Transit Network Design and Service Tradeoffs Workshop

Presented by: Thomas Wittmann

May 15, 2019

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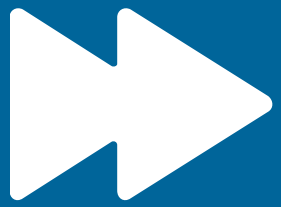
PRESENTATION OVERVIEW

The How and Why of Transit



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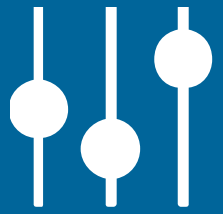
Introduction



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Tradeoffs in Transit Planning

3

Considerations in Transit Planning

4

Next Steps

Introduction

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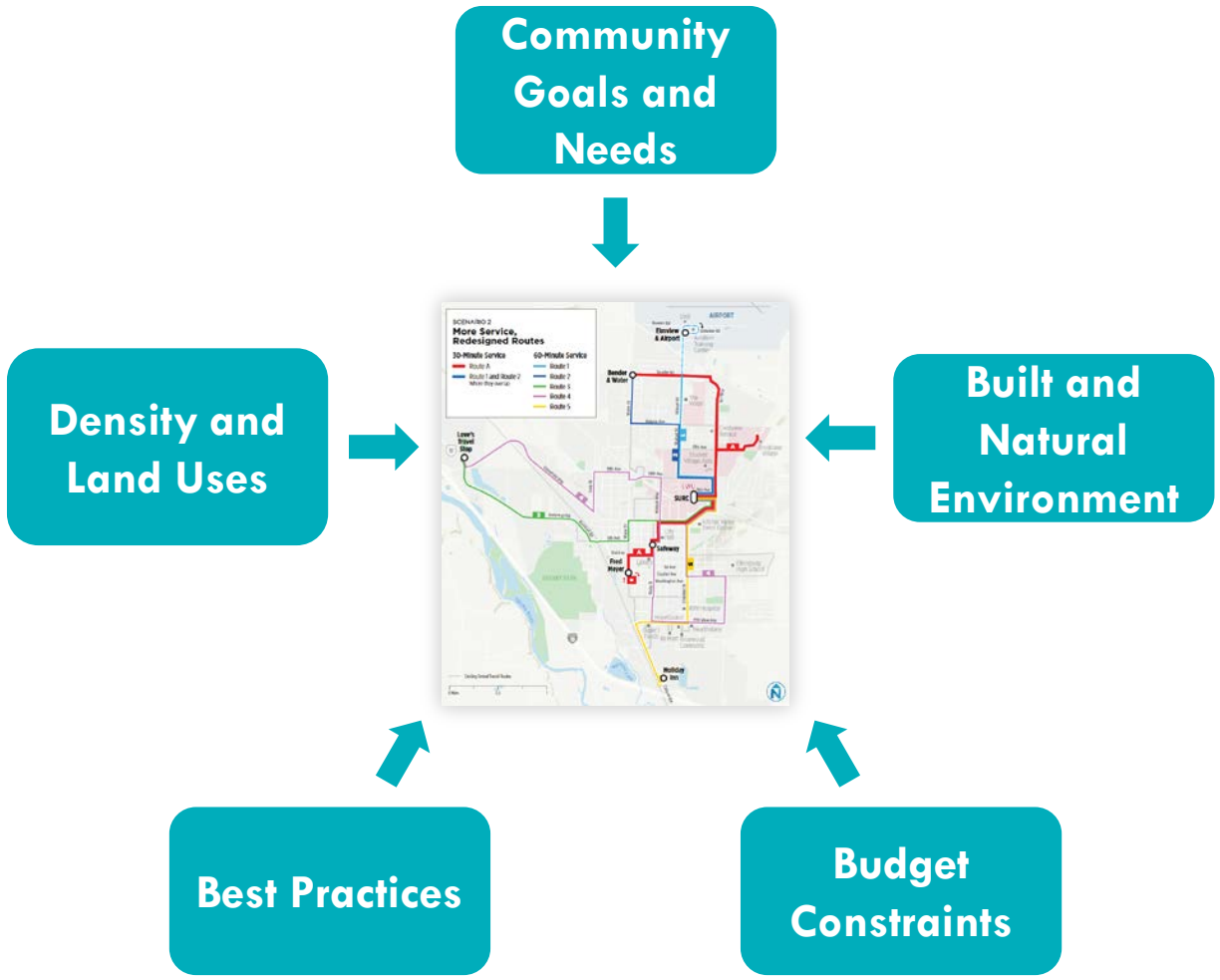
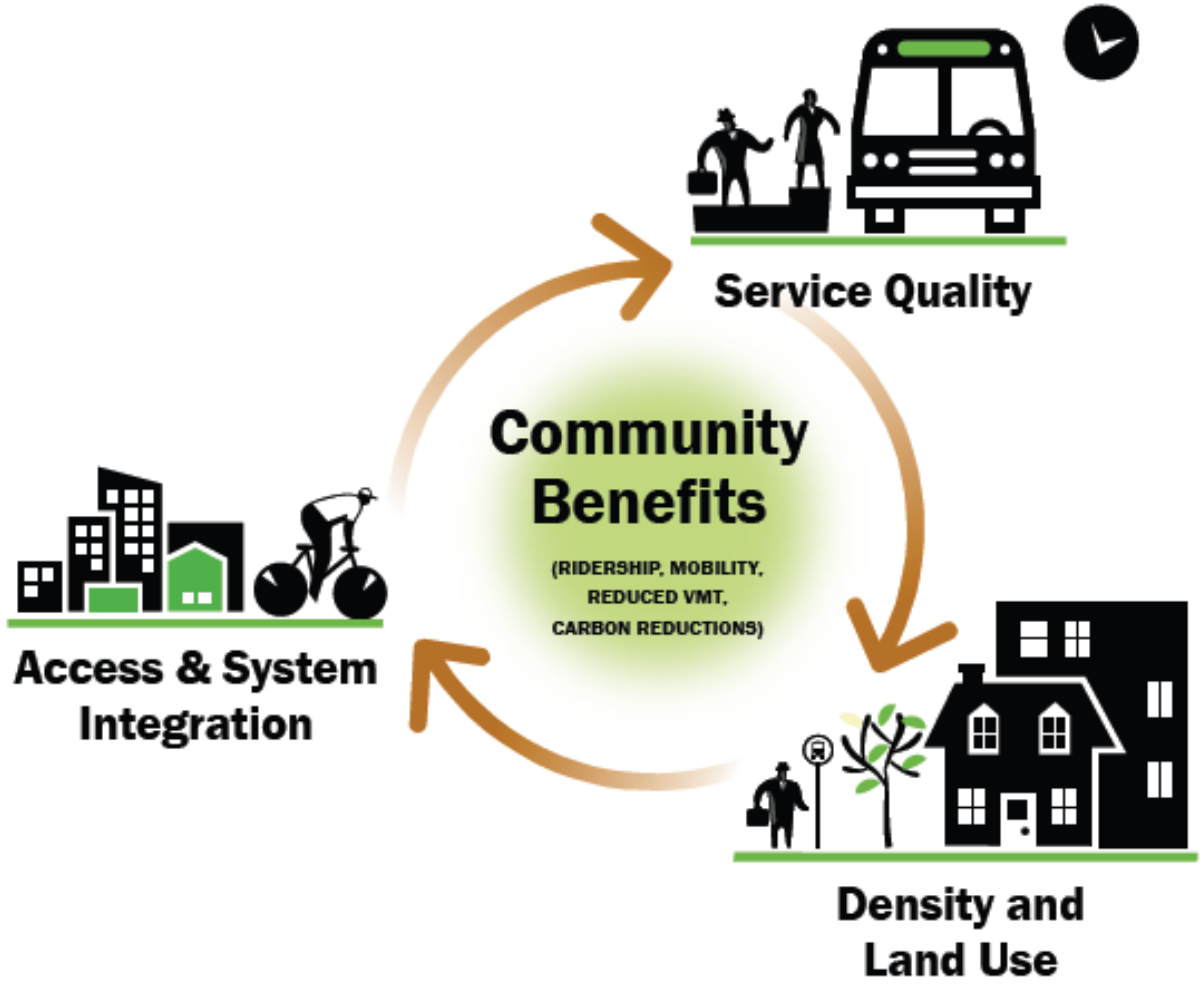
TRANSIT PLANNING CONSIDERATIONS

- What makes transit successful?
- How does service design relate to community goals and needs?
- What may constrain service design or level of service?

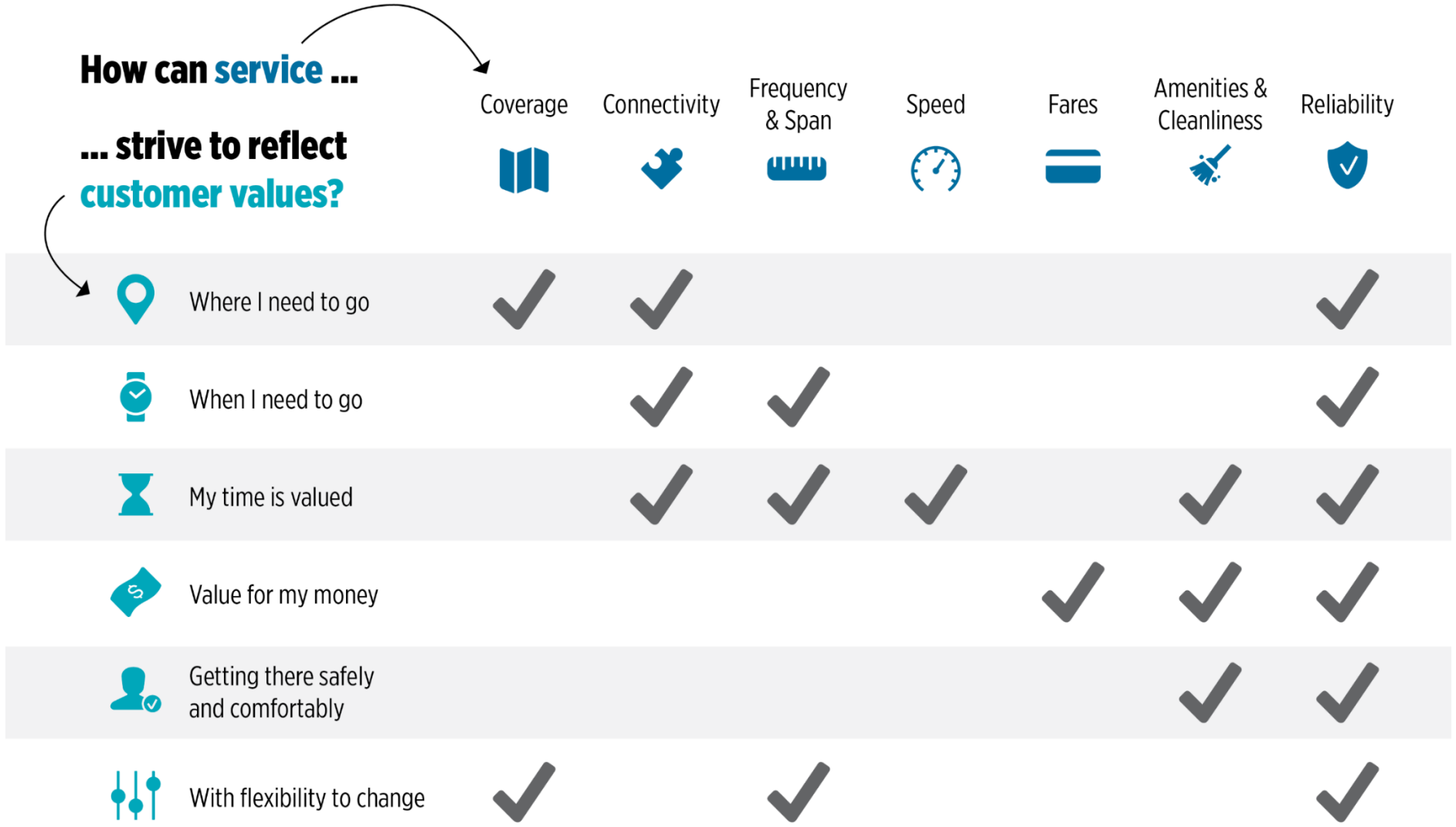


DELIVERING COMMUNITY BENEFITS

Coordinated Investment



MAKING THE CHOICE TO USE TRANSIT



IMPORTANCE OF POLICY FRAMEWORK

- Service planning is about tradeoffs
- If service is expanded, what are the priorities for investing those resources?
- Where are the right places to invest, what are the right markets to serve, and what does equitable investment look like?
- Policy framework provides staff with direction on everyday network design decisions
  - Planning for the long-term outcome to inform short-term decisions
  - Consistency in how decisions are applied to each route or community

Tradeoffs in Transit Planning

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WHAT ARE THE REGION'S VALUES?

FREQUENCY AND SPAN

Provide more frequent service for a shorter time ⟷ Provide less frequent service for a longer time

COVERAGE

Provide less frequent service to more areas ⟷ Provide more frequent service to fewer areas

DAYS OF SERVICE

Provide less weekday service and more weekend service ⟷ Provide more weekday service and less weekend service

TRANSFERS

Provide more routes with less frequent service but fewer transfers ⟷ Provide fewer routes with more frequent service but more transfers

DIRECTNESS

Provide slower and less direct service with shorter walks to stops ⟷ Provide faster, more direct service with longer walks to stops

STOP SPACING

Serve many stops that make service slower but reduce walking distance ⟷ Serve fewer stops to speed service up but increase walking distance

SERVICE TYPE

Improve the local bus network ⟷ Improve the commuter bus network

SERVICE DISTRIBUTION

Provide service in areas in proportion to funding ⟷ Provide service to areas with the most need

IMPORTANCE OF FREQUENCY

FREQUENCY AND SPAN

Provide more frequent service for a shorter time ⟷ Provide less frequent service for a longer time

- Wait less, travel conveniently
- Make connections **easily**
  - When the network is frequent, benefits are multiplied
- Trip security
  - Another bus is coming soon

Imagine if …

You showed up for work, but the elevator only came every 60 minutes

IMPORTANCE OF SPAN OF SERVICE

FREQUENCY AND SPAN

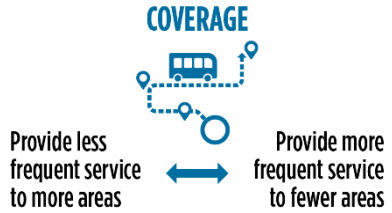
Provide more frequent service for a shorter time ⟷ Provide less frequent service for a longer time

- Job market has expanded beyond standard 9 to 5 times
- Discretionary / non-work related trips are most often during non-peak times
- Longer span of service allows for more trip types to be served

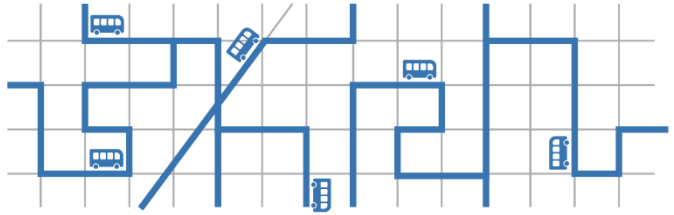
Imagine if …

You showed up for work, but the elevator only operated between 6 to 9 a.m. and 3 to 6 p.m.

PRODUCTIVITY VS. COVERAGE TRADEOFF



COVERAGE

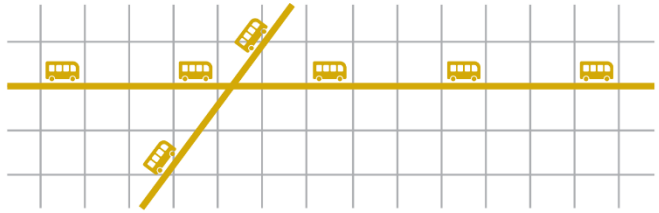


More people have **some** transit access

Ridership is **lower**...

... but really **important** for those who use it

FREQUENCY



More **trips** on transit!

Ridership is **higher**...

... but **no service** in many places

IMPORTANCE OF OPERATING MORE DAYS OF THE WEEK

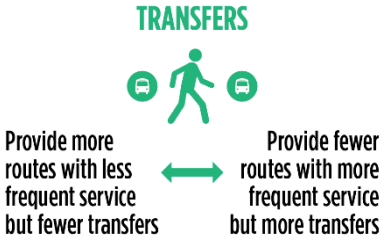
Seven Day Focus

- **Positives**
  - Growing service industry job types are served
  - Ability to live without a car is enhanced
  - Mobility for people who rely on transit improves
- **Drawbacks**
  - Weekend service carries fewer people

Weekday Focus

- **Positives**
  - Resources put where it carries the most passengers
- **Drawbacks**
  - Job access and overall mobility for unserved areas is diminished

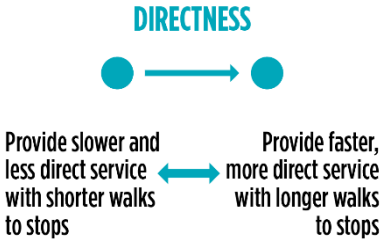
IMPORTANCE OF TRANSFERS

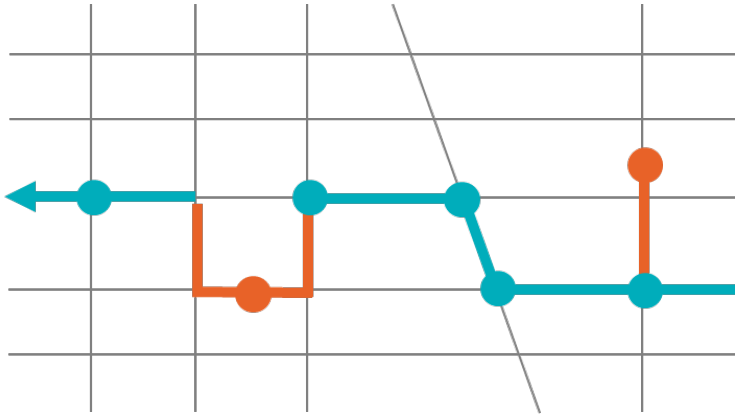


- Most trips within a metropolitan area cannot be served with a one seat ride
- Is it more important to try to serve trip patterns without transfers?

- **Considerations**
  - Customers tend to dislike transfers
  - Frequent service and good connections can reduce these perceptions
  - Greater emphasis on one-seat rides can lead to less frequent and lower utilized routes
  - Where is the balance?

IMPORTANCE OF ROUTE DIRECTNESS





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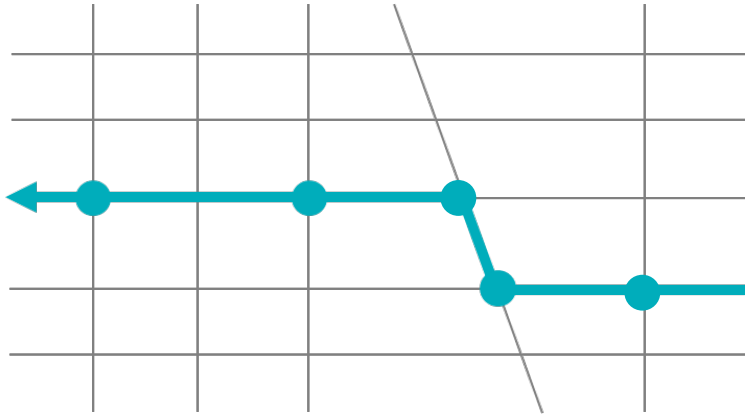
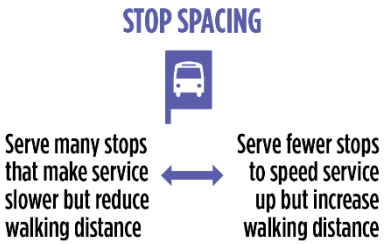
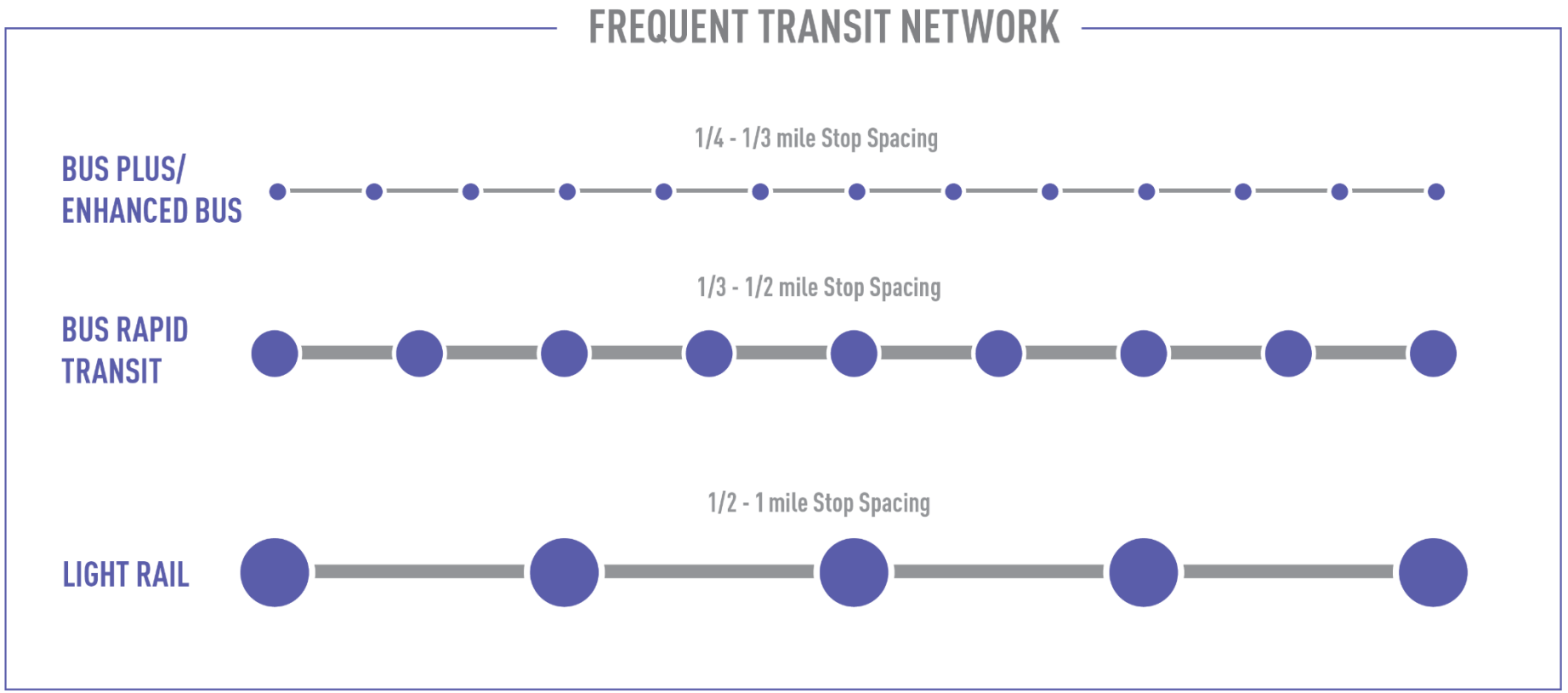


- **Positives**
  - Shorter walks for percentage of riders
- **Drawbacks**
  - Slower travel times for most riders
  - Higher operating costs

- **Positives**
  - Faster travel times for most riders
  - Lower cost
- **Drawbacks**
  - Some people have to walk farther

IMPACT OF STOP SPACING ON SPEED

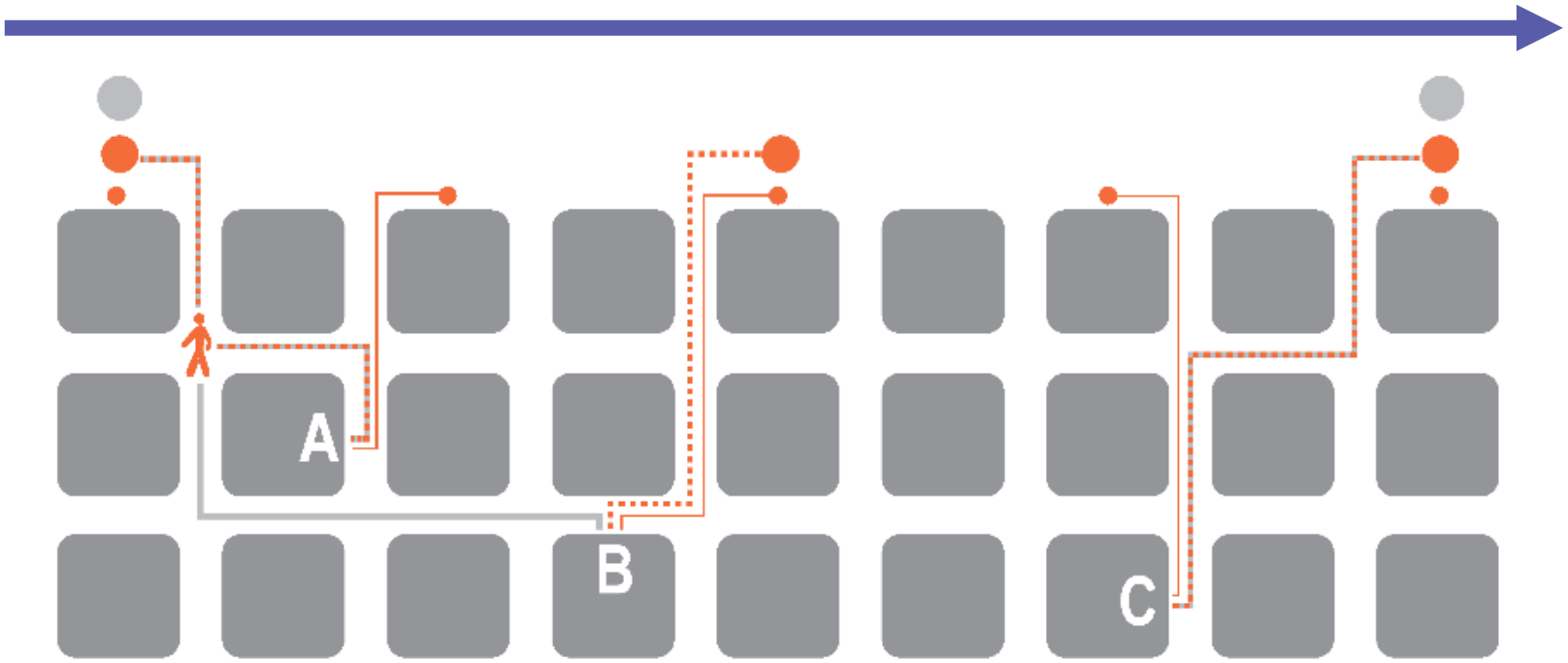




FASTER SERVICE
BUT SOME LONGER WALKS?

STOP SPACING

Serve many stops that make service slower but reduce walking distance ⟷ Serve fewer stops to speed service up but increase walking distance



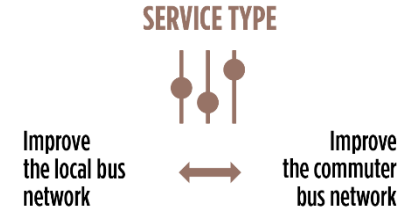
BlocksTraveled by Service Provided

	1/8 mi. Service	BRT 1/4 mi.	BRT 1/2 mi.
Household A	2 blocks	3 blocks	3 blocks
Household B	3 blocks	3 blocks	5 blocks
Household C	3 blocks	3 blocks	4 blocks

Walking Travel Path to Transit Stop

- BRT Stop (1/2 mile stop spacing) and Path
- BRT Stop (1/4 mile stop spacing) and Path
- 1/8 mi. Service Stop and Path

IMPORTANCE OF SERVICE TYPES



Local Services

- Serves all-day market with many trip purposes
- Higher ridership
- Lower operating and capital costs

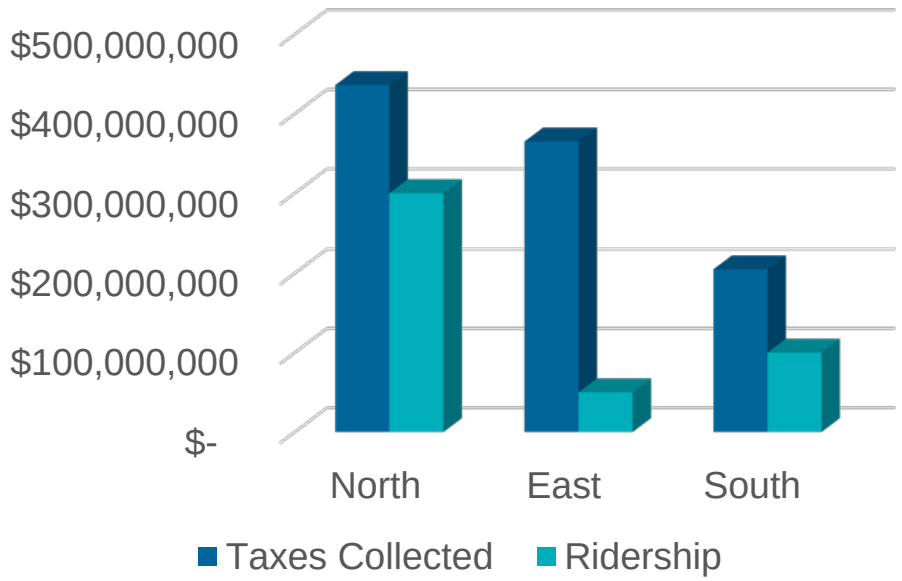
Commuter Services

- Takes people off the road at most congested times
- Attracts downtown employee market
- High operating cost
- High capital cost due to need for park-and-rides

SERVICE DISTRIBUTION HYPOTHETICAL EXAMPLE

SERVICE DISTRIBUTION

Provide service in areas in proportion to funding ⟷ Provide service to areas with the most need



East King County
Population: 579,000
Taxes Collected: $365M
Annual Ridership: 50M

North King County
Population: 782,000
Taxes Collected: $436M
Annual Ridership: 300M

South King County
Population: 511,000
Taxes Collected: $205M
Annual Ridership: 100M

Population & sales tax = 2017, ridership is fictional – i.e. for illustrative purposes only

Considerations in Transit Planning

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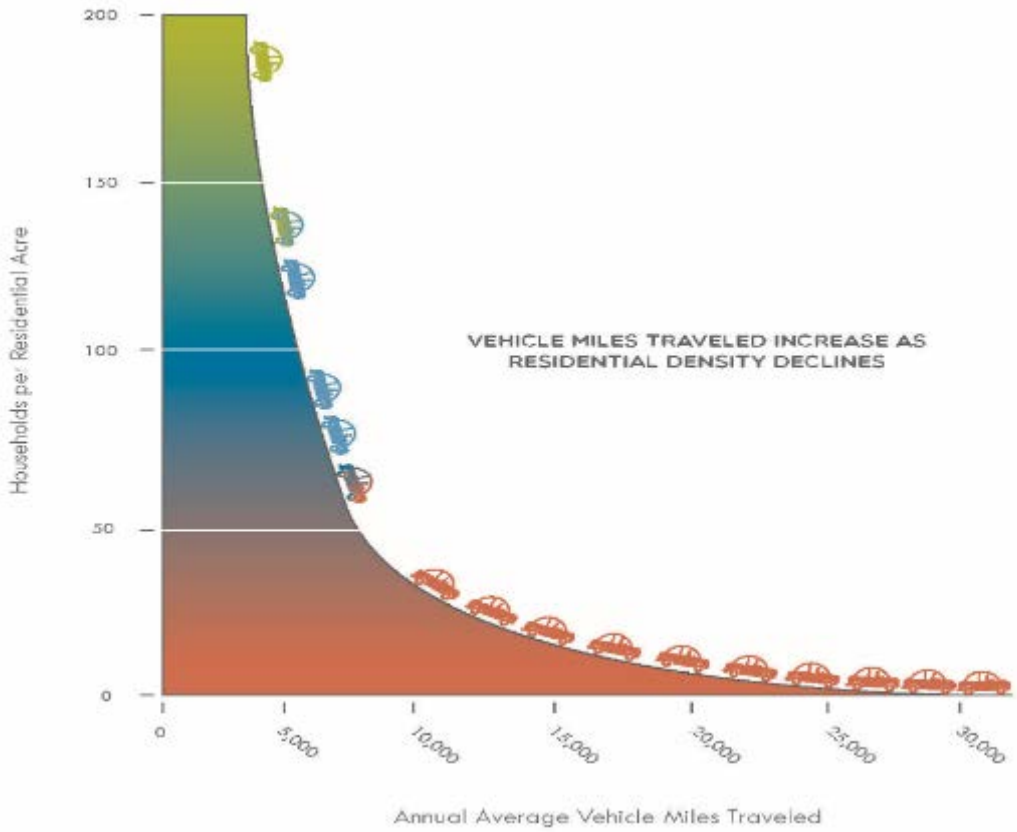
COORDINATING LAND USE AND TRANSPORTATION

- Classic “chicken-and-egg” problem:
  - Transit quality is a key criterion for land use development
  - Yet land use is also a key criterion for transit service performance
- Ideally, quality transit will be available when land use and street design use good transit-oriented forms
- Tools:
  - Frequent Transit Networks/Lines
  - Community based services to feed frequent network
  - Transit priority in the roadway

DESIGN, DIVERSITY, AND DENSITY

The design of downtown Bend encourages biking and walking – both providing access to transit



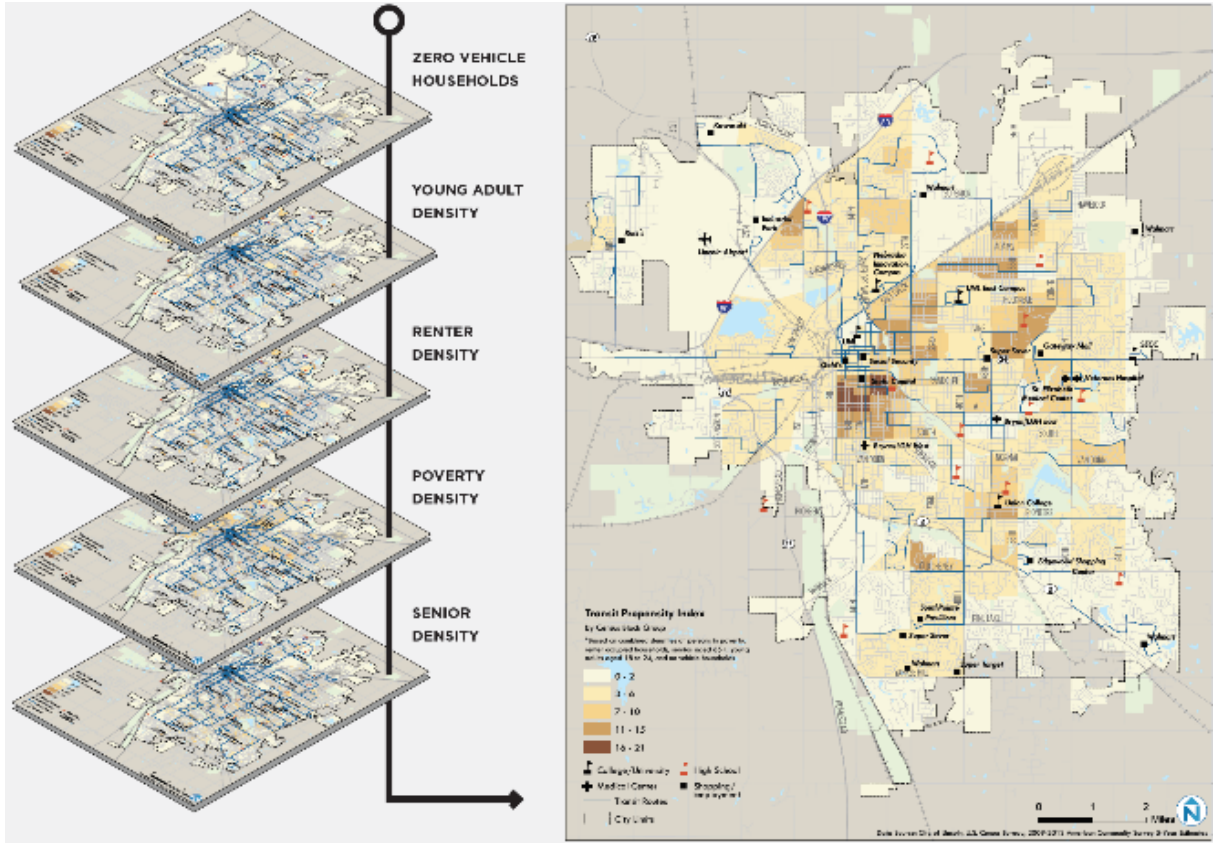
Studies show that households in higher density areas make 25% less auto trips on average

TRANSIT MARKETS

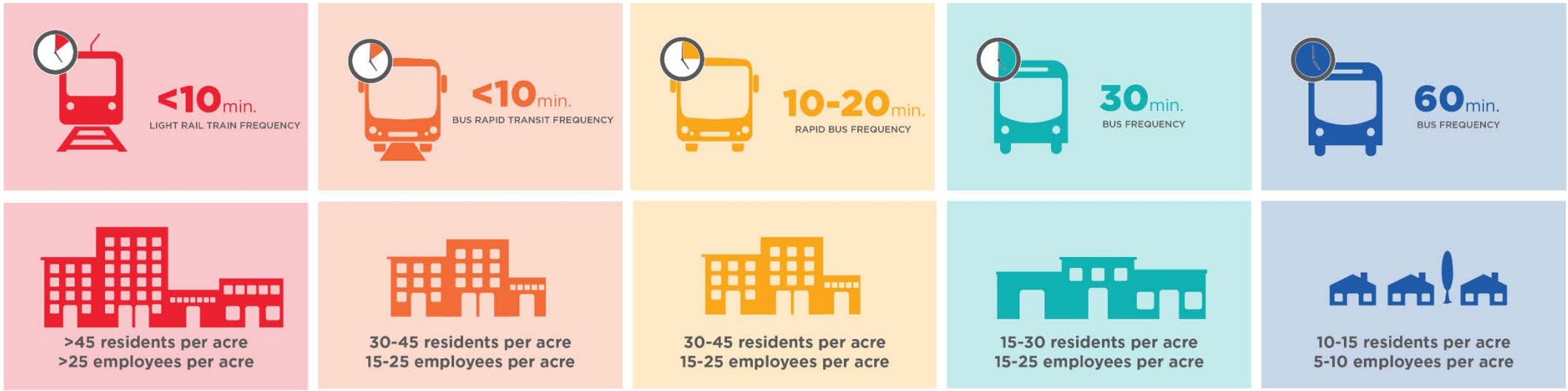
- **Riders with Options**
  - Options are increasing
  - Paying for location efficiency
  - Transit is one choice among an increasing number

- **People who Rely on Transit**
  - Options are not increasing
  - New options are expensive
  - Mobility choice spreads demand and can threaten existing services

Groups More Likely to Rely on Public Transportation

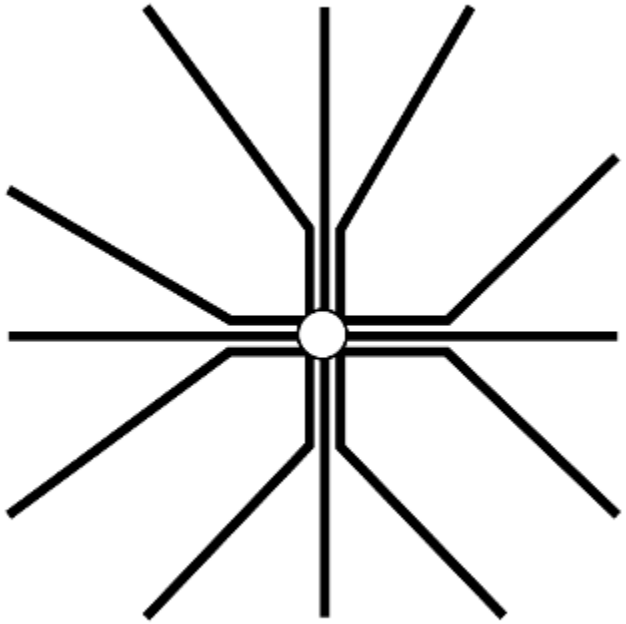


GUIDELINES FOR SERVICE



ARRANGING THE PIECES: NETWORKS

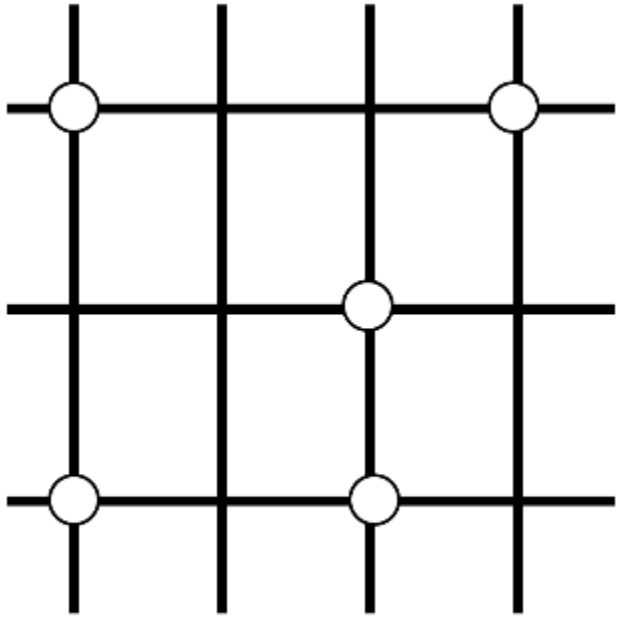
Radial (Hub and Spoke)



Commuter Oriented

Cost Effective

Grid

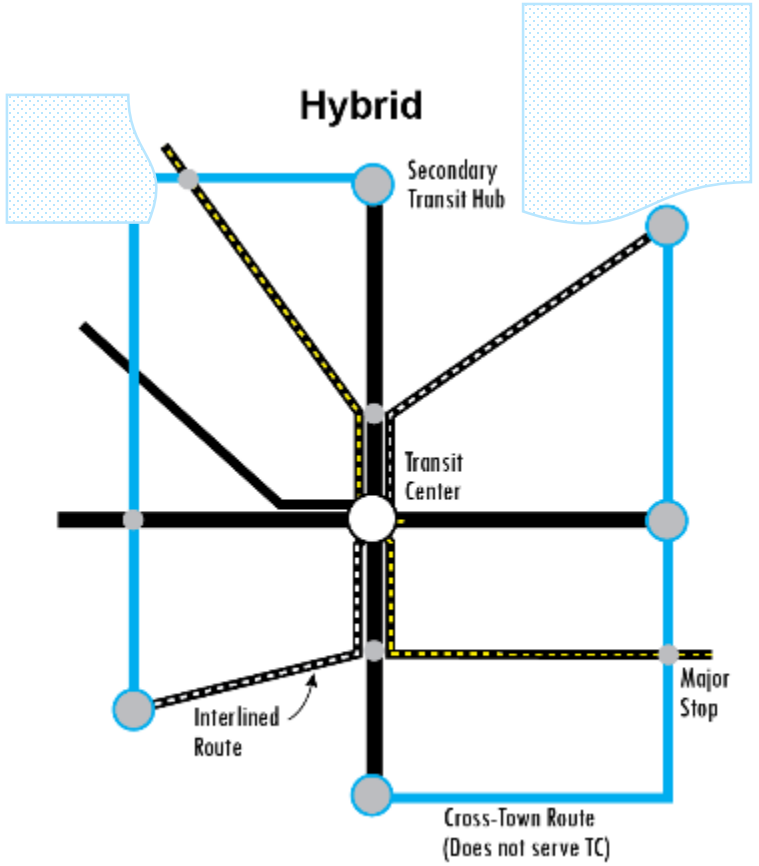


All Trip Types Served

Most Ridership

Highest Cost

Hybrid



Service Types Fitted to Market

Balance Cost and Productivity

EMERGING MOBILITY

Transportation Network Companies (Uber, Lyft, etc.)

Microtransit

Autonomous Shuttles

Defining Success

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VISION FOR SUCCESS

- Assume additional funding for transit in the Metro area
- Fast forward 6 years from now
- Newspaper has just released a headline about Metro
- What is your vision that is expressed in the headline?
- Spend 2 minutes thinking about this
- Share the vision

Next Steps

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INTERACTIVE WORKSHOP PLANNING EXERCISE

- **Challenge:** Redesign a hypothetical service to maximize public benefit

- **Process:** Discuss routes as a group, draw them, check cost, and go back to drawing board as necessary

WORKSHOP PROCESS

Participants will have to make difficult decisions:

- Who gets service?
- What kind, and how much?
- Who gets a “one-seat ride,” and who has to transfer?

THANK YOU!

Thomas Wittmann

206.428.1926

twittmann@nelsonnygaard.com