Grand Rapids, Michigan

~200,000 residents
45 sq. miles
Leader in smart public investment
Green infrastructure program
ArtPrize
BeerCity USA
Transportation Challenges
Vital Streets Project

Just How Bad?

2002: 60% Fair to Good
2012: 60% Poor
2019: 87% Poor

Only 8% of our streets are in good condition.

Streets are Vital for

Residential
- Increased property values
- Better mobility (cars, biking, walking, and buses)

Small Business
- Customers need to safely reach retailers & restaurants in the area

Big Business
- Streets are vital for moving goods & products to consumers

Our Goal: 70% Good Repair

Condition

What’s Needed?
- $22 million a year
- ($294.6 million over 15 years)
Vital Streets Project

• Funding + Citizen Ballot Initiative Renewal

• Critical Needs & Issues for Transportation Funding
  – Safe city
  – Multi-modal city
  – Equitable City

• Decision Making Framework
  – Asset Management
  – Community Equity

• VITAL STREETS = “Complete Streets” PLUS “Green Infrastructure”
Project Partners

- Vital Streets Oversight Commission
  - 26 members

- Stormwater Oversight Commission
  - 8 members

- City of Grand Rapids

- Technical Partners
  - Nelson/Nygaard, SmithGroupJJR, FTCH, Truscott Rossman

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Streets are Complex Places
The **network** of city streets and rights-of-way will be accessible, attractive, multimodal and safe; serving all people of our community, contributing to the **livability** of our neighborhoods and business districts, protecting the **quality of our river**, and increasing **economic opportunity** to individuals, businesses, and new development.

Infrastructure assets will be **maintained and well-managed**, using a multi-faceted funding and educational strategy and **innovative** approaches to preserve our investment.
Values & Measureable Outcomes

The Vital Streets investments should advance the ambitious goals and targets established by the City of Grand Rapids. Specifically:

» **Mode Share.** Reduce single-occupant vehicle travel from a 95% drive-alone commute rate to 45% by 2035 by providing efficient transit corridors, safe walking and bicycle facilities and smart solutions for ride-sharing to achieve mode split of 20% transit, 12% walking, 5% biking, and 20% ridesharing.

» **Equity.** Ensure transportation options are available, affordable, and reliable for all people to meet their travel needs regardless of age, ability, race, ethnicity, or economic status.

» **Vision Zero.** Eliminate all traffic related serious injuries and fatalities on Grand Rapids city streets.

» **Health:** Vital Streets promote and enable walking, bicycling and other forms of active transportation. Vital Streets should, over time, contribute to reductions in childhood and adult obesity and improve public health outcomes.

» **Age-Friendly Community:** Vital Streets will serve and accommodate people through their many phases of life from an infant in a stroller to student walking to school to active adult commute to access for aging seniors.

» **Climate Change:** Vital Streets will reduce transportation related emissions by reducing Vehicle Miles Travelled (VMT) through the increased use of transit, shared vehicles, and non-motorized travel.
Vital Streets Components

Street Typology

Multi-Modal Network
- Bike Plan
- Transit
- Vehicles
- Pedestrian

Design Guidelines

Project Selection
- Asset Management
- Equity Analysis

Performance Monitoring
- Communication
- Dashboards
Street Typology: Form, Function and CONTEXT

• Street Typology Approach & Needs

OLD APPROACH
Building “Out” from Centerline

National Functional Classification (e.g. Arterial, Collector, etc.)

NEW APPROACH
Building “In” from Context

Considers the land use context as a basis for street design. Not just about moving cars.
### Street Typology: Form, Function and CONTEXT

**Balance of “Thru” and “To” Function**

“PLACE” status of public spaces/streets  “LINK” status for meeting mobility needs

<table>
<thead>
<tr>
<th>Street Family</th>
<th>Land Use Context</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boulevard</td>
<td>City (7 stories +)</td>
</tr>
<tr>
<td>Avenue</td>
<td></td>
</tr>
<tr>
<td>Street</td>
<td></td>
</tr>
<tr>
<td>Access Lane</td>
<td></td>
</tr>
</tbody>
</table>
Street Typology: Street Design Affects Safety

- Conventional street design:
  - Posted speed: 25 mph
  - Design speed: 30 mph
  - Operating speed: 40 mph

- Context sensitive street design:
  - Posted speed = Design speed = Operating speed: 25 mph
Street Typology: Street Design Affects Safety

The Effect of Vehicle Speed on Pedestrian Fatalities

- Speed Limit 15: <5% chance of pedestrian fatality
- Speed Limit 25: 12% chance of pedestrian fatality
- Speed Limit 30: 20% chance of pedestrian fatality
- Speed Limit 40: 45% chance of pedestrian fatality

Street Typology: An Aspirational Response

Streets can be a **catalyst for reinvestment**

- Where will land uses change? When?
- How do we want land uses to change?
- How can street facilitate desired land use change?
Street Typology: Framework Map

GIS used to transcribe zoning to street segments and developing typologies

- Refinement and ground trothing
- Modification based on aspirational outlook

Street Type
- Neighborhood Residential
- Link Residential
- Network Residential
- Crosstown Connectors
- Neighborhood Business (Major)
- Neighborhood Business (Minor)
- Urban Center (Major)
- Downtown Streets (Minor)
- Maker/Industrial Primary (Major)
- Maker/Industrial (Minor)
- Service
- Highways
- Trail (Existing or Proposed)
The Curious Case of the Constrained Right-of-Way

- Complete Streets is a great idea – *except when it doesn’t fit*
- Need to make tough choices and tradeoffs.
Multi-Modal Networks: Competing Values

- **Vehicular** Level of Service (LoS) only tells part of the story.

**MOVING CARS**
- 28.4 PEOPLE PER BLOCK

**MOVING PEOPLE**
- 125 PEOPLE PER BLOCK
Multi-Modal Networks: Detecting Conflicts

• GIS dataset developed that looked at:

  - Cycling Infrastructure
  - Transit
  - Stormwater
  - Freight/Traffic
  - Parking
  - Pedestrian
  - Forestry/Landscape
  - Road Infrastructure

• Conflicts identified + scored based on severity
Multi-Modal Networks: Mode Emphasis

Key Considerations

• Diversity of bicycle riders
• “Disaggregating” the network
• Shifting to parallel streets
• Integrate the street typology overlap
Multi-Modal Networks: Bike Facility Plan

- Growing toolbox of bicycle infrastructure.

- City had multiple bike plan efforts that had been conducted – but were often developed in isolation of other street demands.

- Vital Streets Bike Plan leveraged the functional emphasis data to provide a comprehensive bike facility plan.
Design Guidelines: A Toolshed, Not a Toolbox

BUFFED BICYCLE LANE:
- Bicycle facilities may offer an opportunity for porous concrete or asphalt treatments.

SPECIAL CONSIDERATIONS:
- Connectivty among buffered bicycle lanes and other low stress bikeways, like bicycle boulevards, is essential to attract a wider variety of user types.
- Buffered bicycle lanes shall be routed behind transit bus bulbs to eliminate conflicts between boarding or alighting passengers and through bicyclists.
- Flexible posts may be necessary at entry points to the protect bicycle lane to prohibit vehicles from entering.
- Make gutter seams, drainage inlets, and utility covers flush with the ground to prevent conflicts with bike tires. Ensure openings in grates are perpendicular to the bicycle direction of travel to avoid trapping bicycle tires.
- Avoid locating manholes and other utility vaults in bicycle lanes. Ensure any utility or vault covers are properly set and maintained to be flush with the road surface.

REFERENCES:
- USA Bicycle: https://www.usabicycles.org/urban-bikeways-design-guide/cycle-tracks/
- MNDOT: https://www.dot.state.mn.us/roadsigns/MarkSigns/081101.pdf

VITAL STREETS PLAN

SEPARATED BICYCLE FACILITIES

Separated bicycle lanes are on-street bicycle facilities with physical separation between the bicycle facility and the roadway, often through a curb, parked vehicles, planted median raised above street grade, or flexible post. Sometimes referred to as “cycle tracks”, separated bicycle lanes can increase the sense of safety and comfort for bicyclists. Separated bicycle lanes correlate positively with increased cycling activity, as they improve comfort for all types of bicyclists, especially those that are less experienced riders. Separated facilities can dramatically reduce the risk of bicycle/vehicle conflict.

USE:
- While separated bicycle lanes offer more protection and attraction than standard on-street bicycle lanes, they also require a greater amount of street space.
- Separated bicycle lanes often require the conversion of curbside parking or a travel lane for implementation, which may be a significant concern in denser areas.
- Separated bicycle lanes are the preferred bicycle facility on any bicycle emphasis corridor with traffic volumes in excess of 10,000 vehicles per day. Separated bicycle lanes are also ideal for corridors with vehicle speeds higher than 35 mph, those with high collision rates, or areas with high numbers of bicyclists.

DESIGN:
- Separated bicycle lanes shall have a minimum of five feet exclusive of the buffer for a one-directional facility (seven feet is preferred) and eight feet minimum for a two-way facility (10 foot is preferred), inclusive of the gutter.
- Five feet is the preferred width of the separation barrier between separated bicycle lanes and roadway travel lanes; the minimum width is three feet.
- Parked cars in the parking lane may be used as a barrier between the separated bicycle lane and travel lanes. In this case, temporary or permanent curbing and/or flexible posts should be used to ensure that parked vehicles do not encroach upon the bicycle facility.
- Separated bicycle lanes may be flush with the street level, raised to the sidewalk level, or at an intermediate level between street and sidewalk. For sidewalk-level bicycle lanes, use different colors, materials or pavement markings to differentiate from pedestrian space.
- Separated bicycle lanes require careful design at intersections to minimize conflicts with turning vehicles and to improve legibility, visibility, and predictability for all travelers. Special bicycle traffic signals may be necessary at signalized intersections, especially for two-way cycle tracks on one-way streets.
- Use colors, yield, and “Yield to Bikes” signage to make it clear that the protected bicycle lane has priority over crossing traffic. Points of conflict should be clearly marked for both the cyclist and motorist. Bicycle through movements and motor vehicle turning movements...
Project Selection: Prioritization Framework

Funding:
- Investment Guidelines

Asset Management:
- Pavement conditions

Safety:
- Crash locations
- Crash severity

Equity:
- Balance and Distribution
- Demographic Need
- Connectivity Opportunities
Equity is vital for the health of the community and central to the values of Grand Rapids.
Equity Analysis: Demographic Need

Reflects *potential* need for improved mobility access and options.

**Factors:**
- Older Adults
- Young People
- People with Disabilities
- People of Color
- Population Density
- Median Household Income

All data aggregated into Census blocks (2010).

Typically, each census block was scored based on a 1-5 scale (quantiles) for each factor.
Equity Analysis: Demographic Need

• Composite map aggregated the demographic need factors into a single 1-5 score.
Equity Analysis: Connectivity Opportunity

Reflects *opportunity* to connect to mobility infrastructure and/or address safety and access concerns.

**Factors:**
- Transit Access
- Park Access
- Sidewalk Connectivity
- Bicycle Connectivity
- Employment Density
- Commercial Density
- Tree Canopy
- Bicycle and Pedestrian Crashes

All data aggregated into Census blocks (2010). Typically, each census block was scored based on a 1-5 scale (quantiles) for each factor.
Equity Analysis: Connectivity Opportunity

• Composite map aggregated the connectivity factors into a single score.
Equity Analysis: Combined Score

- Uses a score matrix to highlight low-high demographic need and low-high connectivity opportunity independently.

- Analysis used to help select projects that can yield higher returns (e.g. community benefit).
Performance Monitoring

Communicating success is key to community buy-in, leadership support, and building resiliency.
• Year-by-year breakdown of miles improved, % good condition, investment by city wards.
• Showcase priority analysis stools
• Map data accessibility
**Communication: Public Coordination**

- Shows project status and upcoming work schedule
- Shows public road closures and information portal
- Integration with “My Neighborhood” series of web maps/apps
• Used for showing current status of work and tracking performance measures.

GRAND RAPIDS - ENGINEERING DEPARTMENT

ENVIRONMENTAL SUSTAINABILITY GOALS

Vital Streets - Sidewalk Program

Overview
The City's Sidewalk Department inspects and fixes sidewalks that present a danger to pedestrians in response to complaints or property owner requests. Further we look for opportunities to expand our network to better meet the needs of our walking citizens.

Statistics
Over 860 miles of sidewalk
That is enough sidewalk to get from Grand Rapids to Washington DC. With plenty to spare.

Approximately 22,862,000 square feet of concrete.
Roughly 115 square feet per resident in Grand Rapids.

Estimated Sidewalk System replacement value:
$245,005,000

SUSTAINABILITY GOAL: Through the Vital Streets Program, the City inspect and repair all City sidewalks by 2030.