Institute for Critical Technology and Applied Science – Phase II
(ICTAS II)
Virginia Tech
Precinct Planning and Building Design
• Virginia Tech Campus
• 31 acre site
• Linton-Reaves precinct
• Life Sciences District
• Virginia Tech
• 75,000 sq. ft. Research Lab
• $24 million
The analysis of the precinct began with an understanding of the natural systems including how water interacted with the site.
The Precinct Plan created 8 new research focused building sites with a total of 500,000 gsf.
As part of the plan, there were a series of green stormwater strategies that each building project will try to incorporate to manage water as close to the source as possible.

Photos: JJR, LLC, Center for Sustainable Urban Design, Portland BES
A green stormwater overlay defined opportunities for bio-retention facilities and surface conveyance to mimic the natural flows of the site.
ICTAS II will be the first building to be developed under the new plan.

The bio-retention facility will be the first part of the overall stormwater overlay.
Porous Concrete

Porous Pavers

Illustration: JJR, LLC

ICTAS II
The bio-retention facility will manage 90% of the average annual rainfall that is received by the roof and paved areas, and convey the rest.
Leadership in Energy and Environment Design Tracking Tool

VIRGINIA TECH – ICTAS II
BLACKSBURG, VA

Prepared by SmithGroup, Inc.
Meeting Date: 06/01/2007
<table>
<thead>
<tr>
<th>Prereq. or Credit No.</th>
<th>Date</th>
<th>LEED Requirements, Team Action and Documentation</th>
<th>Points</th>
<th>Feasibility</th>
<th>Research Required</th>
<th>Research Team</th>
<th>Life Cycle</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Open Item: ENERGY AND ATMOSPHERE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EA</td>
<td></td>
<td>EAP1 Closed: <strong>Fundamental Commissioning of the Building Energy Systems</strong>: The following commissioning process activities shall be completed by the commissioning team: 1. Designate an individual as the Commissioning Authority (CxA) to lead, review and oversee the completion of the commissioning process activities. 2. The Owner shall document the Owner’s Project Requirements (OPR). The design team shall develop the Basis of Design (BOD). The CxA shall review these documents for clarity and completeness. The Owner and design team shall be responsible for updates to their respective documents. 3. Develop and incorporate commissioning requirements into the construction documents. 4. Develop and implement a commissioning plan. 5. Verify installation and performance of the systems to be commissioned. 6. Complete a summary commissioning report.</td>
<td>P</td>
<td>YES</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EAP2 Closed: <strong>Minimum Energy Performance</strong>: Design the building to comply with both 1) the mandatory provisions (Sections 6.2.4, 6.4, 7.4, 8.4, 9.4, and Table 6.4) of ASHRAE/IESNA Standard 90.1-2004 (without amendments) and the prescriptive requirements (Sections 5.5, 6.5, 7.5, and 9.5) or performance requirements (Section 11) of ASHRAE/IESNA Standard 90.1-2004 (without amendments).</td>
<td>P</td>
<td>YES</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EAP3 Closed: <strong>Fundamental Refrigerant Management</strong>: Zero use of CFC-based refrigerants in new base building HVAC&amp;R systems. When reusing existing base building HVAC equipment, complete a comprehensive CFC phase-out conversion prior to project completion. Phase-out plans extending beyond the project completion date will be considered on their merits.</td>
<td>P</td>
<td>YES</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EAC1 Open: <strong>Optimize Energy Performance</strong>: Demonstrate a percentage improvement in the proposed building performance rating per ASHRAE/IESNA Standard 90.1-2004 (without amendments) by a whole by whole building simulation using the Building Performance Rating Method in Appendix C of the Standard. The minimum energy cost savings percentage for each point threshold is as follows:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>New Bldgs.</td>
<td>Existing Bldgs.</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>16%</td>
<td>5%</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>14%</td>
<td>12%</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>17.5%</td>
<td>16%</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>21%</td>
<td>14%</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>24.5%</td>
<td>17.5%</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>28%</td>
<td>21%</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>31.5%</td>
<td>24.5%</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>35%</td>
<td>28%</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>38.5%</td>
<td>31.5%</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>42%</td>
<td>36%</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
SUSTAINABLE SITE

- Erosion and sedimentation control plan
- Stormwater control for entire precinct; quantity and quality
- Pedestrian and bicycle friendly precinct plan
- Minimize parking; preferred parking for fuel-efficient vehicles
- Maximize open space
- Minimize Heat Island Effect; shade walks, expand landscaped areas
- No permanent irrigation
ARCHITECTURAL FEATURES

- Water efficient fixtures throughout
- Rain garden to collect roof run-off
- Service area for recycling
- Construction waste management plan with contractors
- Specifying materials with high recycled content
- Specifying regionally manufactured products
- Using certified wood products in accordance with the Forest Stewardship Council (FSC)
- Specifying low Volatile Organic Compound (VOC) adhesives, sealants, paints, coatings, carpets, and agrifiber products
- Control indoor chemical pollution
- Increase daylighting and views
ENGINEERING FEATURES

- Third-party commissioning of HVAC&R systems
- Design above ASHRAE standards for HVAC systems performance
- No CFC refrigerants
- Exceed ASHRAE requirements for indoor air quality ventilation
- Develop an Indoor Air Quality Management Plan with contractor
- Design zoned lighting and temperature controls for occupants
- Glycol Heat Recovery System to recover exhaust air energy
- Use LEED AP designers for all systems