

An aerial photograph of a small town with brick buildings and a street. Overlaid on the image are several stylized human outlines in yellow and white, some of which are partially filled with a dark red color. The text "EMPOWERING SMALL MINNESOTA COMMUNITIES" is written in large, bold, white capital letters across the center of the image.

EMPOWERING SMALL MINNESOTA COMMUNITIES

Tom Fisher, Director, Minnesota Design Center,
College of Design at the University of Minnesota
tfisher@umn.edu



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Driven to Discover™

University partners:

Regional Sustainable
Development Partnerships

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EXTENSION

**MINNESOTA
DESIGN CENTER
(MDC)**



Resilient Communities Project

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Building Community-University Partnerships for Resilience

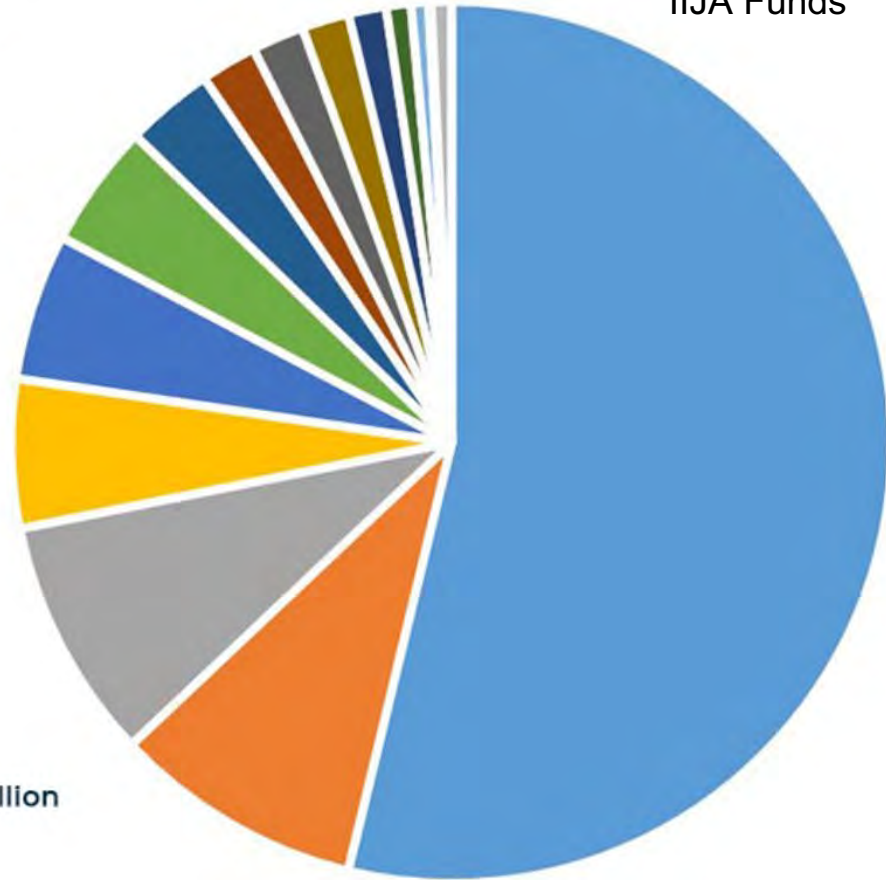
Hubert H. Humphrey School of Public Affairs



CENTER FOR TRANSPORTATION STUDIES

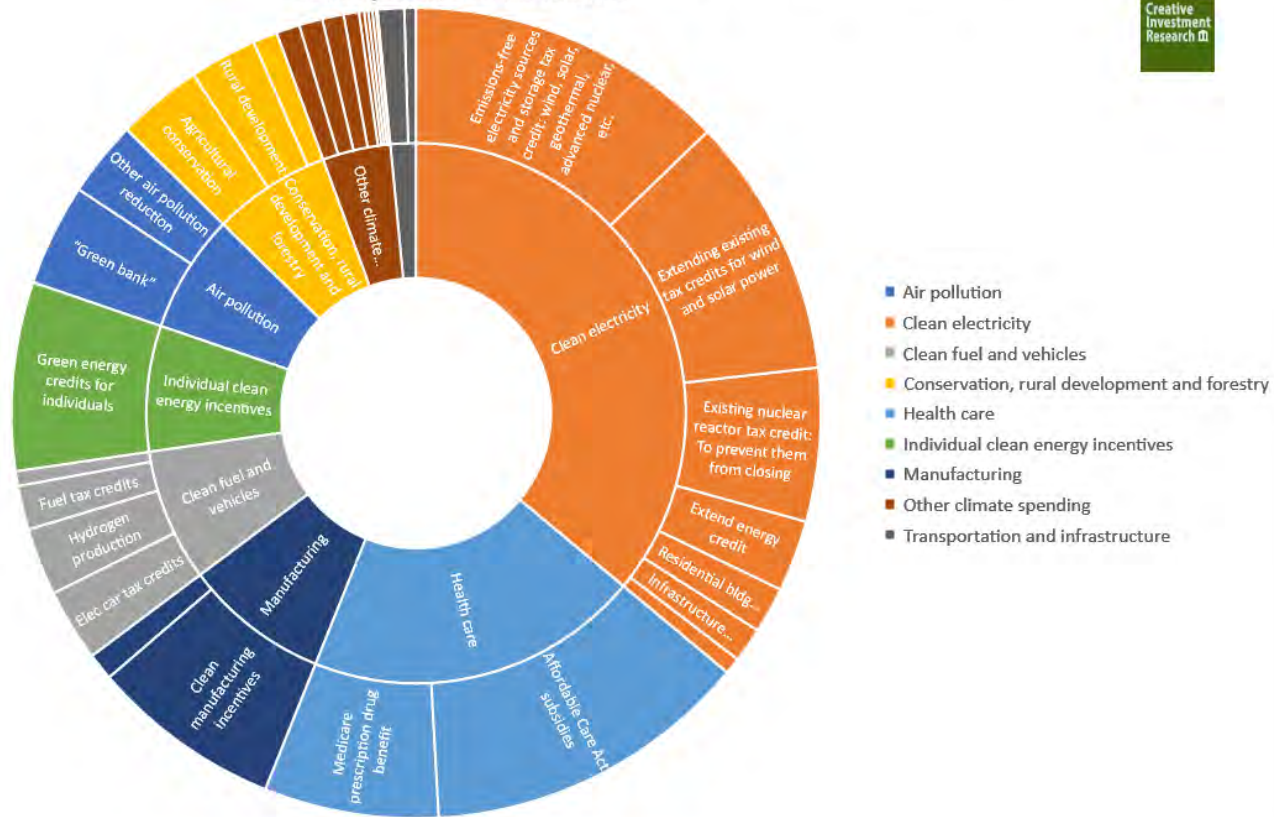


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Inflation Reduction Act Spending and Tax Rebates

Detail by Area, Billions of US dollars



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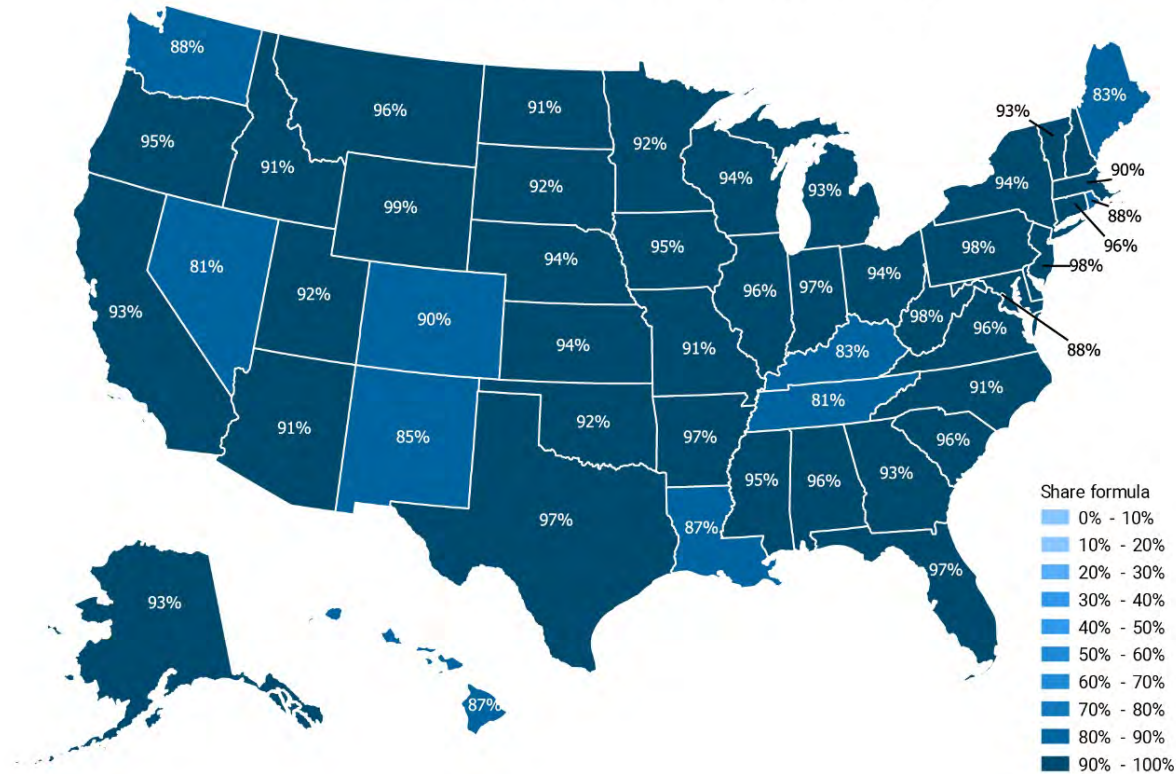
Announced Funding

- \$0 - \$2B
- \$2B - \$4B
- \$4B - \$6B
- \$6B - \$8B
- \$8B - \$10B
- \$10B - \$12B
- \$12B - \$14B
- \$14B - \$16B
- \$16B - \$18B



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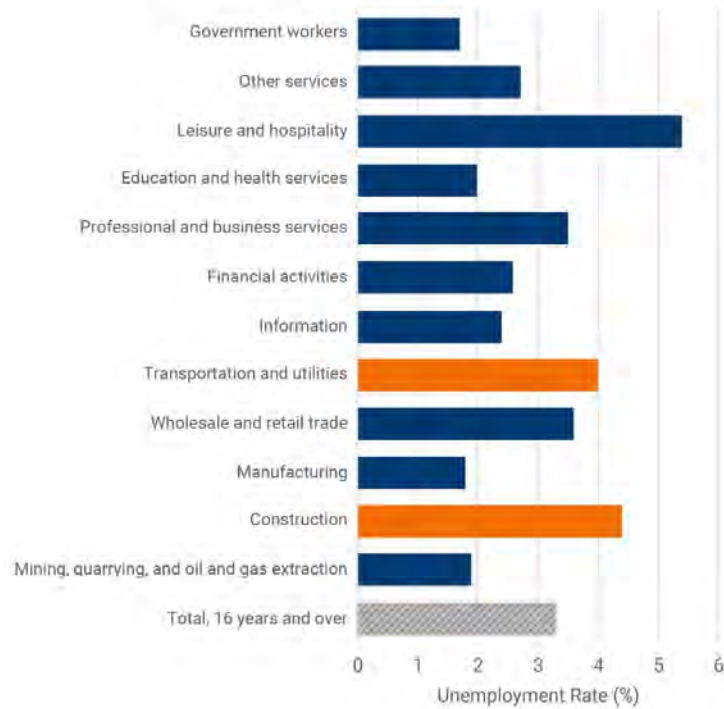
Formula Funding Share of Announced Funding



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Unemployment by industry and class of worker

December 2022



Source: Brookings analysis of U.S. Bureau of Labor Statistics data

B Brookings Metro



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House Bill 2499/Senate Bill 2650

Representatives Koegel, Curran, Smith; Senators Carlson, Fateh, and Dibble

“...to provide support and technical assistance to small communities on infrastructure project analysis and development...including...consideration of sustainability, resiliency, and adaptation to the impacts of climate change; and...efficiencies through coordinated investments in other infrastructure or assets.”



Minnesota State Legislature



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Infrastructure Resilience Advisory Task Force

The Infrastructure Resilience Advisory Task Force is established to evaluate issues related to coordination, sustainability, resiliency, and federal funding on state, local, and private infrastructure in the state.

At a minimum, the task force must:

1. develop objectives and strategies to: provide for effective and efficient management of state, local, and private infrastructure; enhance sustainability and resiliency of infrastructure throughout the state; respond to and mitigate the effects of adverse weather events across the state, including natural disasters, droughts, and floods; and provide for equitable treatment in areas of persistent poverty and historically disadvantaged communities;
2. identify approaches to enhance infrastructure coordination across jurisdictions, agencies, state and local government, and public and private sectors, including in planning, design, engineering, construction, maintenance, and operations;
3. identify methods to maximize federal formula and discretionary funds provided to recipients in the state for infrastructure purposes;
4. evaluate options for organizational design of state agencies to meet the purposes under clauses (1) to (3), including consideration of: options for establishment of a board, council, office, or other agency; and models in other states; and
5. develop findings and recommendations related to the duties specified in this subdivision.

[Minnesota Laws 2023 Chapter 62, Article 2, Section 121](#)



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protecting
protection
helpful
state
accomplish
regional
human
functionality
management
resiliency
answer
expectancy
partnerships
achieve
essential
sector
question
forth
fundamental
meaningful
quality
value
local
long
gains
sustainability
immediate
climate
set
risk
high
undertaking
life
term
legislation
maintaining
maximizing
federal
system
private
public
resilience
taking
viewpoint
avoiding
new
critical
duties
design



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Our vision: To help small Minnesota communities develop resilient infrastructure and strengthen their social, environmental, and economic fabric.



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Our goal: To empower small Minnesota communities to position themselves to secure legacy, state and federal funding to improve community resilience.



Our approach: University of Minnesota researchers partner with communities to prepare compelling proposal ideas for public and private funding programs.



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The opportunity is to access an unprecedented level of funding for infrastructure through the Federal Infrastructure Investment and Job Act (IIJA) and the Inflation Reduction Act (IRA) as well as various State programs.



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Your community is central to this program. You bring important expertise and assets that we are eager to work with, such as: strong civic culture, committed leadership, and a vision for resiliency future

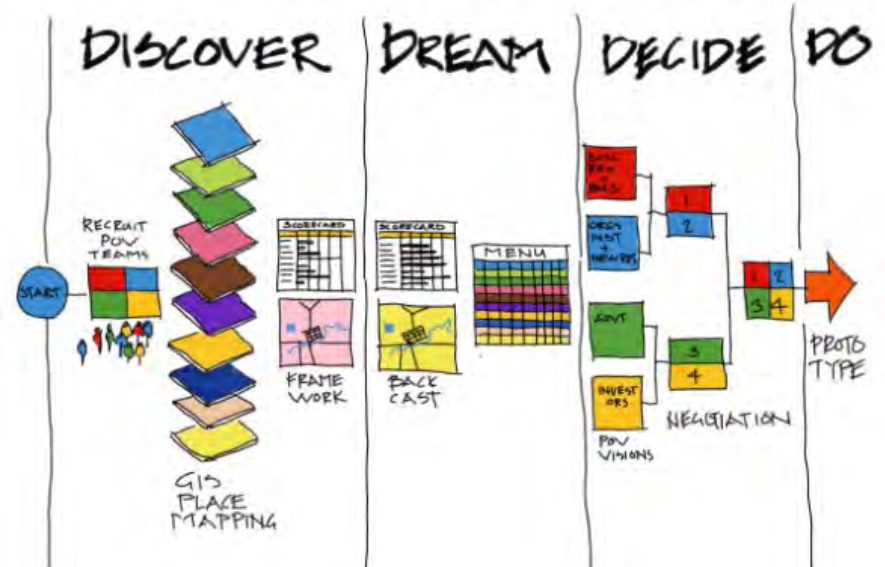
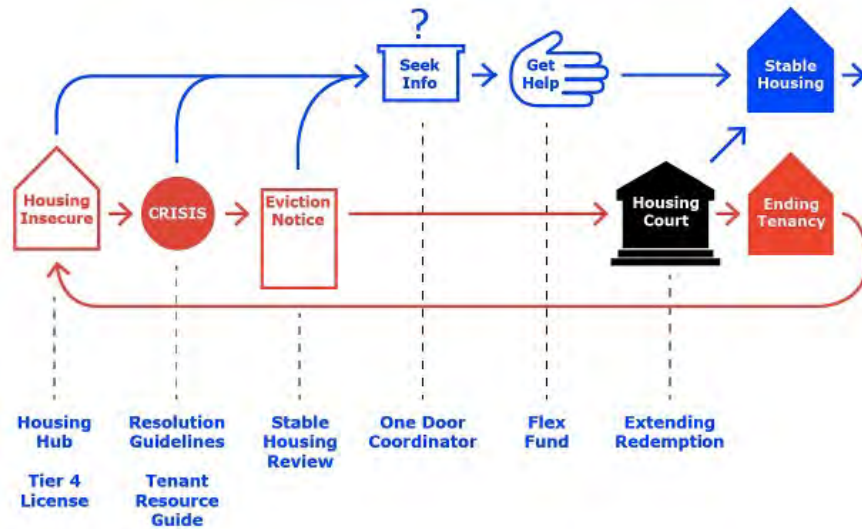


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Together, we will do the work and projects that will strengthen your community

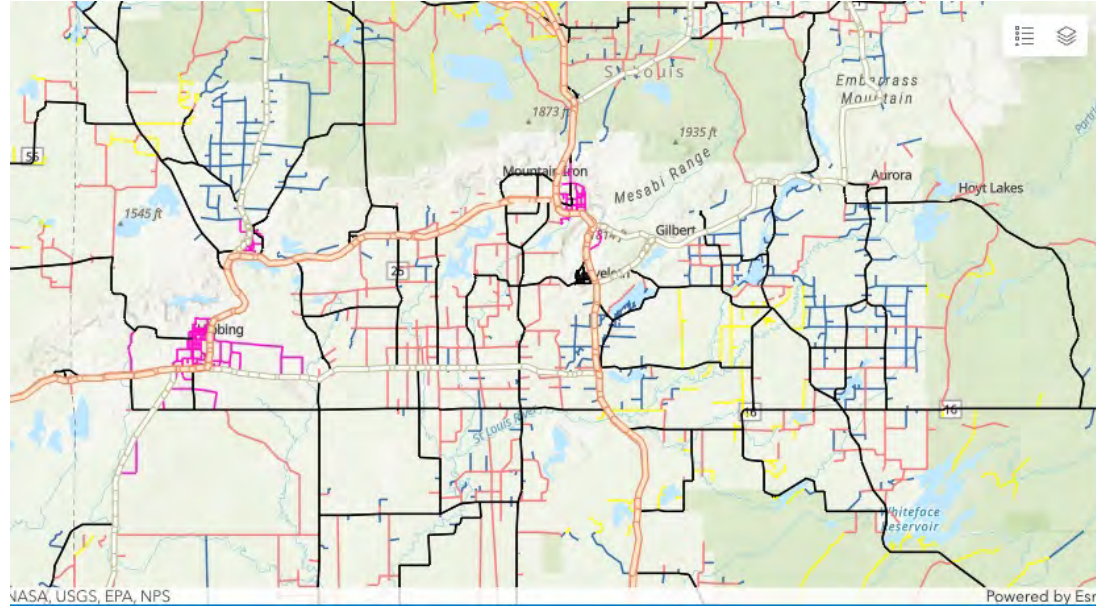


Work can range from **(1) a rapid response** to a need to **(2) a tactical action** on a project to **(3) a deep, sustained engagement** with a community.



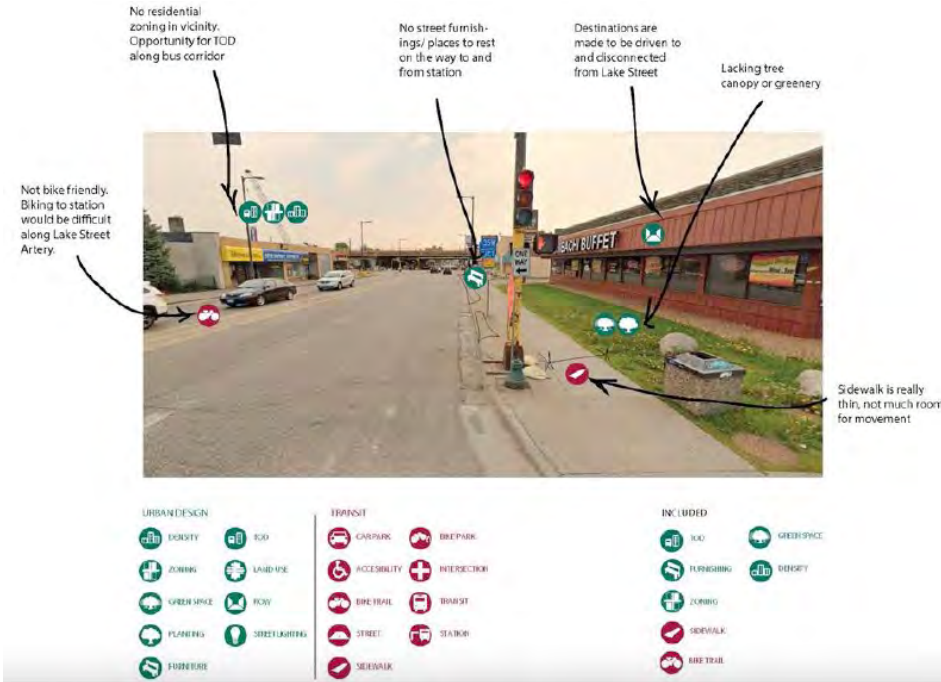
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1. Rapid Response: From one day to one week



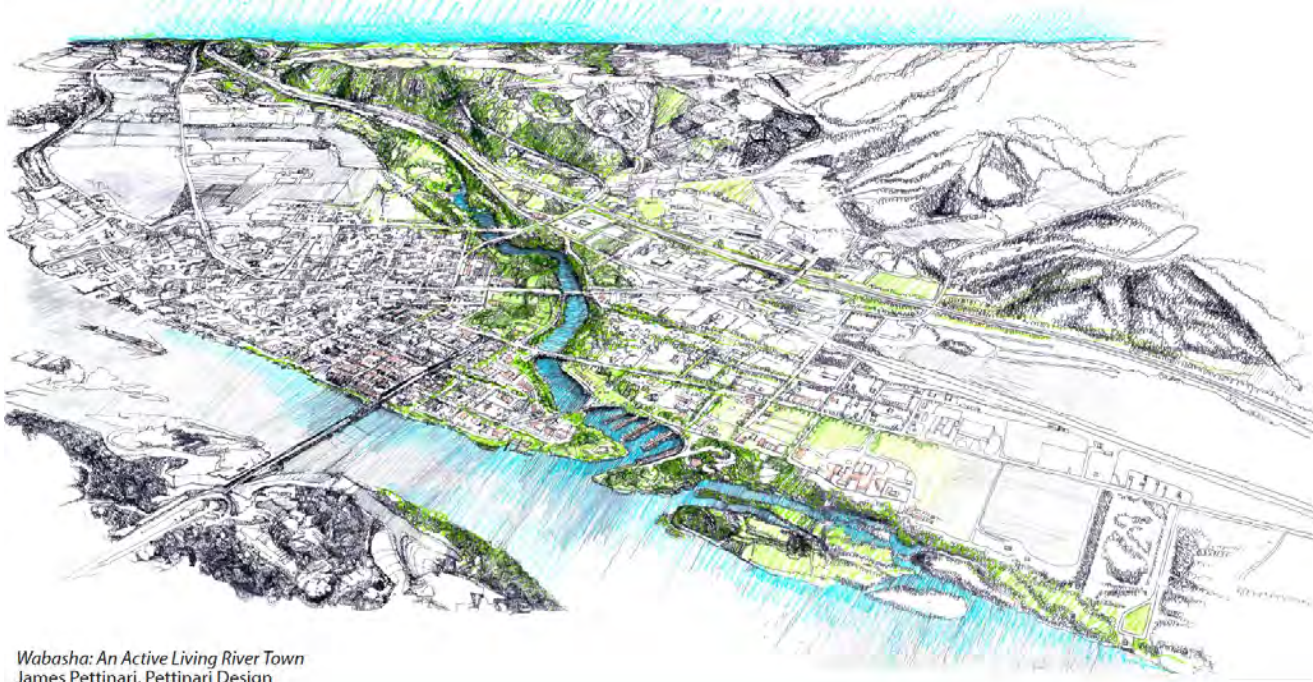
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2. Tactical Action: From a few weeks to a month



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3. Deep, Sustained Engagement: For many months

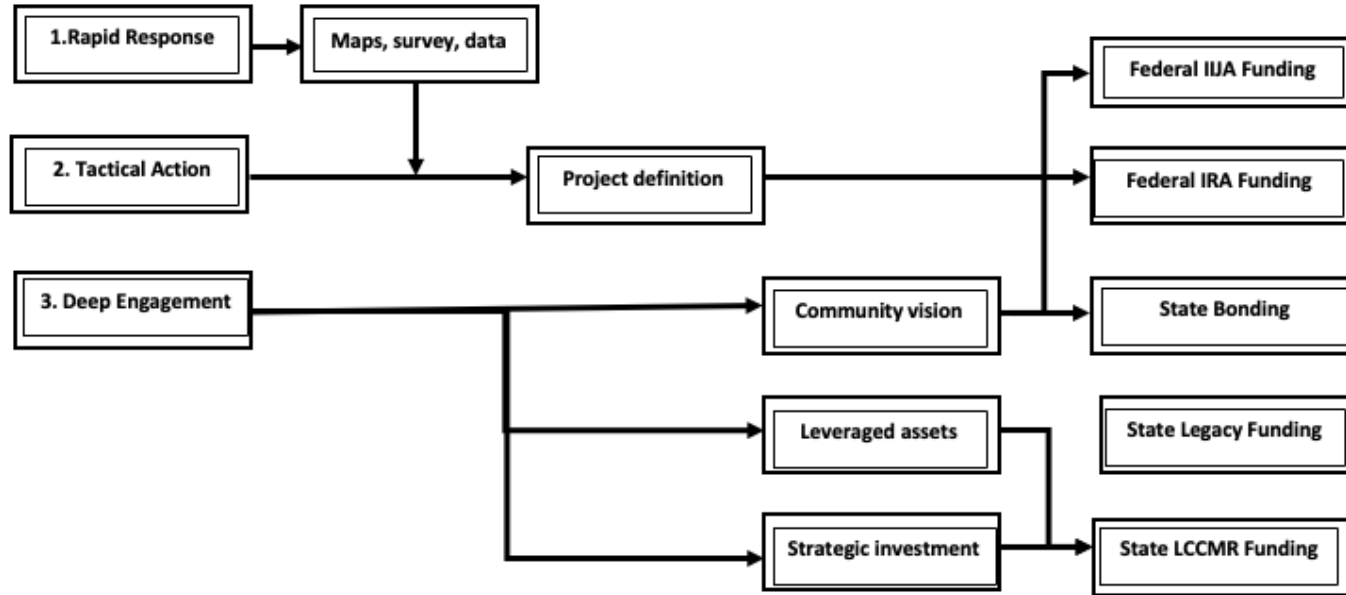


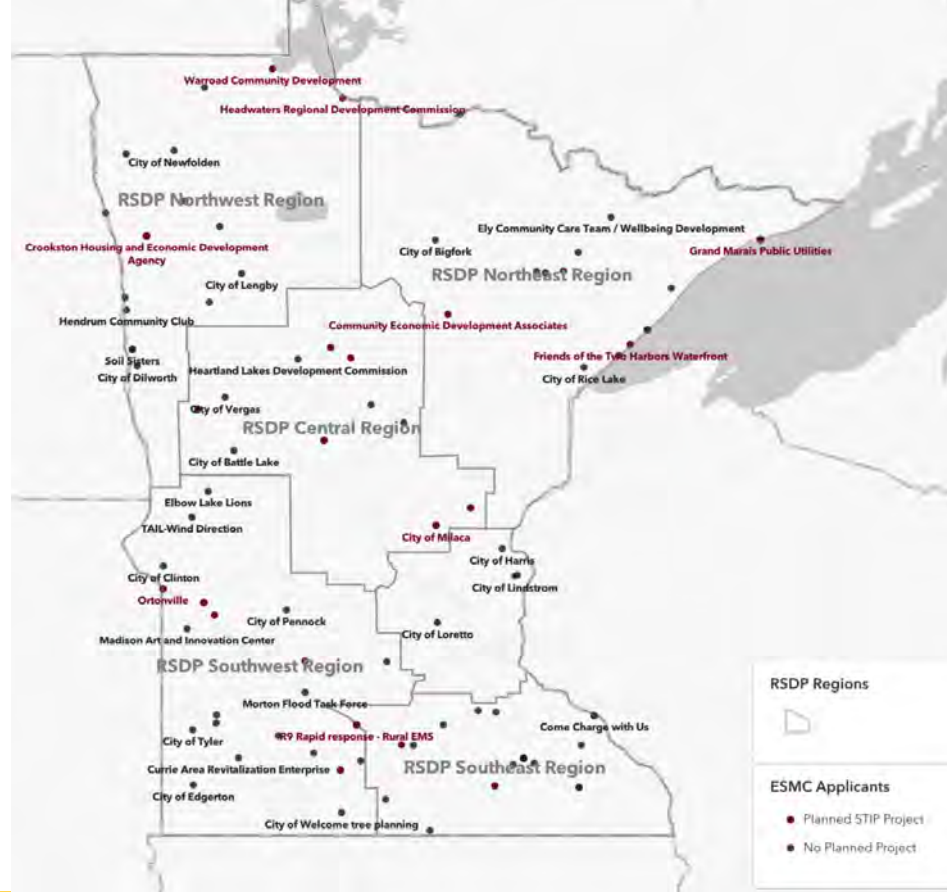
Wabasha: An Active Living River Town
James Pettinari, Pettinari Design



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How to Participate: Along three intersecting paths





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ESMC Community Futures Finalists and RSDP Regions



[CLICK HERE TO VIEW INTERACTIVE MAP](#)

Center for Transportation Studies • Humphrey School of Public Affairs • Minnesota Design Center • Regional Sustainable Development Partnerships • Resilient Communities Project

Crookston, CF pilot project, STIP

Milaca, industrial park, highway 23 project in future STIP

Harris, metro area, along I-35, growing

Baudette, 966 pop. STIP

Warroad, strategic plan STIP 1,830, pop.

Badger, strategic planning, water main replacement

Embarrass, restoration/preservation for economic development

Knife River, survey for recreation/community center

Finland, housing through zoning change & property tax reform

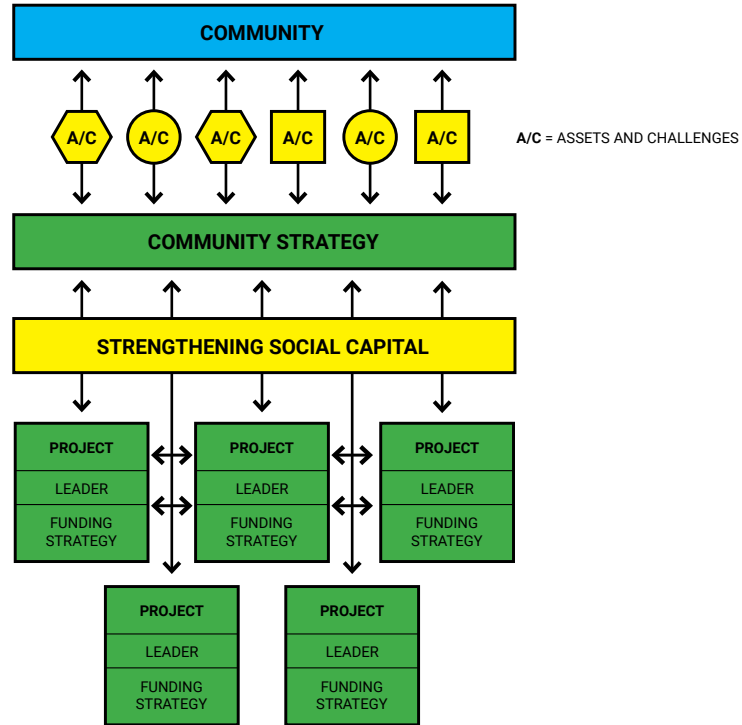
Pelican Rapids, The Bridge, reuse study



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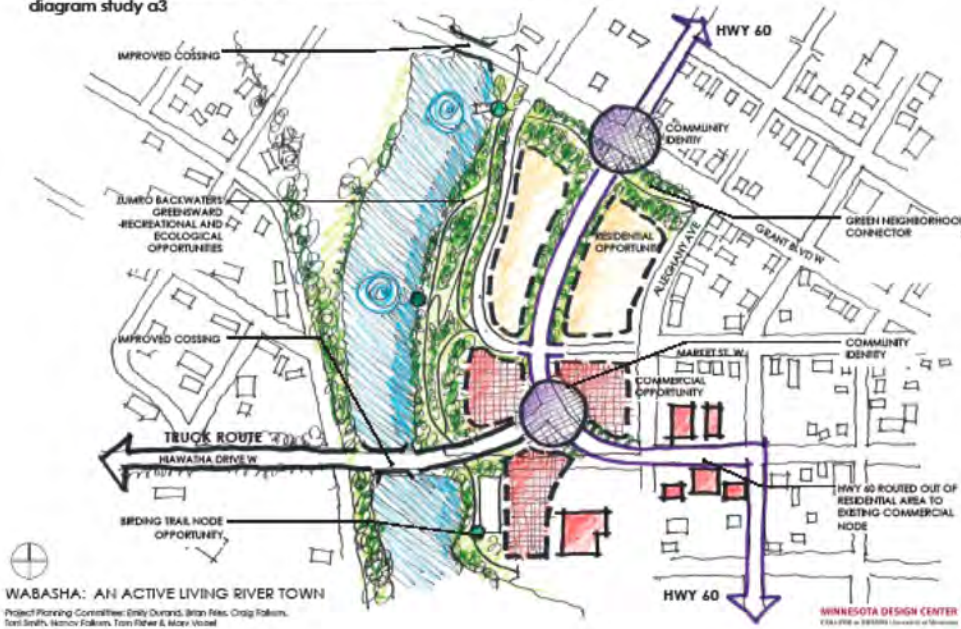
COMMUNITY FUTURES

USING DESIGN THINKING TO CREATE A COMMUNITY STRATEGY AND IDENTIFYING PROJECTS THAT SUPPORT IT



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ZUMBRO SLOUGH/HIGHWAY 60 REALIGNMENT diagram study a3



ZUMBRO SLOUGH opportunities for development & redevelopment



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Towerside Framework for Planning and Implementation

Version 2.1

August 2, 2018



TOWERSIDE

THE MSP INNOVATION DISTRICT

Developed by the
Minnesota Design Center
on behalf of the
Towerside Innovation District

MINNESOTA DESIGN CENTER
COLLEGE of DESIGN UNIVERSITY of MINNESOTA



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SHARED GREEN STREET LOCAL STREET (FUTURE)

- PLANTING**
- Area: 15,947 SF
 - Tree: 84
 - Carbon Sequestration: 20,058 LB/YR

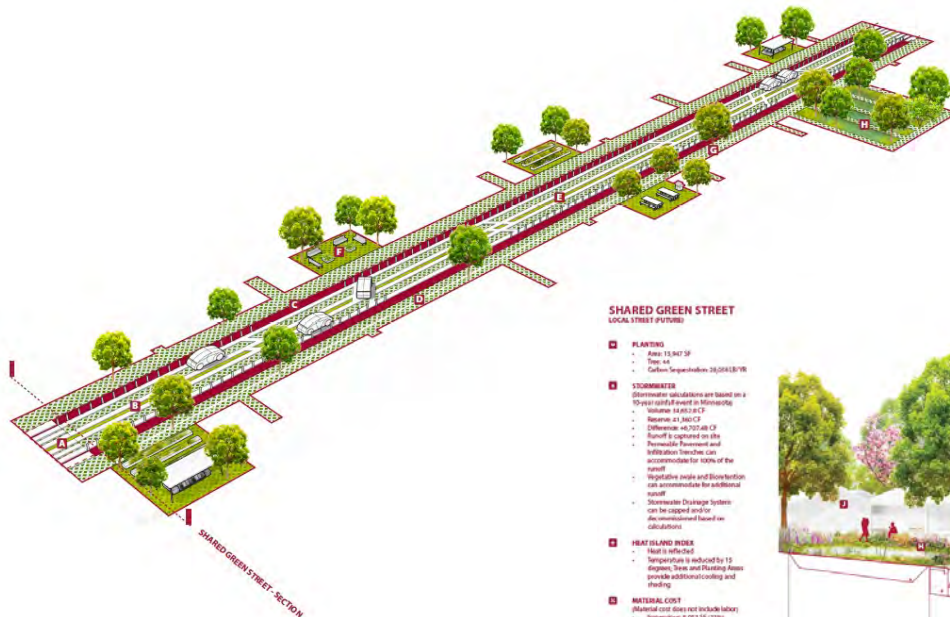
- STORMWATER**
(Stormwater calculations are based on a 10-year rainfall event in Minnesota)
- Volume: 34,952.8 CF
 - Reserve: 41,360 CF
 - Difference: +6,707.48 CF
 - Runoff is captured on site
 - Permeable Pavement and Infiltration Trenches can accommodate for 100% of the runoff
 - Vegetative swale and Bio-retention can accommodate for additional runoff
 - Stormwater Drainage System can be carpooled and/or decommissioned based on calculations

- HEAT ISLAND INDEX**
- Heat is reflected
 - Temperature is reduced by 15 degrees; Trees and Planting Areas provide additional cooling and shading

- MATERIAL COST**
(Material cost does not include labor)
- Impervious: 8,053 SF (33%)
 - Pervious: 15,947 SF (67%)
 - Cost: \$425,642.29
 - Cost decreased by \$604,397.63 (41%)

- PROGRAMS**
- Pedestrian Crosswalk
 - Autonomous Vehicle Tracks
 - Dedicated Bicycle/Small Vehicle Lane
 - Dedicated Pedestrian Sidewalk
 - Pick-up/Drop-off Zone
 - Shared Communal Space/ Front Yard
 - Vegetative Swale and Infiltration Trench
 - Bio-retention and Wetland

--- Street Boundary



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- PROGRAMS**
- Smart Street Technology
 - Autonomous Vehicle Tracks
 - Dedicated Bicycle/Small Vehicle Lane
 - Dedicated Pedestrian Sidewalk
 - Pick-up/Drop-off Zone
 - Shared Communal Space/ Front Yard
 - Vegetative Swale and Infiltration Trench
 - Bio-retention and Wetland
 - Single Family Residential
 - Detached Garage

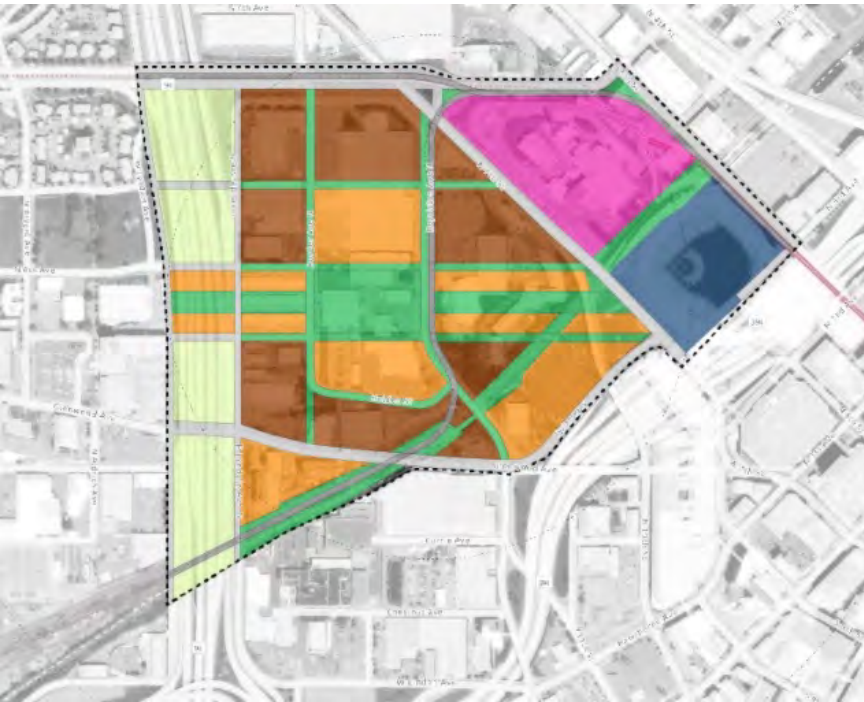
--- Street Boundary



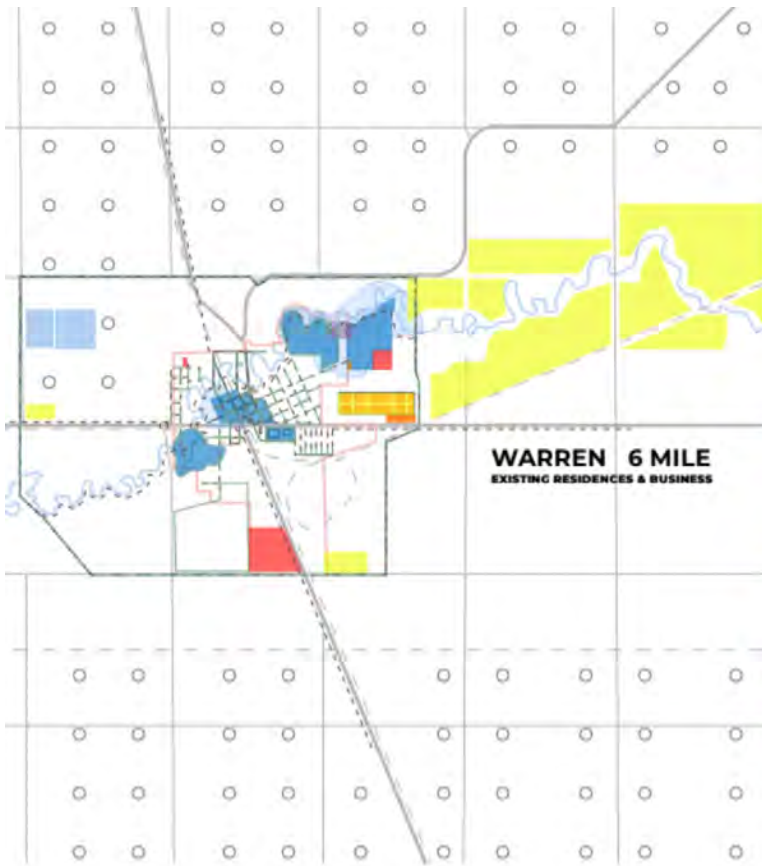
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WARREN POV NEGOTIATION

EXISTING RESIDENCES & BUSINESS

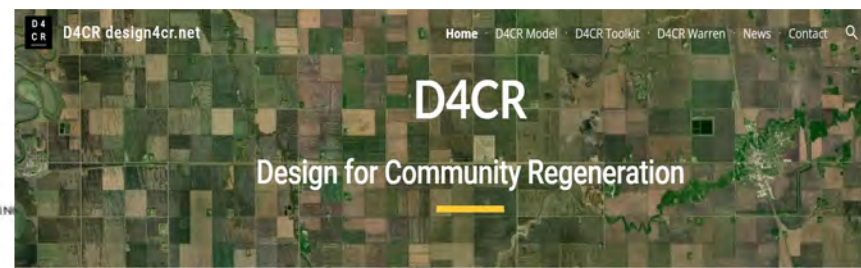
PRIORITIZED BUNDLES

WEDA RIVER PARKS
COMMUNITY MARKET GARDENS
AFFORDABLE HOUSING MANUFACTURING
ECO-AG TOURISM

SECONDARY BUNDLES

GREEN ENERGY INDEPENDENCE
AFFORDABLE GREEN HOUSING DEVELOPMENT
SAFE ROUTES TRAIL LOOP

- WATER
- AGRICULTURE
- GREEN INFRASTRUCTURE
- SOLAR / ENERGY
- TRANSPORTATION
- INDUSTRY
- INSTITUTIONAL
- HOUSING
- ECONOMIC
- EQUITY
- WALKING TRAIL
- CITY LINES
- ROADS
- WIND TURBINE



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HEALING THE URBAN-RURAL DIVIDE THROUGH GREEN INFRASTRUCTURE

LAST YEAR, ERI – THE WORLD'S LEADING GEOGRAPHICAL INFORMATION SYSTEMS COMPANY – AND THE NATIONAL GEOGRAPHIC SOCIETY RELEASED A GREEN INFRASTRUCTURE FOR THE U.S. INITIATIVE (1). THIS EFFORT IDENTIFIES THE NATION'S REMAINING NATURAL AREAS, PROVIDING A POTENTIAL BLUEPRINT FOR LAND PROTECTION AND CONSERVATION. THE INITIATIVE ALSO RECOGNIZES THAT THESE NATURAL ASSETS – GREEN INFRASTRUCTURE – PROVIDE COMMUNITIES WITH INVALUABLE ECOSYSTEM SERVICES THAT CLEAN AIR, CLEAN WATER, AND CLIMATE RESILIENCE. DOMESTIC AND INTERNATIONAL INVESTORS IN THE U.S. SETBACK POSIT TO LAUNCH MAJOR INVESTMENTS IN "GRAY INFRASTRUCTURE" SUCH AS STORMWATER MANAGEMENT SYSTEMS, ROADWAY CURBS AND GUTTERS, AND WATER FILTRATION PLANTS, AND AS THE NATION DEALS WITH DEEP DIVISIONS BETWEEN URBAN AND RURAL COMMUNITIES, THIS INITIATIVE OFFERS AN INNOVATIVE ALTERNATIVE: GREEN INFRASTRUCTURE HAS MANY OF THE SAME, DESIRED OUTCOMES OF GRAY INFRASTRUCTURE AT A FRACTION OF THE COST, WHILE ALSO ENHANCING BOTH RURAL AND URBAN ECONOMIES.

SOME COMMUNITIES HAVE CHOSEN TO PURSUE INNOVATIVE STRATEGIES TO REDUCE THEIR INFRASTRUCTURE COSTS. IN 2013, THE WASHINGTON DC DEPARTMENT OF ENERGY & ENVIRONMENT LAUNCHED THE STORMWATER RETENTION CREDIT TRADING PROGRAM TO OFF-SET THE COSTS OF EXTENDING AND MAINTAINING THE CITY'S STORMWATER COLLECTION AND TREATMENT SYSTEMS. THE PROGRAM INCENTIVIZES DEVELOPERS ON THE CALLONS OF STORMWATER RUNOFF FROM A PROPERTY, PROMOTING GREEN INFRASTRUCTURE BY CREATING AN INCENTIVE-BASED CREDITS AND TRADING SYSTEM RELATED TO STORMWATER GENERATION AND RETENTION. THE PROGRAM PROVIDES A CREDIT FOR EACH PERCENTAGE POINT OF STORMWATER RETENTION REQUIREMENTS AND THEN ALLOWS THEM TO SELL STORMWATER RETENTION CREDITS (SRC) TO OTHER DEVELOPERS THAT CANNOT RETAIN ALL OF THEIR STORMWATER OFF-SITE. THE PROGRAM MANDATES THAT THE CREDITS BE USED TO REDUCE THE STORMWATER COLLECTION AND TREATMENT SYSTEMS TO ACCOUNT FOR THE OTHER HALF BY EITHER PAYING THE IN-LIEU FEE OF \$3.50/GAL/INCH OR PURCHASING LOWER COST SRCs FROM ANOTHER SITE AT APPROXIMATELY 50-CENTS/GAL/INCH TO HELP OFFSET COSTS OF THE STORMWATER COLLECTION AND TREATMENT SYSTEM. ONE SRC CORRESPONDS TO THE RETENTION OF 1 GALLON OF STORMWATER FOR 1 YEAR.

WE THINK THAT WASHINGTON D.C.'S STORMWATER RETENTION CREDIT TRADING PROGRAM OFFERS A VIABLE WAY TO INCENTIVIZE THE INSTALLATION OF GREEN INFRASTRUCTURE IN COMMUNITIES LARGE AND SMALL, ACROSS THE U.S. TO TEST THAT ASSUMPTION, WE HAVE APPLIED THE IDEA OF TRADING STORMWATER RETENTION CREDITS TO A TYPICAL SMALL TOWN - IN THIS CASE, STILLWATER, MINNESOTA - TO DEMONSTRATE THE PROGRAM'S BROAD RELEVANCE; 2) MINNESOTA'S LEGISLATURE HAS HAD HEATED DEBATES OVER A BILL, NOW LAW, THAT REQUIRES THE INSTALLATION OF LANDSCAPE BUFFER STRIPS AROUND MAJOR BODIES OF WATER, PITTING ENVIRONMENTALISTS WANTING TO PROTECT WATER QUALITY IN THE STATE AGAINST FARMERS ARGUING THAT THE LAWS PUTS AN UNNECESSARY BURDEN ON THEM BY TAKING LAND OUT OF PRODUCTION AND LEAVING IT AS A POND; AND WE SEE IN THE STILLWATER, MINN. CASE, THE SUBURBAN D.C. PROGRAM AN OPPORTUNITY TO BOTH PROTECT WATER QUALITY AND COMPENSATE FARMERS AND OTHER PROPERTY OWNERS FOR INSTALLING BUFFER STRIPS.

IN ANY COMMUNITY WITH AGRICULTURAL LAND NEAR URBAN OR SUBURBAN AREAS WITH A LOT OF IMPERVIOUS SURFACES SUCH AS PARKING LOTS OR LARGE, FLAT ROADS, RURAL PROPERTY OWNERS COULD SELL STORMWATER RETENTION CREDITS TO URBAN LANDOWNERS TO OFFSET STORMWATER IMPACTS DOWNSTREAM. THE SALE OF THOSE CREDITS WOULD RELIEVE COMMERCIAL LANDOWNERS IN CITIES AND SUBURBS FROM HAVING TO HANDLE ALL OF THEIR STORMWATER ON SITE. AT THE SAME TIME, IT WOULD PAY FARMERS TO TAKE LAND OUT OF AGRICULTURAL PRODUCTION AND CONVERT PORTIONS OF IT BACK TO GREEN INFRASTRUCTURE IN THE FORM OF VEGETATED BUFFER STRIPS ALONG SUBURBAN WATER, FORESTED HABITAT CORRIDORS, AND REGENERATED WETLANDS AMONG OTHER OPTIONS.

LIKE MANY AMERICAN COMMUNITIES, STILLWATER HAS A RELATIVELY SMALL URBAN CORE ORIENTED TOWARD A RIVER, COMMERCIAL DEVELOPMENT ALONG MAJOR HIGHWAYS, AND A RING OF SPRAWLING, LOW-DENSITY SUBURBAN DEVELOPMENT SURROUNDED BY AGRICULTURAL LAND. THE NATIONAL LAND COVER DATABASE ALSO SHOWS THAT STILLWATER HAS THE GREATEST AMOUNT OF IMPERVIOUS SURFACE IN ITS COMMERCIAL AREAS, DOWNTOWN DISTRICT, INDUSTRIAL ZONES, AND ROAD AND HIGHWAY RIGHT-OF-WAYS. FOR PURPOSES OF THIS STUDY, WE HAVE EXCLUDED RESIDENTIAL AREAS, WITH THEIR IMPERVIOUS DRIVEWAYS, OR THE DOWNTOWN, WITH ITS OLDER BUILDINGS, AND HAVE FOCUSED JUST ON THE HIGHWAY-ORIENTED COMMERCIAL AREA AT EDGE OF TOWN.

STILLWATER, THAT COMMERCIAL AREA COVERS 23 ACRES WITH 64% OF THAT ACREAGE COMPRISING IMPERVIOUS SURFACES. THAT ONE ZONE WOULD GENERATE APPROXIMATELY 5 MILLION GALLONS OF STORMWATER RUNOFF DURING A 1 INCH STORMWATER EVENT, WHICH HAS A 90 PERCENT LIKELIHOOD OF OCCURRING AT LEAST ONCE EVERY FIVE YEARS. IF WE ASSUME THAT THE REMAINING 77 PERCENT OF THE ZONE AND ASSUMING HALF OF THIS STORMWATER GETS CAPTURED CISTERN, WE DETERMINED THAT A \$0.50/GAL/YEAR FEE, CONSIDERABLY SMALLER THAN WHAT C.D.C. CHARGES, WOULD GENERATE APPROXIMATELY \$3.85/MY. IF WE ASSUME THAT ALL OF THE STORMWATER IS CAPTURED CISTERN, THEN A \$0.10/GAL/YEAR OR \$100/ACRE YEAR, THIS CREATES A POSITIVE CASH FLOW TO FARMERS WHOSE LAND IN PRODUCTION GENERATES AN AVERAGE ROF 57¢/SWATCH/INCH. IN STILLWATER, THIS TRANSLATES A 47% ACRES OF THE TOTAL ACREAGE OF THE ZONE. IF WE ASSUME THAT ONLY 50% OF THE STORMWATER IS CAPTURED BY THE MILES OF STREAMS, IMPLEMENTING 100-FOOT BUFFER ZONES AROUND THESE WATER BODIES TOTALS 2,264 ACRES, LEAVING 2,481 ACRES OF LAND AVAILABLE FOR CONVERSION TO GREEN INFRASTRUCTURE. IN OTHER AREAS OF THE LANDSCAPE, SUCH AS ALONG RURAL ROADS IN ORDER TO TRANSFER runoff FROM FARM FIELDS.

THIS EXAMPLE SHOWS HOW GREEN INFRASTRUCTURE OFFERS AN ECONOMICALLY VIABLE, POLITICALLY EQUITABLE AND ENVIRONMENTALLY RESPONSIBLE WAY OF DEALING WITH OUR NATION'S LANDSCAPE. A STORMWATER RETENTION CREDIT TRADING PROGRAM REPRESENTS A COST-EFFECTIVE SOLUTION TO DEALING WITH AMERICA'S AGING INFRASTRUCTURE, WHILE PROTECTING LOCAL WATERSHEDS, LOWERING COSTS FOR URBAN AND SUBURBAN PROPERTY OWNERS, AND INCREASING PAYMENTS TO FARMERS TO PROTECT OUR WATERWAYS AND TO PROVIDE HABITAT CORRIDORS FOR OTHER SPECIES – A WIN-WIN-WIN FOR EVERYONE INVOLVED.

SOURCES
[HTTP://WWW.ESRI.COM/ABOUT-ESRI/GREENINFRASTRUCTURE](http://www.esri.com/about-esri/greeninfrastructure)
[HTTPS://DOEE.DC.GOV/SRC](https://doee.dc.gov/src)
[HTTP://FARMDOCDAILY.ILLINOIS.EDU/2014/10/FARMER-RETURNS-FOR-CASH-RENT-SHARE-RENT-AND-OWNED-FARM-AND-HOME](http://farmdocdaily.illinois.edu/2014/10/farmer-returns-for-cash-rent-share-rent-and-owned-farm-and-home)



GREEN INFRASTRUCTURE CALCULATIONS

STORMWATER RUNOFF IN STILLWATER, MINNESOTA
TOTAL COMMERCIAL AREA
SWRV (GAL) IN COMMERCIAL AREA
 (1.1 IN(.95%IMPERVIOUS)*AREA)*.48/12
 OFFV = SWRV/2
 ILF (IN-LIEU-FEE) (\$0.5/GAL)

STORMWATER CREDIT (SRC)
SRC VALUE
SRC/ILF RATIO
POTENTIAL SRC BUYER QUANTITY
POTENTIAL SRC BUYER QUANTITY

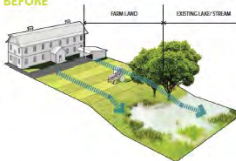
RURAL STORMWATER CREDIT
AVERAGE FARM OWNER REVENUE
VALUE OF ACRE OF FARM LAND
POTENTIAL FARM LAND CONVERSION TO BUFFER

GREEN INFRASTRUCTURE STRATEGY (100 FT BUFFER)
LAKE BUFFER
STREAM BUFFER
POTENTIAL FARM LAND CONVERSION TO BUFFER

LAND AVAILABLE FOR CONVERSION TO BUFFER
IN URBAN STREETS, SUBURBAN HOMES, RURAL ROADS
AND TRAILS, AND HABITAT CORRIDORS
(ASSUMING 100FT LAKE & STREAM BUFFER)



BEFORE



AFTER



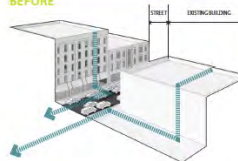
BEFORE



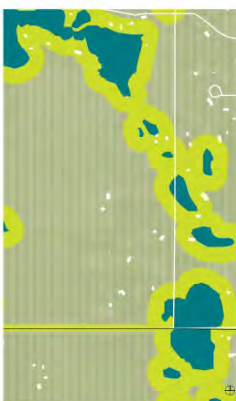
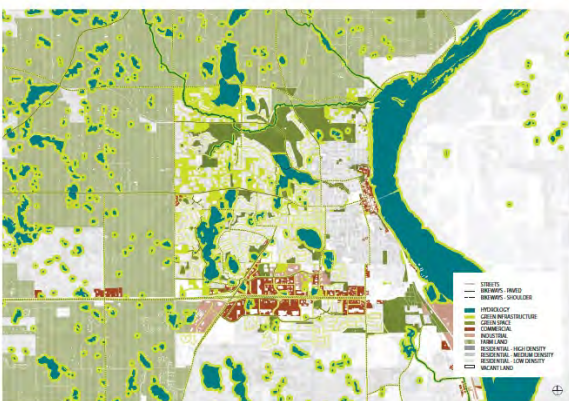
AFTER



BEFORE



AFTER



Thank you!

Empowering Small MN Communities:

<https://www.cts.umn.edu/programs/empoweringcommunities>

Minnesota Design Center:

<https://design.umn.edu/minnesota-design-center>



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