The Resilient Communities Project:

Advancing Sustainable Design Solutions and Community-Engaged Learning

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Photos by Carissa Slotterback, Mike Greco, and Steve Schneider
What Is RCP?

The mission of the Resilient Communities Project is to connect communities in Minnesota with University of Minnesota faculty and students to advance local sustainability and resilience through collaborative course-based projects.

Building Community-University Partnerships for Sustainability and Resilience
What if...?

We connected existing university courses 
...taught in their existing ways
...by existing faculty
...to a single community
...over an academic year
...to work on projects that advance sustainability and resilience
...identified by city staff?
Program Objectives

Building local capacity around sustainability and resilience

Training students to be future sustainability practitioners

Producing case studies, best practices, and tools that can inform sustainability practice
Resilience is the capacity of individuals, institutions, communities, and natural systems to survive, adapt, and thrive in the face of changes, stresses, and shocks.
“A sustainable future is one in which a healthy environment, economic prosperity, and social justice are pursued simultaneously to ensure the well-being and quality of life of present and future generations.”

—Learning for a Sustainable Future
How Does the Model Work?

Partner competitively selected (RFP) + contributes financially
City/County defines 15–30 projects + identifies project leads
RCP matches each project with one or more U of MN courses
Project leads, faculty, and RCP staff collaboratively:
  — clarify and scope projects that students will undertake
  — identify and engage community partners and stakeholders
Students complete projects as part of regular coursework
Students deliver final presentations + work products to city/county
Why the Model Works

Projects are part of city work-plan
Grassroots matchmaking (city staff + faculty)
Participation is opt-in
Multiple students/teams in each class (redundancy)
Frequent communication
Engagement with local residents, businesses, organizations (creates buy-in)
Everyone has ‘skin in the game’ (financial, political, a grade)
RCP: The First Four Years

Community partners:
- Minnetonka
- North St. Paul
- Rosemount
- Carver County

Community Projects: 88
U of MN Courses: 141
U of MN Departments: 39
Students: 1,300+
Participating Departments

Agronomy
Anthropology
Architecture
Bioproducts & Biosystems Engineering
Business Administration
Civil, Environmental, & Geo-Engineering
Communication Studies
Community Health Promotion
Design
Environmental Health
Environmental Science, Policy, & Management
Fisheries, Wildlife, & Conservation Biology
Forest & Natural Resource Management
Geographic Information Systems
Geography
Gerontology
Graphic Design
Health, Physical Education & Recreation (UMD)
Horticulture
Human Resources & Industrial Relations

Housing Studies
Journalism & Mass Communication
Landscape Architecture
Law
Liberal Studies
Maternal & Child Health
Organization Leadership, Policy & Development
Psychology
Public Affairs
Public Policy
Public Health Administration & Policy
Recreation & Resource Management
Scandinavian Studies
Science, Technology, & Environmental Policy
Social Work
Spanish & Portuguese Studies
Sustainability Studies
Urban & Regional Planning
Urban Studies
Youth Studies
Chaska Community Solar Development
*Bioproducts and Biosystems Engineering*

Watertown Whitewater Recreation Park
*Urban Planning, Public Affairs, Natural Resource Management*

Victoria Ecotourism Marketing Plan
*Natural Resource Management, Journalism and Mass Communication*

Suburban Placemaking and Community Gathering Spaces
*Urban Studies, Liberal Studies*

Rosemount Urban Agriculture
*Sustainability Studies, Urban Planning*

Rosemount Eco-Green Business Park
*Business Administration, Public Policy, Public Affairs*

North St. Paul Live/Work Housing and Downtown Revitalization
*Housing Studies, Public Affairs*

Implementing Living Streets Policy in North St. Paul
*Architecture, Public Health, Public Policy, Urban Planning*

Aging in Place in North St. Paul
*Gerontology, Housing Studies, Social Work, Public Policy*
**Partner Community**
- Access to faculty + 1000s of hours of student time
- Student knowledge, creativity, and energy
- Multidisciplinary perspective on issues
- Groundwork for engaging consultants

**Faculty**
- Efficient access to high-quality community-based projects
- Recognition/visibility for community-engaged teaching
- Feedback loop between research and practice

**Students**
- Well-organized + meaningful community-based projects
- “Real world” experience related to sustainability and resilience
- Professional networking opportunities

**Shared benefits**
Enhanced long-term capacity
Ongoing relationships
Visibility for local sustainability efforts
Best practices, tools, and cases for other communities
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Resilient Communities Project

Carver County

7 Community Partners
30 Projects
50+ Courses
100s of Students

Paul Moline, AICP
Carver County
Carver County’s Partnership

- Cities of Chaska, Victoria, Watertown
- SouthWest Transit
- Carver County CDA
- Eastern Carver County School District
- Carver County Water Management Org.

County Departments
- Planning & Water Management
- Historical Society
- Public Health
- Parks
- Land Management

Funding Partners:
- Social Services
- Administration
- Facilities
- GIS
- Public Works
Projects

- Topic Areas
  - Environmental Stewardship
  - Alternative Transportation
  - Human Services
  - Community Engagement & Building Community Identity
  - Effective Administration
  - Site Specific Recommendations
Project Examples

① City of Chaska – Safe Routes to Schools

② City of Chaska – Solar Energy

③ City of Watertown – Whitewater Park / Dam Rehab
1 Safe Routes to Schools

- Project Focus
  - Evaluate current conditions at school campus
  - Research Bike and Ped Safety Options
  - Provide re-design proposals
  - Traffic engineering designs for Ped crossings
  - Site Specific Recommendations
Course 1 – Community Design

PREVIOUS FINDINGS

PROBLEMS + ISSUES:
- Lack of connectivity between neighborhoods + schools.
- Disconnection between sidewalks + lack of crosswalks.
- Safety concerns for children walking to school.

CRITICAL LANE VOLUME ANALYSIS:
Relative free flow is achieved at all nodes evaluated and little to no queuing occurs during peak school hours.

INITIAL NODE RECOMMENDATIONS:

Node 1:
- Reduce speed limit
- Introduce green turn arrow
- Peds have extended crossing / go during green arrow
- Speed bump

Node 2:
- Install sidewalk running along Engler Blvd.
- Transform Crest Dr. into a 2-way street with added pullover lanes for drop off near school doors.

Node 3:
- Define crosswalk across Engler Blvd.
- Install speed limit sign at intersection
- Lay new sidewalks + connect to existing ones

Node 4:
- Lack of crosswalk on both road crossings
- Sidewalks too narrow for both bikers + peds
- Lack of stop sign at Park Ridge Dr.
- School busses should exit at node 4

Node 5 + 6 + 7:
- Connect existing sidewalks

Node 8:
- Implement school speed limit during peak hours
- Crosswalk placed across North Chestnut St. + pedestrian refuge in center median
- Create path connecting neighborhood to new crosswalk

Node 9 + 10:
- Lack of sidewalks + continuous path through middle of parking lot
Proposed Changes: Node 1

- Reduce lanes = LOS of D
- Reduce speed limit - 30 mph
- Protected Left Turns - Easier for drivers
- Countdown timer for pedestrians
- Raised intersection
- Sharp right turns
- Pedestrian refuge
- Wider Crosswalks
  - Painted stripe
- Streetlights on sidewalk
- If needed, could add traffic safety guard
2 Chaska Solar

• Project Focus
  • Evaluate Site Suitability
  • Evaluate Project Feasibility
  • Power generation estimates per site
  • Solar products comparison
  • Site Specific Recommendations
# Course - Renewable Energy Technologies

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Watertown Whitewater Park / Dam Removal

- Evaluate Flow and Sediment Conditions
- Propose Alternative Dam Design
- Evaluate Impact on Fishery
- Assess Demand for Recreation
- Public Engagement Process
Course - Stream Restoration Practice
Course - Stream Restoration Practice
Course - Public Affairs

Recommended Engagement Process

City + County Staff: Meeting
- Create timeline (1.1)
- Draft process (1.2)
- Develop evaluation (1.3)
- Draft option (1.4)
- Stakeholder analysis (1.5)

Stakeholders: Workshop
- Charrette (2.1.b & 2.1.d)
- "Yes, but..." (2.1.c)
- Dot voting (2.1.e)

Watertown Community: Town Event at Rick Johnson Park
- Dot voting/Sticky comments (2.2.a)
- Charrette (2.2.b)
- "Share your favorite memory" (2.2.c)

City + County Staff: Meeting
- Refine Project Options (3)
- Review of design options
- Review of community feedback
- Make final recommendations (5)

Broader Community: Comment Period
- Webpage for forum (4.1.a)
- Newspaper article (4.2)
- Printed materials at local businesses (4.3)
- Temporary signage at Rick Johnson Park (4.4)
- Open house (4.5)

Fundamentals
We identified the following underlying strategies for consideration while designing this engagement process:
- Transparent engagement
- Coordinate City of Watertown + Carver County efforts
- Develop public understanding of the project
- Build relationships with public for future engagement efforts
Challenges

• Developing partners & community buy-in
• Identifying mission aligned projects
• Coordination across organizations and departments
• Staff workloads & expectations
• Supporting student work
• Continuing momentum - measuring outcomes, & sharing across communities
CEGE 5511
Urban Hydrology and Water Quality

John Gulliver, Professor
Department of Civil, Environmental and Geo-Engineering
University of Minnesota-Twin Cities
What I Did

• Joined RCP in 2012-2013 academic year
• Changed my course considerably
  - Fundamentals – No change
  - Applications – Now involved with RCP
How We Spend Class Time?

• 50% lecture, 50% projects
• 4 – 5 students per team
• 3 – 5 different projects
• Typically feasibility studies
  • Address urban stormwater quality concerns
What is Expected of the Students?

- Homework
- Midterm
- Interim and final presentations
- Interim and final reports
- Poster presentation at RCP celebration
Project Examples

• Minnetonka
  – Cost vs. benefits for phosphorus and suspended solids reduction for five lakesheds
  • SAFL Baffle and street sweeping were most cost-effective
  • City asked Ridgedale to sweep parking lot more often
  – Connected vs. disconnected impervious area

Lakeshed Overview

• 98 acre lake
• 1,078 acre watershed
  ▫ 64% low density residential
• Overall trophic state: 47

Project Examples

• North St. Paul
  – Cost vs. benefits for phosphorus and suspended solids reduction for three lakesheds
  • Street sweeping and SAFL Baffle were most cost-effective
  • City changed O&M practice to increase frequency of street sweeping
Project Examples

- **Carver County**
  - Developed water reuse/irrigation recommendations for Carver County
    - Impervious/irrigated area: ~ 2:1
    - 2 in/week irrigation
  - Cost vs. benefits for phosphorus reduction for two lakesheds

**Carver County: Stormwater Reuse Investigation**

Mark Greve
Marcella Hartman
Savannah Hintsala
Alex Nelson
Lilly Rouillard

**LAKE WACONIA:**
TP REDUCTION PRACTICES

Chloe Winterhalter, Jiaqi You,
James Bolton, Erol Gudul, and
Ashley Keske
What is the result?

• Municipal needs are addressed
• Students are more involved
  ─ Real world projects
  ─ Learn by doing
• Spring 2016-Urban Hydrology

• Stormwater BMPs — TMDL for Grace Chain of Lakes

• Partner: Carver County
PROJECT OVERVIEW

- Grace Chain of Lakes (Chaska, MN)
- BMP Assessment and Feasibility—built off of previous study
- Geospatial analysis (GIS) and BMP modeling (P8)
- Final Deliverable: Best Combination of BMPs
PROGRAM BENEFITS

- Industry experience
PROGRAM BENEFITS

- Industry experience
- Connections with practicing engineers
PROGRAM BENEFITS

• Industry experience
• Connections with practicing engineers
• Project management
RCP vs. TRADITIONAL CLASS

- Real world projects
- Team work
- Tangible outcomes, motivating
- Interaction with both professors and industry experts
- Great resume addition
Resilient Communities Project
City of Rosemount
Example Rosemount Projects: Water Management

- Stormwater Management
- Water Reuse and Conservation
Example Rosemount Projects: Water Management

• Stormwater Management
• Water Reuse and Conservation

• Generally Not Engineering Coursework!
Stormwater Management

• Course PA 5232: Environmental Planning, Policy, and Decision Making

  – Public Outreach and Education Example

• Stormwater Action Plan Pamphlet
Stormwater management is quickly becoming a hot issue in today’s urban communities. With climate change creating heavier, more frequent storm events, and as urban development continues, more and more stormwater runoff is produced. An increase of impervious surfaces means an increase of runoff volume that can nearly double that of its pre-developed condition.

Currently, Rosemount uses the traditional curb-and-gutter system to manage stormwater. For large rainfall events, the city relies solely on infiltration through retention ponding. As Rosemount begins to physically expand, the city is looking for alternative methods to accommodate current and future stormwater conditions.
Stormwater Management

• Course PA 5232: Environmental Planning, Policy, and Decision Making
  – Report and Recommendations
    • Bioretention
    • Multi-Use Fields
    • Permeable Pavements
    • Constructed Wetlands
Water Reuse and Conservation

• PUBH 6132: Air, Water & Health
• OLPD 5204: Designing the Adult Education Program
• LAW 7012: Environmental Sustainability: Land Use and Water Policy
Introduction

- What Is Water Reclamation?
- Why Rosemount?
- Obstacles to Water Reclamation
  - Not Permitted Under State Plumbing Code (MPC)
- Updating the MPC
  - Current Plumbing Board Rulemaking
  - Overlapping Oversight/Jurisdiction
- Predictions
- Recommendations

ROSEMOUNT
MINNESOTA
LAW - Environmental Sustainability: Land Use and Water Policy

Water Reclamation & Reuse

- Process of treating greywater or blackwater for industrial or residential reuse.
- Mankato uses treated wastewater for irrigation and industrial purposes but not residential. (City of Mankato, 2015)

LAW - Environmental Sustainability: Land Use and Water Policy

Why Water Reclamation?

2030 MODEL-PREDICTED DRAWDOWN IN THE PRAIRIE DU CHIEN-JORDAN AQUIFER

CHANGE IN FUTURE GROUNDWATER DRAWDOWN

- Less than 5 feet
- 5.1 to 10 feet
- 10.1 to 20 feet
- 20.1 to 30 feet
- 30.1 to 40 feet
- 40.1 to 45 feet

AREAS MOST AFFECTED

Groundwater pumping continues with no change

Note: Model 1 results assume long-term average conditions and continued development of traditional water supplies. Models 2 and 3 assume that some communities adopt different water supplies than they currently use.

Source: StarTribune, February 23, 2013
LAW - Environmental Sustainability: Land Use and Water Policy

• Other Highlights
  – Limitations of Minnesota Plumbing Code for Water Reclamation
LAW - Environmental Sustainability: Land Use and Water Policy

• Other Highlights
  – Limitations of Minnesota Plumbing Code for Water Reclamation
  – Correlation between water rates and landscaped area per resident in community
Questions?

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