USING BIG DATA TO FORECAST FIRST/LAST MILE TRANSIT RIDERSHIP
BRIANA CALHOUN, FEHR & PEERS

JOSEPHINE COUNTY ON DEMAND TRANSPORTATION SERVICE SOLUTIONS
Josephine County:
- Population 86,000
- Grants Pass is the county seat

Josephine Community Transit:
- 162,000 boardings annually, 650 boardings daily for local routes
- Service Monday – Friday, 6:30 am to 6:30 pm

Source: Josephine County Transit Master Plan, 2018
ON DEMAND SERVICE

WHAT IS ON DEMAND SERVICE?

An efficient solution to complement the existing services in the region and expand affordable mobility options.

- Shared rides
- Small to medium size vehicles
- Door to door service
- Flexible routing
- Flexible scheduling
EXISTING CONDITIONS – DEMOGRAPHICS, AND THE BUILT ENVIRONMENT

**Demographic Priority Score Inputs**
- Population density
- Employment density
- Age (<18, >62)
- Income
- Vehicle ownership
- Non-ambulatory

**Proximity Priority Score Inputs**
- Schools
- Parks
- Hospitals
- Transit proximity
- Other key destinations
JCT RIDER SURVEY

- 47% of all trips are to or from work or school, with many people traveling to Rogue Community College
- 74% of transit riders walk to the bus stop
- 20% walk 12 minutes or more
- Use JCT at least twice per week
- If transit were not available:
  - 30% walked
  - 15% would have not made the trip at all
- NO CAR AVAILABLE FOR THEIR TRANSIT TRIP
- 78%

How riders get transit information:
- 60% via cash
- 34% via computer
- 15% via mobile

About half of respondents (49%) have incomes below the federal poverty level; 85% of respondents have incomes below the Grants Pass average.

29% of riders would use JCT more often if later evening service were offered.
## SERVICE TYPES

<table>
<thead>
<tr>
<th>Service Type</th>
<th>Description</th>
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</table>
| **First Last Mile** | • Trips between bus stops and expanded service area  
                      • Operates at same time as JCT bus service (6:30am-6:30pm)  
                      • Extends the range of existing transit service |
| **Point to Point Daytime** | • Connects any two points within JCT’s existing service area  
                      • Operates at same time as JCT bus service (6:30am-6:30pm)  
                      • Connects points that are not currently well-connected |
| **Point to Point Evening** | • Connects any two points within JCT’s existing service area  
                      • Operates after JCT service ends (6:30pm-9:30pm)  
                      • Extends the operating hours of existing transit service |
SERVICE AREA

First Last Mile

Point to Point
Extrapolated transit ridership propensity from the existing fixed route system and service area to the proposed service areas by using:

- Origin-Destination data from StreetLight Data, Inc.
- American Community Survey (ACS) Data
- JCT Rider Survey
- Technical Resources
**EXPECTED FIRST/LAST MILE RIDERSHIP**

<table>
<thead>
<tr>
<th><strong>Low Ridership</strong></th>
<th><strong>High Ridership</strong></th>
</tr>
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<tbody>
<tr>
<td>• Ratio of the boardings by those who walk more than ½ mile to transit to population within ½ mile of transit;</td>
<td>• Ratio of boardings within ½ mile of transit and walking less than 10 minutes</td>
</tr>
<tr>
<td>• Applied to population in the 3 mile service area</td>
<td>• Applied to population in the 3 mile service area</td>
</tr>
</tbody>
</table>

Calculated for total population as well as by income level and vehicle ownership
ASSUMPTIONS

- Factored for:
  - Smartphone access or riders who would use the call-in line to book a ride
  - Decrease in demand with implementation of $1 fare
  - High ridership also included elasticity of wait and increased travel time
EXPECTED POINT TO POINT RIDERSHIP

**Point to Point**

- Compared Streetlight trips to transit boardings in order to approximate transit mode share
- Applied to population in the service area

- Factored for:
  - Smartphone access or riders who would use the call-in line to book a ride
  - Decrease in demand with implementation of $2 fare
  - Elasticity of wait and increased travel time
  - High ridership also included induced demand
# RIDERSHIP ESTIMATES

<table>
<thead>
<tr>
<th>Annual riders (JCT fixed route boarding increase)</th>
<th>First-Last Mile</th>
<th>Point to Point (Daytime)</th>
<th>Point to Point (Evening)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>15,000 (+9%)</td>
<td>51,000 (+32%)</td>
<td>30,000 (+18%)</td>
<td>47,000 (+29%)</td>
</tr>
<tr>
<td>20,000 (+12%)</td>
<td>23,000 (+14%)</td>
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<table>
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<tr>
<th>Daily riders</th>
<th>58</th>
<th>205</th>
<th>119</th>
<th>188</th>
<th>79</th>
<th>91</th>
</tr>
</thead>
</table>

| Peak hour riders | 5 | 16 | 9 | 15 | 35 | 40 |
**IMPLEMENTATION**

- **Costs:**
  - Looked at the number of vehicles needed to meet demand and the costs to run the service
  - Compared costs for a service run by JCT or a service run by a transportation network company
Thank you for your time.

Briana Calhoun
B.calhoun@fehrandpeers.com