Planning for Opportunities
SMART GROWTH
St. Albert

BULLETIN 13
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SMART GROWTH AND THE ENVIRONMENT

SUMMARY

"Recognition is increasing that land use and transportation decisions can either support community goals for livability and environmental protection, or interfere with these goals." (EPA, 2000).

According to a CBC News Survey (2006), the environment was the second most important issue facing Canada, after health care. With public concerns around the loss of valuable farmland and open space, traffic congestion, and worsening air and water quality, many cities are beginning to explore how the built environment impacts the environment.

Our built environment impacts the environment in terms of:

- Land consumption - compact communities require less land. According to Gurin (2003), denser development can contain 71% more dwelling units due to smaller lot frontages, depths and setbacks, and inclusion of apartments.
- Transportation choices - providing sidewalks and cycling facilities encourages people to rely less on their vehicles. In Portland, 8% of city streets have cycling infrastructure, but these attract 51% of cycling trips, even if the route is not the shortest (Redden, 2008).
- Air quality –vehicle exhaust is a significant contributor to pollution. In the United States, "a comprehensive study of air pollution from motor vehicles estimated annual costs of $28.7 to $531 billion in health damage, $2.5 to $4.6 billion in crop damage, and $6.0 to $43.54 billion in damage to visibility." (EPA, 2000).
- Water quality -development alters water balance and quality. Runoff from developed areas contains pollutants, such as oil and grease, which are carried from paved surfaces and deposited into rivers and lakes. Roads and parking lots account for up to 70% of the total impervious surface.
- Energy demands – size of lots and houses, building design and amount of impervious surfaces (roads and parking) impacts energy demands.

At 11.7 hectares per person, St. Albert's footprint is about 30% higher than the Canadian average footprint of 7.8 hectares. Smart Growth St. Albert would minimize the impacts of the built form on the environment, by:

- Preserving natural areas and farmland, by encouraging compact development.
- Improving air quality by providing transportation options, including transit and facilities for walking and cycling. With the modified grid system, boulevards and parkways, more opportunities for trees and greenspace.
- Reducing energy consumption by encouraging smaller lots and homes.
- Improving water quality by reducing the amount of impervious surfaces through reduced parking standards, and encouraging green roofs.

To Read: Copenhagen's 'best city of cyclists' goal discusses what the city is doing to become the world's best city for cyclists.

Find it at:
http://news.bbc.co.uk/2/hi/europe/8224141.stm

To Watch" Arithmetic, population and energy. Professor Al Bartlett examines the consequences steady growth in a finite environment, concluding the lifetimes supply of fossil fuel is much shorter than the optimistic figures suggest.

Find it at:
http://www.albartlett.org/presentations/arithmetic_population_energy_video1.html

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Places to see:
Stockholm, Sweden was received the European Green Capital award, aimed at encouraging cities to improve the quality of urban life by incorporating the environment into urban planning. Stokholm has set the ambitious target of becoming fossil free by 2050, and has adopted an Integrated Management System that ensures environmental issues are included in the city's operations. 95% of the population live less than 300 metres from green areas, and the city has reduced their per capita CO2 emission by 25% since 1990.

The articles and videos referenced in the Bulletins do not necessarily reflect the position of the City of St. Albert and are meant to encourage debate and discussion.

SMART GROWTH AND THE ENVIRONMENT

INTRODUCTION

The "Concept of "sustainable development" emerged from the United Nations Bruntland Report in the late 1980's, in recognition that we need to create prosperous economies and communities, but we cannot damage the planet while we do this, because our children need the same opportunities we have had." Mark Holland, 2005

With increasing pollution and pressure on non-renewable resources, the environment has become a priority for Canadians. Traditionally, policy makers have focussed on technological approaches to reduce pollution, for example requiring more fuel efficient vehicles. However, there is growing recognition the built environment impacts the environment. "Recognition is increasing that land use and transportation decisions can either support community goals for livability and environmental protection, or interfere with these goals." (EPA, 2000). To reduce the environmental impacts of growth and development, many cities are adopting smart growth principles and practices.

Public concerns around the loss of valuable farmland and open space, traffic congestion, and worsening air and water quality continue to grow. According to a CBC News Survey (2006), the environment was the second most important issue facing Canada, after health care. Businesses are also becoming more environmentally aware. "Over the past few years, a number of Fortune 500 companies have built green facilities of their own, including Nortel, Bank of America, Goldman Sachs, and IBM." (Kirk, 2006)

There are a variety of factors supporting sustainable growth and development, including:

- Rapid land consumption - urban land area has almost quadrupled in the U.S between 1954 and 1997, with larger homes and lots, urban decentralization and road expansion (EPA, 2000).
- Rapid habitat destruction and loss of species –development is the main factor in 80% or more of the species on the federal Endangered Species Act. Disturbed habitat also is readily invaded by exotic plants. For example, in Florida the Australian melaleuca tree invaded after water diversions (EPA, 2000).
- Degraded water and air quality - "Alberta led the country in releases of air pollutants in 2003 (1,074,612,102 kilograms of combined toxic and Criteria Air Contaminant air releases), accounting for 25% of Canada's total air pollutants reported to Environment Canada's National Pollutant Release Inventory (NPRI)." (Pollution Watch, ND)

HOW BUIDINGS AND COMMUNITY DESIGN IMPACTS THE ENVIRONMENT

Our built environment impacts the environment through land consumption and fragmentation, and travel behaviour. "Urban form also affects travel behaviour which, in turn, affects air quality (with corresponding impacts on water quality), global climate, and noise (see appendix one)." (EPA, 2000).

Development Patterns

Development patterns that reduce environmental damage include:

- Compact development reduces land consumption and trip distances
- Mixing land uses provides shops and services close to home, reducing the need to use automobiles
- Reducing impervious surfaces, including roads and parking lots, reduces run-off and pollutant loads
- Providing frequent and convenient transit reduces vehicle use
- Providing facilities for pedestrians and bicycling, including sidewalks and bike lanes , encourages active forms of transportation (EPA, 2000).

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Transportation

Development patterns impact how people get around. “Separating land uses, spreading development out, and providing little or no public transportation or safe walking and biking routes foster greater reliance on motor vehicles. As development grows more dispersed, people must drive further to reach their destinations, leading to more and longer vehicle trips.” (EPA, 2009)

Compact, mixed-use developments with connected streets enable people to work, live and play within convenient walking distance to stores, work, recreation facilities or transit. Data from National Personal Transportation Survey showed doubling density decreases the vehicle miles travelled by 38% (Urban Land Institute, 2005). Driving distances are 24 - 50% less in neighbourhoods with a grid layout for streets and mixed uses than in residential neighbourhoods with large blocks and cul-de-sacs (BC Climate Action Toolkit, 2009).

Providing sidewalks and cycling facilities encourages people to rely less on their vehicles. In Portland, 8% of city streets have cycling infrastructure, but these attract 51% of cycling trips, even if the route is not the shortest (Redden, 2008).

Frequent and reliable transit reduces pollution by providing mode choices and reducing vehicle ownership. “A transit bus carrying 40 passengers requires only about one-sixth the energy consumption it takes to transport each person in a private vehicle.” (EPA, 2000). Transit also reduces congestion. “One full 40-foot bus is equivalent to a line of moving automobiles stretching six city blocks, and one full six-car heavy rail train is equivalent to a line of moving automobiles stretching 95 city blocks (assuming traffic operates at 25 mph).” (EPA, 2000).

Land consumption

After World War II, development patterns changed dramatically, with more land being consumed per capita than in the past. Larger homes and lots and an abundance of parking became more popular. “Commercial and office developments are surrounded by large parking lots, with few sidewalks or connections to other developments. Hierarchical street patterns channel traffic to a number of large arterials, and wide streets and driveways are common in residential areas.” (EPA, 2000).

Compact communities require less land. According to Gurin (2003), denser development can contain 71% more dwelling units due to smaller lot frontages, depths and setbacks, and inclusion of apartments. As a result, larger tracts of agricultural and natural lands can be preserved. However, the majority of development has been on prime agricultural land which makes up only 5% of Canadian land (Gurin, 2003). This loss of farmland impacts food production and costs, reduces and fragments natural land, disrupts migration and breeding patterns (David Suzuki Foundation, 2003). A study by the Rutgers University Center for Urban Policy and Research found “planned growth could reduce the conversion of farmland by 28 percent, open space by 43 percent, and environmentally fragile lands by 80 percent.” (EPA, 2009)

Air quality

Vehicle exhaust is a significant contributor to pollution. “A comprehensive study of air pollution from motor vehicles estimated annual costs of $28.7 to $531 billion in health damage, $2.5 to $4.6 billion in crop damage, and $6.0 to $43.54 billion in damage to visibility.” (EPA, 2000).

“According to a National Round Table on the Environment and Economy, transportation energy use in Canada grew by 21.5% between 1990 and 2000, with 60% of this increase attributable to automobile passenger traffic.” (Couroux, Keough, Miller and Row, 2006) Canada is second only to

the US in per capita transportation CO_2 emissions. Per capita, Albertans travel more than residents of other provinces.

Vehicles are a large contributor of green house gases. “Greenhouse gases, such as water vapour, carbon dioxide, methane, nitrous oxide and ozone reflect and absorb the sun’s rays, which has contributed to the Earth’s climate and productivity over millions of years.” (City of St. Albert, 2009). In the last 300 years, green house gases have increased rapidly due to the combustion of fossil fuels as our primary energy sources. A scientific report issued by the Intergovernmental Panel on Climate Change (IPCC), concluded human activity has caused most of the temperature increases in the past 50 years.

Water quality

Development alters water balance and quality. Runoff from developed areas contains pollutants, such as oil and grease, which are carried from paved surfaces and deposited into rivers and lakes. Techniques for reducing impervious surfaces and improving water detention include:

- modification of street standards and parking requirements;
- use of porous surfaces rather than concrete or asphalt;
- use of open and natural drainage systems’ and,
- landscaping that helps retain soil moisture and conserve water usage (EPA, 2000).

Roads and parking lots account for up to 70% of the total impervious surface. To improve water quality, impermeable surfaces need to be reduced through more compact development and preservation of open space. Two studies in New Jersey found compact developments can reduce runoff by 30% and water consumption by 83% compared to suburbs, by reducing the amount of impervious surface and water required for lawn maintenance on lots. (Gurin, 2003)

Reducing street widths can significantly reduce impervious surfaces, while still accommodating emergency response vehicles and traffic. Parking, which is often oversupplied, can be reduced. Parking utilization surveys typically show two to three spaces per 1,000 square feet, less than the three to five parking spaces per 1,000 square feet required in most zoning codes (EPA, 2000). “Parking lots create about 16 times more rain runoff than meadows.” (David Suzuki Foundation, 2003). Open and natural drainage systems detain the discharge for longer periods of time, lowering discharge rates and allowing physical and biological pollutants to be eliminated from the water before it returns to natural systems.

Energy

Many are predicting oil is at its peak, even with the tar sands. According to chief economist Dr. Fatih Birol at the International Energy Agency, global oil production will peak in about 10 years (Connor, 2009). In auto-centric communities, this will lead to high energy costs and possibly shortages. “In 1974 and 1979 serious shortages of gasoline made life very difficult in the suburbs. Motorists waited in long lines to get gas.” (David Suzuki Foundation, 2003).

The built environment can reduce energy demands by encouraging:

- Smaller houses and multi-family homes have smaller footprints. Single-family dwellings use more energy than multi-family dwellings, which share walls, ceilings and floors (Couroux and al., 2006, 5). Large homes and lots also consume more water for lawn and garden maintenance. “A two-storey detached home loses 20% more heat than a semi-detached one and 50% more than a middle home in a row of townhouses of the same size with the same heating system, insulation and windows (CMHC).”
- Building design impacts energy, water efficiency, and indoor air quality. “Buildings stand for 50-100 years or more and their design greatly determines the impact their occupants have on the planet as they live their daily lives (Holland, 2005).”
- Reducing impervious surfaces. “Large expanses of asphalt contribute to the urban heat island effect, which raises local air temperature, elevates smog, and, in turn, increases energy

demand for summer cooling. Vehicles left to "bake in the sun" can be significant polluters as well, emitting smog-forming contaminants when parked and requiring additional energy for cooling when travel resumes." (Toronto City Planning, 2007).

ENVIRONMENT IN ST. ALBERT

"An ecological footprint measures the impact or demand that people place on the environment, based on natural resource consumption and waste generation." (City of St. Albert, 2009). The average world footprint is 2.8 hectares per person, exceeding the 1.8 hectares per person that is actually available. Canada's average footprint is 7.8 hectares, while St. Albert's footprint is about 30% higher, at 11.7 hectares per person." (City of St. Albert, 2009). Some trends causing this in St. Albert include:

- Dependency on private vehicles. Vehicle ownership has grown from 2.2 cars in 2005 to 2.4 cars per household in 2007(City of St. Albert, 2009).
- Residential density in St. Albert (approximately seven to eight dwelling units per gross residential hectare) is not sustainable, given that the City's population is expected to grow from 58,000 to 105,000 people over the next 20 years.(City of St. Albert, 2009)
- High water consumption, with 295L per person per day in St. Albert versus 225L per person in Edmonton.

The Environmental Master Plan sites Smart Growth as a strategy for reaching its goals and targets. "Not only would Smart Growth reduce the amount of space and resources required for development, thereby reducing the ecological footprint of St. Albert residents, it would also reduce our dependency on personal vehicles and the associated production of greenhouse gas emissions." (City of St. Albert, 2009) These goals and corresponding targets include:

- Reduce non -renewable energy consumption and greenhouse gas emissions- achieve 6% reduction of total community greenhouse gas emissions from 1990 levels by 2020; and
- Reduce water consumption - reduce water consumption to 200 litres per person per day by 2020.

Currently through the planning and development process, the city requires developments to follow certain environmental regulations, including:

- Providing Stormwater Management Facilities
- Identifying and preserving natural areas
- Identifying and not building in the floodplain
- Avoiding premature subdivision of land and conversion of agricultural land to other uses
- Reducing leapfrog development, ensuring contiguous development from existing urban areas

SMART GROWTH ST. ALBERT

How we grow and develop impacts the environment. Smart Growth would minimize the impacts of the built form on the environment, by:

- Preserving natural areas and farmland, by encouraging compact development.
- Improving air quality by providing transportation options, including transit and facilities for walking and cycling. With the modified grid system, boulevards and parkways, more opportunities for trees and greenspace.
- Reducing energy consumption by encouraging smaller lots and homes.
- Improving water quality by reducing the amount of impervious surfaces through reduced parking standards, and encouraging green roofs.

CONCLUSION

"The built environment directly affects habitat, ecosystems, endangered species, and water quality through consumption, fragmentation, and replacement of natural cover with impervious surfaces." (EPA, 2000). However the built environment provides significant opportunities to mitigate and improve air and water quality, and preserve natural areas and farmland. Smart Growth St. Albert

encourages building, neighbourhood and street design that reduces the environmental impacts of development.

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