MAKE ART, NOT SPRAWL: USING FORM-BASED CODES TO CREATE COMPLETE, COMPACT, AND LIVABLE SUBURBAN COMMUNITIES

by

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Master of Planning in Urban Development, 2013
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Abstract

North American cities are experiencing rapid rates of urbanization and development, and it has become evident that the conventional Euclidean zoning model has failed to guide growth in a healthy, livable, and sustainable direction. This model, along with existing municipal fiscal policies and social preferences, enables the production of built forms that are conducive to sprawl. This MRP focuses on form-based codes (FBCs), and how this planning tool can be used to help combat sprawl and achieve the successful development of Smart Growth communities within a suburban context. An understanding of the existing literature, best practices, and analysis of the existing built form in the Fleetwood Town Center neighbourhood of the City of Surrey, British Columbia will help to justify the need for a more flexible zoning model. This research has shaped a set of recommendations to the City of Surrey to aid them in the development and implementation of their own FBCs.

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1.0 INTRODUCTION

Euclidean zoning has been the dominant model regulating land use and development in North America for close to a century. The foundation of this model is based on the segregation of uses, which divides a city into "zones" with permitted uses and other standards specified within each zone. In the decades since New York City adopted the first zoning ordinance in 1916, this model has fulfilled the intentions of separating undesired uses and regulating overcrowding. Presently, North American cities are experiencing rapid rates of urbanization and development, and it has become evident that this conventional model has failed to guide growth in a healthy, livable, and sustainable direction. The persistence of Euclidean zoning as the prevailing regulatory model is bolstered by its predictability, accountability, and objectivity – granting developers certainty in dealing with the land market, and ease of administration and control for planners. However, Euclidean zoning's "one-size-fits-all" approach reduces flexibility, and limits creativity in the city planning, design, and building processes; pigeon-holes development into predictable forms; and stifles the art of place making. The model, along with existing municipal fiscal policies and social preferences, enables the production of built forms that are conducive to sprawl. Unfortunately, sprawl is no longer just creeping along the periphery of cities, but becoming the dominant settlement pattern for suburban municipalities in North America. This development typology is plagued by a large number of disadvantages, compared to a very sparse list of advantages. In response, Smart Growth was developed to manage growth in a way that mitigates the negative effects of sprawl. With many North American cities facing rapid increases in population and high rates of urbanization, there is a pressing need for an alternative to the inadequate conventional zoning model. In the past few decades, form-based codes (FBCs) have emerged as an alternative to Euclidean zoning. It is a more flexible model that supports the objectives of Smart Growth, works to eradicate sprawl, and provides support for the development of complete, compact, and sustainable communities.

1.1 Research Objective

This MRP will focus on form-based codes (FBCs), and how this planning tool can be used to help combat sprawl and achieve the successful development of Smart Growth communities within a suburban context.

1.2 Report Structure

This MRP will adhere to the following structure:

1.0 Introduction - Briefly presents the research topic and illustrates the importance of this topic for study. This section concludes with the research objective of this MRP.

2.0 Methods and data collection - Presents the different criterions applied in conducting the literature review, summarization of the best practices, and analysis of the existing conditions in the selected case study neighbourhood. Relevant data sources are also identified in this section.

3.0 Literature review - Summarizes the findings from an extensive review of existing literature on the following topics: history of zoning, sprawl, Smart Growth and New Urbanism, and form-based codes. This review is presented as a logical progression from the initiation of zoning to the identification of its failures in the form of sprawl; to the responses developed to address these failures; and finally, presentation of form-based codes as the alternative model.

4.0 Case Study - Focuses on the Fleetwood Town Centre neighbourhood in the City of Surrey, British Columbia. This neighbourhood has been developed using the Euclidean zoning model and exhibits traditionally suburban characteristics. It has been identified as an appropriate area for the City to implement form-based codes due to its small scale; a growing population and increasing development pressures; and the residents' desires for a more walkable, pedestrian-friendly community.

5.0 Best Practices - Examine three North American cities: Miami, Florida; Arlington (Columbus Pike), Virginia; and St Albert, Alberta. Each city has implemented form-based codes at a different scale including city wide, corridor-orientated, and site-specific. These best practices provide support for the development of form-based codes as an effective tool in combating the effects of sprawl and can provide direction for the City of Surrey as they develop their own model.

6.0 Analysis and critique of the built form in the Fleetwood Town Centre neighbourhood - Examines the existing built form in the neighbourhood and illustrates how they are consistent with sprawl. This section also provides a critique of the City's current *Zoning Bylaw, No. 12000*, identified as the primary inhibitor to Smart Growth.

7.0 Application of form-based codes in the Fleetwood Town Centre neighbourhood - Presents form-based codes as the flexible and innovative solution to addressing the ills created by the conventional zoning model. This section provides six broad recommendations to the City of Surrey on the development, implementation, and evaluation of its own set of Codes.

2.0 METHODS AND DATA COLLECTION

A literature review of key topics, a look into three best practices in North America, and an analysis and critique of the existing built form in the Fleetwood Town Centre neighbourhood will be performed in order to determine the effectiveness of form-based codes as an alternative to Euclidean zoning. Data will be collected from secondary sources including academic publications, which includes books and peer-reviewed papers; grey material, such as blogs and newspaper articles; and relevant municipal documents.

2.1 Methodology

2.1.1 Literature Review

Existing academic and professional pieces written on the topics of Euclidean zoning, sprawl, Smart Growth, and form-based codes (FBCs) incorporate literature reviews of existing publications; personal observations; professional opinions; and the exploration, synthesis, and analysis of case studies. The background research for this MRP will be completed using a literature review of existing research, and will focus on understanding and analyzing how Euclidean zoning has produced inefficient and unattractive built forms and promoted sprawl, and the objectives of the Smart Growth movement. FBCs will be presented as a viable alternative to the conventional model; the implementation of which has been documented to create more vibrant, healthy, and livable suburban communities.

2.1.2 Analysis of Best Practices

Case study analysis of three cities – Miami, Florida; Arlington (Columbia Pike), Virginia; and St. Albert, Alberta will be conducted. These three cities have successfully developed and implemented FBCs at various scales (city wide, corridor, and site specific) and can provide valuable information in regards to the effectiveness of this flexible zoning model. Due to limitations in resources and time, the "success" of these FBCs can only be evaluated based on the initial intentions and objectives of these documents. Physical outcomes, as determined through examination of Google Street View and catalogue photos, will be analyzed to determine whether or not the built forms in each city are consistent with the objectives of their FBCs. Since FBCs are still regarded as a novel alternative to the conventional zoning model, the intent of the best practice analysis will be to

show how this model can successfully guide development in a direction that is supportive of Smart Growth.

2.1.3 Analysis and critique of the existing built form in the Fleetwood Town Centre neighbourhood

The existing built form within the Fleetwood Town Centre neighbourhood will be presented and evaluated. Personal knowledge and Google Street view photographs will be used to identify varying built forms that correlate to different land uses (e.g. residential, commercial, and industrial). An analysis will be conducted, drawing on the elements of good urban design, to illustrate how the existing forms are not conducive to Smart Growth. Next, all the zones present within the neighbourhood will be identified and dissected to show how characteristics (e.g. lot sizes, density, setbacks, building heights, and parking) regulated by the ordinance results in the production of built forms that are consist with sprawl. This analysis will reveal how the Euclidean zoning model has failed to produce the complete and sustainable communities that the City of Surrey's policies are striving for. Finally, FBCs will be applied to the Fleetwood Town Centre neighbourhood to demonstrate how this flexible model can improve the built form of the community. The appropriate transect zones will be identified for the study area, and the characteristics and standards of these zones will be outlined. This exercise will demonstrate how the Fleetwood Town Centre can be transformed, using FBCs, into a vibrant, diverse, and livable community.

2.2 Principle data sources

The data used in this report are collected from secondary sources including, but not restricted to: peer-reviewed academic papers; journal articles; books; professional columns and opinions; and planning documents and policies, such as the City of Surrey's *Sustainability Charter* and *Official Plan*. The data sources are kept within a North American context, in order to keep the knowledge and examples relevant to the City of Surrey. Demographic profiles and other statistical information are compiled from Statistics Canada's 2006 and 2011 censuses.

3.0 LITERATURE REVIEW

The following section will present a literature review on the following topics: Euclidean zoning, sprawl, Smart Growth and New Urbanism, and form-based codes (FBCs). This review will highlight the failures of Euclidean zoning, primarily the prevalence of sprawl, and present FBCs as an effective tool in reducing the development of this environmentally, socially, and economically damaging typology currently running rampant in suburban communities throughout North America.

3.1 Zoning's timeline: past to present

A zoning ordinance is the primary regulatory tool used to control land use and development available to local governments. The objectives of the tool are to divide a region into districts based on the compatibility of uses, in order to minimize negative externalities and spillovers, and to regulate built form and lot characteristics. Euclidean zoning has evolved minimally since its inception in the early 1920's, resulting in a collection of built forms that are boring, expensive, and unsustainable in today's modern cities. This has led policy makers, planners, developers, and consumers to question the effectiveness of this conventional model, and seek alternatives that do a better job at building complete communities.

3.1.1 The beginning: late 1860's to early 1920's

The Industrial Revolution in the United States concentrated commercial, industrial, recreational, and residential activities around a central nucleus for the first time, which has expanded and evolved into the modern cities of today. The influx of people into one locale brought with them the need for a regulatory system to ensure the safety, wellness, and health of residents, and cities were granted authority in the form of police powers to do just that (Janik, 2002; Parolek et al., 2008; Porter, et al., 1988). Before the conception of official zoning ordinances, there was a need to ensure that building placement, setbacks, and height standards met the natural lighting and fire safety standards of the time (Burdette, 2004; Janik, 2002; Parolek et al., 2008). Buildings were required to be placed at a certain distance from each other to prevent shadows, and heights were restricted to allow firefighters to access the top most floors (Parolek et al., 2008; Porter et al., 1988). Preliminary land use regulations also emerged at this time, with cities separating industry from areas of single-family dwellings, in order to protect property values and reduce the spillover of noxious fumes and noises (Janik, 2002; Parolek et al., 2008; Porter et al., 1988).

In 1916, New York City became the first to adopt zoning ordinances as a regulatory tool to control the built form of tall buildings, and separate commercial and industrial uses from the upscale retail and residential neighbourhoods (Burdette, 2004; Elliot, 2008; Lai & Han, 2012; Parolek et al., 2008; Platt, 2004). The City experienced rapid rates of industrialization and urbanization, with commercial and industrial uses competing for a depleting amount of developable land in the city centre. As a result, the City began to expand vertically, building skyscrapers that dominated the skyline, with some up to 50 stories tall and taking up entire city blocks (Burdette, 2004). Along with this new built form came concerns over increased congestion, and sunlight and fresh air being restricted at street level (Burdette, 2004). At the same time, New York City began establishing itself as a dominant commercial hub, attracting an influx of different workers and companies into the region, bringing competition and segregation with them (Burdette, 2004). Subsequently, the garment industry was regarded by the upscale retailers along 5th Avenue as "low-end" establishments, and seen as an undesired use that has, according to the 5th Avenue Association's lawyer, Bruce Falconer, "utterly changed [the] former high-class character, and [has] a derogatory effect upon the entire neighbourhood" (Parolek et al., 2008, pg. 7). In response to the rapidly changing commercial make-up of the City, the local government adopted a zoning ordinance, which divided the City into nine "Use Districts", with specific allowed and prohibited uses established within each district (Burdette, 2006; Porter et al., 1988). In addition to regulating uses, an overlay district also regulated building height and basic dimensions (e.g. minimum lot size, building envelope, setbacks, and density) in relation to the street (Burdette, 2006). The objectives of this rudimentary zoning ordinance were not only to control the physical forms produced, but to prevent the establishment of undesired uses in districts with pre-existing uses, such as residential or upscale retail. The local government justified this new regulatory system based on a legal premise: "[r]estrictions upon the free use of private land must find their justification in some aspect of the police power, asserted for the public welfare" (Hall, 2007, pg. 918). Zoning was also justified on an economic basis with arguments that "lower-end" uses have a harmful effect on "higher-end" ones, especially along the posh 5th Avenue (Porter et al., 1988).

3.1.2 The Standard State Zoning Enabling Act: mid to late 1920's

The zoning ordinance enacted by New York City became the template upon which all other zoning ordinances were based off of. In less than a decade since its initiation, more than 200 municipalities throughout the United States have established their own versions of the ordinance (Burdette, 2004; Elliot, 2008; Janik, 2002; Wickersham, 2001). In recognition of its popularity, the US Department of Commerce, led by Secretary Herbert Hoover, created an enabling statue known as the Standard State Zoning Enabling Act (SZEA) in 1924, with a revised version released two years later (Burdette, 2004; Elliot, 2008; Janik, 2002; Platt, 2004; Wickersham, 2001). The SZEA became the foundation for planning and zoning in the United States; granting permission to governing authorities to develop and enact zoning ordinances for the purpose of controlling private land use, building practices, and density in cities (Burdette, 2004; Elliot, 2008; Janik, 2002; Parolek et al., 2008; Platt, 2004; Porter et al., 1988; Wickersham, 2001). The Standard City Planning Enabling Act (SCPEA) followed in 1928, and required local planning commissions to supplement their zoning ordinances with master plans, street plans and subdivision regulations (Elliot, 2008). Additional regulatory powers also became available to local governments, including building regulations, heritage designations, signage, use restrictions on environmentally sensitive or unstable lands, and utilization of tax incentives to encourage land development (Platt, 2004). In the end, zoning still remains as the most important regulatory tool available to local governments in North America (Platt, 2004).

3.1.3 Euclidean zoning: Village of Euclid v. Ambler Realty Co.: 1926

In 1926, the term "Euclidean zoning" was coined as a result of the *Village of Euclid v. Ambler Realty Co. (272 U.S. 365)* case (Burdette, 2004; Elliot, 2008; Janik, 2002; Platt, 2004; Tombari, 2009; U.S. Supreme Court, 1926). As summarized in the 1926 US Supreme Court document, the case was situated in the Village of Euclid, a suburb of the City of Cleveland, in the state of Ohio. The Village enacted a zoning ordinance in order to control and restrict the amount of industrial development in the suburb, which was resulting from an overflow from Cleveland. The ordinance included six zoning districts, organized hierarchically: U-1 (single-family detached homes), U-2 (U-1 plus duplex units), U-3 (U-2 plus apartments), U-4 (U-3 plus office and commercial), U-5 (U-4 plus warehouse and some manufacturing), U-6 (U-5 plus all other industries). The ordinance also included three classes of height districts and four classes of area districts. The appellee in this case, Ambler Realty, owned 68 acres of land within the Village, which was divided into three different districts (U-2, U-3, U-6), and various height and class districts under the zoning ordinance. Ambler Realty's aim was to

sell the land for industrial uses, which would have procured them a higher sale value; however, the zoning ordinance prohibited industrial uses on more than half of the property. As a result, Ambler Realty sued the Village for the potential loss in revenue. Ultimately, the Supreme Court sided with the defendant, arguing that the zoning ordinance was justifiably enacted, based on the Village's police powers, a measure to limit nuisances in a traditionally residential suburb. To this day, the rationale provided by the Supreme Court in support of the Village's zoning ordinance still holds true, and has enabled Euclidean zoning to sustain itself as the dominant land use regulating tool in the modern planning world:

"Until recent years, urban life was comparatively simple; but with the great increase and concentration of population, problems have developed, and constantly are developing, which require, and will continue to require, additional restriction in respect of the use and occupation of private lands in urban communities." (U.S. Supreme Court, 1926)

3.1.4 Euclidean zoning today: successes and failures

The main intent of Euclidean zoning is to protect the safety and well-being of the public, through the regulation of land uses, densities, and building forms (Batchis, 2010; Elliot, 2008; Kwartler, 1989; Lai & Han, 2012; Platt, 2004). The "backbone" of Euclidean zoning involves the division of a city into zones, and segregation of land uses based on their perceived "appropriateness" (Batchis, 2010; Elliot, 2008; Lai & Han, 2012; MAP, 2007; Tombari, 2009). Unfortunately, suburban communities dictated by this model have not developed into attractive, healthy, or sustainable places to live. So, why has this model persisted in determining the built form of cities around the world? Ultimately, zoning has achieved its primary objectives of limiting the negative spillover from incompatible uses by placing different functions in its appropriate zones, reducing overcrowding, and ensuring the presence of light and fresh air at street level (Burdette, 2004; Janik, 2002; Lai & Han, 2012; Wickersham, 2001). The model worked to combat the ills of a rapidly industrializing society at a time where no formal regulations were in place to protect the well-being and integrity of the city's residents (Wickersham, 2001). The limited flexibility permitted under Euclidean zoning is designed to ensure stability and predictability for land owners and investors, which is one of the main reasons why this model has stood the test of time (Batchis, 2010; Burdette, 2004; Kwartler, 1989; Platt, 2004). The zones prescribed through an ordinance delineate the property rights associated with each type of land use (Janik, 2002). Property rights include, but are not limited to, the right to sell, subdivide, consolidate, and use the land as the owner seems fit (Janik, 2002; Springer, 2012). The more rights attached to a property, the higher its value will be on

the land market (Janik, 2002; Springer, 2012). In turn, developers respond to these prices, make transactions, and undertake development based on the market value of the land (Janik, 2002). The rigidity of the conventional model provides developers and real estate agents with a sense of certainty that the use, and therefore value, of land will not change overnight. Planners are in favour of the conventional model because of its low costs, ease of implementation, and the level of control it gives them (Burdette, 2004; Janik, 2002; Kwartler, 1989; Levy, 1995). Consumers appreciate this model because it protects their private investments by ensuring that residential property values will be retained by preventing incompatible uses from becoming their next door neighbours (Batchis, 2010; Janik, 2002; Kwartler, 1989). Finally, the dominance of Euclidean zoning as the primarily regulatory tool for municipalities has been endorsed by legal statutes in both the United States and Canada (Batchis, 2010; Janik, 2002).

Critiques of Euclidean zoning have centred on how the simplicity of the model does not consider the complexity of cities. As stated by Hall in her assessment "[t]he fundamental problem with Euclidean zoning is that it…ignores how cities actually operate" (Hall, 2006, pg. 919). She goes further to state that Euclidean zoning manages, dictates, and regulates a city as if it is a "machine, rather than an ever-evolving organism" (Hall, 2006, pg. 918). The model's static-nature and over emphasis on land use segregation makes it extremely difficult for developers to create dense, mixed-use communities, making sprawl the cheaper and easier option (Elliot, 2008; Jacobs, 1961; Lai & Han, 2012; Madden & Spikowski, 2006; Spikowski, 2010). It is evident through the environmental, social, and economic ills experienced by urbanized cities today, that Euclidean zoning has failed in producing built forms that are conducive to healthy, vibrant, and sustainable communities (Madden & Spikowski, 2006; MAP, 2007; Spikowski, 2010). As quoted by D. Listokin in his book "Land Use Controls: Present Problems and Future Reform":

"Zoning is seriously ill and its physicians – the planners – are mainly to blame. We have unnecessarily prolonged the existence of a land-use control device conceived in another era when the true and frightening complexity of urban life was barely appreciated. We have, through heroic efforts and with massive doses of legislative remedies, managed to preserve what was once a lusty infant not only past the retirement age but well into senility. What is called for is legal euthanasia, a respectful requiem, and a search for a new legislative substitute sturdy enough to survive in the modern urban world." (Listokin, 1974)

One of the most expressive opponents of Euclidean zoning was Jane Jacobs, who in her 1961 book, *The Death and Life of Great American Cities*, directly blames the conventional model for its failure to produce vibrant and diverse cities. According to Jacobs, the model "has been hard where it should be soft and soft where it should be hard" – too rigid in dividing a city into districts with prescribed uses, and too lax when it comes to setting design standards for built form (Jacobs, 1961; Wickersham, 2001, pg. 548). There is also quantitative evidence that links the production of sprawl to regulations and standards imposed by conventional zoning ordinances (Batchis, 2010). The Brookings Institution conducted a study on land use in 50 of the largest metropolitan areas in the United States, and found that 40% of jurisdictions within areas studied were considered "low density", and had ordinances that prohibited two-storey, multi-family apartments (Batchis, 2010). Lastly, this model has also been critiqued in terms of its usability, with opponents arguing that the ordinances are too complex and difficult to interpret without the aid of a professional (Elliot, 2008; Jacobs, 1961).

3.2 Sprawl: The unfortunate phenomenon

After World War II, development attention in North American cities began to shift towards the suburbs, producing the initial hints of sprawl (Atkinson & Oleson, 1996; Blais, 2010). Sprawl can be defined as "uncontrolled, unplanned, irresponsible, low-density development on an urban periphery beyond existing infrastructure and areas of employment" (Jackson & Kochtizky, 2001 in Neill et al., 2003). This development typology is characterized by the land-intensive built forms that segregate land uses, reduces open space, promotes automobile dependency, and places over emphasis on the private realm (Atkinson & Oleson, 1996; Batchis, 2010; Blais, 2010; Filion, 2003; Filion & McSpurren, 2007; Geller, 2003; Neill et al., 2003; Ross, 2010; Slack, 2002; Song & Zenou, 2006; Sustainable Prosperity, 2012; Tombari, 2009). Sprawl also produces a "leapfrog pattern", where residential, commercial, and industrial uses are separated by farmland and forests, resulting in a "haphazard patchwork" of built up spaces (Batchis, 2010). As previously illustrated, sprawl is aided by the implementation of the Euclidean zoning model as the primary land use regulatory tool, which applies an "one-size-fits-all" approach; striving for uniformity through the standardization of parameters such as setbacks, building heights, and density (Bharne, 2011; Crawford, 2004). The result is the production of built forms that are homogenous in design, aesthetically unpleasing, and land intensive (Katz, 2004; MAP, 2007; Rangwala, 2012). It is common to see cookie-cutter residential subdivisions, long expansions of asphalt and pavement, strip malls and big box stores

intimately surrounded by parking lots, impersonal business parks, and isolated pockets of open space framed by roads in numerous North American suburbs today (Duany & Talen, 2002).

3.2.1 Causes of sprawl

Euclidean zoning has been identified as the prominent driver of sprawl. What began as a tool used to respond to the challenges posed by the Industrial Revolution has resulted in the production of a debilitating, isolating, and unattractive landscape (Batchis, 2010; Crawford, 2004; Janik, 2002). The minimal densities and setbacks tightly regulated by Euclidean zoning restrict the overall density permitted in an area, resulting in the need to expand, which creates sprawl (Batchis, 2010; Crawford, 2004; Duany & Talen, 2002; Janik, 2002). Despite the strong correlation between the conventional model and sprawl, researchers and economists have also noted consumer preferences, market failures, and existing municipal fiscal policies as additional promoters of this hazardous built form.

Consumer preferences

The shift in consumer preferences from urban to suburban living began after World War II, and was partially motivated by government subsidies, including federal housing programs for returning veterans, and increased investments in highway construction (Atkinson & Oleson, 1996; Batchis, 2010; Blais, 2010; Brueckner & Kim, 2003; Duany & Talen, 2002; Janik, 2002). Municipal planning policies and regulations, like the zoning bylaw, were enacted to protect the safety and well-being of city dwellers (Elliot, 2008; Platt, 2004). As a result, single-use neighbourhoods became the ideal land use pattern, and are endorsed to this day by planning staff and consumers alike. The rapid urbanization of many North American cities gave rise to numerous urban issues, including increasing unaffordability of housing, escalating levels of traffic congestion, decline in access to open space, and high concentration of social and fiscal problems within the central city (Slack, 2002). As a result, consumers began seeking housing options out in the suburbs; away from the established urban core. The development industry responded to this demand by shifting its resources and attention to the periphery; marketing the ideal suburban lifestyle in the form of homes with more living and private outdoor spaces, located far from the undesired features of the central city (Batchis, 2010; Duany & Talen, 2002; Filion, 2003). In addition to the perceptions of suburban living as being ideal, sprawl is also driven by rising incomes, falling private transportation costs, decentralization of employment, and municipal fiscal policies that incentivize low-density

development (Atkinson & Oleson, 1996; Batchis, 2010; Blais, 2010; Brueckner & Kim, 2003; Duany & Talen, 2002; Filion, 2003; Nechyba & Walsh, 2004; Slack, 2002; Song & Zenou, 2009; Sustainable Prosperity, 2012).

Market failures and incentives for sprawl

In the eyes of economists, sprawl results from three market failures: not recognizing positive externalities; not internalizing the cost of negative externalities; and artificially lowering the cost of development (Blais, 2010; Brueckner & Kim, 2003; Slack, 2002). The first failure is the market's disregard for the social value of open spaces and agricultural lands, resulting in an over exploitation of these resources (Blais, 2010; Brueckner & Kim, 2003; Slack, 2002). Sprawl most commonly occurs on greenfield lands at the city's edges; however, the costs incurred by society over the loss of these areas are not reflected in the actual price of the land (Blais, 2010; Brueckner & Kim, 2003; Slack, 2002). As a result, developers are not penalized for building developments that are land intensive; such as low-density, single family subdivisions (Blais, 2010; Brueckner & Kim, 2003; Slack, 2002). Secondly, development produces a number of negative externalities, including highway congestion and air pollution, which adversely affects the region as a whole (Blais, 2010; Brueckner & Kim, 2003; Slack, 2002). The social costs of these externalities are typically not reflected in the costs developers pay to develop the land, resulting in an overproduction of a built form that exacerbates these externalities (Blais, 2010; Brueckner & Kim, 2003; Slack, 2002). Lastly, there are a number of fiscal policies, including development cost charges and property taxes, employed by municipalities that artificially lowers the cost of development (Blais, 2010; Duany & Talen, 2002; Slack, 2002). It is evident that the social cost of building on the periphery is distorted, leading to the over production of low-density built forms, which contribute to the unfortunate phenomenon of sprawl.

3.2.2 Effect of sprawl on cities

Sprawl is not only aesthetically unpleasing, but this development typology is also detrimental to a city's physical environment, social health, and economic prosperity. The negative repercussions on the physical environment includes increases in traffic congestion, which result in higher levels of air pollution, smog, and greenhouse gas emissions; consumption of environmentally sensitive habitats; and loss of viable agricultural lands (Batchis, 2010; Blais, 2010; Filion & McSpurren, 2007; Geller, 2003; Neill et al., 2003; Slack, 2002; Song & Zenou, 2006; Sustainable Prosperity, 2012). Sprawl is also destructive to the social health and safety of a community. It

generates built forms that inhibits a city's walkability and accessibility, which creates a more sedentary life style; increases the segregation of residents; and places more cars on the roads, which elevates traffic accident rates (Batchis, 2010; Blais, 2010; Geller, 2003; Hall, 2007). Social exclusion and isolation is also present in communities cut from the cloth of Euclidean zoning. Low-income individuals are commonly pushed to the periphery, where land is cheap, but services and amenities are minimal (Hall, 2007, Jacobs, 1961, Platt, 2004). From the perspective of municipal finance, sprawl is costly. Developments situated at the periphery of the city are removed from areas where infrastructure and services are already established (Neill et al., 2003; Slack, 2002; Sustainable Prosperity, 2012). As a result, increased pressure is placed on local municipal capital and operating budgets to deliver and maintain hard infrastructure (roads, sewer, water) and soft services (police, fire, schools, hospitals) in these newly developed areas (Batchis, 2010; Blais, 2010; Geller, 2003; Neill et al., 2003; Slack, 2002). Research has shown that the density of development has the greatest effect on the cost of infrastructure networks, such as water and sewer (Blais, 2010; Slack, 2004). Unfortunately, many suburban municipalities are driven by their desire to expand their property tax base, and view sprawl as a means to achieve increases in revenue; in turn, accepting the negative externalities that are associated with this built form (Filion, 2003). Despite the overwhelming concentration of disadvantages associated with sprawl, there is an advantage to building housing away from the central city (Blais, 2010). The cost of land is substantially lower in suburban communities, which translates to lower development costs and cheaper house prices (Blais, 2010). This makes housing more affordable and accessible to a larger portion of the population, especially young families and lower-income individuals (Blais, 2010).

3.3 Smart Growth and New Urbanism: The antidotes to sprawl?

Sprawl can be viewed as "not any form of suburban growth, but a particular form" (Downs 1998a, 1; 1998b, 8 in Danielsen et al., 1999). It has become evident that cities cannot continue to develop in this manner, and a change is required in the policies that dictate the design of the built form (Jabareen, 2006). Debates surrounding sprawl began to move into the consciousness of planners, policy makers, and different levels of government beginning in the 1970's (DPZ, 2003; Janik, 2002). Two approaches were developed to address sprawl and turn attention towards the creation of compact, complete, and sustainable communities: Smart Growth and New Urbanism (DPZ, 2003). Smart Growth applies a planning and growth management approach; while it does not attempt to stop growth, it aims to construct policies that will manage it in a way that is "economically,

environmentally, and socially" responsible (Alexander & Tomalty, 2002; Daniels, 2001; Danielsen et al., 1999; Filion, 2003; Filion & McSpurren, 2007; Geller, 2003; Jabareen, 2006; Nechyba & Walsh, 2004). Smart Growth policies enable the creation of well-designed, mixed-use neighbourhoods that encourages alternate forms of transportation; production of affordable housing choices and a range of local amenities and employment opportunities; and protection of the natural environment (Alexander & Tomalty, 2002; Daniels, 2001; Danielsen et al., 1999; DPZ, 2003; Filion, 2003; Geller, 2003; Jabareen, 2006; Janik, 2002; Smart Growth BC, 2012). Similarly, New Urbanism is a design-orientated movement that aims to produce built forms that are consistent with the objectives of Smart Growth (DPZ, 2003). The concept began in the early 1980's and was first applied in Seaside, Florida and has now been adopted in hundreds of communities throughout the United States (Broberg, 2009; DPZ, 2003). The development of the SmartCode manual, which applies transect zones, (described in detail in Section 3.4.3) establishes design standards that guide developers and other stakeholders in the creation of communities that support the objectives of Smart Growth policies (Crawford, 2004; DPZ, 2003).

3.3.1 Zoning flexibility as a key to achieving Smart Growth

Land-use segregation and rigid density standards entrenched in the conventional Euclidean zoning model is stubborn and inflexible; producing unattractive, repetitive, and environmentally-damaging physical typologies (Berelowitz, 2005; Madden & Spikowski, 2006; MAP, 2007; Spikowski, 2010). The conventional model is one of the primary drivers of sprawl, reflected in strip malls, cookie-cutter subdivisions, and homogenous office parks, all separated by vast expanses of highways and road networks that cater to the private automobile. There has been a call for a more flexible zoning model that can aid in the implementation of Smart Growth objectives. This flexible model should be about "ensuring development meets the overall goals of a neighbourhood, instead of conforming to a pre-determined set of rules" (Berelowitz, 2005). Flexible zoning is about prescribing cans, instead of cannots, for a city as it grows, changes, adapts, and evolves. As demographics change so do the needs and desires of the residents, who are now demanding more in terms of access and availability of goods, services, and amenities (Platt, 2004). They are choosing to turn away from the Leave-It-To-Beaver suburbia and are seeking neighbourhoods that are complex, complete, diverse, and exhilarating. Recently, form-based codes (FBCs) have emerged as an alternative zoning model, used to counteract the products of Euclidean zoning (Berg, 2010; Duany & Talen, 2002; Elliot, 2008; Katz, 2004; LGC, n.d; Madden & Spikowski, 2006; MAP, 2007;

Rangwala, 2010; Ross, 2010; Spikowski, 2010). The application of this alterative model can also aid in the facilitation of transit-oriented developments and mixed-use communities; assist in the revitalization of brownfield sites; enable the development of affordable, infill housing options; and allow growth to be concentrated within pre-existing urbanized areas.

3.4 Form-based codes (FBCs): A flexible zoning model

Smart Growth policies that promote transit-oriented developments, urban growth boundaries, and diversity in housing options have only minimally improved the physical and social landscape of North American cities (Parolek et al., 2008). Portland, Oregon has an extensive urban growth boundary; however, it has done very little in effectively curbing sprawl (Parolek et al., 2008). Although developing and implementing policies that support Smart Growth is a step in the right direction, actually effecting change depends on the availability of appropriate tools that can be applied at a local level to directly control the built form (Parolek et al., 2008).

3.4.1 Alternatives to Euclidean zoning

The recognition for the need to inject more flexibility into the conventional zoning model produced a number of alternatives, including planned unit developments (PUDs), cluster zoning, transfer of development rights (TDRs), and performance-based zoning. PUDs are ordinances that apply to a specific parcel of land, resulting in the custom design of the individual parcel (Elliot, 2008). PUDs work best for large developments and can bring a diverse set of land uses and housing types onto a single site (Elliot, 2008; MAP, 2007; Platt, 2004). Cluster zoning is typically applied on sites where there is a desire to preserve open space or existing natural features (MAP, 2007). TDRs involve the selling of rights, usually density, between two lots, in order to preserve an asset on the selling lot (Platt, 2004). Lastly, performance-based zoning is the tool that most closely resembles FBCs. The objective of the tool is to "regulate land to require the performance we want and not try to guess what physical shape that has to take" (Elliot, 2008, pg. 23). It allows for more flexibility by removing setbacks and other physical spacing requirements, and has worked best for commercial and industrial developments (Elliot, 2008).

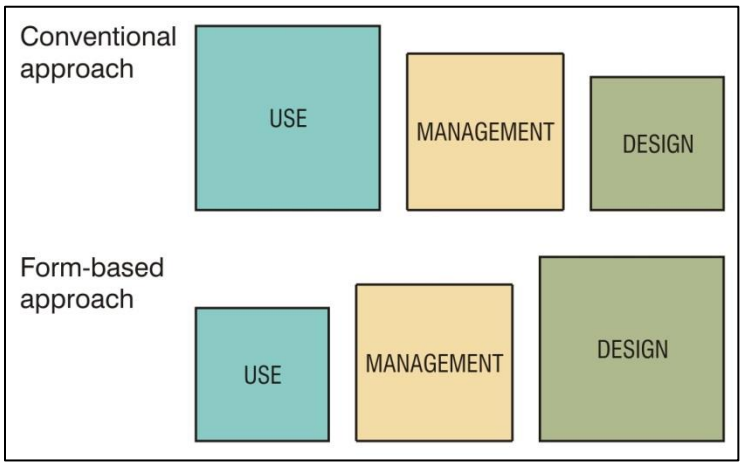
Each of these alternatives addresses components of Euclidean zoning that have failed; however, they do not present the solution to mitigating the ills of sprawl in its entirety. Critics argue that instead of changing the base framework of zoning, these alternatives are merely reactionary as opposed to pro-active, and only serve as "Band-Aid" solutions for select ills (Wickersham, 2001). In

addition, since a number of these alternatives are approved on a project-specific basis in exchange for public benefits, it is feared that municipalities may be more inclined to allow densities and uses in areas not suited for them (Wickersham, 2001). Also, tools like PUDs and performance-based zoning only work effectively on specific projects, such as large scale developments and commercial/industrial properties, and can reduce the incentive for smaller-scale renovation and revitalization projects in older urban centres (Wickersham, 2001). Lastly, these alternatives are most commonly applied at a local, site-specific level, without much regard to the effects at a regional scale (Wickersham, 2001). Due to these short comings, these alternatives are limited in their abilities to effectively reduce sprawl.

3.4.2 What are Form-based codes?

Form-based codes (FBCs) emerged out of the New Urbanism School of Development in the early 1990's as an alternative model, used to counteract the products of Euclidean zoning (Elliot, 2008; Parolek et al., 2008; Tombari, 2009). As defined by the Form-Based Codes Institute (FBCI) this new tool will "…foster predictable built results and a high-quality public realm by using physical form (rather than separation of uses) as the organizing principle for the code" (FBCI, 2010). FBCs are the preferred tool for the developing or redeveloping of communities to reflect the objectives of Smart Growth. This tool makes improvements to the built environment, regulates elements that are important in creating human-scaled spaces, and fights against sprawl (Bharne, 2011; Broberg, 2009; Mammosmer, 2011; Parolek et al., 2008). This tool provides a powerful and effective alternative to the conventional zoning model. It dictates "function" to follow "form", with emphasis placed on regulating the built form of development, as opposed to its specific uses (Berg, 2010; Burdette, 2004; Elliot, 2008; FBCI, n.d; Government of Massachusetts, n.d; LGC, n.d; MAP, 2007; Talen, 2009) (Figure 1).

Figure 1: Conventional approach vs. Form-based approach



Source: City of St Albert, n.d

FBCs ensures quality, appearance, and coherency of the built form within the public realm by paying attention to the visual aspects through specification of items such as building mass and height, façade treatments, location of parking, and the relationship of the building to its neighbours and to the street (Elliot, 2008; Howson, 2013; LGC, n.d; Talen, 2009). Diverse uses are managed and harmonized through the design and orientation of buildings, as opposed to the implementation of strict segregation rules (Elliot, 2008; MAP, 2007; Spikowski, 2010). This allows for the creation of mixed-use streetscapes where residential, commercial, retail, and light industrial uses can co-exist harmoniously. The argument is that uses do not have to be segregated, as long as the scale of use is compatible with each other and its surroundings (Elliot, 2008). FBCs allow cities to bring back the art in place making by being prescriptive in nature; outlining what a developer can do, while Euclidean zoning, is seen as being proscriptive, and focuses on what cannot be done (Berg, 2010; Elliot, 2008; Inniss, 2007; Rangwala, 2012). The Code's main objectives are to provide developers with more creative flexibility and to remove the restrictions that are currently discouraging the building of mixed-use, pedestrian-oriented communities (Howson, 2013; Madden & Spikowski, 2006; Mammosmer, 2011; Rangwala, 2012). In addition, well-crafted FBCs include extensive public consultation and participation in order to develop a vision and a set of design standards that reflect the desires and intentions of the community (Berg, 2010; Government of Massachusetts, n.d, Howson, 2013; Inniss, 2007; Katz, 2004). The major differences between the Euclidean zoning model and FBCs are summarized below (Table 1).

Table 1: Primary differences between Euclidean zoning and FBCs

Euclidean zoning	**Form-based codes**
Segregation of uses – creates isolation and disconnect between live, work and play within cities; promotes reliance on automobiles; generates socioeconomic inequality	De-emphasizes use, allows for mixed-uses more easily. Focuses on providing a range of uses within a neighbourhood to give residents access to housing, employment, and recreation.
Creates uniformity – built forms are usually cookie-cutter, monotonous, repetitive, and sterile in design; disconnect between physical structure and the public realm	Focuses on built form and its relation to adjacent uses, and the public realm – creates interest, diversity, and usability. Encourages developers to respect and preserve the history and character of the area.
Inflexible – proscriptive in nature; changes require amendments and variances	Centres on flexibility and being prescriptive – allows for changes to occur over time and as the city evolves.
Enables development of sprawl – promotes singular uses, land intensive, low-density, minimum parking requirements	Encourages diverse uses, density, human-scaled structures, walkability, connectivity, use of transit, socialization, and preservation of open spaces.
Does not address urban design	Includes regulations for building, public space, streetscape, signage, and architectural elements.
Promotes exclusion – segregates lower income households to more undesirable parts of town	Encourages the building of affordable housing to reduce socioeconomic exclusion.
Minimal public participation	Engages all stakeholders, including the general public, through the use of open houses and charettes to develop consensus on the vision and desired urban form for the city

3.4.3 Application of Form-based codes

Form-based codes (FBCs) can be appropriate for all project scales ranging from individual blocks to entire communities. This model also enables revitalization and infill projects at a neighbourhood-scale, and the preservation of historic properties (Berg, 2010; Katz, 2004; Madden & Spikowski, 2006; MAP, 2007).

The Transect: SmartCode

The most commonly used model of FBCs is the SmartCode, developed by Duany Plater-Zyberk & Company in 2003 (CATS, n.d; DPZ, 2003). SmartCode acts as a model ordinance; directing and guiding growth without being soft and vision-oriented, or strict and overly-instructive (DPZ, 2003). This model allows for adaptability, and is designed to fit and reflect the block, neighbourhood, community or region it is serving (DPZ, 2003; Duany & Talen, 2002). SmartCode uses transects as its ordering principle, to create areas that reflect the characteristics of traditional towns and villages (DPZ, 2003; Duany & Talen, 2002). A transect was first used in the 18th century to observe nature ecologies and geographical cross-sections of regions (DPZ, 2003; Duany & Talen, 2002). A transect of nature reveals the varying characteristics exhibited by different zones ranging from shores, to plains, to forests (DPZ, 2003; Duany & Talen, 2002). It helps researchers understand the complexities and similarities that exist within and between zones, allowing a deeper understanding of how each individual zone fits into the overall picture (DPZ, 2003; Duany & Talen, 2002). Six Transect Zones (T-zones) ranging from rural to urban (T1-T6) forms the basis of SmartCode (Broberg, 2009; CATS, n.d; DPZ, 2003; Emerson, 2006; Parolek et al., 2008) (Figure 2). The T-zones are designed to recognize the continuum of habitats that exist; ensuring a smooth transition between the different zones, from preserving natural features at the edge, to promoting urbanization and densification at the centre (Broberg, 2009; Duany & Talen, 2002; Emerson, 2006; Parolek et al., 2008) (Figure 3). The separation of the continuum into different T-zones allows for the application of standards that reflect the appropriate levels and intensities of the physical and social elements (DPZ, 2003; Duany & Talen, 2002) (Figure 4). For example, industrial uses and high-density developments are too “intense” to be allowed in the T2 (rural) zone, where the focus should be on preserving natural features and open spaces. This understanding and sensitivity is crucial in preventing an imbalance between human-made structures and the natural surroundings (Duany & Talen, 2002). Instead of relying on the strict land use segregation technique of Euclidean zoning, SmartCode regulates how individual forms fit into the overall region, and emphasizes neighbourhood structure, including favourable pedestrian realms, mixed-use, transit-oriented developments, and diversity in housing and employment options (CATS, n.d; Emerson, 2006).

Figure 2: The T-zones of the transect model

Source: CATS, n.d.

Figure 3: Built form in the different T-zones

Source: City of Miami, 2008

Figure 4: Perspective views of the different transects from urban core to natural, and everything in between

Source: DPZ, n.d.

Implementation of Form-based codes

Before a FBC is developed, a comprehensive analysis and evaluation of the study area should be completed in order to identify the different elements that need to be reflected in the Code (Mammoser, 2010). Therefore, each Code is tailor-made to the region, neighbourhood, block, or site it represents. A FBC document is commonly comprised of the following components; a regulating plan, building form standards, public space standards, streetscape standards, administration, definitions/annotated glossary, architectural design standards, and signage standards (FBCI, 2010; Katz, 2004; LGC, n.d; MAP, 2007; Parolek et al., 2008; Ross, 2010; Sitkowski & Ohm, 2006). FBCs can be applied as overlays, hybrids, or completely replace the existing zoning bylaw (Crawford, 2004; Daugherty, 2007; Rangwala, 2012). Zoning overlays are applied over specific areas, while some municipalities may choose to completely overhaul their existing bylaw and replace it with FBCs (Crawford, 2002; Daugherty, 2007; Rangwala, 2012). A hybrid approach allows FBCs to coexist with the Euclidean zoning model, while minimizing political opposition; and permitting flexibility, while allowing some standardization and segregation where necessary (Bharne, 2011; Burdette, 2004; Daugherty, 2007; MAP, 2007; Mammoser, 2010; Parolek et al., 2008; Rangwala, 2012).

3.4.4 Are Form-based codes a good alternative to Euclidean Zoning?

In cities, new and old, uses and residents change, but it is the built form that endures over time (Katz, 2004). Old industrial warehouse districts that were the heart of the Industrial Revolution slowly gives way to loft living, trendy restaurants and cafes, and boutique stores; however, the brick clad buildings themselves will remain as a testament to its historic past. The quality of these built forms and its relation to the public realm can either enhance a neighbourhood or deter users from being there, turning it into a desolate ghost town. FBCs recognize the importance of producing high quality physical structures, connections, and urban designs, which are important components of the city that Jacobs accused the conventional model of being “too soft” on (Berg, 2010; Jacobs, 1961; Ross, 2010).

Advantages

A FBC is one of the most effective tools that can be applied by local municipalities in order to produce compact, walkable, diverse, vibrant, healthy, livable, and sustainable communities. This model can be adapted and applied to a variety of geographic areas including suburbs, downtown

(brownfield and redevelopment), entire municipalities, historic districts (to preserve character), commercial corridors, and new town centres (Bharne, 2011; Duany & Talen, 2002; MAP, 2007). The main advantage of the model is its flexibility in adapting to the needs of a community, while still maintaining consistency, predictability, and order (Broberg, 2009; Parolek et al., 2008). FBCs include public participation and consensus-building as part of its development process, which ensures that the regulations reflect the visions and desires of the community it will be serving (Burdette, 2004; Duany & Talen, 2002; Parolek et al., 2008). The conventional zoning model, with its standardized setbacks and separation of uses, can drastically change the character of old, traditional neighbourhoods through redevelopment (MAP, 2007; Spikowski, 2010). In the case of neighbourhood revitalization and infill projects, FBCs are a good model to apply because they allow the development of new uses and structures, while retaining the traditional character of the community (Berelowitz, 2005; Duany & Talen, 2002; Katz, 2004; Madden & Spikowski, 2006; MAP, 2007). In addition, FBCs such as SmartCode integrates regulations that promote environmental protection, open space conservation, and water quality standards (DPZ, 2003). Lastly, FBCs use graphics and photographs to convey information, avoid the over use of technical jargon, and is light on text, making them easier for the general public to interpret and understand (Berg, 2010; Spikowski, 2010).

Disadvantages

North American cities are only beginning to apply FBCs as an alternative to the conventional Euclidean zoning model (Berg, 2010). The high costs (up to two to four times more) and inexperience surrounding the development and implementation of FBCs have limited its use (Madden & Spikowski, 2006; MAP, 2007; Rangwala, 2010; Tombari, 2009). In addition, planners may lack design skills and an understanding of the architectural, landscape, and building components that make up a city (Rangwala, 2010). Other professions affected by a change in the regulatory model include developers and architects. Developers are resistant to the change due to their lack of certainty and familiarity with the alternative model (Madden & Spikowski, 2006). Architects are afraid of having their creativity stifled by the Architectural Standards that are part of FBCs (Berg, 2010; Madden & Spikowski, 2006; MAP, 2007; Rangwala, 2010; Sitkowski & Ohm, 2006; Tombari, 2009). Furthermore, FBCs may also be challenged when issues arise that were not anticipated (Sitkowski & Ohm, 2006). For example, the Code's prescriptive nature may not be appropriate when it comes to preventing incompatible uses from being situated next to each other;

therefore, discretion needs to be applied to allow for flexibility where appropriate and strictness where required (Rangwala, 2012). One of the advantages FBCs have over the conventional model is the consensus building process; however, reaching consensus can be difficult and time consuming, and NIMBY resistance can still be present (Madden & Spikowski, 2006; MAP, 2007; Tombari, 2009). Lastly, the effectiveness of FBCs resides in the community's commitment to building better places, and needs to be supported by overarching policy documents, and all levels of government (Madden & Spikowski, 2006; MAP, 2007; Tombari, 2009). Education of elected officials, development and planning professionals, and the general public can be costly and time consuming.

4.0 CASE STUDY

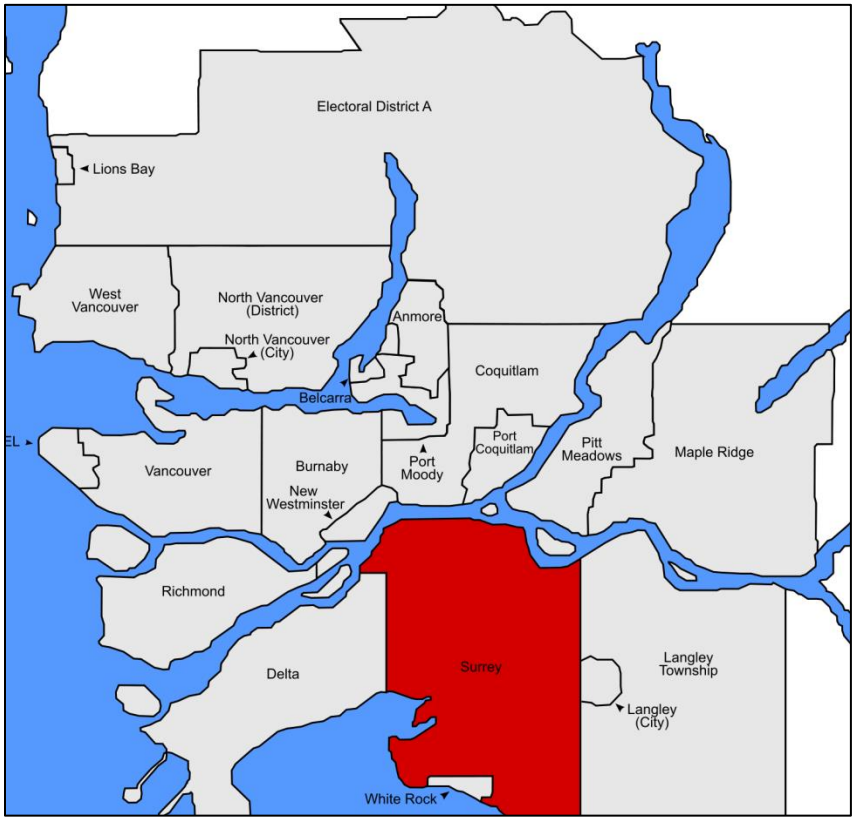
The application of form-based codes (FBCs) as an alternative to the traditional, Euclidean zoning model has been identified as a potentially effective tool in the development of Smart Growth-oriented communities. Literature and practice has identified communities that are facing developmental pressures as appropriate places to apply this innovative model. For this paper, the locational context in which FBCs will be analyzed and applied will be in Fleetwood Town Centre in the City of Surrey, British Columbia. The aim will be to transform this traditionally suburban neighbourhood, through the application of a flexible zoning model, into one that meets the vision and goals established by the City of Surrey's *Official Community Plan* and *Sustainability Charter*, and the *Fleetwood Town Centre Land Use Plan*.

4.1 City of Surrey, British Columbia

Metro Vancouver, formally known as the Greater Vancouver Regional District (GVRD), is a governmental body established by the Province of British Columbia as a "regional district, responsible for the deliverance of services, policies, and leadership to the region" (Metro Vancouver, 2011). Metro Vancouver is comprised of 24 local governments, which includes 22 municipalities, one electoral area, and one treaty First Nation (Metro Vancouver, 2011). The City of Surrey is a suburban municipality located within the south-eastern portion of the region (Figure 5). The first residents of the area were the First Nations groups of Semiahmoo and Kwantlen, followed by European settlers and explorers (City of Surrey, n.d). Officially incorporated as a City in 1879, the region played host to farms and wood mills, which supplied resources for the building of the Canadian Pacific Railway (City of Surrey, n.d, Laven, 2008). The first subdivision of land within the municipality began in the 1920's, which resulted in 2 ½, 5 and 10 acre parcels (Laven, 2008). The late 1930's and early 1940's brought the completion of the Pattullo Bridge, which connects the City to municipalities on the north side of the Fraser River; and King George Highway, the spine of the region's transportation network (Laven, 2008; Natrasony & Alexander, n.d). After World War II, many returning veterans chose to raise their families in Surrey due to the relatively cheap costs and availability of land (Laven, 2008). The municipality started off as, and still is, a bedroom community for people working in Vancouver and Burnaby; establishing itself as a traditional suburb (City of Surrey, n.d; Laven, 2008). The City's current slogan *"the future lives here"* implies that the municipality is aiming to attract the next wave of residents through the development of a range of

affordable housing options, diverse employment opportunities, local services and amenities, and reliable transportation infrastructure.

Figure 5: City of Surrey in relation to other municipalities in Metro Vancouver



Source: Wikipedia, 2009

4.1.1 City of Surrey's profile

The past few decades has brought rapid population growth to the City of Surrey at a rate only second to the region's largest municipality, City of Vancouver (City of Surrey, n.d). According to the 2011 Census, Surrey's population increased 18.6% between 2006 and 2011 to close to half a million residents, making it the fastest growing municipality based on population within the region (Metro Vancouver, 2011; Statistics Canada, 2011) (Table 2). As of 2011, Surrey's population growth accounted for 37% of the overall population growth experienced in Metro Vancouver, within a five year period (Metro Vancouver, 2011). Currently, the City of Vancouver is the largest municipality based on population; however, with the addition of approximately 1,000 new residents every month, Surrey is poised to surpass Vancouver's population within the next decade (City of Surrey, n.d). The City also has a diverse ethnic make-up and is home to a large number of new immigrants,

primarily from South East Asia (Statistics Canada, 2011; Laven, 2008). The City's jurisdiction encompasses approximately 317 square kilometers of land, making it the largest municipality in Metro Vancouver based on land area (Statistics Canada, 2011) (Table 2). The population density of Surrey is approximately 1,479.9 individuals per square kilometer (Statistics Canada, 2011) (Table 2). Although the density of the City is relatively high compared to Metro Vancouver's average, it is mostly concentrated in small nodes, while the built form of the rest of the municipality is archetypal of sprawl.

Table 2: Population and dwelling counts - City of Surrey vs. Metro Vancouver

City of Surrey	2011 Pop.	2006 Pop.	Pop. Increase	Land area (km^2)	Pop. Density/km^2
	468,251	394,976	18.6%	316.41	1,479.9
Metro Vancouver	2011 Pop.	2006 Pop.	Pop. Increase	Land area (km^2)	Pop. Density/km^2
	2,313,328	2,116,581	9.3%	2,882.55	802.5

Source: Statistics Canada, 2011

4.1.2 Built form in the City of Surrey

The City of Surrey has six town centres: City Centre, Whalley, Fleetwood, Guildford, Cloverdale, and South Surrey, which provides employment, residences, and amenities for the municipality's rapidly growing population (City of Surrey, n.d) (Figure 6). Since the beginning of the 1990's, the City has focused a large amount of attention and resources to the development of the City Centre neighbourhood (City of Surrey, n.d). The goal is to transform this area into Metro Vancouver's newest regional downtown; a hub for commercial activity, offices, local services, community and cultural amenities, and diverse residential neighbourhoods (City of Surrey, n.d). Unfortunately, the remaining five town centres are not primed for the amount of densification and diversification that the City Centre town centre is planned for, and they contain to exhibit the characteristics that are predominant in generically suburban communities.

Figure 6: Town centres in the City of Surrey

Source: City of Surrey, n.d

The current built form of the City also reaffirms the stereotypes associated with suburbia. Development in the City is typically done through land assembly by large land developers who install the necessary infrastructure and services, and subdivide into smaller lots for sale (Laven, 2008). Currently, over half of the residential developments in the City are of the single-family, detached nature, with a small portion designated for multi-family (Laven, 2008). Developers are keen to reinforce the suburban nature of the municipality through the production of traditional, single-family homes, because they are most appealing to potential buyers (Laven, 2008). In keeping with the objectives of the *Zoning Bylaw, No. 12000* and political wishes of Council, the City regulates land use through segregation, maximum densities, and minimum setbacks. This produces isolated pockets of residential, industrial, and commercial establishments, which are accessed primarily by private automobiles. The work trip distribution also reflects the suburban attitude, with over half of the individuals in the labour force working outside the City (Laven, 2008). Although the municipality is connected by Skytrain, the mode share of these commuters weigh heavily in favor of private

automobiles, with only a fraction taking public transit and even less choosing to walk or bike (Laven, 2008). Although the concepts of Smart Growth and New Urbanism are currently not the guiding principles for development in the City of Surrey, planning staff have identified a number of goals in the *Official Community Plan* and *Sustainability Charter* that reflect the desire to create more compact, complete, and sustainable communities.

4.2 Planning context in British Columbia

The planning of land use, soft services and hard infrastructure, economic development, heritage and preservation, finance, and transportation is mostly done at the municipal level (Government of BC, n.d). Local governments use a variety of planning tools, including zoning bylaws, Board of Variances, and community, social, and environmental departments, in order to achieve goals and fulfill responsibilities (Government of BC, n.d). Land use regulation is one of the biggest responsibilities of local governments, who are granted the authority to develop and implement Official Community Plans (OCPs) and various bylaws pursuant to the *Local Government Act* (Government of BC, n.d).

The regional district of Metro Vancouver is responsible for the governance of municipalities within its jurisdiction, including the City of Surrey. Metro Vancouver's *Regional Growth Strategy 2040*, adopted in 2010, is a long term strategy that "focuses on land use policies to guide the future development of the region and support the efficient provision of transportation, regional infrastructure and community services" (Metro Vancouver, 2010). The Strategy focuses primarily on land use, while incorporating the objectives of a number of other plans and strategies including the Air Quality Management Plan; Affordable Housing Strategy; Integrated Solid Waste and Liquid Waste and Resource Management Plans; Drinking Water Management Plan; Regional Food System Strategy; and Parks and Greenways Plan (Metro Vancouver, 2010). The *Growth Strategy* provides the policy framework on how to guide growth and development going into the future (Metro Vancouver, 2011). Individual municipalities are required to submit a Regional Context Statement to the Metro Vancouver Board, which binds OCPs to the *Strategy* (Metro Vancouver, 2011). The City of Surrey's Regional Context Statement outlines how the City's OCP supports and works towards the goals established in the *Strategy* (Metro Vancouver, 2011). The five goals of the *Strategy*, which are also represented to some degree in the City of Surrey's *Official Community Plan* and *Sustainability Charter*, include:

1. Create compact urban areas
2. Support sustainable economy
3. Protect environment and respond to climate change impacts
4. Develop complete communities
5. Support sustainable transportation

4.3 City of Surrey's planning documents

The rapid population growth faced by the City of Surrey places strong developmental pressures on the municipality to provide adequate physical infrastructure, services, and amenities. Land development and planning in the City is predominately governed by the *Surrey Official Community Plan,* various Secondary Land Use Plans, and *Zoning By-Law, No. 12000*.

4.3.1 *Surrey Official Community Plan (OCP), By-Law No. 12900*

The Province of British Columbia's *Local Government Act* granted municipalities the authority to develop and implement Official Community Plans (OCPs) in order to guide development within their jurisdictions. The *Surrey Official Community Plan, By-Law 12900* was officially adopted on October 8, 1996 and updated on October 1, 2012 (City of Surrey, 2012). The OCP is a "comprehensive and long-term perspective", which provides guidance for the "physical structures, land use, growth, transportation systems, community development, services and amenities, agricultural lands, environmental protection, and social well-being" of the City (City of Surrey, 2012). The OCP document is reviewed by planning staff every five years.

The OCP identifies thirteen broad goals that the City has set for itself as it continues to grow and develop. The document also lists ten broad policies that support the goals that have been identified. The goals and policies of the OCP are summarized in Appendix A. The majority of the City's goals focus on creating compact, complete, healthy and safe communities, which improves the quality of life for its residents and respects the natural and agricultural environments of the City. The OCP document also includes a Land Use Strategy, which assigns general land use designations for the entire City. Associated with each designation is a list of zones, and maximum densities allowed. Developers are required to ensure that their proposed project complies with the existing OCP land use designation, or an amendment will be required and subject to Council approval before any development can take place. This process ensures predictability and certainty; however, it also sustains the rigidity exhibited by the Euclidean zoning model.

4.3.2 Secondary Land Use Plans (Various)

Secondary Land Use Plans are used to supplement the OCP by providing detailed neighbourhood planning for developing areas within the City. Secondary Land Use Plans include the General Land Use Plan, Neighbourhood Concept Plans, Town Centre Plans, and older Local Area Plans. The General Land Use Plan acts as an overall planning framework, which directs the development of Neighbourhood Concept Plans and Town Centre Plans (City of Surrey, n.d). Neighbourhood Concept Plans are developed for specific areas that are experiencing, or are expected to experience, rapid growth (City of Surrey, n.d). These documents include information on the locational context, planning objectives, land use plans and policies, urban design concepts and guidelines, planning implementation, and engineering requirements identified for the study area. Town Centre Plans act as Neighbourhood Concept Plans but are specific to the five designated town centre areas (City of Surrey, n.d). Finally, Local Area Plans are older plans that only provide general land use information (City of Surrey, n.d).

4.3.3 *Zoning By-Law, No. 12000*

The Province of British Columbia's *Municipal Act* grants municipalities the authority to make and enact their own zoning bylaws in order to manage and control development within its boundaries. Z*oning By-Law, No. 12000* was adopted by Council in 1993, and its principle is to regulate location, density, and land use within the City. In addition, the document also lays out the requirements for off street parking and loading/unloading, landscaping, subdivisions, and special and other regulations. The City of Surrey has seven broad zone categories: agricultural, residential, cemetery, assembly hall/institutional, commercial, business park/industrial, and comprehensive development. Each category is further broken down into more descriptive sub-categories such as single-family residential, multiple-family residential, downtown commercial zone, and light impact industrial. *Zoning By-Law, No. 12000* employs Euclidean zoning as its base, and places strict regulations on the location of uses, maximum densities and building heights, minimum setbacks, lot sizes, parking spaces, and other elements. Unfortunately, the *By-law* neglects to recognize the importance of urban design in tying the built form to the rest of the public realm. As a result, planning and development patterns in the City have become the quintessential examples of sprawl.

4.3.4 *Sustainability Charter*

The City released its *Sustainability Charter* in 2008; an overarching document aimed at guiding the City's policy decisions and development direction. The primary objectives of the *Charter* are to recognize the environmental, economic, and social health of the City and establish short, medium and long term goals to maintain the overall sustainability of the region. The *Charter* identifies a number of broad, long-term goals that the City is striving to achieve by 2038 (Appendix B). In terms of sustainable development and growth management, the City is striving to become "home to the region's second downtown", "lead the way in sustainable community design and development", "promote a society where all residents feel a sense of belonging", and "support housing options to meet the diverse needs of Surrey's population" (City of Surrey, 2008). These broad goals influence more specific goals, categorized under the three pillars of sustainability; socio-cultural, economic, and environmental, and broken down into short, medium and long term agendas. The significance of this document reveals the City's commitment to promoting and directing growth in a sustainable manner. The implementation of FBCs can facilitate the development of compact, mixed-use, healthy communities aimed for by the *Charter*.

4.4 Fleetwood Town Centre

The neighbourhood of Fleetwood is located in the north-east portion of the City of Surrey, and is connected to the rest of the municipality via a highway and local road networks. The Fleetwood Town Centre is situated within the south-east portion of the Fleetwood neighbourhood, around the prescribed commercial node at 84 Avenue and 160 Street (Figure 7). The designated Town Centre is approximately 350 hectares (864 acres) in size, and is bounded by 88 Avenue to the north, 80 Avenue to the south, 156 Street to the west, and 168 Street to the east. Currently, the Fleetwood neighbourhood is experiencing population growth at a rate much faster than initially anticipated, and is projected to reach 60,000 inhabitants within the next decade (City of Surrey, 2000).

Figure 7: Fleetwood Town Centre in relation to the entire Fleetwood neighbourhood

Source: City of Surrey, n.d

Fleetwood represents a stereotypical, suburban neighbourhood with land use patterns, built forms and street networks evocative of sprawl. The current physical landscape of the area includes a mish-mash of small commercial enterprises centred on Fraser Highway; low-density, suburban, residential developments; and a few public amenities including public schools, a recreational facility, and library. The neighborhood limits walkability with wide streets, large front yard setbacks, minimal street character, and un-engaging facades. The land use patterns segregate uses by isolating residential areas away from the central commercial and retail hub, without providing accessible walking or cycling paths. The road networks within the subdivisions are disconnected and end in cul-de-sacs and dead ends, which further reduces walkability. The residential built forms are repetitive and monotonous, with every house within a block looking similar to its neighbours. Commercial and retail establishments are typically contained in rectangular boxes, fronting on to large expanses of paved parking spaces, and bordered by roads. The pockets of green space that exist are typically un-manicured and bordered by arterial roads or parking lots, making them unattractive and isolated.

In the late 1990's, Fleetwood's Community Association approached planning staff and requested a review of the area and direction on the development and growth of the Town Centre. Residents in the neighbourhood had a "desire for a new land use plan that will provide a sense of

direction as to how the Fleetwood Town Centre will grow into a pedestrian-oriented, vibrant centre, instead of a continuation of the auto-orientated, commercial strip development" (City of Surrey, 2000). Current issues in the community include an over dependency on automobiles and a lack of connectivity between the commercial node and surrounding residential areas. The desires of the Community Association brought to light the isolation and discontent of its residents, as a result of the existing land use and zoning regulations instilled by the planning department and endorsed by City Council.

The presence of a Town Centre Plan coupled with mounting developmental pressures makes Fleetwood Town Centre a good area for the City of Surrey to experiment with a flexible zoning model. The rapid increase in population within the Fleetwood neighbourhood places development pressures on the Town Centre area to provide attractive, safe, and diverse housing, commercial, and employment options for current and future residents. The community's desire to deviate from the existing suburban development form, towards a more mixed-use, pedestrian friendly, transit-oriented Town Centre is reflected in the general planning principles of the Town Centre Plan. A departure from the conventional zoning model may be a novel, but innovative approach to re-envisioning this neighbourhood as one where residents can be proud to call home.

5.0 BEST PRACTICES

More than 320 FBCs have been enacted or are in development throughout the United States and Canada to date (Berg, 2010). The shift from a Euclidean based zoning model to FBCs by a city shows its dedication to the principles of Smart Growth and New Urbanism, and its efforts to fight against sprawl. This section will highlight three cities: Miami, Florida; Arlington (Columbus Pike), Virginia; and St Albert, Alberta. All three cities have implemented FBCs based on the transect principle, as either a mandatory or optional tool to regulate land use and built form (Burdette, 2004; City of St Albert, n.d; Parolek et al., 2008). The application of the Code varies between the three locations ranging from city-wide to corridor to site-specific, which shows how this flexible model can be used at different scales, and on varying urban forms. The challenges of implementing a new regulatory system is consistent between the three examples, including concerns and apprehension from property owners and other stakeholders, and fitting the new model within existing city policies (Bergum, 2009; Burdette, 2004; Chamis, 2000; City of Miami, 2011). Furthermore, the success of the Code depends on more than just planning efforts, but also on market conditions and consumer preferences (Ma, 2009). A FBC is still regarded as a new and innovative tool, and the results of its efforts may not be seen for another few decades. However, the shift by cities from the rigid, conventional model to FBCs signifies the desire to bring back the art of place making to produce communities that are complete, compact, and sustainable now and into the future.

5.1 Miami, Florida

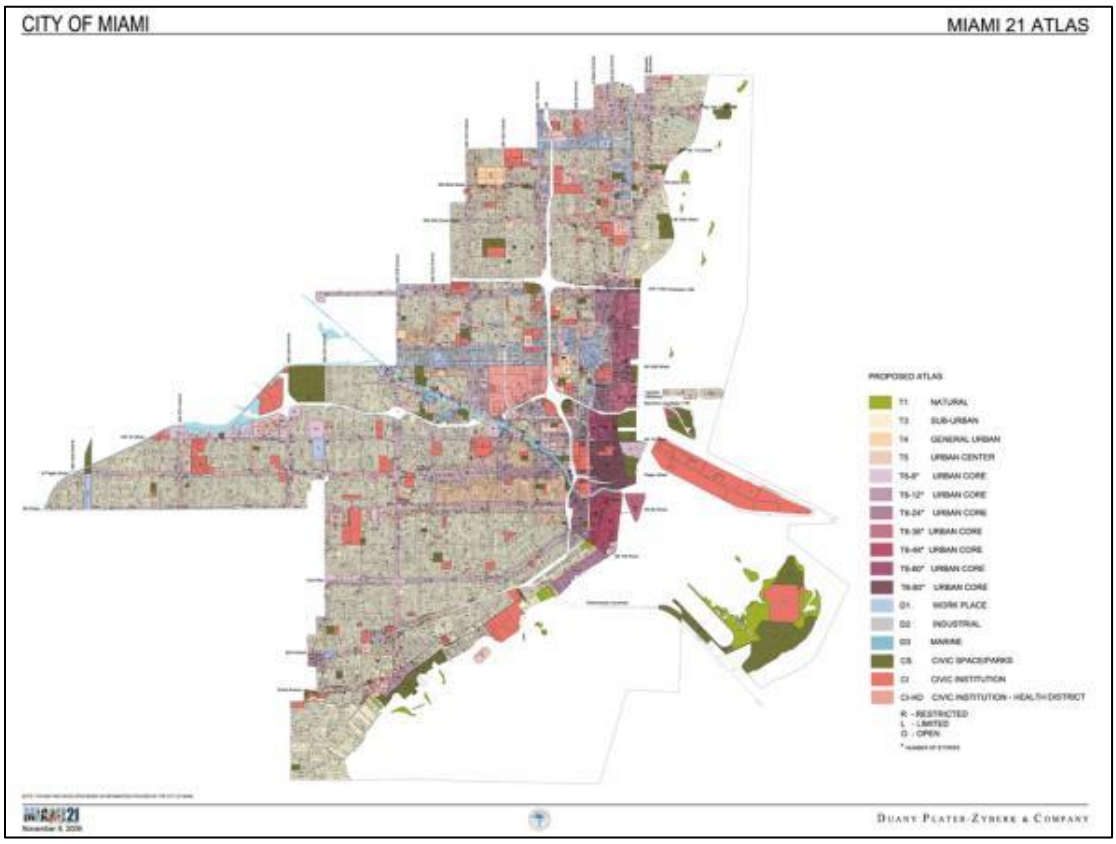
The City of Miami is a large metropolitan city located in southeast Florida, with a population of approximately 400,000 (US Census Bureau, 2010). The City is the first in the United States to use FBCs as its primary regulatory tool (City of Miami, 2011; DPZ, n.d.; Narin, 2009). Development in Miami was previously regulated by Euclidean zoning, which segregated uses, increased the dependency on automobiles, and was land intensive (Parolek et al., 2008). Prior to the implementation of FBCs, the physical form of the City exhibited conditions consistent with sprawl: minimal transit with irregularly placed stops; overabundance of parking spaces; sterile office towers; a disengaged public realm; and a spatial-disconnect between high-density downtown and the low-density residential neighbourhoods (Nairn, 2009). The rising population and expanding economic base induced rapid rates of redevelopment and development in the City, through which the inconsistencies in the existing zoning bylaw and conflicts between the high and low density neighbourhoods were revealed (Parolek et al., 2008). In 2005, the City of Miami, with the support of

Mayor Manny Diaz, hired Duany Plater-Zyberk & Company (DPZ) to develop a FBC to replace the existing ordinance (DPZ, n.d; Parolek et al., 2008). Miami 21 is the City's commitment to improving the long-term quality of life and livability of its neighbourhoods (City of Miami, 2011; DPZ, n.d.; Parolek et al., 2008). The Code's mandate is to incorporate "principles of good planning" into its regulatory process including animating blank walls; encouraging infill development; making connections between the private and public realm; creating mixed-use, transit-oriented main streets; building complete communities and revitalizing abandoned sites; creating connections and pathways for all users; removing the presence of parking; and improving streetscapes and building frontages (City of Miami, 2008) (Figure 8). On May 20, 2010, the City implemented Miami 21, a mandatory and fully-integrated Code that is applied city-wide (City of Miami, 2011; DPZ, n.d; Parolek et al., 2008; Rabin, 2010). The Code split the City into four quadrants, reduced the number of uses from 360 to 46, applied transect principles, and created new sections relevant to a large city previously not identified by SmartCode (City of Miami, 2011; Parolek et al., 2008) (Figure 9). The Code also ensures sustainability, predictability and efficiency in growth and development by increasing the speed of the permitting process; reducing the need for zoning amendments; promoting investment and revitalization; and incorporating environmental stewardship into the planning process (City of Miami, 2011; DPZ, n.d). The development and implementation of Miami 21 has received numerous awards, including the APA National Planning Excellence Award for Best Practice in 2011, proving that FBCs can be successfully applied on a city-wide basis (City of Miami, 2011; DPZ, n.d).

Figure 8: Existing built form (top) and proposed built form (bottom) for the City of Miami

Source: City of Miami, 2008

Figure 9: Application of the transect principle to the City of Miami



Source: DPZ, n.d

5.2 Arlington (Columbus Pike), Virginia

Arlington County is a suburb of approximately 190,000 residents, located across the Potomac River from Washington, DC (Burdette, 2004; Chamis, 2000; Dover Kohl, n.d.; Madden & Spikowski, 2006). Despite a consistent growth in population, development along Columbus Pike, the main corridor, has stalled as a result of the strict restrictions entrenched in the existing zoning bylaw (Burdette, 2004; Chamis, 2000; Dover Kohl, n.d.). In addition, the Euclidean zoning model used to guide development has produced unattractive built forms including commercial strip malls, fast food restaurants, and excessive amounts of parking along the 3.5 mile long corridor (Burdette, 2004). The Columbus Pike Redevelopment Commission established in 1998, focused on the revitalization of the downtown area based on Smart Growth principles (Burdette, 2004; Dover Kohl, n.d). The revitalization of the corridor is centred on transforming the area into a "main street" typology which can promote walkability, and increase the quality and quantity of residential and retail options (Burdette, 2004; Dover Kohl, n.d). The *Columbus Pike Special Revitalization District Master Plan and Form-Based Code* was adopted in February 2003, and endorsed the creation of higher-density,

mixed-use projects by reducing traditional restrictions, such as maximum densities and building heights (Arlington County, n.d; Burdette, 2004; Dover Kohl, n.d). The Code also aims to internalize parking and encourage investment in public buildings and structures in order to improve the public realm (Arlington County, n.d; Dover Kohl, n.d). A *Land Use and Housing Study* was also undertaken to develop policies to guide the development of a stock of affordable housing along the corridor (Arlington County, n.d). Lastly, the Code also focuses on making improvements to transit options and infrastructure along the corridor, including improvements to bus services; upgrades to the Washington Boulevard Bridge to make it safer for all users; installation of new underground water, sanitary sewer and gas lines; improvements to the streetscape; realignment of intersections; and development of a new streetcar line (Arlington County, n.d) (Figure 10). The Code is implemented as an overlay within the existing Euclidean zoning framework, with its application being optional; however developers are incentivized by the County to apply it to their projects (Burdette, 2004). The development and implementation of a FBC for Columbus Pike shows how this tool can be used to direct and manage growth and development along a specific corridor.

Figure 10: Improved built form and public realm along Columbus Pike

Source: Arlington County, 2009

5.3 St Albert, Alberta

The City of St Albert is a suburb located northwest of Edmonton in the Province of Alberta. In 2011, the City had a population of approximately 62,000 residents (City of St Alberta, n.d). The City's *Land Use Bylaw* is based off of the Euclidean zoning model, which produces development patterns consistent with traditional suburban sprawl, including segregated uses; wide streets that are not pedestrian friendly; commercial and retail strip developments that are disconnected from surrounding uses; low-density residential; and expansive parking lots (City of St Albert, 2009). In 2009, the City initiated the development of a FBC in order to address these ills (City of St Albert, 2009). The objectives of the Code include facilitating and supporting higher densities and mixed-uses in select areas; encouraging transit usage and reducing the dependency on cars; providing amenities and services closer to where people live and work; and creating a safe and comfortable pedestrian environment (Bergum, 2009; City of St Albert, 2009) (Figure 11). The Code also aims to improve the public realm by addressing the design of civic spaces and sidewalks; ensuring that the streetscape is varied and engaging for pedestrians and cyclists; designing multimodal streets to accommodate various transportation modes; strengthening building orientations; and incorporating the natural system into the urban fabric (Bergum, 2009; City of St Albert, 2009) (Figure 12). A draft Code was released in April 2009 and identified four broad zones (Neighbourhood Activity Centre, Transit-Oriented Development, Large Format Commercial, and Form-Based Business Park), and regulations for building types, parking, and environment and climate. Currently, the Code is incorporated as a stand-alone section within the existing Land Use Bylaw, and only pertains to specific areas (City of St Albert, 2009). The hybrid format allows development to be consistent with Smart Growth objectives, while allowing the City to address the legislative challenges associated with the implementation of a new regulatory framework (City of St Albert, 2009).

Figure 11: A block designed using FBCs in St Albert, Alberta

Source: Google Maps, 2012

Figure 12: Improved commercial streetscapes in St Albert, Alberta

Source: Google Maps, 2012

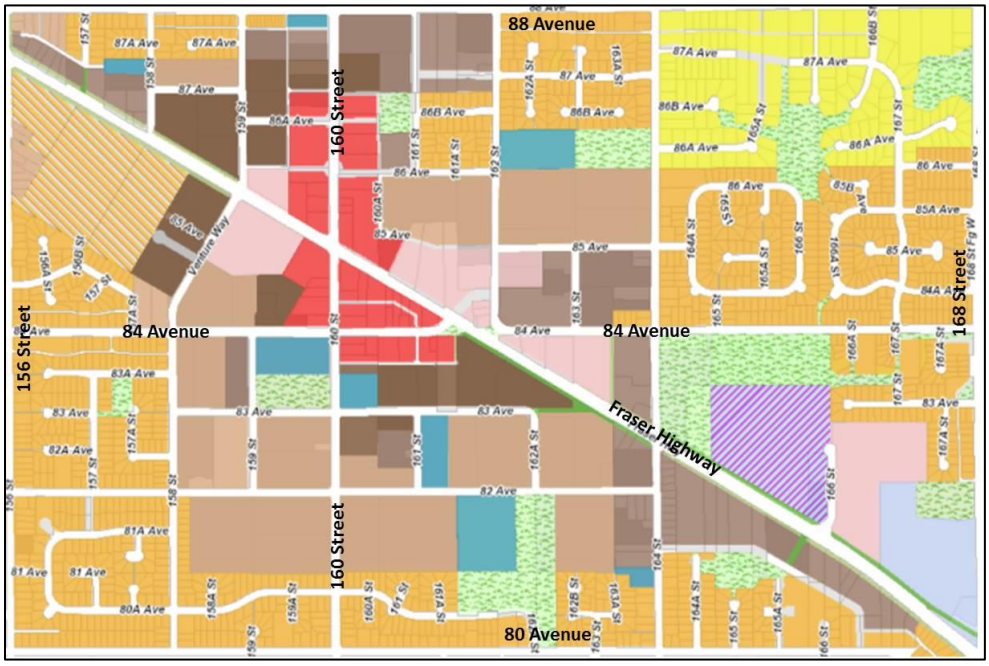
6.0 ANALYSIS AND CRITIQUE OF THE EXISTING BUILT FORM IN THE FLEETWOOD TOWN CENTRE NEIGHBOURHOOD

Fleetwood is a traditional suburban neighbourhood in the City of Surrey, planned and designed using the Euclidean zoning model (City of Surrey, 2000). This model segregates and disperses different land uses like blocks on a patchwork quilt, stitched together by a jumble of disconnected road networks (Figure 13). It has become apparent that the conventional approach to regulating land use and built form has not created communities that are consistent with the objectives outlined in the City's *Official Community Plan,* the *Fleetwood Town Centre Land Use Plan,* and *Sustainability Charter*. The following section will identify the objectives of the neighbourhood *Land Use Plan* and how the built forms produced have not been consistent with the its ideologies. An analysis and critique of the existing built forms in the study area will illustrate the pitfalls of the Euclidean zoning model using real-world examples. Lastly, specific components of the City's *Zoning Bylaw, No. 12000* will be scrutinized to reveal how these regulations are contributing to the development of sprawl in the neighbourhood.

6.1 Fleetwood Town Centre Land Use Plan: Objectives vs. Reality

The *Fleetwood Town Centre Land Use Plan*, approved by Council in 2000, was implemented as an overarching policy document to guide development decisions within the neighbourhood. The *Plan* incorporated the current context of the neighbourhood, the changing demographics of the area, and opinions from residents and other stakeholders into a document that includes policy recommendations and a set of urban design guidelines. The objective of the document is to guide development in a direction that will produce a more complete and well-designed community. The document includes a new land use plan, which designates the intersection of 160 Street and 84 Avenue as the proposed Town Centre. Objectives for the development of the Town Centre includes reinforcing the role of the intersection in the community; enhancing its economic strength; improving the physical form of the area; and creating a unique character, enforced through urban design guidelines. The *Plan* also aims to provide a range of housing options from high and medium density, multi-unit apartments to townhouses and low-density, single-family dwellings in a more suburban context. Raising the overall residential density and creating a "village-like" environment in the Town Centre are also objectives of the *Plan*. Finally, the document recognizes the need to increase pedestrian and cycling infrastructures and connections, including the construction of core pedestrian spines and routes, and bicycle paths throughout the neighbourhood.

Figure 13: Land use designations and associated zones in the Fleetwood Town Centre neighbourhood



Source: City of Surrey, 2000

Land use	Color on Town Centre Plan	Existing zones in Fleetwood Town Centre neighbourhood
Community Commercial		RA, RF, RM-M, PA-1, C-8, C-15, CHI, CD
Highway Commercial		C-8, CD
Apartment & Medium Density Townhouses		RM-15, RM-30, RM-45, RM-70
Medium Density Townhouses		RA, RF, RM-D, RM-30
Low Density Townhouses		RM-15, CD
Single Family Urban		RA, RF, RF-G, RF-9, RF-12, RM-D, CD
Single Family Suburban		RA, RH, RH-G
Manufactured Homes		RM-M
Industrial		CHI, IL
Institutional		RA, RMS-2, PA-1
Parks & Linear Corridors		N/A
Institutional/Commercial		CD
Multiuse Corridor		N/A
Buffer (private land)		N/A

The *Plan* presents the big picture for the Fleetwood neighbourhood and represents the ideal built-out allocation of land uses and built forms within the area; achievement of which will take a considerable amount of time and investments. Unfortunately, the current built forms in the area are not reflective of the *Plan's* ultimate vision. To date, there is only a minimal concentration of commercial and retail establishments at the prescribed intersection and the existing structures are not conducive to the development of a vibrant town centre (Figure 14). Public space, in the form of a plaza or square, is also missing from this intersection, which is designated as the pedestrian-core and social gathering space for the neighbourhood. The *Plan's* objective to increase density has not been completely met either; a number of sites designated for medium density, multi-unit residential or commercial uses have not been redeveloped and are still occupied by low-density, single-family dwellings (Figure 15). This may be due to reasons beyond the control of the City, such as property owners unwilling to sell or a lack of developer interest; however, this represents an underutilization of land. Lastly, the road networks are still car-centric with wide streets, limited pedestrian amenities, and minimal connections between commercial and residential areas (Figure 16). The road patterns within residential subdivisions take the form of curved streets, with many ending in cul-de-sacs, which greatly impair the walkability of the area. Bike routes are present, but they are only dedicated along major arterial and collector roads. The lack of pedestrian and cyclist pathways within the neighbourhood reduces the amount of walking or biking undertaken for leisure or exercise purposes. In conclusion, the *Fleetwood Town Centre Land Use Plan* implemented more than a decade ago has not guided development in a direction that is supportive of the *Plan's* primary vision for the neighbourhood – a mixed-use, pedestrian-oriented community that fosters a sense of place and belonging.

Figure 14: "Heart" of the proposed Fleetwood Town Centre

Source: Google Maps, 2011

Figure 15: Mismatch between proposed land use designation and current use

Area designated for low-density townhouse | Area designated for community commercial

Source: Google Maps, 2011

Figure 16: Disconnected, wide, car-centric road networks

Source: Google Maps, 2011

6.2 Existing built forms in the Fleetwood Town Centre neighbourhood

It is evident that development and the existing built form in the Fleetwood Town Centre neighbourhood is not consistent with the goals outlined in the overarching policy documents of the City. Development in the area has not produced a distinct or vibrant neighbourhood. There is a lack of affordable housing options, and the current physical infrastructure is not supportive of alternative forms of transportation. All-in-all, the City is missing its targets in its quest to transform Fleetwood into a complete, livable, and sustainable community. One possible reason is attributed to planners that continue to approach city planning in the conventional way, focusing on the distribution of land uses "as one would redistribute coloured pieces of paper on a map" (Natrosony & Alexander, n.d, pg. 17). Planners need to think creatively and grasp a better understanding of how people use space, and create land use mixes that integrate home, work, and play, allowing users to meet their day-to-day needs without having to travel long distances. Transportation engineers and developers also bear fault for the promotion of these unattractive and inefficient built forms (Natrosony & Alexander, n.d). One of the primary objectives of transportation engineers is to facilitate the

movement of cars, reduce congestion, and ensure adequate parking (Natrosony & Alexander, n.d). In addition, capital improvements are typically directed to the expansion of road networks, while the provision of pedestrian-cyclist-amenities is regarded as a lower priority (Natrosony & Alexander, n.d). Lastly, developers are motivated by profit, which causes them to standardize development – producing outgrowths of commercial and residential projects that are sterile, characterless, and repetitive (Natrosony & Alexander, n.d). The lack of a holistic approach to planning in the City of Surrey has resulted in the production of "disconnected zones", and "fragmented landscapes", which instead of connecting users, pushes them away from each other and into their private automobiles (Natrosony & Alexander, n.d).

As previously identified in Table 1, segregated uses; disconnected, car-centric road networks; minimal attention to urban design; and lackluster public and green spaces can all be attributed to the Euclidean zoning model. The persistence of these characteristics throughout the Fleetwood Town Centre neighbourhood is representative of the failures of the conventional zoning model in guiding growth in an efficient and sustainable manner.

Segregated land uses

The *Fleetwood Town Centre Land Use Plan* and the *Zoning Bylaw, No. 12000* both apply land use segregation as a principle tool in the siting of varying uses throughout the neighbourhood. The resulting landscape of single-uses knitted together by a car-oriented road network minimizes connections and walkability, creating a community that relies on private automobiles in order to accomplish simple day-to-day tasks. In addition, strict regulations on use make it extremely difficult to build mixed-use projects, such as a main street with ground-level commercial and retail, topped with residential. Homogenous blocks also reduce the safety and security of the neighbourhood, creating pockets of spaces with minimal or no activity during various times of the day. For example, commercial and retail establishments are typically only open from the morning to early evening, turning into dead zones later at night. On the other hand, residential neighbourhoods are usually derelict and empty during the day when their occupants are at work or at school. In the Fleetwood Town Centre neighbourhood, different land uses are clearly delineated on the ground, with hard edges, in the form of road ways or open spaces, providing separation between them (Figure 17). This minimizes the flow of users between residential, commercial, and institutional uses, which endorses a more sedentary and isolated lifestyle.

Figure 17: Distinct segregation of land uses and a pedestrian-unfriendly public realm

Source: Google Maps, 2011

Car-centric road networks with minimal connections

Roads and pathways are fibers that connect the different parts of a city. Unfortunately in today's cities, roads have been taken away from pedestrians and cyclists and turned over to the automobile. There is a hierarchy of roads in the Fleetwood Town Centre neighbourhood including arterial (minimum 30m width), collector (minimum 24m width), and local collector roads (City of Surrey, 2010). These road dimensions are based off of engineering standards and are classified by the amount of vehicular traffic they can accommodate. Arterial and collector roads are designed to support amenities for pedestrians and cyclists including bike lanes, sidewalks, and street trees. Unfortunately, the current road conditions in the neighbourhood suggest that minimal attention has been given to the design of streets and sidewalks. The largest arterial road in the neighbourhood is Fraser Highway; however, instead of defining the area, it acts as a barrier between the north and south sides (Figure 18). Walking conditions along Fraser Highway can be unpleasant and unsafe, due to the presence of high-speed vehicular traffic, minimal separation between the sidewalk and the street, and frequency of driveways (Figure 18). The pedestrian realm is also bland and uninviting, and lack amenities such as benches, shade-trees, and sufficient lighting and activities, making it especially uncomfortable for users at night (Figure 18). Unfortunately, the corridor is a long way from achieving the vision set out for it in the *Plan*, which is to transform it into the commercial and

retail spine of the neighbourhood. Collector roads in the neighbourhood are typically located in residential neighbourhoods and alongside smaller scaled commercial lots. This road typology also exhibits conditions and characteristics similar to the ones identified along Fraser Highway (Figure 19). Finally, the road layouts in the residential areas consist of large blocks with minimal mid-block connections, cul-de-sacs and dead ends, limited pathways and walkways between different uses, and poor way-finding elements; reducing walkability and fueling a car-oriented community (Figure 19). Sidewalks, where they exist, have not been designed to attract residents to mingle and socialize along them; instead stretching and winding throughout the neighbourhood like blank, concrete ribbons.

Figure 18: Current road conditions along Fraser Highway

Source: Google Maps, 2011

Figure 19: Current road conditions along a collector road in residential (left) and commercial (right) neighbourhood

Source: Google Maps, 2011

Minimal attention to urban design

Urban design focuses on the details and connections between different "strands of place-making", including the natural and social environments, a locale's history and character, and the physical infrastructure of a city (English Partnership, n.d). The practice centres on the development of a vision and its goal is to "eliminat[e]…barriers, as well as creat[e]…opportunities for people to move about the city in a free, safe, and pleasant way" (Steger, 1988 in Burdette, 2004, pg. 27). Unfortunately, under the Euclidean zoning model, urban design takes a back seat to land use segregation, standardization and regulation. The public realm within the Fleetwood neighbourhood has not been designed to be human-scale, inviting, or aesthetically attractive. Commercial uses are setback extensively from the sidewalk, have blank facades or walls facing the street, and are surrounded by void spaces created by expansive parking lots (Figure 20).

Figure 20: Typical commercial developments in the neighbourhood

Source: Google Maps, 2011

The Fleetwood area in general is relatively young; therefore, it lacks the character and history that may be present in other parts of the City. The majority of the buildings in the neighbourhood are new-builds and do not exhibit any distinct architectural features. The mass production of residential subdivisions results in blocks upon blocks of houses that closely resemble its neighbours (Figure 21). This cookie-cutter style is meant to save developers money because they can tap into economies of scale, and save city planners time, so they do not need to approve each individual unit. Unfortunately, this approach produces a monotonous landscape that "drains[s] the

vitality [from] the environment" (Natrasony & Alexander, n.d, pg 26). Finally, large-scale residential subdivision and commercial projects require massive site clearings, which can damage the existing identity, character, and history of the neighbourhood.

Figure 21: Typical residential subdivisions in the neighbourhood

Source: Google Maps, 2011

Lackluster public and green spaces

In order to create places for people, planners and designers need to integrate elements into the neighbourhood that evoke a sense of place, identity and connection between users and the built form. Jane Jacobs (1961) and Peter Calthorpe (2001) both recognize the importance of creating a sense of place and community through the creation of human-scaled forms, walkable places and public spaces, such as parks, squares, plazas and main streets, which facilitates socialization and interaction. The City of Surrey requires developments within specifically designated neighbourhoods to pay amenity contribution fees, which are used to fund community amenities (parks, libraries, community centres) and services (police and fire) (City of Surrey, 2013). Unfortunately, these fees do not cover spaces such as squares and plazas specifically, which are included in larger commercial developments by the developer; however, voluntary provision of these types of amenities by developers is rare. In the Fleetwood Town Centre neighbourhood there is an absence of public spaces. Instead of encouraging people to be out on the streets and in public spaces, the existing built form actually does the reverse, drawing people off the streets and into enclosed environments.

The natural environment existed long before people began urbanizing places that eventually turned into cities. Sensitivity, inclusion, and preservation of these natural systems are not only beneficial, but necessary. The Fleetwood Town Centre neighbourhood has integrated green space into its *Land Use Plan*; however, the poor execution and design of these spaces have barred residents from utilizing them to their full potential. As outlined in the *Official Community Plan*,

parkland dedication is required for subdivisions over three lots and is collected either as 5% of the total subdivided land area or cash-in-lieu of 5% of the average market value of the lands (City of Surrey, 1986). Although a bylaw is in place to ensure the presence of parks in the neighbourhood, there has been a lack of attention to design. Small pocket parks are scattered within the residential areas and are not connected to each other in the form of a trail system or pathways. Formal parks are also designed to be very standardized and sterile, without a mix of open and intimate spaces to accommodate different users and activities. Many are attached to institutional uses such as schools, which restricts the hours they are accessible by other users besides school children. In addition, a few of the park sites designated by the *Land Use Plan* are currently natural and un-kept, which reduce their usability, accessibility, and safety. Open spaces in the area are also typically bordered by high-volume roads, which do not produce a functional or comfortable environment for users (Figure 22).

Figure 22: Existing park and open spaces within the neighbourhood

Source: Google Maps, 2013 (maps); Google Maps, 2011 (photographs)

6.3 *Zoning By-Law No. 12000*: Inhibitor of Smart Growth

The *Fleetwood Town Centre Land Use Plan* identifies broad policies that are designed to guide development and urban design within the neighbourhood. The *Plan* offers an optimistic view of what the area could look like if its policy recommendations are adhered to and brought to fruition. Although development and redevelopment within the designated Town Centre area must reflect the intentions of the *Plan's* policies, it acts more like a passive document; and is rarely read in detail prior to development.

For most municipalities in North America, the Zoning Bylaw serves as the principle source of control and implementation tool for land use and built form. The Bylaw shapes the building blocks of a city, establishing the look, feel, and functionality of the buildings, road networks, and open spaces. The flexibility and effectiveness of the Bylaw can either enhance or detract from the overall quality and continuity of a neighbourhood. The City of Surrey's *Zoning Bylaw, No. 12000* specifies zones that are permitted under each land use designation. As identified previously, the Euclidean zoning model, which the *Bylaw* is based off of, is incredibly rigid, proscriptive, and flawed. The strict regulations imposed on attributes that directly affect the built form have resulted in landscapes that are bland, un-stimulating, and repetitive, and enclosed by expansive amounts of pavement catered towards the private automobile. Appendix C lists all of the zones that currently exist in the Fleetwood Town Centre neighbourhood and identifies the standards imposed on lot size, density, setbacks, building height, and parking directly affect the built form. The following summary of each attribute will highlight how the current Euclidean zoning model applied by the City of Surrey is inhibiting the development of Smart Growth communities prescribed by the *Official Community Plan,* the *Fleetwood Town Centre Land use Plan* and *Sustainability Charter*.

<u>Minimum lot sizes & maximum densities</u>

Minimum lot sizes and maximum densities directly affect the spatial distribution of built forms. Lot size is typically measured in square meters or square feet, while density is based on a floor area ratio (FAR), calculated by dividing the total area of all the floors of a building by the lot area or the number of units per acre (u.p.a). In the City of Surrey, the regulations for both attributes vary depending on the land use designation and zone. The intent of these regulations is to preserve the integrity of the neighbourhood. For example, subdivisions within suburban areas should maintain the low-density characteristic of the land use, while subdivisions in urban areas permit

smaller lot sizes in order to reflect the desire for higher densities. Density, along with use, cannot be amended in the *Bylaw*, and both can severely handicap development. Any changes to either one of those elements will require a rezoning process to re-dedicate the site for a higher density or another use. The *Bylaw's* intent on controlling density goes back to its origins of trying to reduce overcrowding. The densities assigned to each zone reflect the number of units or building size that has been deemed "appropriate" for those specific uses. Maximum densities also reflect the intentions of the underlying land use. For example, the maximum density of a development in a suburban area is restricted to 1 or 2 u.p.a., while multi-unit residential developments in urban settings can have densities upwards of 45 u.p.a. In urban areas, density bonus schemes exist where the City will grant developers more density in exchange for public amenities, such as day care spaces, affordable housing units, and public art. Unfortunately, restrictions on both lot sizes and densities for the sake of maintaining the existing suburban nature, and preventing overcrowding in the Fleetwood Town Centre neighbourhood has inhibited the development of high-density, mixed-use projects, which contradicts the objectives of the *Land Use Plan, Official Community Plan,* and *Sustainability Charter*.

Standardized setbacks

Setbacks represent the "least horizontal distance from the lot line to the building, excluding eaves, chimneys, hutches, balconies or sundecks and bay or boxed windows…"(City of Surrey, 1993). The intent of applying standardized setbacks to development is to regulate the distance between built structures and the public realm, and neighbouring buildings, in order to minimize the effect of negative externalities, such as unwanted noise, sights, smells, and sounds. Unfortunately, standardized setbacks can produce a repetitive and monotonous streetscape, and reduce the efficient use of space. Minimum setbacks in commercial zones site buildings and shop windows further back from the street, create dead space, and reduce interaction and "eyes on the street", especially in the presence of parking lots. In addition, it makes it difficult to built structures and spaces that encourage social interaction, such as patios and plazas. Minimum setbacks are important for residential zones because it prevents accessory buildings like sheds and porches, from encroaching on neighboring properties. However, front yard setbacks should be relaxed to allow residential dwellings to be located closer to the street, or permit the inclusion of front porches, which can increase socialization and interaction among neighbors. The current practice of applying

setbacks results in standardization of space, without taking into consideration how different uses can be best presented and accommodated in the public realm.

Maximum building heights

The height of a building is defined as the "vertical distance measured from the average existing grade level…to: the highest point on a flat roof; or the average level between the eaves and the ridge of a gable, hip or gambrel roofed building" or the higher of the two measurements (City of Surrey, 1993). Building height measurements are applied to both the principle building, as well as any accessory buildings on the lot. The objective for regulating building height is to prevent the production of structures that conflicts with its surroundings. For example, the maximum building height in single-family residential zones is capped at 9 metres, preventing the development of four-storey tall dwellings that can tower over the street and neighbouring structures. Restrictions on building heights make it difficult to build multi-unit residential dwellings, such as apartments or stacked townhouses in areas not specifically designated for them. The *Bylaw* also restricts building height to a maximum of 14 metres in commercial zones, which inhibits the development of mixed-use buildings Ultimately, the restrictions placed on building height will reduce the overall density permitted in the area, which imposes limitations on the number of affordable housing options provided, diversity of uses within a structure, and reduces the efficient use of land.

Minimum parking requirements

Parking spaces are required for the majority of uses listed in the *Bylaw*, with the minimum space requirements varying between zones and specific uses. Residential zones are required to provide adequate parking for residents, as well as visitors, while space requirements for commercial and industrial uses are calculated based on the square footage of proposed buildings. A point of contention for development proposals, especially for commercial projects, is the mismatch between the number of parking stalls developers are willing to provide and the minimum number required as dictated by the *Bylaw*. Developers usually aim to reduce the number of parking spaces provided in order to maximize buildable floor area. Alternatively, planning staff want to ensure adequate parking, in order to reduce the spillover of cars onto the streets or parking in areas that are not permitted. Unfortunately, the minimum parking requirements enforced by the *Bylaw* does not reflect the location of the development. For instance, a development located within close proximity to reliable public transit should be allowed to reduce the minimum number of parking spaces

required. City planners should encourage development of commercial establishments and offices along public transit routes, and incentivize developers to include car and bike sharing programs and spaces in their residential developments in order to reduce the reliance on private automobiles. The City's current emphasis on ensuring adequate parking associated with each use promotes driving; increases the amount of paved surfaces, which increases runoff; reduces social interaction; is extremely costly to construct; and contributes to an inefficient use of land.

Summary

Land use and built form in the City of Surrey is heavily regulated by *Zoning Bylaw, No. 12000*. The strict regulations placed on attributes such as lot size, density, setbacks, building height, and parking spaces directly affect the resulting built forms and the overall make-up of the community. Inflexibility and standardization is the basis of the *Bylaw,* which ensures uniformity and predictability; however, this also promotes the development of characteristics consistent with sprawl. In order to prevent being typecasted as a sprawling, suburban community, the City needs to update the primary tool currently enabling and facilitating this development typology.

7.0 APPLICATION OF FORM-BASED CODES IN THE FLEETWOOD TOWN CENTRE NEIGHBOURHOOD

As the analysis has shown, the current Euclidean zoning model regulating land use and built form has failed to produce Smart Growth oriented communities in the City of Surrey. The City's commitment to improving the physical, social, and economic conditions of its neighbourhoods requires more than just an optimistic attitude and broad policies that do not have any teeth when it comes to enforcing change. The application of form-based codes (FBC) in the Fleetwood Town Centre neighbourhood can facilitate the vision and objectives of the *Fleetwood Town Centre Land Use Plan, Official Community Plan*, and *Sustainability Charter*. This innovative approach to land use management can aid the City in its quest to transform sprawl into Smart Growth. FBCs centre on being flexible and prescriptive, which allows the built form to adapt and change as the City evolves. The models' de-emphasis on specific uses will permit the development of mixed-use neighbourhoods that can provide live, work, and play opportunities locally. Lastly, the public realm can be drastically transformed from mundane, repetitive and unsafe to vibrant, exciting, and engaging through the application of building, architecture, landscape and streetscape standards. Bringing back the art of place making in city building will enable the production of attractive and affordable communities that will meet the needs of a growing and diverse population. The following section will outline six broad recommendations that the City should consider when developing, implementing and evaluating its own set of FBCs.

1. Apply FBCs as a pilot project at a small scale

FBCs are still a relatively novel alternative to the Euclidean zoning model and many cities do not have the experience or resources required to implement them at a large scale. The City of Surrey should begin their transition to FBCs by applying them as a pilot project within the Fleetwood Town Centre neighbourhood. This approach will allow costs to be kept low until the benefits of this model can be quantified and used to justify its application on a city–wide basis. Applying this model at a small scale will also allow planners to more easily address the issues that arise, and minimize disruptions to the administrative process. The Fleetwood Town Centre neighbourhood can implement a hybrid model, which integrates FBCs with the conventional Euclidean zoning model. Under this hybrid model, the pre-existing code for the neighbourhood should be updated to include a mandatory FBC section. The *Zoning Bylaw No. 12000* can still apply to external areas and where strict segregation is necessary, like around industrial sites. A thorough analysis should be conducted

on supplemental regulations such as parking, landscape, and signage standards to determine whether or not they should be integrated into the new Code. The mandatory nature means the new Code will be binding and not optional, which will give it more "teeth" and a better chance at achieving the community vision. The hybrid model has been applied by cities such as St. Albert, Alberta and Flagstaff, Arizona, and has resulted in a more efficient and easier-to-use regulatory system. By simplifying the development process, the Code also lowers the cost and time of development, which can spur economic growth.

The new FBC for the Fleetwood Town Centre neighbourhood should apply the transect principle developed by Duany Plater-Zyberk & Company (DPZ). Three transect zones are appropriate for the neighbourhood: T5 (urban centre), T4 (general urban zone), and T3 (suburban-urban) (Figure 23). The T5 zone should be centred on the intersection of Fraser Highway and 160 Street, and encompass the area around 160 Street and 84 Avenue, the prescribed node of the neighbourhood. The existing land uses within this area include commercial, medium density residential, and institutional. The T4 zone should include the areas surrounding the T5 zone that are currently designated as single-family urban residential, which also includes a manufactured homes site and open spaces. The T3 zone will comprise of single-family suburban properties within the neighbourhood's northeast corner. As the entire area grows and densifies, the T3 zone should transition into a T4 zone.

Figure 23: Transect zones proposed for the Fleetwood Town Centre neighbourhood

Source: Google Maps, 2013

T-zone	Description	Characteristics
T5	Urban centre	• Higher density • Mixed-use • Residential (apartments & row houses), retail, office • Pedestrian-oriented public realm: sidewalks, connections, street trees • Buildings set closer to street
T4	General urban	• Mixed use, but primarily residential in nature • Wide range of building types • Varying setbacks and landscaping • Pedestrian-oriented streets
T3	Suburban-urban	• Low density residential • Adjacent to higher density, mixed use areas • Retain natural landscapes and plantings • Deeper setbacks • Larger blocks and irregular streets

2. Educate and develop consensus among planning and development professionals in FBCs

If the City is serious about applying FBCs and want to ensure its success, it will need to get all planning and development professionals on board and on the same page. There is currently a divide within City Hall between planners and traffic engineers, with one envisioning more pedestrian-oriented streets, and the latter pushing for wider roads that can accommodate higher volumes of traffic and reduce congestion. Coherency and consensus on what the overall vision for the City is needs to be established in order to prevent these contradictions at the decision-making level. In addition, a micro-level analysis of the City's existing built forms and road networks should be undertaken to gain a deeper understanding of the elements that make up the City and how the transect standards can be best applied. On the other hand, planning consultants and developers may be unaware of the benefits associated with FBCs, and may choose to stick with the conventional model for its lower cost and familiarity. All stakeholders, including the general public, need to be educated about the advantages and disadvantages of this new model. Finally, the establishment of a broad vision that is agreed on by all stakeholders is crucial for the success of FBCs.

3. Provide incentives for developers to develop in FBC areas

The apprehension from developers towards applying FBCs can be partially addressed through incentives provided by the City, similar to what has been done in the City Centre neighbourhood. Tax incentives, density bonuses, streamlining of the application process, and reductions in development cost charges and building permit fees can be used to encourage the development of projects in FBC designated areas and that reflect the objectives of Smart Growth. The City can also jump start development by making capital investments in road, utility, and park infrastructure. Lastly, reductions of business license fees can encourage commercial development, especially smaller-scale retail and commercial stores.

4. Ensure FBCs are prescriptive and respectful of different professional perspectives

The FBC developed should be prescriptive and respectful of different professions. One concern over the inclusion of Architectural Standards in FBC documents is that it intrudes into the creative freedom of architects. The development process for a new FBC should include all professions potentially affected including architects, landscape architects, designers, engineers, planning consultants, and developers. Open dialogue between all the groups will ensure that the FBC produced is effective, while not overstepping its bounds into varying fields of expertise.

5. Get support from Council and overarching policy documents

Support from Council is crucial in endorsing FBCs as the new direction the City should go in regards to regulating land use and built form. Council should promote FBCs through educational seminars and workshops, as well as various incentives and awards for developers and consultants willing to apply this new approach. Overarching policy documents, such as the *Official Community Plan*, various secondary plans, and the *Sustainability Charter* should identify and endorse FBCs as the tool that can help develop Smart Growth communities.

6. Develop checklist to evaluate the new FBC

A checklist should be developed in order to determine whether or not the FBC applied in the Fleetwood Town Centre neighbourhood is effective. This checklist should also be able to quantify the benefits derived from the implementation of the Code, as compared to previous performance under the conventional zoning model. A list of questions prepared by the Form-Based Codes Institute is included in Appendix D. These questions can help the City evaluate its FBC for its

enforceability, usability, and whether or not it is has been efficacious in producing Smart Growth communities.

APPENDICES

Appendix A: Goals and policies of the OCP

Policies	Goals
A. Manage Growth for Compact Communities	*I. To create a complete and self-sufficient City and communities* *II. To achieve a balance between residential and business development* III. *To manage development in a fiscally sound and sustainable manner*
B. Build a Sustainable Local Economy	*I. To accelerate business investment and development* *II. To provide employment for working residents of Surrey* III. *To provide adequate opportunities for business and employment activities*
C. Build Complete Communities	*I. To create a complete and self-sufficient City and communities* *II. To achieve a balance between residential and business development* III. *To enhance livability and provide opportunities for a variety of housing in the City*
D. Enhance Image and Character	*I. To enhance the City's image and character*
E. Increase Transportation Choice	*I. To provide an effective and efficient transportation system that balances opportunities for walking, bicycling and public transit with opportunities for traveling by car within the City, and ensure the efficient movement of goods*
F. Protect Agriculture and Agricultural Areas	*I. To preserve and protect the natural environment and agricultural land*
G. Protect Natural Areas	*I. To preserve and protect the natural environment and agricultural land*
J. Provide Parks and Recreational Facilities	*I. To address the social and cultural needs of the community*
J. Improve the "Quality of the Community"	*I. To support preservation of areas, sites and features that illustrate and enhance the City's heritage*

	II. To address the social and cultural needs of the community
J. Enhance Citizen's Safety and Well-being Through Crime Prevention	*I. To enhance public safety by incorporating crime prevention principles in the built environment throughout the City*

Source: City of Surrey's OCP, 2012

Appendix B: Long-term goals (2038) for sustainability

Goals	
Be a model for the protection and conservation of the natural environment and trees and enhancement of natural areas and biodiversity	• Celebrate biodiversity • Protect fish bearing streams and natural corridors • Maintain lush tree canopy • Integrate nature into urban areas
Be home to region's second downtown	• Develop into metropolitan centre, with renowned skyline, views, urban design, arts and culture, and green infrastructure • Connect to surrounding regions via rapid transit and road network • Accepting of diversity • Create distinct and vibrant neighbourhoods • Strengthen business sector • Provide education and hospital infrastructure
Institutionalize triple bottom line accounting	• Standard corporate practice • Consider social, economic and environmental factors in decision making • Ensure sustained funding for municipal facilities and infrastructure
Incorporate alternative energy sources, and strive to maintain carbon neutrality and no net impact from waste generated by the community	• Reduce fossil fuel consumption and achieve carbon neutrality • Focus on using renewable energy sources • Promote the use of locally produced resources, and recycling and reusing
Have a full range of local employment opportunities and green businesses	• Become "green" business leader: education and research on sustainability issues and practices • Create high quality local jobs for residents to minimize commuting and strengthen tax base
Have a network of accessible health and social services	• Provide full range of community-based health and social services • Region's largest full service hospital

	offering care, support, innovative research, and education
Be a safe community	• Reduce property crimes and crimes against persons • Enhance safety in all areas of the City • Develop early childhood and youth programs to prevent at risk youths from getting into crime • Provide local services to deal with disputes, substance abuse, mental house, housing, and employment issues
Lead the way in sustainable community design and development	• Use sustainable building technology • Encourage infill and retrofitting of existing building stock to provide affordable housing and commercial spaces • Produce attractive public realm that encourages social interact and exhibits vibrancy
Embrace an accessible and diverse culture	• Accept and embrace diverse population • Celebrate diversity of cultures through the hosting of festivals and events
Incorporate a sustainable agricultural base and local food security	• Become leader in protection of its agricultural land reserve (ALR) • Promote urban and sustainable agricultural practices • Encourage the consumption of locally produced foods
Efficiently move people and goods, not just vehicles	• Promote walking, cycling, and transit over driving • Create communities that are safe and comfortable to walk in • Develop comprehensive cycling network • Increase frequency of transit service • Lower the priority of private automobiles
Promote active living and cultural opportunities	• Ensure that parks, recreation, library, and other cultural opportunities are

	accessible by everyone • Create network of greenways and natural corridors to encourage fitness and wellness
Promote a society where all residents feel a sense of belonging	• Create strong social connections and ties • Encourage volunteerism and citizen engagement • Be inclusive of persons of different ages, cultures, abilities, religions, backgrounds and lifestyles • Be child, youth, senior, and special needs friendly
Support housing options to meet the diverse needs of Surrey's population	• Provide range of housing choices to meet diverse needs (eg. size, composition, income level) • Provide support for those with special needs to allow them to live independently

Source: City of Surrey, 2008

Appendix C: Existing zones and regulated attributes

Zone	**Minimum Lot Size**	**Maximum Density** [1]	**Minimum Setbacks** (Front, Rear, Side, Side flanking street)	**Maximum Building Height**	**Minimum Parking**[4]
Residential					
One-Acre Residential (RA)	1 acre	1 u.p.a	7.5m, 7.5m, 4.5m, 7.5m	9m	2 spaces
Half-Acre Residential (RH)	0.5 acre	2 u.p.a	7.5m, 7.5m, 4.5m, 7.5m	9m	2 spaces
Half-Acre Residential Gross Density (RH-G)	0.5 acre	1.6 u.p.a	7.5m, 7.5m, 3m, 7.5m	9m	2 spaces
Single Family Residential (RF)	560 sq.m	6 u.p.a	7.5m, 7.5m, 1.8m, 3.6m	9m	2 spaces
Single-Family Residential Gross Density (RF-G)	560 sq.m	6 u.p.a	7.5m, 7.5m, 1.2m, 3.6m	9m	2 spaces
Single Family Residential 12 (RF-12)	320 sq.m	10 u.p.a	6m, 7.5m, 1.2m, 2.4m	9.5m	2 spaces
Single Family Residential 9 (RF-9)	220 sq.m	14.5 u.p.a	3.5m, 6.5m, 1.2m, 2.7m	9.5m	2 spaces
Duplex Residential (RM-D) *corner-lots*	930 sq.m	Max FAR[2]: 446 sq.m	7.5m, 7.5m, 1.8m, 3.6m	9m	2 spaces/unit
Manufactured Home Residential (RM-M)	5 acres (fee simple lots) 225 sq.m (bare land strata lots)	9 u.p.a	All lot lines: 7.5m	4.5m (manufactured home) 9m (single-family dwelling)	1.25 space/ unit

Multiple Residential 15 (RM-15)	0.5 acre	15 u.p.a	All lot lines: 7.5m	11m	2.2 spaces/unit for ground oriented units Various depending on number of bedrooms for non-ground oriented buildings
Multiple Residential 30 (RM-30)	0.5 acre	30 u.p.a	All lot lines: 7.5m	13m	Same as RM-15
Multiple Residential 45 (RM-45)	0.5 acre	45 u.p.a	All lot lines: 7.5m	15m	Same as RM-15
Multiple Residential 70 (RM-70)	0.5 acre	Max FAR: 1.5	All lot lines: 7.5m	50m	Same as RM-15
Special Care Housing 2 (RMS-2)	0.5 acre	Max FAR: 1	All lot lines: 7.5m	13m	Based on specific uses and floor area
Assembly Hall 1 (PA-1)	0.25 acre	Max FAR: 0.35	7.5m, 7.5m, 3.6m, 7.5m	9m	Based on specific uses and floor area
Commercial					
Community Commercial (C-8)	0.5 acre	Max FAR: 0.8	All lot lines: 7.5m	12m	Based on specific uses and floor area
Town Centre Commercial (C-15)	0.5 acre	Max FAR: 1.5	2m, 7.5m, 7.5m, 3m	14m	Based on specific uses and floor area
Highway Commercial Industrial (CHI)	1,000 sq.m	Max FAR: 1	All lot lines: 7.5m	9m	Based on specific uses and floor area
Industrial					
Light Impact Industrial (IL)	0.5 acre	Max FAR: 1	All lot lines: 7.5m	18m	Based on specific uses and floor area
Other					

Comprehensive Development (CD)[3]	Various depending on base zone	Various depending on base zone	Various depending on base zone	Various depending on base zone	Various depending on base zone

[1]Maximum density allowed, measured in units per acre (u.p.a), based on the provision of amenities by the developer. Amenity provision is required for development within NCP areas

[2] Certain zones regulate density based on the floor area ration (FAR) for building construction

[3] CD zones are zones that exhibit site-specific amendments, while keeping consistent with the uses and densities prescribed in an existing zone, which acts as its base zone

[4] Parking requirements for residential zones include minimum spaces for residents and visitors

Appendix D: Checklist questions to evaluate FBCs (FBCI, 2011)

1. Is the Code enforceable?
    - Does the Code implement a plan that reflects specific community intentions?
    - Are the procedures for Code administration clearly described?
    - Is the FBC effectively coordinated with other applicable policies and control development?
2. Is the Code easy to use?
    - Is the overall format and structure of the Code readily discernible so it is user-friendly?
    - Can users readily understand and execute the physical form intended by the Code?
    - Are technical terms used in the Code defined in a clear and understandable manner?
    - Does the Code format lend itself to convenience public distribution and use?
    - Are the intentions of each regulation clearly described and apparent even to planning staff and residents who did not participate in its preparation?
3. Will the Code produce a functional and vital urbanism?
    - Will the Code shape the public realm to invite pedestrian uses and social interaction?
    - Will the Code produce walkable, identifiable neighbourhoods that provide for daily need?
    - Are parking requirements compatible with pedestrian-scaled urbanism?
    - Is the Code based on a sufficiently detailed physical plan and/or other clear community vision that directs development and aids implementation?

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