

**Carolina North  
MEETING REPORT  
November 6-8, 2006**

**Monday, November 6<sup>th</sup>**

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**3:00-5:00      Infrastructure Workshop Kick-off**

**Participants**

Curtis Brooks	Town of Chapel Hill
Dianne Bachman	UNC-FP
Meg Holton	UNC-Energy Services (W, WW, SW)
Kirk Pelland	UNC-Grounds
Ray Magyar	UNC-Public Safety
Claire Kane	UNC-Public Safety
Keith Snead	UNC-Facilities Planning
Cheryl Stout	UNC-Public Safety
Jerry Schuett	AEI
William Lowery	UNC-Cogen Systems
Brad Petterson	AEI
Masaya Konishi	UNC-Facilities Planning
Willie Scruggs	UNC-Athletics
Peter Krawchak	UNC-Facilities Planning
Cindy Shea	UNC-Sustainability
Pete Reinhardt	UNC-Environ Health & Safety
Ray DuBose	UNC-Energy Services
Jim Alty	UNC-Facilities Services
Blair Pollock	Orange County
Chris Krupinski	RK&K
Kevin Nunnery	Biohabitats
Judy Weseman	PENC
Ed Holland	OWASA
Ed Kerwin	OWASA
Mike Aitken	UNC-CH
Fran DiGiano	UNC-CH
Sue Burke	Chapel Hill
David L_____	Chapel Hill
John Masson	UNC-CN Facilities Planning
Jim McAdam	UNC-Energy Services
Walter Jochern	Sustainability
Phil Barner	Energy Services
Allen Johnson	Energy Services
Derek Poarch	Public Safety
Jim Dunlop	NCDOT
Ellen Beckmann	DCHC MPO
Dale McKeel	Town of Carrboro
Wayne Pittman	School of Pharmacy
Mike Freeman	Auxiliary Services
Mike Taylor	Town of Chapel Hill
David Bonk	Town of Chapel Hill
George Small	Town of Chapel Hill
Tim Toben	Greenbridge
Frost Rollins	Town of Chapel Hill
Mark Sobsey	UNC-Dept. ESE
Anna Wu	UNC-Facilities Planning
David Stancil	Orange County ERCO

Keith Bowers	Biohabitats
Ted Brown	Biohabitats
Ellen Miller	Stonebridge Assoc.
George Alexiou	MAB
BJ Tipton	UNC-OWRR
Linda Convissor	University Relations
Jill Coleman	UNC-Facilities Planning
Luanne Greene	ASG
Karla Aghajanian	ASG

- Group introductions
- Consultant team gave an overview of the project status and explained the purpose of the Infrastructure workshops.
- Outline of work to be done in the next three months
- Summary of dialogue from September UNC infrastructure worksession
- Questions/comments

### **5:30-7:00 Biohabitats Listening Session with Community Leaders**

#### **Participants**

Neal Flanagan	Friends of Bolin Creek
Julie McClintock	Friends of Bolin Creek
Johnny Randall	NC Botanical Garden
David Cooley	Friends of Bolin Creek
Terri Buckner	
Tony Waldrop	UNC
Loren Hintz	Chapel Hill High School
Ted Brown	Biohabitats
Kevin Nunnery	Biohabitats
Keith Bowers	Biohabitats
Kirk Pelland	UNC-Grounds
Tom Bythell	UNC-Grounds
Sharon Myers	UNC-EHS
Neil Caudle	UNC
Mary Jane Felgenhauer	UNC
Bob Berkebile	BNIM
Anna Wu	UNC
Jill Coleman	UNC-Facilities Planning
Stewart Bryan	TORC
Bill Camp	Triangle Off-Road Cyclists (TORC)
Carolyn Buckner	Friends of Bolin Creek
Randee Haven-O'Donnell	Town of Carrboro
Haven Wiley	UNC-Biology
Peter White	UNC-Biology/NC Botanical Garden
Luanne Greene	ASG
Jonathan Howes	UNC
Bruce Runberg	UNC
Blair Pollack	Lake Ellen Homeowners Assoc.
Dave Otto	Friends of Bolin Creek

#### Does the group know of any studies that have been done on the site?

- Morgan and Little Creek Plan by the State of NC
- Chapel Hill Bird Club bird counts
- Chapel Hill High School bird counts
- Smith Middle School water monitoring (data may not be usable)
- Streamwatch on Bolin Creek

- Fish studies done by UNC students downstream of site
- Creeping Cedar study
- County assessment of forests across the entire county includes site (publication- Landscape for Wildlife in Orange County)
- Salamander study by graduate student
- Local governments and Haw River Assembly water quality data-Wendy Smith, of Town of Chapel Hill, may have some of the data
- Carrboro macro-invertebrate data
- Information on Friends of Bolin Creek website-pictures of flora and also pictures of Crow Branch
  
- There is some history of the site on the Friends of Bolin Creek website also. There is an old mill site on the property, originally owned by Buck Taylor, a notable early Chapel Hill citizen. Comment that this site has been abused/disturbed by the public.

Are there any notable areas or features of the site the group would like to point out?

- Winter sparrows and woodpeckers are often sighted on property.
  - Over the past 10 years invasive plant species presence has increased notably.
  - The pond enhances site beauty and should be preserved.
  - There is a hardwood stand to the north of the pond that is very nice.
  - There is a very old hardwood stand in the northwest corner of the site.
  - There are large, mature yellow poplars to the west of the runway.
  - There are large mounds of earth to the north of the runway, of uniform size and spacing, that are visible from an interior road.
  - There are approximately 20 miles of mountain bike trails on the site that are also used by hikers and people walking their dogs.
  - An area to the north and east of the runway is not well drained and the bike trail builders avoided it.
- The open area on the west side of the site was a community garden site approximately 10 years ago.
- Crow Branch and its tributaries are a very ecologically important part of the site.
  - Suggestion that the rail line be a focus area for transit, rather than using interior site routes;
  - Bedrock prevents vertical erosion of the channel of Bolin Creek, which is increasing lateral erosion of the stream banks.
  - Vernal pools exist to the north of the west end of the runway.
  - Quite a few Indian artifacts have been found in the former community garden area.
  - Areas that were part of the former Navy runways have pioneer species vegetation that are different from the adjacent areas.
  - There are piles of organic matter north of the west end of the runway that are in and around an open area. They were placed there by the University for recycling, before the drum grinder was purchased and placed in the current lay down area.
  - The water quality in Crow Branch downstream of the pond appears to be poor, and it may be that the leachate from the old landfill is negatively affecting it.
  - The water quality in the pond is good.
  - The Carolina North tract is a very important community amenity for outdoor activities.
  - There is no data on usage, but the numbers of users is thought to be high.
  - There are not many recreational trails in the greater site area.
  - Some of the trails on the site are very old.
  - Some of the mountain bike trails on the site are well-built and some are not.
  - The mountain bike community would like to volunteer to work with the University on the trails.
  - The southeastern portion of the tract is not as recreationally attractive as other areas of the site.
  - Individual commented that they view open fields/athletic fields as greenspace.
  - The site is a very good running site, it has a rural flavor that is valuable.
  - The site needs some active management now, to maintain it and prevent degradation.
  - The deer population may become a problem as habitat surrounding the site shrinks.

- There is an opportunity to build bike trails through the site along Bolin Creek that would avoid car traffic and possibly connect to Barclay Road.
- High school students occasionally use trails across site to get to school.
- There are possibilities to link community greenways across the site, on the Craig and Adams tracts, and from Twin Creeks to the site.
- Local residents see the site as a destination for open space.
- Carolina North will provide an impetus for an off-road link between old and new campuses.

What are some changes that the group would like to see?

- Invasive plant species removal;
- Improved water quality;
- Trail design and management;
- Landfill and chemical site remediation;
- Recreational spaces-fields;
- More archaeological assessment of the site;
- Use of proper construction specifications for mountain bike trails, which are available through local bike clubs;
- Repair the channels of tributaries of Crow Branch that flow across gas line right of way;
- Stream bank restoration/stabilization where there is high trail use;
- Successfully prohibit four-wheelers from the site;
- The Little River County Park could be used as a model for good bike trail design;
- Leave standing dead trees for bird habitat;
- Deer population management;
- Wildlife inventory;
- Maintain wildlife corridor to north of Homestead Road;
- There are many different ecotypes onsite, it is complicated and needs further discussion to fully explore;

Are there any data gaps?

- Viewscape locations on the site-the feeling of isolation is valued, especially along Bolin Creek;
- Habitat Map;
- User frequency data;
- GPS mapping of bike trails;
- How much ecological work does the site do for society? How much natural capital exists onsite?
- The fewer rules, the better;
- Conservation areas need to be at least 40 acres for viable wildlife habitat presentation; Forested areas, especially mature hardwoods, are very ecologically valuable.

**Tuesday November 7th**

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**10:30-12:00 Landscape, Natural Habitat, Water Quality Work Group**

**Participants**

Ed Holland	OWASA
Judy Weseman	PENC
Jim McAdam	UNC-Energy Services
Mary Jane Felgenhauer	UNC-FP
Fran DiGiano	UNC-ESE
Meg Holton	UNC-Energy Services
Sharon Myers	UNC-EHS
Sue Burke	Chapel Hill Stormwater
Jill Coleman	UNC-Facilities Planning
Jonathan Howes	UNC-University Relations

Bruce Runberg	UNC-FP&C
Curtis Brooks	Town of Chapel Hill
Jack Evans	UNC-Carolina North
Bob Berkebile	BNIM
Anna Wu	UNC-FP
Keith Snead	UNC-FP
Tom Bythell	UNC-Grounds
Kevin Nunnery	Biohabitats
Keith Bowers	Biohabitats
Ted Brown	Biohabitats
Karla Aghajanian	ASG
Luanne Greene	ASG
Ellen Miller	Stonebridge

**Flip chart notes from session**

Notes that are italicized were more commentary than suggestions of opportunities and possibilities. They, in general, were not written on the flip charts, but are provided as part of the dialogue record.

- Integration of research and education e.g., research projects over time to evaluate new technologies and ideas.
- Use of natural systems to provide functions for campus
- Explore groundwater use for irrigation or other uses
- Reuse vs. recycle vs. xeriscape
- Need for education of users/designers, about what a sustainable landscape is, what it looks like, and how it needs to be managed. It may look different from what users are used to seeing.
- Should we expand our focus to look at a bigger region than what is shown with 2 mile radius map. Look at regional corridors for humans and wildlife to capture, consider and maintain some important open spaces and natural systems, like Duke forest, headwaters, Bolin creek.
- Orange County has a map to maintain wildlife corridors, and what about the established trails that go through this property. Wildlife shifts to neighborhoods and we need to have a corridor for them to move through this region much like we have corridors for humans
- Don't preserve the landfill and build on the trees, build on the already impacted areas. Build on brownfields and preserve greenfields to extent feasible
- Impact of Utility corridors should be carefully studied, examples of impact of steam tunnels and utility lines with tree growth. Consider utility needs and locations when considering areas suitable for building and areas targeted for conservation
- From a stormwater and water quality perspective respect natural drainage. Don't flatten out the site and then try to recreate what nature has already done. Integrate stormwater into land development process to capture uniqueness of the site. Develop a site stormwater masterplan that accounts for these considerations
- Need to develop wildlife management plan that accounts for community feelings about beavers, deer and other local wildlife that may need to be managed as development progresses

- *Carolyn – in regards to water reuse stormwater and wastewater how does this happen do they get mixed together. How are we going to decide what is the priority to which is more appropriate. Keith at this time we don't want specifics, but if this idea is to reuse either or both of these it is what we.*
- *Ted at some point we may have to do a gap analysis to see which is the higher priority measuring what we need and what its intended use.*
- *Carolyn what are the footprint of these systems what do they require, how do you keep them from being germy. Keith these are technologies. Where as concept may be use pervious surfaces to let all percolate, and then another would be capture and reuse. We should strive to capture and reuse to meet the needs of the users.*
- *MJ we should look at site provided systems first. Rainwater, reuse, irrigation, wastewater, use what you get on its way back into the ground.*
- *Jack develop a sources and uses of funds chart for these resources both for planning and education. Once these are mapped out we can then look at technologies and funding for moving these resources.*
- *Strive to capture and reuse water. Concentrate on water generated on site and looking for ways to use including capture-reuse-recycle. (potable, wastewater, irrigation/greywater all need to be considered in terms of how we account and deliver to minimize and meet needs).*
- *Expand opportunities to link education to the water cycle, many uses and bring these to the surface for more to see.*
- *Think of features of the existing landscape that we want to celebrate and enhance access to.*
- *Keith prompting for ideas about soils, landscaping, heat island affects, using site for food or fiber for the users.*
- *Question do we know enough about the needs that will go out their including open space needs?*
- *We need to get the building area we are going to building dense, but even with that density what open spaces will be required. Building sizes, type of people, population target etc.*
- *Luanne we don't know, but it is recognized that open space is valuable on the existing campus and these are a vital part of the connections.*
- *Ted, there is an active user group out there now, how do we address that uncontrolled group of uses and users. Do we want to maintain and address the open uses of this site.*
- *What are open space needs to meet uses and population needs?*
- *Design and plan space with safety in mind. Sustainable landscapes are not always safe environments.*
- *Anna, this whole development will be more dense that what we are used to with other network of site preservation areas, and what happens in the transition points*
- *Maintain viewsapes to keep sense of refuge. Transition zone design is critical.*

- Use natural area existing topo to provide sheet flow and filter functions to accommodate site runoff and larger events and minimize need for large stormwater BMPs. Our soils are not pervious they are dense clays we don't want to shift our water to our neighbors we do this well on existing campus and it is an issue.
- We need to be mindful of the timeline for this over 50 years. This will be phased. So which strategy when?
- Need to be explicit about the tradeoffs that will be coming up. For example, Some towns people have asked that we limited all buildings to 4 stories on assumption that this is the limit for effective solar power, but this hampers density goals where there is a desire to build up to preserve/conservate natural areas.
- Landfill should be explored as a developable site. Also research is needed on brownfield legislation at state level and relieving liability. Need to be classified as a new owner.
- We should not divorce the natural and the built environment. In fact they should mesh and be integrated. Need to create both localized small scale natural features at the building envelope but also larger spaces such as courtyards, arboretums etc that are designed public natural spaces. These spaces also need to have long-term maintenance of space
- Having tall buildings on part of campus is important for density goals and minimizing impervious cover footprint.
- Green roofs should be considered as technique for reduction of stormwater as well as an aesthetic that would allow a visual fabric of green as you view from higher building on to lower buildings in a tiered building sequence.
- Look at the creek as an asset in lieu of an impediment.
- Concept of outdoor rooms on existing campus. Important to intellectual climate.
- Need to include community in space and use.
- Allow natural features of site to influence building siting.
- *Keith - Existing regulations for treating stormwater, do we want to just comply with those or go beyond? Should parts of site be used for farming to support the needs of site, or some areas designated for logging.*
- What regenerative forest management can we have for alternative energy.
- Explore potential for community gardens. Is there a scale that works here? Can this be used for education?
- Create a space with more biodiversity than it has today.
- *acknowledge great thoughts boding well to for movement into future. Bob sees one thing that needs to be brought up the possibility to create an 'ecotone'. For restoring and connecting building environment and natural environment. Truth of existing site is that it is already managed and mismanaged, but that CN will have more vitality 25 years from now that today and we will have a different relationship and appreciation for nature that you have today. Perhaps leaving building into elevated area over nature. A bigger collaborative integration between natural and built.*

- *existing campus built on principles from 500 years ago and CN needs to shift to the new things we learned over the past 2 centuries for better buildings.*

**12:45-2:15 Water, Sewer, and Stormwater Systems Work Group**

**Participants**

Randy Kabrick	OWASA Board
Craig Benedict	Orange County Gov't.
Meg Holton	UNC-Energy Services (W, WW, SW)
Ed Holland	OWASA
Fran DiGiano	UNC-ESE
Judy Weseman	PENC
Sharon Myers	UNC-EHS
Sue Burke	Chapel Hill Stormwater
David Larowsky	Chapel Hill Stormwater
Ellen Miller	SAI
Jim Alty	UNC-Facilities Services
Dianne Bachman	UNC-FP
Mary Jane Felgenhauer	UNC-FP
Jonathan Howes	UNC-University Relations
Jack Evans	UNC
Ray DuBose	UNC-Energy Services
Carolyn Elfland	UNC-Campus Services
Mark Sobsey	UNC-Dept. of Env. Science & Eng.
Jim McAdam	UNC-Chilled Water
Jill Coleman	UNC-FP
Karla Aghajanian	ASG
Luanne Greene	ASG
Ellen Miller	Stonebridge

**Flip chart notes from session**

- Soil Amendments – Typically used for small scale BMPs to improve infiltration capabilities; however, consider potential opportunities for more widespread use
- Greywater is typically defined as wastewater that does not contain human waste (blackwater). Reclaimed water is water that has been collected (and treated possibly) for reuse
  - What is the potential need and benefits for treating greywater to potable water standards?
- What is the feasibility of supplying reclaimed water from the Mason Farm WWTP to Carolina North (CN)? Pumping requirements/distance may make that cost prohibitive? [OWASA has not done any official studies checking the feasibility].
- OWASA has a “skimming facility” in its CIP proposed along Bolin Creek that may be able to provide reclaimed water to the CN vicinity.
  - Approach to odor control would likely be a concern with skimming facility
- Energy input for wastewater (ww) treatment facilities (i.e. for aeration activities, etc) is important criteria for selecting system
- Membrane bioreactor treatment methods are one possible means of treatment. They have been used in facilities that have a similar to scale to CN.

- Natural systems (i.e. constructed wetlands) for treating ww should be considered. These systems typically require significant land area
- The pros and cons of a centralized ww treatment approach vs. a decentralized approach should be considered. There are believed to be examples of decentralized ww treatment systems (membrane bioreactors) used on golf course facilities
- High-Rate Stabilization Ponds (oxidation ponds) as an alternative?
  - Excavated ponds with impervious liners
  - Typically configured as a series of ponds to complete varying degrees of treatment
  - Potential source for reclaimed water?
  - Often requires a significant commitment of land area
  - Have been implemented within this climate zone
- Suggested separation between potable demands for drinking water and potential non-potable uses such as fire suppression
- OWASA identified demand estimates from previous CN studies. Using a development estimate of 8 million square feet, OWASA estimated that the water demand would be approximately 1.6 million gallon a day (mgd).
  - This estimate did not include any accounting for water conservation methods.
  - OWASA's existing infrastructure and water treatment plant (Jones Ferry) has the capability to support this demand.
- Understanding the extent of wet labs proposed for CN is important to developing alternatives for the ww treatment system
  - Acceptability of different effluent types? Are ww treatment processes capable of addressing wet lab effluent? What is the level of treatment that can be achieved (Non-potable vs potable)?
  - The discharge of wet lab effluent into sanitary system may not be allowable by OWASA depending on characteristics of waste. Similar situation for discharge into a watercourse.
  - CDC project experiences may provide a useful resource
  - Impact on aquatic life is a concern
- What is the possibility of implementing a zone-style ww treatment system that incorporated different treatment methods for different building typologies or effluent types?
  - Separating waste types within the building plumbing system would be challenging
- What type of studies might be necessary for evaluating feasibility of a new reclaimed water use? The affect of ww on typical pipe materials, and the microbial quality of the treated/untreated water?
- Explore potential funding opportunities to support some of the studies necessary for the innovative alternatives that could be proposed for water/ww treatment.
- NIST may offer some examples of an integrated water treatment approach. The proposed solutions for CN may offer the University leadership opportunities that could also relate to funding opportunities.

- The proposed water/ww treatment methods could have an effect on research programs offered at the university.
- When looking at treatment methods, the focus should be on controlling contaminants at the source. Understanding EPA/local regulatory criteria as compared to innovative solution operation and performance.
  - Recycling or waste stream separation opportunities?
- Utility Tunnel/Corridor Discussion
  - It is important for a utility master plan to be part of the early planning activities in order to make informed decisions about site layout
  - A utility corridor (or tunnel) can help maximize the amount of natural space with proposed building and stormwater management needs
  - Utility master plan should consider options for providing flexibility within the plan. This will allow for better decisions about what areas within the site should be considered “maintainable” space vs areas for nature conservation
  - There are limiting factors associated with tunnels when it comes to developing flexible designs (i.e. additional space requires larger tunnels that can be expensive)
  - Proposed roadways should be used for defining utility corridors wherever possible. This helps minimize disturbance to landscaped areas.
  - The type of development (campus type) considered for CN is appropriate to support a utility corridor concept
  - One example of a disadvantage to the tunnel system on the main campus is the ability to retrofit. The utility tunnel concept should be considered in the early stages for CN.
  - There are sometimes conflicting goals when you compare providing a flexible utility master plan and a sustainable design that will need to be negotiated through the design process.
- Utility Tunnel Concept
  - Offers the ability to monitor and more easily maintain utility systems
  - Is there personnel movement or material handling opportunities that could be incorporated into a tunnel system on CN?
  - A challenge to the utility tunnel concept is the reluctance of some utility providers to occupy the same tunnel space as other utility systems
  - Funding implications? Establish discussions early with university and regulatory agencies to try and reduce the draw on infrastructure budgets for construction of a utility tunnel.
- Some other possible discussion topics:
  - Is there the desire to develop a program where no waste leaves the site (construction, post-construction solid waste, etc)?
  - Recharge/reuse opportunities for stormwater?
  - Stormwater treatment opportunities for upstream/offsite areas?
- The CN development will need to be based on a phasing plan that offers the greatest amount of flexibility. Understanding that technologies change on a regular basis, a long term view is important to achieving success in sustainable development.
- Studies for CN should include a water management analysis that identifies potentials water sources; water demands; and reuse opportunities. Potential water harvesting technologies would be factored into this study along with their achievable levels of water quality.

- Sustainability typically relates to flexibility.
- Storm events in developed areas result in a burden on their receiving water courses. As the intensity of a storm increases, so does the amount of stormwater that typically leaves the site which results in greater degradation of downstream areas.
- How does the location of the Mason Farm WWTP effect options for providing reclaimed water to CN?
- If a decentralized system of water/ww facilities is proposed, design should consider standardization of these systems to ease operations/maintenance issues.
- Proposed solutions should consider educational opportunities for users.
- Is there a potential for use of composting toilets? campus wide? Solid disposal is typically the most challenging hurdle for these systems? The World Health Organization may offer insight into various technologies and initiatives.
- Don't utilize irrigation systems – plant native species instead?
- Lessons Learned?
  - There have been marginal successes in some instances with spray irrigation systems.
  - In the past, it is often difficult to separate ownership/management failures from system performance failures.
  - OWASA has been the recipient facilities that resulted in failed attempts (private endeavors) at water/ww treatment.
  - It is important to resolve design decisions while considering how they influence operations and maintenance.
  - Provide redundant systems will assist in resolving problems associated with treatment systems
  - The university's community focus on water conservation was successful during past drought periods
  - The Town of Chapel Hill and Carrboro have had success with lavatory water reuse systems (toilet flushing)
  - Direct improvements to utility infrastructure (OWASA) has proven to benefit the performance of the public systems (as opposed to some examples of plant improvements in the Durham area that did not have as significant of an effect)

**2:30-4:00      Transportation, Parking and Roads Work Group**

**Participants**

Chris Krupinski	RK&K
Allen Johnson	Energy Services
Derek Poarch	UNC-DPS
Ray Magyar	UNC-Public Safety
Jim McAdam	UNC-Chilled Water
Claire Kane	UNC-DPS
Ellen Miller	SAI
Jill Coleman	UNC-FP
Jim Alty	UNC-Facilities Services
Kumar Neppalli	Town of Chapel Hill
MaryJane Felgenhauer	UNC-FP
Jonathan Howes	UNC-University Relations
Luana Deans	MAB

Jack Evans	UNC
Jim Dunlop	NCDOT
Craig Benedict	OC Planning
Carolyn W. Elfland	UNC-Campus Services
Linda Convissor	University Relations
Ted Brown	Biohabitats
Sharon Myers	UNC-EHS
Anna Wu	UNC-FP
Luanne Greene	ASG
Karla Aghajanian	ASG
John d'Epagnier	RK&K
Kevin Nunnery	Biohabitats
Keith Bowers	Biohabitats
Brad Nies	BNIM
Bob Berkebile	BNIM
Daniel Rodriguez	UNC-DCRP
Mike Taylor	Town of Chapel Hill
Dianne Bachman	UNC-FP
Bruce Runberg	UNC
Roy Williford	Town of Carrboro
Michael A. Pierce	UNC-Facilities Planning
Anna Biton	Town of Chapel Hill
Ellen Beckmann	DCHC MPO
Diane Gillis	UNC-Facilities Planning
Meg Holton	UNC-Energy Services (W, WW, SW)

### Flip chart notes from session

- Consider flows both to and from CN
- People moving to campus is a primary but designers should not forget operational service and construction access as the development will be phased.
- Access points relates to how you bring people in (MLK, Estes Extension, Rail)
- Carbon versus non-carbon based modes
- Design for human health (pedestrian, bikes)
- Use of rail line needs to be explored
  - Look to develop core areas around the rail (hub)
- How is the site integrated with transit to main campus and other areas
  - Satellite parking
  - Multi-modal options
- Know where folks are coming from and where they need to go. Once on campus there area another suite of options to determine how to travel.
- Leverage CN as coherent plan to obtain funding from state and Feds
  - Effective land use design can increase odds of getting funding for transit
- Design internal features for safe attractive foot and bike travel
- Focus development along rail and/or MLK
  - Look for higher levels than current bus routes
- Integrate with both CH's and Carborro's Bike/Ped Master Plan (Greenway Planning Link @ regional scale)
- Minimize paved surfaces for better stormwater, etc.
- Mixed-use site should reduce daily vehicle trips needed
- Build flexible system that accommodates many modes
- Pragmatic planning needed.
  - Look at range of options to create series of scenarios to plan from (Scenario Planning)
- Need to decide what outcome we want to inform the scenarios
- Can our campus be like a Japanese home. Let the site dictate the primary mode
  - Pedestrians are king/queen

- Need to define how servicing will work. Add to scenario planning mix.
- Integrate stormwater into transportation/transit footprint
- Prioritize design for peds at least in certain areas
- Building type and location dictate zones and priorities
- Services underground? Like Disneyland
  - But not under roads. Plans to put utilities under the roads
- UNC needs to work closely with communities. MLK, Estes, etc. need careful consideration in planning.
- Does transit go through site or to edges?
- What is the planned campus movement and how is it managed?
- Look for incentives to facilitate transit/transportation goals
- What is transit goal for campus? Maybe shifting over time but ultimately want to minimize use of car
- Need to knit two campuses together and needs to be present on day one.
- Distance learning
- Telecommuting

### Wednesday November 8<sup>th</sup>

#### 8:30-10:00 Building Typology Work Group

##### Participants

John D'Epagnier	RK&K
Brad Petterson	AEI
Luanne Greene	Ayers/Saint/Gross
Karla Aghajanian	Ayers/Saint/Gross
James Carnahan	Leadership Advisory Committee
Gordon Sutherland	Town of Chapel Hill, Planning Dept.
Keith Bowers	Biohabitats
Jill Coleman	UNC-FP
Bob Berkebile	BNIM/Elements
Carol Tresolini	UNC
Warren Jochem	UNC-Sustainability
Edd Lovette	UNC-Building Services
Jim McAdam	UNC-Chilled Water
Jerry Schuett	AEI
Ted Brown	Biohabitats
Bill McCraw	UNC-FP
Cindy Shea	UNC-Sustainability
BJ Tipton	UNC-Waste Reduction
Anna Wu	UNC-FF
Tim Toben	Greenbridge Developments
Mary Jane Felgenhauer	UNC-FP
Craig Baker	UNC-FP
Wayne Pittman	UNC-School of Pharmacy
Mike Freeman	Auxiliary Services
Peter Reinhardt	UNC-Env. Health & Safety
Peter Krawchyk	UNC-Facilities Planning
Rob Kark	UNC-School of Public Health
Jerry Guerrier	UNC-Facilities Planning
Diane Gillis	UNC-Facilities Planning

##### Flip chart notes from session

- How much of Technology is there to develop + opp?
- A living building today – all of it.
- A living building is a net zero building for all of its own resources.

- How can you apply complexities of buildings like labs and achieve living building in those types?
- Breathtaking opportunities to learn from and rethink current ideas to more innovative ones.
- Apply new science to systems in building for more healthy opportunities.
- Use some internal building waste as resources.
- Organize and inform ideas by ecology represented on site.
- Waste leaving one building as food for another building.
- How do you accommodate a building with large footprint with intensive uses and needs?
- Acknowledge buildings' needs and optimize it for site, climate and rethink barrier with new science.
- Building program needs will continue to grow.
- Helpful to ask questions in critical way. 4 or 5 whys to reality.
- Develop communication strategy with other groups.
- What is criteria for a given requirement?
- Building performance guidelines - is this too big a step? Design for end user flexibility is driving use of resources. Get these done soon and make sure they are achievable.

Change the way we "do business."

- Before guidelines are set first – prior to benchmarks
- Should be done with best thinking available
- Not outdated expectations. Have users talk to other users using newer methods.
- Heat wheels, efficient fume hoods and others currently being shelved.
- Challenge of getting better material resources.
- New approaches that zoning and codes not used to seeing or understanding.
- First cost vs. operating costs.
- Need to educate legislature about net present value calculations because they don't think about budgets far enough out.
- How does UNC-CH deal with budgets?
- Bad decision on capital side burdens operations forever.
- Harvard loan fund example: Budget 1.5 mil, save 6 mil, staff of 20.
- Current standards not working.
- Integration of users with facilities and operation.
- Better questions are necessary and education within has provided facilities knowledge for better questions.
- Too reactive to programming side.
- Spending too much time bringing others along.
- Part of barrier is process.
- Customer starving for program and realizing this is their one lifetime chance to get what they want.
- Shift to not user building but to university (Fac/Opp) building.
- Only reacting at points reviewing drawings. Not a table making decisions.
- People replicating current condition. Not thinking of innovative solution. Thinking of more, not how. Develop an approach to thinking creatively.
- Difference between state and receipt funded.
- Energy efficiency is not always being talked about.
- Mandate from University for informing users. We are going to be sustainable.
- Integrate savings calculations into process.
- Need to understand options. Not either or.
- Users, technical experts (designer), and decision-makers and maintenance to table early.
- Apply some ideas to main campus.
- Schools need to understand more than their building what synergies exist for overall savings.

- Users need carrot or stick incentive towards understand operations.
- Legislature has two budgets. Recreates operating budget every two years so money is lost if not needed for operations. Was a bill that failed working against itself? Should we work or adapt to this system. To get more upfront so they pay less each year.
- Building Code – enforced by state insurance department. Construction procurement also dated. Needs education. To much individual interpretation.
- Anything new and innovative is most often rejected.
- State self-insured.
- Highly restrictive in fire area.
- Educate different groups – also energy sector. No incentives that others have realized have positive impacts.
- We are our own utility.
- Barrier standardizing systems because of rigid purchasing driven by low cost . So operations does not have so many unique situations to deal with.
- Design for deconstruction. Lots of effort in redesigning buildings for changing needs.
- Pattern for adaptability. Lowering intensity of use.
- Don't plan beyond the pattern of use length.
- Don't over-supply the building for a time period it won't exist for.
- Technologies for change need to be identified to help bonding work as stages.
- Research overhead fund some buildings or renovations. Money for that specifically.
- Not valid to assume users are not interested.
- Question checklist.
- PMs have been educated but may not be champions or educators of other team member commitment required.

### **10:15-11:45 Energy Generation & Consumption, Utilities Work Group**

#### **Participants**

John d'Epagnier	RK&K
Brad Petterson	AEI
Frost Rollins	TOCH
Luanne Greene	ASG
Karla Aghajanian	ASG
Linda Convissor	UNC-Chapel Hill
Jack Evans	UNC
Doug Crawford-Blown	UNC
John Masson	UNCCH-Facilities Planning
William Lowery	UNC-Cogen Systems
Phil Barner	UNC-Energy Services
Craig Baker	UNC-FP
Mary Jane Felgenhauer	UNC-FP
Ray DuBose	UNC-Energy Services
Anna Wu	UNC-FP
Bruce Runberg	UNC-FP&C
Cindy Shea	UNC-Sustainability
Jim Alty	UNC-Facilities Services
Carolyn Elfland	UNC

#### **Flip chart notes from session**

- Sustainability = Efficiency + Ecological Impact Mitigation
- Carbon Neutrality – Fossil Fuel only or all carbon sources (landfill gases) not just fossil fuels should be considered but all greenhouse gases

- AIA 2030 → Return to 1990 Carbon Emissions Values. UNC 60% CRED commitment is greater. Need to correlate BTU/SF (AIA 2030) with BTU/Person (UNC CRED)
- Building typology may or should be considered to broaden solutions / opportunities (i.e. ground source heat pumps for residential)
- Look for integration opportunities to reuse energy between facilities
- How manage private facilities that may be located on CN? (i.e. Residential) → NC utilities commission regulations
- UNC CRED commitment includes both CM and main campus → Demand side management will be key on both campuses
- Are district energy systems appropriate vs. local systems?
- Opportunities to better integrate heating and cooling systems (RENCI) instead of rejecting energy to atmosphere.
- Should District Energy Systems & Cogen be promoted at CN over local?...Yes.
- Alternative fuel sources → wood, landfill gas, animal waste
- Look for opportunities to wring out every BTU
- UNC recognized experts in district energy. Look for opportunities to improve even further.
- Reliability is a great attribute of central systems
- Central systems have saved significant energy on Main Campus along with O & M costs.
- High interest in renewable sources. Need to understand limitations (i.e. landfill gas +/-15 years) and develop "Bridge" solutions.
- Look to optimize building operations to minimize size of central systems → take advantage of easy items at buildings first.
- Need to consider transportation costs and energy consumption associated with alternative fuel production and delivery.
- Are there any load projections for CN available? Is there space on CN campus to produce all energy on site? Need to better understand building programs and planning to develop.
- Look aggressively for opportunities to develop demand side control and incentives for building users.
  - Lighting controls
  - HVAC setbacks
  - Temperature reset at plants
- Establish Net Metering System for Buildings
- Lease spaces (Glaxo, EPA) pay their utility bills to UNC. Model for private sector on CN?
- Balance of local and district systems will be a challenge on CN as it develops.
- 22 MW back-up generators on main campus, Consider integration with district system on CN. Consider investing money in central systems to minimize need for generators. EPA emissions regulation limitations → biodiesel?
- Consider planning for centralized back-up power solutions as part of campus infrastructure plan.
- Develop campus energy systems so they can be seen and understood by everyone. Make performance data available.
- Building performance data for each building displayed
- Showcase systems so they can be seen in operation
- Steam vs. Hot Water
  - Hot water provides more opportunities to integrate with building systems (solar hot water heating supplement)
  - Sterling & Rankine engines for low temperature hot water systems.
- Central systems allow for greater diversity across campus buildings to reduce size of central systems.
- Multiple pipe systems with a series of meters for energy will most likely be required.
- Need to establish utility corridors to aid in planning the CN campus. May also need to consider method of distribution including planning of future systems and providing maintenance access to systems.
- Need to consider O & M costs and staff capabilities to implement new systems into analysis.
- From a practical perspective, systems must work and be maintainable.

- Look for opportunities to educate building occupants to understand and appreciate systems.
- Need to better define building standards such that first cost does not drive projects and result in poor performance (i.e. AOB noise levels)
- 50 year thinking challenge → just get off the power grid or be able to export to the grid.
- Look for CRED for reductions through the entire design and construction process not just measure it after the building is put into service. (consultant travel, construction process and building operation)
- 

### 1:00-3:15 Report out from Work Groups to Large Group & Wrap-up

#### Participants

Luanne Greene	Ayers Saint Gross
Karla Aghajanian	Ayers Saint Gross
Mary Jane Felgenhauer	UNC/FP
Carolyn Elfland	UNC
George Alexiou	MAB
Brad Nies	
Ed Holland	OWASA
Jack Evans	UNC
Cindy Shea	UNC-Sustainability
Sharon Myers	UNC-EHS
Bruce Runberg	UNC
Meg Holton	UNC-Energy Services (W, WW, SW)
James Carnahan	Leadership Advisory Committee,
Dianne Bachman	UNC-FP
John d'Epagnier	RK&K
Jerry Schuett	AEI
Kirk Pelland	UNC-Grounds
Jim Alty	UNC-Facilities Services
BJ Tipton	Office of Waste Reduction and Recycling, UNC
Wayne Pittman	Pharmacy
Claire Kane	UNC Transportation
Keith Bowers	Biohabitats
Jill Coleman	UNC-FP
Masaya Konichi	
Bill McCraw	UNC-FP
Tom Bythell	UNC-Grounds
Ted Brown	Biohabitats
Bob Berkebile	BNIM/Elements
Craig Benedict	Orange County Gov't
Michael Beale	
George Small	TOCH Engineering
Sue Burke	TOCH Stormwater
Mike Taylor	TOCH Transportation
Pete Reinhardt	UNC-Environ Health & Safety
Gary Shaver	
Anna Wu	UNC-FP
Pat Crawford	UNC at Chapel Hill
Ray DuBose	UNC-Energy Services
John Masson	UNC-CN Facilities Planning
Brad Petterson	AEI
Tiffany Clarke	VC/Tony Waldrop office
David Bonk	Town of Chapel Hill
Peter Krawchyk	UNC-Facilities Planning
David Stancil	Orange County

Curtis Brooks  
Jim McAdam  
Phil Barner  
Allen Johnson  
Linda Convisor

Town of Chapel Hill  
UNC-Energy Services  
Energy Services  
Energy Services  
University Relations

#### **Landscape, Natural Habitat, Water Quality Group report**

- Integrate research and education into the landscape, habitat, and water quality features (e.g., visible stormwater BMPs, ecosystem restoration, planning and monitoring of biodiversity)
- Maintaining/enhancing community and ecosystem connectivity (for example through protection of Bolin Creek corridor and also through preserving forest connectivity)
- Build on brownfields first with eye towards conserving greenfield areas. This is an important opportunity to restore existing impacted landscapes, habitat, and water quality
- Allow natural drainage to form stormwater management strategy. Emphasize capture-reuse-recycle approaches. Use natural areas to receive excess flows as sheet flow to filter and infiltrate.
- Preserve viewscapes and integrate ecological function throughout the built environment and create a natural and functional transition to the non-built environment.
- Identify existing site features that we want to celebrate and design for better access to experience their value.
- Possible Barriers
- Liability with respect to brownfields
- Need for balance between factors such as building height, need for density, and impervious cover footprint and how these intersect with view corridors and community “feel”

#### **Water, Wastewater, Stormwater Group report**

- Integrate research and planning
- Flexibility, adaptability in the master plan
- Potable versus non-potable versus fire supply
- OWASA Master Plan accounts for Carolina North at 1.6 MGD
- Funding opportunities for innovative systems
- Utility corridor/tunnel; needs to be integrated with master plan
- Innovative technologies must integrate design, operations and maintenance
- Zone treatment options – one size does not fit all
- Education of users
- Evaluate the need for redundancy and back-up systems
- Grab the free stuff: rain harvesting and up-stream capture
- Use reclaimed water: OWASA versus on-site?
- Stormwater treatment: How far do we go? Off-site treatment?
- Land planning for all treatment systems: Wetlands wastewater treatment?
- No waste leaves the site?
- Management of water budget: collection and reuse of water
- Standardization of decentralized systems.

#### **Internal Transportation, Parking, Roads Group report**

##### **Background**

- Site is about 2 miles end-to-end
- Site is about 1 mile from main campus
- Closest major road intersection is I-40 and Martin Luther King
- Railroad provides opportunities

##### **Types of Transportation Needs**

- People
- Workers

- Residents
- Visitors
- Operations
- Construction

#### **General Considerations**

- Think of transportation modes as carbon based and non-carbon based, emphasize non-carbon based
- Consider where people are coming from and going to
- Has mode implications
- Has site access implications
- Integrate with the greenway systems in Chapel Hill and Carrboro

#### **Land Use**

- Need to develop proper land use design to support transit-oriented transportation system
- High density mixed use supports transit
- What will the street system/urban design look like?
- Grid versus traditional pedestrian campus
- Different in different zones (residential, institutional, commercial)

#### **Transit**

- Design transit needs from Day #1
- RR corridor ?
- MLK?
- Future regional transit solutions unclear
- MPOs are taking lead in developing vision
- We need to look at a strategy that will integrate with a variety of potential regional outcomes
- Leverage Carolina North plan to obtain state and federal funding
- Reserve right-of-way for transit corridors to site
- Local and regional transit penetrate site versus use shuttles for internal circulation

#### **Flexibility**

- How does the system evolve with the different phases of development?
- Provide flexibility for future technologies and unknowns
- Undertake scenario planning to understand and compare different futures
- Think 3 dimensional
- ? put service and other supply lines underground

#### **Building Typology Group report**

- Building Types
- Response to Climate
- Baseline Design Standards
- Integration of Users
- Synergistic Building Types
- Pedagogical Opportunities
- Human Health and Productivity
- Adaptability
- Carbon Footprint
- A Living Building
- Treat buildings as species. Design as close as possible to have a positive impact, move beyond reduction strategies to restorative solutions
- Increase Human potential: provide spaces where occupants are comfortable, productive so that research breakthroughs can occur.
- A common goal we all share is to recruit and retain the best researchers, faculty and students. If we do that private sector will want to join us and bring research dollars.
- Additional benefits of high performance buildings are adaptability/flexibility, durability, maintainability, reduced emissions including carbon footprint and pedagogical opportunities

- Methodology: use free resources, design in efficiency, use best technology, then renewable systems and reuse waste.
- Educate about the benefits of high performance design including looking at life cycle cost and net present value not just first cost. Expand the options considered based on sound science and peer collaboration
- Educate project managers, eventual occupants, decision makers, governing boards, legislature, state agencies, community and local government
- Move from suggested guidelines to requirements developed from performance based criteria.
- Standardize design process regardless of project manager, funding stream or eventual occupants
- Use knowledgeable integrated design teams
- Invest in intensiveness of buildings strategically so systems are not oversized
- Incentivize decision making and appropriate behaviors
- Standardize systems to limit unique maintenance requirements

#### **Energy and Utilities Group report**

- Drivers
  - Carbon Reduction – Minimize Greenhouse Gases
  - UNC / TCH CRed Pledge – 60% Per Capita Reduction by 2050
  - Alternative Non-Carbon Bases Fuel Sources
  - Carolina North to be Sustainable Campus
  - Social Responsibility
  - Maintain Best in Class Central Systems
- Hierarchal Approach to Energy Systems
  - Individual Building Level
  - Highly Efficient Central Plant
  - Reuse Excess Energy from Buildings through Plant
- District Systems
  - Take Advantage of Diversity
  - Adaptable for Future Technologies
  - Consider Standby Power as a Central Utility
  - Hot Water is a Viable as an Alternative to Steam
- Other Issues
  - Demand Side Management
  - Net Energy Metering per Building
  - Local Display of Building Energy and Systems Operation and Performance
  - Education of Building Occupants
  - Need to Study Distribution Methods

#### **Final Plenary Notes/Comments**

- Use of natural site hydrology as a key principle for the site (based on HWCC principle); no more runoff (net) that what is now on the site
- Integrated pedestrian networks to reduce/eliminate conflicts at street level; underground?
- Any thoughts to integrating regional transportation options from north and northwest areas? Rural MPO; geocoding of UNC employees—need to reach out to this big employee growth area

- Preserve fixed guideway corridors to and through Carolina North
- Is geothermal an option for HVAC? One of the options discussed energy supply; appropriate for certain uses
- Education was a common theme in the work groups: education of users about functions of building, site features, knowing what options are
- Next workshop will have simultaneous work groups; longer period for each work group
- Potential conflict between available time and how much dialogue there can be
- More discussion of the possibilities to lead to parameters
- No outright rejection of any of the ideas/possibilities that were expressed this week
- Next workshop will emphasize goals that build on the possibilities from this workshop; ultimately would like consensus; examples from other places from broad range of experiences of UNC community, other participants, and consultants
- Provide all participants with summary of the worksessions so that everyone can be thinking ahead to next time and be prepared to hit the ground running
- Suggested combined topic areas: green infrastructure, gray infrastructure, and buildings/land use
- Can consultants try to organize the blue sky ideas/ group them/ provide examples from other places and how others have developed goals, metrics, objectives
- This session has been a lot of idealizing; for next time, think about competing issues, values, interferences—help get to realistic conversations
- More time in next work groups—drill down, explore more in more detail
- By thinking more broadly and in a more integrated way (like nature), can we start working in a different way
- Chaotic thinking: integration of chaos and order
- Continue to think about all the options, beyond the barriers
- Celebrate what's already been done and what we can do in the future
- What are we each doing about being carbon neutral? What is the commitment?
- Carbon footprint calculators on line