Meeting Date: 03/09/09	Item Number: A-2
AGENDA ITEM: Introduction of Ordinance Amending Chapter 15.02, Buildings, Structures and Equipment, of the Culver City Municipal Code, to Add a New Subchapter 15.02.1100, et seq. Entitled "Green Building Program and Requirements."	

ATTACHMENTS: **PAGES**

Green Building Chronology

- April 2004, two voluntary informational green building handouts were developed and available to the public at the Building Safety information counter.

- February 2005 the City Council considered an item; a "Discussion of Future Green Building Standards in Culver City".

- November 2006 the City Council directed staff to form a **Sustainable City Plan** (SCP). To achieve this; an "Interdepartmental Sustainable Culver City Green Team" was formed consisting of City staff members from several different departments and a City Council subcommittee. The plan includes five overall goal areas: Resource Conservation, Environmental Pollution and Public Health Protection, Solid Waste Diversion and Recycling, Open Space and Land Use, and Community Education and Civic Participation.

- May 2007 Culver City was host to an American Institute of Architects "Sustainable Design Assessment Team" (SDAT). Culver City received technical assistance under the SDAT Program and conducted community outreach through charrette style workshops from which a final report has been received and is being evaluated by staff.

- July 2007 City staff obtained California Energy Commission approval of a Culver City mandatory solar photovoltaic requirement.

- August 2007 the City Council approved the Mayor signing the "U.S. Conference of Mayors Climate Protection Agreement", with a broad goal of reducing greenhouse emissions and global warming.

- February 2008 the City Council gave final approval to a mandatory solar photovoltaic requirement for new construction, additions, and major renovations over 10,000 square feet.

- March 2008 the City Council discussed several green building options, including the green building programs of Santa Monica, West Hollywood, Pasadena, and Manhattan Beach.

- May 2008 City staff hosted a meeting of local green building stakeholders; local design professionals and energy and green environment experts to discuss green building options.

- July 2008 City staff refined the green building options and hosted the second meeting with the green building stakeholders. City staff also met with the City Council Sustainable City subcommittee to discuss overall sustainable City direction.

- July 2008 City staff met again with the City Council sustainable City subcommittee to discuss green building direction.

- August 2008 City staff met with the City Council Sustainable City subcommittee to discuss overall sustainable City direction and this report.

- September 2008 City Council green building discussion item. # options were discussed; staff received direction.

- October 2008 City staff met with the City Council sustainable City subcommittee to discuss the latest green building direction.

- November 2008 City staff met with the City Council sustainable City subcommittee and hosted the third meeting with the the green building stakeholder group, including local general contractors and local business representatives, to discuss the latest green building direction.

City of Culver City, California

City Council Agenda Item Report

Meeting Date: 9.22.08	Item Number: A-2
AGENDA ITEM: Discussion of Green Building Standards in Culver City	
Contact Person/Dept.: Craig Johnson Sol Blumenfeld	Phone Number: 310-253-5802 310-253-5702
Fiscal Impact: Yes [X] No []	General Fund: Yes [X] No []
Public Hearing: [X]	Action Item: [] Attachments: [x]
Public Notification: Master E-Mail Notification List (09/17/08), public stakeholders, public speakers at past green building City Council discussions. Advertisement in *Culver City Observer* (9/18/08)	
Department Approval: Sol Blumenfeld (09/16/08)	City Attorney Approval: Carol Schwab (by H. Baker) (09/16/08)
Chief Financial Officer Approval: Jeff Muir (by N. Kimball) (09/17/08)	City Manager Approval: Jerry Fulwood (09/17/08)

RECOMMENDATION

Staff recommends the City Council discuss proposed green building standards and provide direction to staff.

BACKGROUND

The purpose of this report is to provide a menu both to require and encourage green building in the City. The recommendations contained herein are intended to build on the successful work that has been accomplished over the last two years. These efforts are summarized on the attached chronology. (Attachment No. 1).

DISCUSSION

In keeping with Culver City's leadership in the areas of environmental stewardship, the City has taken certain steps regarding the problems of rising energy costs and global warming have prompted the City to consider a more sustainable approach to the way buildings are planned and constructed. "Green" buildings are more energy efficient, reduce solid waste during construction, reduce environmental pollution and conserve natural resources. Green buildings create healthier work, learning, and living environments with more natural light and cleaner air, contributing to improved health, comfort, and productivity.

Staff has focused initially on green building as an important component of sustainability. Other program considerations and sustainable measures may be coordinated through the Sustainable City Plan and focus on the areas of conservation, land use and waste diversion.

In looking at best practices of current green building programs operating in Santa Monica, West Hollywood and other nearby cities (Attachment No. 2), staff has prepared three green building options for the City Council's consideration. These options range from incentive programs to mandatory construction requirements for new development. Staff recommends that the City Council consider implementing one or more of the following green building options:

Option 1: Incentive Program for LEED Certification and "Green Zone" Program

Option 2: Mandatory New Development Requirements

Option 3: Mandatory Green Building Point System.

Option 1: Incentive Programs for LEED Certification & Green Zone Program

LEED Certification Incentive Program

This option proposes a partial permit fee refund for projects obtaining Leadership in Energy and Environmental Design (LEED) Certification. Building permit fee refunds are an incentive to developers, but do not fully cover the costs of obtaining LEED certification. LEED is the third party review and green building rating system which offers four certification levels for new construction: Certified, Silver, Gold, and Platinum. These levels correspond to five green design categories: sustainable sites, water efficiency, energy and atmosphere, materials and resources and indoor environmental quality. The LEED certification adds from 6% to 9% to overall building permit costs.

Staff proposes the City establish a fee refund schedule as follows:

- 20% of the building permit fee for projects obtaining LEED certified status
- 30% of the building permit fee for projects obtaining LEED silver status
- 40% of the building permit fee for projects obtaining LEED gold status
- 50% of the building permit fee for projects obtaining LEED platinum status

Example of New Development and LEED Certification Costs:

New Development (square footage)	Valuation	Approximate Building permit fees*	Certified 6% of project valuation	Silver 7% of project valuation	Gold 8% of project valuation	Platinum 9% of project valuation
117,000	$14.7 Million	$90,000	$882,000	$1,030,000	$1,176,000	$1,323,000

- *excluding plan check fees and all other City fees and charges, and excluding the costs of the other civil, fire, mechanical, electrical, and plumbing permits that may be typically expected with a project of this type.*

It is important to note that the typical Culver City building permit fee cost, if refunded in full, would probably only cover the cost of a project to obtain LEED certified status. Since a full refund would significantly reduce City building permit revenues, staff recommends a cap of $60,000 for any individual project. Staff proposes administering this program by collecting the full building permit fees prior to construction. Upon presentation of LEED certification, a refund would be generated (subject to the annual cap as recommended by staff and approved by the City Council).

"Green Zone" Demonstration Program

This program would allow for building permit fee waivers for installation of **any** approved energy saving construction within the City's designated "green zones." It is proposed that these green zones be the current Phase I and Phase II Area Improvement Project Demonstration Areas (West Washington Blvd from Wade to Beethoven Avenues (Phase I Shown on Attachment No. 3) and Centinela Boulevard to Colonial Avenue (Phase II)). A list of approved energy saving construction efforts would be culled from the proposed Mandatory measures (Option 2) and the points based system (Option3).

Staff recommends a 100% building permit fee refund as illustrated below within the green zones with a maximum cap of $5,000 for any individual project.

Project Scope	Project Valuation	Total Permit All Fees	Building Permit Fee	Total Amount of Incentive
Improve energy efficiency through upgraded insulation, exterior doors and windows.	$40,000	$2,200	$650	$650

Staff recommends that the Green Zone program remain in effect for five years for each zone designated in order to provide time to encourage business and property owner's participation. There are approximately 40 properties and businesses that could benefit from this option. This option would provide a financial incentive in a highly visible demonstration program for the City.

Option 2: Mandatory Requirements Program for All New Development

This option involves the creation of a list of mandatory prescriptive measures that would apply to new ground-up construction. A building permit will not be issued until adherence to the program requirements is achieved. Over time, zoning

considerations and new technology may require updating this list to ensure program effectiveness. This option does not provide any financial incentive; but would be effective and relatively simple to administer.

The following mandatory green building requirements are proposed for all new development:

1. Minimum 17 Seasonal Energy Efficiency Ration (SEER) for all new ac units in new construction (The efficiency of air conditioners is often rated by SEER. The SEER rating is the Btu of cooling output during a typical cooling-season divided by the total electric energy input in watt-hours during the same period. The higher the SEER rating of a unit, the more energy efficient it is. A minimum SEER rating of 13 is currently required under the Building Code??.)
2. All new gas heating units in new construction to be minimum 92% efficient (96.6% efficient is the highest efficiency generally available).
3. All heating and cooling ducts to be within heated or cooled space for new construction.
4. Minimum R-38 roofs and floors (to exterior spaces), minimum R-28 walls in new construction. (R–rating is an index of the insulation value. The higher the rating, the higher the insulation value.)
5. Radiant barriers under roof sheathing in new construction. (Possible additional measure: also require radiant barriers under all west, south, and east wall sheathing in new construction.)
6. Current code allows exterior glass to be U .38 and SHGC of .31; require all new glass to be minimum U .35 and SHGC of .30 in new construction *and additions and remodels. (U-rating is an insulation rating of the glass. The lower the U-rating, the higher the insulation value. SHGC is the Solar Heat Gain Coefficient which is a measure of glass resistance to radiant heat.)*
7. All new low-slope roofs to have a minimum SRI of 75% in all new construction *and all low-slope re-roofing permits. (Solar Reflectance Index is a measure of reflectivity of the roofing surface.)*
8. Exterior shading over all glass on the west, south, and east sides of all new construction. (Alternate: require all glass on the west, south, and east side of new construction to be upgraded performance.)
9. All new interior and exterior lighting to be fluorescent or Light Emitting Diode (LED) or other high efficiency lighting in new construction.
10. All bathroom lighting (fluorescent or LED) and exhaust fans to be motion sensor controlled in new construction.
11. All corridors (and any other typically unoccupied spaces) lighting (fluorescent or LED) to be motion sensor controlled in new construction.
12. All garage and parking structure lighting (fluorescent or LED) to be motion sensor controlled in new construction. (Minimum base level lighting allowed.)
13. Dual flush water closets in new construction.

14. Only waterless urinals in new construction.
15. Tankless water heaters in new residential construction.
16. Two(2) - 2" electrical conduits to be installed from the roof to the electrical panels for future photovoltaic installation for each unit in all new residential construction and in all new commercial construction. (Of less than 10,000 sf which doesn't qualify for mandatory photovoltaic installation.)
17. A bike parking area in all new construction.
18. A recyclables collection area in all new construction. (*Possible additional measure: require 2 trash chutes in all new multi-floor construction; routed directly to 2 different dumpsters in a trash room below; one for trash, one for recyclables.)*
19. One (1) duplex ground fault circuit interrupter outlet for each eight parking spaces in new residential construction. (For future plug-in vehicles.)
20. Require all new construction to have smart irrigation controllers.

Option 3: Mandatory Green Building Point System.

This option involves the establishment of a mandatory point system to help achieve energy efficiency in new development and building improvement. A building permit will not be issued unless there are a minimum number of points received pursuant to the table below. The points based system is a compilation of the most effective items from several points based systems from other cities as well as LEED checklists and would be administered in addition to the mandatory items prescribed in Option #2.

Each item on the list would equal one point and would apply to all remodels, tenant improvements, additions, and new construction. Projects of varying scopes must meet a thresholds of the available points based on new construction square footage.

An example is illustrated below:

Square footage	Mandatory list	Points required
10,000 – 25,000 sq. ft.	All items	13 points
25,000 – 50,000 sq. ft.	All items	16 points
Over 50,000 sq. ft.	All items	22 points

Site

- Preserve all existing site and/or street trees.
- Provide additional drought tolerant landscaping and shade trees, minimize turf areas.
- Install efficient irrigation system (minimize spray heads, maximize use of bubblers and drop irrigation.)

Natural Heating and Cooling

- Provide operable windows for ventilation in all new construction.
- Provide ceiling fans in all habitable areas.
- Minimize air conditioning.

Foundation

- Incorporate fly ash or recycled content in all paving and foundation concrete.

Structure

- Use engineered wood or steel for 90% of the floor and roof framing (to reduce amount of wood consumption.)
- Use FSC certified wood framing for 20% of all wood framing materials.
- Use structural insulated panels.

Plumbing

- Insulate the full length of all hot water piping.
- Install faucets of less than 2.5 gpm.

Insulation/ Energy

- Minimum 25% of insulation formaldehyde free, recycled content.
- Minimum 60% of wall insulation cellulose, cotton ball, or bio-based foam.
- Minimum 60% of ceiling insulation cellulose, cotton ball, or bio-based foam.
- Pre-plumb for future solar hot water heating.
- Install solar photovoltaic (for projects less than 10,000 sf not qualifying for mandatory solar pv.)
- Install Energy Star programmable thermostats.
- Perform duct testing.

Indoor Air Quality

- Use low Volatile Organic Compound (VOC)sealants and adhesives.
- Use composite wood with no added urea formaldehyde for counters and countertops.
- Use carpet Carpet and Rug Institute Green Label certified.
- All wood flooring bamboo or other renewable material.

Roofing

- Use 25% recycled content roofing materials.
- Roofing materials warranty minimum 40 yr. for asphalt shingles, 15 yr. for built-up.

Exterior Finishes

- Minimum 30% of exterior surfaces integral or no color stucco, or durable surface panels.

Interior Finishes

- Minimum 20% exposed concrete floors.
- Minimum 25% recycled content countertop materials.

General

- Divert minimum 75% of construction demolition by weight to recycling.
- Innovative design as determined by City staff.

Costs and Benefits of Potential Culver City Green Building Programs

Staffing

Option 1 and Option 2 would not require additional staffing to implement.

Staff estimates, however, that Option 3 would require, at minimum, one additional full time City staff member and one additional City vehicle. (Attachment No. 3)

Energy Costs and Annual Emissions Illustration

In an effort to illustrate the relative benefit of these programs/options against the current Energy Code, an example of a commercial project (totaling 282,000 sq. ft.) and nine new residential units (totaling 49,000) is highlighted below:

Options	Annual Commercial	Annual Residential	Annual Carbon	Annual Energy	Construction Cost Increase	Additional Staffing

	BTU's	Btu's	Emissions	Costs		
Standard California Energy Code	25.5 billion	.78	561 tons	$392,000	(0)	n/a
Option 1 – LEED certification*	21.7 billion	.66	477 tons	$333,000	$376,000	n/a
Option 2 – Mandatory Program **	22.9 billion	.70	505 tons	$353,000	$188,000	n/a
Option 3 – Points based ***	20.4 billion	.62	448 tons	$313,000	$564,000	1 additional staff

* assumes Silver certification level, 15% energy improvement and additional $1.00 square foot construction cost. Does not include green zone program.
** assumes 10% energy improvement and an additional $.50 per square foot construction cost.
*** assumes 20% energy improvement and an additional $1.50 per square foot construction cost.
General Assumptions;

- *That under each option all annual 282k s.f. of new commercial space and all 9 new residential units fully comply with that option.*
- *That the consumption of each 45,000 btu's produces 1 ton of carbon emissions*
- *The btu cost is estimated at 70,000 btu's per $1.*
- *The estimated construction cost increase is an additional cost to the developer of a building.*

SUMMARY

Staff is proposing three green building program options for Council consideration. Option 1 is an incentive program that could offer a refund of up to 50% of the building permit fee for LEED certified projects. It is proposed that a cap be put in place of at least $60,000 for individual projects and $225,000 annually for the program as whole. This option also includes 100% building permit refunds for "green zones" within the City. As a pilot program, staff recommends that the first green zone be coterminous with the current West Washington Demonstration Project – Phase I. Based on the current property and business constitution, the cost for this program could be up to $15,000 in building permit refunds and would not require any additional staffing.

Option 2 is a mandatory checklist of standards applied to all new development. The list represents a number of effective and straightforward prescriptive measures that would effectively reduce carbon emissions and increase sustainability within the City. Staff believes that this program could be absorbed with current staffing levels and would not require any additional staffing.

Option 3 is a hybrid program that would require adherence to all of the measures listed in Option 2 as well as additional requirements, via a point system, based on building square footage. This option would be case specific for each new project and would require more in depth inspection to ensure compliance. This option would require an additional staff person and associated resources.

FISCAL ANALYSIS

All three options would forward the City's general policy goal of obtaining a more sustainable environment. However, there is a fiscal cost to the City to implement each option. All three options would have the consequence of a loss in Utility Users' Tax (UUT) revenue. There is a direct relationship between UUT revenues and a building's energy efficiency. As energy efficiency increases, the amount that a business pays per square foot in utilities (such as electricity, gas and water) decreases, consequently decreasing the amount of UUT paid by the consumer. Currently, electricity, gas, and water UUT combined generate approximately $8 million in revenues, with the primary piece of that being electricity at approximately $6 million. As the number, size, and level of energy efficient projects increases over time, the City can expect to see a proportionate decrease in UUT revenue over what would be generated by a traditional project. That being said, the economic cost to clean the environment in the long run may far exceed the potential loss of UUT revenue.

If Option #1 were pursued (LEED Certification and Green Zone incentives), staff recommends the City Council determine annual cap limits for building permit refunds and incentives that would result in a decrease in net revenues to the General Fund. As proposed, these discounts would not fully cover the actual cost of LEED certification, but could substantially subsidize consultant fees to achieve certification and/or make sustainable improvements to an existing structure. The cost of this program is whatever the City Council ultimately determines as an annual cap for the program (see next paragraph) plus loss of UUT revenue.

For example, in Option #1 a total annual program cap of $225,000 ($60,000 per individual project), or approximately 10% of annual Building Safety revenues, could include three commercial projects refunded $30,000 each and nine residential projects refunded $15,000 each or any other combination within this limit. This would, in essence, cost the City up to $225,000 plus ongoing lost UUT revenue plus staff time to develop the necessary applications, rating processes, benchmarks, etc. Additionally, the "green zone" program could refund an additional $15,000 in building permit fees if approximately 50% of the business participated in the West Washington Demonstration Project, Phase I. Based on the location of these

businesses, staff anticipates that most of the sustainable upgrades would be limited to energy efficiency efforts to include glass/window upgrades, insulation, and HVAC.

As proposed, Option #2, a Mandatory Green Building Program, would not have additional cost to the City beyond the potential loss of UUT revenues and some additional staff time to implement the additional requirements for developers.

Option #3, a Points Based System, would require one additional full-time employee (approximately $100,000 including salary and benefits, which would increase on an annual basis), $30,000 for one additional hybrid vehicle, and $5,000 annually for related amortization and garage expenses.

Based on the City Council's desire to explore implementation of one or more of the proposed options, the further fiscal impacts would need to be refined.

ATTACHMENTS

1. Green Building Chronology
2. Green Building Programs in Other Cities
3. Deomonstration Area Map
4. Staffing Requirement Calculation for Option 3
5. Culver City Mandatory Solar Photovoltaic Information
6. "Building Green with Carrots and Sticks", *Western City Magazine*, May 2008
7. *Los Angeles Business Journal* Article, August 18, 2008.
8. Other Programs for Consideration

MOTION:

That the City Council:

Receive and file this report and provide direction regarding proposed green building standards.

GREEN BUILDING STAKEHOLDERS

Attachment 3

1 John Maloney
Architect

2 Trever Abramson
Principal
Abramson Teiger Architects

3 Carl Johnson
Vice President
HOK

4 Zoltan Pali
Principal
SPF:architects

5 Lori Selcer
Senior Associate
HOK

6 Gregory Fisher
Senior
SPF:architects

7 Joel Davidson
Principal
Solutions in Solar Electricity

8 Colette Brooks
Chief Imagination Officer
Big Imagination Group

9 Erik Mar
Carde Ten Architects

10 Greg Reitz
Principal
ReThink Development Corp.

11 Stephanie Pincetl
Professor, Green Building
University of California, Los Angeles

12 Amy Rosenstein
Architect

13 Steven J. Rose
CEO
Culver City Chamber of Commerce

14 Karen Kurokawa
Impact Design, Inc.

15 Tony Haske
Solar City

16 Jonathan Cowan
Executive Director, Government Affairs
Sony Pictures Entertainment

17 Scott Wyant
Green Representative - Chamber of Commerce

18 Bob Grush
Contractor
Ed Grush

19 Mike Corigan
CCUSD

CULVER CITY
CHAMBER OF COMMERCE

January 6, 2009

Elaine Gerety-Warner
Senior Management Analyst
Community Development
City of Culver City
PO Box 507
Culver City, CA 90232-0507

Dear Ms. Gerety-Warner

Thank you for including the Culver City Chamber of Commerce in your stakeholders meeting to solicit feedback on staff's Green Building Standards proposal. As a follow-up, this letter addresses the Chamber's response to the plans that were presented.

Generally, the Chamber of Commerce, has the following concerns.

- The mandatory checklist proposal would require applicable projects to comply with 20 of 25 items. The Chamber believes that this is too stringent a requirement. If the city settles on a mandatory checklist for projects, there should be a much lower threshold, e.g. 10 of 25 items. Not every item applies to every project, as there are differences between residential and commercial construction, as well as between a new building and a renovation. Requiring fewer items to be met allows greater flexibility to best suit the parameters of individual projects.

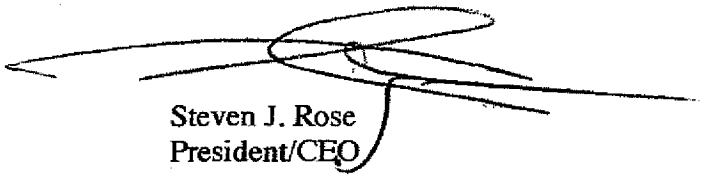
- The mandatory checklist proposal doesn't distinguish between provisions that apply to new projects versus renovations. Some items on the checklist may be more feasible to achieve during new construction and this distinction should be reflected in staff's final proposal.

- How is city staff planning to administer the LEED Certified Performance Level proposal under current staffing levels? Because there is some subjectivity in the LEED credit process, is the City planning to defer to the US Green Building Council for these decisions or to hire its own expert? Since some credits are up for interpretation, will the review and re-review process lengthen the amount of time typically required for plan check? Will the city be using its own templates or relying on the LEED templates for what has to be submitted?

- In an economic downturn where real estate construction and renovation activity has greatly decreased, what incentives has staff considered to entice developers to build in Culver City in return for meeting these additional cost hurdles? From changing parking requirements, to density bonuses, to quicker permit approval, staff has a range of options that should be considered so as to not send a negative message to the development community.

Attached to this letter, you'll find a more detailed point-by-point response to the specifics of the various proposals. Again, thank you for working with the Chamber on this issue and I look forward to our continued dialogue.

Sincerely,



Steven J. Rose
President/CEO

Cc:
Chamber Board

POINT-BY-POINT RESPONSE TO GREEN BUILDING PROGRAM PROPOSALS

I. MANDATORY CHECKLIST

3. It is the Chamber's understanding that requiring all heating and cooling ducts to be within heated or cooled space for new construction will be challenging to achieve. Ductwork that runs from the exterior unit to roof penetration locations is exposed but this penetration is insulated to accommodate.

4. R-30 for roofs and R-19 for walls is often specified for LEED projects so this would be a better minimum to focus on.

5. Radiant barriers are used within attic spaces so this item should specify that this won't be applicable in all cases as this is most typical for residential projects.

12. This could be problematic from a security standpoint as night-time lighting is a safety issue.

14. This requirement should recognize that waterless urinals may not be achievable in certain projects due to drain slope and other factors.

20. This seems to be addressed in number 22.

21. Permeable paving may not always be achievable with given soil types within the city. The soil may not allow any infiltration which would prevent the permeable paving from being effective.

22. LEED Credit 1.1: Water Efficient Landscaping Reduce by 50% allows for greater flexibility in the types of landscaping as long as the efficiency rating is maintained. There may not be a need to prohibit grass areas completely.

23. Use of engineered wood is typically not applicable in commercial construction given the size of these project types. Because of size, most commercial construction requires concrete and steel.

II. MANDATORY LEED CERTIFIED PERFORMANCE LEVEL

7. This states that the LEED checklist and items in the construction drawings will be plan checked by city staff concurrently with other routine city reviews. LEED

has both design and construction credits. However, only the design credits, if completed, will be available at the time of plan check. The construction credits are an ongoing process and typically not available until after the building has been completed and occupied. This item should be changed to clarify what is needed at the time of city submission.

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Culver CITY
BUILDING SAFETY DIVISION

February 10th, 2009

Mr. Steve Rose
President/ CEO
Culver City Chamber of Commerce
4249 Overland Avenue
Culver City, CA, 90232

Re; reply to your letter of January 6th, 2009, regarding a potential Culver City Green Building Program

Dear Steve,

Thank you very much for your continued interest and support of a potential Culver City Green Building Program; in reply to your comments:

1. **"...mandatory checklist proposal...20 of 25 items...too stringent a requirement...there should be a much lower threshold..."**
Please note the checklist applies only to new ground up buildings and major renovations, and the number of required items may be reduced by the City Council. Please also note that as the California Codes become more stringent many of these items will likely become mandatory in the near future, so Culver City may be viewed as merely accelerating California's process of adopting more stringent green building codes.

2. **"...mandatory checklist...doesn't distinguish between...new projects versus renovations..."**
Please note that most items applying to new buildings will also apply to major renovations, and as noted above the City Council may reduce the number of required items.

3. **"How is City staff intending to administer LEED certified performance level...is the City intending to defer to the US Green building Council for these decisions..."**
The LEED Certified performance level program is a program very similar to the green building program now in effect in the City of Los Angeles. The City of Los Angeles has hired a consultant to audit one of every seven qualifying projects due to their large volume of building activity. Culver City has a relatively low number of qualifying projects; therefore existing City staff will be able to monitor compliance.
The proposed program involves City staff informing design professionals and property owners of the green building program and requirements at the outset of a project. City staff verifies the project has a LEED Accredited Professional as part of the design team. Staff verifies the project has incorporated the required LEED certified items into the project construction documents. Staff verifies the project has registered with the US Green Building Council (USGBC), and verifies the LEED certified items are part of the building construction; this is similar to the City of Los Angeles green building program, with the exception of the audit firm.

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Past President of the International Code Council Los Angeles Basin Chapter

4. **"Will the review and re-review process lengthen the amount of time typically required for plan check?"**
The Culver City Green Building program is intended to be integrated into and operate concurrently with the existing Culver City discretionary review, construction permit application, and field inspection processes, and isn't expected to lengthen the process, unless project developers fail to comply with the requirements.

5. **"Will the City be using its own templates or relying on the LEED templates...?"**
As noted above City staff will be verifying compliance with a LEED certified performance level and correct documentation with the USGBC, not reinventing the USGBC LEED program.
6. **"What incentives have staff considered...additional cost hurdles...changing parking requirements, density bonuses, quicker permit approvals...should be considered..."**
Staff is proposing a "green zone" with permit fee incentives as part of the Culver City Green Building Program. There are many studies showing the life cycle costs of green buildings to be lower than non green buildings; this will be increasingly true as fossil fuel costs continue to rise. As you may be aware, more lenient parking requirements and greater density have not been popular in Culver City. Therefore these incentives are not proposed as part of the Culver City Green Building Program. Culver City already has very quick construction plan check times. With the proposed Green Building Program being integrated into the existing permitting processes no special expediting will be necessary.

7. **Mandatory Checklist**
8. **"3..all heating and cooling ducts to be within the heated space...will be challenging to achieve...ductwork...exposed but...insulated to accommodate."**
The requirement applies to new construction; almost all new construction already complies with this item. The staff report does note that City staff will have the ability to authorize appropriate adjustments; such as upgraded insulation for exposed ducts.

9. **"R-30 for roofs and R-19 for walls is often specified for LEED projects so this would be a better minimum..."**
R-30 roofs and R-19 walls are already generally the minimum for projects to comply with the existing California Energy Code. The Culver City Green Building Program is proposed as an improvement to existing California Codes. Upgraded insulation is one of the most cost effective methods to lower energy use.

10. **"Radiant barriers...this item should specify that this won't be applicable in all cases as this is most typical for residential projects."**
As noted the Mandatory Checklist is flexible in that project developers may pick and choose which items to apply. Radiant barriers are also one of the most cost effective methods to lower energy use.

11. ***(Garage and parking structure lighting to be motion sensor controlled...)*** **"This could be problematic from a security standpoint..."**
That item does note minimum base level lighting is allowed. Garage lights left on in residential uses is one of the most common energy wastes.

12. ***(Waterless urinals)*** **"This requirement should recognize that waterless urinals may not be achievable in certain projects due to drain slope and other factors."**

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Past President of the International Code Council Los Angeles Basin Chapter

As noted the Mandatory Checklist is flexible in that project developers may pick and choose which items to apply. Waterless urinals are a major water saver and operate with the same drain line slopes as other plumbing fixtures.

13. ***(Smart irrigation controllers)*** **"This seems to be addressed in number 22"**
The smart irrigation controller item has been removed.

14. **"Permeable paving may not always be achievable..."**
As noted the Mandatory Checklist is flexible in that project developers may pick and choose which items to apply. Its true permeable paving may not always be achievable or desirable on every project but during the City Council review of the Green Building discussion Item in September 2008 the City Council unanimously approved permeable paving as part of a Culver City Green Building Program.

15. **"LEED credit 1.1; water efficient landscaping...there may not be a need to prohibit grass areas completely."**
The staff report does note that City staff will have the ability to authorize appropriate adjustments.

16. **"Use of engineered wood is not typically applicable to commercial construction...because of size, most commercial construction requires concrete and steel."**
The largest commercial projects certainly are built primarily with concrete and steel, but all other projects, including mid size commercial projects, contain a large degree of wood construction. Using engineered wood members is one of the best methods to reduce wood usage.

17. **Mandatory LEED Certified Performance Level**
"LEED checklist and items in the construction drawings will be plan checked by City staff concurrently....LEED has both design and construction credits...construction credits are an ongoing process and typically *(are)* not available until after the building has been completed and occupied...clarify what is needed at the time of City submission."
As noted previously qualifying projects will have to provide evidence the project has been registered with the USGBC LEED program, and the required LEED items as part of the USGBC submission will be required to be part of the construction documents.
City staff will verify the required LEED items are part of the construction documents and will also verify the required LEED items are incorporated into the project during the construction.
You're correct a LEED project will be required to provide construction documentation to the USGBC to obtain final LEED Certified status.
Culver City, similar to the City of Los Angeles, is not requiring LEED Certified status, merely a LEED Certified performance level.
It is hoped that qualifying projects already having a LEED AP as part of the design team, already registered with the USGBC, and meeting a LEED certified performance level will choose to complete the LEED documentation and obtain LEED Certified status.

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Thank you again for your continued support of green building in Culver City, and I look forward to your continued involvement in Culver City sustainable efforts.

Best wishes, sincerely,

Craig Johnson
Building Official
Culver City Building Safety Division

cc: Mr. Sol Blumenfeld, Culver City Community Development Director
Mrs. Elaine Gerety-Warner Culver City Community Development Department Management Analyst

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Benefits of Trees in Urban Areas

Mapleton Avenue, a well shaded street in Boulder, Colorado.

Trees are major capital assets in cities across the United States. Just as streets, sidewalks, public buildings and recreational facilities are a part of a community's infrastructure, so are publicly owned trees. Trees -- and, collectively, the urban forest -- are important assets that require care and maintenance the same as other public property. Trees are on the job 24 hours every day working for all of us to improve our environment and quality of life.

Colorado's urban forest provides many environmental benefits to our community. Aside from the obvious aesthetic benefits, trees within our urban forest improve our air, protect our water, save energy, and improve economic sustainability.

Unlike urban areas in the eastern U.S., canopy cover in Colorado decreases along an urban to rural gradient. In other words, since most trees have been planted much of the tree cover is in urban areas as opposed to "natural lands". Therefore, estimated pollutant uptake rates are higher for residential compared to natural or unmanaged lands. Possible management implications of these estimates are that air pollutant uptake benefits from tree planting may be optimized by planting in areas where air pollutant concentrations are elevated and where relatively high planting densities can be achieved thereby enhancing the health of urban dwellers.

Thank you to Kathleen Alexander for composing and compiling this information.

Urban Forests Improve Our Air Through:

- Carbon Sequestration
- Reduction of Other Pollutants
- More Info on Air Quality Enhancement

Urban Forests Protect Our Water

- Info on Rainfall Interception Provided by Greg McPherson

Urban Forests Save Energy

Urban Forests Can Also:

- Extend the Life of Paved Surfaces
- Increase Traffic Safety
- Improve Economic Sustainability
- Affect Consumer Perceptions and Behaviors
- Add Aesthetic Value
- Increase Real Estate Values
- Increase Sociological Benefits

Other Articles:

- Putting a Value On The Urban Forest of the Front Range (for Colorado Green Magazine)
- What A Large Tree Can Do For You

Urban Forests Improve Our Air

Carbon Sequestration:

- Heat from Earth is trapped in the atmosphere due to high levels of carbon dioxide (CO_2) and other heat-trapping gases that prohibit it from releasing heat into space -- creating a phenomenon known as the "greenhouse effect." Trees remove (sequester) CO_2 from the atmosphere during photosynthesis to form carbohydrates that are used in plant structure/function and return oxygen back to the atmosphere as a byproduct. About half of the greenhouse effect is caused by CO_2. Trees therefore act as a carbon sink by removing the carbon and storing it as cellulose in their trunk, branches, leaves and roots while releasing oxygen back into the air.
- Trees also reduce the greenhouse effect by shading our homes and office buildings. This reduces air conditioning needs up to 30%, thereby reducing the amount of fossil fuels burned to produce electricity. This combination of CO_2 removal from the atmosphere, carbon storage in wood, and the cooling effect makes trees a very efficient tool in fighting the greenhouse effect. (11)
- One tree that shades your home in the city will also save fossil fuel, cutting CO_2 buildup as much as 15 forest trees. (16)

- Approximately 800 million tons of carbon are stored in U.S. urban forests with a $22 billion equivalent in control costs. (1)
- Planting trees remains one of the cheapest, most effective means of drawing excess CO_2 from the atmosphere. (15)
- A single mature tree can absorb carbon dioxide at a rate of 48 lbs./year and release enough oxygen back into the atmosphere to support 2 human beings. (10)
- Each person in the U.S. generates approximately 2.3 tons of CO_2 each year. A healthy tree stores about 13 pounds of carbon annually -- or 2.6 tons per acre each year. An acre of trees absorbs enough CO_2 over one year to equal the amount produced by driving a car 26,000 miles. An estimate of carbon emitted per vehicle mile is between 0.88 lb. CO_2/mi. - 1.06 lb. CO_2/mi. (Nowak, 1993). Thus, a car driven 26,000 miles will emit between 22,880 lbs CO_2 and 27,647 lbs. CO_2. Thus, one acre of tree cover in Brooklyn can compensate for automobile fuel use equivalent to driving a car between 7,200 and 8,700 miles. (8)
- If every American family planted just one tree, the amount of CO_2 in the atmosphere would be reduced by one billion lbs annually. This is almost 5% of the amount that human activity pumps into the atmosphere each year. (17)
- The U.S. Forest Service estimates that all the forests in the United States combined sequestered a net of approximately 309 million tons of carbon per year from 1952 to 1992, offsetting approximately 25% of U.S. human-caused emissions of carbon during that period.
- Over a 50-year lifetime, a tree generates $31,250 worth of oxygen, provides $62,000 worth of air pollution control, recycles $37,500 worth of water, and controls $31,250 worth of soil erosion. (2)

Reduction of Other Air Pollutants:

- Trees also remove other gaseous pollutants by absorbing them with normal air components through the stomates in the leaf surface. (3)
- Some of the other major air pollutants and their primary sources are:
  - Sulfur Dioxide (SO_2) - Coal burning for electricity/home heating is responsible for about 60 percent of the sulfur dioxide in the air. Refining and combustion of petroleum products produce 21% of the SO_2.
  - Ozone (O_3) - is a naturally occurring oxidant, existing in the upper atmosphere. O_3 may be brought to earth by turbulence during severe storms, and small amounts are formed by lighting. Most O_3 - and another oxidant, peroxyacetylnitrate (PAN) - come from the emissions of automobiles and industries, which mix in the air and undergo photochemical reactions in sunlight. High concentrations of O_3 and PAN often build up where there are many automobiles.
  - Nitrogen oxides - Automotive exhaust is probably the largest producer of NO_x. Oxides of nitrogen are also formed by combustion at high temperatures in the presence of two natural components of the air, nitrogen and oxygen.
  - Particulates are small (<10 microns) particles emitted in smoke from burning fuel, particular diesel, that enters our lungs and cause respiratory problems. (10)
- There is up to a 60% reduction in street level particulates with trees. (1)
- In one urban park (212 ha.) tree cover was found to remove daily 48lbs. particulates, 9 lbs nitrogen dioxide, 6 lbs sulfur dioxide, and 2 lb carbon monoxide ($136/day value based upon pollution control technology) and 100 lbs of carbon. (1)
- One sugar maple (12" DBH) along a roadway removes in one growing season 60mg cadmium, 140 mg chromium, 820 mg nickel, and 5200 mg lead from the environment. (1)
- Planting trees and expanding parklands improves the air quality of Los Angeles county. A total of 300 trees can counter balance the amount of pollution one person produces in a lifetime. (10)

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Urban Forests Protect Our Water

- Trees reduce topsoil erosion, prevent harmful land pollutants contained in the soil from getting into our waterways, slow down water run-off, and ensure that our groundwater supplies are continually being replenished. For every 5% of tree cover added to a community, stormwater runoff is reduced by approximately 2%. (1)
- Research by the USFS shows that in a 1 inch rainstorm over 12 hours, the interception of rain by the canopy of the urban forest in Salt Lake City reduces surface runoff by about 11.3 million gallons, or 17%. These values would increase as the canopy increases. (13)
- Along with breaking the fall of rainwater, tree roots remove nutrients harmful to water ecology and quality. (13)

- Trees act as natural pollution filters. Their canopies, trunks, roots, and associated soil and other natural elements of the landscape filter polluted particulate matter out of the flow toward the storm sewers. Reducing the flow of stormwater reduces the amount of pollution that is washed into a drainage area. Trees use nutrients like nitrogen, phosphorus, and potassium--byproducts of urban living--which can pollute streams. (20)

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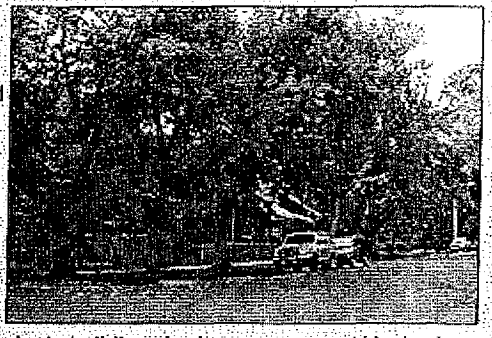
Urban Forests Save Energy



- Homeowners that properly place trees in their landscape can realize savings up to 58% on daytime air conditioning and as high as 65% for mobile homes. If applied nationwide to buildings not now benefiting from trees, the shade could reduce our nation's consumption of oil by 500,000 barrels of oil/day. (12)
- The maximum potential annual savings from energy conserving landscapes around a typical residence ranged from 13% in Madison up to 38% in Miami. Projections suggest that 100 million additional mature trees in US cities (3 trees for every unshaded single family home) could save over $2 billion in energy costs per year. (10)
- Trees lower local air temperatures by transpiring water and shading surfaces. Because they lower air temperatures, shade buildings in the summer, and block winter winds, they can reduce building energy use and cooling costs. (6)
- Help to cool cities by reducing heat sinks. Heat sinks are 6-19 degrees F° warmer than their surroundings (Global Releaf GA). A tree can be a natural air conditioner. The evaporation from a single large tree can produce the cooling effect of 10 room size air conditioners operating 24 hours/day. (18)
- USFS estimates the annual effect of well-positioned trees on energy use in conventional houses at savings between 20-25% when compared to a house in a wide-open area. (USFS meteorologist Gordon Heisler)(13).

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Urban Forests Can Extend the Life of Paved Surfaces

The asphalt paving on streets contain stone aggregate in an oil binder. Without tree shade, the oil heats up and volatizes, leaving the aggregate unprotected.

Vehicles then loosen the aggregate and much like sandpaper, the loose aggregate grinds down the pavement. Streets should be overlaid or slurry sealed every 7-10 years over a 30-40 year period, after which reconstruction is required.

A slurry seal costs approximately $0.27/sq.ft. or $50,000/linear mile. Because the oil does not dry out as fast on a shaded street as it does on a street with no shade trees, this street maintenance can be deferred. The slurry seal can be deferred from every 10 years to every 20-25 years for older streets with extensive tree canopy cover. (19)

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Urban Forests Can Increase Traffic Safety

- Trees can also enhance traffic calming measures, such as narrower streets, extended curbs, roundabouts, etc. Tall trees give the perception of making a street feel narrower, slowing people down. Closely spaced trees give the perception of speed (they go by very quickly) slowing people down. A treeless street enhances the perception of a street being wide and free of hazard, thereby increasing speeds. Increased speed leads to more accidents.
- Trees can serve as a buffer between moving vehicles and pedestrians.
- Street trees also forewarn drivers of upcoming curves. If the driver sees tree trunks curving ahead before seeing the road curve, they will slow down and be more cautious when approaching curves. (16)

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Urban Forests Can Improve Economic Sustainability

The scope and condition of a community's trees and, collectively, its urban forest, is usually the first impression a community projects to its visitors. A community's urban forest is an extension of its pride and community spirit.

Studies have shown that:

1. Trees enhance community economic stability by attracting businesses and tourists.
2. People linger and shop longer along tree-lined streets.
3. Apartments and offices in wooded areas rent more quickly and have higher occupancy rates.
4. Businesses leasing office spaces in developments with trees find their workers are more productive and absenteeism is reduced. (11)

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Urban Forests Can Increase Real Estate Values

- Property values increase 5-15% when compared to properties without trees (depends on species, maturity, quantity and location)
- A 1976 study that evaluated the effects of several different variables on homes in Manchester, Connecticut, found that street trees added about $2686 or 6% to the sale price of a home. (10)
- A more recent study indicated that trees added $9,500, or more than 18 percent, to the average sale price of a residence in a suburb of Rochester, New York. (8)

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Urban Forests Can Increase Sociological Benefits

Two University of Illinois researchers (Kuo and Sullivan) studied how well residents of the Chicago Robert Taylor Housing Project (the largest public housing development in the world) were doing in their daily lives based upon the amount of contact they had with trees, and came to the following conclusions:

- Trees have the potential to reduce social service budgets, decrease police calls for domestic violence, strengthen urban communities, and decrease the incidence of child abuse according to the study. Chicago officials heard that message last year. The city government spent $10 million to plant 20,000 trees, a decision influenced by Kuo's and Sullivan's research, according to the *Chicago Tribune*.
- Residents who live near trees have significantly better relations with and stronger ties to their neighbors.
- Researchers found fewer reports of physical violence in homes that had trees outside the buildings. Of the residents interviewed, 14% of residents living in barren conditions have threatened to use a knife or gun against their children versus 3% for the residents living in green conditions. (15)
- Studies have shown that hospital patients with a view of trees out their windows recover much faster and with fewer complications than similar patients without such views. (13)
- A Texas A&M study indicates that trees help create relaxation and well being.
- A U.S. Department of Energy study reports that trees reduce noise pollution by acting as a buffer and absorbing 50% of urban noise.

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What a Large Tree Can Do For You

A large front yard tree in a San Joaquin Valley community like Modesto (dry like Colorado) provides the following benefits each year:

1. Saves $30 in summertime air conditioning by shading the building and cooling the air (250 kWh), about 9% of total annual air conditioning cost.
2. Absorbs 10 lbs of air pollutants, including 4 lbs of ozone and 3 lbs of particulates. The value of pollutant uptake by the tree is $45 using the local market price of emission reduction credits. Uptake of NOx by the tree is equivalent to NOx emitted by a typical car driven 3,600 miles.
3. Intercepts 760 gal of rainfall in its crown, thereby reducing runoff of polluted stormwater and flooding. This benefit is valued at $6 based on local expenditures for water quality management and flood control.
4. Cleans 330 lbs of CO2 (90 lbs C) from the atmosphere through direct sequestration in the tree's wood and reduced power plant emissions due to cooling energy savings. The value of this benefit is $5 assuming the California Energy Commission's price of $30/ton. This tree reduces the same amount of atmospheric CO2 as released by a typical car driven 500 miles.
5. Adds about 1% to the sales price of the property, or about $25 each year when annualized over a 40-year period. This assumes a median residential property sales price of $100,000.

The value of all benefits is $111 in this example. Typically, a city will spend $20-$40 per year to maintain a street tree of this size (sometimes located in a front yard easement) and a resident will spend about $10 per year maintaining a large yard tree. Our benefit-cost analysis for Modesto's 90,000 street/park trees found $1.89 returned annually for every $1 invested in stewardship.

--Greg McPherson

(top)

Air Quality and Trees

We all know that trees give us shade, protect us from wind and rain, add beauty to a home landscape, soften the harsh lines of urban architecture, provide homes for birds and squirrels, and much, much more. Most of us can't imagine a city without trees. They have become part of the infra structure like the streets, lights, sidewalks, schools, and other city assets. Quantifying the value of these benefits is difficult but there are researchers doing just that. Here is some recent information from David Nowak, a researcher with the USDA Forest Service in Syracuse, NY. He is answering some questions asked by city forester.

I've heard that 1 ac of trees provides oxygen for 18 people every day a) how many trees per ac are we talking and what type & size of trees? b) how much oxygen does a person need every day?

Based on field data and modeling for Brooklyn, NY (Nowak et al, in review), one acre of tree cover in Brooklyn gives off an approximate net amount of 2.8 t O2/yr (this estimate does not include tree decomposition). Estimated annual average net oxygen production for Brooklyn trees is (for various dbh classes):

DBH Class (in)	Oxygen produced (lbs/yr)
0-3	6
9-12	49
18-21	115
27-30	148
39+	247

a) The average density in a forest stand is around 480 tree/ac (e.g., Raile and Leatherberry, 1988). Average tree density within tree covered urban areas is approximately 204 trees/ac of tree cover. This estimate is based on field data from 7 cities (Dwyer et al., in review). In the Chicago area (Cook and DuPage Counties), 77% of the trees were less than 6 in. dbh. (Nowak, 1994a).

b) The average annual oxygen consumption for a person at rest at 20 degrees C and 760 mm Hg (standard pressure) is between 355 lbs/yr and 444 lbs/yr (average = 400 lbs O2/ yr). This is a conservative estimate as exercise will increase oxygen consumption.

Based on the above estimates of oxygen consumption and net oxygen production by an acre of tree cover in Brooklyn, one acre of trees would produce enough oxygen for 14 people. However, it is debatable as to whether oxygen production by an acre of trees or large tracts of forests are significant, because if the acre of trees did not exist, 14 people would not suffocate from lack of oxygen. There are many sources of oxygen and plenty of oxygen in the atmosphere, but trees do contribute oxygen to the atmosphere. "We have a large number of serious ecological problems, but suffocation from lack of oxygen is not one of them (Broeker 1970, SCEP 1970). The oxygen content of the atmosphere remains essentially constant, with the oxygen consumed by all animals, bacteria, and respiration processes roughly balanced by the oxygen released by land and sea plants during photosynthesis.

The present atmospheric oxygen content seems not to have changed since 1910 (SCEP 1970). Furthermore, because air is about 20 percent oxygen, the total supply is immense (Broeker 1970)" (Miller, 1979). Waters of the world are the main oxygen generators of the biosphere; their algae are estimated to replace about 90% of all oxygen used (Encyclopedia Brittannica, 1994). Also, most of the oxygen produced by trees will be consumed when the tree dies and decomposes.

I've read that 1 ac of trees absorbs enough CO_2 in a year is equal to that produced from driving a car 26K miles. a) how much CO_2 does 1 ac of trees absorb in 1 year? b) how much CO_2 does driving a car 26K mi produce?

a) this answer depends on tree density per acre, diameter structure, species composition, and growth rates. Estimates from Chicago are 2.7 t C/ac of tree cover/yr (Nowak 1994b); the Chicago area: 2.2 t C/ac of tree cover/yr (Nowak, 1994b); and in Brooklyn, NY: 1.0 t C/ac of tree cover/yr (Nowak et al., in review). These are gross carbon sequestration estimates and do not account for carbon emitted due to decomposition. The Chicago estimates are likely liberal as they do not account for tree condition or stand structure effects on growth. Gross carbon sequestration estimates for individual trees in Brooklyn, by various diameter classes are (Nowak et al., in review):

DBH Class (in)	Carbon Sequestration (lbs/yr)
0-3	2
9-12	19
18-21	43
27-30	55

39+	93

b) Estimate of carbon emitted per vehicle mile is approximately 0.24 lb C/mi (see Nowak, 1993 for calculation and references) but is as high as 0.29 lb C/mi if carbon produced from transportation and fuel processing is included. Thus, a car driven 26,000 miles will emit 6,240 lbs C (22,880 lbs CO_2) or 7,540 lbs C (27,647 lbs CO_2) if the whole fuel process is included. Thus, one acre of tree cover in Brooklyn can compensate for automobile fuel use equivalent to driving a car between 7,200 and 8,700 miles, depending on which estimate you choose to use. However, when the tree dies, most, if not all, of the carbon stored will eventually be released back to the atmosphere and form CO_2. Thus, the CO_2 gains made by trees are sustained as long as the forest structure is sustained. Also, the gains made are only good for the first generation of trees, unless the carbon is prevented from decomposing. If first generation decomposes, the second generation of trees will only compensate for the loss of the first generation (Nowak et al., in preparation).

What about the statement, 1 ac of trees store 2.6 tons of carbon each year (removed from the air) where does the carbon in the air come from?

See answer 2a for urban forest estimates.

Carbon in the atmosphere comes mainly from fossil fuel combustion (emissions of approximately 5 billion metric tons/yr) and deforestation (loss of stored carbon in biomass) (emissions of about 1-2 billion metric tons/yr) (Schneider, 1989). Carbon in trees comes from atmospheric carbon dioxide (a very minor portion may come from other chemicals containing carbon [e.g., carbon monoxide], but many of these chemicals convert to carbon dioxide through time).

Trees remove several tons/day of O_3, CO_2, SO_2, NO_2, PM_{10}. How many trees does it take to remove so many tons of one element?

We are currently completing a comparison of pollution removal by trees in 50 cities across the United States. Pollution removal varies based on meteorology, amount of tree and shrub cover (acres), pollution concentration, and length of growing season. Pollution removal (ozone, particulate matter, sulfur dioxide, nitrogen dioxide, and carbon monoxide) by trees and shrubs in Chicago in 1994 was estimated at 651 tons (rates varied for each pollutant) (Nowak, 1994c). In Brooklyn, 1994 pollution removal (same 5 pollutants) by trees and shrubs was estimated at 287 tons (Nowak et al., in review). Average individual tree pollution removal estimates for Brooklyn by various diameter classes are:

DBH Class (in)	Pollution Removal (lbs/yr)
0-3	0.07
9-12	0.8
18-21	2.2
27-30	2.0
39+	5.3

Differences in removal rates per tree by diameter classes are due to differences in the average amount of healthy leaf area per tree among the diameter classes.

Where did the info come from on trees reducing urban temps & the 2% increase in electricity consumption for every 1 deg.?

"For U.S. cities with populations larger than 100,000, peak utility loads will increase 1.5 to 2 percent for every 1 degree F increase in temperature" is from page 16 of Akbari et al. (1992). On page 18 it reports "the nation-wide response of peak-cooling electricity load to temperature in the United States could range from 0.5 to 3 percent for each 1 degree F rise in temperature." It appears that these figures may come from Linder and Inglis (1989). It is important to note that these data are for peak loads. However, from a graph on page 20, it appears that annual energy use could increase between 0.25% and 3% (average of approx. 1.1%) per degree F rise in temperature, depending on city location.

How much carbon does a tree store in its wood? Is it based on size ?

One half of a tree's dry weight is carbon (see Nowak, 1994b for various citations). Thus carbon storage is directly related to size (i.e., bigger trees have more carbon stored). Annual carbon sequestration (the amount of carbon removed from the atmosphere each year) is related to tree size and growth rates (large trees with fast growth rates will remove more carbon annually than small trees with slow growth rates).

How is the value derived from the in leaf pollution removal (Dave Nowak's research)?

Values are derived based on median environmental externality values for the United States for each pollutant from Murray et al. (1994) (Nowak et al, 1998). Environmental impacts or damage caused by pollutant emissions are one type of environmental externality. Externalities include benefits and costs resulting as an unintended byproduct of economic activity that accrue to someone other than the parties involved in the activity. Externality values attempt to account for

the cost to society due to the pollutant emission, and are usually given in $/ton. There are various limitations with certain approaches to obtaining externality values, but externality values are one of the most reasonable approaches to valuing the functions of urban forests, particularly if the externality value is directly derived from the societal costs of the pollutant emitted into the atmosphere (e.g., human health, materials damage, etc.).

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(top)

Rainfall Interception of Trees

This info was requested by Bailey Hudson and I pass it on in case anyone else is interested. It is an estimate of rainfall interception by a thoroughly saturated tree (0.5 inch storm). Tree data are based on destructive sampling of a callery pear tree in Davis and interception is based on our measurements and modeling studies using this tree. Visit our web site for related publications (http://www.fs.fed.us/psw/programs/cufr/). -- Greg.

Tree age: 9 years
Size: 28 ft tall, 19 ft crown diameter, 276 sq ft crown projection area (CPA), 1,923 sq ft leaf area, 446 sq ft stem area
Saturation storage: leaf = 0.04 inch, stem = 0.04 inch
Rainfall: 0.5 inches
Interception by leaf: 47.2 gal
Interception by stem: 10.9 gal
Total interception: 58.1 gal
Total precip in CPA: 86.1 gal
Interception %: 68%

These values assume no evaporation from the crown so actual interception will increase as temperatures and wind speed increase and thereby drive higher evap rates. In other words, this is a lowball estimate for an in-leaf pear. We are beginning to measure the saturation storage capacity for different tree species and this info will improve our ability to accurately model impacts of urban forests on stormwater runoff.

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Davis, CA 95816
530.752.5897 (fax) 530.752.6634

(top)

Trees and Commercial Business

Trees and business - it's often a love-hate relationship! There are certainly costs that come with having trees on streets. Yet, a new study provides evidence that trees have positive effects on consumers. Despite their costs, trees do provide indirect benefits to businesses.

About 70% of America's gross domestic product is generated by the purchases of individuals. Consumers consider many factors when deciding on what products and services to buy. Value, quality and convenience are major messages that marketers communicate about their products. Often overlooked is the importance of the retail place on shopping decisions. A pleasant, welcoming retail environment is important to consumers.

How does the community forest influence consumers? A national study, conducted by social scientists at the University of Washington, used survey questionnaires to investigate public perceptions about the role of trees in revitalizing business districts. Surveys were sent to selected districts in cities of the Pacific Northwest, Austin, Los Angeles, Chicago, Pittsburgh, and Washington, DC.

CONSUMER PERCEPTIONS AND BEHAVIORS

Place Perception
Four categories of perceptions emerged from participant ratings of three business districts: ***Amenity and Comfort***, ***Interaction with Merchants***, ***Quality of Products***, ***Maintenance and Upkeep***.

Consumers' ratings on each of the categories was significantly higher for districts that had street trees and other landscape improvements. For instance, ***Amenity and Comfort ratings*** were about 80% higher for a tree lined sidewalk compared to a non-shaded street. Also, ***Quality of Products***, ratings were 30% higher in districts having trees over those with barren sidewalks. Interaction with Merchants items included customer service issues; ratings were about 15% higher for districts with trees.

Patronage Behavior
Actions follow our impressions of a place. Respondents were asked to give opinions of their behavior within the three shopping districts, including travel time, travel distance, duration of a visit, frequency of visits and willingness-to-pay for parking. Again, trees make a difference! Considering ALL behaviors, higher measures were reported in the districts having trees. For instance, respondents claimed they would be willing to pay more for parking in a well landscaped business district. This suggests greater revenues from shaded parking could offset the costs of parking space loss, a frequent objection by merchants.

Pricing Patterns
Do trees influence how much people are willing to pay for goods? Contingent valuation methods were used to assess how amenity values relate to customers' price valuations. Survey respondents were asked to specify a price for each of 15 items in a "basket of goods" in the business districts. The survey participants consistently priced goods significantly higher in landscaped districts! Prices were, on average, about 11% higher for products in the landscape compared to the no-tree district. This was true of low-price, impulse-buy convenience goods (e.g. lunch sandwich, flower bouquet), as well as bigger ticket, comparison-shopped items (e.g. sports shoes, new glasses). Give the low profit margins of most retail businesses, trees appear to provide a significant "amenity margin."

(top)

22 Benefits of Urban Street Trees

By Dan Burden, Senior Urban Designer
Glatting Jackson and Walkable Communities, Inc; May, 2006

U.S Forest Service facts and figures and new traffic safety studies detail many urban street tree benefits. Once seen as highly problematic for many reasons, street trees are proving to be a great value to people living, working, shopping, sharing, walking and motoring in and through urban places.

For a planting cost of $250-600 (includes first 3 years of maintenance) a single street tree returns over $90,000 of direct benefits (not including aesthetic, social and natural) in the lifetime of the tree. Street trees (generally planted from 4 feet to 8 feet from curbs) provide many benefits to those streets they occupy. These trees provide so many benefits that they should always be considered as an urban area default street making feature. With new attentions being paid to global warming causes and impacts more is becoming known about the many negative environmental impacts of treeless urban streets. We are well on the way to recognizing the need for urban street trees to be the default design, rather than a luxury item to be tolerated by traffic engineering and budget conscious city administrators.

The many identified problems of street trees are overcome with care by designers. Generally street trees are placed each 15-30 feet. These trees are carefully positioned to allow adequate sight triangles at intersections and driveways, to not block illumination of the street from overhead lamps, and not impact lines above or below ground. Street trees of various varieties can be used in all climates, including semi-arid and even arid conditions.

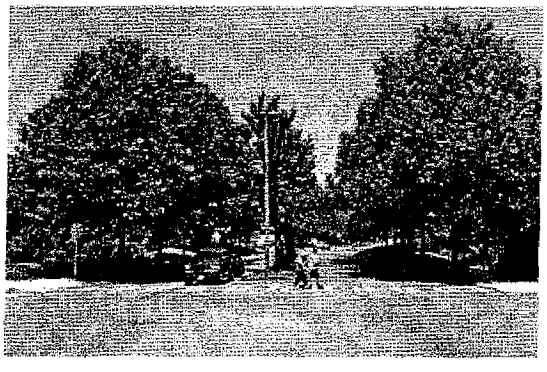
The science of street tree placement and maintenance is well known and observed in a growing number of communities (i.e. Chicago, Illinois; Sacramento, Davis, California; Eugene, Oregon; Seattle, Redmond, Olympia and Issaquah, Washington; Charlotte, N.C.). Although care and maintenance of trees in urban places is a costly task, the value in returned benefits is so great that a sustainable community cannot be imagined without these important green features.

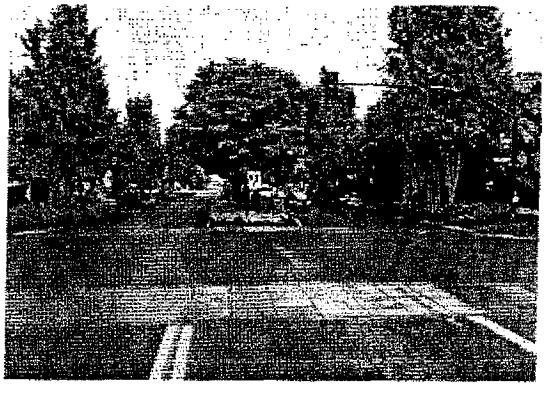
Properly placed and spaced urban street trees provide these benefits:

Increased motorized traffic and pedestrian safety (contrary to popular myths). See below article for details on mode safety enhancements. See especially the compilation of safety benefits detailed in, Safe Streets, Livable Streets, by Eric Dumbaugh Journal of the American Planning Association, Vol. 71, No. 3, Summer 2005. One such indication of increased safety with urban street trees is quoted from this document:

"Indeed, there is a growing body of evidence suggesting that the inclusion of trees and other streetscape features in the roadside environment may actually reduce crashes and injuries on urban roadways. Naderi (2003) examined the safety impacts of aesthetic streetscape enhancements placed along the roadside and medians of five arterial roadways in downtown Toronto. Using a quasi-experimental design, the author found that the inclusion of features such as trees and concrete planters along the roadside resulted in statistically significant reductions in the number of mid-block crashes along all five roadways, with the number of crashes decreasing from between 5 and 20% as a result of the streetscape improvements. While the cause for these reductions is not clear, the author suggests that the presence of a well defined roadside edge may be leading drivers to exercise greater caution."

1. **Reduced and more appropriate urban traffic speeds**. Urban street trees create vertical walls framing streets, and a defined edge, helping motorists guide their movement and assess their speed (leading to overall speed reductions). Street safety comparisons show a reduction of run-off-the-road crashes and overall crash severity when street tree sections are compared with equivalent treeless streets. (Texas A and M conducted simulation research which found people slow down while driving through a treed scape. These observations are also noted in the real world when following motorists along first a treed portion of a street, and then a non treed portion. Speed differentials of 3 mph to 15 mph are noted.



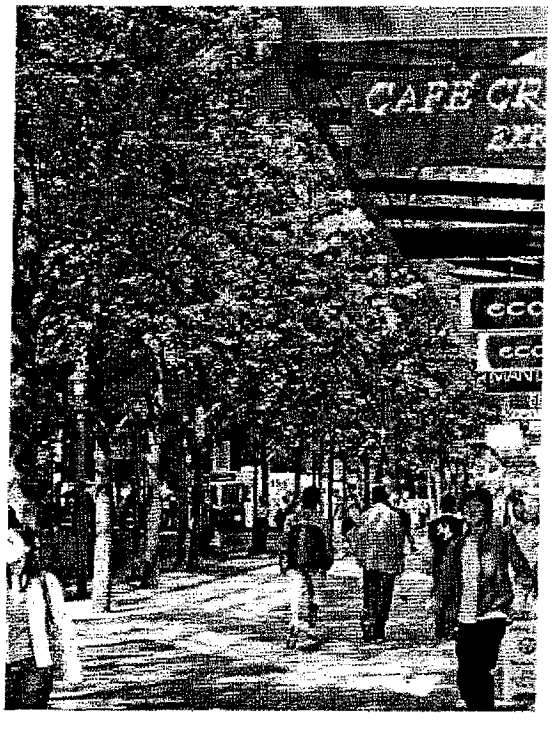


2. **Create safer walking environments**, by forming and framing visual walls and providing distinct edges to sidewalks so that motorists better distinguish between their environment and one shared with people. If a motorist were to significantly err in their urban driving task, street trees can deflect or fully stop a motorist from taking another human life.

3. **Trees call for planting strips**, which further separate motorists from pedestrians, buildings and other urban fabric.

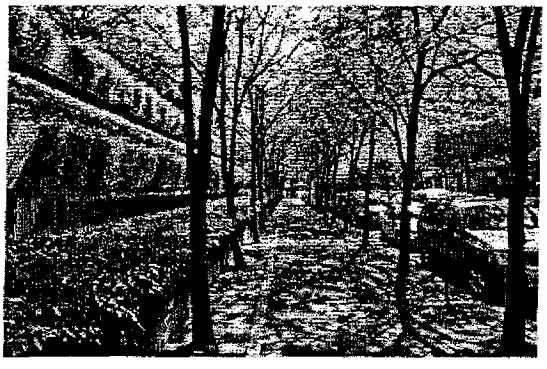
4. **Increased security**. Trees create more pleasant walking environments, bringing about increased walking, talking, pride, care of place, association and therefore actual ownership and surveillance of homes, blocks, neighborhoods plazas, businesses and other civic spaces.

5. **Improved business.** Businesses on treescaped streets show 20% higher income streams, which is often the essential competitive edge needed for main street store success, versus competition from plaza discount store prices.



6. **Less drainage infrastructure.** Trees absorb the first 30% of most precipitation through their leaf system, allowing evaporation back into the atmosphere. This moisture never hits the ground. Another percentage (up to 30%) of precipitation is absorbed back into the ground and taken in and held onto by the root structure, then absorbed and then transpired back to the air. Some of this water also naturally percolates into the ground water and aquifer. Storm water runoff and flooding potential to urban properties is therefore reduced.

7. **Rain, sun, heat and skin protection.** For light or moderate rains, pedestrians find less need for rain protection. In cities with good tree coverage there is less need for chemical sun blocking agents. Temperature differentials of 5-15 degrees are felt when walking under tree canopied streets.



8. **Reduced harm from tailpipe emissions.** Automobile and truck exhaust is a major public health concern and contains significant pollutants, including carbon monoxide (CO), volatile organic compounds (VOC), nitrogen oxides (NOx), and particulate matter (PM). Tailpipe emissions are adding to asthma, ozone and other health impacts. Impacts are reduced significantly from proximity to trees.

9. **Gas transformation efficiency.** Trees in street proximity absorb 9 times more pollutants than more distant trees, converting harmful gasses back into oxygen and other useful and natural gasses.

10. **Lower urban air temperatures.** Asphalt and concrete streets and parking lots are known to increase urban temperatures 3-7 degrees. These temperature increases significantly impact energy costs to homeowners and consumers. A properly shaded neighborhood, mostly from urban street trees, can reduce energy bills for a household from 15-35%.

11. **Lower Ozone.** Increases in urban street temperatures that hover directly above asphalt where tailpipe emissions occur dramatically increase creation of harmful ozone and other gasses into more noxious substances impacting health of people, animals and surrounding agricultural lands.

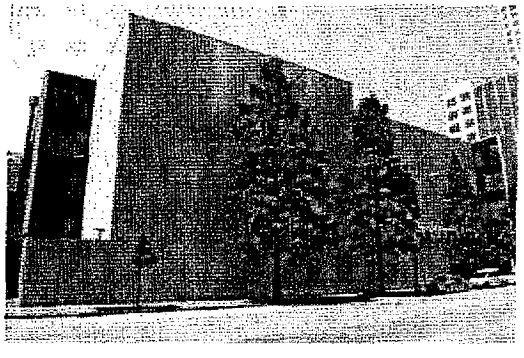
12. **Convert streets, parking and walls into more aesthetically pleasing environments.** There are few streetmaking elements that do as much to soften wide, grey visual wastelands created by wide streets, parking lots and massive, but sometimes necessary blank walls than trees.

13. **Soften and screen necessary street features** such as utility poles, light poles and other needed street furniture. Trees are highly effective at screening those other vertical features to roadways that are needed for many safety and functional reasons.

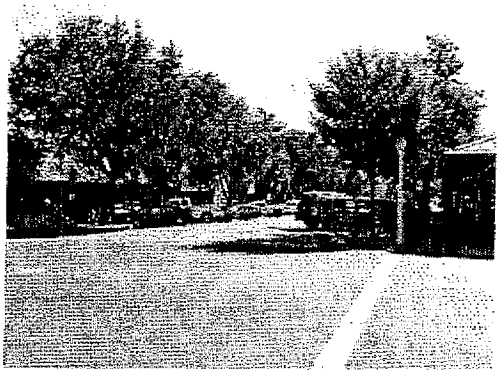
14. **Reduced blood pressure, improved overall emotional and psychological health.** People are impacted by ugly or attractive environments where they spend time. Kathlene Wolf, Social Science Ph.D. University of Washington gave a presentation that said "the risk of treed streets was questionable compared to other types of accidents along with the increased benefit of trees on human behavior, health, pavement longevity, etc." She noted that trees have a calming and healing effect on ADHD adults and teens.

15. **Time in travel perception.** Other research and observations confirm that motorists perceive the time it takes to get through treed versus non-treed environments has a significant differential. A treeless environment trip is perceived to be longer than one that is treed (Walter Kulash, P.E.; speech circa 1994, Glatting Jackson).

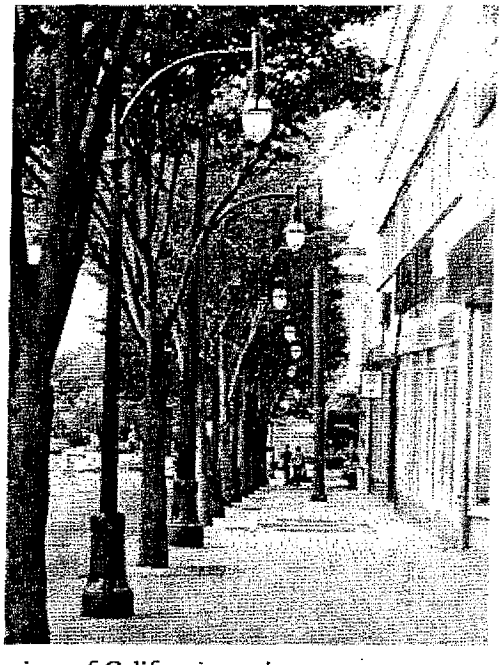
16. **Reduced road rage.** Although this may at first seem a stretch, there is strong, compelling research that motorist road rage is less in green urban versus stark suburban areas. Trees and aesthetics, which are known to reduce blood pressure, may handle some of this calming effect.



17. **Improved operations potential.** When properly positioned and maintained, the backdrop of street trees allow those features that should be dominant to be better seen, such as vital traffic regulatory signs. The absence of a well developed Greenscape allows the sickly grey mass of strip to dominate the visual world. At the same time, poorly placed signs, signals, or poorly maintained trees reduces this positive gain, and thus proper placement and maintenance must be rigidly adhered to.



18. **Added value to adjacent homes, businesses and tax base.** Realtor based estimates of street tree versus non street tree comparable streets relate a $15-25,000 increase in home or business value. This often adds to the base tax base and operations budgets of a city allowing for added street maintenance. Future economic analysis may determine that this is a break-even for city maintenance budgets.



19. **Provides a lawn for a splash and spray zone, storage of snow, driveway elevation transition and more.** Tree lawns are an essential part of the operational side of a street.

20. **Filtering and screening agent.** Softens and screens utility poles, light poles, on-street and off-street parking and other features creating visual pollution to the street.

21. **Longer pavement life.** Studies conducted in a variety of California environments show that the shade of urban street trees can add from 40-60% more life to costly asphalt. This factor is based on reduced daily heating and cooling (expansion/contraction) of asphalt. As peak oil pricing increases roadway overlays, this will become a significant cost reduction to maintaining a more affordable roadway system.

22. **Connection to nature and the human senses.** Urban street trees provide a canopy, root structure and setting for important insect and bacterial life below the surface; at grade for pets and romantic people to pause for what pets and romantic people pause for; they act as essential lofty environments for song birds, seeds, nuts, squirrels and other urban life. Indeed, street trees so well establish natural and comfortable urban life it is unlikely we will ever see any advertisement for any marketed urban product, including cars, to be featured without street trees making the ultimate dominant, bold visual statement about place.

ORDINANCE NO. 2008-_____

AN ORDINANCE OF THE CITY OF CULVER CITY, STATE OF CALIFORNIA, AMENDING CHAPTER 15.02, BUILDINGS, STRUCTURES AND EQUIPMENT, OF THE CULVER CITY MUNICIPAL CODE TO ADD A NEW SUBCHAPTER 15.02.1100, et seq., ENTITLED "GREEN BUILDING PROGRAM AND REQUIREMENTS."

WHEREAS, State Mandates AB 32 and SB 375 require that local municipalities join and lead in the fight against global warming. One method to achieve this end is through smart green building practices; and

WHEREAS, a number of existing green building programs at the State and local level were reviewed in the process of developing the City's Green Building Program. All programs surveyed were for commercial, mixed-use, and multi-family development and almost all were mandatory; and

WHEREAS, the cities of Los Angeles, Beverly Hills, Santa Monica, Pasadena and West Hollywood have all adopted Green Building programs in an effort to reduce carbon emissions and increase the health and sustainability of its residents and fight against global warming; and

WHEREAS, Culver City has been developing a Green Building Program over the last several years that derives best practices from neighboring cities, but that is designed specifically for Culver City; and

WHEREAS, conventional design and construction methods produce buildings that can negatively impact the environment as well as occupant health and productivity. These buildings are comparatively expensive to operate and contribute to excessive resource consumption, waste generation and pollution. To help reduce these impacts, the

City has proposed a set of guidelines for the development of "green buildings;" and

WHEREAS, "green buildings" reduce energy and water consumption, and improve air quality. Greenhouse gas emissions from building account for more than 40% of global warming pollution. Green building ordinances are a good first step towards building energy-efficient, climate friendly sustainable cities; and

WHEREAS, "green buildings" require the use of fewer natural resources and provide a healthy, productive, indoor environment for occupants by using an integrated design approach that incorporates: site planning, design, building preservation, construction, operations and maintenance; and

WHEREAS, the benefits of green building include: more natural resources for the future, reduced energy consumption, lower operating costs, increased employee productivity, increased energy efficiently in buildings, reduction of greenhouse gas generated by buildings and reduction of the carbon footprint; and

WHEREAS, to ensure a viable future, the City must take a leadership role and address the impacts placed on the environment by urbanization and a growing populace, which includes air and water pollution, climate change and habitat loss; and

WHEREAS, the City is striving to become a model of environmental excellence and a prevailing force of environmental protection. To accomplish these goals, the City shall establish policies that will incorporate environmental responsibility into its daily management of urban and industrial growth, energy and water use, air quality, transportation, waste reduction, economic development and open space and natural habitats.

NOW THEREFORE, the City Council of the City of Culver City, California, **DOES HEREBY ORDAIN** as follows:

SECTION 1. Based on the foregoing recitations and findings, Chapter 15.02 of the Culver City Municipal Code is hereby amended to add subchapter 15.02.1100, *et seq.* as follows:

GREEN BUILDING PROGRAM AND REQUIREMENTS

§ 15.02.1100 ESTABLISHMENT OF PROGRAM AND PURPOSE.

The City has established a Green Building Program, which shall be administered by the Building Safety Division pursuant to the provisions of this Subchapter. The purpose of the Green Building Program is to reduce the use of natural resources, create healthier living environments and minimize the negative impacts of development on local, regional and global ecosystems.

§ 15.02.1105 DEFINITIONS.

Terms defined herein shall have the following meanings when used in this Subchapter:

AIP – Phase I shall mean the West Washington Boulevard Area Improvement Plan – Phase I (located on West Washington Boulevard between Wade Street and Beethoven Street).

AIP – Phase II shall mean the West Washington Boulevard Area Improvement Plan – Phase II (located on West Washington Boulevard between Centinela Avenue and Colonial Avenue).

Applicant shall mean any individual, firm, limited liability company, association, partnership, political subdivision, government agency, municipality, industry or public or private corporation, or any other entity whatsoever that applies to the City for the applicable permits to undertake a Qualifying Project.

Building Official shall mean the Building Official of the City of Culver City or his or her designee.

Building Safety Division shall mean the City's Building Safety Division and its staff.

Category 1 Qualifying Project shall mean the construction or major renovation of any building or structure that requires a building permit and meets the criteria established in Section 15.02.1105.A.

Category 2 Qualifying Project shall mean the construction or major renovation of any building or structure that requires a building permit and meets the criteria established in Section 15.02.1105.B.

CCMC shall mean the Culver City Municipal Code.

City shall mean the City of Culver City.

Director shall mean the Community Development Director of the City of Culver City or his or her designee.

LEED® shall mean Leadership in Energy and Environmental Design, a rating system put forth by the U.S. Green Building Council that is the nationally accepted benchmark for the design, construction and operation of high performance green buildings.

LEED®-AP shall mean a person who has been designated a LEED® Accredited Professional by the Green Building Certification Institute (GBCI).

Major renovation shall mean any change, addition or modification to an existing building, where the valuation of the change, addition or

modification is equal to at least fifty percent (50%) of the valuation of the existing building.

Project shall mean the Qualifying Project that is the subject of the permit application.

USGBC shall mean the U.S. Green Building Council.

§ 15.02.1110 REQUIREMENTS.

A. *Category 1 Qualifying Projects.* All new buildings of 49,999 square feet or less of gross floor area and major renovations to existing buildings of 49,999 square feet or less of gross floor area, shall comply with a minimum of 20 of the following items:

1. Heating, ventilating and air conditioning (HVAC) units shall have a minimum seasonal energy efficiency rating (SEER) of 17;

2. Gas heating units shall be a minimum of 93% energy efficient;

3. All heating and cooling ducts shall be located within the space to be heated and cooled;

4. Roof and floor structures abutting an exterior space shall be a minimum value of R-38 (thermal resistance value); and all exterior walls shall be a minimum value of R-28;

5. Radiant barriers shall be installed under all new roof sheathing;

6. All new exterior glass shall be a minimum value of U.35 (measure of heat conducting properties) and a minimum value of .30 SHGC (solar heat gain coefficient);

7. Low slope roofs shall be a minimum value of 75% SRI (solar reflectance index);

8. Exterior shading shall be provided over all west, south and east facing exterior glass. Where exterior shading is infeasible, all new exterior glass shall be a minimum value of U.32 and a minimum value of .27 SHGC;

9. All new interior and exterior lighting shall be fluorescent, LED or other type of high efficiency lighting;

10. All new lighting installed in restroom or bathroom areas shall be fluorescent, LED or other type of high efficiency lighting and shall be motion sensor controlled. All new exhaust fans installed in restroom or bathroom areas shall be motion sensor controlled;

11. All new lighting installed in any corridor, entryway or other typically unoccupied space shall be fluorescent, LED or other type of high efficiency lighting and shall be motion sensor controlled. Minimum base level lighting shall be permitted;

12. All new lighting installed in a garage or parking structure shall be motion sensor controlled. Minimum base level lighting shall be permitted;

13. Water closets shall be dual flush models;

14. Urinals shall be waterless models;

15. Water heaters installed for the heating of water in residential units shall be tankless models;

16. Two two-inch electrical conduits shall be installed from the roof to the electrical panels for future solar photovoltaic installation for each unit in residential and commercial buildings. (Qualifying Projects that are subject to the provisions of CCMC Section 15.02.1005, may not use this item toward satisfying the requirements of this Section.);

17. A 20 square feet area to house recyclable material containers shall be provided. This requirement shall be in addition to any other CCMC requirements related to solid waste and recyclable material containers;

18. Multistory buildings shall provide separate trash chutes for recyclable and non-recyclable materials and waste. Such chutes shall discharge directly into separate recyclable and non-recyclable materials and waste containers. This requirement shall be in addition to any other CCMC requirements related to trash chutes;

19. One duplex weather proof (WP) ground fault circuit interrupter (GFCI) outlet shall be installed for every eight parking spaces to be utilized for future electric "plug-in" vehicles.

20. All doors leading from heated or cooled spaces to non-heated and non-cooled spaces shall be insulated doors and shall include weather-stripping and adequate closers.

21. Any new on-site, ground-level paving, which is open to the sky, shall be permeable.

22. All on-site landscaping shall be low-water, drought tolerant. All irrigation shall be bubbler systems.

23. All wood floor and roof structures shall be constructed with 90% engineered lumber.

24. A minimum of 50% of the overall building insulation shall be formaldehyde free and recycled content. A minimum aggregate of 60% of the wall, ceiling, and floor insulation shall be cellulose, cotton ball, or bio-based foam.

25. 1kw of solar photovoltaic power shall be installed. (Qualifying Projects that are subject to the provisions of CCMC Section

15.02.1005 may not use this item toward satisfying the requirements of this Section.).

B. *Category 2 Qualifying Projects.* All new buildings of 50,000 square feet or more of gross floor area and major renovations to existing buildings of 50,000 square feet or more of gross floor area, shall comply with the following requirements:

1. Prior to the issuance of a building permit, Applicant shall submit the following:

a. Evidence that a LEED®-AP is one of the members of the Project team.

b. Evidence that the Project has been registered with USGBC's LEED® program.

c. A LEED® checklist, including points allocated to the "Innovation and Design" category, which demonstrates that the Project meets the selected LEED® Rating System at the "Certified" level or higher.

d. A signed declaration from the LEED®-AP member of the Project team, stating that the plans and plan details have been reviewed and the Project meets the intent of the criteria for certification of the selected LEED® Rating System at the "Certified" level or higher.

2. The Project shall comply with USGBC's "3 point margin of error" for LEED® certification.

3. Applicant shall submit to the Building Official copies of all correspondence between the Applicant and USGBC regarding the Project.

C. *Green Building Checklist.* A green building checklist, on a form approved by the Building Official, shall be completed and submitted prior to construction of a Category 1 Qualifying Project.

D. *Exceptions.* This Section shall not apply to one and two family residences.

§ 15.02.1115 URBAN TREE REQUIREMENTS.

Applicants of any Qualifying Project must comply with the following:

A. When feasible, all existing on-site trees with a trunk diameter of 2" or greater shall be preserved or replaced with trees of comparable size per the recommendations of the Culver City Parks Manager.

B. When feasible, all existing street trees with a trunk diameter of 2" or greater shall be preserved or replaced with trees of comparable size per the recommendations of the Culver City City Engineer.

§ 15.02.1120 GREEN ZONE INCENTIVE PROGRAM.

A. Subject to approval by the Director, plan check and permit fees in an amount not to exceed Five Thousand Dollars ($5,000) may be waived for Category 1 and Category 2 Qualifying Projects, which comply with the requirements of this Subchapter and are located in AIP – Phase I and AIP – Phase II areas.

B. The aggregate amount of fee waivers for the Green Zone Incentive Program shall not exceed the amount, if any, appropriated for such purpose by the Culver City City Council or the Culver City Redevelopment Agency.

C. Fee waivers shall be granted on a first come, first served basis.

D. The Green Zone Incentive Program, as set forth in this Section, shall remain in effect until _____, 2014, and as of that date is

repealed, unless a later enacted statute, enacted before _____, 2014, deletes or extends that date.

§ 15.02.1125 INSPECTIONS AND ENFORCEMENT.

A. No final inspection shall be approved for a Project subject to the requirements of this Subchapter, nor shall a temporary or final certificate of occupancy be issued for such Project, until such time as the requirements of this Subchapter have been satisfied, as determined by final inspection of the Building Safety Division.

B. The Building Safety Division may issue field correction notices and/or stop work orders on a Project for non-compliance with the requirements of this Subchapter.

C. The provisions of this Subchapter may be enforced through any or all available remedies provided in the CCMC.

SECTION 2. Pursuant to Section 619 of the City Charter, this Ordinance shall take effect thirty (30) days after the date of its adoption. Pursuant to Sections 616 and 621 of the City Charter, prior to the expiration of fifteen (15) days after the adoption, the City Clerk shall cause this Ordinance, or a summary thereof, to be published in the Culver City News and shall post this Ordinance or a summary thereof in at least three places within the City.

SECTION 3. The City Council hereby declares that, if any provision, section, subsection, paragraph, sentence, phrase or word of this ordinance is rendered or declared invalid or unconstitutional by any final action in a court of competent jurisdiction or by reason of any preemptive legislation, then the City Council would have independently

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adopted the remaining provisions, sections, subsections, paragraphs, sentences, phrases or words of this ordinance and as such they shall remain in full force and effect.

APPROVED AND ADOPTED this _____ day of _____, 2009.

D. SCOTT MALSIN, Mayor
City of Culver City, California

ATTEST:

MARTIN R. COLE, City Clerk

APPROVED AS TO FORM:

for CAROL A. SCHWAB, City Attorney