabling the energy, creativity, and playfulness to be appreciated and accommodated. Having a variety of interesting activity settings to meet and talk with friends, or play informal games, sports, or places for snacks, doing errands, where there was "action" to observe, seemed to make the places more user orientated. Places where there were activities to observe or join in were favoured. Peer gathering places, where the community allowed children to 'claim' space, or niches of their own to play and socialize with friends made them feel welcome, thus promoting use. These places vary but could include coffee shops, the mall, sport centres, civic centres, parks, overgrown lots, undeveloped margins, or sport fields. A combination of physical markings to make a cohesive community identity and clear physical boundaries made the areas distinct. The cohesion included history of place along with parents and culture, where areas were claimed as their own with shared celebrations, events, and familiarities within the markings. Some of the simple markings included, rivers, main roadways, facility areas, or other identifiable landmarks. Highly valued by most people was green space. This could be in the form of flat sport fields, parks, playgrounds, tree shaded bluffs, overgrown public utility lots, or undeveloped margins. (Chawla, 2002; Phillips, 1996)

Not surprisingly, alienating feelings come from the opposites of what made a more comfortable place to live. Included are stigma, and social exclusion, boredom, heavy traffic, racial tensions, and fear of harassment and crime. Youth needs to be a part of the social, cultural, and leisure life of their community. If there are not appropriate gathering places for youth to hang out, they become concealed under the perception of youth as a problem. If the places set aside are sterile, featureless, or do not create a safe positive space for differing ages and individualities, boredom, and/or fear prevails and with this aspect comes a quagmire of social problems.

Similar patterns and ideas can be found in the works of Kevin Lynch. Lynch looked into how people in general think about the urban space around them and their reactions to it. If adults do not understand the space around them, or do not see a reason for them to become a part of it, they will often be reclusive or stay within a limited part of the space. Similar to children

and teens, adults have the same basic feelings, only their perceptions, and cognitive mapping are different because of priori experience, changes in lifestyle, and interests. Although the form of “place” may change, the essentials of safety and freedom of movement, social integration, a variety of interesting activity settings, peer gathering places, green spaces, and cohesive community identity remain fundamentals that make for comfortable, enjoyable places that get utilized. Lynch defines why people enjoy and feel comfortable in certain places as a system of mental maps contrived in people’s minds. He describes a person's perception of the world as a mental map. A mental map is an individual's own map of the known world. He uses three examples to investigate individual’s mental maps:

- by asking for directions to a landmark or other location,
- by asking someone to draw a sketch map of an area or describe that area,
  by asking a person to name as many places as possible in a short period of time.

“A distinctive and legible environment not only offers security, but also heightens the potential depth and intensity of human experience.” (Lynch, 1960: 47)

FIGURE 6.8

Understanding there are three filters of reality, and individuals filter the world psychologically, socially, and culturally is important when designing places that is all

inclusive. This understanding can be seen when people view the core of a city as either an exciting cultural centre, or the home of sin. (Phillips, 1996)

Lynch understands this concept and deals with people's association to "The Image of the Environment". He says, "Every citizen has had long associations with some part of the city, and his image is soaked in memories and meanings." He is also concerned with how we locate ourselves within the city, and how we find our way around. To know where we are within the city, we have to build up a workable image of each part. Each of these images will comprise:

- our recognition of its "individuality or oneness" within the city as a whole,
- our recognition of its spatial or pattern relationships to other parts of the city,
- its practical meaning for each of us (both practical and emotional)

To address these issues of how people use space, Lynch defined what he calls legibility of the city. This is based on the concept of legibility depending on the people's 'mental maps'. Legibility is a term used to describe the ease with which people can understand the layout of a place. In Lynch's book "The Image of the City", he developed a system to evaluate and understand "legibility' that can be applied to urban space, making it more comfortable and easier to use. By making questionnaire surveys, Lynch defined a method of analyzing legibility based on five elements: paths, edges, districts, nodes and landmarks. (La Gory, Pipkin. 1981; Lynch,1960)

Paths- familiar routes followed- "are the channels along which the observer customarily, occasionally, or potentially moves. They may be streets, walkways, transit lines, canals, railroads ..." These are the major and minor routes of circulation that people use to move around. A city has a network of major routes and a neighborhood network of minor routes.

Districts- areas with perceived internal homogeneity- "are medium-to-large sections of the city, conceived of as having two-dimensional extent, which the observer mentally enters 'inside of,' and which are recognizable as having some common identifying character" A city

is composed of component neighborhoods or districts; (center, midtown, in-town residential areas, organized industrial areas, train yards, suburbs, college campuses, etc.) Sometime they are districts in form and extent. (Lynch 1960: 51)

Edges- dividing lines between districts- "are the linear elements not used or considered as paths by the observer. They are boundaries between two phases or linear breaks in continuity: shores, railroad cuts, edges of development, walls ... " The termination of a district is its edge. Some districts have no edges at all but gradually taper off and blend into another district. When two districts are joined at one edge they form a seam.

Landmarks- point of reference- "are another type of point-reference, but in this case the observer does not enter within them. They are external. They are usually a rather simply defined physical object: building, sign, store, or mountain". The prominent visual features of the city are its landmarks. Some landmarks are very large and seen at great distances, or they can be very small like a single tree in a park or square. (Lynch 1960: 52)

FIGURE 6.9

Nodes- centers of attraction that you can enter-"are points, the strategic spots in a city, or neighborhood into which an observer can enter, and which are intensive foci to and from where he is traveling. They may be primary junctions, places of a break in transportation, a

crossing or convergence of paths, or moments of shift from one structure to another. The nodes may be simply concentrations, which gain their importance from being the condensation of some use or physical character, as a street-corner hangout or an enclosed square … " A node is a center of activity. It is a type of landmark, but is distinguished from a landmark by virtue of its active function. Where a landmark is a distinct visual object, a node is a distinct hub of activity. (Lynch, 1960: 52)

The element essential for people of all ages, ethnicities, and backgrounds is that they understand, feel comfortable, and enjoy using the space in which they live and have available. The understanding of different needs of all user groups, and accounting for this through design by incorporating different places aligned so mixes occur where appropriate, provides individuals with opportunities and will lead to better use of public and semi-public space. The making of “place” is more then just the physical manipulation of the neighborhood or city, as it must incorporate an “experience” where people are first. This means a place where people have safety and freedom of movement, social integration, a variety of interesting activity settings, peer gathering places, green spaces, and cohesive community identity. The design of “place” should allow the connection of people in ways that make them happy and able to enjoy the experience of their neighbourhood and city. (Lynch, 1960)

> In cognitive terms; we react to all aspects of space symbolically, by means of our concepts, language, images, and stereotypes. People react to cognitive image, not to reality. In their role as manipulators of physical space, planners can also influence urban imagery and mental maps. This role of information managers is critical, for by improving the public’s mental maps, planners can further reduce the constraints on residential choice and access to services. Designing legible and functional spaces can foster more efficient spatial behaviour and demolish the spatial boundaries that are more imaginary than real. (La Gory, Pipkin. 1981. pg 298)

6.5 Design Strategies to Enhance Social Interaction: Challenges and Opportunities

> The question of how space influences behavior is extremely difficult to answer because spatial structure exerts its effects in such an enormous variety of ways. Space is objective and cognitive, absolute and relative; it has both metric and topological attributes; spatial structures both cause and indicate social structure. (La Gory, Pipkin. 1981. pg 298)

Design does not determine behavior but it can have a significant influence on it, as well as symbolizing what is valued in a place. However, people are flexible and places change over time. Today very different ways of living are experienced and different values expressed in cities built in the days of the Industrial Revolution. The variety of ways that people experience space depending on age, gender, cultural background, and socio-economic status, will also determine how the built environment reflects values and behaviors.

> . . . . . Americans tend to see the single-family home in a low density suburb as ideal for children's growth, but the French tend to idealize big city apartment life as healthy for their children's development. Further, suburbanites tend to see an expansive green lawn as a symbol of healthy living, while urban critics see it as an ecological outrage and a waste of time and energy. (Phillips. 1996. Pg 163)

Thinking about how design reflects and supports behavior is important when visions for future communities anticipate behavioral change: current design responses and patterns may need subtle or even drastic adjustment. The questions we have tried to address during the planning of this project is "What are the aspects of design that will encourage or support our vision for this community?"

Community vitality is being proposed as a highly desirable quality for the Mahogany community. This vitality will be expressed by lively streets and public places where people will regularly gather and interact. Achieving this kind of vitality is going to rely on a shift in values. Lewis Mumford once described the suburbs as a "collective effort to live a private

life". This desire for privacy presents a real challenge to the vision of vitality. However we believe we can plan a community that is prepared for such a change to take place, without negatively impacting other behavioral choices.

> A more reasonable strategy than searching for the ideal is surely using spatial arrangements *permissively* rather than *coercively.* Although we may be unable to specify a comprehensive ideal, we know well that some arrangements inhibit social activity while others facilitate choice. (La Gory, Pipkin. 1981. Pg. 299)

Sustainability is another important part of the vision for the Mahogany community. Environmental, economic and social aspects of sustainability can be linked to social interaction, and opportunities and challenges will again depend on changing values and behaviors. For example, later on in the report we will consider how increasing use of public transport will present new opportunities for casual interaction amongst commuters.

Community usually forms around similar interests and values. The representation of those interests in the community through planning and design will strengthen relationships. Public and civic spaces that can be enjoyed by everyone will also create opportunities for people to bond with the place and to share that experience: but the challenge will be to understand how to plan and design such places given the limitations imposed by schedules and activity patterns.

6.6 Recommendations for the Planning and Design of Mahogany

Design guidelines included in policy documents often include statements that presuppose behavior. For example, a statement such as "Provide places and design the environment so that it is child-friendly" assume there is a shared understanding of just what "child-friendly" is. A deeper understanding of how and when children will use public spaces can help us to determine more specifically what the qualities of those places should be and to evaluate whether proposed designs fulfill the intent. Imagining how places will be used by going through typical daily activity patterns can help planners and designers to understand when

opportunities for use will be, and to understand how spatial attributes can increase feelings of safety, security and belonging.

Four recommendations for planning and design to enhance social interaction follow:

- Neighbours
- Kids
- Public Transit
- Multi-user facilities.

6.6.1 Neighbours

Knowing the neighbors increases a sense of caring and safety in a community. But opportunities for getting to know them can be limited by busy schedules. Opportunities for casual interactions can be increased if domestic activities can take place in shared, semi-public areas.

FIGURE 6.10

Design Ideas:

- Block mailbox areas have been tried in other places because they are a daily activity and can be clearly associated with a small cluster of people within the larger community.

- Block recycling centers can provide places where neighbours can run into each other, that individual blue box programs don't provide – by doing this at a very local level feelings of ownership can also be enhanced

6.6.2 Kids Places

Children often act as a catalyst for community social interactions. Supporting social activities for children can have far reaching effects, bringing the adult population together. Of all the age groups kids spend the most time in the community and they are most likely to spend time outdoors. They are also in an important socializing stage of life. Places for loud, boisterous physical activities, as well as quiet, intensive, imaginary play enhance a child's experience of place and society. However, a challenge is to provide for places where parents and children feel they are safe. Private yards do allow for many activities to take place, but can limit socializing opportunities.

FIGURE 6.11

Design Ideas:

- Create small/local level public places (courtyards or commons) where younger children can meet and play, yet be seen from home

- Create public places within walking distance from home where older children can gather, and yet remain in the public eye

6.6.3 Public Transit

Communities of commuters will develop with increased use of public transit in the Mahogany community. People will be brought together in a travelling community as commuters tend to follow similar schedules. School buses will also likely be a reality for children at least the early stages of the community. Even recognizing people can help to create a feeling of shared belonging among commuters.

FIGURE 6.12

Design Ideas:

- Create transit stops with adequate room for several people to gather comfortably away from vehicle traffic and out of the way of pedestrians
- Provide shelters at all local stops
- Use distinctive paving and planting so that transit stops say something about their important status

6.6.4 Multi-User Facilities

Diversity of age and interests adds to the vitality and sustainability of communities. Interaction between diverse residents will be enhanced where they can cross paths and share destinations through both casual and organized encounters. The challenge here is to recognize the schedules and interests of the different age groups do not always easily overlap. But one can imagine opportunities for casual interaction will increase if, for instance, someone on their way to the store can look in and see kids playing in the daycare yard.

FIGURE 6.13

Design Ideas:

- Include retail and community facilities in mixed use areas so that users of one facility pass by another on their way
- place the “active faces” of buildings where they can be clearly seen from the street
- consider the “in between” places as opportunities for interaction

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8.0 Annex

Commercial Development – Existing Policy

Commercial Development Existing Policy		
Policy Area	**Policy Area**	**Policy Area**
Employment	Within the economic and commercial context, the City of Calgary promotes a policy of decentralized employment in order to create more efficient transit and land use. These policies are in keeping with the Sustainable Suburbs Study and the Calgary The City of Calgary aims to be: • Transit oriented • Mixed use • Pedestrian friendly • Supportive of non-retail, commercial development • Created with strong urban-design principles • Provide a safe and accessible regional economic centre • Develop a clear, neighbourhood identity • Respect the environment and contribute to overall health and well-being • Integrate public systems, such as park space, transit and the path system.	The Calgary Plan (Municipal Development Plan), Calgary Transportation Plan (GoPlan), Sustainable Suburbs Study, Southeast Planning Area Regional Policy Plan, Southeast Employment Centre Area Structure Plan, McKenzie South Lands Retail Demand Assessment, Jobs/ Housing Balance Strategy (J/ HB Strategy
	A feasibility study for the proposed South Macleod Trail Employment Centre outlines: • Economic context of the south area of Calgary • Trends in suburban commercial development • Economic feasibility of suburban commercial developments • Trends in employee preferences for commercial employment	South Macleod Trail Employment Center Study
	The economic outlook of Calgary and region helps to frame the policy guidelines by providing information about: • Economic trends and outlooks • Population trends and outlooks	Calgary and Region Economic Outlook 2004 – 2014

Affordable Housing Existing Policy

Affordable Housing Existing Policy		
Policy Area	**Theme**	**Supporting Documents**
Housing	The Calgary Plan is required under the Municipal Government Act it is the main or overarching plan that is intended to guide city wide development in a variety of aspects including affordable housing. Although, very general and broad in nature with respect to affordable housing, the policies that have general implications for affordable housing in the community of Mahogany are listed below. 2-2.2.2C Endeavour to ensure, through new community plan/area structure plan processes, that new communities will work to achieve a target of an overall density of 6-8 units per gross residential acre over time. **2**-3.2.2A Facilitate the provision of shelter within the municipal jurisdiction through a variety of means including: • maintaining a working relationship with Provincial housing officials who control funds for social housing projects; • pursuing partnerships with the private sector to encourage the provision of affordable housing for persons in need; • establishing links with special needs groups working towards housing solutions for low income families, urban natives, persons with disabilities and the hard to house; • examining ways for The City and senior governments to partner in land development or housing projects, which, because of their innovative character, would not qualify for consideration by traditional money sources; and • encouraging the establishment of public, private and joint rehabilitation projects, where appropriate. **2**-3.2.2B Emphasize targeting housing solutions to those most in need. **2**-3.2.2C Encourage a more varied social composition in all parts of the city by locating social housing projects in a variety of areas throughout the city. These housing projects should be small scale in nature. **2**-3.2.2D Encourage the provision of an adequate supply of rental accommodation for different socio-economic groups in all parts of the city. **2**-3.2.2E Encourage developers to make available a portion of their serviced land for low priced housing.	The Calgary Plan (Municipal Development Plan),

	The City of Calgary's Affordable Housing Strategy was created to address affordable housing in a consistent manner and is to be used as a tool to guide affordable housing the affordable housing efforts of the City of Calgary and other stakeholders. The strategy is seen as a vehicle for achieving the affordable housing objectives of the Calgary Plan and the City's Corporate Business Plan. The City of Calgary has identified affordable housing roles eight roles: 1. The City's **core business and first priority is to build/operate non-market housing**. 2. City financial resources should **leverage other resources** through public/private/non-profit partnerships & joint ventures for City and community initiated projects. 3. The City will **administer financial assistance for capital projects, preferably in the form of land**, the value of which is charged against Program 489, the Capital Housing Reserve. The value of the land will be determined at the discretion of the Affordable Housing Team as per the Terms of Reference of the Corporate Housing Capital Reserve (FB99-62 and its amendment). 4**. Council's Affordable Housing Team will establish priorities** for the use of City financial and staff resources, including a decision about the ratio of funds to be used for City core business projects in relation to funds allocated through a community process (e.g., The Calgary Homeless Foundation Funders' Table), **based upon the results of a biennial housing needs assessment** undertaken by the City in consultation with other affordable housing stakeholders. 5. Although The City will cultivate partnerships with all relevant stakeholders, it will **assign staff or request aldermanic involvement in other organizations' Boards only when** The City has contributed significant resources to the organization, when frequent liaison is important for accomplishing The City's identified housing priority area, or when requested by another level of government. 6. Council of The City of Calgary will be requested to **reduce / waive / relax development fees and standards**, subject to Affordable Housing Team recommendation, where it clearly enhances the viability and affordability of the project**.** 7. Wherever possible **affordable housing shall be provided on a "mixed income" basis** where some residents receive a rental subsidy while the remainder pays a "low end" of market rent. This kind of affordable housing creates healthy communities, reduces the concentration of low income households and contributes to affordable housing opportunities for both non-market and market renters. 8. The City of Calgary will **support the increase of expertise within communities** to develop and implement local solution to local housing issues.	Affordable Housing Strategy

	The Sustainable Suburbs Study was developed in 1994 not only to promote the development of sustainable suburbs it was seen as key to the implementation of the Calgary Transportation Plan. The study was also undertaken to control the costs of growth, to better meet people's needs, and to encourage more sustainable lifestyles. With respect to affordable housing, the study recognizes and outlines the challenges of providing affordable housing in new suburban communities. However, the study contains four policies that provide more choice for housing in the suburban housing market. The study sets minimum densities, requires a mix of housing type and sets the stage for policies and guidelines to be created to provide low to medium income housing in the suburbs. Consistent with the Calgary Municipal Development Plan the study also states that multi family housing should be located near community centers, neighborhood nodes, and be close to transit stops.	Sustainable Suburbs Study

Environment Existing Policy

Environment Existing Policy		
Policy Area	**Theme**	**Supporting Documents**
	• Sections 661 -670 of the *Municipal Government Act* - Dedication of a Municipal Reserve will be 10% as part of the subdivision process this land will be dedicated to supply schools, public parks or recreation areas	Municipal Government Act
Environmental Considerations	• Protection of environmentally significant areas • Improvement of atmospheric air quality, sound management of water resources, responsible land stewardship • Preservation of important natural environments; minimize air, water and soil pollution, reduce resource consumption. • Protection of wetlands, by utilizing in storm water system • Also it is important to find ways of incorporating parks, natural areas into public systems to ensure broad public spaces.	Calgary Plan, Calgary Open Space Plan, Natural Areas Management Plan, Plan Southeast Planning Area Regional Plan, Sustainable Suburbs
	• Recognizes the complex nature of wetlands and develops practices that preserve wetlands.	Wetland Conservation Plan, Natural Area Management Plan

Environmental Considerations	• Reviews and compiles biophysical characteristics within the project area; Outlines environmental issues and concerns; • Confirms vegetation communities, evaluate wetlands • Mitigation measures have also been compiled for this project based on the sensitivities of the project area and construction methodology.	Biophysical Impact Assessment
	• Protection of areas that represent habitat of migratory birds • Protection of Canada's species at risk and their habitats	Federal Migratory Birds Convention Act Species at Risk Act

Transportation Existing Policy

Transportation Existing Policy		
Policy Area	**Theme**	**Supporting Documents**
Transportation	The City of Calgary is now focusing on designing new communities so they are "transit-supportive", which takes both public transit and urban design into account. The public transit system needs to be planned integrally into these new communities, providing convenient and reliable service to focal points, neighbourhood nodes, and areas of higher density. The urban design aims to link land use and mobility for two reasons. 1) The community should provide a mix of services, amenities, and employment within the community, which will encourage community activity and civic pride. 2) There should be a choice of travel modes, set up to increase the number of trips made by foot, bicycle, or transit, and to decrease the number of trips made by car.	The Calgary Plan (Municipal Development Plan) (1998), Calgary Transportation Plan (GoPlan) (1995), Sustainable Suburbs Study (1995), Southeast Planning Area Regional Policy Plan (2004), Cranston Community Plan (1998), Auburn Bay Community Plan (2004)
	This plan is unique for Calgary because it incorporates a "transit station planning area", which is a special density area around the LRT station, planned using the principles of transit-oriented development. The objective of this part of the plan is to "make transit a more convenient, accessible, and efficient transportation choice for people", by specifying higher densities, special land uses, and a close attention to design which encourages walking and cycling.	Auburn Bay Community Plan (2004)
	This example from Portland also aims to create "transit-supportive and pedestrian sensitive mixed use developments" and takes many transit modes into account, including carpooling. The unique part of this document is the conscious effort to "convenient access to light rail stations while minimizing and overcoming physical and psychological barriers".	Hillsboro Station Community Planning Areas (City of Hillsboro 2003a, 2003b)

	This guide contains several points which were important to keep in mind while planning for Mahogany. The most interesting of these were to: 1) Make sure transportation models do not discount pedestrians, cyclists, or public transit, 2) Transform park 'n' ride lots into multiuse facilities, and 3) Provide transit riders with customized transit information for their area.	Getting to Smart Growth II (Smart Growth Network 2003)

Municipal Infrastructure Existing Policy

Municipal Infrastructure Existing Policy		
Policy Area	**Theme**	**Supporting Documents**
Municipal Infrastructure	Throughout these plans, the essence of the infrastructure policy is to: 1) Build these systems before development arrives – trying to preserve open spaces; 2) Provide infrastructure which works efficiently and consistently; 3) Aim to reduce the per capita cost of constructing and maintaining infrastructure; and 4) Use ecological principles in designing stormwater infrastructure.	The Calgary Plan (Municipal Development Plan) (1998), Calgary Transportation Plan (GoPlan) (1995), Sustainable Suburbs Study (1995), Southeast Planning Area Regional Policy Plan (2004)

Economic Trends

United States

Considering the fact that "90% of Alberta exports are shipped to the U.S.", it is worthwhile to briefly examine trends in the U.S. economy to gain further insight into how Alberta's economy might perform in the future (Government of Alberta 2004a, 4).

Starting in 2003, the U.S. economy appeared to be recovering after its slow economic growth in 2001. Growth rates are expected to be around 3.0% from 2003-08, spurred by increased consumer spending, residential purchases, government spending and low interest rates (City of Calgary 2003a). In 2003, the annual GDP increased by 3.1% (Department of Foreign Affairs and International Trade 2004). However, unstable international relations, including terrorism, and higher predicted interest rates may reverse this growth trend. Unemployment is expected to fall from 6% to 5% during the period of 2003-08, which may in turn increase consumer spending (City of Calgary 2003a).

Canada

Canada's strong economic growth (3.3% in 2002) and its strong dollar may have a positive or adverse effect on certain industries. Adverse effects are most imminent in export industries, particularly ones with close trade links with the U.S. Growth is expected to remain at or below 3% from 2004-08 (City of Calgary 2003a).

Geopolitical events such as the war in Iraq, affected consumer spending in 2003, which in turn was one of the key factors in heightening Canadian economic growth in 2002 (City of Calgary 2003a). However, employment growth proved to be strong throughout 2003 at 2.2% despite national and provincial crises such as SARS, power rages in Ontario, and the B.C. forest fires (Statistics Canada 2003).

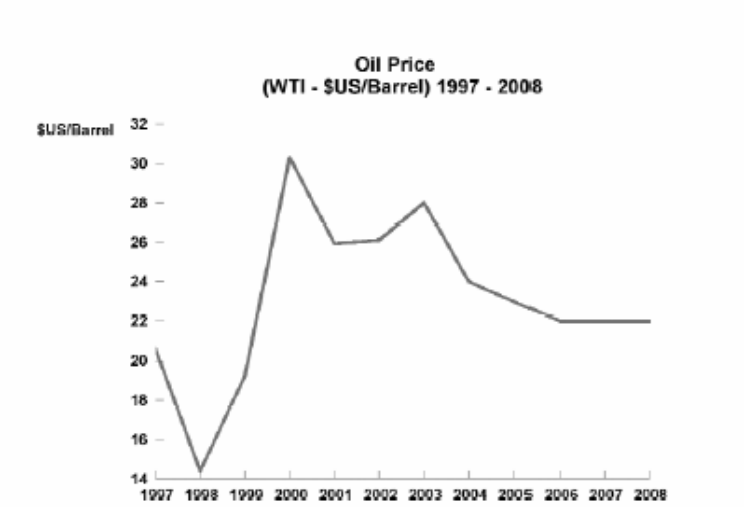
Alberta

Alberta is forecasted to have a strong economy due to a multitude of factors including:

- Increased consumer spending
- "The Alberta Advantage" (meaning the province is expected to be debt free by 2005)
- The development of major oil sands projects in Northern Alberta
- Alberta's competitive tax structure
- High energy prices and investment in energy (Government of Alberta 2004a; City of Calgary 2003a)

However, the strong Canadian dollar may have ramifications for Alberta's export energy trade with the U.S. In addition, the effects of the ongoing Mad Cow Disease crisis have yet to be seen as well as the unpredictability of political events which drive oil prices: a decline in crude oil prices is expected by take place by 2008 (see table below) (City of Calgary 2003a).

Forecast of world oil prices



Source: Federal Reserve Bank of St. Louis

Even though the oil, gas and oil sands industry comprised 64% of major projects in Alberta in 2003, there is an acknowledgement by the Alberta government that a slow shift to developing knowledge-based industries (i.e. business services) is needed due to demands for long-term sustainability and the need to be technologically innovative considering increased competition from major markets like China and India (Government of Alberta 2004a). This trend is conducive to this report's suggestion that work-live units focused on knowledge-based employment should be the primary form of employment in the Mahogany area.

Calgary

Calgary's economy was the strongest in all of Canada's major cities from 2003-04 due to:

- Strong population growth
- Energy sector investment
- High energy commodity prices
- Low interest rates
- Low business costs (International Results Group 2004; Government of Alberta 2004a)

With 89% of Canadian oil and gas companies' headquarters based in Calgary and with these companies providing 50,000 oil and gas-related jobs in the city, Calgary is expected to gain significantly from high energy prices worldwide (International Results Group 2004; City of Calgary 2003a).

However, Calgary is seeing a trend of industry diversification with the result that the oil and gas industries do not comprise as much of the city's GDP as it once did. To compare, in 1985, they made up 35% of the GDP, while in 2001, that percentage decreased to 27% (see charts below) (International Results Group 2004).

Breakdown of Calgary's GDP 1985

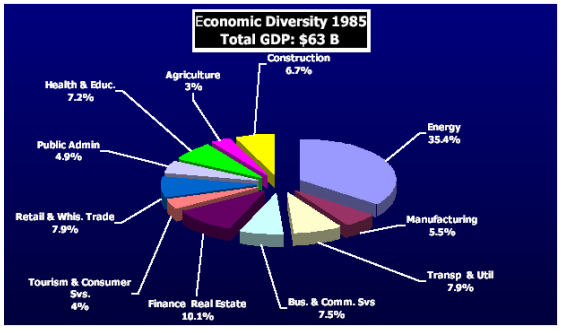
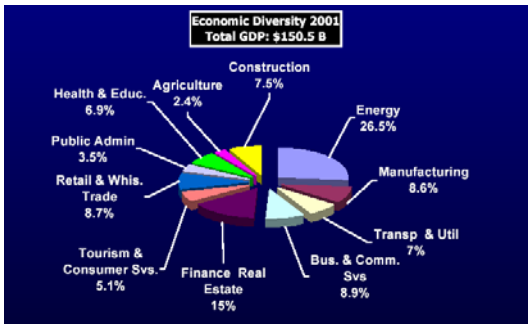


Figure 3.3- Breakdown of Calgary's GDP 2001



Source: Labour Market Overview: Calgary and Area Annual Report (2003-04)

Employment and Growth Trends

Calgary Population Growth Trends

There are three major trends which demarcate the changes in Calgary's population from 1998-2008.

The first of these is a very high population growth rate due to the allure of Calgary's burgeoning job market (City of Calgary 2003a). The greatest influx of out-of-province migrants lasted from 1996-2001 with the 20-34 year-old age cohort comprising 48.9% of all migrants (City of Calgary 2003a). In the 1998-2002 period, the city population grew by 3.1%. This trend in growth has lessened in recent years as other provinces' economies – especially those of B.C. and Ontario – have started to rebound (Government of Alberta 2004a).

Overall, predicted population growth for the city is strong and expected to be 2.2% from 2003-08 with a projected population of 1.02 million by 2008 (from 922,315 in 2003) (City of Calgary 2003a). This kind of population growth is favourable to the Southeast Planning Area, considering an estimated 90,000 people are needed to dwell in the area to ensure it is a thriving employment and retail center.

The second trend is a rapidly aging labour force. The retirement age cohort (ages 55 -65+) is expected to grow at an annual above average rate of 2.3% between 2003-08. This is well-demonstrated by the fact that this cohort represented 17.7% of the city's population in 2003 – or 163,422 people – and are estimated to represent 20% of the city's population by 2008 – or 205,200 people (see table below) (City of Calgary 2003a). The retirement age cohort's withdrawal from the labour market may mean that a large void in the job market will ensue although Calgary's large youthful population and increased international immigration may mitigate this problem.

Population Change in the City of Calgary: 2003-08

Age Groups	2003	Distribution %	2008	Distribution %	% Change Annual
Age 0 to 14	171,932	18.6	179,300	17.7	0.9
Age 15 to 24	135,278	14.7	143,100	14.1	1.2
Age 25 to 34	152,891	16.6	175,900	17.3	3.0
Age 35 to 44	160,524	17.4	152,800	15.0	(1.0)
Age 45 to 54	138,268	15.0	159,500	15.7	3.1
Age 55 to 64	77,147	8.4	101,100	10.0	6.2
Age 65+	86,275	9.4	104,100	10.2	4.1
Total Population	922,315	100	1,015,800	100	2.0

Source: The City of Calgary

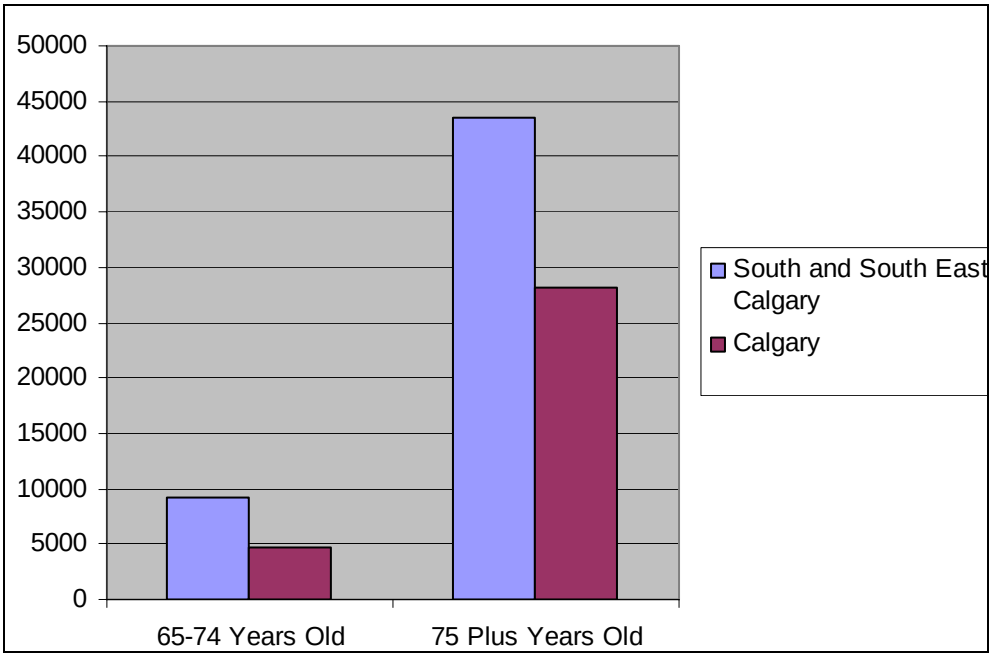
The third trend is an influx of international immigrants to Calgary. According to the *Calgary and Region Socio-Economic Outlook: 2003-08*, 20.9% of Calgary's population is foreign-born (53). From 1996-2001, international immigrants comprised around 20% of Calgary's total population. Although 40% of immigrants have a university degree, professional accreditation is currently difficult to obtain – due to the cost and time of accreditation examinations and courses for upgrading – which may lead to difficulties in immigrants being able to fill the job market void left by the retirement age cohort (Government of Alberta 2004b).

South Sector Population Growth Trends

The one apparent trend in Calgary's South-Southeast area is the fast growth of its retirement age population. Although relatively small in numbers in comparison with the working age and school age cohorts in the area, it grew by 166% in between 1986- 2001 compared to 45% and 28% for working age and school age populations, respectively.

The retirement age population represents a greater amount of the South-Southeast sector in comparison to the rest of the city as demonstrated by the table below:

Distribution of Retirement Aged Population in South-Southeast Calgary and Calgary: 1996



Source: EVDP 636 Community Profile: Population (2005)

The rapidly increasing retirement age population should be an important factor when planning services and retail types for the Mahogany area.

Matrix for Orenco Station, Hillsboro, Oregon

GOAL	OUTCOME	INDICATOR	FULLY MET	PARTIALY MET	NOT MET
Alternative Transportation Methods	Reduce dependence on personal automobile, promote walking	Public transit within 400m walk for all residents	X		
		Higher density development within 10 minute walk of major transportation node	X		
		Minimum parking requirements		X	
		Schools and parks centrally located in neighbourhoods		X	
Increased Density	Compact development	Minimum density of 10 UPA	X		
		Minimum 25% multifamily dwellings	X		
		Residential right of way, maximum 17m	X		

	Circulation plan that provides convenient access to major transit nodes and/or destinations in community while minimizing physical barriers	Grid or modified grid pattern with short blocks	X		
Mixed-use Center	Balance of residential, diverse retail, employment, and civic spaces	Retail and non-retail employment within walking distance or short transit ride	X		
	Reduce need for personal automobile	Neighbourhood retail to service local residents	X		
	Increase social interaction	Open spaces integrated into mixed-use area	X		
	Range of temporal uses	Vibrant commercial/residential district functioning various hours of the day	X		

GOAL	OBJECTIVE	INDICATOR	FULLY MET	PARTIALLY MET	NOT MET
Increased Social Interaction	Encourage pedestrian use to obtain greater social capacity, cohesion, and community involvement	Pedestrian & Cycle paths with spaces for sitting and meeting built into paths	X		
		Attractive open spaces, capitalizing on natural amenities	X		
		Linked open spaces	X		
		Varied recreational uses (passive and constructed)	X		
	Friendlier, human scale streetscapes	Decreased housing setback, providing a friendly face to the street	X		
	Pedestrian sensitive building design	Wider, detached sidewalks	X		
		Rear-loading garages in designated areas of development	X		
		Tree lined streets	X		
Mix of Housing	Increase diversity (social & economic)	Various housing types (multifamily, semidetached, single detached, live/work, "granny suites", apartments, lofts)	X		
		Various types of ownership (owned, rental, leased)	X		
	Housing that is adaptable over time	Range in price, affordability		X*	
	Interesting visual	Design controls produce	X		

	streetscape	homes that have a common thread but are distinct at the same time			
Environmental Preservation	Environmentally sound development principles	Alternative management systems for wastewater	**X**		
		Energy efficient building methods/materials		**X**	
		Pathways and roads should follow natural topography	**X**		
	Establish green capital	Integration of critical environmental areas into development	**X**		
		Preserving and protecting natural areas and native species	**X**		
	Provide link to original land uses/ historical elements of area	Commemorative elements integrated into urban fabric	**X**		

*Presently housing stock contains very little affordable housing. New, more affordable housing options are currently under construction

Matrix for Kentlands, Gaithersburg, Maryland

GOAL	OUTCOME	INDICATOR	FULLY MET	PARTIALY MET	NOT MET
Alternative Transportation Methods	Reduce dependence on personal automobile, promote walking	Public transit within 400m walk for all residents	**X**		
		Higher density development within 10 minute walk of major transportation node		**X**	
		Minimum parking requirements	**X**		
		Schools and parks centrally located in neighbourhoods	**X**		
Increased Density	Compact development	Minimum density of 10 UPA		**X**	
		Minimum 25% multifamily dwellings	**X**		
		Residential right of way, maximum 17m	**X**		
	Circulation plan that provides convenient access to major transit nodes and/or destinations in community while minimizing physical barriers	Grid or modified grid pattern with short blocks	**X**		
Mixed-use	Balance of	Retail and non-retail	**X**		

Center	residential, diverse retail, employment, and civic spaces	employment within walking distance or short transit ride			
	Reduce need for personal automobile	Neighbourhood retail to service local residents	X		
	Increase social interaction	Open spaces integrated into mixed-use area	X		
	Range of temporal uses	Vibrant commercial/residential district functioning various hours of the day	X		

GOAL	OBJECTIVE	INDICATOR	FULLY MET	PARTIALLY MET	NOT MET
Increased Social Interaction	Encourage pedestrian use to obtain greater social capacity, cohesion, and community involvement	Pedestrian & Cycle paths with spaces for sitting and meeting built into paths	X		
		Attractive open spaces, capitalizing on natural amenities	X		
		Linked open spaces	X		
		Varied recreational uses (passive and constructed)	X		
	Friendlier, human scale streetscapes	Decreased housing setback, providing a friendly face to the street	X		
	Pedestrian sensitive building design	Wider, detached sidewalks	X		
		Rear-loading garages in designated areas of development	X		
		Tree lined streets	X		
Mix of Housing	Increase diversity (social & economic)	Various housing types (multifamily, semidetached, single detached, live/work, "granny suites", apartments, lofts)	X		
		Various types of ownership (owned, rental, leased)	X		
	Housing that is adaptable over time	Range in price, affordability		X	
	Interesting visual streetscape	Design controls produce homes that have a common thread but are distinct at the same time	X		
Environmental Preservation	Environmentally sound development principles	Alternative management systems for wastewater		X	
		Energy efficient building methods/materials	X		
		Pathways and roads should follow natural topography	X		

	Establish green capital	Integration of critical environmental areas into development	X		
		Preserving and protecting natural areas and native species	X		
	Provide link to original land uses/ historical elements of area	Commemorative elements integrated into urban fabric	X		

Matrix for East Clayton, Surrey, British Columbia

GOAL	OUTCOME	INDICATOR	FULLY MET	PARTIALY MET	NOT MET
Alternative Transportation Methods	Reduce dependence on personal automobile, promote walking	Public transit within 400m walk for all residents		X	
		Higher density development within 10 minute walk of major transportation node		X	
		Minimum parking requirements	X		
		Schools and parks centrally located in neighbourhoods	X		*
Increased Density	Compact development	Minimum density of 10 UPA	X		
		Minimum 25% multifamily dwellings	X		
		Residential right of way, maximum 17m	X		
	Circulation plan that provides convenient access to major transit nodes and/or destinations in community while minimizing physical barriers	Grid or modified grid pattern with short blocks	X		
Mixed-use Center	Balance of residential, diverse retail, employment, and civic spaces	Retail and non-retail employment within walking distance or short transit ride			**
	Reduce need for personal automobile	Neighbourhood retail to service local residents			**
	Increase social interaction	Open spaces integrated into mixed-use area			**
	Range of temporal uses	Vibrant commercial/residential district functioning various hours of the day			**

GOAL	OBJECTIVE	INDICATOR	FULLY MET	PARTIALLY MET	NOT MET
Increased Social Interaction	Encourage pedestrian use to obtain greater social capacity, cohesion, and community involvement	Pedestrian & Cycle paths with spaces for sitting and meeting built into paths	X		
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		Linked open spaces	X		
		Varied recreational uses (passive and constructed)	X		
	Friendlier, human scale streetscapes	Decreased housing setback, providing a friendly face to the street	X		
	Pedestrian sensitive building design	Wider, detached sidewalks	X		
		Rear-loading garages in designated areas of development		X	
		Tree lined streets		X	
Mix of Housing	Increase diversity (social & economic)	Various housing types (multifamily, semidetached, single detached, live/work, "granny suites", apartments, lofts)	X		
		Various types of ownership (owned, rental, leased)	X		
	Housing that is adaptable over time	Range in price, affordability	X		
	Interesting visual streetscape	Design controls produce homes that have a common thread but are distinct at the same time	X		
Environmental Preservation	Environmentally sound development principles	Alternative management systems for wastewater	X		
		Energy efficient building methods/materials	X		
		Pathways and roads should follow natural topography	X		
	Establish green capital	Integration of critical environmental areas into development	X		
		Preserving and protecting natural areas and native species	X		
	Provide link to original land uses/ historical elements of area	Commemorative elements integrated into urban fabric			***

*Parks are centrally located. Construction of school has not begun, but school site is centrally located
** Mixed-use center has not been constructed
*** No commemorative/historical features to retain