

**City of Boston Environment Department Guidelines for High Performance Buildings and Sustainable Development**

These Guidelines are designed to protect, in both the short and long term, the environmental health of those who live and work in Boston and to preserve and promote the integrity of our natural resources. Informational materials and Guidelines should be used as a resource for minimizing the environmental impacts of proposed projects.

<b>Sustainable Buildings</b>	<p>The buildings that we live and work in today have substantial impacts upon the environment and human health. The construction and operation of buildings unnecessarily depletes limited natural resources, contributes to pollution and uses excessive amounts of energy – approximately one-third of all the energy consumed in the U.S., and two-thirds of all electricity. There are now proven technologies and methods that help the environment and add value to our homes and businesses by increasing energy efficiency, improving interior comfort and occupant productivity, and reducing operation and maintenance costs. The development of high performance buildings is accomplished by integrating sustainable design methods and resource efficient technologies and materials into every aspect of a project’s development and operational life cycle. It requires an assessment of interrelationships between the building, its siting and occupants, as well as the interrelationships between the individual components of a building (i.e. windows, lighting, HVAC) and how they affect one another’s operation and energy use. The results will conserve limited natural resources, provide for a healthy work and living environment and increase the long-term value of a project.</p>
	<p>The United States Green Building Council (USGBC) provides a comprehensive guide for sustainable building practices through its <b>Leadership in Energy &amp; Environmental Design (LEED™)</b> standards. LEED™ is a green building rating and certification system, which evaluates environmental performance from a “whole building” perspective over a structure’s life cycle. The LEED Rating System can be downloaded at: <a href="http://www.usgbc.org">www.usgbc.org</a> 202-828-7422</p>
Sustainable Design Resources and Examples	<ul style="list-style-type: none"> <li>• Sustainable Building Industry Council <a href="http://www.sbicouncil.org">www.sbicouncil.org</a> 202-628-7400</li> <li>• U.S. DOE Office of Building Technology, State and Community Programs – design approaches and software applications: <a href="http://www.eren.doe.gov/buildings/highperformance/">http://www.eren.doe.gov/buildings/highperformance/</a></li> <li>• Minnesota Sustainable Design Guide: <a href="http://www.sustainabledesignguide.umn.edu">www.sustainabledesignguide.umn.edu</a></li> <li>• BuildingGreen – Publishers of Environmental Building News: <a href="http://www.buildinggreen.com">www.buildinggreen.com</a> 802-257-7300</li> <li>• Advanced Building Contractors: <a href="http://www.advancedbuildings.com/">http://www.advancedbuildings.com/</a> 515-964-2345</li> <li>• Center of Excellence for Sustainable Development: <a href="http://www.sustainable.doe.gov/buildings/gbintro.shtml">www.sustainable.doe.gov/buildings/gbintro.shtml</a></li> <li>• Sustainable Building Resource – comprehensive information search engine: <a href="http://www.iris.ba.cnr.it/sustain/welcome.asp">www.iris.ba.cnr.it/sustain/welcome.asp</a></li> <li>• Green Building Resource Center – includes more than 600 green building resources: <a href="http://www.greendesign.net/gbrc/index.html">http://www.greendesign.net/gbrc/index.html</a></li> <li>• Green Building Design and Construction – sustainable building tool kit and implementation plan: <a href="http://www.ciwmb.ca.gov/GreenBuilding/">http://www.ciwmb.ca.gov/GreenBuilding/</a></li> <li>• EPA Greenbuildings: <a href="http://www.epa.gov/greenbuilding/">http://www.epa.gov/greenbuilding/</a> 703-308-7255</li> <li>• Greenbuilding Commissioning Resources: <a href="http://www.energy.state.or.us/bus/comm/bldgcx.htm">http://www.energy.state.or.us/bus/comm/bldgcx.htm</a></li> <li>• Building Science Consortium – design and technical resources: <a href="http://www.buildingscience.com">www.buildingscience.com</a></li> <li>• Hickory Consortium – Boston area green building projects: <a href="http://www.hickoryconsortium.org/projects.htm">www.hickoryconsortium.org/projects.htm</a> 978-456-6950</li> <li>• U.S. Green Building Council Web Resources: <a href="http://www.usgbc.org/Resources/links.asp">www.usgbc.org/Resources/links.asp</a></li> </ul>
Guide for Greenbuildings Specifications	<ul style="list-style-type: none"> <li>• <a href="http://www.ciwmb.ca.gov/GreenBuilding/Specs/default.htm">Construction Specifications Institute's (CSI) MasterFormat.™</a> <a href="http://www.ciwmb.ca.gov/GreenBuilding/Specs/default.htm">www.ciwmb.ca.gov/GreenBuilding/Specs/default.htm</a> 800-689-2900</li> </ul>
Sustainable Building Products	<ul style="list-style-type: none"> <li>• Oikos provides a search engine for green building materials: <a href="http://www.oikos.com/products/index.lasso">www.oikos.com/products/index.lasso</a></li> <li>• U.S. Environmental Protection Agency information on recycled content construction products: <a href="http://www.epa.gov/cpg">www.epa.gov/cpg</a>, and environmental preferable products: <a href="http://www.epa.gov/oppt/epp">www.epa.gov/oppt/epp</a></li> <li>• The Guide to Resource Efficient Building Elements: <a href="http://www.crbt.org">www.crbt.org</a> 406-549-7678</li> <li>• Eco-Products supply of green building materials, recycled products for the home, office and the building industry: <a href="http://www.ecoproducts.com">www.ecoproducts.com</a> 303-449-1876.</li> <li>• NAHB Research Center – click on Tool Base Services for extensive general information on energy efficient materials and methodologies <a href="http://www.nahbrc.org">www.nahbrc.org</a> 800-565-2842</li> <li>• Environmentally Preferable Purchasing Guide: <a href="http://www.swmcb.org/EPPG/1_1.htm">http://www.swmcb.org/EPPG/1_1.htm</a></li> <li>• Greenguard: <a href="http://www.greenguard.org/products/productguide.asp">http://www.greenguard.org/products/productguide.asp</a> 800-427-9681</li> </ul>

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Life Cycle Analysis	<p>LCA is a cradle-to-grave assessment of the environmental impacts of buildings and building products, from raw material extraction, to processing, waste generation, transportation, product use and disposal. The following provide further information and LCA tools:</p> <ul style="list-style-type: none"> <li>• The Athena™ Sustainable Materials Institute: <a href="http://www.athenasmi.ca/index.html">http://www.athenasmi.ca/index.html</a></li> <li>• Building for Environmental and Economic Sustainability – software for balancing the environmental and economic performance of building products. <a href="http://www.bfrel.nist.gov/oe/software/bees.html">http://www.bfrel.nist.gov/oe/software/bees.html</a></li> </ul>
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**Components of Sustainable Design**

<b>1. Energy Conservation</b>	<p>New construction and rehabilitation projects provide an opportunity to protect the environment and minimize utility costs for future owners and occupants with the installation of energy and resource conserving devices. Through purchasing energy efficient appliances, lighting, heating/cooling systems and managing energy use, conservation of existing energy resources can be realized.</p>			
	<p>The following resources provide information on ways to improve energy conservation beyond that required by Commonwealth of Massachusetts State Building Code (CMR 780, Commercial Code Ch. 13, Residential Code Appendix J). State Code establishes the minimum requirements for envelope, HVAC, power and lighting systems but does not represent state-of-the-art practices and technologies for energy and resource conservation and protection. Free software and additional information available at: <a href="http://www.state.ma.us/bbrs/energy.htm">http://www.state.ma.us/bbrs/energy.htm</a></p>			
<b>Information on Energy Savings &amp; Resources for Calculating Savings</b>	<ul style="list-style-type: none"> <li>• General information on energy savings technology and practices: <a href="http://www.energy.gov/efficiency/">http://www.energy.gov/efficiency/</a>; <a href="http://www.homeenergy.org/">www.homeenergy.org/</a>; <a href="http://www.homeenergysaver.lbl.gov/">http://www.homeenergysaver.lbl.gov/</a></li> <li>• Resources to calculate energy savings: <a href="http://www.eren.doe.gov/buildings/building_america/performance_analysis.shtml">http://www.eren.doe.gov/buildings/building_america/performance_analysis.shtml</a>; <a href="http://www.eren.doe.gov/buildings/highperformance/simulation_software.html">http://www.eren.doe.gov/buildings/highperformance/simulation_software.html</a></li> </ul>			
<b>Resources for Grants, Tax Exemptions and Energy Savings Programs</b>	<ul style="list-style-type: none"> <li>• American Council for an Energy Efficient Economy - database provides information on energy efficiency programs delivered through public benefit mechanisms and/or utility rate funding: <a href="http://www.aceee.org/new/eedb.htm">http://www.aceee.org/new/eedb.htm</a></li> <li>• Nstar Programs – information on rebates and resources for answering energy conservation questions: <a href="http://www.nstaronline.com/index2.asp?lk=home">http://www.nstaronline.com/index2.asp?lk=home</a></li> <li>• Masselectric - energy savings programs: For businesses: <a href="http://www.masselectric.com/bus/effic/index.htm">http://www.masselectric.com/bus/effic/index.htm</a> For residential: <a href="http://www.masselectric.com/res/conserv/index.htm">http://www.masselectric.com/res/conserv/index.htm</a></li> <li>• Massachusetts Technological Collaborative - is the state's development agency for renewable energy. MTC provides grants for green building and renewable energy projects: <a href="http://www.mtpc.org/">http://www.mtpc.org/</a></li> <li>• Massachusetts Incentives for Renewable Energy – provides information on state tax exemptions, deductions and grant programs associated with renewable and energy efficient technologies: <a href="http://www.dsireusa.org/library/includes/map2.cfm?CurrentPageID=1&amp;State=MA">http://www.dsireusa.org/library/includes/map2.cfm?CurrentPageID=1&amp;State=MA</a></li> <li>• Smart Communities Network – information on mortgage programs that promote energy efficiency: <a href="http://www.sustainable.doe.gov/financing/green.shtml">http://www.sustainable.doe.gov/financing/green.shtml</a></li> </ul>			
<b>Energy Star/Green Lights Program</b>	<p>A U.S. Environmental Protection Agency's (EPA), program that offers assistance with strategic energy management and energy efficiency resulting in air pollution prevention and cost savings for participants.</p>	<ul style="list-style-type: none"> <li>- Resources for benchmarking building's energy performance.</li> <li>- Online directory to identify companies providing products and services related to energy efficiency in buildings.</li> </ul>	<p>Related Websites are: <a href="http://www.energystar.gov/">www.energystar.gov/</a> Energy saving services and products at <a href="http://www.epa.gov/asap">www.epa.gov/asap</a> 888-782-7937</p>	<p>Residential Commercial Industrial Institutional Mixed use</p>
<b>The Energy Efficiency and Renewable Energy Clearinghouse (EREC)</b>	<p>Funded by the U.S. Department of Energy (DOE), EREC provides answers to questions regarding energy efficient and renewable energy technologies.</p>	<ul style="list-style-type: none"> <li>- Information is available on such topics as efficient commercial and residential equipment and materials, renewable energy and industrial technologies.</li> </ul>	<p>Submit questions at: <a href="http://www.eren.doe.gov/askanenergyexpert/">http://www.eren.doe.gov/askanenergyexpert/</a>, or call 1-800-DOE-EREC (363-3732).</p>	<p>Residential Commercial Industrial Institutional Mixed use</p>

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<b>Energy Efficiency and Renewable Energy Network (EREN)</b>	A DOE sponsored program, EREN is a comprehensive resource for energy efficiency and renewable energy information.	- The EREN website contains more than 600 links and 800 documents including case studies, building energy data and building information.	<a href="http://www.eren.doe.gov">www.eren.doe.gov</a>	Residential Commercial Industrial Institutional Mixed use
<b>Rebuild America Solution Center</b>	A DOE program providing step by step information on how to build, renovate or retrofit energy efficient buildings.	- Website has calculators for determining energy savings and return on investment. - Provides directories, guides and software to assist with each phase of project planning, construction and operations.	<a href="http://www.rebuild.org/SolutionCenter/productservices.asp">Http://www.rebuild.org/SolutionCenter/productservices.asp</a>	Residential Commercial Industrial Institutional Mixed use
<b>Energy Management and Control Systems</b>	Provides a centralized and comprehensive method of monitoring mechanical and electrical systems to allow optimum comfort and energy savings.	- Automatically adjusts heating, air conditioning and ventilation in a building based upon changes in ambient temperature and operating conditions.	<a href="http://www.ledalite.com/markets/energy/index.html">Http://www.ledalite.com/markets/energy/index.html</a> <a href="http://www.jci.com/cg/">Http://www.jci.com/cg/</a>	Commercial Industrial Institutional Mixed use
<b>1.1 Renewable Energy Technologies</b>	Renewable energy technologies derive electricity, heat and mechanical power from continually replenished energy sources, such as the sun, wind, water, the Earth's heat, and plants. Compared with non-renewable fossil fuels, renewables present far fewer environmental and health impacts, allow for energy independence and provide high-skilled jobs that contribute to the domestic economy.			
	<ul style="list-style-type: none"> <li>• The State Division of Energy Resources provides a Renewable Energy &amp; Distributed Generation Guidebook for developers. The website also has guides for energy savings and related tax incentives: <a href="http://www.state.ma.us/doer/programs/renew/renew.htm">www.state.ma.us/doer/programs/renew/renew.htm</a></li> <li>• Resource for businesses that provide renewable energy technologies: <a href="http://energy.sourceguides.com/index.shtml">http://energy.sourceguides.com/index.shtml</a></li> </ul>			
<b>1.1.1 Solar</b>				
Passive Solar Design (daylighting)	Utilizes indirect sun light for heating and ventilation through non-mechanical design methods.	- A building's overall orientation and massing should be designed to optimize the sun's natural heat and light. - The location of windows and louvers assist with building ventilation. - Choices of building materials are important for insulation and maintaining heat gain. - SolarTubes bring natural daylight into interior rooms and are relatively easy to retrofit into an existing house.	<a href="http://www.greenbuilder.com/sourcebook/PassiveSol.html">www.greenbuilder.com/sourcebook/PassiveSol.html</a>  Solar tubes consists of a clear dome that collects sunlight into a highly polished and reflective tube that reflects the light down to a diffuser on the ceiling. <a href="http://www.solatube.com/home.htm">www.solatube.com/home.htm</a> , <a href="http://www.suntunnel.com/">www.suntunnel.com/</a>	Residential Commercial Industrial Institutional Mixed use
Active Solar	Utilizes solar energy to provide hot water and home heating.	- Solar hot water systems utilize solar collectors – panels - to heat water or heat transfer fluid, which flows through the collectors for home hot water use or heating. - Systems can also utilize photovoltaic powered pumps.	<a href="http://www.fsec.ucf.edu/solar/">http://www.fsec.ucf.edu/solar/</a>	Residential Commercial Industrial Institutional Mixed use

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Photovoltaic Panels and Roof Shingles	Contain cells made of silicon crystals that convert solar energy into usable electricity.	<ul style="list-style-type: none"> <li>- Makes solar energy immediately available for electrical uses.</li> <li>- Panels are light and may be installed in numerous places on a building's exterior.</li> <li>- Energy can also be stored in batteries for later use or transferred to the electric grid for a credit on utility bills.</li> </ul>	<a href="http://www.oksolar.com">www.oksolar.com</a> 954-704-0457 <a href="http://www.eren.doe.gov/buildings/solar_pv.html">www.eren.doe.gov/buildings/solar_pv.html</a> The DOE Office of Energy Efficiency and Renewable Energy is sponsoring the Million Solar Roofs Initiative (Initiative). For More Information: <a href="http://www.eren.doe.gov/millionroofs">www.eren.doe.gov/millionroofs</a>	Residential Commercial Industrial Institutional Mixed use
<b>1.1.2 Geothermal</b>	Geothermal heat pumps utilize the constant temperature (50-60 degrees) within the earth for building heating, cooling and hot water.	<ul style="list-style-type: none"> <li>- The heat pump transfers the heat from a heat exchanger into the building's air handling system to warm the building in the winter. The process is reversed in summer months.</li> <li>- Heat pumps are generally more efficient and require less maintenance than oil and gas based systems.</li> <li>- There are also heat pump applications utilizing seawater in the same way.</li> </ul>	Manufacturers: <a href="http://www.northeastgeo.com/default.html">http://www.northeastgeo.com/default.html</a> 603-362-4666 <a href="http://www.geoexchange.org">www.geoexchange.org</a> 202-508-5500 General info: <a href="http://www.soundgt.com">www.soundgt.com</a> (has cost savings estimator function) <a href="http://yosemite1.epa.gov/estar/consumers.nsf/content/hvac.htm">http://yosemite1.epa.gov/estar/consumers.nsf/content/hvac.htm</a> ; <a href="http://www.repp.org/geothermal/index.html">http://www.repp.org/geothermal/index.html</a>	Residential Commercial Industrial Institutional Mixed use

**2. Building Design Components and Materials**

<b>2.1 Roofing</b>	The roof is a key component of the building envelope and must be constructed to protect the structure and prevent heat transfer.			
Cool Roofing	Highly reflective and emissive roofing materials that stay 50 to 60 degrees Fahrenheit cooler during peak summer conditions than traditional asphalt shingles.	<ul style="list-style-type: none"> <li>- Reduce heat load on building, lessening demands on air conditioning system.</li> <li>- More durable than asphalt roofs.</li> <li>- Reduce outside air temperatures, mitigating smog formation.</li> </ul>	<a href="http://www.energystar.gov/products">http://www.energystar.gov/products</a> <a href="http://eetd.lbl.gov/CoolRoofs/">http://eetd.lbl.gov/CoolRoofs/</a> <a href="http://www.coolroofusa.com">www.coolroofusa.com</a> 626-852-1220 <a href="http://www.jpselastomerics.com/roofing/index4.html">www.jpselastomerics.com/roofing/index4.html</a>	Residential Commercial Industrial Institutional Mixed use
Eco-roofs	Establish vegetation on parts, or all of building roof areas.	<ul style="list-style-type: none"> <li>- Retain rainwater, reducing stormwater flows.</li> <li>- Reduces heat load on building and utility demands.</li> <li>- Extend roof life.</li> </ul>	<a href="http://www.greenroofs.com">www.greenroofs.com</a> <a href="http://www.peck.ca/grhcc/main.htm">http://www.peck.ca/grhcc/main.htm</a> 416-971-4494	Residential Commercial Industrial Institutional Mixed use
<b>2.2 Heating and Air Conditioning</b>	Heating, air conditioning and ventilation systems can account for over 40% of utility bills for commercial and residential buildings. Building design can assist in reducing loads on HVAC systems by considering natural lighting and ventilation, passive solar heating and cooling, and the lighting load of the building.			

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	<ul style="list-style-type: none"> <li>Constructing a building heating system that is 20 percent more efficient than the standards of the American Society of Heating, Refrigerating and Air- Conditioning Engineers, Inc. (ASHRAE) can cost 0.5 to 2 percent more than the less efficient standard with a two to three year payback time. A system that is 30 percent more efficient can cost one to three percent more with a payback period of five to seven years.</li> </ul>			
Flash Heaters	Tankless water heaters that utilize a heat exchanger to provide immediate hot water close to the demand source.	<ul style="list-style-type: none"> <li>Provide constant hot water on demand.</li> <li>Avoids use of traditional water tank where 15% of energy is lost through continual re-heating</li> </ul>	<a href="http://www.controlledenergy.com/ed">www.controlledenergy.com/ed</a> 800-642-3199	Residential Institutional Mixed use
Water Heater Jackets	Insulation that fits around water heaters.	<ul style="list-style-type: none"> <li>Reduces heat loss from tank.</li> </ul>		Residential
Programmable Thermostats	Allow for preset temperature to be maintained in one or several rooms of a building during different times of the day	<ul style="list-style-type: none"> <li>Prevent heating and cooling when buildings are unoccupied, saving up to 20-30%.</li> <li>Maintain consistent comfort.</li> <li>A set temperature is important, as a degree or two change can effect heating and cooling bills by two to three percent</li> </ul>		Residential
Whole House Fans	Utilize outdoor air to vent and cool building by pulling rising hot air, which enters a residence through windows, and pushes the air through vent louvers in the upper floors, or attic.	<ul style="list-style-type: none"> <li>Systems continually move a volume of air through the home, keeping temperatures comfortable.</li> <li>Reduce air conditioning use.</li> </ul>	<a href="http://www.wholehousefan.com/">http://www.wholehousefan.com/</a> 888-845-6597 <a href="http://www.superioratticfans.com/">http://www.superioratticfans.com/</a> 630-205-FANS <a href="http://www.attic-air.com/">http://www.attic-air.com/</a>	Residential
Variable Speed Ceiling Fans	Adjust fan speed to efficiently maintain air circulation and comfort in warmer months and destratify warmer air that collects near the ceiling in colder weather.	<ul style="list-style-type: none"> <li>Reduce load on HVAC system.</li> </ul>		Residential Commercial Industrial Institutional Mixed use
Air Conditioning Systems	Systems must be sized based upon load demand and the volume of the structure, not the square footage of the building. Units that are too large are not effective because they only run for short periods of time, which does not adequately dehumidify the air. Constant cycling of air conditioning systems increases wear, utility costs and noise. Systems need to be located and oriented away from residences to prevent noise problems.		Air Conditioning Contractors of America's Manual MAScheck and COMcheck software programs: <a href="http://www.state.ma.us/bbrs/software_download.htm">http://www.state.ma.us/bbrs/software_download.htm</a>	
<b>2.3 Insulation</b>	Efficient heating and cooling systems will not realize their full cost savings potential without adequate insulation. A properly insulated building creates a thermal barrier which minimizes the transfer of heat through the walls, ceiling, and floor. All gaps, voids and leaks in the building envelope must be filled when installing insulation material.			
	<ul style="list-style-type: none"> <li>Insulation is measured by its R-value, which is the level of resistance to heat transfer per inch of the insulating material. The higher the R-Value the better the performance of the insulation. More information at <a href="http://www.simplyinsulate.com">www.simplyinsulate.com</a></li> </ul>			
Cellulose Insulation	Consists of waste paper products, such as recycled newspapers, mixed with a binder.	<ul style="list-style-type: none"> <li>May be chemically treated with borates so that it is resistant to fire, insects and fungus.</li> <li>Does not contain formaldehyde, like</li> </ul>	<a href="http://www.cellulose.org/">www.cellulose.org/</a> 888-881-2462 <a href="http://www.ci.austin.tx.us/greenbuilder/glfs_insulation.htm">www.ci.austin.tx.us/greenbuilder/glfs_insulation.htm</a>	Residential Commercial Mixed use

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		<p>fiberglass, and is therefore a healthier option.</p> <ul style="list-style-type: none"> <li>- Has an R-Value of 3-3.7/inch</li> </ul>		
Insulated Concrete Forms	Hollow panels or blocks made of foam plastic stacked into the shape of a building's exterior walls and then filled with concrete.	<ul style="list-style-type: none"> <li>- Panels can be installed quickly</li> <li>- Flexible with size based upon structural and insulating requirements.</li> <li>- Use 40% less for heating and 30% less for cooling than wood framed structures.</li> </ul>	<a href="http://hem.dis.anl.gov/eehem/98/980712.html">http://hem.dis.anl.gov/eehem/98/980712.html</a>	Residential Commercial Industrial Institutional Mixed use
Structural Insulated Panels	Rigid foam insulation between oriented strand board, used for floors, ceilings and walls	<ul style="list-style-type: none"> <li>- Since insulation is part of panel there is less waste and assists in creating an airtight seal of the building envelope.</li> <li>- More efficient than standard frame walls and utilize less timber</li> </ul>	<a href="http://www.sips.org/">www.sips.org/</a> 253-858-7472	Residential Commercial Industrial Institutional Mixed use
<b>2.4 Windows</b>	The frame and glass of a window allow for heat transfer between the outside and interior of a building. Energy efficient windows have double or triple panes, which insulate more effectively than a single pane, and also serve as a sound barrier to exterior noise. The following window technologies provide for better interior lighting and improve energy performance and interior comfort. Two or more of these applications are often combined in a window.			
	<ul style="list-style-type: none"> <li>• The National Fenestration Rating Council (NFRC) label certifies windows based upon their energy saving performance <a href="http://www.nfrc.org">www.nfrc.org</a> 301-589-1776. The lower the U-value, or the higher the R-value, the better the insulation. In colder climates, a U-value of 0.35 or below is recommended. These windows have at least double glazing and low-e coating.</li> <li>• For more information about windows: <a href="http://www.aamanet.org/">www.aamanet.org/</a>; <a href="http://www.efficientwindows.org/">www.efficientwindows.org/</a> 202-530-2231; <a href="http://windows.lbl.gov/">http://windows.lbl.gov/</a></li> </ul>			
Glazing (glass)	Heat-Absorbing Glazing (tinted glass) – where the glass has been chemically altered to absorb light and heat.	<ul style="list-style-type: none"> <li>- Glass often appears gray or blue green in color. Does allow for heat transfer into building and does not control heat loss. Can also be a coating.</li> </ul>		Residential Commercial Industrial Institutional Mixed use
Glazing Coatings	Low-(e) Glazings – A thin film applied to the outer surface of the inner panes of glass of double-pane windows.	<ul style="list-style-type: none"> <li>- The coating reflects heat back into a building during the winter months and reduces heat gain during the summer.</li> <li>- May cost about 10% to 15% more than regular windows, but can reduce energy loss by as much as 30% to 50%.</li> </ul>		Residential Commercial Industrial Institutional Mixed use
	Spectrally Selective Coatings – Another low-e technology that allow for higher levels of natural light to enter a building.	<ul style="list-style-type: none"> <li>- Allow the same amount of sunlight to be transferred as standard glass, but filter out from 40% to 70% of the heat normally transmitted.</li> <li>- Can be applied to tinted glass to increase or decrease levels of heat gain.</li> </ul>		Residential Commercial Industrial Institutional Mixed use
	Reflective Coatings – Greatly reduce level of sun light allowed into building	<ul style="list-style-type: none"> <li>- Block more light than solar heat gain. When applied to tinted or clear glass</li> </ul>		Residential Commercial



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		heat transmission can be reduced.		Industrial Institutional Mixed use
Frames & Gas Fill	Framing material and presence of gas between panes can further reduce conductivity of window	<ul style="list-style-type: none"> <li>- Frames constructed of wood, vinyl or fiberglass provide better insulation than those made of metal.</li> <li>- Argon or Krypton gas between panes reduce heat transfer.</li> </ul>		Residential Commercial Industrial Institutional Mixed use
<b>2.5 Lighting</b>	Lighting accounts for approximately 30% of energy use for businesses and 20% for residences. Lighting should be designed with consideration given to the site layout of the structure, available natural light, hours of use, types of use and those that will be occupying the building. Buildings that have excess lighting capacity are uncomfortable for occupants and produce additional heat, increasing demands on the cooling load.			
T-8, T-5 and Compact Fluorescents	Fluorescent lighting fixtures last 10-times longer than incandescent bulbs and require one sixth of the wattage.	<ul style="list-style-type: none"> <li>- T-5 lamps (5/8" in diameter) are newer and 10 - 15% more efficient than the T-8 systems</li> <li>- May also incorporate dimmable ballasts to adjust lighting levels and further reduce energy use.</li> <li>- Utilize electronics ballasts as opposed to electromagnetic ballasts, as they operate more quietly and efficiently in converting power to light.</li> </ul>	More information on lighting: <a href="http://www.eren.doe.gov/EE/buildings_lighting.html">http://www.eren.doe.gov/EE/buildings_lighting.html</a>	Commercial Industrial Institutional Mixed use
Photosensors	Optimize ambient light levels by adjusting electronic ballasts.	<ul style="list-style-type: none"> <li>- System raises light levels when the ambient light is low to maintain uniform lighting throughout the day.</li> </ul>		Commercial Industrial Institutional Mixed use
Occupancy Sensors	Turning lights on when motion is detected, and shutting them off after a specified period without motion.	<ul style="list-style-type: none"> <li>- May be used in conjunction with photocensors for improved energy savings.</li> </ul>		Commercial Industrial Institutional Mixed use
Specular Reflectors	Constructed of highly reflective, mirror-like material, these devices can be installed within existing lighting systems to direct light out of the fixture more efficiently.	<ul style="list-style-type: none"> <li>- Using specular reflectors with T-8 lamps and electronic ballasts will often reduce the number of lamps required by half and energy costs by 70%.</li> </ul>		Commercial Industrial Institutional Mixed use
Zoned Lighting	Enables centralized programming of a building's lighting system	<ul style="list-style-type: none"> <li>- Automatically shuts off lighting in specific areas of a building based upon schedule and use.</li> <li>- Occupancy and photocensors may also be incorporated into these systems.</li> </ul>	<a href="http://www.lightcontrol.net">www.lightcontrol.net</a> 954-448-4554 Lighting Management Systems: <a href="http://www.lutron.com/microwatt/">http://www.lutron.com/microwatt/</a> 610-282-3800	Commercial Industrial Institutional Mixed use
Exterior Lighting	Lighting choices should serve operational and security needs while not adding to light pollution	<ul style="list-style-type: none"> <li>- Lighting may be upgraded from incandescent to Compact Fluorescents and set on a timer.</li> </ul>	The <a href="#">Good Neighbor Outdoor Lighting</a> information is an excellent guide to urban lighting design:	Residential Commercial Industrial Institutional

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		<ul style="list-style-type: none"> <li>- Replacing mercury vapor street lighting fixtures with high-pressure sodium, can cut energy use by 50%.</li> <li>- Metal halide lighting may require more frequent replacement than high-pressure sodium but is preferred due to its luminescent quality and is less visible off-site.</li> <li>- Fixtures should be directed downward or shielded.</li> </ul>	<a href="http://www.darksky.org/handouts/gnol.html">http://www.darksky.org/handouts/gnol.html</a>	Mixed use
<b>2.6 Plumbing &amp; Water Conservation</b>	Reducing water use will provide water and sewer bill savings and help relieve limitations to water supply caused by circumstances such as drought. Sites with general water conservation tips: <a href="http://www.waterwiser.org">www.waterwiser.org</a> ; <a href="http://www.mwra.com/water/html/watsav.htm">www.mwra.com/water/html/watsav.htm</a>			
Low Flow Plumbing Fixtures	Sensor-operated sinks with water conserving aerators and sensor-operated toilets should be installed.	<ul style="list-style-type: none"> <li>- These fixtures can reduce water consumption by 50%.</li> </ul>		Commercial Industrial Mixed use
Low Flush Toilets	Toilets utilize the most water in a household – up to 40%.	<ul style="list-style-type: none"> <li>- Low flush systems include Gravity Tanks, Flushometers and Pressurized Tank Toilets (if retrofitting, make certain existing plumbing can accommodate these systems).</li> <li>- Existing toilets should be retrofitted with toilet dams or other water-saving devices.</li> </ul>	<a href="http://www.mwra.com/water/html/lctilet.htm">www.mwra.com/water/html/lctilet.htm</a> 617-788-1170	Residential Commercial Industrial Mixed use
Efficient Appliances	Replacing clothes and dishwashing appliances provides opportunities to save water, time and money.	<ul style="list-style-type: none"> <li>- Energy Star certified clothes washers use 30-50% less water and 50-60% less energy, and cause less wear on clothing.</li> <li>- Front loading clothes washers require less water than top loading units.</li> <li>- Efficient dishwashers require only 6-10 gallons per wash, opposed to 20 gallons for hand washing.</li> </ul>	<a href="http://www.energystar.gov/products/appliances.shtml">www.energystar.gov/products/appliances.shtml</a>	Residential Institutional
Water Recovery Systems	Gray Water Systems use dish, shower, sink and laundry water (non-toilet), which comprises 50-80% of residential wastewater, for uses such as landscaping. Systems such as SmartStorm™ capture rooftop runoff for non-potable residential uses and allows for recharge of extra water.	<ul style="list-style-type: none"> <li>- Requires less energy and chemical use.</li> <li>- Reduces flows to treatment plants and waterways.</li> <li>- Recharges groundwater.</li> <li>- Can provide water for irrigation.</li> <li>- Reduces demands on potable water sources.</li> </ul>	Information: <a href="http://www.graywater.net">www.graywater.net</a> ; <a href="http://www.clivusmultrum.com">www.clivusmultrum.com</a> 800-4-CLIVUS SmartStorm™ information at: <a href="http://www.crwa.org">www.crwa.org</a>	Residential Commercial Institutional
<b>2.7 Air Quality</b>	Indoor air quality is an increasing concern for public health as many of us spend up to 80% of our day indoors, either at work or at home. Inside buildings we can be exposed to chemical and microbial agents at far greater concentrations than outdoors. Careful			



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	choices in building materials and properly sized and functioning ventilation systems can assist in reducing exposure to chemicals that are off-gassed from building materials and prevent Sick Building Syndrome. The following are Options for Improving Indoor Air Quality.			
Air Handling System	System should have adequate means for the intake of fresh air and each room should have an air supply vent.	<ul style="list-style-type: none"> <li>- The amount of outdoor air needed in a building should, in part, be based upon the number of people who will occupy the space.</li> <li>- Air intake and exhaust vents should be located at least 10-feet above public ways and away from areas such as loading docks where vehicles idle.</li> </ul>		Residential Commercial Industrial Institutional Mixed use
HVAC Equipment	Sick Building Syndrome is often caused by poor filtration and airflow causing increased humidity and moisture within the building.	<ul style="list-style-type: none"> <li>- Systems need to be maintained regularly to ensure equipment is functioning efficiently.</li> <li>- Systems need to be sized properly with consideration give to number of occupants and building design factors such as natural lighting and ventilation, passive solar heating and cooling, and the lighting load of the building.</li> <li>- Systems should not be sized by the square footage of the building alone.</li> </ul>	Systems should be operated to Standard 62-1989 of the American Society of Heating, Refrigerating and Air-Conditioning Engineers.	Residential Commercial Industrial Institutional Mixed use
Interior Building Materials, Finishes and Floor Coverings	Indoor chemical contaminants are emitted from solvent based adhesives, upholstery, particleboard, carpeting, and interior paints and finishes. These materials can off-gas formaldehyde and volatile organic compounds (VOCs).	<ul style="list-style-type: none"> <li>- Low/No-VOC interior paints and wood finishes on the market and are manufactured without toxins such as mercury, lead, cadmium and chromium.</li> <li>- Allow time for building materials in new or remodeled areas to off-gas pollutants before occupancy.</li> <li>- Replace water damaged carpeting and ceiling tiles.</li> </ul>		Residential Commercial Industrial Institutional Mixed use
Carbon Monoxide Monitors	Enclosed structures where combustion appliances and vehicles are present can lead to dangerous levels of CO.	<ul style="list-style-type: none"> <li>- Parking structures should be equipped with CO monitors that have direct read meters as well as visual and audible alarms.</li> </ul>		Residential Commercial Industrial Institutional Mixed use
<b>2.8 Noise</b>	The Regulations for the Control of Noise in the City of Boston, administered by the Boston Air Pollution Control Commission (APCC) through this department, limit noise levels in the city. Noise affecting a residence, regardless of the zoning status of the noise source, cannot exceed 60dBA from 7:00 a.m. to 6:00 p.m. and cannot exceed 50 dBA from 6:00 p.m. to 7:00 a.m. Sound attenuation barriers and enclosures may be necessary to comply with the standards.			
HVAC Equipment and Rooftop Mechanical	Equipment cycles on and off during daytime and nighttime hours disturbing	<ul style="list-style-type: none"> <li>- Systems should be located and oriented away from residences.</li> </ul>		Residential Commercial

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Systems	residents and employees.	oriented away from residences. - Equipment should be properly sized to serve the proposed project but should not provide excess capacity.		Industrial Institutional Mixed use
Emergency Generators	Most are diesel engines without substantial muffler systems.	- Generators should only be tested the minimum number of times recommended by the manufacturer and when ambient noise levels in the area are high. - Should be located away from residences.		Residential Commercial Industrial Institutional Mixed use
Loading/Delivery Areas	Deliveries often occur during the night and can disturb area residents.	- Enclosed or screen areas with adequate noise attenuation barriers.		Commercial Industrial Institutional

**3. The Building Site**

<b>3.1 Stormwater</b>	One the greatest challenges to preserving and maintaining our wetlands and waterways is the control of non-point source pollution. With each rainstorm numerous pollutants including animal waste, residue from automobiles, sediment, lawn fertilizers and pesticides are swept into the stormwater system and discharged to the area rivers and harbor.			
Stormwater Management	Improve site infiltration to reduce runoff velocities and erosion, and improve water quality	- Refer to the Massachusetts Department of Environmental Protection's <u>Stormwater Management Policy and Handbook</u> . - Utilize systems such as SmartStorm™ which capture rooftop runoff for non-potable residential uses and allow for recharge.	DEP's Stormwater Handbook at: <a href="http://www.state.ma.us/dep/brp/stormwtr/stormpub.htm">http://www.state.ma.us/dep/brp/stormwtr/stormpub.htm</a> 978-661-7660 SmartStorm™ information at: <a href="http://www.crwa.org">www.crwa.org</a>	Residential Commercial Industrial Institutional Mixed use
Protection of Catch Basins	Maintenance and cleaning of catch basins (storm drains) not located on public streets is the responsibility of the property owner.	- To educate the public and prevent illegal dumping into drains property owners should install a permanent plaque or stencil their catch basins with a "Don't Dump" message.	Information on stencils and castings can be obtained from the Boston Water & Sewer Commission 617-989-7000. Click on Education heading: <a href="http://www.bwsc.org/tab_menu/frameset3.htm">http://www.bwsc.org/tab_menu/frameset3.htm</a>	Residential Commercial Industrial Institutional Mixed use
Reduce Nitrates and Phosphate Use	These substances are introduced into waterbodies through animal waste, lawn fertilizers and laundry detergents entering stormwater systems. The resulting algae blooms kill aquatic organisms.	- Clean up after your pets. - Utilize sodium-free deicing materials. - Utilize non-phosphate laundry detergents. - Use lawn fertilizer sparingly and never before rain events.	Click on Education heading: <a href="http://www.bwsc.org/tab_menu/frameset3.htm">http://www.bwsc.org/tab_menu/frameset3.htm</a> 617-989-7000	Residential Commercial Industrial Institutional Mixed use
Road Salt and Deicing Practices	Spring thaws can load waterbodies with sodium that has accumulated due to the application of salt in winter months.	- The storage of salt, sand and other deicing chemicals should be located away from waterbodies and areas		Residential Commercial Industrial

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	Material such as sand may also clog storm drains and discharge outfalls.	<p>where they can infiltrate into groundwater.</p> <ul style="list-style-type: none"> <li>- Snow removed from roadways and walkways cannot be discharged into Boston Harbor or other waterbodies.</li> <li>- Regularly sweep sidewalks and driveways to remove excess sand.</li> </ul>		Institutional Mixed use
<b>3.2 Landscaping</b>	Sustainable landscaping reduces use of resource intensive and polluting materials to maintain plantings and locates vegetation in areas where it may assist in reducing heating and cooling loads on buildings.			
Strategic Landscaping	Utilizes native plant species, compliments existing habitats, conserves water and energy, mitigates stormwater runoff and reduces chemical herbicides and fertilizers.	<ul style="list-style-type: none"> <li>- Plant deciduous trees to provide shade in summer months.</li> <li>- Vine trellises provide shading for structures.</li> <li>- Plants should be a combination of drought tolerant species and those that do not require extensive irrigation.</li> <li>- Utilize plants that are compatible with the surrounding environment.</li> </ul>	<a href="http://www.greengardener.org/information.html">www.greengardener.org/information.html</a> ; <a href="http://www.epa.gov/glnpo/greenacres/toolkit/index.html">www.epa.gov/glnpo/greenacres/toolkit/index.html</a> <a href="http://www.greenbuilder.com/sourc ebook/xeriscape.html">www.greenbuilder.com/sourc ebook/xeriscape.html</a> ; <a href="http://www.csu.org/xeri/">www.csu.org/xeri/</a>	Residential Commercial Industrial Institutional Mixed use
Rainwater Recovery	Rain Gardens utilize barrels to capture rainwater from roof gutters and discharge water through a sand filter to garden plants. SmartStorm™ also captures rooftop runoff for non-potable residential uses such as car washing and allows for recharge of extra water.	<ul style="list-style-type: none"> <li>- Purifies water and greatly reduces stormwater runoff.</li> <li>- Self sufficient irrigation system.</li> <li>- Reduces demands on potable water sources.</li> </ul>	SmartStorm™ information at: <a href="http://www.crwa.org">www.crwa.org</a>	Residential
Irrigation	Efficient irrigation systems will improve the health of landscape vegetation while saving water.	<ul style="list-style-type: none"> <li>- Established grasses and shrubs only need one inch of water per week.</li> <li>- Lawn watering should occur in the early morning or evening hours to reduce evaporation.</li> <li>- Sprinkler systems should include timers, tensionmeters (soil moisture indicators), and rainfall sensors.</li> </ul>	<a href="http://www.mwra.state.ma.us/water/html/gardening.htm">http://www.mwra.state.ma.us/water/html/gardening.htm</a> 617-242-SAVE <a href="http://www.miniclik.com/800-476-0260">http://www.miniclik.com/800-476-0260</a>	Residential Commercial Institutional
Integrated Pest Management (IPM)	A technique that involves two or more control strategies in suppressing pests that is safer, more cost-effective and more ecologically sound than the traditional use of pesticide.	<ul style="list-style-type: none"> <li>- Landscape design and plantings can assist in reducing damage to vegetation by pests and infestation of adjoining buildings.</li> </ul>	IPM Based Landscape Design: <a href="http://www.efn.org/~ipmpa/D-Mhome.html">http://www.efn.org/~ipmpa/D-Mhome.html</a>	Residential Commercial Industrial Institutional Mixed use
Cool Paving	Cool Paving technologies have higher reflectivity (albedo), resulting in less heat absorption and reflection.	<ul style="list-style-type: none"> <li>- Reduces Heat Island Effect which effects air quality and indoor air temperatures.</li> <li>- Less stress upon material, extending the durability and lifetime of material.</li> </ul>	<a href="http://www.pavingexpert.com/permabl1.html">www.pavingexpert.com/permabl1.html</a>	Residential Commercial Industrial Institutional Mixed use

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Permeable Pavement	Allows rainwater to infiltrate through paving.	- Reduces stormwater runoff and assists with irrigation.	<a href="http://www.greenbuilder.com/sourcebook/PerviousMaterials.html">www.greenbuilder.com/sourcebook/PerviousMaterials.html</a> <a href="http://www.interlockonline.com/environ.html">www.interlockonline.com/environ.html</a> 800-572-3189	Residential Commercial Industrial Institutional Mixed use
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**4. Building Operation**

<b>4.1 Pest Management</b>	Pesticides are present in the buildings we work and live in, as well as the outdoor environs. They include herbicides, insecticides and fungicides, utilized to repel pests ranging from mice to weeds to viruses. Due to their number and broad application, pesticides can present a health hazard for individuals and the environment.			
Integrated Pest Management (IPM)	A technique that involves two or more control strategies in suppressing pests that is safer, more cost-effective and more ecologically sound than the traditional use of pesticide.	<ul style="list-style-type: none"> <li>- Evaluate potential areas of harborage and infestation and eliminate accessibility and upgrading sanitation and maintenance facilities.</li> <li>- Begin during construction so that the completed facility is less likely to provide areas of access and harborage.</li> </ul>	Further information can be obtained from the New England Pest Control Association (781-899-5843). New England Pest Management Association: <a href="http://www.nepma.org/">http://www.nepma.org/</a> ; Integrated Pest Management Information Service: <a href="http://www.efn.org/~ipmpa/">http://www.efn.org/~ipmpa/</a>	Residential Commercial Industrial Institutional Mixed use
<b>4.2 Solid Waste and Recycling</b>	State law (310 CMR 19.017) bans the disposal of recyclables in solid waste facilities. Recycling will help to extend the life of landfills and minimize the pollutants emitted by incinerators.			
Residential Recycling	Items accepted for recycling include glass containers, metal containers, cardboard, newsprint, white paper, milk cartons, juice boxes and plastic containers designated from 1 to 7.	<ul style="list-style-type: none"> <li>- Homes and apartment buildings should have adequate sorting, storage and pick-up space.</li> </ul>	<a href="http://www.cityofboston.gov/publicworks/recycling.asp">http://www.cityofboston.gov/publicworks/recycling.asp</a> 617-635-4959 For large apartment buildings contact: John McCarthy at 617-635-4959 <a href="http://www.state.ma.us/dep/recycle/consumer.htm">http://www.state.ma.us/dep/recycle/consumer.htm</a>	Residential
Non-Residential Recycling	Massachusetts businesses generate over 4.5 million tons of waste - more than half of all waste sent to landfills and combustion facilities in the Commonwealth each year, according to Mass DEP. Numerous opportunities now exist for businesses to reduce, reuse and recycle materials ranging from paper to computer monitors.	<ul style="list-style-type: none"> <li>- WasteCap of Massachusetts produces the <a href="#">Recycling Service Directory and Markets Guide for Massachusetts</a>, which provides information on recycling service providers who accept, collect or purchase recyclable materials and recycling market information.</li> <li>- WasteCap provides technical assistance to businesses interested in establishing recycling programs.</li> </ul>	WasteCap Directory: Municipalities and other government entities: 617-338-2255, or 800-462-0444. Businesses/private institutions can call 617-236-7715 or e-mail a request to: <a href="mailto:wastecap@wastecap.org">wastecap@wastecap.org</a> . <a href="http://www.wastecap.org/">http://www.wastecap.org/</a> ; <a href="http://www.state.ma.us/dep/recycle/business.htm">http://www.state.ma.us/dep/recycle/business.htm</a>	Commercial Industrial Institutional Mixed use
Hazardous Materials	The proper handling and disposal of hazardous household materials is key to reducing human and environmental	<ul style="list-style-type: none"> <li>- Projects that will be occupied by individuals or companies using hazardous materials, should include</li> </ul>	The Boston Public Works Department has designated days and locations for	Residential Commercial Industrial

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	exposure to toxic substances.	<p>the means for proper storage and disposal plan for such materials.</p> <ul style="list-style-type: none"> <li>- In work/live condominium developments, the deeds or by-laws of the condominium association should contain a provision requiring compliance with such a plan.</li> </ul>	household hazardous waste drop off. For information contact: 617-635-4959.	Institutional Mixed use
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**5. Historic & Existing Resources**

<b>The Boston Landmarks Commission (BLC)</b>	BLC staff of can assist property owners in identifying the history, style and significance of an existing property. In addition, the BLC reviews proposed new construction in addition to BRA staff if historic resources are affected. The staff will also assist with the application process for demolition under Article 85 of the Boston Zoning Code.			
Building Materials	Projects should be constructed with traditional building materials and techniques rather than synthetic composite materials.	<ul style="list-style-type: none"> <li>- Simulated materials such as exterior insulated finish systems (EIFS), and glass fiber reinforced concrete (GFRC) are inconsistent with Boston architecture and unlikely to withstand decades of the City's freeze-and-thaw climate.</li> </ul>	Please contact the Commission at 617-635-3850 to discuss material choices.	Residential Commercial Institutional Mixed use
Corner Stones	The BLC requests that dated cornerstones be incorporated into all new construction.	<ul style="list-style-type: none"> <li>- This element will allow those who value the architecture of the City to appreciate the historical context in which structures were conceived.</li> </ul>		Residential Commercial Institutional Mixed use
Building Subsidence	This process undermines building foundations through the fluctuation of the groundwater tables caused by construction related excavation and dewatering activities.	<ul style="list-style-type: none"> <li>- Please refer to <i>Geotechnical &amp; Groundwater Considerations</i> in the Construction Guidelines for measures to monitor and prevent subsidence.</li> </ul>	<a href="http://bostongroundwater.org/">http://bostongroundwater.org/</a>	Residential
Building Reuse	Recycling existing buildings can preserve cultural resources and provide savings on building materials and infrastructure	<ul style="list-style-type: none"> <li>- Reduces development of open space.</li> <li>- Saves materials and energy.</li> <li>- Can revitalize downtown areas and neighborhoods.</li> <li>- Preserve quality workmanship and aesthetics.</li> </ul>		Residential Commercial Industrial Institutional Mixed use

**6. Transportation**

<b>6.1 Transportation Demand Management</b>	Transportation Demand Management is intended to help further the goal of minimizing localized air quality impacts by increasing transit and high occupancy vehicle (HOV) use by commuters. Programs such as Commuter Check ( <a href="http://www.commutercheck.com">www.commutercheck.com</a> ) should be considered, which offer a tax-free employee benefit that reduces the cost of transit. Further information may be obtained through <b>CARAVAN for Commuters, Inc. at 10 Park Plaza, Suite 2180, Boston, MA 02116</b> or at <b>1-888-4-COMMUTE (1-888-426-6883)</b> , <a href="http://www.commute.com">www.commute.com</a> . Additional TDM measures include:
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	<b>General Measures</b>	<ul style="list-style-type: none"> <li>• An on-site Transportation Coordinator.</li> <li>• Joining and actively participating in a Transportation Management Association (TMA) <a href="http://www.masscommute.com/index.html">http://www.masscommute.com/index.html</a>.</li> <li>• Guaranteed Ride Home program for non-drivers and HOV users.</li> <li>• Offering a parking “cash out” option if free or subsidized parking is a benefit.</li> <li>• Maintaining a database of employee information for ridematching/planning purposes – home address, commuting mode.</li> <li>• Outdoor bicycle storage space for visitors, messengers, etc., as recommended by the Boston Transportation Department.</li> </ul>
	<b>Information</b>	<ul style="list-style-type: none"> <li>• Posting public and private transit routes (including water), schedules and rates.</li> <li>• Providing the same information on Web sites and through e-mails, newsletters and at employee orientations.</li> <li>• On-site availability of public and private transit schedules.</li> <li>• Promote special events such as National Bike Week.</li> </ul>
	<b>Public Transit-Related</b>	<ul style="list-style-type: none"> <li>• Transit pass subsidies for all employees with a <i>pro rata</i> subsidy for part-timers.</li> <li>• Pre-tax payroll deduction for MBTA pass purchase.</li> <li>• On-site MBTA pass sales.</li> <li>• Bikes on buses.</li> <li>• Park and Ride lot locations: <a href="http://www.ctps.org/bostonmpo/info/pnr/pr.htm">http://www.ctps.org/bostonmpo/info/pnr/pr.htm</a></li> </ul>
	<b>Bicycle/Walk-Related</b>	<ul style="list-style-type: none"> <li>• Secure bicycle storage in an area protected from the elements (for commuters)</li> <li>• Additional bicycle storage for short-term users.</li> <li>• Showers and changing rooms/lockers.</li> </ul>
	<b>Auto/Vehicle-Related</b>	<ul style="list-style-type: none"> <li>• Offering incentives such as preferential parking or reduced-rate parking for high occupancy vehicle (HOV) commuting (three or more commuters).</li> <li>• Providing one or more parking spaces for carpool vehicles.</li> <li>• Providing van/carpooling matching services.</li> <li>• Offering occasional parking for transit commuters who may sometimes need to drive.</li> <li>• Maintaining a Zipcar™ (<a href="http://www.zipcar.com">www.zipcar.com</a>) or other car-sharing vehicle space on-site.</li> <li>• Establishing parking rate structures to discourage commuter use.</li> <li>• If establishing shuttle services, contract with one that uses clean (alternative) fueled vehicles.</li> <li>• Providing electric vehicle recharging stations.</li> </ul>
	<b>Other</b>	<ul style="list-style-type: none"> <li>• When parking is off-site, assign parking based upon trip origin so that commuters are not driving across town.</li> <li>• Offering direct deposit of paychecks.</li> <li>• An on-site ATM.</li> <li>• Options for flextime and telecommuting.</li> <li>• Shared services with neighbors such as a cafeteria to reduce lunchtime vehicle trips or showers and changing/locker rooms to encourage biking and walking.</li> <li>• Establishing a local hiring program (Walk to Work).</li> </ul>
	<b>Hotel and Convention-Specific</b>	<ul style="list-style-type: none"> <li>• On-site car rental or special arrangements with car rental agency to provide car at hotel.</li> <li>• Send transit information (MBTA, water shuttle, etc.) to those reserving a room and all registrants of conferences or seminars held at the facility.</li> </ul>



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	<b>Residence-Specific</b>	<ul style="list-style-type: none"> <li>• Maintaining a Zipcar™ (<a href="http://www.zipcar.com">www.zipcar.com</a>) or other car-sharing vehicle space on-site.</li> <li>• Bicycle storage space in accordance with ratio recommended by the Boston Transportation Department.</li> </ul>
<b>6.2 Parking Freeze</b>	Several areas of Boston are covered by a “Parking Freeze”, which is an air quality regulation that limits the parking supply. Those areas include Downtown proper, East Boston and South Boston. Developers proposing changes to the parking supply should contact the Boston Air Pollution Control Commission at 617-635-3850, to determine whether the Freeze applies. Other parking regulations are included in the Boston Zoning Code and through the Boston Transportation Dept.	

<b>Green Campus Resources</b>	<ul style="list-style-type: none"> <li>• Brown University: <a href="http://www.brown.edu/Departments/Brown_Is_Green/">http://www.brown.edu/Departments/Brown_Is_Green/</a></li> <li>• Harvard Green Campus Initiative: <a href="http://www.greencampus.harvard.edu/">http://www.greencampus.harvard.edu/</a></li> <li>• EPA Green Campus Initiatives - This site provides a listing of World Wide Web addresses for several public and private organizations that are involved in the important issues of greening their campus: <a href="http://www.epa.gov/region1/steward/univ/sus.html">http://www.epa.gov/region1/steward/univ/sus.html</a></li> <li>• University of Buffalo: <a href="http://wings.buffalo.edu/ubgreen/index.htm">http://wings.buffalo.edu/ubgreen/index.htm</a></li> <li>• University of Colorado at Boulder – Green Campus Blueprint: <a href="http://www.colorado.edu/cuenvironmentalcenter/projects/greening_cu/2000/page4.html">http://www.colorado.edu/cuenvironmentalcenter/projects/greening_cu/2000/page4.html</a></li> <li>• Sustainable Development on Campus: <a href="http://iisd1.iisd.ca/educate/">http://iisd1.iisd.ca/educate/</a></li> <li>• The Greening of Campus: <a href="http://www.islandpress.org/economics/energy/greencamp.html">www.islandpress.org/economics/energy/greencamp.html</a></li> </ul>
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The Guidelines are compiled from and modeled after many existing resources, including the City of New York High Performance Building Guidelines and information on green building and sustainability provided by the City of Portland Oregon and the City of Austin Texas.