The Land Development Design Initiative

LDDI Overview

July 24, 2015

Virginia Tech
Invent the Future
What is LDDI?

Started in 2006, the Land Development Design Initiative is a collaborative effort between the Via Dept of Civil & Env. Engineering at VT and industry practitioners.

This consortium of engineers, developers, and regulatory personnel were brought together to:

- improve undergraduate land development design education
- promote student & practitioner interaction
- enhance research in land development
LDDI Organizational Structure

• Advisory Board
  Derrick Cave       Bill Junda
  Alisa Cowen       Jeff Lighthiser
  Greg Deubler      Arch Marston
  Mike Flagg        Kevin Murray
  Louis Genuario    John Neel
  Jeff Gilliland    Skip Notte
  Ginger Greunke    Cameron Palmore
  Clay Hodges       James Patteson
  Bob Hubbell       Richard Street
  Mark Huffman      Dennis Thomas
  Bob Jansen        Roy Waugh
  Jonathan Jolley   Sue Wolford
  Charles Yowell    

• Coordinator – Randy Dymond, dymond@vt.edu
• Assistant Coordinator – Kevin Young, keyoung@vt.edu
• Student Representative – Amanda Dritschel

• Four subcommittees
  • Curriculum and Course Enhancement, Outreach
  • Practitioner Involvement, Research and Development
LDDI Problem Statement

• 25-33% of CEE grads work in LD, but no track or required LD coursework prior to LDDI.

• Practitioner call for better student preparation for LD and better research to support policies

1. “How can we improve CEE Education with regards to land development?”

2. “How can we educate our students about career opportunities in LD?”

3. “How can we strengthen the involvement of our professionals in the educational process?”

4. “How can we improve our LD research?”
What Have We Achieved?

Let’s look at what we’ve done over the last 9 years…
Prior to LDDI

- **One** senior elective course in Land Development Design (CEE 4274)
- Offered only one semester each academic year
- Little to no practitioner involvement
- Adjunct instructors
  - Frequent turnover, no continuity
LDDI is Making a Difference:

- Virginia Tech CEE students now have **five** individual course offerings in Land Development Design:
  - Intro. To Land Development Design (twice/yr)
  - Land Development Design (twice/yr)
  - Sustainable Land Development (once/yr)
  - Advanced Land Development Design (alternate yrs)
  - Municipal Engineering (alternate yrs)
CEE 3274: Introduction to Land Development Design

Spark student interest at the junior level

Financial support from LDDI

Topics include:

- LD Intro & Issues
- Ordinances & Comp Plans
- Site Analysis
- Civil 3D/GIS Survey, Mapping
- Basic Utility Layout
- Grading & Earthwork
- Introduction to Hydrology, E&SC

Course went into production Fall 2010

120 students enrolled learning Civil 3D!
CEE 4274: Land Development Design

Semester-long design project broken into five “Learning Modules”

1) Feasibility & Conceptual Design,
2) Grading and Roadway Design,
3) Stormwater Management,
4) Utility/E&SC,
5) Costs, Visualization, Final Presentation

7 to 10 student groups; EACH group is assigned a professional mentor from an LDDI sponsoring firm

Topics include:
Site Analysis, Pro Forma
Civil 3D/GIS Survey, Mapping
Grading & Earthwork
Transportation
Hydrology/Drainage
Utilities, E&SC
Cost Analysis
Visualization
CEE 4264: Sustainable Land Development

• Offered as a three credit course open to seniors in any major
• Focus on sustainability as it relates to land development
• Topics include:
  Trends in population, health, lifestyle, development
  The Development & Planning Process
  Smart Location and Linkage
  Neighborhood Pattern and Design
  Green Technologies
  Water Management, Air Quality, Industrial Ecology
  More…

LEED FOR NEIGHBORHOOD DEVELOPMENT
CEE 4254: Municipal Engineering
(alternate spring semesters)

Last taught spring 2014 semester, next in spring 2016

Focus on:

- Public Policy and Planning
- Ordinance development and enforcement
- Major Infrastructure Systems
- Asset and Resource management
- Disaster planning, prevention, and response
- Plan review

Multiple field trips, guest speakers, mentored project reports on municipal issues.

Taught by Meredith Jones (MJ Services, Eden & Associates) with help from James Patteson (Fairfax County) and Randy Dymond
CEE 4284: Advanced Land Development Design
(alternate spring semesters)

Last taught spring 2015 semester, next in spring 2017

In-depth coverage of advanced land development topics

- Virginia’s new stormwater regulations
- Design-build
- Infill development

Course taught exclusively by professionals from LDDI sponsoring firms

  - Kimley-Horn & Associates
  - Balzer & Associates
  - Draper Aden Associates

“Alternative” meeting times

Friday nights / Saturday mornings
LDDI in the Overall Curriculum

• Land Development is now recognized as one of eight “Specialty Areas” in the new CEE curriculum

• Significant achievement, as land development has not traditionally been recognized as a CEE discipline

• List of non-CEE courses for LD focus is has been developed by the Curriculum Committee

• LDDI is heavily involved in the new Real Estate Program at VT
Financial Support for Courses

• Six total course offerings in Land Development Design per academic year

• CEE Department financially supports only two of these courses

• LDDI is financially responsible for the remaining four courses

Note that all junior level CEE classes, including CEE 3274, are now restricted to 65 students/section. With limited teaching resources, this is an issue...
Prior to LDDI

- As many as 1/3 of all graduating CEEs found themselves working in the land development design field – without adequate preparation
- Students were largely unaware of the various career opportunities in this field
- Students were unsure about which combination of electives best prepared them for a career in land development design
LDDI is making a difference:

- Development of informational brochures
- Creation of the Sustainable Land Development student club
- Creation of the LDDI website
- Publication of a quarterly LDDI newsletter and monthly eUpdates
- Publication of an Annual Report
- Feature in ASCE News magazine
- Feature in Civil Engineering Central
- Presentations to professional organizations
- Road Shows around the State
Development and Distribution of Informational Brochures

LAND DEVELOPMENT EXPLAINED.

Land Development is the process of changing the function of a parcel of land to improve its use. It includes studying feasible alternatives within the bounds of applicable laws and codes, and designing the site to accommodate the client's needs in the most effective and environmentally conscious way.

No two projects are alike.

Every project has different parameters. It is this variety that makes the study of land development full of interesting opportunities. A solid understanding of land development requires a knowledge of:

- Land Surveying and Land Planning
- Local, State, and Federal Regulations
- Street and Highway Design
- Commercial and Residential Site Design
- Stormwater Management
- Utility Design
- Erosion and Sediment Control
- Wetlands Delineation, Permitting, Mitigation
- Construction Management

Sustainable Land Development Club

The Sustainable Land Development Club is a group interested in learning more about the land development design profession. Funded by LOD, the Club is free to join and offers a variety of events throughout the year.

For more information please contact Dr. Randy Daymond at rdaymond@vt.edu.

“Not only do these students have a leg up on others looking for jobs in civil engineering design consulting, the practitioners have the leg up on finding the students they think will work well in their firms.”

Mr. Bob Hubbell
President, Brookfield Homes

CAREER OPTIONS

There are a variety of exciting career opportunities available to professionals with a background in land development including:

- Engineering Firms
- Home Builders
- Government Agencies

Visit the LODI website to learn more about a career in land development design.

www.lddi.cee.vt.edu

Courses in the CEE Curriculum

CEE 3274: Intro to Land Development
CEE 4254: Municipal Engineering
CEE 4264: Sustainable Land Development
CEE 4274: Land Development Design
CEE 4284: Advanced Land Development
CEE 4554: Geotechnics for Land De

WHAT IS LAND DEVELOPMENT?

Land Development is the process of changing the function of a parcel of land to improve its use. It includes studying feasible alternatives within the bounds of applicable laws and codes, and designing the site to accommodate the client’s needs in the most effective and environmentally conscious way.

The best land development engineers have a strong capability to visualize the new site and to use their knowledge of roadway design, water distribution, sanitary sewers, storm water management, and erosion and sediment control to create an attractive and yet functional environment.

In land development, no two projects are alike. Each project has different parameters. It is this variety that makes the study of land development full of interesting opportunities. Understanding land development requires a knowledge of:

- Land Surveying and Land Planning
- Local, State, and Federal Regulations
- Street and Highway Design
- Commercial and Residential Site Design
- Storm Water Management
- Utility Design
- Wetlands Delineation, Permitting, Mitigation
- Construction Management

“Wetland development introduced me to different concepts, and I am now using all of the skills I learned, from hydrology to time management. All of the courses were beneficial because they showed me projects and examples of real-world issues that I have come across since leaving college.”

- Ettie Burtik, Kimley-Horn Associates, VT Class of 2010

Virginia Tech
Invent the Future
LDDI Website (www.lddi.cee.vt.edu)

Student resume bank
LD project summaries
Career spotlights
Student contests
Curricular information
Brochures
Quarterly newsletter focuses on new courses, news from campus, career spotlights, project summaries from LDDI sponsoring firms.

Monthly eUpdates keep you up to speed with LDDI on-campus!
The Land Development Design Initiative (LDDI) 2015 Annual Report

Published annually since 2011, provides a comprehensive overview of the program including financial summaries and major developments inside and outside of the classroom.
Promotional Presentations and Publications

• American Society for Engineering Education Conference presentation (June 2011, June 2007)

• Feature article in civilengineeringcentral.com newsletter (April 2010)

• ASCE News article (July 2008)

• Presentations to state chapters of professional organizations
  - HBAV
  - ASCE
National Recognition

• In the spring of 2009, LDDI received one of five 2\textsuperscript{nd} place awards from the National Council of Examiners for Engineering and Surveying (NCEES) for Connecting Professional Practice and Education!
LDDI Road Shows

- Periodically, Road Shows about LDDI are presented around the state of Virginia. Professional Engineers, developers, and governmental employees are briefed about the program.
Practitioner Involvement

Prior to LDDI

- Individual firms held infrequent information sessions
- No formal practitioner involvement in the classroom
- Students largely unaware of which firms routinely hire land development engineers
LDDI is making a difference:

- Semiannual Land Development career and information sessions
- Major expansion of the number of professionals involved in guest lecturing/mentoring (~40 in Fall 2015)
- CEE 4274 mentoring program
- Offering of Advanced Land Development and Municipal Engineering (taught by industry professionals)
- Advising and mentoring members of the Sustainable Land Development Student Club
LD Socials and Career Nights

• Held the evening prior to Career Fairs and at other times
• Practitioners and students mingle and get to know each other on a social level

• Learning to communicate in a social setting is part of their education!
Sustainable Land Development Student Club

- Club began in fall 2008
- Social outings
- Community service
- Service projects
- Field trips
- LD Career Night
Practitioners & Students...

- CEE 4274 Mentoring
- Teaching
  - Advanced Land Development Design
  - Sustainable Land Development
  - Municipal Engineering
- Student club support
- Design Charrette Competition
LDDI’s Research and Development arm is working hard to give an objective voice to many of the issues surrounding land development today. Projects are now underway with NSF, VCTIR/VDOT, Blacksburg, and the City of Roanoke. LDDI is working on a collaborative proposal with multiple faculty and municipalities on a Center for Stormwater Treatment Assessment (CSTA) for Virginia.
Where is LDDI Headed?

Strategic Planning Goals:

- **Maintain awareness** of land development as a career opportunity for undergraduate students

- **Continually improve the educational experience** in the land development area, including the business side

- **Increase opportunities for practitioners to interact** with students and expand to the developer/builder constituency

- **Provide for the long-term sustainability** of the program Teaching resources, Scholarships, Seminars (Dr. Hogan, USDOE)

- **Solicit and Promote interdepartmental collaboration and university support** – **New Real Estate BS Program**!

- **Build the LDDI related research program**
Why is it Vital to Support LDDI?

This program provides numerous benefits to the students, the industry, companies, and Virginia Tech.

- LDDI students gain a more advanced knowledge of land development design than other students, saving on-the-job training dollars.
- The next generation of professionals are more familiar with innovative design strategies, technologies, services, products, and timely issues facing the industry.
- Sponsoring companies have close contact with students and faculty to enhance recruiting.
- VT provides only partial support for teaching the coursework.
- State of the art research helps make supportable policies for development.
Corporate Sponsors (July 2015)

Diamond Sponsors:

Platinum Sponsors:

Gold Sponsors:

Silver Sponsors:
Thanks to our Individual Donors!

Legacy Donor
Mr. Julian B. Bell Jr.

Diamond Donor
Mr. Gary Bowman

Platinum Donor
Mr. Tom Rust

Gold Donor
Mr. Paul Johnson

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• Mr. Joe Arrowsmith
• Ms. Jessie Berg
• Ms. Mary Ann Bonadeo
• Mr. Tyson Catlett
• Mr. Arvil Catlett
• Mr. Rick DiSalvo
• Mr. Mark Huffman
• Mr. Caleb Hurst
• Mr. Jimmie Jenkins
• Ms. Meredith Jones
• Mr. Pete Lazarevich
• Mr. Spud Mistr
• Mr. Mark Richardson
• Mr. Greg Stecher
• Mr. Drew Sullivan
• Mr. Jack Vega
• Mr. Joe Whitebread
Summary of the LDDI Program

University-Practitioner Collaboration Fills a Need

• An evolved need for more education and research in Land Development Design was perceived by industry and academia.
• Partnership has resulted in more courses that are jointly designed AND more interaction with professionals in a variety of venues.
• Professionals from LDDI’s sponsoring firms actively participate in the classroom as instructors, mentors, and guest speakers as well as socialize with students in informal settings.

Win-Win Scenario

• Students, faculty, and practitioners all benefit from this increased interaction: better preparation, relationships, jobs…

Servicing the Industry

• The collaboration benefits employers through stronger hires and offers the opportunity to work on research issues that affect our industry.
A Few Comments about the Current State and the Future of the VT College of Engineering

Slides courtesy of Dean Richard Benson
The X-Curve at Virginia Tech

Our Education and General (E&G) Budget at Virginia Tech has a 3-to-1 dependence on tuition dollars over state dollars. The 1-to-1 crossover occurred in FY 2003, 2-to-1 in FY 2010.
Undergraduate Admissions Trends

- Applied to VT but not the COE
- Applied to the VT College of Engineering
- Were offered admission to the COE
- Were offered admission but not to the COE
- Enrolled in the College of Engineering
- Enrolled in the second choice college
We wish to keep the undergraduate student-to-teacher ratio below 18-to-1.

We anticipate that the undergraduate student body will be about 7800 next fall.

We would need 433 faculty members to be at 18-to-1.

We would need 347 faculty members to drop below the current 22.5-to-1.

We are running over 40 faculty searches this year.
Working to make Virginia Tech faculty salaries competitive

- SCHEV Peer 60th Percentile
- VT Salary Average
Our USN&WR Graduate Rank is 21.

This is up from 31 in 2005. President Sands has challenged us to reach the top 10.

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Virginia Tech - Invent the Future
**Ranked 9\textsuperscript{th} on the NSF Research Spending List**

The College of Engineering recently moved into the 9\textsuperscript{th} position in the annual NSF assessment of research spending. Virginia Tech, as a whole, ranks 38\textsuperscript{th}.

We had been 10\textsuperscript{th} for several years and were 13\textsuperscript{th} in 2005. We passed five colleges: Stanford, Ohio State, Illinois, UC-Berkeley and Texas Austin.

The SUNY College of Nanoscale Science and Engineering is a relatively new industry / university / state partnership.

*All figures in thousands →*

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Goodwin Hall Dedication

On October 24, 2014 we dedicated Goodwin Hall, Virginia Tech’s “signature engineering building.”
Our next capital project is the paired-renovations of Holden Hall (built in 1940 and 46,800 sq. ft. in size) and Randolph Hall (built in 1959, and 165,918 sq. ft. in size). The College of Engineering is funding a feasibility study which will cost around $250,000. 19 A&E firms applied for the job, and we have narrowed the list down to 4.
Questions and Feedback