



Town of Carrboro

Town Hall
301 W. Main St.
Carrboro, NC 27510

Meeting Agenda Board of Aldermen



Tuesday, March 18, 2014

7:30 PM

Board Chambers - Room 110

A. REQUESTS FROM VISITORS AND SPEAKERS FROM THE FLOOR

B. RESOLUTIONS, PROCLAMATIONS, AND ACKNOWLEDGEMENTS

7:30-7:35

1. [14-0068](#) Earth Hour Resolution

Attachments: [Earth Hour Resolution_14](#)
[Earth Hour PSA_14](#)

7:35-7:40

C. CONSENT AGENDA

1. **14-0088** Approval of Previous Meeting Minutes
2. [14-0085](#) Request-to-set a public hearing on Land Use Ordinance Amendments Relating to Building Setbacks

PURPOSE: The purpose of this agenda item is for the Board of Aldermen to consider setting a public hearing on potential text amendments modifying the building setback provisions as they relate to roof overhangs. A resolution setting a public hearing date for April 22, 2014 has been prepared, and advisory board review has also been requested prior to the public hearing.

Attachments: [Attachment A Resolution](#)
[Attachment B Draft - LUO Amendment Building Setbacks_3-10-2014](#)
[Attachment C Excerpts from ART-XII](#)
[Attachment D Fact Sheets from the NC Solar Center](#)

3. [14-0086](#) Town Code Amendment Establishing a Safe Routes to School Implementation Committee

PURPOSE: Following up on a March 4, 2014, agenda item, the Board of Aldermen is asked to consider establishing a Safe Routes to School Implementation Committee.

Attachments: [Att A - ORD AMD - Establish SRTS implementation committee - Mar 2014 - updated](#)
[Att B - ORD AMD - Establish SRTS implementation committee - Mar 2014 - updated - changes tracked](#)

4. [14-0087](#) Proposed Revisions to the DCHC-MPO Memorandum of Understanding

PURPOSE: The Board of Aldermen approved a revised version of the Durham-Chapel Hill-Carrboro Metropolitan Planning Organization (DCHC-MPO) Memorandum of Understanding (MOU) on February 25, 2014, and authorized the Mayor to sign it. The MPO Transportation Advisory Committee (TAC) approved a further-revised version on March 12, 2014. The resolution in Attachment A approves this version and authorizes the Mayor to sign it.

Attachments: [Attachment A - Resolution - MPO MOU approval and authorization - March 2014](#)
[Attachment B - 2013 DCHC MPO MOU - recommended for member gov approval - 2014-03-12](#)
[Attachment C - 2013 DCHC MPO MOU - recommended - marked - 2014-03-12](#)
[Attachment D - Letter to Managers re 2014 MOU update - 2014-03-12 - signed](#)

D. OTHER MATTERS

7:40-8:00

1. [14-0084](#) Report on the Planning Board's Community Zoning Conversations

PURPOSE: The purpose of this agenda item is to provide the Board of Aldermen with a report on the Planning Board's "Community Zoning Conversations" outreach program held in October of 2013.

Attachments: [Attachment A - Resolution to Accept Community Zoning Conversations Report](#)
[Attachment B - Carrboro Community Zoning Conversations](#)

8:00-8:20

2. [14-0079](#) Update on Stormwater Volume Control Requirement

Attachments: [StormwaterVolumeResolution031214](#)
[StormwaterVolumeMemo031214](#)

G. MATTERS BY BOARD MEMBERS

1. [14-0089](#) Brief Monthly Report/Update from Members of the Board

H. MATTERS BY TOWN CLERK

I. MATTERS BY TOWN MANAGER

J. MATTERS BY TOWN ATTORNEY



Town of Carrboro

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Legislation Text

File #: 14-0068, **Version:** 1

TITLE:

Earth Hour Resolution

PURPOSE: The purpose of this agenda item is to present a resolution supporting Earth Hour.

DEPARTMENT: Planning

CONTACT INFORMATION: Patricia McGuire, 918-7327, Randy Dodd, 918-7326

INFORMATION: Earth Hour, sponsored by World Wildlife Fund, has cemented itself as the largest voluntary action for the environment, with hundreds of millions of people around the world coming together to call for action on climate change by doing something quite simple—turning off their lights for one hour. In 2013, Earth Hour concluded another record sweep around the planet, with hundreds of millions again uniting to send a clear and determined message to create a sustainable future for our planet. The event was observed in more than 7000 cities, towns and municipalities in more than 150 countries and territories, with “lights out” as the backdrop to a multitude of “beyond the hour” activities and initiatives. In 2012, the campaign launched the “I Will If You Will” campaign, with more than 200,000 individuals accepting a challenge, and astronaut André Kuipers observing the lights off event from the International Space Station. Also, just months after the end of the Libyan uprising, two teenagers in Tripoli organized the very first Earth Hour in Libya. For Earth Hour 2010, polling in the United States showed that an estimated 90,000,000 Americans participated as “lights out” included iconic landmarks such as Mount Rushmore, the Las Vegas Strip, the Empire State Building and Niagara Falls. In Chicago, the Building Owners and Managers Association (BOMA) developed lighting guidelines to reduce light pollution, and reduce the carbon footprint of downtown buildings. Mount Rushmore in South Dakota has started powering down each night around 9 p.m. instead of 11 p.m. In Vietnam, electricity demand fell 500,000 kWh during Earth Hour 2010, which was three times larger than in 2009. About 4000 cities participated, including landmarks such as Big Ben, the Empire State Building, the Sydney Opera House, the Eiffel Tower, the Parthenon, the Brandenburg Gate, and the Forbidden City. Celebrity Earth Hour ambassadors have included South African Archbishop Desmond Tutu, former New Zealand Prime Minister Helen Clark, President of Vietnam Nguyễn Minh Triết, and London Mayor Boris Johnson. Earth Hour has garnered support from many corporations including Coca-Cola Enterprises, Wells Fargo, IKEA, HSBC, PwC, Accenture and Nokia Siemens Networks. Sydney's Herald Sun equated the power savings in the Sydney central business district to "taking 48,613 cars off the road for 1 hour." More information about Earth Hour, including how Earth Hour began, what has been accomplished, and what is in store for 2014, is available at www.earthhour.org.

FISCAL & STAFF IMPACT: There is no staff or fiscal impact.

RECOMMENDATION: Staff recommends that the Board adopt the attached resolution.

A RESOLUTION FOR PARTICPATION IN EARTH HOUR ON MARCH 23rd

Resolution No. ~~2014-~~

WHEREAS, March 29th, 2014, 8:30 PM has been designated as "Earth Hour" by the World Wildlife Fund as a reminder that, by working together, people can make a positive impact in the fight against climate change;

WHEREAS, Carrboro is joining with others across the country and around the world to raise awareness and demonstrate commitment to addressing climate change by supporting "Earth Hour," and;

WHEREAS, "Earth Hour" involves something quite simple:—turning off lights for one hour, and otherwise raising awareness and building a global commitment;

WHEREAS, "Earth Hour" is the largest event of its kind in the world;

WHEREAS, Carrboro has joined Cities for Climate Protection, and is committed to reducing greenhouse emissions;

WHEREAS, the Board of Aldermen adopted a climate protection resolution in December, 2009;

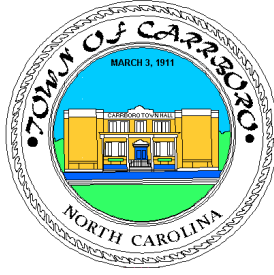
THEREFORE, the Carrboro Board of Aldermen, do hereby proclaim, March 29, 2014 from 8:30 – 9:30 p.m. as "Earth Hour" in Carrboro and call upon all residents and businesses of Carrboro to join in supporting the aims and goals of this effort.

FURTHERMORE, the Carrboro Board of Aldermen, do hereby direct staff to send out a public service announcement to publicize "Earth Hour".

this 18th day of March, 2014

Mayor's signature _____

ATTEST



March 19, 2014

PUBLIC SERVICE ANNOUNCEMENT – TOWN OF CARRBORO, NC

Climate change is happening all around us and its pace is accelerating. From melting glaciers to increasingly intense weather patterns, climate change is already impacting life on Earth.

In a bold statement of collective concern for our planet, millions and perhaps billions of people around the world will turn off their lights for one hour—Earth Hour—on March 29, 2014 at 8:30 p.m. local time.

Sponsored by World Wildlife Fund, Earth Hour is the largest event of its kind in the world. In 2013, Earth Hour concluded another record sweep around our planet from Samoa on one side of the International Date Line to the Cook Islands on the other, with hundreds of millions again uniting to send a clear message - we are determined to create a sustainable future for our planet. The event was observed in more than 7000 cities, towns and municipalities in more than 150 countries and territories, with many of the world's best known human and natural landmarks going dark as the backdrop to a multitude of "beyond the hour" activities and initiatives generating outcomes for the movement and the planet on which we live.

“What is most important is the ever increasing extent to which Earth Hour’s supporters are participating in or taking actions themselves,” said Earth Hour CEO and Co-Founder, Andy Ridley. “Now in its 7th year, Earth Hour is maturing from its origins as a consciousness raising event in one city, to a global movement that is not just calling for change but is engaging in it.”

The Carrboro Board of Aldermen request that you join our community’s effort to raise awareness of this issue by helping spread the word about Earth Hour between now and March 29th. Ways to spread the word can be found at <http://www.earthhour.org/page/get-involved/spread-word>. Working together, our community can send a strong message that we care and are calling for action to save our planet for future generations.

Additional details are available at www.earthhour.org.

For more information, contact:

Trish McGuire, Planning Director
918-7327 / pmcguire@townofcarrboro.org

Randy Dodd, Environmental Planner
918-7326/ rdodd@townofcarrboro.org



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Legislation Text

File #: 14-0085, **Version:** 1

TITLE:

Request-to-set a public hearing on Land Use Ordinance Amendments Relating to Building Setbacks

PURPOSE: The purpose of this agenda item is for the Board of Aldermen to consider setting a public hearing on potential text amendments modifying the building setback provisions as they relate to roof overhangs. A resolution setting a public hearing date for April 22, 2014 has been prepared, and advisory board review has also been requested prior to the public hearing.

DEPARTMENT: Planning

CONTACT INFORMATION: Christina Moon 919-918-7325; Marty Roupe 919-918-7333; Patricia McGuire 919-918-7327; Mike Brough 919-929-3905

INFORMATION: Over the years Planning staff have received requests from the building community to consider excluding roof overhangs from the building setback provisions. Interest in this topic has increased in recent years, due in part to the inclusion of roof overhangs as a potential feature in green building design. Strategically placed roof overhangs offer a passive solar benefit, which when combined with proper orientation and landscaping can provide energy savings (*Attachment D*). Benefits from substantial roof overhangs include: diverting water away from building foundations, sheltering windows and exterior siding from the elements, and depending on the height of the building roof overhangs can offer some protection for stored items such as bicycles and gardening equipment, leaning against a wall. In addition, roof overhangs of approximately one to two feet are typical of the older building stock in Carrboro dating to the mill period, and which include modest side-gable houses for mill workers and the larger Craftsman homes constructed for merchants.

Interest in removing roof overhangs from the setback provisions resurfaced again at the March 11, 2014 work session when Board members expressed interest in modifying the ordinance to allow overhangs of up to three feet to be excluded from the setback provisions. The Board of Aldermen must receive public comment before adopting amendments to the LUO. Planning Board and Orange County review is also needed.

FISCAL & STAFF IMPACT: Public hearings involve staff and public notice costs associated with advisory board and Board of Aldermen Review.

RECOMMENDATION: Staff recommends that the Board of Aldermen consider the attached resolution, setting a public hearing for April 22, 2014 and referring the proposed amendments to Orange County, the Planning Board, the Appearance Commission, and the Environmental Advisory Board.

A RESOLUTION SETTING A PUBLIC HEARING ON AN ORDINANCE AMENDING THE CARRBORO LAND USE ORDINANCE TO MODIFY SETBACK PROVISIONS RELATING TO ROOF OVERHANGS

WHEREAS, the Board of Aldermen seeks to provide ample opportunities for the public to comment on proposed amendments to the Land Use Ordinance;

NOW, THEREFORE BE IT RESOLVED that the Board of Aldermen sets a public hearing on April 22, 2014, to consider adopting “An Ordinance Amending the Carrboro Land Use Ordinance to Modify Setback Provisions Relating to Roof Overhangs.”

BE IT FURTHER RESOLVED that the draft ordinance is referred to Orange County, the Town of Carrboro Planning Board and the following Town of Carrboro advisory boards and commissions for consideration and recommendation prior to the specified public hearing date:

- | | |
|--|--|
| <input checked="" type="checkbox"/> Appearance Commission | <input type="checkbox"/> Recreation and Parks Commission |
| <input type="checkbox"/> Transportation Advisory Board | <input type="checkbox"/> Northern Transition Area Advisory Committee |
| <input checked="" type="checkbox"/> Environmental Advisory Board | <input type="checkbox"/> |
| <input type="checkbox"/> Economic Sustainability Commission | <input type="checkbox"/> _____ |

This is the 18th day of March in the year 2014.

AN ORDINANCE AMENDING THE LAND USE ORDINANCE TO MODIFY SETBACK
PROVISIONS RELATING TO ROOF OVERHANGS

****DRAFT 3-10-2014****

THE BOARD OF ALDERMEN OF THE TOWN OF CARRBORO ORDAINS:

Section 1. Section 15-184(a) of the Carrboro Land Use Ordinance is revised by adding a new subdivision (5) that reads as follows:

(5) Notwithstanding the foregoing, the first three feet of roof overhang on a residential structure constructed in a residential zoning district is not considered a building for the purposes of this section and is not subject to the building setback requirements.

Section 2 This ordinance shall become effective upon adoption.

ARTICLE XII

DENSITY AND DIMENSIONAL REGULATIONS

Section 15-184 Building Setback Requirements.

- (a) Subject to Section 15-187 (Architecturally Integrated Subdivisions) and the other provisions of this section, no portion of any building or any freestanding sign may be located on any lot closer to any lot line or to the street right-of-way line or centerline than is authorized in the table set forth below: **(AMENDED 1/22/85)**
- (1) If the street right-of-way line is readily determinable (by reference to a recorded map, set irons, or other means), the setback shall be measured from such right-of-way line. If the right-of-way line is not so determinable, the setback shall be measured from the street centerline.
 - (2) As used in this section, the term “lot boundary line” refers to lot boundaries other than those that abut streets.
 - (3) As used in this section, the term “building” includes any substantial structure, which, by nature of its size, scale, dimensions, bulk, or use tends to constitute a visual obstruction or generate activity similar to that usually associated with a building. Without limiting the generality of the foregoing, the following structures shall be deemed to fall within this description:
 - a. Gas pumps and overhead canopies or roofs.
 - b. Fences, walls or berms running along lot boundaries adjacent to public street rights-of-way if such fences, walls or berms exceed three feet in height and are substantially opaque except that fences, walls or berms shall not be regarded as “buildings” within the meaning of this subsection if they are located along the rear lot line of lots that have street frontage along both the front and rear of such lots. **(AMENDED 05/19/98)**
 - c. Pergolas, except that a pergola will not be considered a “building” for purposes of this section if it consists merely of an insubstantial frame, no larger than 15 feet long on any side, presents itself visually more as a part of the landscape than as a building. **(AMENDED 10/22/13)**
 - (4) Notwithstanding any other provision of this chapter, signs that do not meet the definition of freestanding signs may be erected on or affixed to structures (e.g., some fences) that are not subject to the setback requirements applicable to buildings only if such signs are located such that

Art. XII DENSITY AND DIMENSIONAL REGULATIONS

they satisfy the setback requirements applicable to freestanding signs in the district where located. (AMENDED 5/26/81; 12/7/83; 2/4/86; 11/14/88; 05/15/90; 04/16/91; 01/16/01)

ZONE	Minimum Distance from Street Right of Way line		Minimum Distance from Street Centerline		Minimum Distance from Lot Boundary Line
	Building	Freestanding Sign	Building	Freestanding Sign	Building and Freestanding Sign
C	25	12.5	55	42.5	20
WR	35	17.5	65	47.5	20
RR	40	20	70	50	20
R-20	40	20	70	50	20
R-15	35	17.5	55	47.5	20
R-10	25	12.5	55	42.5	12
R-S.I.R.	25	12.5	55	42.5	10
R-7.5	25	12.5	55	42.5	10
R-3	15	7.5	45	37.5	8
B-1(c)	--	--	30	--	--
B-1(g)	--	--	30		
B-2	15	7.5	45	37.5	10
B-3	15	7.5	45	37.5	15
B-3-T	15	7.5	45	37.5	15
B-4	30	15	60	45	10
CT	--	--	30	--	--
B-5	40	20	70	50	20
M-1	--	--	30	--	--
M-2	--	--	30	--	--
WM-3	30	15	60	45	20
O	15	7.5	45	37.5	15
O/A	15	7.5	45	37.5	15
R-2	15	7.5	45	37.5	8, plus 2 feet for every additional foot above 35 feet in height

(b) With respect to lots within the R-20 district that were in existence or had received preliminary plat approval by Orange County prior to November 14, 1988 and were outside the town’s extraterritorial planning jurisdiction but that on or after that date became zoned R-20 as a result of the implementation of the Joint Planning Agreement:

(1) The minimum set back distance from the lot boundary line shall be 15 feet rather than the 20 feet indicated in the table set forth in subsection (a);

Art. XII DENSITY AND DIMENSIONAL REGULATIONS

- (2) On lots having frontage on more than one street, the building setback applicable to the street which the front of the principal building located on that lot faces shall be as set forth in subsection (a). The building setback from the other streets shall be 15 feet from the right-of-way line. **(AMENDED 04/25/89)**
- (c) Whenever a lot in a nonresidential district has a common boundary line with a lot in a residential district, then the lot in the nonresidential district shall be required to observe the property line setback requirements applicable to the adjoining residential lot.
- (d) Setback distances shall be measured from the property line or street centerline to a point on the lot that is directly below the nearest extension of any part of the building that is substantially a part of the building itself and not a mere appendage to it (such as a flagpole, etc.). Setbacks for berms shall be measured from the property line or street centerline to the point on the berm where it exceeds three feet in height. **(AMENDED 05/19/98)**
- (e) Whenever a private road that serves more than three lots or more than three dwelling units or that serves any nonresidential use tending to generate traffic equivalent to more than three dwelling units is located along a lot boundary, then:
- (1) If the lot is not also bordered by a public street, buildings and freestanding signs shall be set back from the centerline of the private road just as if such road were a public street.
- (2) If the lot is also bordered by a public street, then the setback distance on lots used for residential purposes (as set forth above in the column labeled "Minimum Distance from Lot Boundary Line") shall be measured from the inside boundary of the traveled portion of the private road.
- (f) Notwithstanding any other provision of this section, on lots in residential zones used for residential purposes, a maximum of one accessory building may be located in the rear yard of such lot without regard to the setback requirements otherwise applicable to the rear lot boundary line if such accessory building does not exceed fifteen feet in height or contain more than 150 square feet of gross floor area. **(AMENDED 5/26/81)**
- (g) Reserved. **(REPEALED 3/24/09)**
- (h) Reserved. **(REPEALED 3/24/09)**
- (i) Notwithstanding any other provision of this section, no setback requirement shall apply to bus shelters erected by or at the direction of the town. **(AMENDED 1/22/85)**

Art. XII DENSITY AND DIMENSIONAL REGULATIONS

- (j) Notwithstanding any provision in (a), no minimum distance from a lot boundary line for buildings or freestanding signs shall be required from any railroad right-of-way or other railroad property being used principally as a track bed or corridor. **(AMENDED 2/4/86)**
- (k) In addition to the overall density restrictions of the underlying zone, each mobile home unit in any mobile home community (use classification 1.122 or 1.123) must be placed such that it is at least 10 feet in any direction from any other mobile home unit within the community, in order to reduce the likelihood of the spread of fire. **(AMENDED 10/20/87)**
- (l) Notwithstanding the provisions of subsections (a) or (b), properties located in Carrboro's Transition Area II, and zoned R-R shall be required to maintain a 100-foot undisturbed, naturally vegetated setback along any common boundary line with Properties in Orange County's planning jurisdiction that are designated both Rural Buffer and Public/Private Open Space on the Joint Planning Area Land Use Plan. No structures or associated clearing shall be permitted within this setback. Utilities and associated clearing shall be permitted within this setback only to the extent that no reasonable alternative exists. **(AMENDED 06/05/89)**
- (m) When the neighborhood preservation district commission determines that an application for a permit under this ordinance involves a proposed authentic restoration, new construction or reconstruction in the same location and in the original conformation of a structure within a neighborhood preservation district that has architectural or historic significance, but that such proposed restoration, construction or reconstruction cannot reasonably be accomplished in conformity with the setback requirements set forth in this section, the neighborhood preservation district commission may recommend, and the permit issuing authority may allow, a deviation from these requirements to the extent reasonably necessary to accommodate such restoration, construction or reconstruction. **(AMENDED 09/26/89)**
- (n) Signs erected in connection with elections or political campaigns, as described in subsection 15-273(a)(5), shall not be subject to the setback requirements of this section. However, as provided in subsection 15-273(a)(5), such signs may not be attached to any natural or man-made permanent structure located within a public right-of-way, including without limitation trees, utility poles, or traffic control signs. **(AMENDED 08/25/92)**
- (o) When the appearance commission determines that (i) any new construction or any repair, renovation, or reconstruction of a pre-existing building is proposed within any commercial zoning district; and (ii) the appearance of the building would be substantially improved by the addition of or extension of an architectural feature; and (iii) the feature proposed by the appearance commission would violate the

Art. XII DENSITY AND DIMENSIONAL REGULATIONS

setback provisions of this section, then, subject to the following requirements, the commission may recommend, and upon such recommendation the applicant may amend his plans to propose and the permit issuing authority may authorize, an encroachment of such architectural feature into the required setback area.

- (1) For purposes of this subsection, the term “architectural feature” includes any part of a building other than a building wall or mechanical appurtenance.
 - (2) The maximum encroachment that can be authorized under this subsection is two feet.
 - (3) The encroachment may be allowed when the appearance commission and permit issuing authority both conclude that authorization of the encroachment would result in a building that is more compatible with the surrounding neighborhood than would be the case if the encroachment were not allowed. **(AMENDED 11/09/93)**
- (p) Notwithstanding the other provisions of this section, in the historic district, no portion of any new dwelling unit on a flag lot may be located any closer than fifteen (15) feet from any property line or any closer than thirty (30) feet from any existing dwelling unit located on the lot from which the flag lot was created (see Section 15-175.10). **(AMENDED 11/21/95)**
- (q) Notwithstanding the other provisions of this section, the base of a use classification 18.200 tower shall be set back from a street right-of-way line and a lot boundary lane a distance that is not less than the height of the tower. **(AMENDED 02/18/97)**
- (r) Notwithstanding any provision in this section with respect to use classification 1.340, single-room occupancy buildings may be set back from a street right-of-way line a distance that is consistent with the setbacks of other nearby buildings that front the same street. **(AMENDED 01/11/00)**

Passive Solar Home Design Checklist

Good passive solar homes are not difficult to design or expensive to build. However, they do require the use of basic, common-sense methods of working with the climate rather than against it. When you build a solar home that responds well to the climate in which it is built, you can count on it being:

- 1 **Comfortable** – warm in the winter and cool in the summer;
- 2 **Economical** – homeowners receive a positive cash flow or excellent return on their investment;
- 3 **Durable** – often built from locally available, long-lasting, low-maintenance materials;
- 4 **Attractive** – full of light and well connected to the outdoors; and
- 5 **Environmentally Responsible** – passive solar homes make efficient use of our energy resources and provide a healthy space for owners.

Passive solar concepts are not difficult to apply, but require consideration from the preliminary stages of design to be most effective. This checklist is presented as a planning tool, with references to other, more complete sources. The *Passive Solar Options for North Carolina Homes* fact sheet is another, more comprehensive fact sheet that works well in tandem with this checklist.

✓ *The longest wall of the home should face within 15 degrees, plus or minus, of true south to receive the most winter solar heat gain and reduce summer cooling costs (Figures 1 and 4).* At 30 degrees east or west of south, winter heat gain is reduced by 15 percent from the optimum. Minimizing east and west facing walls and windows reduces excessive summer

heat gain. See fact sheet *Siting of Active Solar Collectors and Photovoltaic Modules* for more information on determining true south.

✓ *Size south-facing windows and thermal mass appropriately.*

◆ *Suntempered* homes with no internal solar thermal mass should have south facing windows with a glass area of no more than 7 percent of the floor area .

◆ *Direct gain systems* can have south-facing window glass area which is 7-12 percent of the floor area. Every 1 square foot of south-facing glass over the 7 percent suntempering allowance must be accompanied by 5-6 square feet of 4-inch-thick masonry.

◆ *Sunspaces* should include only vertical glass. Sloped glazing can cause serious overheating. Every 1 square foot of south-facing glass must be accompanied by 3 square feet of 4-inch-thick masonry.

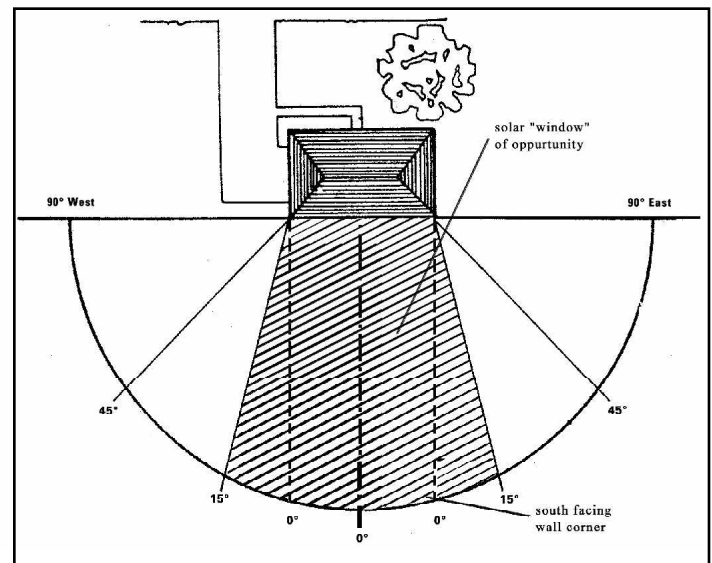


Figure 1. A house can be angled as much as 15 degrees east or west of true south and still collect useful solar heat.

- ◆ *Thermal storage or Trombe walls* should be 8 to 12-inch-thick masonry. The outside of the masonry should be coated with a selective surface and the inside surface should be free of coverings. The outside of the glass should be covered or shaded in summer. In NC, these walls require the least operator involvement in our colder climates.

- ✓ **Size overhangs properly.**

As a rule of thumb in North Carolina to prevent summer gains, the angle " " between a line "S" from edge of the overhang to the bottom of the window and a vertical line "V" should be approximately equal to the latitude minus 18.5 degrees. To prevent winter shading, the angle " " between a line "W" from the edge of the overhang to the top of the window and a vertical line should be approximately equal to the latitude plus 18.5 degrees. An overhang designed with this formula will provide shade all summer and full sun in the coldest part of the winter (Figures 2 and 4). For more detailed calculations, use computer simulation software or procure services of a professional solar designer.

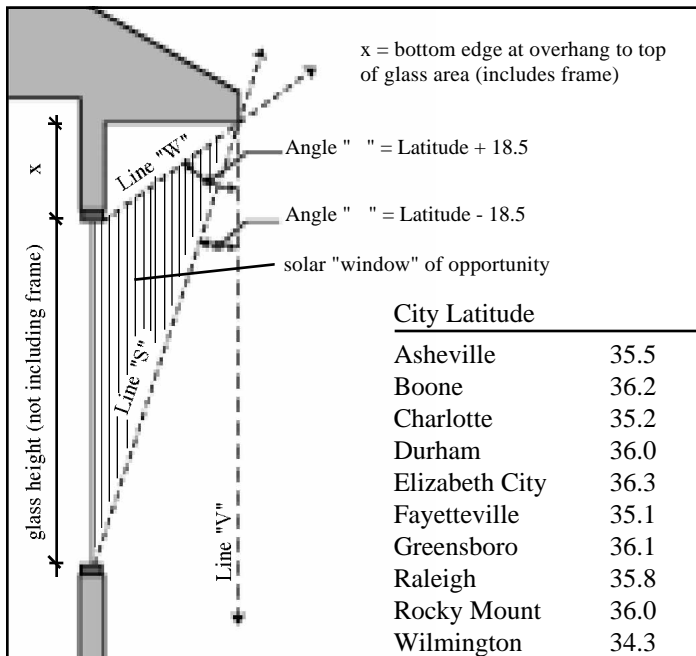


Figure 2. Diagram for sizing overhang

- ✓ **Match the solar heating system to the room use.**

What are the heating, lighting and privacy needs after sunset? A Trombe wall might be a logical choice for a room requiring privacy. A living room, on the other hand, which needs daytime and early evening heat and has a higher lighting requirement, might benefit from a direct gain system or sunspace.

- ✓ **Buffer the north side of the building.**

Place rooms with low heating, lighting, and use requirements, such as utility rooms, storage rooms and garages, on the north side of the building to reduce the effect of winter heat loads. This can reduce the normally higher heat loss through northern walls while not interfering with solar access. Rooms that generate their own internal heat, such as the kitchen, should also be placed on the north side (Figure 3). Landscaping elements, such as evergreen trees on the north and west sides of the house, can buffer against the cold winter winds and strong afternoon summer sun.

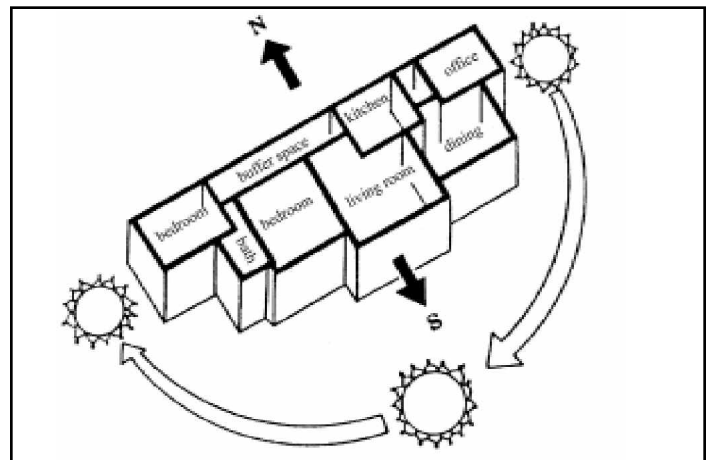


Figure 3. Place rooms where they are compatible with the sun's path. Buffer spaces should be placed to the north.

- ✓ **Lightweight materials should be lighter in color.**

Lighter colors absorb less energy (sunlight) and are more reflective. When light energy is absorbed, it is transferred into heat energy. If the material does not have sufficient storage mass, the material may heat up too quickly and release the excess heat to the room air, causing overheating.

- ✓ **Masonry walls can be any color in direct gain system,** but... actually, it is best to use colors in the middle range of the absorptivity scale to diffuse the solar energy over all the storage mass in the room.

(The absorptivity range of concrete masonry falls in this range without paints or special treatment being necessary). Colors for dense materials such as brick and concrete, need to be somewhat darker than lighter weight materials; however, if the storage mass is too dark, surfaces exposed to the direct rays of the sun will soon reach high temperatures. This can lead to overheating of the air, while other surfaces in the room may receive very little of the day's solar energy.

Trombe walls should always be very dark to increase solar absorption.

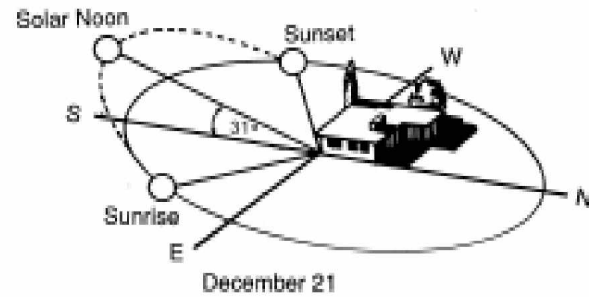
✓ **Do not cover the storage mass with furniture.** Rugs and wall tapestries can also reduce the effect of storage mass. It is wise to plan in advance to match the system to room use. See fact sheet *Decorating Your Passive Solar Home* for additional information.

✓ **Distribute the mass throughout the room.** In direct gain systems, performance is fairly insensitive to the locations of mass in the room. It is relatively the same whether the mass is located on the floor or on the east, west, or north walls. It is important to put some mass in direct sun, but rarely is it possible to expose all the required thermal mass because of furniture and floor coverings. Comfort is improved if the mass is distributed evenly in the room because the increased surface area reduces localized hot or cold spots. Light colored, lightweight materials “bounce” the sun to more massive materials as long as they are in a room with lots of sun. Also, vertical mass surfaces not in direct sunlight can reduce temperature swings by absorbing excess heat in the air.

✓ **Consider night window insulation.** Generally R-9 night insulation over double pane windows provides an approximate 20 to 30 percent increase in annual solar performance over systems using double pane windows without night insulation.

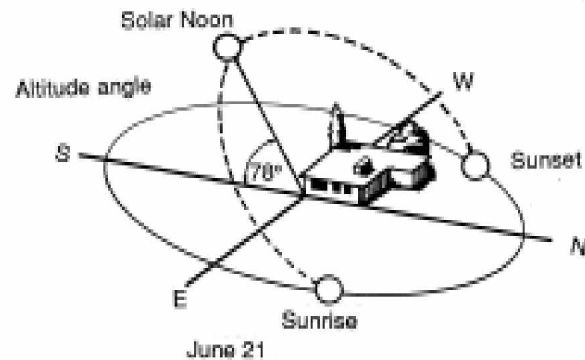
✓ **Integrate ventilation for cooling.** In most parts of North Carolina, just as much energy, if not more, may be used for cooling in summer. Thus, a properly designed home in North Carolina, whether it is solar or not, should require a minimum amount of energy for cooling in the summer. Ventilation, or the movement of air, is one of the most powerful means of achieving a cool home. Ventilation has two goals: to remove heat from the house and to provide air movement within the house to cool its occupants. See the fact sheet *Passive Cooling for your North Carolina Home*, for more detailed information on ventilation and also interior and exterior shading.

Winter Sun



For 36 degrees Northern latitude, the angle of winter sun is 31 degrees from horizon at solar noon.

Summer Sun



For 36 degrees Northern latitude, the angle of summer sun is 78 degrees from horizon at solar noon.

Figure 4. Seasonal path of the sun in horizon in Raleigh, NC.

Once these preliminary design issues are addressed, it is time to consider the finer details. The NC Solar Center has several fact sheets that deal with these issues in a more detailed manner. These are available by mail, via the internet, or by visiting the NCSU Solar House in Raleigh. The Center also offers a free plan review service for people designing or retrofitting a solar home. For more information, or to set up an appointment to talk about your plans, call us at (919) 515-3480 or toll-free in North Carolina at 1-800-33 NC SUN

Other Sources of Information

Computer Simulation Software

The Sustainable Buildings Industry Council offers workshops around the country for builders and architects on guidelines for passive solar building and remodeling and the easy-to-use computer software program, **BuilderGuide**. SBIC developed the “*Passive Solar Design Strategies: Guidelines for Home Builders*” workshops and the *BuilderGuide* software with the National Renewable Energy Laboratory and the US Department of Energy. Climate-specific guidelines are available for more than 2,000 cities and towns around the United States. SBIC also provides the building industry with practical, useful information on passive solar and sustainable technologies for commercial buildings. They distribute a Windows version of BuilderGuide and an advanced

energy simulation program for commercial buildings called Energy-10.

Sustainable Buildings Industry Council

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For additional resources, see the fact sheet *Recommended Reading List for Solar and Renewable Energy Technologies*.

This publication is available for download and printing from the list of information factsheets on the NC Solar Center's web-site at www.ncsc.ncsu.edu. To reduce paper waste, this publication was not mass reproduced in hardcopy. Printed copies can be mailed to those who do not have access to the Internet.



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The NC Solar Center is sponsored by the State Energy Office, NC Department of Administration, and the US Department of Energy, with state Energy Program funds, in cooperation with North Carolina State University.



SOLAR CENTER INFORMATION

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Passive Cooling for Your North Carolina Home

As energy costs rise, and the public becomes more aware of the environmental damage arising from current energy use patterns, more people are looking into passive or active solar heating as a way of reducing the amount of energy used in their home. In most of North Carolina, just as much energy, if not more, may be used for cooling in summer. Thus, a properly designed home in North Carolina, whether it is solar or not, should be designed to require a minimum amount of energy for cooling in the summer.

This factsheet will discuss the major passive and low-energy cooling methods applicable to North Carolina homes. In general, the strategy for reducing cooling energy in the home is as follows:

- *Block heat from entering*
- *Minimize heat generated*
- *Ventilate to remove heat and move air*
- *Air condition only when needed as a supplement to low-energy cooling strategies.*

There are two factors which determine summertime comfort: temperature and humidity. Although passive cooling measures can be very effective in controlling temperature, they are generally incapable of removing the moisture from humid air. Therefore, it may be necessary to use an air conditioner from time to time for dehumidification. Humidity control is important not just for comfort reasons, but to prevent moisture problems such as mildew growth in closets.

Remember that the goal of air conditioning is to provide comfort for the occupants of the house, not to maintain a particular temperature setting to appease the thermostat on the wall. If a breeze is passing through the room, your perception of the temperature will be lower than that measured by the thermostat because the movement of air allows your body to

lose heat more effectively. Follow the common-sense dictum of dressing appropriately for the season, too; when you're dressed in short-sleeved, loose-fitting clothing, you'll be able to feel more comfortable at a higher thermostat setting than the one you use in your office when you're dressed in a suit.

BLOCK HEAT FROM ENTERING

INSULATE, CAULK, AND WEATHER-STRIP

One of the top cooling strategies is one that you should already be using in your house to provide savings in heating energy. By making sure your home is well-insulated, you will not only lose less heat to the outdoors in winter, but also reduce unwanted heat gains in summer. Caulking and weather-stripping will reduce the infiltration of cold air in winter and the exfiltration of air-conditioned air in summer. Though ventilation is important for your home, it should come from the planned ventilation of fans, open doors and windows rather than the uncontrollable leakage of air through cracks and gaps in the house's structure.

There are several excellent free publications available which discuss the details of insulating, caulking, and weather-stripping. "Energy: Saving is Having - Do it with Insulation" and "Do it with Weatherproofing" are part of a series of pamphlets on energy saving tips offered by the Energy Division of the North Carolina Department of Commerce (1830A Tillery Place; Raleigh, NC 27604). "Fixin' a Hole Where the Wind Gets In: Practical Information on Weatherproofing Your Home" is available from the Advanced Energy Corporation (909 Capability Drive; Raleigh, NC 27606-3870). "Caulking and Weather-Stripping" (FS 203) and "Insulation" (FS 142) are factsheets available from the Energy Efficiency and Renewable Energy Clearinghouse of the US Department of Energy, (P.O. Box 3048; Merrifield, VA 22116; 1-800-523-2929, www.eren.doe.gov/consumerinfo).

SHADING

One of the simplest and most effective methods of blocking heat from entering the home is shading. There are many different methods available to provide shading both inside and outside the house. Most are very simple and can easily be retrofitted to an existing structure. In general, exterior shading is more effective than interior because it blocks the heat before it enters the house. Interior shading, while effective at blocking sunlight from reaching the center of the room, still allows heat to enter the house, where it is trapped between the shade and the window. In addition, some types of exterior shading may be used to shade the walls and roof, as well as windows, thus reducing their temperature and heat transmission to the inside. Interior shading, however, has the advantages of being easily controlled by the occupants of the house while also not being exposed to wind and rain. A combination of both indoor and outdoor shading maximizes both heat reduction and controllability.

EXTERIOR SHADING

Landscaping

Landscaping is an effective and pleasant means of providing shading for your house. An effectively planned landscape will block out the hot summer sun, encourage warming sun to enter the house in winter, deflect the cold winter winds, and channel breezes for cooling in summer. In general, an "ideal" landscape plan for North Carolina would include trees to the east and west of the house to provide summer shading, with the area to the south of the house left relatively clear in order to allow solar heating in winter. Trees will be most effective if they shade east and west windows, where the most heat can enter, but shading east and west walls and the roof is also important. Even trees which do not directly shade the house, such as those planted to its north, are valuable because they reduce the temperature of the air surrounding the house. *Figure 1* shows an "ideal" site plan for most of North Carolina.

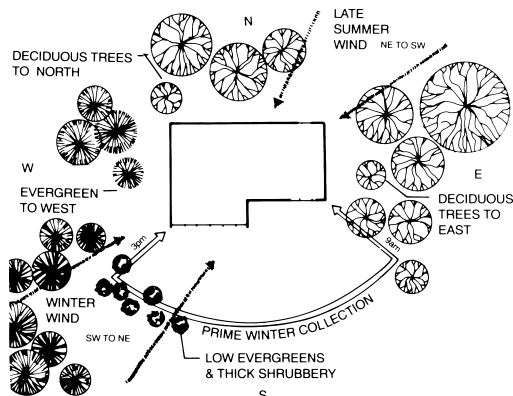


Figure 1. An Energy-saving site plan for central North Carolina.

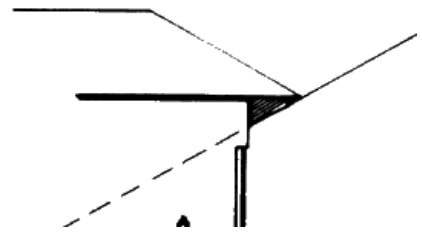


Figure 2. Overhang Shading in summer and winter

The subject of landscaping for a passive solar house is discussed in detail in *Energy-Saving Landscaping for Your Passive Solar Home (FS 109)*, a factsheet distributed by the NC Solar Center.

Roof Overhangs

A roof overhang is a simple architectural feature which can be used on the south side of the house to block direct sunlight in summer without reducing the available sunlight in winter. *Figure 2* illustrates how this is possible: because the sun travels a higher path in the sky in the summer than in winter, the overhang blocks direct sunlight from entering in summer, while the lower winter sun passes beneath the overhang. Overhangs do not work as effectively on orientations other than due south, however, because the sun is at lower angles in the sky when it shines from the east or west, thus bypassing the overhang.

Figure 3, taken from *Building with Passive Solar* by the Southern Solar Energy Center, illustrates how orientation affects overhang effectiveness. The chart is designed to size overhangs to provide shading for the five most severe sun hours on August 1. For example, consider Raleigh, which sits at a latitude of 36° . Find the point where 36° intersects the "south-summer" curve. Then draw a line vertically downward to determine the feet of vertical wall in shade per foot of eave overhang. For Raleigh, this figure is about 3.3; that is a 1 foot overhang would shade 3.3 feet down the wall; a 2 foot overhang would shade 6.6 feet, and so on.

Following the same procedure using the "East or West" curve, however, shows that each foot of an east or west overhang will only shade about 0.8 feet down the wall. Because an east or west overhang would have to extend out several feet to provide shade, which would require extra support, a simple roof overhang is rarely used at these orientations. A covered porch or carport on the east or west side may be used, however, to produce the same effect since it would extend out by several feet.

Overhangs may be a permanent part of the building's structure, or may be used seasonally. The sunspace of the NCSU Solar House uses overhangs as a permanent shading mechanism. The top portion of the sunspace is shaded by a permanent 3' roof overhang.

An important point to remember about overhangs is that they block direct sunlight. During the summer, only about 45 percent of the sunlight shining on a vertical

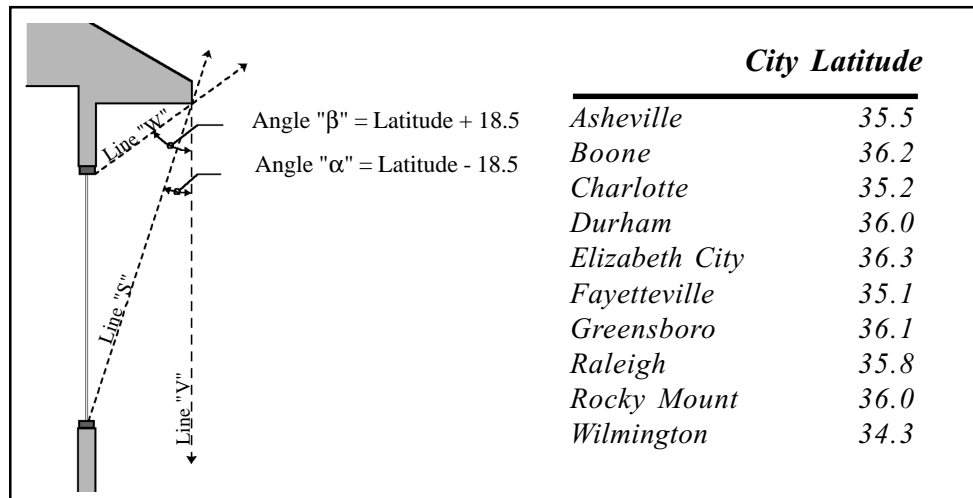


Figure 3. Calculating overhangs for sites in North Carolina

window in North Carolina is direct sunlight. The remaining 55 percent is made up of diffuse and reflected sunlight, which will not be blocked by overhangs. This does not imply that overhangs are not useful; it just means that they should be used in conjunction with some other cooling strategies, such as interior shading, to be fully effective.

A chart which illustrates the varying sun angles throughout the year, which may be helpful in determining overhang effectiveness, is contained in "Siting of Active Solar Collectors and Flat Plate Modules," a free factsheet (# 112) distributed by the North Carolina Solar Center.

Awnings

Awnings serve the same general function as an overhang, but are more flexible in their application. Made of lightweight materials such as aluminum, canvas, acrylic, or polyvinyl laminate, it is possible for them to span distances of several feet without the need of extra support, thus making it possible for them to provide adequate shade even on the east or west. They are also frequently designed to extend below the top of the window, increasing their shading effectiveness.

Awnings can be custom-made to match the home exterior, making them an attractive design feature for many homes. They may have open or closed sides. Sideless awnings can shade east and west windows effectively, but for south windows, awnings with sides will give better protection against the early morning and late afternoon sunlight. To avoid trapping heat underneath the awning next to the window, the awning must have some means of allowing heat to escape, either through open sides or from a vent at the top. To be most effective, awnings should be light in color.

Permanent awnings may be appropriate for use on the east or west side, but awnings on the south side need to be retractable or removable in winter in order to allow in sunlight for heating.

Exterior Shade Screens

Solar shade screens are a very effective shading option. Made of a thick fiberglass mesh which absorbs the sunlight, they are effective against diffuse and reflected, as well as direct, sunlight. Consequently, they are capable of blocking up to 70 percent of all incoming sunlight before it enters the windows. Because most varieties can also serve as insect screening, they also allow the use of natural ventilation, unlike some other shading options (such as interior or exterior shades) which block air flow.

Shade screens come in a variety of colors. From the outside, most shade screens appear darker than a standard window screen, however, from the inside, most people will not notice an appreciable difference in color.

Shade screens may be ordered to size for a particular window, or the mesh may be purchased by the roll and installed by the homeowner using special hardware that snaps in the window frame. In addition to fiberglass mesh, there is another type of shade screen which uses thin louvered metal fins to reflect the sunlight. This type is more expensive, however, and is used more frequently on commercial buildings than residences.

Shade screens should be removed in winter to allow full sunlight to enter the windows.

Shutters and Shades

Exterior shutters and shades, either hinged or of the rolling blind type, are another option for shading. Although they block sunlight very effectively, they have a few disadvantages: they obscure the view from the window, block daylighting, and may be inconvenient to operate on a daily basis. They are also subject to wear and tear, and may block air flow.

Exterior shutters may be operated manually or automatically. Automatic controls are more costly and difficult to maintain, but may be more practical than manual controls when the shutters are at inconvenient locations, such as behind shrubbery or on the second floor. Proper use of the

shutters is also more likely when they are automatically controlled rather than depending upon compliance by members of the household.

The lifestyle of the family needs to be considered in the decision of whether or not to use exterior shutters. If the house is unoccupied during the day, and the shutters can be easily closed by the homeowners as they leave for work and reopened on arriving home, exterior shutters can significantly reduce the amount of heat entering the house during the day. On the other hand, if some of the family is at home occupying those rooms during the day, they may be resistant to the loss of view. Similarly, there will be resistance from family members to opening and closing shutters which are inconvenient to operate.

Another variety of exterior shutter, the *Bahama shutter*, is hinged at the top and projects out from the window at an angle, held in place by a rod or wood strip. In practice, it shades more like an awning, allowing in daylight and ventilation. Unlike other exterior shutters, it may be operated from the inside.

INTERIOR SHADING

While interior shading is not as effective as exterior shading, since it is unable to block heat until it has already entered the building, it can still be a useful supplement to exterior shading. It should certainly be used where other shading options are unavailable. Interior window treatments are normally considered a necessity for privacy and as part of the house's decor. Proper selection of window treatments can make them an asset for cooling as well.

Draperies and curtains are most effective when made of tightly-woven, opaque material of a light or reflective color. The tighter the curtain fits to the window, the better its ability to trap heat and prevent it from entering the house.

Simple white roller shades shade quite effectively when fully drawn, but prevent light and air from entering. Venetian blinds, while not as effective at trapping heat, will allow air and light to pass through, while reflecting some of the sun's heat. Some newer blinds are coated with special reflective finishes.

The subject of interior and exterior window treatments is discussed in detail in "Summer Shading and Exterior Insulation for Windows," a free factsheet (# 103) distributed by the North Carolina Solar Center.

Reflective Films and Coatings

Reflective coatings which adhere to glass can block up to 85 percent of incoming sunlight. Some coatings may be applied seasonally; others are permanently affixed to the glass surface. Permanent films or coatings are not appropriate for south windows in passive solar homes, since they would block heat from entering all year round. However, they would be practical for unshaded east or west windows.

Window films are not recommended for windows which receive partial shading, because the film absorbs the sunlight and will cause the glass to heat unevenly and possibly crack. Some window manufacturers will invalidate their warranties if reflective films are used on the windows.

Radiant Barriers

For roofs which are unshaded, radiant barriers provide another way to block heat from entering your home. A radiant barrier is a layer of aluminum foil placed in an air space between a heat-radiating surface (the roof of your house) and a heat-absorbing surface (the insulation on the floor of your attic). It works to reduce the heat entering your house in two ways: its reflective surface reflects most of the radiant heat striking it, and it will itself emit very little heat.

Radiant barriers come in many different forms: single-sided or double-sided foils, foil-faced insulation, and multilayered foil systems with air spaces. Any of these products should perform equally well if properly installed, so the cost of the product and its ease of installation should guide your decision between them.

To work properly, the shiny side of the radiant barrier must face an air space. In an attic, this is done by stapling the radiant barrier, shiny side down, to the underside of the roof decking or the roof trusses. Although this may seem counter to what your intuition tells you, this is the preferred position. The orientation of the shiny surface itself does not matter; it will reflect heat equally well whether it points up or down. What is important is that the surface remain shiny. Hanging the radiant barrier with its shiny side down prevents dust from accumulating on its surface and reducing its ability to reflect heat. Some dealers recommend laying the radiant barrier on the floor of the attic for ease of installation. This is not a good idea, however, because of the dust accumulation problem, damage from possible traffic and, most important, the possibility of moisture problems being caused by water vapor trapped beneath the radiant barrier.

The Florida Solar Energy Center has prepared a factsheet on radiant barriers entitled "Radiant Barriers: A Question and Answer Primer." This factsheet is available free of charge from the North Carolina Solar Center.

MINIMIZE HEAT GENERATED

Not all of the heat in our homes in summer comes from the sun; much of it comes from the occupants of the home and the appliances they use. By carefully selecting appliances and the times when they are used, members of the household can help keep the house cooler.

SELECT ENERGY-EFFICIENT APPLIANCES

The first step in minimizing heat generated within the home is choosing energy-efficient appliances throughout the house, from the large appliances like refrigerators down to the smaller ones, like light bulbs. The less efficient an appliance is, the more waste heat it generates: thus, its inefficiency costs in two ways: the extra energy it costs to run the appliance, and the cooling penalty that comes with having to remove the extra heat it generates.

Most major appliances come with energy-guide labels that show how much energy the appliance will use, and compare its energy use to that of similar products. Use these labels to guide your purchases. Remember that you will continue paying for the appliance long after its purchase due to the energy it consumes, so that the one that appears least expensive at first may not be so in the long run.

This is especially true in lighting. Consider a 60 Watt incandescent light bulb. It will provide light for about 1000 hours before burning out. To get 10,000 hours worth of lighting, you would pay about \$6.80 (for 10 bulbs, at \$0.68 each) plus \$45.60 for the electricity to run them (assuming electricity costs \$0.076 per kWh) for a grand total of \$52.40. Compare this to a single 15 Watt compact fluorescent "lamp", or light bulb, which produces a similar amount of light and has a lifetime of 10,000 hours. Its initial purchase cost would be higher, about \$15, but the cost of electricity to run it is one-quarter that of the incandescent, or \$11.40, making the total cost of lighting from the compact fluorescent only \$26.40. This is roughly half the cost of the incandescent, even without considering the extra costs imposed by the effect of the incandescents on the house's cooling load.

In general, incandescent light bulbs are the least energy-efficient source of lighting for the home. Better alternatives include fluorescent lights and daylighting. If there are windows in the home, and if they have been shaded with trees, overhangs, awnings, or venetian blinds as discussed in the previous section, daylighting can be an effective source of diffuse sunlight. Diffuse light entering from the side is a pleasant and effective source of lighting for the house during the day. Direct sunlight tends to cause problems with glare and introduces too much heat along with it to be a sensible source of summer lighting. Skylights are generally not considered an energy-saving source of daylighting because of the increase in the house's cooling load caused by the heat that they admit.

USE APPLIANCES WISELY

Kitchen and laundry appliances, by design, produce heat. By substituting less-heating alternatives or scheduling their use for the cooler morning or evening hours, however, their effect on the house's load can be minimized.

In the kitchen, use a microwave oven or a smaller toaster oven rather than the large oven whenever possible. Serving

cold dishes in summer is a good idea because lunch and dinner time occur during the hottest part of the day. Cold dishes will be refreshing and cut down on the amount of heat added to the house at mealtimes. Cooking dishes in the evening to be served later (either cold or reheated in the microwave) shifts the added heat of cooking away from the already warm dinner hour and also fits well into the schedules of many two-income families. Consider grilling foods outdoors. Although this can be a pretty hot way to cook a meal, the heat that is produced stays outside your house.

When cooking on the stovetop, be sure to cover pots and pans. Less energy will be needed to cook the foods, and less heat and humidity will be added to the house. If boiling in an open pot is necessary, be sure to turn on the kitchen exhaust fan so that it can help remove the humidity introduced by the steam.

When doing laundry, wash only full loads and use cold water whenever possible. It will save the energy needed to heat the water, and lessen the addition of warm, moist air in your laundry room. If the schedules of family members permit, consider using a "solar clothes dryer," or a clothes line, instead of an electric or gas clothes dryer since they produce large amounts of heat. Moving laundry tasks to the morning or evening hours is helpful, too.

VENTILATE TO REMOVE HEAT AND MOVE AIR

Ventilation, or the movement of air, is one of the most powerful means of achieving a cool home. Ventilation has two goals: (1) to remove heat from the house and (2) to provide air movement within the house to cool its occupants. There are several different types of ventilation, both natural and mechanical, which meet these goals in different ways. Though mechanical ventilation measures are not strictly passive, they are a much less energy-intensive method of achieving a cool home than air conditioning.

NATURAL VENTILATION

Natural ventilation, or relying upon summer breezes to generate air movement within the house, is the simplest of passive cooling strategies. Due to the variability of wind speed and direction, though, it can also be the least reliable. However, careful selection of windows and their positioning can help enhance the natural ventilation possibilities of your house.

When determining the type of windows to be used in your home, appearance should not be the only factor; the summer ventilation and winter infiltration potential of the window should also be considered. With the standard double-hung window, where the window is opened by pushing one half of the window in front of the other half,

slightly less than half, or about 45 percent, of the total window area is available for ventilation purposes. The same is true of single-hung and horizontal sliding windows. With awning windows, this percentage is 75 percent; with casement windows, the percentage of free vent area is 90 percent. Casement and awning windows are also superior to the single-hung, double-hung, and sliding windows in winter, since they are better able to achieve a tight fit which reduces infiltration.

In planning the layout of windows in the house, the important point to remember is that for natural ventilation to succeed, there must be both an inlet and an exit for the air. In other words, windows on both the windward side and the leeward side of the house need to be open to promote air flow. If there is not an exit for the air, the house will become pressurized by the addition of incoming air. Once the house is pressurized, the wind will see the open windows of the house as just another obstacle to be bypassed, rather than an inviting gate to enter.

Pathways for airflow within the house also need to be left open. For example, if the door to the bedroom on the windward side of the house is normally left closed, the room will quickly become pressurized and lose its potential to help cool itself and the rest of the house.

Rooms with two exterior walls should have windows on both walls, with as much distance between the windows as possible, to maximize the potential for cross-ventilation. Of course, this guideline needs to be considered at the same time as the recommendation to minimize windows on the east and west side. If your family is unlikely to use natural ventilation, your cooling needs would be better met by minimizing the east/west window area. On the other hand, if your family rarely uses air conditioning and the east or west windows would be well shaded by trees or by other means, the windows could be a cooling asset.

WHOLE HOUSE FANS

Whole house fans allow your house to use outdoor air for cooling even when no breezes are blowing. Whole house fans remove hot room air from the ceiling and exhaust it out through the vents in the attic. At the same time, it pulls in cooler supply air through the windows.

A general rule of thumb for sizing whole house fans is that the fan should be able to provide between 0.5 and 1 air changes per minute. For example, consider a 2000 square foot house with 8 foot ceilings. The house volume equals the floor area times the ceiling height, or 16,000 cubic feet. Thus, this house would need a fan that provides between 8000 and 16,000 cubic feet per minute (CFM). You may find it worthwhile to choose a fan rated toward the upper end of this range. This way, you will frequently be able to operate the fan at low speed, where it will run more quietly. The installation of a 12-hour timer switch is also convenient, so that the fan can be set to turn off automatically during the night.

CEILING FANS

Whole house fans move large volumes of air at moderate speeds in order to exhaust heat from the house. Ceiling fans, on the other hand, don't remove heat. Instead, they provide localized breezes which blow past your body and help it lose heat more efficiently, giving you the perception that the temperature is about 4 degrees cooler than it actually is. Accordingly, in a house with strategically located fans, the air conditioner thermostat setting may be raised from 2 to 6 degrees above what would otherwise be considered comfortable.

To be most effective, fans need to be located throughout the house. If located only in the family room and master bedroom, family members in other rooms are likely to lower the thermostat setting to a point where they are comfortable, too. Portable fans are useful to have around to provide air movement in rooms that are only intermittently occupied. *Ceiling Fans for Cooling Comfort*, an article reprint, is available free of charge from the North Carolina Solar Center.

EXHAUST FANS

The kitchen and bathroom come equipped with exhaust fans designed to remove the hot, humid air produced in these areas. Their proper operation is important not just for comfort, but to help prevent the growth of mold and mildew.

Install a timer control switch on the bathroom vent fan, so that when the fan is turned on after a shower or bath, it will run only long enough to remove the excess moisture from the room, without having to depend on having someone remember to turn it off. When selecting a fan, choose a quiet fan (one with a rating of 3 sones or less), because experience has shown that people tend to avoid using noisier fans.

Exhaust fans need to vent to the outdoors, rather than into the attic, to avoid moisture damage to the insulation or mold growth.

ATTIC AND ROOF VENTILATION

Proper ventilation between the roof and the insulation is important all year round. In winter, it helps prevent moisture buildup which could damage the insulation and other building materials; in summer, it reduces roof and ceiling temperatures, thus saving on cooling costs and lengthening the life of the roof.

Figure 4 shows some of the variety of vent types to choose from are ridge, gable, soffit, static mushroom, and turbines. There are also electrically powered attic ventilators. In general, however, electric attic ventilators consume as much electricity to operate as they would save in air conditioning costs, and are recommended only in cases where the required ventilation cannot be met by passive means. (Note: this type of attic ventilation fan should not be confused with the whole house fan discussed earlier; they are different technologies).

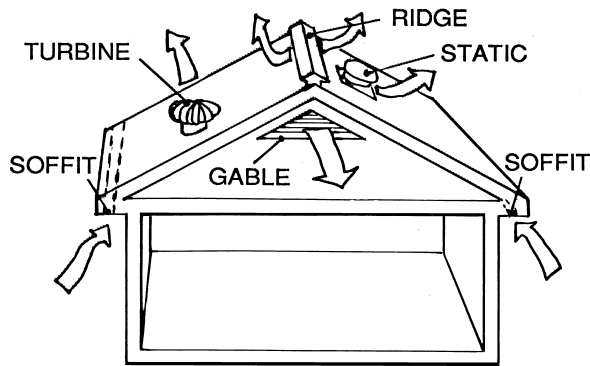


Figure 4. Types of roof vents.

To achieve proper ventilation, the vent area needs to be divided equally between low vents, at the eave or soffit, and high vents, at the roof ridge or gable. The most effective ventilation strategy is to combine continuous ridge and soffit vents. The amount of ventilation depends upon the floor area of the attic and the amount of moisture entering it. The general guideline is that there must be one square foot of attic vent for every 150 square feet of attic floor area.

AIR CONDITION ONLY IF NEEDED

In most of North Carolina, even after following all of these passive cooling guidelines, there will still be days when air conditioning is required to provide the comfort level to which most of us are accustomed. In a house designed for passive cooling, however, air conditioning will be required in lesser amounts and on fewer days.

Make sure that your central air-conditioning unit is properly sized for your house, using air conditioning industry standard "ASHRAE" or "Manual J" sizing procedures rather than a rule of thumb. Do not buy an oversized unit because it will actually be less effective in making your house comfortable. Part of your air conditioner's job is to dehumidify the air in your home. If the unit is oversized, the unit will lower the air temperature before it has a chance to dehumidify the air. To get to a comfortable humidity level, homeowners tend to lower the thermostat setting, thus consuming more energy than is necessary and sometimes ending up with a cold, clammy house.

Make sure that your ductwork has been adequately sealed and insulated. Even though it sounds as if it's the right tool for the job, duct tape does not do an adequate job of sealing ductwork from leaks. A sealing compound, known as *mastic*, will do a much better job of sealing the ducts.

Continue to use your ceiling fans even when the air conditioning is on. They will allow you to raise the thermostat set point and, for every one degree that the thermostat is raised, air conditioning costs will drop by 3 to 8 percent.

WHAT ABOUT....?

EARTH TUBES

The earth tube, or earth cooling tube, was a concept that gained popularity for a while in the late seventies and early eighties. It consists of pipes buried several feet below ground, where temperatures are lower. Air is drawn into the house through the underground tubes, which allow it to be cooled before entering.

Experience has shown earth tubes to be unfeasible in North Carolina for several reasons. The chief problem is the fact that the air introduced through the earth tubes is typically humid, with the result being that the occupants of the house are frequently left less comfortable than before due to the extra humidity. In some homes, they were found to be an entry way for insects, vermin, and sometimes water during heavy rain storms. Additionally, the fact that earth tubes increase the possibility of exposure to radon and other unhealthy soil gases has led to their falling into disfavor as public awareness of the dangers of these gases has grown.

SOLAR CHIMNEYS

Another concept that gained popularity during the seventies was the solar or thermal chimney. Basically, the thermal chimney is like a small, open solar collector on the roof that connects to the air inside the house through an opening in the ceiling or wall. As the air inside the chimney warms, it rises and exhausts through the top of the chimney, pulling air from inside the house to replace it, which in turn will be replaced by fresh air pulled in through the open windows of the house.

The biggest problem with the thermal chimney is that of timing. Unfortunately, the time when the solar chimney works its best is at mid-day when the sun is shining brightly, when the air temperature outside is high and outside air should not be brought indoors. In the cooler morning and evening hours, when outdoor air would be desirable, the chimney is not capable of producing a strong enough draft to effectively draw in the cooler air.

EVAPORATIVE COOLING

Evaporative cooling concepts have been known and successfully implemented for centuries. As water evaporates, it draws heat from the air passing by it, producing cool, damp air. While this is an attractive concept in arid climates, it is less appealing in areas like North Carolina which already have high humidity levels in summer.

FOR MORE INFORMATION

The North Carolina Solar Center has a reference library as well as other free fact sheets and information on solar energy, renewable energy, energy efficiency, and related subjects. For more information on these topics, or to learn more about the resources available, contact the Solar Center.

Written by:

Lib Reid-McGowan
Solar Engineering Specialist
North Carolina Solar Center

Take advantage of the state tax credit for solar energy!

North Carolina has revised and updated its renewable energy tax credits, effective January 1, 2000.

For residential applications, homeowners may now take a 35 percent tax credit for all renewable energy sources, with the maximum credit depending on the application. For passive and active solar space heating and cooling, the maximum credit is \$3,500. For solar water heating, the maximum credit is \$1,400. For photovoltaics and other renewable energy sources, the maximum credit is \$10,500. For commercial and industrial renewable energy applications, the tax credit is also 35 percent, with a maximum credit of \$250,000 for all sources and applications. For further information on these tax credits, contact the North Carolina Solar Center at 1-800-33-NC SUN or 919-515-3480, or visit our website at www.ncsc.ncsu.edu.

3,000 copies of this public document were printed at a cost of \$622 or \$.21 each.



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Sponsored by the Energy Division, NC. Department of Commerce and the US Department of Energy, with State Energy Program Funds, in cooperation with NC State University. However, any opinions, findings, conclusions, or recommendations expressed herein are those of the author(s) and do not necessarily reflect the views of the Energy Division, NC Department of Commerce, or the US Department of Energy.



Town of Carrboro

Town Hall
301 W. Main St.
Carrboro, NC 27510

Legislation Text

File #: 14-0086, **Version:** 1

TITLE:

Town Code Amendment Establishing a Safe Routes to School Implementation Committee

PURPOSE: Following up on a March 4, 2014, agenda item, the Board of Aldermen is asked to consider establishing a Safe Routes to School Implementation Committee.

DEPARTMENT: Planning

CONTACT INFORMATION: Jeff Brubaker - 919-918-7329

INFORMATION: The Board of Aldermen received a report on establishing an SRTS Implementation Committee on March 4. At the meeting, the Board provided feedback that the proposed Sec. 3-24.10 should make youth members voting members. It had showed them as being only non-voting, advisory members.

Staff have revised the language in the draft amendment to reflect this change. Also, the minimum quorum number has been changed from five to eight.

A revised version of the amendment is in Attachment A, and a changes-tracked version is in Attachment B.

FISCAL & STAFF IMPACT: If the ordinance is adopted, staff time will be needed to help recruit applicants to the Committee. Each meeting may require approximately 10-20 hours of staff time, which would be 30-60 hours assuming three meetings per year. As part of the draft FY 2014-15 budget, a Committee budget of \$250 is being considered by staff.

RECOMMENDATION: Staff recommend that the Board of Aldermen adopt the ordinance in Attachment A establishing the committee.

The following ordinance was introduced by Alderman _____ and duly seconded by Alderman _____.

AN ORDINANCE AMENDING CHAPTER 3 OF THE CARRBORO TOWN CODE TO ESTABLISH A SAFE ROUTES TO SCHOOL IMPLEMENTATION COMMITTEE

THE BOARD OF ALDERMEN OF THE TOWN OF CARRBORO ORDAINS:

Section 1. Article V of Chapter 3 of the Carrboro Town Code is amended by adding new sections as follows:

Section 3-24.10 Safe Routes to School Implementation Committee Established

(a) There shall be a Safe Routes to School Implementation Committee composed of thirteen voting members. One of these members shall be a member of the Board of Aldermen appointed by the Board as a liaison member. Twelve of these members shall be appointed by the Board of Aldermen and shall be composed as follows:

- (1) One member of the Chapel Hill-Carrboro City Schools Board of Education
- (2) One member of the Chapel Hill-Carrboro City Schools administration
- (3) One member of the administration, faculty, or staff of Carrboro Elementary School
- (4) One member of the administration, faculty, or staff of McDougle Elementary School
- (5) One member of the administration, faculty, or staff of Morris Grove Elementary School
- (6) One member of the Transportation Advisory Board
- (7) One representative of the North Carolina Department of Transportation
- (8) One parent of a student attending an elementary school in Carrboro
- (9) One resident of the Town with a demonstrated background in public health, physical activity promotion, or active transportation
- (10) One youth member enrolled in high school
- (11) One youth member enrolled in middle school
- (12) One youth member enrolled in elementary school

The members denoted by (1) through (7) in this list above shall be recommended by their respective organizations. The member denoted by (8) shall be eligible to serve on the Committee in any calendar year in which his or her child is or was enrolled as

ATTACHMENT A

a student. The Board of Aldermen may appoint the youth members denoted by (10) through (12) after receiving recommendations from their respective schools. The Board of Aldermen may appoint alternate members for each of these members to serve when the members are not present.

(b) Excluding the Board liaison member and youth members, voting members of the Committee shall serve three-year staggered terms, but members may continue to serve until their successors are appointed and qualified. The terms of three seats shall expire on February 1, 2016, and every third anniversary thereafter. The terms of three seats shall expire on February 1, 2017, and every third anniversary thereafter. The terms of three seats shall expire on February 1, 2018, and every third anniversary thereafter.

(c) The Board liaison member shall serve at the pleasure of the Board. The Board may appoint an alternate Board liaison member to serve when the liaison member is unavailable.

(d) Youth members shall serve one-year terms but may continue to serve until their successors are appointed and qualified and as long as they remain enrolled the same school or at the same level (elementary, middle, high) of another school in Carboro.

(e) Committee members may be appointed for a maximum of two successive terms (or any part thereof). A member who has served for two successive terms (or any part thereof) shall be eligible for re-appointment only after an absence from the Committee of at least one year.

(f) Members may be removed as follows:

- (1) The chairman shall file or cause to be filed with the town clerk an attendance report after each meeting identifying those members who were present or absent.
- (2) Unless the chairperson waives the requirement, members shall be removed if they are absent from three consecutive meetings. The town clerk shall notify the chairperson in writing as soon as a member becomes subject to removal under this section. The chairman will have ten days after receipt of such notice to waive the removal. If the chairman fails to notify the town clerk in writing within ten days after receipt of such notice that the automatic removal requirement should be waived, the town clerk will send a removal notice to the member. This removal shall be effective on the date of such notice.

- (3) Members may also be removed by the appointing authority, after a hearing, for any good cause related to performance of duty.

Section 3-24.11 Meetings and Officers of the Safe Routes to School Implementation Committee

- (a) Beginning with calendar year 2015, the Committee shall hold regular meetings at least three times per calendar year at such times and places as it shall designate.
- (b) A quorum shall consist of a majority of the non-vacant seats on the Committee, except that in no case shall a quorum consist of fewer than eight members.
- (c) Abstention from voting is strongly discouraged except in circumstances when a member has a direct financial interest in the outcome of the matter at issue. Abstention shall not be required in any case, but members are expected to disclose potential conflicts of interest that are not apparent from the nature of the matter at issue.
- (d) The Committee shall designate one of its members to serve as chairperson and one to serve as vice-chairperson. These officers shall be selected annually at the commission's first meeting of the year and shall serve for terms of one year unless their terms of appointment to the Committee sooner expire. A member may be selected to serve as chairperson for not more than two consecutive full one-year terms. The chairperson and vice-chairperson may take part in all deliberations and vote on all issues.

Section 3-24.12 Powers and Duties of the Safe Routes to School Implementation Committee

- (a) The Committee shall recommend transportation projects, policies, programs, or activities that serve to increase the safety and convenience of walking and bicycling to school. The Committee shall provide guidance and support for implementing the recommendations of the adopted Safe Routes to School Action Plan and evaluating implementation progress. The Committee may provide assistance with seeking project or program funding, including applying for grants, Safe Routes to School event planning, and data collection.
- (b) In creating this section, the Board of Aldermen finds that while safe walking and bicycling options are important for all levels of K-12 education, Safe Routes to School efforts typically focus on elementary and middle schools. Therefore, the Committee shall focus its efforts on existing or planned elementary and middle schools within Town limits.

ATTACHMENT A

(c) The Committee may adopt rules and regulations governing its procedures and operations not inconsistent with the provisions of this chapter.

Section 2. All provisions of any town ordinance in conflict with this ordinance are repealed.

Section 3. This ordinance shall become effective upon adoption.

The foregoing ordinance, having been submitted to a vote, received the following vote and was duly adopted this 18th day of March, in the year 2014.

Ayes:

Noes:

Absent or Excused:

ATTACHMENT A

The following ordinance was introduced by Alderman _____ and duly seconded by Alderman _____.

AN ORDINANCE AMENDING CHAPTER 3 OF THE CARRBORO TOWN CODE TO ESTABLISH A SAFE ROUTES TO SCHOOL IMPLEMENTATION COMMITTEE

THE BOARD OF ALDERMEN OF THE TOWN OF CARRBORO ORDAINS:

Section 1. Article V of Chapter 3 of the Carrboro Town Code is amended by adding new sections as follows:

Section 3-24.10 Safe Routes to School Implementation Committee Established

(a) There shall be a Safe Routes to School Implementation Committee composed of ~~thirteen~~ voting members. One of these members shall be a member of the Board of Aldermen appointed by the Board as a liaison member. ~~Twelve~~ of these members shall be appointed by the Board of Aldermen and shall be composed as follows:

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- (1) One member of the Chapel Hill-Carrboro City Schools Board of Education
- (2) One member of the Chapel Hill-Carrboro City Schools administration
- (3) One member of the administration, faculty, or staff of Carrboro Elementary School
- (4) One member of the administration, faculty, or staff of McDougle Elementary School
- (5) One member of the administration, faculty, or staff of Morris Grove Elementary School
- (6) One member of the Transportation Advisory Board
- (7) One representative of the North Carolina Department of Transportation
- (8) One parent of a student attending an elementary school in Carrboro
- ~~(9) One resident of the Town with a demonstrated background in public health, physical activity promotion, or active transportation~~
- ~~(10) One youth member enrolled in high school~~
- ~~(11) One youth member enrolled in middle school~~
- (12) One youth member enrolled in elementary school

The members denoted by (1) through (7) in this list above shall be recommended by their respective organizations. The member denoted by (8) shall be eligible to serve on the Committee in any calendar year in which his or her child is or was enrolled as

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ATTACHMENT A

a student. The Board of Aldermen may appoint the youth members denoted by (10) through (12), after receiving recommendations from their respective schools. The Board of Aldermen may appoint alternate members for each of these members to serve when the members are not present.

(b) Excluding the Board liaison member and youth members, voting members of the Committee shall serve three-year staggered terms, but members may continue to serve until their successors are appointed and qualified. The terms of three seats shall expire on February 1, 2016, and every third anniversary thereafter. The terms of three seats shall expire on February 1, 2017, and every third anniversary thereafter. The terms of three seats shall expire on February 1, 2018, and every third anniversary thereafter.

(c) The Board liaison member shall serve at the pleasure of the Board. The Board may appoint an alternate Board liaison member to serve when the liaison member is unavailable.

(d) Youth members shall serve one-year terms but may continue to serve until their successors are appointed and qualified and as long as they remain enrolled the same school or at the same level (elementary, middle, high) of another school in Carrboro.

(e) Committee members may be appointed for a maximum of two successive terms (or any part thereof). A member who has served for two successive terms (or any part thereof) shall be eligible for re-appointment only after an absence from the Committee of at least one year.

(f) Members may be removed as follows:

- (1) The chairman shall file or cause to be filed with the town clerk an attendance report after each meeting identifying those members who were present or absent.
- (2) Unless the chairperson waives the requirement, members shall be removed if they are absent from three consecutive meetings. The town clerk shall notify the chairperson in writing as soon as a member becomes subject to removal under this section. The chairman will have ten days after receipt of such notice to waive the removal. If the chairman fails to notify the town clerk in writing within ten days after receipt of such notice that the automatic removal requirement should be waived, the town clerk will send a removal notice to the member. This removal shall be effective on the date of such notice.

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¶ The Committee shall include three non-voting youth advisory members who are enrolled in schools in Carrboro. One of these members shall be a student enrolled in high school, one shall be a student enrolled in middle school, and one shall be a student enrolled in elementary school. The youth advisory members shall present a student's perspective on walking and bicycling to school and may offer ideas for consideration by the voting members.

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ATTACHMENT A

- (3) Members may also be removed by the appointing authority, after a hearing, for any good cause related to performance of duty.

Section 3-24.11 Meetings and Officers of the Safe Routes to School Implementation Committee

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(a) ~~Beginning with calendar year 2015,~~ the Committee shall hold regular meetings at least three times per ~~calendar~~ year at such times and places as it shall designate.

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(b) A quorum shall consist of a majority of the non-vacant seats on the Committee, except that in no case shall a quorum consist of fewer than ~~eight~~ members.

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(c) Abstention from voting is strongly discouraged except in circumstances when a member has a direct financial interest in the outcome of the matter at issue. Abstention shall not be required in any case, but members are expected to disclose potential conflicts of interest that are not apparent from the nature of the matter at issue.

(d) The Committee shall designate one of its members to serve as chairperson and one to serve as vice-chairperson. These officers shall be selected annually at the commission's first meeting of the year and shall serve for terms of one year unless their terms of appointment to the Committee sooner expire. A member may be selected to serve as chairperson for not more than two consecutive full one-year terms. The chairperson and vice-chairperson may take part in all deliberations and vote on all issues.

Section 3-24.12 Powers and Duties of the Safe Routes to School Implementation Committee

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(a) The Committee shall recommend transportation projects, policies, programs, or activities that serve to increase the safety and convenience of walking and bicycling to school. The Committee shall provide guidance and support for implementing the recommendations of the adopted Safe Routes to School Action Plan and evaluating implementation progress. The Committee may provide assistance with seeking project or program funding, including applying for grants, Safe Routes to School event planning, and data collection.

(b) In creating this section, the Board of Aldermen finds that while safe walking and bicycling options are important for all levels of K-12 education, Safe Routes to School efforts typically focus on elementary and middle schools. Therefore, the Committee shall focus its efforts on existing or planned elementary and middle schools within Town limits.

ATTACHMENT A

(c) The Committee may adopt rules and regulations governing its procedures and operations not inconsistent with the provisions of this chapter.

Section 2. All provisions of any town ordinance in conflict with this ordinance are repealed.

Section 3. This ordinance shall become effective upon adoption.

The foregoing ordinance, having been submitted to a vote, received the following vote and was duly adopted this 18th day of March, in the year 2014.

Ayes:

Noes:

Absent or Excused:

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Town of Carrboro

Town Hall
301 W. Main St.
Carrboro, NC 27510

Legislation Text

File #: 14-0087, **Version:** 1

TITLE:

Proposed Revisions to the DCHC-MPO Memorandum of Understanding

PURPOSE: The Board of Aldermen approved a revised version of the Durham-Chapel Hill-Carrboro Metropolitan Planning Organization (DCHC-MPO) Memorandum of Understanding (MOU) on February 25, 2014, and authorized the Mayor to sign it. The MPO Transportation Advisory Committee (TAC) approved a further-revised version on March 12, 2014. The resolution in Attachment A approves this version and authorizes the Mayor to sign it.

DEPARTMENT: Planning

CONTACT INFORMATION: Jeff Brubaker - 918-7329

INFORMATION: The MOU version approved by the TAC on March 12, 2014, includes several non-substantive changes. Since the wording of the Board's February 25 approval/authorization did not explicitly allow for flexibility for non-substantive changes other than for quorum language, staff believes it is prudent to adopt another resolution reapproving and reauthorizing, in order to eliminate any potential for inconsistency.

FISCAL & STAFF IMPACT: Approving the revisions to the MOU as proposed would not have a fiscal impact at this time. Staff will include the required share of the local match for MPO planning activities in departmental budget submittals for the upcoming fiscal year and anticipates doing the same in subsequent years.

RECOMMENDATION: Staff recommend that the Board of Aldermen approve the draft resolution provided in Attachment A.

A RESOLUTION APPROVING A REVISED VERSION OF THE DURHAM-CHAPEL HILL-CARRBORO METROPOLITAN PLANNING ORGANIZATION MEMORANDUM OF UNDERSTANDING

WHEREAS, Section 134 of Title 23 of the United States Code establishes requirements for the designation of metropolitan planning organizations (MPOs), plans to be developed, transportation modes to be included in the planning process, and other factors; and,

WHEREAS, the aforementioned section requires a “performance-driven, outcome-based approach to planning” for an intermodal (including bicycle and pedestrian) transportation system; and,

WHEREAS, Section 66.2 of Chapter 136 of the North Carolina General Statutes requires that MPOs develop comprehensive transportation plans (CTP); and,

WHEREAS, the Town of Carrboro has participated in the regional transportation process as an active member of the Durham-Chapel Hill-Carrboro Metropolitan Planning Organization (DCHC-MPO); and,

WHEREAS, the planning activities of the DCHC-MPO are governed by a Memorandum of Understanding (MOU) approved and signed by the State and all MPO member jurisdictions; and,

WHEREAS, the current MOU was executed in January 1994; and,

WHEREAS, several changes are necessary to “reflect current federal and state legislation and regulations, planning practices of the MPO, updated population figures, and best planning principles”, as stated by MPO staff; and,

WHEREAS, the Town of Carrboro continues to be committed to working with all MPO member jurisdictions to further cooperative, comprehensive, and continuing transportation planning; and,

WHEREAS, the Transportation Advisory Committee (TAC) of the MPO approved a revised MOU on October 9, 2013; and,

WHEREAS, on February 25, 2014, the Board of Aldermen approved the revised MOU and authorized the Mayor to sign it; and,

WHEREAS, on March 12, 2014, the TAC subsequently approved a version of the MOU revised further by non-substantial changes; and,

WHEREAS, the Board finds it prudent to re-approve the March 12, 2014, MOU and reauthorize the Mayor to sign it, in order to ensure the highest degree of consistency in its approval process;

NOW, THEREFORE, BE IT RESOLVED by the Carrboro Board of Aldermen that the Board of Aldermen approves the revised Durham-Chapel Hill-Carrboro Metropolitan Planning

ATTACHMENT A

Organization (DCHC-MPO) Memorandum of Understanding as included in Attachment B, dated March 12, 2014, including any subsequent versions of it with non-substantive changes only.

BE IT FURTHER RESOLVED that the Board of Aldermen authorizes the Mayor to execute the revised Durham-Chapel Hill-Carrboro Metropolitan Planning Organization (DCHC-MPO) Memorandum of Understanding as included in Attachment B, dated March 12, 2014, including any subsequent versions of it with non-substantive changes only.

BE IT FURTHER RESOLVED that the Board of Aldermen acknowledges that the process for payment of the local match by the Town of Carrboro to the MPO for MPO planning activities included in the Unified Planning Work Program (UPWP) – including, but not necessarily limited to, the timing of payment and documentation necessary for payment – will be subject to further discussion by Town staff, MPO staff, staff from other MPO member jurisdictions, and, if necessary, the Board of Aldermen and MPO Transportation Advisory Committee.

This is the 18th day of March in the year 2014.

**DURHAM-CHAPEL HILL-CARRBORO
METROPOLITAN PLANNING ORGANIZATION**

**MEMORANDUM OF UNDERSTANDING
FOR
COOPERATIVE, COMPREHENSIVE, AND CONTINUING
TRANSPORTATION PLANNING**

Between

THE GOVERNOR OF THE STATE OF NORTH CAROLINA,
CITY OF DURHAM, TOWN OF CHAPEL HILL, TOWN OF CARRBORO
TOWN OF HILLSBOROUGH, COUNTY OF DURHAM,
COUNTY OF ORANGE, COUNTY OF CHATHAM, TRIANGLE TRANSIT, AND
THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

in cooperation with

THE UNITED STATES DEPARTMENT OF TRANSPORTATION

March 12, 2014

WITNESSETH THAT

WHEREAS, Section 134(a) of Title 23 United States Codes states:

Policy – It is in the national interest—

- (1) to encourage and promote the safe and efficient management, operation, and development of surface transportation systems that will serve the mobility needs of people and freight and foster economic growth and development within and between States and urbanized areas, while minimizing transportation-related fuel consumption and air pollution through metropolitan and statewide transportation planning processes identified in this chapter; and
- (2) to encourage the continued improvement and evolution of the metropolitan and statewide transportation planning processes by metropolitan planning organizations, State departments of transportation, and public transit operators as guided by the planning factors identified in subsection (h) and section 135(d).

WHEREAS, Section 134(c) of Title 23 United States Codes states:

General Requirements.—

- (1) Development of long-range plans and Transportation Improvement Programs (TIPs).— To accomplish the objectives in subsection (a), metropolitan planning organizations designated under subsection (d), in cooperation with the State and

public transportation operators, shall develop long-range transportation plans and transportation improvement programs through a performance-driven, outcome-based approach to planning for metropolitan areas of the State.

(2) Contents.— The plans and TIPs for each metropolitan area shall provide for the development and integrated management and operation of transportation systems and facilities (including accessible pedestrian walkways and bicycle transportation facilities) that will function as an intermodal transportation system for the metropolitan planning area and as an integral part of an intermodal transportation system for the State and the United States.

(3) Process of development.— The process for developing the plans and TIPs shall provide for consideration of all modes of transportation and shall be continuing, cooperative, and comprehensive to the degree appropriate, based on the complexity of the transportation problems to be addressed.

WHEREAS, Chapter 136, Section 66.2(a) of the General Statutes of North Carolina states:

Each Metropolitan Planning Organization (MPO), with cooperation of the Department of Transportation, shall develop a comprehensive transportation plan in accordance with 23 U.S.C. Section 134. In addition, an MPO may include projects in its transportation plan that are not included in a financially constrained plan or are anticipated to be needed beyond the horizon year as required by 23 U.S.C. Section 134. For municipalities located within an MPO, the development of a comprehensive transportation plan will take place through the metropolitan planning organization. For purposes of transportation planning and programming, the MPO shall represent the municipality's interests to the Department of Transportation.

WHEREAS, Chapter 136, Section 66.2(b) of the General Statutes of North Carolina states:

After completion and analysis of the plan, the plan shall be adopted by both the governing body of the municipality or MPO and the Department of Transportation as the basis for future transportation improvements in and around the municipality or within the MPO. The governing body of the municipality and the Department of Transportation shall reach agreement as to which of the existing and proposed streets and highways included in the adopted plan will be a part of the State highway system and which streets will be a part of the municipal street system. As used in this Article, the State highway system shall mean both the primary highway system of the State and the secondary road system of the State within municipalities.

WHEREAS, Chapter 136, Section 66.2(d) of the General Statutes of North Carolina states:

For MPOs, either the MPO or the Department of Transportation may propose changes in the plan at any time by giving notice to the other party, but no change shall be effective until it is adopted by both the Department of Transportation and the MPO.

WHEREAS, a transportation planning process includes the operational procedures and working arrangements by which short and long-range transportation plans are soundly conceived and developed and continuously evaluated in a manner that will:

1. Assist governing bodies and official agencies in determining courses of action and in formulating attainable capital improvement programs in anticipation of community needs; and,
2. Guide private individuals and groups in planning their decisions which can be important factors in the pattern of future development and redevelopment of the area;

WHEREAS, it is the desire of these agencies that a continuing, cooperative, and comprehensive transportation planning process, be established for the Durham-Chapel Hill-Carrboro Metropolitan Planning Area in compliance with Title 23 U.S.C. Section 134 and any subsequent amendments to that statute, and any implementing regulations; Title 49 U.S.C. Chapter 53 and any subsequent amendments to these statutes, and any implementing regulations; and the Clean Air Act of 1970, as amended, [42 U.S.C. 7504 and 7506(c)].

WHEREAS, it is the desire of these parties that all prior Memoranda of Understanding between the parties be superseded and replaced by this Memorandum of Understanding.

NOW THEREFORE, the following Memorandum of Understanding is made:

Section I

It is hereby agreed that the City of Durham, Town of Chapel Hill, Town of Carrboro, Town of Hillsborough, County of Durham, County of Orange, County of Chatham, Research Triangle Regional Public Transportation Authority (d/b/a Triangle Transit), and the North Carolina Department of Transportation in cooperation with the United States Department of Transportation will participate in a continuing, cooperative, and comprehensive transportation planning process with responsibilities and undertakings as related in the following paragraphs:

1. The Durham-Chapel Hill-Carrboro Metropolitan Planning Area, will consist of the Durham Urbanized Area as defined by the United States Department of Commerce, Bureau of the Census, plus that area beyond the existing urbanized area boundary that is expected to become urbanized or be affected by urban policies within a twenty-year planning period. This area is hereinafter referred to as the Metropolitan Planning Area.
2. The Durham-Chapel Hill-Carrboro Metropolitan Planning Organization (DCHC MPO) shall include the policy boards of general purpose local government – the Durham City Council, Chapel Hill Town Council, Carrboro Board of Aldermen, Hillsborough Board of Commissioners, Durham County Board of Commissioners, Orange County Board of Commissioners, and Chatham County Board of Commissioners; the North Carolina Department of Transportation; a MPO Board hereinafter defined, a MPO Technical

Committee hereinafter defined, and the various agencies and units of local, regional, state, and federal government participating in the transportation planning for the area.

3. The Metropolitan Planning Area boundary will be periodically reviewed and revised in light of new developments, basic data projections for the current planning period, and as may otherwise be required by federal and state laws.
4. The continuing transportation planning process will be a cooperative one reflective of and responsive to the programs of the North Carolina Department of Transportation, and to the comprehensive plans for growth and development of the Municipalities of Durham, Chapel Hill, Carrboro, and Hillsborough; and the Counties of Durham, Orange, and Chatham. Attention will be given to cooperative planning with the neighboring metropolitan and rural planning organizations.
5. The continuing transportation planning process will be in accordance with the intent, procedures, and programs of Title VI of the Civil Rights Act of 1964, as amended.
6. The continuing transportation planning process will be in accordance with the intent, procedures, and programs of Clean Air Act of 1970, as amended.
7. Transportation policy decisions within the MPO are the shared responsibility of the MPO Board, the N.C. Board of Transportation, and participating local governments.
8. Transportation plans and programs, and land use policies and programs, for the Planning Area, having regional impacts, will be coordinated with Triangle Transit, the neighboring metropolitan and rural planning organizations, and Triangle J Council of Governments.
9. A MPO Board is hereby established with the responsibility for cooperative transportation decision-making for the Durham-Chapel Hill-Carrboro Metropolitan Planning Organization (DCHC MPO). The MPO Board shall have the responsibility for keeping the policy boards informed of the status and requirements of the transportation planning process; assisting in the dissemination and clarification of the decisions, inclinations, and policies of the policy boards, and for providing opportunities for citizen participation in the transportation planning process.

The MPO Board will be responsible for carrying out the provisions of 23 U.S.C. Section 134; Title 49 U.S.C. Chapter 53; and 42 U.S.C. 7504 and 7506(c); including but not limited to:

- a. Establishment of goals and objectives for the transportation planning process;

- b. Review and approval of a Prospectus for transportation planning which defines work tasks and responsibilities for the various agencies participating in the transportation planning process;
- c. Review and approval of the transportation Unified Planning Work Program;
- d. Review and approval of changes to the National Highway System, Functional Classification, and Metropolitan Planning Area boundary;
- e. Review and approval of the Comprehensive and Metropolitan Transportation Plans. As specified in General Statutes Section 136-66.2(a), the Comprehensive Transportation Plan shall include the projects in the Metropolitan Transportation Plan and may include additional projects that are not included in the financially constrained plan or are anticipated to be needed beyond the horizon year as required by 23 U.S.C. Section 134. As specified in General Statutes Section 136-66.2(d) revisions to the Comprehensive Transportation Plan are required to be jointly approved by the North Carolina Department of Transportation and the MPO Board;
- f. Review and approval of the Transportation Improvement Program and changes to the Transportation Improvement Program. As specified in 23 U.S.C. Section 134(k), all federally funded projects carried out within the boundaries of a metropolitan planning area serving a transportation management area (excluding projects carried out on the National Highway System) shall be selected for implementation from the approved TIP by the metropolitan planning organization designated for the area in consultation with the State and any affected public transportation operator;
- g. Review and approval of planning procedures for air quality conformity and review and approval of air quality conformity determination for projects, programs, and plans;
- h. Review and approval of a Congestion Management Process;
- i. Review and approval of the distribution and oversight of federal funds designated for the DCHC MPO under the provisions of MAP-21 and any other subsequent Transportation Authorizations;
- j. Review and approval of a policy for public involvement for the DCHC MPO;
- k. Review and approval of an agreement between the MPO, the State, and public transportation operators serving the Metropolitan Planning Area that defines mutual responsibilities for carrying out the metropolitan planning process in accordance with 23 C.F.R. 450.314;

- l. Oversight of the Lead Planning Agency staff;
- m. Revision in membership of the MPO Technical Committee hereinafter defined;
- n. Development and approval of committee bylaws for the purpose of establishing operating policies and procedures;
- o. Review and approval of cooperative agreements with other transportation organizations, transportation providers, counties, and municipalities.

The membership of the MPO Board shall include:

- a. Two members of the Durham City Council;
- b. One member of the Chapel Hill Town Council;
- c. One member of the Carrboro Board of Aldermen;
- d. One member of the Hillsborough Board of Commissioners;
- e. One member of the Durham County Board of Commissioners;
- f. One member of the Orange County Board of Commissioners;
- g. One member of the Chatham County Board of Commissioners;
- h. One member of the North Carolina Board of Transportation;
- i. One member of the Triangle Transit Board of Trustees.

Municipal and county public transit providers shall be represented on the MPO Board through their respective municipal and county local government board members.

It shall be the responsibility of each member jurisdiction to appoint a representative and an alternate(s) to the MPO Board.

In order for a quorum of the MPO Board to be established:

- a. A simple majority of the voting members shall be present; and
- b. The total number of weighted votes associated with the simple majority, as identified in the weighted voting schedule below, shall represent a majority of the total number of possible weighted votes.

A majority vote shall be sufficient for approval of matters coming before the committee with the exception that a committee member may invoke the following weighted vote provisions on any matter:

<u>Government Body</u>	<u>Votes</u>
City of Durham	16*
Town of Chapel Hill	6
Durham County	4
Orange County	4
Town of Carrboro	2

Chatham County	2
Town of Hillsborough	2
N.C. Board of Transportation	1
<u>Triangle Transit</u>	<u>1</u>
Total	38

* 8 votes per representative

Representatives from each of the following bodies will serve as non-voting members of the MPO Board:

- a. A representative of the Federal Highway Administration;
- b. A representative of the Federal Transit Administration;
- c. Other local, regional, state, or federal agencies impacting transportation in the planning area at the invitation of the MPO Board.

The MPO Board will meet as often as it is deemed appropriate and advisable. On the basis of a majority vote, the MPO Board may appoint members of the Board to act as Chair and Vice-Chair with the responsibility for coordination of the Board’s activities. A member of the Lead Planning Agency staff will serve as Secretary to the Board and will work cooperatively with the staff of other jurisdictions.

10. A MPO Technical Committee shall be established with the responsibility of general review, guidance and coordination of the transportation planning process for the planning area and with the responsibility for making recommendations to the respective local, state, and federal governmental agencies and the MPO Board regarding any necessary actions relating to the continuing transportation planning process. The MPO Technical Committee shall be responsible for development, review and recommendations for approval and changes to the Prospectus, Unified Planning Work Program, Transportation Improvement Program, National Highway System, Functional Classification, Metropolitan Planning Area boundary, Metropolitan Transportation Plan, and Comprehensive Transportation Plan, for planning citizen participation, and for documenting reports of various transportation studies.

Membership of the MPO Technical Committee shall include technical representatives from local and state agencies directly related to and concerned with the transportation planning process for the planning area. Representatives will be designated by the chief executive officer of each represented agency. Departments or divisions within local and state agencies that should be represented on the MPO Technical Committee include, but are not limited to, those responsible for transportation planning, land use planning, transportation operations, public works and construction, engineering, public transportation, environmental conservation and planning, bicycle and pedestrian planning, and economic development. Initially, the membership shall include, but not be limited to, the following:

- | | |
|--|-------------------|
| a. The City of Durham | 5 representatives |
| b. The Town of Chapel Hill | 3 representatives |
| c. The Town of Carrboro | 2 representatives |
| d. The Town of Hillsborough | 1 representative |
| e. Durham County | 3 representatives |
| f. Orange County | 3 representatives |
| g. Chatham County | 1 representative |
| h. The N.C. Department of Transportation | 5 representatives |
| i. Triangle J Council of Governments | 1 representative |
| j. Duke University | 1 representative |
| k. N.C. Central University | 1 representative |
| l. The University of North Carolina | 1 representative |
| m. The Raleigh-Durham Airport Authority | 1 representative |
| n. Triangle Transit | 1 representative |
| o. The Research Triangle Park Foundation | 1 representative |
| p. The N.C. Department of the Environment and
Natural Resources | 1 representative |

The City of Durham’s membership shall not include members of the Lead Planning Agency staff.

In addition to voting membership, the following agencies shall have non-voting membership:

- | | |
|--|------------------|
| a. The Federal Highway Administration | 1 representative |
| b. The Federal Transit Administration | 1 representative |
| c. The U.S. Army Corps of Engineers | 1 representative |
| d. The U.S. Environmental Protection Agency | 1 representative |
| e. The U.S. Fish and Wildlife Service | 1 representative |
| f. The N.C. Department of Cultural Resources | 1 representative |
| g. The N.C. Department of Commerce | 1 representative |
| h. The U.S. Department of Housing and Urban
Development | 1 representative |
| i. The N.C. Railroad Company | 1 representative |
| j. The N.C. Trucking Association | 1 representative |
| k. The N.C. Motorcoach Association | 1 representative |
| l. Regional Transportation Alliance | 1 representative |

The MPO Technical Committee shall meet when it is deemed appropriate and advisable. On the basis of a majority vote, the MPO Technical Committee may appoint voting members of the Committee to act as Chair and Vice-Chair with the responsibility for coordination of the Committee’s activities.

11. The Durham City Council, Chapel Hill Town Council, Carrboro Board of Aldermen, Hillsborough Board of Commissioners, Durham County Board of Commissioners, Orange County Board of Commissioners, and Chatham County Board of Commissioners shall serve as the primary means for citizen input to the continuing transportation planning process. During the Metropolitan Transportation Plan reevaluation, citizen involvement in the planning process shall be encouraged during re-analysis of goals and objectives and plan formation. This citizen involvement will be obtained through procedures outlined in the MPO's policy for public involvement.

The MPO Board may also receive public input or hold public hearings as may also be required by federal or state law.

Section II

It is further agreed that the subscribing agencies will have the following responsibilities, these responsibilities being those most logically assumed by the several agencies:

The Municipalities and the Counties

The municipalities and the counties will assist in the transportation planning process by providing planning assistance, data, and inventories in accordance with the Prospectus. The municipalities and the counties shall coordinate zoning and subdivision approval within their respective jurisdictions in accordance with the adopted Metropolitan Transportation Plan and the Comprehensive Transportation Plan.

Additionally, the City of Durham will serve as the Lead Planning Agency for the transportation planning process in the Planning Area.

The municipalities and the counties will participate in funding the portion of the costs of the MPO's work program not covered by federal or state funding as reflected in the annual Planning Work Program approved by the MPO Board. The portion to be paid by each municipal and county member government will be based upon its pro rata share of population within the MPO Planning Area, utilizing the most recent certified North Carolina Office of State Planning municipal and county population estimates. In addition, MPO members may also voluntarily contribute additional funds for other purposes such as to participate in funding the costs of special studies, or other specialized services as mutually agreed upon.

Funding provided by member agencies will be used to provide the required local match to federal funds. Failure by member agencies to pay the approved share of costs would impact the MPO's ability to match federal funds and could have the effect of invalidating the MPO's Unified Planning Work Program and the annual MPO self-certification, and could also result in the withholding of transportation project funds.

Failure by member governments to pay the approved share of costs may also result in the withholding of MPO services and funding.

The municipalities and the counties receiving federal transportation funding designated for the Durham Urbanized Area as approved by the MPO Board through the Unified Planning Work Program shall comply with adopted reporting and oversight procedures.

North Carolina Department of Transportation

The Department will assist in the transportation planning process by providing planning assistance, data, and inventories in accordance with the Prospectus. Should any authorized local government body choose to adopt or amend a transportation corridor official map for a proposed public transportation corridor pursuant to N.C.G.S. § 136-44.50, the Department may offer assistance by providing mapping, data, inventories, or other Department resources that could aid the local government body in adopting or amending a transportation corridor official map.

Triangle Transit

Triangle Transit will assist in the transportation planning process by providing planning assistance, data, and inventories in accordance with the Prospectus. Triangle Transit may also voluntarily contribute additional funds for other purposes such as to participate in funding the costs of special studies, or other specialized services as mutually agreed upon. Triangle Transit shall comply with adopted reporting and oversight procedures for the receipt of federal transportation funding designated for the Durham Urbanized Area as approved by the MPO Board through the Unified Planning Work Program.

E-Verify Compliance for All Parties to this Agreement

Each of the parties covenants that if it enters into any subcontracts in order to perform any of its obligations under this contract, it shall require that the contractors and their subcontractors comply with the requirements of NC Gen. Stat. Article 2 of Chapter 64. In this E-Verify Compliance section, the words contractors, subcontractors, and comply shall have the meanings intended by applicable provisions of NC Gen. Stat. Chapters 153A and 160A.

Section III

Parties to this Memorandum of Understanding may terminate their participation in the continuing transportation planning process by giving ninety (90) days written notice to the other parties prior to the date of termination. If any party should terminate participation, this Memorandum of Understanding shall remain in force and the Durham-Chapel Hill-Carrboro Metropolitan Planning Organization shall continue to operate as long as 75% or more of the

population within the Metropolitan Planning Area is represented by the remaining members. For the purpose of determining 75% representation, the populations within incorporated areas are represented by the respective municipal governments and the populations within the unincorporated areas are represented by the respective county governments.

Section IV

In witness whereof, the parties of this Memorandum of Understanding have been authorized by appropriate and proper resolutions to sign the same, the City of Durham by its Mayor, the Town of Chapel Hill by its Mayor, the Town of Carrboro by its Mayor, the Town of Hillsborough by its Mayor, Durham County by its Chair, Orange County by its Chair, Chatham County by its Chair, Triangle Transit by its Chair, and the Secretary of Transportation on behalf of the Governor of the State of North Carolina and the North Carolina Department of Transportation, this the _____ day of _____, ____.

(Seal)

City of Durham

_____ By _____
Clerk Mayor

(Seal)

Town of Chapel Hill

_____ By _____
Clerk Mayor

(Seal)

Town of Carrboro

_____ By _____
Clerk Mayor

(Seal)

Town of Hillsborough

_____ By _____
Clerk Mayor

(Seal)

County of Durham

_____ By _____
Clerk Chair

(Seal)

County of Orange

_____ By _____
Clerk Chair

(Seal)

County of Chatham

_____ By _____
Clerk Chair

(Seal)

Triangle Transit

_____ By _____
Clerk Chair

(Seal)

North Carolina Department of
Transportation

By _____
Secretary

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**DURHAM-CHAPEL HILL-CARRBORO
METROPOLITAN PLANNING ORGANIZATION**

**MEMORANDUM OF UNDERSTANDING
FOR
COOPERATIVE, COMPREHENSIVE, AND CONTINUING
TRANSPORTATION PLANNING**

Between

THE GOVERNOR OF THE STATE OF NORTH CAROLINA,
CITY OF DURHAM, TOWN OF CHAPEL HILL, TOWN OF CARRBORO
TOWN OF HILLSBOROUGH, COUNTY OF DURHAM,
COUNTY OF ORANGE, COUNTY OF CHATHAM, TRIANGLE TRANSIT, AND
THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

Comment [BE1]: Added

in cooperation with

THE UNITED STATES DEPARTMENT OF TRANSPORTATION

March 12, 2014

Comment [BE2]: Updated date.

WITNESSETH THAT

WHEREAS, Section 134(a) of Title 23 United States Codes states:

Comment [BE3]: Reference U.S.C. first as it establishes the basis for MPOs

Policy – It is in the national interest—

- (1) to encourage and promote the safe and efficient management, operation, and development of surface transportation systems that will serve the mobility needs of people and freight and foster economic growth and development within and between States and urbanized areas, while minimizing transportation-related fuel consumption and air pollution through metropolitan and statewide transportation planning processes identified in this chapter; and
- (2) to encourage the continued improvement and evolution of the metropolitan and statewide transportation planning processes by metropolitan planning organizations, State departments of transportation, and public transit operators as guided by the planning factors identified in subsection (h) and section 135(d).

WHEREAS, Section 134(c) of Title 23 United States Codes states:

General Requirements.—

- (1) Development of long-range plans and Transportation Improvement Programs (TIPs).— To accomplish the objectives in subsection (a), metropolitan planning organizations designated under subsection (d), in cooperation with the State and

Comment [BE4]: Added. This is a non-substantive change for clarification only.

1 public transportation operators, shall develop long-range transportation plans
2 and transportation improvement programs through a performance-driven,
3 outcome-based approach to planning for metropolitan areas of the State.
4 (2) Contents.— The plans and TIPs for each metropolitan area shall provide for
5 the development and integrated management and operation of transportation
6 systems and facilities (including accessible pedestrian walkways and bicycle
7 transportation facilities) that will function as an intermodal transportation
8 system for the metropolitan planning area and as an integral part of an
9 intermodal transportation system for the State and the United States.
10 (3) Process of development.— The process for developing the plans and TIPs
11 shall provide for consideration of all modes of transportation and shall be
12 continuing, cooperative, and comprehensive to the degree appropriate, based
13 on the complexity of the transportation problems to be addressed.

14
15 WHEREAS, Chapter 136, Section 66.2(a) of the General Statutes of North Carolina states:

16
17 Each Metropolitan Planning Organization (MPO), with cooperation of the Department of
18 Transportation, shall develop a comprehensive transportation plan in accordance with
19 23 U.S.C. Section 134. In addition, an MPO may include projects in its transportation
20 plan that are not included in a financially constrained plan or are anticipated to be
21 needed beyond the horizon year as required by 23 U.S.C. Section 134. For municipalities
22 located within an MPO, the development of a comprehensive transportation plan will
23 take place through the metropolitan planning organization. For purposes of
24 transportation planning and programming, the MPO shall represent the municipality's
25 interests to the Department of Transportation.
26

27 WHEREAS, Chapter 136, Section 66.2(b) of the General Statutes of North Carolina states:

28
29 After completion and analysis of the plan, the plan shall be adopted by both the
30 governing body of the municipality or MPO and the Department of Transportation as
31 the basis for future transportation improvements in and around the municipality or
32 within the MPO. The governing body of the municipality and the Department of
33 Transportation shall reach agreement as to which of the existing and proposed streets
34 and highways included in the adopted plan will be a part of the State highway system
35 and which streets will be a part of the municipal street system. As used in this Article,
36 the State highway system shall mean both the primary highway system of the State and
37 the secondary road system of the State within municipalities.
38

39 WHEREAS, Chapter 136, Section 66.2(d) of the General Statutes of North Carolina states:

40
41 For MPOs, either the MPO or the Department of Transportation may propose changes
42 in the plan at any time by giving notice to the other party, but no change shall be
43 effective until it is adopted by both the Department of Transportation and the MPO.
44

Comment [BE5]: Reference N.C. General Statutes second as it establishes a requirement for MPOs

Comment [BE6]: Added. This is a non-substantive change for clarification only.

1 WHEREAS, a transportation planning process includes the operational procedures and working
2 arrangements by which short and long-range transportation plans are soundly conceived and
3 developed and continuously evaluated in a manner that will:

- 4
- 5 1. Assist governing bodies and official agencies in determining courses of action and in
6 formulating attainable capital improvement programs in anticipation of community
7 needs; and,
8
- 9 2. Guide private individuals and groups in planning their decisions which can be important
10 factors in the pattern of future development and redevelopment of the area;

11
12 WHEREAS, it is the desire of these agencies that a continuing, cooperative, and comprehensive
13 transportation planning process, be established for the Durham-Chapel Hill-Carrboro
14 Metropolitan Planning Area in compliance with Title 23 U.S.C. Section 134 and any subsequent
15 amendments to that statute, and any implementing regulations; Title 49 U.S.C. Chapter 53 and
16 any subsequent amendments to these statutes, and any implementing regulations; and the
17 Clean Air Act of 1970, as amended, [42 U.S.C. 7504 and 7506(c)].

Comment [BE7]: Changed from “Durham Urbanized Area” in response to NCDOT comment.

Comment [BE8]: Changed reference from Federal Transit Act of 1991 to the U.S.C. related to Metropolitan Planning and public transportation

Comment [BE9]: Added Clean Air Act – references U.S.C. requirements on conformity

18
19 WHEREAS, it is the desire of these parties that all prior Memoranda of Understanding between the
20 parties be superseded and replaced by this Memorandum of Understanding.

21
22 NOW THEREFORE, the following Memorandum of Understanding is made:

23
24 Section I

25
26 It is hereby agreed that the City of Durham, Town of Chapel Hill, Town of Carrboro, Town of
27 Hillsborough, County of Durham, County of Orange, County of Chatham, Research Triangle
28 Regional Public Transportation Authority (d/b/a Triangle Transit), and the North Carolina
29 Department of Transportation in cooperation with the United States Department of
30 Transportation will participate in a continuing, cooperative, and comprehensive transportation
31 planning process with responsibilities and undertakings as related in the following paragraphs:

Comment [BE10]: Added. Correcting an inadvertent omission. Since all other references in the MOU indicate that Triangle Transit is a party to the agreement, this is a non-substantive change.

Comment [BE11]: Added.

32
33 1. The Durham-Chapel Hill-Carrboro Metropolitan Planning Area, will consist of the
34 Durham Urbanized Area as defined by the United States Department of Commerce,
35 Bureau of the Census, plus that area beyond the existing urbanized area boundary that
36 is expected to become urbanized or be affected by urban policies within a twenty-year
37 planning period. This area is hereinafter referred to as the Metropolitan Planning Area.

Comment [BE12]: Metropolitan Planning Area – not Metropolitan Area Boundary – is term used in U.S.C.

Comment [BE13]: Changed from Durham-Chapel Hill-Carrboro Urbanized Area. Census uses “Durham Urbanized Area”

38
39 2. The Durham-Chapel Hill-Carrboro Metropolitan Planning Organization (DCHC MPO) shall
40 include the policy boards of general purpose local government – the Durham City
41 Council, Chapel Hill Town Council, Carrboro Board of Aldermen, Hillsborough Board of
42 Commissioners, Durham County Board of Commissioners, Orange County Board of
43 Commissioners, and Chatham County Board of Commissioners; the North Carolina
44 Department of Transportation; a MPO Board hereinafter defined, a MPO Technical

Comment [BE14]: Added. This is a non-substantive change for clarification only.

Comment [BE15]: New name for TAC

1 Committee hereinafter defined, and the various agencies and units of local, regional,
2 state, and federal government participating in the transportation planning for the area.

Comment [BE16]: New name for TCC

Comment [BE17]: Added regional. Could refer to TJCOG, Triangle Transit, etc.

3
4 3. The Metropolitan Planning Area boundary will be periodically reviewed and revised in
5 light of new developments, basic data projections for the current planning period, and
6 as may otherwise be required by federal and state laws.

7
8 4. The continuing transportation planning process will be a cooperative one reflective of
9 and responsive to the programs of the North Carolina Department of Transportation,
10 and to the comprehensive plans for growth and development of the Municipalities of
11 Durham, Chapel Hill, Carrboro, and Hillsborough; and the Counties of Durham, Orange,
12 and Chatham. Attention will be given to cooperative planning with the neighboring
13 metropolitan and rural planning organizations.

Comment [BE18]: Changed to more inclusive language (previously only referenced CAMPO).

14
15 5. The continuing transportation planning process will be in accordance with the intent,
16 procedures, and programs of Title VI of the Civil Rights Act of 1964, as amended.

17
18 6. The continuing transportation planning process will be in accordance with the intent,
19 procedures, and programs of Clean Air Act of 1970, as amended.

Comment [BE19]: Added

20
21 7. Transportation policy decisions within the MPO are the shared responsibility of the MPO
22 Board, the N.C. Board of Transportation, and participating local governments.

Comment [BE20]: Changed from "Planning Area" in response to NCDOT comment.

23
24 8. Transportation plans and programs, and land use policies and programs, for the
25 Planning Area, having regional impacts, will be coordinated with Triangle Transit, the
26 neighboring metropolitan and rural planning organizations, and Triangle J Council of
27 Governments.

Comment [BE21]: Changed to more inclusive language (previously only referenced CAMPO).

28
29 9. A MPO Board is hereby established with the responsibility for cooperative
30 transportation decision-making for the Durham-Chapel Hill-Carrboro Metropolitan
31 Planning Organization (DCHC MPO). The MPO Board shall have the responsibility for
32 keeping the policy boards informed of the status and requirements of the
33 transportation planning process; assisting in the dissemination and clarification of the
34 decisions, inclinations, and policies of the policy boards, and for providing opportunities
35 for citizen participation in the transportation planning process.

36
37 The MPO Board will be responsible for carrying out the provisions of 23 U.S.C. Section
38 134; Title 49 U.S.C. Chapter 53; and 42 U.S.C. 7504 and 7506(c); including but not
39 limited to:

Comment [BE22]: Updated reference to public transportation U.S.C.

Comment [BE23]: Added. References Clean Air Act requirements.

40
41 a. Establishment of goals and objectives for the transportation planning process;
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- b. Review and approval of a Prospectus for transportation planning which defines work tasks and responsibilities for the various agencies participating in the transportation planning process;
- c. Review and approval of the transportation Unified Planning Work Program;
- d. Review and approval of changes to the National Highway System, Functional Classification, and Metropolitan Planning Area boundary;
- e. Review and approval of the Comprehensive and Metropolitan Transportation Plans. As specified in General Statutes Section 136-66.2(a), the Comprehensive Transportation Plan shall include the projects in the Metropolitan Transportation Plan and may include additional projects that are not included in the financially constrained plan or are anticipated to be needed beyond the horizon year as required by 23 U.S.C. Section 134. As specified in General Statutes Section 136-66.2(d) revisions to the Comprehensive Transportation Plan are required to be jointly approved by the North Carolina Department of Transportation and the MPO Board;
- f. Review and approval of the Transportation Improvement Program and changes to the Transportation Improvement Program. As specified in 23 U.S.C. Section 134(k), all federally funded projects carried out within the boundaries of a metropolitan planning area serving a transportation management area (excluding projects carried out on the National Highway System) shall be selected for implementation from the approved TIP by the metropolitan planning organization designated for the area in consultation with the State and any affected public transportation operator;
- g. Review and approval of planning procedures for air quality conformity and review and approval of air quality conformity determination for projects, programs, and plans;
- h. Review and approval of a Congestion Management Process;
- i. Review and approval of the distribution and oversight of federal funds designated for the DCHC MPO under the provisions of MAP-21 and any other subsequent Transportation Authorizations;
- j. Review and approval of a policy for public involvement for the DCHC MPO;
- k. Review and approval of an agreement between the MPO, the State, and public transportation operators serving the Metropolitan Planning Area that defines mutual responsibilities for carrying out the metropolitan planning process in accordance with 23 C.F.R. 450.314;

Comment [BE24]: Old MOU includes “urban area boundary”. Urbanized area set by Census. Smoothed UZA no longer necessary.

Comment [BE25]: Changed from “as well as” in response to NCDOT comment

Comment [BE26]: Changed from “may be” in response to NCDOT comment.

Comment [BE27]: Updated to reflect current names of plans and legislation.

Comment [BE28]: Added reference to specific language for selection of TIP projects in Transportation Management Areas.

Comment [BE29]: Added

Comment [BE30]: Added

Comment [BE31]: Changed from “Durham Urbanized Area” in response to NCDOT comment.

Comment [BE32]: Added

Comment [BE33]: Added

Comment [BE34]: Added

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- l. Oversight of the Lead Planning Agency staff;
- m. Revision in membership of the MPO Technical Committee hereinafter defined;
- n. Development and approval of committee bylaws for the purpose of establishing operating policies and procedures;
- o. Review and approval of cooperative agreements with other transportation organizations, transportation providers, counties, and municipalities.

Comment [BE35]: Added

Comment [BE36]: Added.

The membership of the MPO Board shall include:

- a. Two members of the Durham City Council;
- b. One member of the Chapel Hill Town Council;
- c. One member of the Carrboro Board of Aldermen;
- d. One member of the Hillsborough Board of Commissioners;
- e. One member of the Durham County Board of Commissioners;
- f. One member of the Orange County Board of Commissioners;
- g. One member of the Chatham County Board of Commissioners;
- h. One member of the North Carolina Board of Transportation;
- i. One member of the Triangle Transit Board of Trustees.

Municipal and county public transit providers shall be represented on the MPO Board through their respective municipal and county local government board members.

Comment [BE37]: Added to address MAP-21 requirement that transit providers be voting members of the MPO Board.

It shall be the responsibility of each member jurisdiction to appoint a representative and an alternate(s) to the MPO Board.

In order for a quorum of the MPO Board to be established:

- a. A simple majority of the voting members shall be present; and
- b. The total number of weighted votes associated with the simple majority, as identified in the weighted voting schedule below, shall represent a majority of the total number of possible weighted votes.

Comment [BE38]: Changed from "A quorum of the MPO Board shall consist of a majority of the voting members whose votes together represent a majority of the possible weighted votes identified in the weighted vote schedule below." This is a non-substantive change as the new language has the same meaning as the original language

A majority vote shall be sufficient for approval of matters coming before the committee with the exception that a committee member may invoke the following weighted vote provisions on any matter:

Government Body	Votes
City of Durham	16*
Town of Chapel Hill	6
Durham County	4
Orange County	4
Town of Carrboro	2

Chatham County	2
Town of Hillsborough	2
N.C. Board of Transportation	1
Triangle Transit	1
Total	38

* 8 votes per representative

Representatives from each of the following bodies will serve as non-voting members of the MPO Board:

- a. A representative of the Federal Highway Administration;
- b. A representative of the Federal Transit Administration;
- c. Other local, regional, state, or federal agencies impacting transportation in the planning area at the invitation of the MPO Board.

The MPO Board will meet as often as it is deemed appropriate and advisable. On the basis of a majority vote, the MPO Board may appoint members of the Board to act as Chair and Vice-Chair with the responsibility for coordination of the Board's activities. A member of the Lead Planning Agency staff will serve as Secretary to the Board and will work cooperatively with the staff of other jurisdictions.

10. A MPO Technical Committee shall be established with the responsibility of general review, guidance and coordination of the transportation planning process for the planning area and with the responsibility for making recommendations to the respective local, state, and federal governmental agencies and the MPO Board regarding any necessary actions relating to the continuing transportation planning process. The MPO Technical Committee shall be responsible for development, review and recommendations for approval and changes to the Prospectus, Unified Planning Work Program, Transportation Improvement Program, National Highway System, Functional Classification, Metropolitan Planning Area boundary, Metropolitan Transportation Plan, and Comprehensive Transportation Plan, for planning citizen participation, and for documenting reports of various transportation studies.

Membership of the MPO Technical Committee shall include technical representatives from local and state agencies directly related to and concerned with the transportation planning process for the planning area. Representatives will be designated by the chief executive officer of each represented agency. Departments or divisions within local and state agencies that should be represented on the MPO Technical Committee include, but are not limited to, those responsible for transportation planning, land use planning, transportation operations, public works and construction, engineering, public transportation, environmental conservation and planning, bicycle and pedestrian planning, and economic development. Initially, the membership shall include, but not be limited to, the following:

Comment [BE39]: Proposed Weighted Voting is based on the current MOU, but makes Durham County and Orange County equivalent due to similar populations and increases Chapel Hill due to comparatively larger size. In response to Carrboro's comments, all local governments receive a minimum of two votes. The number of weighted votes for all jurisdictions were doubled from the draft MOU. Quorum is 6 members who represent 20 weighted votes.

Comment [BE40]: Current MOU "A Division Administrator(s) of the Federal Highway Administration and/or the Federal Transit Administration, or their representative(s);"

Comment [BE41]: Changed from City of Durham Department of Transportation

Comment [BE42]: Changed from "the transportation study" in response to Orange County comment.

Comment [BE43]: Added.

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- a. The City of Durham 5 representatives
- b. The Town of Chapel Hill 3 representatives
- c. The Town of Carrboro 2 representatives
- d. The Town of Hillsborough 1 representative
- e. Durham County 3 representatives
- f. Orange County 3 representatives
- g. Chatham County 1 representative
- h. The N.C. Department of Transportation 5 representatives
- i. Triangle J Council of Governments 1 representative
- j. Duke University 1 representative
- k. N.C. Central University 1 representative
- l. The University of North Carolina 1 representative
- m. The Raleigh-Durham Airport Authority 1 representative
- n. Triangle Transit 1 representative
- o. The Research Triangle Park Foundation 1 representative
- p. The N.C. Department of the Environment and Natural Resources 1 representative

Comment [BE44]: Increased to 3 to be equal with Durham County.

Comment [BE45]: Added due to air quality and Merger Process roles

The City of Durham’s membership shall not include members of the Lead Planning Agency staff.

Comment [BE46]: Added

In addition to voting membership, the following agencies shall have non-voting membership:

- a. The Federal Highway Administration 1 representative
- b. The Federal Transit Administration 1 representative
- c. The U.S. Army Corps of Engineers 1 representative
- d. The U.S. Environmental Protection Agency 1 representative
- e. The U.S. Fish and Wildlife Service 1 representative
- f. The N.C. Department of Cultural Resources 1 representative
- g. The N.C. Department of Commerce 1 representative
- h. The U.S. Department of Housing and Urban Development 1 representative
- i. The N.C. Railroad Company 1 representative
- j. The N.C. Trucking Association 1 representative
- k. The N.C. Motorcoach Association 1 representative
- l. Regional Transportation Alliance 1 representative

Comment [BE47]: Current MOU says 2 from USDOT. Proposed MOU specifically requests one from FHWA and one from FTA.

Comment [BE48]: Added – all have role in Merger Process

Comment [BE49]: Added due to Livability Initiative.

Comment [BE50]: Added to incorporate freight interests.

Comment [BE51]: Added as a substitute for the Greyhound membership currently in the TCC bylaws. Represents private charter bus operators.

Comment [BE52]: Added to incorporate economic development interests.

The MPO Technical Committee shall meet when it is deemed appropriate and advisable. On the basis of a majority vote, the MPO Technical Committee may appoint voting members of the Committee to act as Chair and Vice-Chair with the responsibility for coordination of the Committee’s activities.

1 11. The Durham City Council, Chapel Hill Town Council, Carrboro Board of Aldermen,
2 Hillsborough Board of Commissioners, Durham County Board of Commissioners, Orange
3 County Board of Commissioners, and Chatham County Board of Commissioners shall
4 serve as the primary means for citizen input to the continuing transportation planning
5 process. During the Metropolitan Transportation Plan reevaluation, citizen involvement
6 in the planning process shall be encouraged during re-analysis of goals and objectives
7 and plan formation. This citizen involvement will be obtained through procedures
8 outlined in the MPO's policy for public involvement.

Comment [BE53]: Deleted "...goals and objectives surveys, neighborhood forums, and public hearings in accordance with..."

Comment [BE54]: Changed from "North Carolina Highway Action Plan"

9
10 The MPO Board may also receive public input or hold public hearings as may also be
11 required by federal or state law.

12
13 Section II

14
15 It is further agreed that the subscribing agencies will have the following responsibilities, these
16 responsibilities being those most logically assumed by the several agencies:

17
18 The Municipalities and the Counties

Comment [BE55]: Condensed into one section. Current MOU includes identical language for all seven municipalities and counties.

19
20 The municipalities and the counties will assist in the transportation planning process by
21 providing planning assistance, data, and inventories in accordance with the Prospectus.
22 The municipalities and the counties shall coordinate zoning and subdivision approval
23 within their respective jurisdictions in accordance with the adopted Metropolitan
24 Transportation Plan and the Comprehensive Transportation Plan.

25
26 Additionally, the City of Durham will serve as the Lead Planning Agency for the
27 transportation planning process in the Planning Area.

28
29 The municipalities and the counties will participate in funding the portion of the costs of
30 the MPO's work program not covered by federal or state funding as reflected in the
31 annual Planning Work Program approved by the MPO Board. The portion to be paid by
32 each municipal and county member government will be based upon its pro rata share of
33 population within the MPO Planning Area, utilizing the most recent certified North
34 Carolina Office of State Planning municipal and county population estimates. In
35 addition, MPO members may also voluntarily contribute additional funds for other
36 purposes such as to participate in funding the costs of special studies, or other
37 specialized services as mutually agreed upon.

Comment [BE56]: Added in response to Chapel Hill comment.

Comment [BE57]: Added. Uses same language as CAMPO.

38
39 Funding provided by member agencies will be used to provide the required local match
40 to federal funds. Failure by member agencies to pay the approved share of costs would
41 impact the MPO's ability to match federal funds and could have the effect of
42 invalidating the MPO's Unified Planning Work Program and the annual MPO self-
43 certification, and could also result in the withholding of transportation project funds.

1 Failure by member governments to pay the approved share of costs may also result in
2 the withholding of MPO services and funding.

Comment [BE58]: Added. This paragraph was rewritten in response to NCDOT and Orange County comment.

3
4 The municipalities and the counties receiving federal transportation funding designated
5 for the Durham Urbanized Area as approved by the MPO Board through the Unified
6 Planning Work Program shall comply with adopted reporting and oversight procedures.

Comment [BE59]: Added

7 8 North Carolina Department of Transportation

9
10 The Department will assist in the transportation planning process by providing planning
11 assistance, data, and inventories in accordance with the Prospectus. Should any
12 authorized local government body choose to adopt or amend a transportation corridor
13 official map for a proposed public transportation corridor pursuant to N.C.G.S. § 136-
14 44.50, the Department may offer assistance by providing mapping, data, inventories, or
15 other Department resources that could aid the local government body in adopting or
16 amending a transportation corridor official map.

Comment [BE60]: Changed from “The Department, to the fullest extent possible and as permitted by existing state and federal regulations, will provide assistance in the protection of necessary rights-of-way for those transportation facilities designated in the adopted Metropolitan Transportation Plan and Comprehensive Transportation Plan” in response to NCDOT comment.

17 18 Triangle Transit

19
20 Triangle Transit will assist in the transportation planning process by providing planning
21 assistance, data, and inventories in accordance with the Prospectus. Triangle Transit
22 may also voluntarily contribute additional funds for other purposes such as to
23 participate in funding the costs of special studies, or other specialized services as
24 mutually agreed upon. Triangle Transit shall comply with adopted reporting and
25 oversight procedures for the receipt of federal transportation funding designated for
26 the Durham Urbanized Area as approved by the MPO Board through the Unified
27 Planning Work Program.

Comment [BE61]: Added. Uses same language as CAMPO.

Comment [BE62]: Added. This is a non-substantive change as it clarifies that Triangle Transit has the same option as the municipalities and counties to contribute funding (identical to the sentence on page 9, lines 34-37). The contribution is not required; it is optional.

28 29 E-Verify Compliance for All Parties to this Agreement

Comment [BE63]: Added.

30
31 Each of the parties covenants that if it enters into any subcontracts in order to perform
32 any of its obligations under this contract, it shall require that the contractors and their
33 subcontractors comply with the requirements of NC Gen. Stat. Article 2 of Chapter
34 64. In this E-Verify Compliance section, the words contractors, subcontractors, and
35 comply shall have the meanings intended by applicable provisions of NC Gen. Stat.
36 Chapters 153A and 160A.

Comment [BE64]: Added in response to City of Durham comment.

37 38 Section III

39
40 Parties to this Memorandum of Understanding may terminate their participation in the
41 continuing transportation planning process by giving ninety (90) days written notice to the
42 other parties prior to the date of termination. If any party should terminate participation, this
43 Memorandum of Understanding shall remain in force and the Durham-Chapel Hill-Carrboro
44 Metropolitan Planning Organization shall continue to operate as long as 75% or more of the

Comment [BE65]: Changed from “thirty (30)” in response to Carrboro and City of Durham comment.

1 population within the Metropolitan Planning Area is represented by the remaining members.
2 For the purpose of determining 75% representation, the populations within incorporated areas
3 are represented by the respective municipal governments and the populations within the
4 unincorporated areas are represented by the respective county governments.

5
6 Section IV

7
8 In witness whereof, the parties of this Memorandum of Understanding have been authorized
9 by appropriate and proper resolutions to sign the same, the City of Durham by its Mayor, the
10 Town of Chapel Hill by its Mayor, the Town of Carrboro by its Mayor, the Town of Hillsborough
11 by its Mayor, Durham County by its Chair, Orange County by its Chair, Chatham County by its
12 Chair, Triangle Transit by its Chair, and the Secretary of Transportation on behalf of the
13 Governor of the State of North Carolina and the North Carolina Department of Transportation,
14 this the _____ day of _____, ____.

Comment [BE66]: Changed from Manager.

Comment [BE67]: Added in response to NCDOT comment.

15
16 (Seal) _____ City of Durham

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18
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20 _____ By _____
21 Clerk Mayor

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23 (Seal) _____ Town of Chapel Hill

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30 (Seal) _____ Town of Carrboro

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37 (Seal) _____ Town of Hillsborough

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44 (Seal) _____ County of Durham

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Clerk By _____
Chair

(Seal) _____
County of Orange

Clerk By _____
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(Seal) _____
County of Chatham

Clerk By _____
Chair

(Seal) _____
Triangle Transit

Clerk By _____
Chair

(Seal) _____
North Carolina Department of
Transportation

By _____
Secretary

Comment [BE68]: Signature lines will be on separate pages in the final MOU for easier execution.

March 12, 2014

Dear DCHC MPO Member Government Managers:

In November 2013, the Durham-Chapel Hill-Carrboro Metropolitan Planning Organization (DCHC MPO) sent you a request to approve our updated Memorandum of Understanding (MOU). We appreciate you and your staffs' attention to this request. All of our member governments except for NCDOT considered this request and several boards approved the MOU. (NCDOT elected to wait until all other members have approved the MOU before considering it.)

A few jurisdictions requested that additional changes be made to the MOU. The DCHC MPO's Board considered these requests at its March 12, 2014 meeting and voted to endorse a revised MOU for execution. All of these changes are very minor to correct errors or to increase the clarity of the language in the MOU. The changes are:

- Page 1: Updated date of endorsement of the MOU by the MPO Board
- Page 1 and 2: Wrote out the acronyms for Transportation Improvement Program and Metropolitan Planning Organization for clarity.
- Page 3: Added Triangle Transit's full legal name in Section I to correct an inadvertent error.
- Page 3: Added the word policy before boards for clarity.
- Page 6: Revised the language defining the quorum for the MPO Board for clarity.
- Page 10: Added a sentence to indicate that, similar to all member governments, Triangle Transit also has the option to voluntarily contribute funding for special studies or services. While the previous language did not preclude this option, the added sentence makes it clearer that Triangle Transit may contribute if mutually agreed upon.
- Page 11: Changed to have the Mayor execute the agreement for the City of Durham.

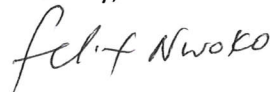
The DCHC MPO requests that you execute this revised MOU. We believe that these changes are all minor and do not substantially change the meaning of the MOU. For the member governments that have already approved the MOU, we defer to your staffs' judgment and internal review procedures to determine if you need to seek re-approval of the MOU by your board or if your previous approval suffices.

Attached to this letter are a clean copy of the final MOU and a marked copy of the final MOU. In the marked copy, the comments indicate all of the changes between the DCHC MPO's MOU from 1994 and the final MOU. The comments that are highlighted in yellow indicate the minor changes made between the MOU sent to you in November and the final MOU.

We request that you approve and execute the final MOU by June 12, 2014. Please send us a signed copy of the MOU. The signature pages have been separated by jurisdiction so MPO staff can combine the signed pages for the final document. An electronic scan of the final MOU will be transmitted back to you. If you require an original signed copy of the MOU, please contact us immediately to make this arrangement.

MPO staff members are available to meet and discuss this document with you and can assist with any necessary presentation of the document to staff or governing boards. Please contact Felix Nwoko at felix.nwoko@durhamnc.gov or 919-560-4366 x 36424 with any questions or to schedule a meeting.

Sincerely,

A handwritten signature in cursive script that reads "Felix Nwoko".

Felix Nwoko
Planning Manager

cc: DCHC MPO TCC Members



Town of Carrboro

Town Hall
301 W. Main St.
Carrboro, NC 27510

Legislation Text

File #: 14-0084, **Version:** 1

TITLE:

Report on the Planning Board's Community Zoning Conversations

PURPOSE: The purpose of this agenda item is to provide the Board of Aldermen with a report on the Planning Board's "Community Zoning Conversations" outreach program held in October of 2013.

DEPARTMENT: Planning

CONTACT INFORMATION: Bethany Chaney - 919-306-4346, Christina Moon - 919-918-7325

INFORMATION: Encouraged by the success of the 2012 program on affordable housing, the Planning Board voted to hold another series of three dialogue sessions in recognition of community planning month in October of 2013. The 2013 program, entitled Community Zoning Conversations, was designed to help citizens gain a better understanding of the role of zoning as land use planning tool as well as how and when to participate in the process. With assistance from some of the other advisory boards, mainly-the Economic Sustainability Commission, Transportation Advisory Board and Environmental Advisory Board-- the Planning Board held three outreach sessions: October 10th, October 15th and October 30th.

Information from those sessions can be found at the following link:

<http://www.townofcarrboro.org/PZI/CommunityConversationZoning.htm> .

The three programs focused on different areas within the Town's planning jurisdiction to provide real-life examples of various development scenarios and to better illustrate the applicability of different zoning mechanisms for different applications. Each program included a brief overview or primer on the basic concepts of zoning, a group exercise and a panel discussion to summary lessons learned. Approximately twenty-four participants attended each event.

Subsequent to the October events, the Planning Board outreach subcommittee prepared a draft report on its findings and shared the report with the full Planning Board and later with the other advisory boards for reflection and refinement. The Planning Board requested an opportunity to share these findings with the Board of the Aldermen. A resolution receiving the Planning Board's report is provided as Attachment A; a copy of the final report is included as Attachment B.

FISCAL & STAFF IMPACT: None associated with receiving this report.

RECOMMENDATION: Staff recommends that the Board of Aldermen consider the resolution to receive the report (*Attachment A*).

**A RESOLUTION RECEIVING THE PLANNING BOARD'S REPORT, "CARRBORO
COMMUNITY ZONING CONVERSATIONS: RESULTS AND RECOMMENDATIONS"**

WHEREAS, an outreach committee of the Town of Carrboro Planning Board sponsored a series of three dialogue sessions on zoning held during the month of October, 2013; and

WHEREAS, the Chair of the Planning Board presented a report on the Planning Board's 2013 dialogue sessions on zoning.

NOW, THEREFORE, BE IT RESOLVED by the Carrboro Board of Aldermen that the Board receives the report.

This is the 18th day of March in the year 2014.

Carrboro Community Zoning Conversations: Results and Recommendations



A report to the Board of Aldermen from the Carrboro Planning Board
with input from the EAB, ESC and TAB

March, 2014

Summary

In October 2013, the Planning Board hosted its second annual observance of National Community Planning Month, aimed at encouraging residents to learn about and engage with important planning issues. With an eye toward a number of major projects in the development review pipeline that require rezoning or conditional use rezoning applications, the Planning Board opted for a series of Community Zoning Conversations, each focused on a different part of Carrboro:

- Changing the Landscape: Subdivisions in Carrboro explored primarily residential, suburban areas of the community. (October 10th, Carrboro Town Hall)
- Mills, Malls and Mini Marts in Carrboro evaluated the possibilities for commercial growth outside of downtown in predominantly residential areas. (October 15th, McDougle Middle School)
- A Downtown Destination focused on what is needed to support a healthy, vibrant core downtown. (October 30th, 7 pm, The Arts Center)

In addition to exploring specific issues in these three areas of town, the series was designed to help people understand the basics of zoning, including the application process, permissible uses, and ways zoning can support or conflict with the community's vision and needs. An important goal for the Planning Board, as well as Aldermen and staff in attendance, was to better understand how residents and business owners envision their neighborhoods, and how well these neighborhoods connect and relate to the rest of the town.

Each session included a presentation and discussion about zoning history and concepts; an interactive small group exercise (sample attached); and facilitated discussion. Content was enhanced with each successive event, and included the following topics:

- Typical zoning requirements
- Carrboro's zoning map and table of permissible uses
- Plans and ordinances related to zoning (comprehensive plans, vision documents.)
- Legislative and quasi-judicial zoning decisions
- Definition and role of evidence in quasi-judicial decisions
- Conditional use standards and districts
- Conditional zoning
- Community participation in legislative versus quasi-judicial processes
- Annexation
- Extraterritorial planning jurisdictions
- Special districts and other tools commonly used in downtown areas

Agendas, presentation handouts, session notes, evaluation summaries, and two session videos are posted on the Town's website.

Turnout was modest but engaged, with 53 individuals attending at least one session and an average 24 people attending each night. Participants included neighborhood residents, business owners, architects and planners, students, representatives from the Chapel Hill-Carrboro Chamber of Commerce, Chapel Hill Transit and OWASA, and town staff, advisory board members and aldermen. Participants actively contributed to the small group exercises and larger conversations, and offered positive and constructive evaluations that will improve Planning Board outreach sessions in the future.



Critical support for the series was provided by Adam Lovelady, Assistant Professor of Public Administration and Government at the UNC School of Government, who presented information about the concept, application, and legal issues related to zoning; Trish McGuire, Planning Director, and Tina Moon, Planning Administrator, both of whom offered research, content and other guidance; and Jane Tuohey, Administrative Assistant, who coordinated logistics throughout the series. Dan Jewell, architect with Coulter Jewell Thames, P.A.; Leo Gaev, owner of Leo Gaev Metalworks; Marty Roupe, Development Review Administrator; and Annette Stone, Community and Economic Development Director, served as panelists during one or more of the conversations. The ArtsCenter generously provided space free of charge for the final event.

What follows is a summary of key themes, lessons and concerns raised by conversation participants, as well as a limited set of recommendations to the Board of Aldermen related to zoning process, community education and engagement.

Key Themes and Lessons

Thanks in part to skilled facilitation, event discussions gave rise to a number of powerful themes. These can be grouped into two broad categories.

- Challenges residents face when attempting to negotiate the zoning process, especially related to a particular development.
- Tensions inherent in zoning: the need to balance competing uses, priorities and interests.

Challenges for Residents

Participants in the first two outreach events, which focused on zoning in residential areas, came seeking information that would allow them to join a zoning process at the right time and in the right ways. They noted a number of hurdles to public participation:

- Zoning terms and town regulations are difficult to decipher. The technical jargon often associated with zoning can be confusing, and the dense land use ordinance provides little guidance for the layperson.
- There is confusion about the difference between quasi-judicial and legislative decision-making. Aspects of the quasi-judicial process, especially rules pertaining to ex parte communication and heightened evidentiary standards, create uncertainty and a sense of disempowerment. For example, residents may not know or understand the prohibition against local officials talking to one side only. As a result, when letters and e-mails to the Board of Aldermen about a proposed development application fail to elicit an acknowledgement or a reply, residents feel they are not being heard. Similarly, residents who want to speak at a quasi-judicial hearing can be frustrated when the requirement for 'evidence' means their input is devalued.
- There is an "information gap," as one participant termed it, between stakeholders. Different stakeholders are privy to different information about development projects and the zoning process, and community members feel they know the least.
- For people not already involved in community politics or advocacy groups, it can be intimidating when considering how to address one's concerns, and confusing as to the most effective and appropriate forum in which to do so.

Some participants described a perception that the town, inadvertently or not, favors developers in the rezoning process. One participant commented that neighbors affected by rezoning seem to “get less time” with planning department staff than the applicants for rezoning. This leads to a view that the town is helping the developer, which enters the process proactively, more than it is helping neighborhood residents, who generally enter the process reactively.

Others felt the developer has the upper hand, regardless of the town’s involvement, because of their sheer access to information and resources. For example, one participant noted that the developer seems to control the timing of the community engagement process. The point at which neighbors are engaged, this participant pointed out, can affect the community response, the tone of the discussion, and the outcome. Another participant noted that the perceived imbalance between developers and residents was exacerbated by the cost of development in Carrboro. Only the “big guys” can afford the significant expense entailed by development, including the cost of the process itself.

Tensions Inherent in Zoning

The third outreach event examined how zoning affects economic development, with special attention paid to Carrboro’s downtown. Many participants commented on the tensions that arise when zoning is used as a tool to foster economic growth. In particular, they expressed concern that when zoning is used to support policy preferences for certain sectors of the local economy, the result can be displacement or crowding out of other kinds of businesses. For example, a zoning code designed to support the development of an arts district could drive light manufacturing--a creative industry in and of itself--from downtown. This would alter the landscape of certain downtown neighborhoods, while limiting the types of jobs and livelihoods available to residents within the core.

The economic impact of zoning also raised larger questions from participants:

- How does Carrboro’s zoning classification and process support and advance our values, not just our policies?



- What if those values come into conflict?
- If property becomes more valuable because of zoning and its effects, what happens to older or lower income residents or business owners?
- How can we use zoning to honor and reflect “old Carrboro” while also embracing its future?
- Can people afford to live and work here?

As they articulated these larger questions, participants strongly suggested that it may be time to reevaluate Carrboro’s land use ordinance to ensure it is aligned with a clear strategy for economic growth. In this way, the town will be better equipped to balance the interests of individuals, neighborhoods and the town overall.

Recommendations

Planning and zoning decisions have real consequences when it comes to bridging economic development goals with community visions and values. What Carrboro becomes in five or twenty years is based not only on economic development policy, but on its zoning code. The zoning conversations suggest that Carrboro has an important opportunity to foster an approach to zoning that aligns with its vision: protecting what is cherished while preparing for the future needs of those who will live, work and play in Carrboro. The ability for residents to engage in meaningful dialogue around zoning and development priorities, and to do so on more equally informed footing with owners and developers, should be part of this approach.

Community members from the outlying suburbs to those working and living downtown have made it clear that they wish to be empowered decision-makers in and contributors to town planning. Participants offered some good ideas to reduce barriers to the process while encouraging a balanced approach that ensures visions and decisions are closely aligned:

- Develop information geared toward the average resident that describes the zoning classification(s) and permissible uses in their neighborhood. Mail this information once to all residents, to newcomers, and to residents within a certain distance from a proposed development. This information should be easily categorized and accessible on the Town’s website.
- Develop an on-line primer for community residents seeking to engage in zoning and other project-related decision-making, including a “roadmap” for legislative and quasi-judicial processes, clear contact information, and a guide for effectively making one’s

voice heard. This resource could be a particularly useful springboard for neighbors who seek to organize and represent an effective, collective voice to the town.

- As the town moves forward on its website redesign, create an interactive zoning and planning page that:
 - Helps residents and developers understand the link between zoning classifications and Carrboro's Vision 2020 statement.
 - Archives past projects and identifies where current and proposed development or zoning applications are in the pipeline.
 - Enables people to comment on a current or proposed development and/or zoning application and to have their comments included and acknowledged as part of the decision-making process. Perhaps it would be most constructive to require commenters to provide their name and address and to make comments invisible to the open web. This would encourage informative, constructive discussion, while also mitigating the combative nature typical of online comments sections.
 - Includes a "What matters to me?" section whereby residents may articulate the ideals that are important to them as Carrboro's zoning, planning and economic development priorities continue to evolve. This could prove quite effective as a "continuous visioning" tool and a barometer for Carrboro's decision-making.
- Rewrite portions or all of the Land Use Ordinance in plain, straightforward language, adding concrete examples that the average user and the expert alike can understand and put to use. Minimize jargon and "legalese," and explain in direct terms how zoning may affect property owners, residents, individuals, businesses and neighborhoods.
- Improve protocols for directing and responding to resident concerns about zoning and planning issues. Provide clearer on-line guidance to residents about "go to" staff for particular issues or development applications, or assign a staff person to play the role of community ombudsman. In the case of quasi-judicial matters, develop a policy that both encourages and enables Aldermen to acknowledge resident communication while complying with the law regarding ex parte communication. Both listening and responding to the voices of the community are important for residents to feel they are an authentic part of the process.
- Improve not only the means of conversation and community input, but the quality of it as well. Suggestions from participants included:

- Incentivizing zoning/development applicants to have higher-quality community engagement processes.
- Convene focus group meetings in different areas of Carrboro, and brainstorm together how to better empower our diverse residents to share their respective interests.
- Develop better tools and connections to facilitate neighborhood-Town contact. Homeowners associations do not exist in all neighborhoods, and are not relevant to all neighbors.

The bottom line is that continuing to invest in town planning processes is important, and this investment must include better tools for active listening and proactive planning that considers the multifaceted relationships between public and private interests.

Conclusion

The Planning Board is keenly aware of how difficult it can be to engage a large cross-section of Carrboro. While we sincerely appreciated the attendance and contribution of those present at our zoning conversations, we struggled with how to do a better job of drawing interest from a wider swath of the community. While providing new and easier tools to engage is vital, the key is to make sure these tools are relevant to diverse neighborhoods and across social, economic and other demographic bounds.



We know our neighbors have vision and ideas. They are spoken on porches or in backyard cookouts; between business owners; at community gathering spots, restaurants and bars; at the farmer's market; between faith congregations; between parents and children at school and in the park; at the bus stop; and at meetings between board members, developers, and municipal employees. Perhaps it is time to revisit Carrboro's Vision 2020 and test whether the vision it articulates still reflects these diverse voices in the context of current zoning, planning and economic development decision-making. A renewed vision and investment in community engagement will ensure that Carrboro can best utilize zoning and other planning tools to shape a healthy, vibrant and inclusive future.

Attachment

Mills, Malls and Mini Marts in Carrboro Small Group Exercise

- **Objective:** Participants will make decisions about commercial growth in a largely rural part of town.
- **The Lot and Zone:**
 - Lot size is 2.5 acres, zoned for residential, and is currently undeveloped (including no water/sewer tap).
 - Under this zone, minimum lot size for any development is .5 acre. This means a maximum of five single-family homes can be built on this lot. An exception is if one affordable unit is built, in which case you will win a density bonus, allowing you to build 6 houses.
 - A residential development of more than 4 lots is considered a major subdivision. To build a major subdivision in this zone requires a special use permit, but not a rezoning.
- **The Scenario:**
 - Potential buyers of this property are developers who would like to construct a convenience store and gas station.
 - The zone currently does not allow for this type of land use, so a proposal would need to be submitted to the Town of Carrboro for a conditional use rezoning, requiring a public hearing.
- Land Use and Other Concerns:
 - Setbacks
 - Screening
 - Lighting
 - Parking spaces required for commercial
 - Open space requirements for residential
 - Right of way access to road
 - Adjacent conservation area is downstream from the property
 - Two story limitation on homes **and** commercial buildings
 - Storage of hazardous materials
 - No water/sewer currently in place
 - Not on public transportation line
- Initial Task:
 - Count off by two.
 - Split into your two groups

- Group leader passes out assignments for each group
- Each group takes 10 minutes to review their assignments before joining their full group

Group 1—Buyer-Developers

Scenario: You have purchased an expensive 2.5 acre lot in a rural area on the edge of Carrboro’s town limits. You know there is pent up demand for consumer goods and other critical services in this area, particularly as people who live in adjacent towns and counties travel past this lot on their way to work at the hospital and university in Chapel Hill. You prefer to build a convenience store and gas station, and you have a potential lessor already lined up. You stand to gain a significant amount of income from the long-term lease, given the pent-up demand. Water and sewer hook-up for this kind of business would be a minimal expense, and the lot would not require subdividing.

This purpose will require a rezoning of the property, which would lead to a public hearing. You have a choice to propose a general rezoning to a commercial zone that includes these purposes, or to propose a conditional rezoning.

You anticipate resistance from the neighbors no matter what you choose, as there is a conservation area adjacent to the property and a gas station will set a precedent for commercial development in the area. They may show a preference for residential. To build a residential subdivision, you will have to subdivide the lot and get a special use permit, as well as meet other land use ordinances that require open space and buffers. Your upfront costs would be higher because of multiple water and sewer taps, as well as county impact fees. You may be able to recoup these costs upon sale of the property, but the market is still soft.

Step 1: Please convene with your group for about ten minutes to discuss this scenario. Consider the following questions:

- How will you position your proposal with the neighbors to ensure the least resistance to your idea?
- What is your rezoning strategy—general or conditional?
- Are you willing to make concessions about the kind of commercial development you will build? Would you consider building “up” (two stories) for a truly multi-use property? Would your lessor want that?
- Is residential an option for you, and if so, what are your parameters?

Step 2: Reconvene with Group 2, the neighbors. You will lead off the discussion by presenting your preferred option in whatever way you see fit. For the next 20 minutes, attempt to form a consensus with the neighbors and get what you need and want from your planned investment. You will use a plot map provided and props to demonstrate what you want to build, and where.

Group 2—Area Residents

Scenario: A developer has purchased an expensive 2.5 acre lot in your rural area, which is on the edge of Carrboro's town limits. The developer would like to build a convenience store and gas station on the lot to satisfy the pent up demand for consumer goods and other critical services in this area. People who live in adjacent towns and counties travel past this lot on their way to work at the hospital and university in Chapel Hill. This commercial purpose will require a rezoning of the property by means of a public hearing. The lot is currently zoned residential.

There is no public transportation in your area, and traffic is a problem in the mornings and evenings. Any development on that lot will stress water and sewer infrastructure. The lot also is adjacent to a conservation area. You and your neighbors drive some distance to get gas and basic food items now, and you are considering whether you want these services any closer to you. On the other hand, the developer could build houses there, which would increase traffic and encourage additional subdivision of larger lots down the road.

Step 1: Please convene with your group for about ten minutes to discuss this scenario. Consider the following questions:

- Are you willing to have the lot rezoned for commercial purposes? What about specifically for a gas station and convenience store?
- If you were to agree to commercial rezoning, what are your ideal parameters? Are there other kinds of businesses or services you would like to see on that parcel? Would you be opposed to a two story building instead of one?
- Are there public service needs you feel have to be a condition of this development?
- Is a residential development an option for you, and if so, what are your parameters?

Step 2: Reconvene with Group 1, the buyer-developers. They will lead off the discussion by presenting their preferred option for the development. For the next 20 minutes, attempt to form a consensus with the buyer-developers and get what you need and want for your neighborhood. There will be a plot map provided and props that will enable you to offer alternatives to the proposed build-out.

Key to the Props

Color/Material/Shapes	Symbolizes
Green pipe cleaners	Trees/Screening. Mandatory for commercial development on lot lines adjacent to housing.
Orange rectangles	Setbacks. Must be placed on perimeter of all property lines. You cannot build within this zone, but you may place right of ways within this zone.
Black square	Parking lot—must use for commercial
Black rectangles and various shapes	Right of way. Must be provided adequately for each commercial or residential unit.
Red paper	Gas pumps. Must use both for commercial
Yellow paper	Lighting. Must be adequate for the use.
Brown paper with skulls	Gas tanks. Must use all three.
Blocks	Buildings. Stack for two stories.



Town of Carrboro

Town Hall
301 W. Main St.
Carrboro, NC 27510

Legislation Text

File #: 14-0079, **Version:** 1

TITLE:

Update on Stormwater Volume Control Requirement

PURPOSE: The purpose of this item is to provide an update regarding implementation of a stormwater volume requirement in the Land Use Ordinance.

DEPARTMENT: Planning

CONTACT INFORMATION: Randy Dodd (919) 918-7326

INFORMATION: The Town's Land Use Ordinance (LUO) includes provisions for stormwater management to address peak runoff, water quality (as measured by total suspended solids and nitrogen and phosphorus), drawdown rates, and other stormwater management aspects. In addition, in 2012, the Town added a provision to regulate the total volume of stormwater runoff from a site. Increases in the total volume of runoff associated with new development results in environmental impacts such as decreased groundwater recharge and increased stream channel instability/erosion. A technical amendment to the provision was added in 2013 to recognize State changes with calculating total stormwater volume. Staff have compiled results of total stormwater volume calculations, which are included in an attached staff memo.

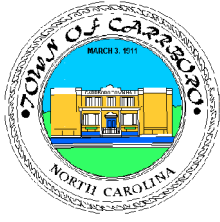
FISCAL & STAFF IMPACT: There is no fiscal or staff impact associated with this update.

RECOMMENDATION: Staff recommends that the Board receive the staff update.

A RESOLUTION RECEIVING A STAFF UPDATE REGARDING STORMWATER PROVISIONS
IN THE LAND USE ORDINANCE

WHEREAS, the Carrboro Land Use Ordinance was amended in 2012 with a provision limiting the volume of permissible stormwater volume that runs off a developed site that provides additional protection for groundwater resources and the stability of stream channels.

NOW, THEREFORE, The Board of Aldermen of the Town of Carrboro receives the staff update discussing this ordinance provision and staff experience with its implementation.



TOWN OF CARRBORO

NORTH CAROLINA

TRANSMITTAL

PLANNING DEPARTMENT

DELIVERED VIA: *HAND* *MAIL* *FAX* *EMAIL*

To: Mayor and Board of Aldermen
David Andrews, Town Manager
Patricia McGuire, Planning Director
Christina Moon, Planning Administrator

From: Randy Dodd, Environmental Planner

Cc: Martin Roupe, Development Review Administrator
Henry Wells, Sungate Engineering

Date: March 12, 2014

Subject: Update on Stormwater Volume Control for New Development

Background and Summary

The Town's Land Use Ordinance (LUO) includes provisions for stormwater management to address peak runoff, water quality (as measured by total suspended solids and nitrogen and phosphorus), drawdown rates, and other stormwater management aspects. In addition, the Town amended the ordinance in 2012 to include explicit provisions regulating the total volume of stormwater runoff from a site. The Town adopted a technical amendment in 2013 to include updated State provisions for recognizing the impact of permeable pavement on stormwater volume. Increases in the total volume of runoff associated with new development results in environmental impacts such as decreased groundwater recharge and increased stream channel instability/erosion. Information is presented in this memo to provide an update on staff experience in implementing the total stormwater runoff volume provision.

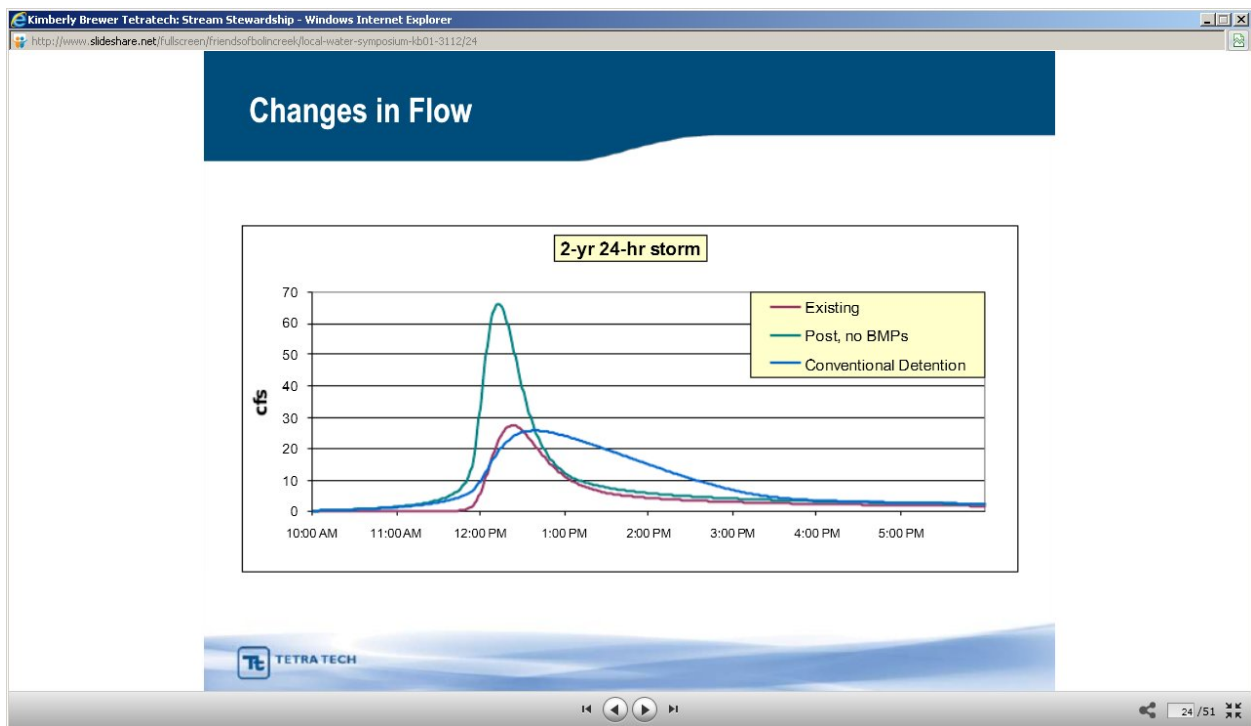
Information

Why is Total Stormwater Volume Control Important?

Both Bolin Creek and Morgan Creek have been recognized by the North Carolina Division of Water Quality as impaired. Multiple studies undertaken by the State and the Bolin Creek Watershed Restoration Team have identified stormwater quantity as a significant stressor to local creeks. Recent benthic macroinvertebrate monitoring undertaken by the Town has indicated that Bolin Creek remains stressed, with signs of additional stress associated with decreased baseflow.

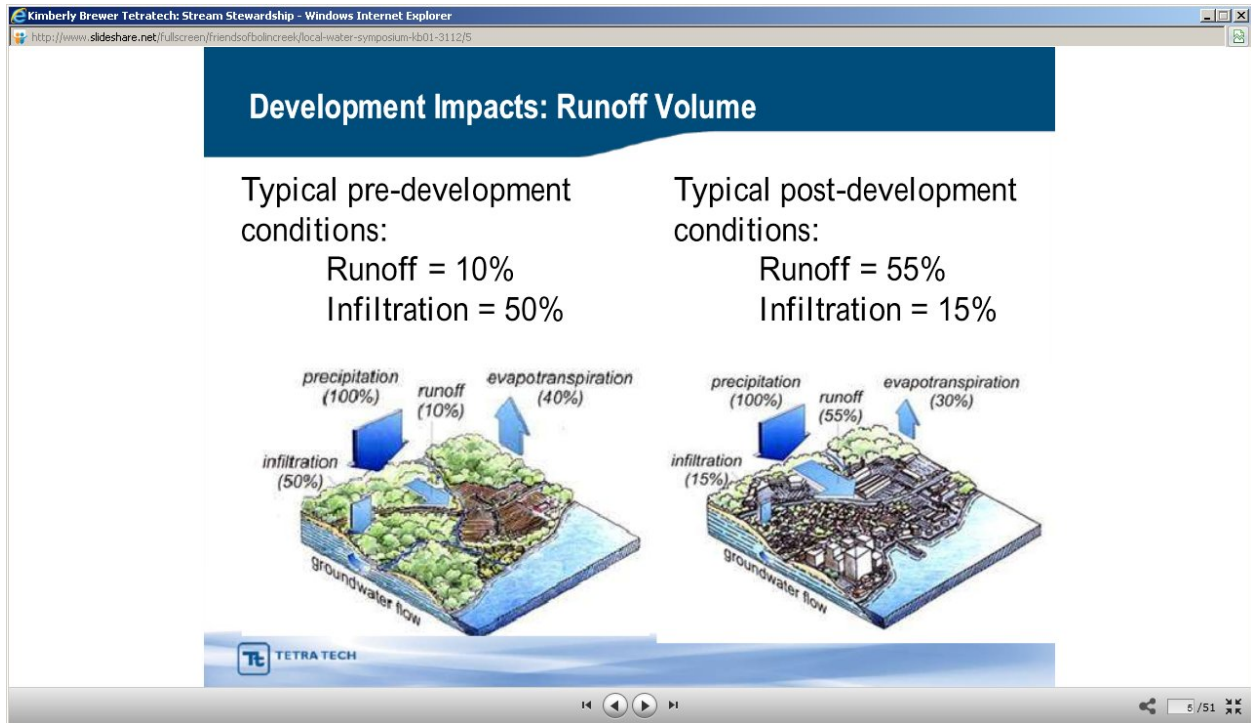
Carrboro’s current ordinance provisions address stormwater volume in that treatment of stormwater peak flow is required for the 1 through 25-year recurrence interval 24-hour design storms. In addition, water quality treatment is required for the first inch of rain during a storm event. Storm storage volume is required to be drawn down in 2 to 5 days after rain events to allow for capture of subsequent storms. These requirements provide water quantity control to minimize flooding and water quality treatment. However, these requirements do not fully mitigate stormwater impacts associated with decreases in groundwater recharge and increases in streambank erosion. As stormwater is released in the hours and several days after a storm event, this runoff is not available to replenish groundwater supplies. In addition, controlling volume for flood protection does not provide maximum protection for stream banks since the critical flow for protecting stream banks (at and approaching “bankfull” flow) is not explicitly regulated. Practices that do not intentionally address the total volume of stormwater generated can therefore result in impacts to stream channels from more frequent flows at erosive levels. Figure 1 graphically indicates how peak flow can be maintained after development, but with a substantial increase in the total volume of runoff relative to pre-development.

Figure 1: Illustrative Pre and Post Hydrographs Indicating Runoff for Pre-Development and Post Development With and Without BMPs to address Peak Flow (Source: Kimberly Brewer, 2012 Local Creek Symposium at NC Botanical Garden)



A typical impact for a developing urban environment is illustrated in Figure 2. Historically, urban needs around transportation infrastructure and the built environment have resulted in dedication of significant portions of the landscape to intentionally impervious features. In addition, development can often compromise or reduce infiltration capacity through impacts on soil quality and permeability. In this typical scenario, the proportions of rainfall that runs off and infiltrates are essentially reversed before and after development.

Figure 2: A Comparison of Pre and Post Runoff (Typical) (Source: (Source: Kimberly Brewer, 2012 Local Creek Symposium at NC Botanical Garden)



The concept of total stormwater volume control, also being referred to more and more as “runoff reduction”, marks an important philosophical milestone that is helping define the next generation of stormwater design. The intention of runoff reduction is that the benefits go beyond flood protection and water quality improvement. If site and stormwater designs can successfully implement runoff reduction strategies, then they will do a better job at replicating a more natural (or pre-development) hydrologic condition. This goes beyond peak rate control to address total runoff volume, duration, velocity, frequency, groundwater recharge, and protection of stream channels. The field of stormwater management is actively involved in integrating the runoff reduction concept with stormwater requirements to create stormwater criteria that can be presented in a unified approach. This concept is also significantly challenging in areas such as Carrboro where the native soils are generally not as well drained as Coastal Plain or Sandhill soils and infiltration of stormwater is difficult to achieve.

What Stormwater Management Approaches Are Available to Reduce Runoff?

One way of categorizing approaches to runoff reduction is as “nonstructural” versus “structural”. A similar presentation is via approaches that are more planning oriented and more engineering oriented. Nonstructural/planning approaches attempt to reduce runoff via methods that minimize unnecessary or unwise disturbance that increases runoff whereas structural methods attempt to treat and manage runoff resulting from disturbance. Structural practices have for years been known as “Best Management Practices” (BMPs). The effectiveness of these practices in reducing overall runoff is beginning to be captured in guidance and planning tools for stormwater management, as depicted in the following table.

Table 1 (Source: Hirschmann et al; NCSU & NCDENR, 2011)

Runoff Reduction % for various BMPs (relative to no treatment)		
Practice	Virginia*	JFLSAT** (NC Piedmont)
Green Roof	45 to 60%	50
Rooftop Disconnection	25 to 50%	NA
Raintanks and Cisterns	40%	User defined
Permeable Pavement	45 to 75%	0-90%
Grass Channel	10 to 20%	0
Bioretention	40 to 80%	35-50%
Dry Swale	40 to 60%	
Wet Swale	0	
Infiltration	50 to 90%	NA
ED Pond	0 to 15%	0
Soil Amendments	50 to 75%	NA
Sheetflow to Open Space	50 to 75%	40
Filtering Practice	0	5
Constructed Wetland	0	20
Wet Pond	0	10

* Virginia statewide technical provisions

* Jordan/Falls Lake Stormwater Accounting Tool (JFLSAT) assumptions

The above table references a stormwater regulatory tool recently developed to support implementation of new development requirements in the Jordan Lake Rules. While its use focuses on regulation of nitrogen and phosphorus, the calculation for nutrient loading (in lb/ac/yr) requires the calculation of total annual runoff volume. It is noteworthy in implementing the stormwater volume or runoff reduction provisions in the Town’s ordinance and the timing in parallel with implementation of new development provisions for nitrogen and phosphorus per the Jordan Lake Rules that the rules allow for “offset payments”. Experience to date with the accounting tool indicates that compliance with the Town’s existing water quality treatment provisions for total suspended solids are resulting in many new developments being able to comply with the new Jordan Lake nutrient rules simply via an offset payment with little or no additional onsite treatment beyond

what is required in the ordinance for TSS treatment. This underscores that the volume control/runoff reduction component in the ordinance provides additional protection for local waterways not provided via the Jordan Lake new development provisions. A final point regarding State approaches for stormwater regulation is that new State guidelines for permeable pavement were adopted in 2012 that result in additional volume control credits for this technique. Previously, the Jordan Lake Accounting Tool assumed no credit for volume control for permeable pavement. The new credits can result in up to 90% volume credit for the area treated by the permeable pavement, with 80-85% credit being likely for application in Carrboro. The credit is variable based on the soil type and whether the permeable pavement is designed as “infiltrating” or “detention”.

Carrboro’s Ordinance Provision for Stormwater Volume

“No impact” development given Carrboro’s zoning and policies is not in a literal sense feasible when it comes to maintaining total runoff at predevelopment conditions; the ordinance attempts to provide a transparent performance standard for achieving “low impact” development, and is based on the principals and concepts discussed above. The ordinance explicitly quantifies the deviation in stormwater volume from the preexisting condition that is deemed acceptable, and uses the Jordan Lake Accounting Tool (in addition to curve numbers) to calculate annual (and not design event) stormwater volume. The JFLSAT uses the Simple Method (a standard runoff calculation method approved in the NCDWQ BMP Manual). The ordinance specifically states that the post-development total annual stormwater runoff volume shall not exceed the predevelopment volume by more than the limits set forth in the following table.

Table 2: Carrboro’s Allowable Increase in Stormwater Volume

Preexisting Composite Curve Number*	Maximum allowable increase in annual stormwater runoff volume
>= 78	50%
70-78	100%
64-70	200%
<=64	400%

*see appendix for more information on the composite curve number

The ordinance provision assesses compliance during the pre-development/permitting stage based on a composite curve number for the development site using the runoff curve number method described in USDA Technical NRCS Technical Release 55, Urban Hydrology for Small Watersheds (June, 1986) (see appendix for more information on curve number calculation).

On June 26, 2012 the Board of Aldermen adopted these new volume control provisions to the stormwater management requirements in Section 15-263 of the Land Use Ordinance (LUO) to regulate the total volume of stormwater runoff from a site. At that time, it was noted that refinements may be warranted as staff and others gained experience with the Jordan Lake accounting tool (JFLSAT) and the application of the requirements to specific projects/designs. In addition and as mentioned above, NCDWQ had not yet established the JFLSAT credit for permeable pavement. In early 2013, staff received information from the NCDWQ regarding State guidance on stormwater volume control credits for permeable pavement, and prepared a draft ordinance update recognizing the credits which was approved in February, 2013. At that time, staff also changed the development submittal checklist to require applicants to conduct some field work, in particular, soils testing and a determination of the water table height, prior to land use permit approval.

The intent of the stormwater volume ordinance is to establish a specific “not to exceed” maximum annual volume increase. In addition, utilizing the JFLSAT means that a separate set of calculations do not have to be completed to address the ordinance requirement. The thresholds for % increase have been set based on judgment from application of the tool for sites with development applications. The minimum curve number value (64) included in the table is based on the NCDWQ BMP Manual which states “if the composite CN is equal to or below 64, assume that there is no runoff resulting from either the 1 or 1½ inch storm”. Other threshold values are based on review of the information in the appendix. Note that while the thresholds are based on careful review, they are not seen as “absolute”. Staff envision that these thresholds can and should be reviewed as experience grows with implementing the Jordan Lake rules and using the accounting tool. The experience to date is discussed below.

Experience From Applying the JFLSAT and Volume Control Ordinance Requirements

How any given development application considers volume/runoff reduction depends on the site and the applicant’s design goals. Over time, it is likely that a combination of approaches will be employed for many projects that include additional and/or larger stormwater structural measures, greater reliance on structural practices that are more beneficial for runoff reduction, greater utilization of rainwater harvesting and reuse, and in general greater employment of LID principals and practices and reduction in impervious surfaces during the planning and design. Table 2 presents stormwater volume calculations for the 4 permitted projects and 4 other sites for which the accounting tool has been applied to study stormwater volume and the ordinance provision (Table 2).

Table 3: Annual Runoff Volume Change from Recent Applications

Project (chronological) <i>(underline: land use permit issued; italics: provision did not apply at time of permit review)</i>	Annual runoff (cubic feet) ₁		% change	Monitored % change ₂ (developed portion only)	Compliant with Ordinance
	Pre-development	Post-development (with BMPs)			
<u>Pacifica</u>	92,012	342,639	272%	408%/946%	Probably
<u>Claremont South</u>	358,883	2,112,505	489%		No
<i>Family Dollar</i>	8,416	101,541	1170%		No
CVS	147,705	179,000	34%		Yes
Claremont Phase 5 (Charter School)	124,553	320,778	158%		Yes
<u>Shelton Station</u> ₃	67,278	100,430	49%		Yes
<u>West Carr Street Apts.</u>	65,622	77,384	18%		Yes
Lloyd Property	413,466	1,433,451	247%		TBD ₄
1 from JFLSAT applications 2 (Line, WRRI, 2012) (values reported for each of two stations. <i>Note that these values are not appropriate for a regulatory interpretation since they do not represent the entire site.</i>) 3 applicant submitted CUP plans and calculations indicating that stormwater reuse for toilet flushing and irrigation would be employed in addition to BMPs shown on plans and accounted for in JFLSAT. 4 Preliminary calculation; review in process.					

It appears from this analysis that all of the applications/projects and associated stormwater management plans for which the JFLSAT has been applied appear to be in compliance with the ordinance, with the following qualifications.

- 1) The Pacifica project (built) would probably comply with this requirement as designed based on JFLSAT tool runs.
- 2) The Claremont South application would have warranted modification to comply with the stormwater volume ordinance via additional and/or different structural and/or nonstructural stormwater practices. Additional analysis is necessary to see if this requirement could have been met with stormwater management modifications alone or if some changes to other aspects of the site plan would have also been required.
- 3) The Family Dollar application would have had significant challenges in complying with this requirement. A fundamentally different site plan with less disturbance would likely have been warranted for this site to comply with this requirement. Additional/different runoff reduction stormwater management measures would also probably have to be employed, since a sand filter and detention are not effective in runoff reduction/total volume control.
- 4) The Lloyd Property application and calculations are still being reviewed.

In summary, experience with the stormwater volume provision of the ordinance has indicated that the provision (relative to other sections of the ordinance):

1. Has resulted in stormwater plans at the CUP stage that demonstrate compliance for all sites reviewed subsequent to the ordinance adoption.
2. Has resulted in stormwater management plans with additional stormwater management/Low Impact Development features for most sites.
3. Requires the most changes to stormwater management plans for currently undeveloped sites with very high intensity/percent impervious planned new development.

Recommendation

Staff recommend that the Board receive the staff report.

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- Wake County Stormwater Ordinance. Downloaded from <http://www.wakegov.com/NR/rdonlyres/84589E98-7163-4D58-8869-688341DAD390/0/newSWOrdinance.pdf>

Appendix: Curve Number Reference Information

Table 2-2a Runoff curve numbers for urban areas ^{1/}

Cover description	Average percent impervious area ^{2/}	Curve numbers for hydrologic soil group			
		A	B	C	D
<i>Fully developed urban areas (vegetation established)</i>					
Open space (lawns, parks, golf courses, cemeteries, etc.) ^{3/} :					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) ^{4/}		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
<i>Developing urban areas</i>					
Newly graded areas (pervious areas only, no vegetation) ^{5/}					
		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

¹ Average runoff condition, and $I_a = 0.2S$.

² The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.

³ CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

⁴ Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

⁵ Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

Source: NRCS, 1986

Figure 2-3 Composite CN with connected impervious area.

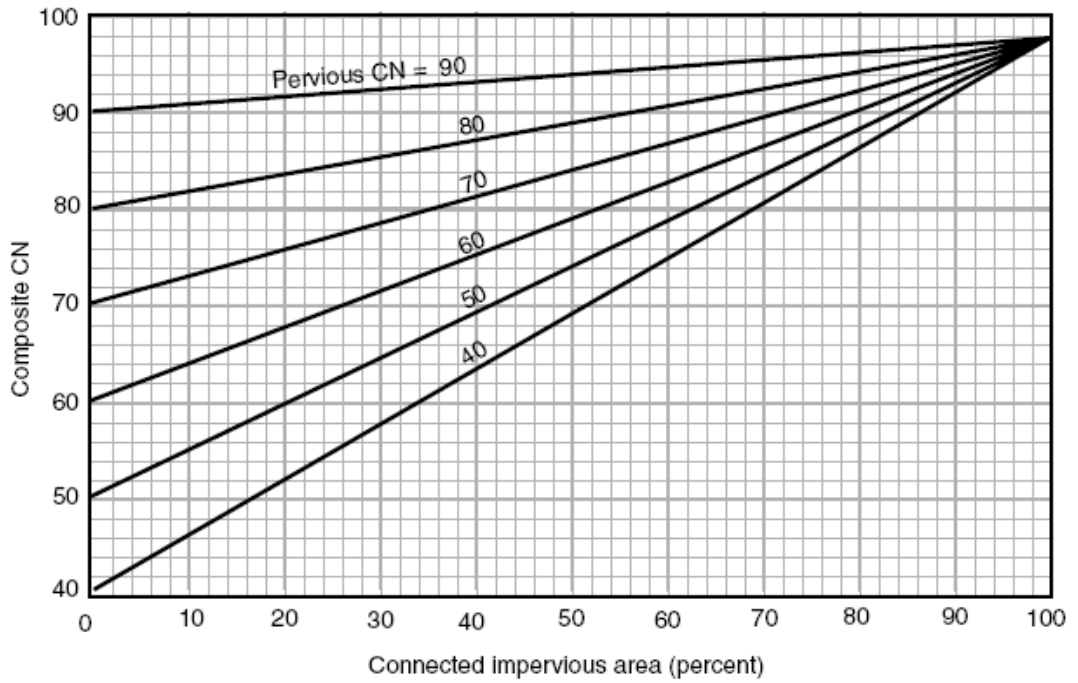
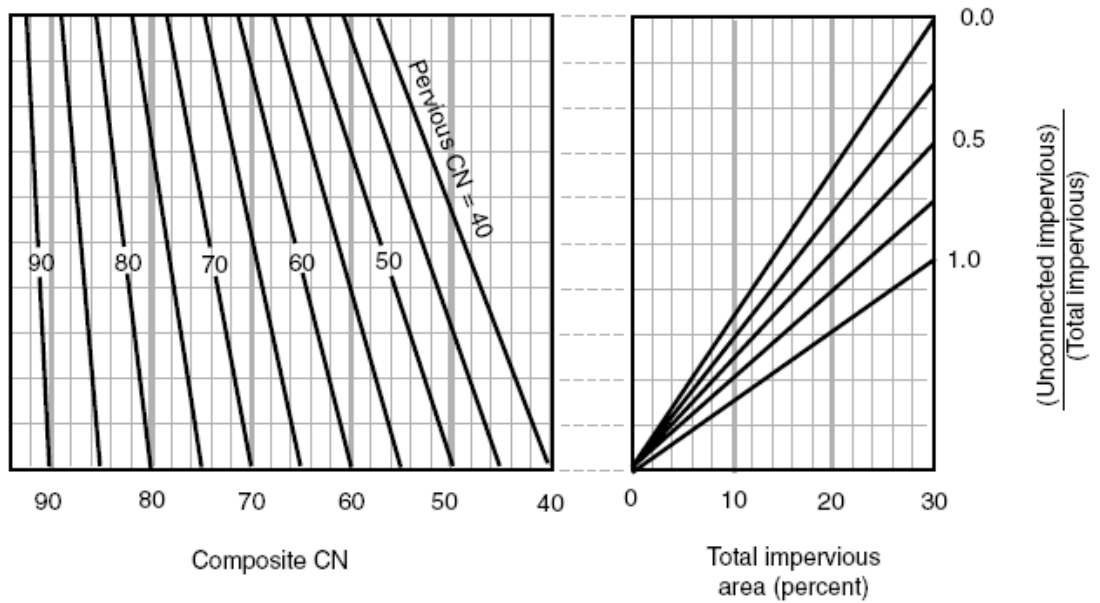


Figure 2-4 Composite CN with unconnected impervious areas and total impervious area less than 30%.



Source: NRCS, 1986