



CITY OF LONE TREE
www.cityoflonetree.com/green

SUSTAINABLE DEVELOPMENT GUIDE

The construction of environmentally-friendly developments are encouraged by the City of Lone Tree. The Sustainable Development Guide is a voluntary, self-directed resource designed to assist owners, builders and developers in the design and building process.

The guide combines the City of Lone Tree's Comprehensive Plan conservation objectives, the zoning code requirements and the Leadership in Energy and Environmental Design (LEED) Green Building Rating System. Links to local utility, state and federal rebate and incentive programs are included.

Sustainable buildings have a minimal negative impact on the environment because they incorporate water and energy conservation measures, protect our natural resources and reduce pollution. Attention to planning, design, material selection and construction results in highly functional, comfortable, cost-effective buildings that afford the highest possible level of environmental protection.

All sections noted herein refer to the City of Lone Tree zoning code: www.cityoflonetree.com/zoningcode.



ENERGY CONSERVATION OBJECTIVE:

PROTECT THE ENVIRONMENT AND CONSERVE NATURAL RESOURCES THROUGH ENERGY CONSERVATION AND THE PROPER DISPOSAL OF WASTE, REDUCTION IN USE OF MATERIALS, REUSE AND RECYCLING.

Construction Activity Pollution Prevention

Reduce pollution from construction activities by controlling soil erosion, waterway sedimentation and airborne dust generation. Employ strategies such as temporary and permanent seeding, mulching, earth dikes, silt fencing, sediment traps and sediment basins.



CITY OF LONE TREE SIP REQUIREMENT TO CITY ENGINEER:

Storm Drainage Design and Technical Criteria

Grading plan Sec. 16-27-140

Phase III drainage report and plan Sec. 16-27-150

Erosion control study and plan Sec. 16-27-160

Optimize Energy Performance

Achieve increasing levels of energy performance to reduce environmental and economic impacts associated with excessive energy use.



POTENTIAL TECHNOLOGIES & STRATEGIES:

Design the building envelope, HVAC, lighting, and other systems to maximize energy performance. Assess the energy performance and identify the most cost-effective energy efficiency measures.

RESOURCE AVAILABLE:

Xcel Energy Design Assistance Program offers energy-design consulting in order to build in energy efficiency: <http://www.xcelenergy.com/docs/retail/busmrkts/BusinessEnergyDesignAssistanceManualCO.pdf>

ConservationWise from Xcel Energy offers cash rebates for energy efficient equipment and mechanical system components: <http://www.xcelenergy.com/docs/ConservationProgramsSummariesCO.pdf>

Governor's Energy Office offers High Performance Design <http://www.colorado.gov/energy/commercial/performance-contracting.asp> and Performance Contracting Programs: <http://www.colorado.gov/energy/commercial/new-high-performance-design.asp>

Energy Star Rebate Finder locates rebates offered for Energy Star products: http://www.energystar.gov/index.cfm?fuseaction=rebate.rebate_locator

On-Site Renewable Energy

Encourage and recognize increasing levels of on-site renewable energy self-supply in order to reduce environmental and economic impacts associated with fossil fuel energy use.



POTENTIAL TECHNOLOGIES & STRATEGIES:

Assess the project for non-polluting and renewable energy potential including solar, wind, and geothermal.

RESOURCES AVAILABLE:

Governor's Energy Office offers Renewables in Performance Contracting Grants: http://www.colorado.gov/energy/in/uploaded_pdf/RenewablesinPerformanceContracting.pdf

Xcel Solar Rebate Program and Net Metering http://www.xcelenergy.com/XLWEB/CDA/0,3080,1-1-2_41004_43476-23075-2_358_568-0,00.html

Federal Tax Credits: http://www.energystar.gov/index.cfm?c=products.pr_tax_credits

Green Power

Encourage the development and use of grid-source, renewable energy technologies on a net zero pollution basis.



POTENTIAL TECHNOLOGIES & STRATEGIES:

Determine the energy needs of the building and investigate opportunities to engage in a green power purchase.

RESOURCES AVAILABLE:

Xcel Energy Windsource Program: http://www.xcelenergy.com/XLWEB/CDA/0,3080,1-1-2_41004_44018-221-2_358_568-0,00.html

Storage & Collection of Recyclables

Facilitate the reduction of waste generated by building occupants that is hauled to and disposed of in landfills.



POTENTIAL TECHNOLOGIES & STRATEGIES:

Coordinate the size, functionality and location of the recycling areas with the anticipated collection services for glass, plastic, office paper, and newspaper, cardboard and organic wastes to maximize the effectiveness of the dedicated areas.

CITY OF LONE TREE SIP REQUIREMENT:

Requirements specific to exterior trash bins Sec. 16-27-40 (6).

Building and Materials Reuse

Extend the life cycle of existing building stock, conserve resources, retain cultural resources, reduce waste and reduce environmental impacts of new buildings as they relate to materials manufacturing and transport.



POTENTIAL TECHNOLOGIES & STRATEGIES:

- Consider reuse of existing, previously occupied buildings, including structure, envelope and elements.
- Remove elements that pose contamination risk to building occupants and upgrade components that would improve energy and water efficiency such as windows, lighting, mechanical systems and plumbing fixtures.

Construction Waste Management

Divert construction, demolition and land-clearing debris from disposal in landfills and incinerators. Redirect recyclable recovered resources back to the manufacturing process. Redirect reusable materials to appropriate sites.



POTENTIAL TECHNOLOGIES & STRATEGIES:

- Establish goals for diversion from disposal in landfills and incinerators and adopt a construction waste management plan to achieve these goals.
- Consider recycling cardboard, metal, brick, acoustical tile, concrete, plastic, clean wood, glass, gypsum wallboard, carpet and insulation.
- Designate a specific area(s) on the construction site for segregated or comingled collection of recyclable materials, and track recycling efforts throughout the construction process.
- Identify construction haulers and recyclers to handle the designated materials.
- Note that diversion may include donation of materials to charitable organizations and salvage of materials on-site.
- Contact construction waste recycling companies such as <http://www.resourceyard.org> and www.waste-not.com.

Recycled Content

Incorporate the use of recycled content materials, thereby reducing impacts resulting from extraction and processing of virgin materials.



POTENTIAL TECHNOLOGIES & STRATEGIES:

Consider materials with recycled content such as concrete with fly ash, plastic lumber and handrails, cellulose insulation and interior finish materials.

REFERENCE AVAILABLE:

- USGBC Colorado Chapter LEED Materials and Resource Matrix spreadsheet for contact information on available products with recycled content, listed by division.
- <http://www.usgbccolorado.org/downloads/MaterialsMatrixv2.pdf>

Regional Materials

Increase demand for building materials and products that are extracted and manufactured within Colorado, thereby supporting the use of indigenous resources and reducing the environmental impacts resulting from transportation.



POTENTIAL TECHNOLOGIES & STRATEGIES:

Consider regional materials such as regionally produced materials such as unit and brick pavers, concrete with fly ash, metal framing and gypsum board.

REFERENCE AVAILABLE:

- USGBC Colorado Chapter LEED Materials and Resource Matrix spreadsheet for contact information on available products manufactured regionally, listed by division.
- <http://www.usgbccolorado.org/downloads/MaterialsMatrixv2.pdf>

Rapidly Renewable Materials

Reduce the use and depletion of finite raw materials and long-cycle renewable materials by replacing them with rapidly renewable materials.



POTENTIAL TECHNOLOGIES & STRATEGIES:

Consider materials such as bamboo, wool, cotton insulation, agrifiber, linoleum, wheat-board, strawboard and cork. During construction, ensure that the specified renewable materials are installed.

REFERENCE AVAILABLE:

- USGBC Colorado Chapter LEED Materials and Resource Matrix spreadsheet for contact information on available products that are made from renewable materials, listed by division.
- <http://www.usgbccolorado.org/downloads/MaterialsMatrixv2.pdf>

Certified Wood

Encourage environmentally responsible forest management.



POTENTIAL TECHNOLOGIES & STRATEGIES:

Use wood-based materials and products, which are certified in accordance with the Forest Stewardship Council's (FSC) Principles and criteria. http://www.fscus.org/green_building/

REFERENCE AVAILABLE:

- USGBC Colorado Chapter LEED Materials and Resource Matrix spreadsheet for contact information on available certified wood products, listed by division.
- <http://www.usgbccolorado.org/downloads/MaterialsMatrixv2.pdf>



ENVIRONMENTAL HAZARDS OBJECTIVE:

ENSURE THE SAFETY OF THE COMMUNITY AND THE PROTECTION OF PUBLIC AND PRIVATE PROPERTY THROUGH CAREFUL SITING, APPROPRIATE MONITORING, AND MITIGATION.

Site Selection

Reduce the environmental impact from the location of a building on a site.



POTENTIAL TECHNOLOGIES & STRATEGIES:

Select a suitable building location and design the building with the minimal footprint to minimize site disruption of those environmentally sensitive areas.

CITY OF LONE TREE SIP REQUIREMENT:

Clearing, Grading and Land Disturbance Article XXXI review issues

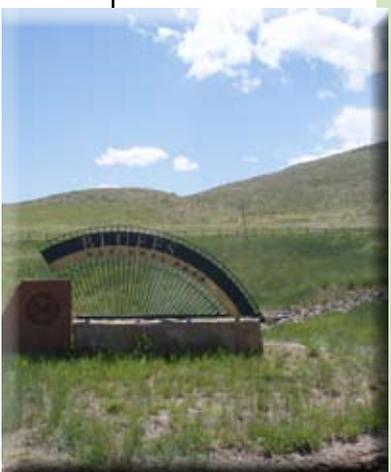


VEGETATION OBJECTIVE:

CONSERVE AND ENHANCE THE INTEGRITY OF THE NATURAL AND BUILT LANDSCAPE IN WAYS COMPATIBLE AND COMPLEMENTARY TO OUR CLIMATE.

Protect or Restore Habitat

Conserve existing natural areas and restore damaged areas to provide habitat and promote biodiversity.



POTENTIAL TECHNOLOGIES & STRATEGIES:

- Carefully site the building to minimize disruption to existing ecosystems and design the building to minimize its footprint.
- Strategies include stacking the building program, tuck-under parking and sharing facilities with neighbors.
- Establish clearly marked construction boundaries to minimize disturbance of the existing site and restore previously degraded areas to their natural state.
- Select appropriate native or adapted plant materials.
- Prohibit plant materials listed as invasive or noxious weed species.
- Native/adapted plants require minimal or no irrigation following establishment, do not require active maintenance such as mowing or chemical inputs such as fertilizers, pesticides or herbicides, and provide habitat value and promote biodiversity through avoidance of monoculture plantings.



WATER QUALITY OBJECTIVE:

PROTECT OUR WATER RESOURCES.

Stormwater Design: Quantity and Quality Control

Limit disruption of natural water hydrology by reducing impervious cover, increasing on-site infiltration, reducing or eliminating pollution from stormwater runoff, and eliminating contaminants. Limit disruption and pollution of natural water flows by managing stormwater runoff.



POTENTIAL TECHNOLOGIES & STRATEGIES :

Use alternative surfaces (e.g., vegetated roofs, pervious pavement or grid pavers) and nonstructural techniques (e.g., rain gardens, vegetated swales, disconnection of imperviousness, rainwater recycling) to reduce imperviousness and promote infiltration thereby reducing pollutant loadings.

Use sustainable design strategies (e.g., Low Impact Development, Environmentally Sensitive Design) to design integrated natural and mechanical treatment systems such as constructed wetlands, vegetated filters, and open channels to treat stormwater runoff.

CITY OF LONE TREE SIP REQUIREMENT:

Clearing, Grading and Land Disturbance Article XXXI reviewed by the Engineering Division

Conform to Storm Drainage Design and Technical Criteria

Water Efficient Landscaping

Limit or eliminate the use of potable water, or other natural surface or subsurface water resources available on or near the project site, for landscape irrigation.



POTENTIAL TECHNOLOGIES & STRATEGIES:

Use appropriate plant material and design the landscape with native or adapted plants to reduce or eliminate irrigation requirements. Where irrigation is required, use high-efficiency equipment and/or climate-based controllers.

CITY OF LONE TREE SIP REQUIREMENT:

Requirements specific to landscape plan Sec. 16-27-120, Sec. 16-27-130, Sec. 16-27-40 (2)

RESOURCES AND INCENTIVES:

Denver Water residential and commercial rebates available. <http://www.denverwater.org>



AIR QUALITY OBJECTIVE:

MINIMIZE AIR POLLUTION GENERATED BY CURRENT AND FUTURE DEVELOPMENT.

Heat Island Effect: Non-Roof

Reduce heat islands (thermal gradient differences between developed and undeveloped areas) to minimize impact on micro climate and human and wildlife habitat.



POTENTIAL TECHNOLOGIES & STRATEGIES:

- Shade constructed surfaces on the site with landscape features and utilize high-reflectance materials for hardscape.
- Consider replacing constructed surfaces (i.e. roof, roads, sidewalks, etc.) with vegetated surfaces such as vegetated roofs and open grid paving or specify high-albedo materials to reduce the heat absorption.

CITY OF LONE TREE SIP REQUIREMENT:

- Parking area to be surfaced with bituminous concrete, Portland Cement concrete or other similar material approved by City Engineer. Sec. 16-28-5

Heat Island Effect: Roof

Reduce heat islands (thermal gradient differences between developed and undeveloped areas) to minimize impact on microclimate and human and wildlife habitat.



POTENTIAL TECHNOLOGIES & STRATEGIES:

Consider installing high-albedo and vegetated roofs to reduce heat absorption. Product information is available from the Cool Roof Rating Council website, at www.coolroofs.org.

Fundamental Refrigerant Management

Reduce ozone depletion.



Specify new HVAC equipment in the base building that uses no CFC refrigerants.



VISUAL QUALITY OBJECTIVE:

PRESERVE OR ENHANCE THE NATURAL AND MAN-MADE VISUAL ENVIRONMENT.

Light Pollution Reduction

Minimize light trespass from the building and site, improve night time visibility through glare reduction, and reduce development impact on nocturnal environments.



POTENTIAL TECHNOLOGIES & STRATEGIES:

Maintain safe light levels while avoiding off-site lighting and night sky pollution. Minimize site lighting where possible and model the site lighting using a computer model. Technologies to reduce light pollution include full cutoff luminaires, low-reflectance surfaces and low-angle spotlights.

CITY OF LONE TREE SIP REQUIREMENT:

Lighting standards Article XXX

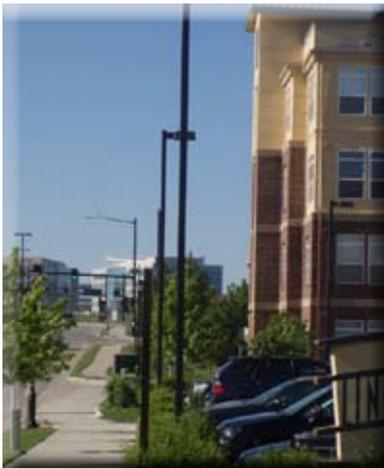


LAND USE OBJECTIVE:

ENCOURAGE QUALITY, MIXED-USE, COMPACT, AND PEDESTRIAN-FRIENDLY DEVELOPMENT.

Development Density & Community Connectivity

Design with the goal of minimizing automobile dependency.



POTENTIAL TECHNOLOGIES & STRATEGIES:

Identify services and amenities within ½ mile of the site and design sidewalks and trails to access such.



TRANSPORTATION GOAL:

OPTIMAL EFFICIENCY, CONNECTIVITY AND SAFETY IN THE TRANSPORTATION SYSTEM, INTEGRATED WITH SURROUNDING LAND USES AND ENVIRONMENTAL CONDITIONS.

Public Transportation Access

Reduce pollution and land development impacts from automobile use.



POTENTIAL TECHNOLOGIES & STRATEGIES:

Perform a transportation survey of future building occupants to identify transportation needs. Identify measures and connections that facilitate mass transit use.

Bicycle Storage & Changing Rooms

Reduce pollution and land development impacts from automobile use.



POTENTIAL TECHNOLOGIES & STRATEGIES:

Design the building with transportation amenities such as bicycle racks and showering/changing facilities.

CITY OF LONE TREE SIP REQUIREMENT:

Required bicycle parking facilities to be provided as per Sec. 16-28-80

Low Emitting & Fuel Efficient Vehicles

Reduce pollution and land development impacts from automobile use.



POTENTIAL TECHNOLOGIES & STRATEGIES:

- Provide transportation amenities such as alternative fuel refueling stations and electrical hookups for future electric car commuting. Consider sharing the costs and benefits of refueling stations with neighbors.
- Provide premium parking areas (next to building entries) for fuel efficient cars and car pooling.

Parking Capacity

Reduce pollution and land development impacts from single occupancy vehicle use.



POTENTIAL TECHNOLOGIES & STRATEGIES:

Minimize parking lot/garage size. Consider sharing parking facilities with adjacent buildings. Consider alternatives that will limit the use of single occupancy vehicles.

CITY OF LONE TREE SIP REQUIREMENT:

Conform to Parking Standards Article XXVIII

Required bicycle parking facilities to be provided as per Sec. 16-28-80

GREEN BUILDER OF THE YEAR AWARD

AN ANNUAL AWARD WILL BE GIVEN TO RECOGNIZING RESIDENTIAL OR COMMERCIAL BUILDERS WHO HAVE DEMONSTRATED AN OUTSTANDING COMMITMENT TO SUSTAINABLE DEVELOPMENT. RECOGNITION BY THE MAYOR AND CITY COUNCIL, LOCAL MEDIA AND WEBSITE. AN EXCELLENT OPPORTUNITY TO BE RECOGNIZED FOR YOUR BUSINESSES' EFFORTS!