2: Guiding Principles

This chapter describes the guiding principles that underlie the foundation of the Brunswick Landing and Topsham Commerce Park Design Guidelines. These principles are used to structure the values, inspirations, and components that comprise the completed design guidelines, and are central to the overarching theme and intent of the entire project. Based largely on the ideals of Smart Growth, these guiding principles are integral to the successful development and redevelopment of Brunswick Landing and the Topsham Commerce Park.

2.2 Androscoggin Pedestrian Swinging Bridge

2.3 Downtown Brunswick

2.4 Curb cuts to facilitate infiltration

Sustainability Principles

Transit Oriented Development

The reduction of single vehicle trips to and from Brunswick Landing and Topsham Commerce Park is a tangible method to minimize the carbon footprint of the development, while creating a safe and pleasant environment. Transit-Oriented Development (TOD) is a smart growth planning principle, outlining a mix of moderate to high density land uses oriented around a walkable, multi-modal mass transportation system. Typically, the density radiates outwardly from the transportation linkage; the further away from transit, the lower the density. An ideal TOD development scenario ensures that the majority of the development is within half a mile of transit, to ensure walkability to mass transportation for pedestrians, and minimizing the requirement for land consumptive surfacing parking.

Transit oriented development also typically integrates features and initiatives within the design to encourage and support mass transit ridership. Reduced personal parking availability, rideshare incentives, extended hours of transit service, bike facilities, and high-quality pedestrian shelters are all elements that characterize TODs.

Context Sensitive Transportation

Context sensitive solution (CSS) transportation design is defined by the Institute of Transportation Engineers as a collaborative, interdisciplinary approach that integrates stakeholders into the process to develop solutions that address a number of factors, such as aesthetics, circulation, sustainability, safety, and overall design. A CSS approach considers the entire realm in which any given transportation solution will function, and looks beyond the boundaries of a more traditional engineering approach. By undertaking a CSS approach early on in the development process, it will ensure that the circulation and built transportation infrastructure considers future growth holistically, and integrates sustainable design principles where applicable.

LEED and the Built Environment

The Brunswick Landing and Topsham Commerce Park redevelopments should mitigate the impact of built form on the natural environment where feasible, through the use of sustainable materials, environmentally sound construction practices, and green building technologies. It is not only the final product that determines the sustainability of a project, but also the process of implementation. In order to achieve a true measure of environmental responsibility, it is important to undertake the redevelopment in an ecologically-considerate manner. By integrating green building science into the design process and implementation phases of the project, it should be a natural catalyst to employ LEED building and neighborhood standards.

Stormwater and Low-Impact Development

Impervious surfacing is one of the most detrimental landscape modifications with respect to the hydrologic cycle. Excessive hard surfacing may result in increased run-off, surcharges to the stormwater management system, and the possible introduction of contaminants into the environment. Traditional stormwater management deals with collection and convergence of run-off, with little or no regard for infiltration or treatment. The basis of this approach is to collect the water in catch basins and maintenance holes as quickly as possible, and carry it through pipes to discharge points back to water bodies, often without any treatment. The limitations of this approach include the lack of any steps to avoid contamination of the destination water bodies, increased speed of run off and erosion, and capacity failure due to the ever increasing scale of storm events.

2.5 Rain gardens in the streetscape

Alternatives to the conventional stormwater system include detention / retention ponds, bioswales, rain gardens, and green roofs. These options reduce the impervious area of the built environment, allowing water to filter back into the ground or evaporate, mimicking the natural hydrological process. The potential for contamination is reduced, as the distance stormwater run-off travels is lessened, minimizing the opportunities to acquire hydrocarbon residues off asphalt surfaces. Interception by vegetation also captures contaminants before they can be discharged back to the source water bodies.

Rain gardens, stormwater ponds, and green roofs also help reduce heat and air pollution by adding vegetation to the landscape. Additional plant material modifies the microclimate, shading and cooling buildings, and capturing airborne pollutants. In terms of public green space, these stormwater management alternatives can be valuable green assets, providing open and amenity space for both the public and private realm.

Current Best Management Practices promulgated by the MDEP supports these alternatives to conventional stormwater management.

Green Infrastructure

Green infrastructure is often defined as an integrated network of green space that seeks to preserve ecological function, and providing associated benefits to humans. Green infrastructure is a different approach to thinking about land conservation and open space planning, as it considers not only the ecological function of the landscape, but also the values of land development and growth, and the impacts of the built environment.

Green Energy

Climate change may currently be the most pressing global environmental issue. Sources estimate that close to 86% of primary global energy production can be attributable to fossil fuels, and demand for energy is on the rise. It is critical to reduce global dependency on fossil fuels, and the development of new communities presents an excellent opportunity to switch focus towards sustainable energy generation, and to apply leading energy conservation design approaches.

Renewable Energy

Renewable energy is generated from naturally-occurring, replenishable resources, such as sunlight, ocean tides, precipitation, geothermal heat, wind, or biomass. As oil prices continue to rise, and the impacts of climate change are felt, the conversion to renewable energy becomes more attractive, from both an economic and environmental point of view. Large-scale renewable energy production continues to grow across North America, with wind and solar farms appearing in all states and provinces. Large scale wind production is the most common form of on-grid green energy generation, but geothermal and solar applications continue to grow. Smaller, off-grid projects are also becoming increasingly common, as new development and redevelopment sites look to future-forward energy alternatives.

2.6 Green walls improve efficiency

Heat Distribution

A central district energy system would connect multiple buildings and users to a network of sustainably generated heating and cooling energy. Such energy, produced from sources such as combined heat / power, industrial waste heat, renewable energy, or geothermal, would be distributed across the development in a network of subterranean pipes. District energy systems produce and deliver steam, hot water, or chilled water on a large scale and for a large client base, reducing overall energy costs. By centrally locating the energy system, individual buildings have access to the additional space that would typically accommodate a conventional heating and cooling system. By concentrating production on a large scale, cost and environmental efficiencies are increased, and negative impacts are reduced.

District energy systems are currently in place throughout the world. The City of The Hague has developed an innovative energy concept that consists of a seawater central supply unit with a heat exchanger and heat pump unit that uses the nearby sea as a temperature source. The central heating system supplies 1000 residential units. A similar system has been built in the City of Halifax, servicing a large, multi-tower office complex. University and hospital campuses typically run off a district energy system, and capitalize on the cost savings and sustainability benefits.

Mix of Land Uses

Development that supports a mixture of land uses often leads to the creation of sustainable and highly livable communities. Mixed land use is a catalyst for the ideal conditions for enhanced walkability, viable multi-modal public transportation linkages, and increased socio-economic diversity.

Smart growth supports the integration of mixed land uses into communities as a critical component of achieving better places to live. A neighborhood should attempt to include a balanced mix of housing, working, shopping, recreation and civic uses. The close proximity of these uses provides the residents with sustainable alternatives to driving, such as walking or biking. Mixed land use supports a more diverse and sizeable population and good commercial base for supporting viable public transit. Mixed land use helps to enhance the vitality and perceived security of an area by increasing the number and types of interactions of people on the street.

Large parcels of land containing single uses such as housing subdivisions, apartment clusters, office parks, and shopping centers contribute to suburban sprawl, contrary to smart growth. Single use districts make life less convenient and require more driving. Mixed land use can bring substantial fiscal and economic benefits. Commercial uses in close proximity to residential areas are often reflected in higher property values, and therefore help raise local tax revenues.

2.7 Native vegetation

Compact Development Form

Conventional, sprawl - style land development can be land consumptive and vehicle-dependent. A compact development form permits the continued growth of a community, but in a more contextually sensitive and sustainable manner. By encouraging higher densities and taller buildings, and limiting surface parking and development footprints, a community can preserve green space and limit impervious surfacing, two critical steps towards greater development sustainability.

There are a number of key benefits to a compact development form. Compact development promotes pedestrian connectivity and ridership of multi-modal mass transit, as destinations and people are closer together. Private and public capital and operational costs may be reduced, as services such as water and electricity are being provided to more consumers over smaller geographical distances. Often, property values are higher in compact developments, as the benefits such as access to transit and services are very attractive to potential residents.

Native Vegetation & Urban Forestry

Traditional planting design considers aesthetic principles first, with less regard for ecological function and long-term sustainability. Implementing a native planting regime not only can produce richly textured and beautiful open space, but also supports greater ecological function, as well as improving on site sustainability. The benefits of native planting design include:

1. Lower maintenance costs because native plants are evolved for the local conditions, and will grow to a predictable size.
2. Public health benefits due to less intensive maintenance practices. Native plants require less fertilizers, pesticides, and mechanical care, so there are less toxins and noise input into the environment.
3. Water conservation, because native plants are adapted to the climate of the site, and won't require watering after establishment.
4. Native plants will attract butterflies, other pollinators, and song birds, increasing the aesthetic and ecological value of the open space.

2.8 Native vegetation in a bioswale

2.9 Native vegetation in a bioswale

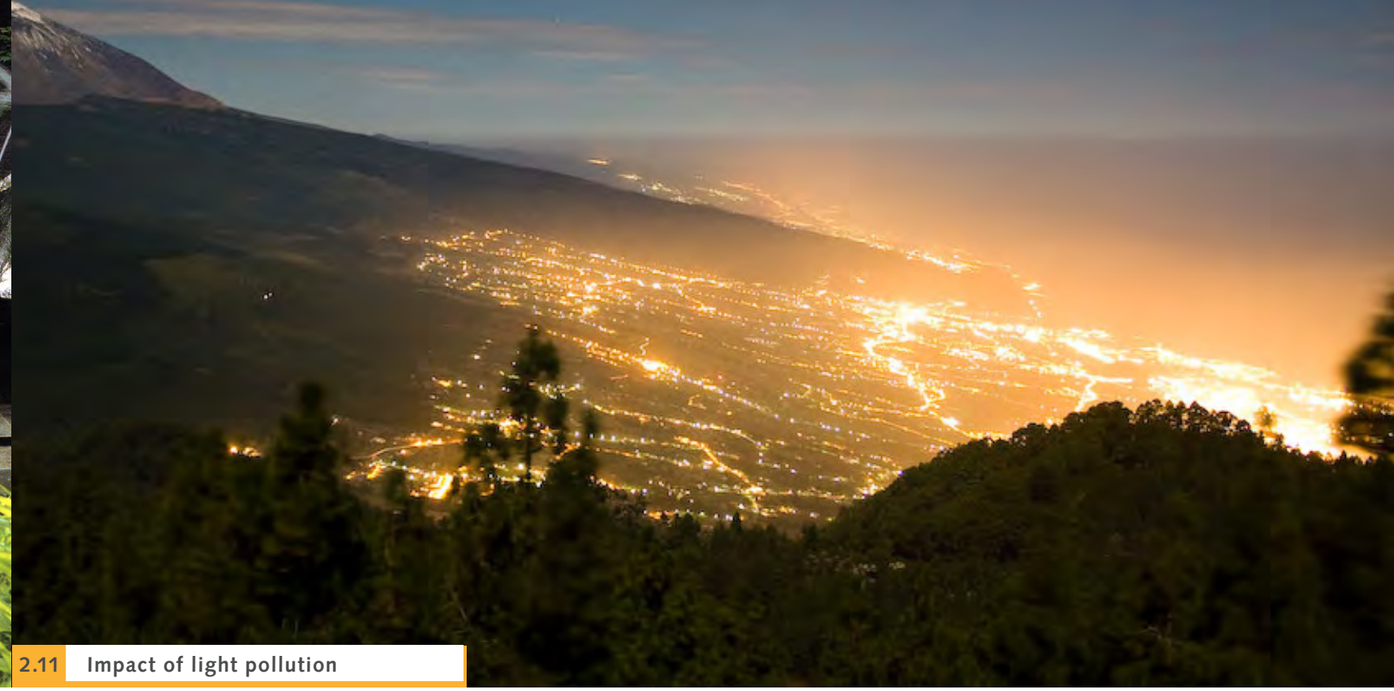
Trees in the urban landscape are not just individual plants, but rather comprise the forest that offers numerous benefits to communities. No longer just a handful of remnant trees that survived development, the urban forest is a critical component of the green infrastructure of a city, and should be managed as such.

An urban forest management program will provide a framework to ensure that the Brunswick Landing and Topsham Commerce Park trees and forests are appropriately cared for to meet community objectives. The development of such a plan, in keeping with the overarching Brunswick-Topsham urban forestry objectives, will ensure the long-term health, viability, and sustainability of trees in these areas.

The urban forest provides a number of tangible benefits:

- Stormwater capture and infiltration
- Noise and light pollution abatement
- Energy conservation through microclimate modification
- Habitat provision
- Streetscape beautification
- Sequestration of air pollutants
- Increased property value.

2.10 Water Gardens are ideal amenities



2.11 Impact of light pollution

Social Equity & Community Development

The more traditional sprawl development pattern is vehicle-dependent, given the larger geographical distances that are often covered. Vehicle-dependent development favors higher income brackets, and often works against the formation of a cohesive community. Widely spaced single-family lots, cul-de-sacs, and garages do not encourage neighborhood interaction, and do not facilitate moderate to high densities, multi-modal transportation, and walkable communities. Development that supports principles of social equity often inspires the creation of true community and sense of place. The Brunswick Landing and Topsham Commerce Park designs are based on the fundamental principles of smart growth that include a variety of land uses. This diversity provides attractive and practical residential housing for a broad demographic and socioeconomic range. The social development of 'community' could be fostered through the establishment of neighborhood associations and connections with local business development groups.

Public Amenities

Memorable spaces should have a variety of amenities that enhance the quality, visual character, and sense of community of the development. Public art, interpretive signage, and character-driven site furnishings add depth, comfort, and vitality to the urban landscape. The provision of unique and innovative public amenities will ensure that Brunswick & Topsham become destinations for residents and visitors alike. Parks, trails, plazas, and open space become the fabric of a neighborhood, and in turn the catalyst for community development.

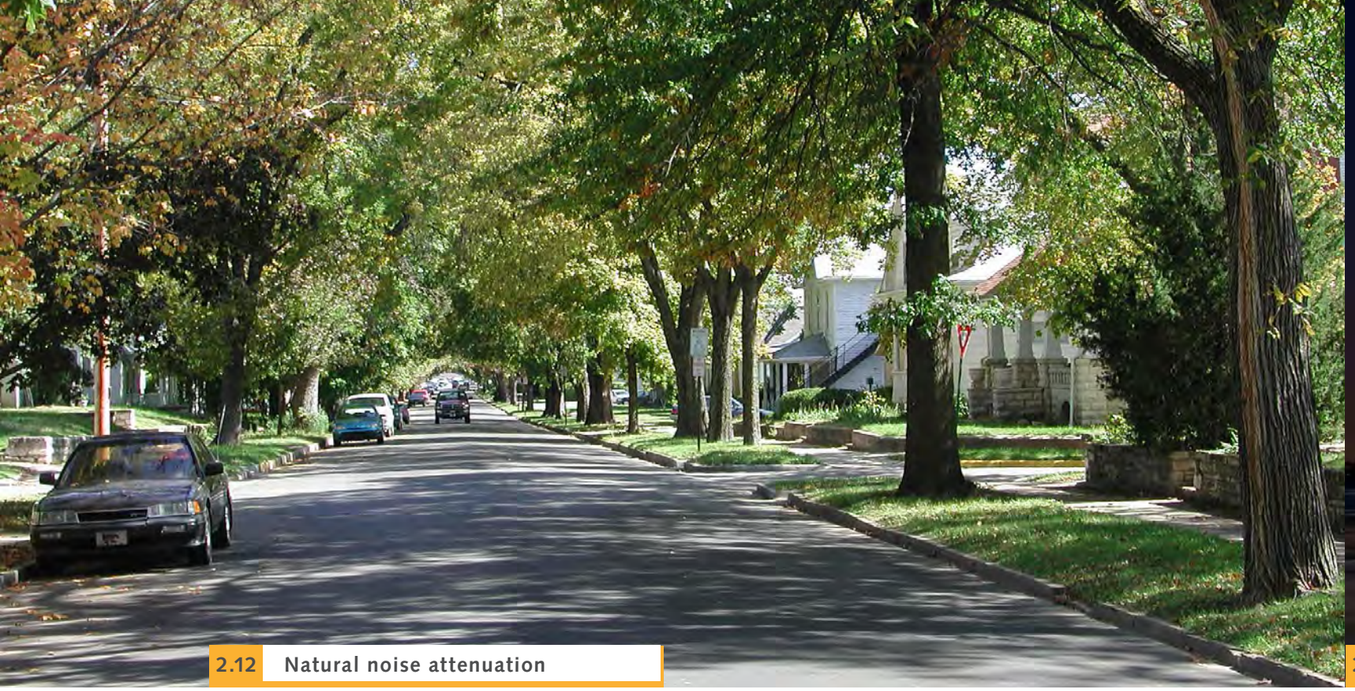
Light Pollution Abatement

Light pollution is often defined as excessive or obtrusive artificial light. The environmental and public health impacts of light pollution are often overlooked, but still have significant negative impacts. Over-illumination taxes the public electricity system, disrupts many aspects of nocturnal ecology, and may cause a variety of adverse human health conditions.

Energy efficient, dark-sky compliant light fixtures are specially designed to direct light downward, focusing on where the light is really needed. Streets, corridors, and plazas can still be effectively lit for visibility and security, while mitigating the negative impacts of light pollution, such as glare, over-illumination, sky glow, and light clutter.

Benefits of Light Pollution Abatement:

- Energy savings for the municipality.
- Greenhouse gas reduction, from the conservation of electricity.
- Glare reduction, leading to improved safety for night-time driving.
- Reduction in the disturbance of nocturnal ecology.
- Aesthetic benefits of improved vision of the night sky.
- Mitigation of the potential negative health impacts of over-illumination.



2.12 Natural noise attenuation

2.13 Example of contextual design

Acoustic Ecology

Noise pollution often occurs as a result of poor urban planning, when conflicting land uses are cited close together. Acoustic ecology is the study of soundscapes, and their impacts on human health and experiences. The impacts of a negative soundscape dominated by noise pollution are tangible; damage to human physiological and psychological health, characterized by hearing loss, stress, hypertension, or sleep disturbance.

Noise pollution also impacts the environment, creating stress for animals, interfering with their communication patterns, and disrupting predation regimes. Negative soundscapes will deter animal migration, and compromise habitat such that typical territories are drastically reduced in size. By considering the acoustic ecology of a landscape or neighborhood, smart planning strategies can seek to mitigate any detrimental environmental impacts of noise pollution.

Smart Growth planning suggests that locally undesirable land uses, such as those that detract from a positive soundscape, should be developed following existing patterns of transportation or land use, and not grouped together. In areas where negative noise generation is unavoidable, noise attenuation, soundscape cognizant design, and other design modifications should be employed to minimize the impacts to the neighborhood soundscape.

Contextual Design

Regional architecture has developed in response to climate and culture; the most appropriate and ecologically-sound buildings often grow out of local building traditions. Residential privacy should be ensured through conscious building design and site layout rather than by increased distances between dwellings.

Smart growth seeks to create interesting, unique communities, which reflect the values and cultures of the people who reside there, and foster the types of physical environments which support a more cohesive community fabric. It also supports development which uses natural and man-made boundaries and landmarks to create a sense of defined neighborhoods, towns and regions. Architectural and natural elements will help to create high-quality communities that reflect the interests of all residents; there is a greater likelihood that buildings (and therefore entire neighborhoods) will retain their economic vitality and value over time.