Making Effective Fixed-Guideway Transit Investments: Indicators of Success

TCRP Report 167

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TCRP
REPORT 167

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Making Effective Fixed-Guideway Transit Investments: Indicators of Success

Volume 1: Handbook

Volume 2: Research Report

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Introduction

- Urban rail and BRT lines are among the largest urban infrastructure investments
- Investment decisions therefore justify careful decision making
- Different kinds of initial information may be helpful in narrowing down a longer list of options

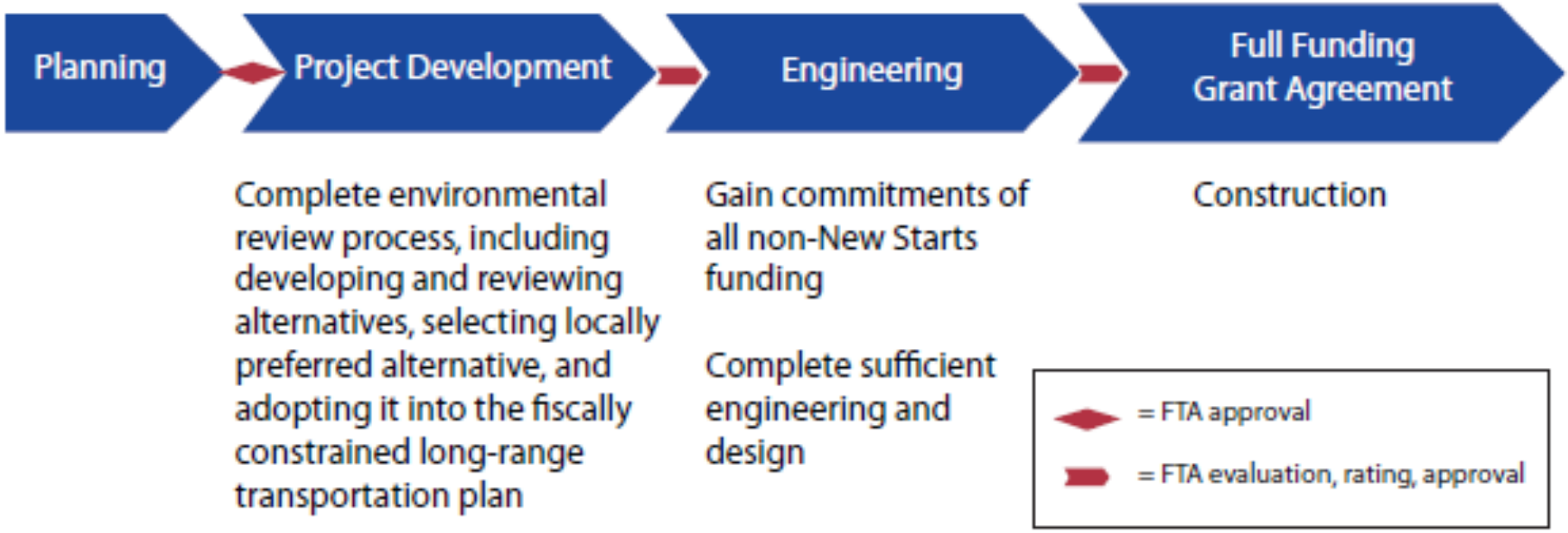
Figure 5: WMATA Orange Line

Photo courtesy of Arlington County
(markings by Kaid Benfield)

Project purpose

- The goal was to develop a method to predict project success based on the conditions in the corridor and the metro area
- The project was partly intended to *define* success measures
  - In the end, we used project ridership, change in transit usage, and capital cost

Figure 17: New Starts Planning and Development Process under MAP-21



Source: Adapted from Federal Transit Administration, Capital Investment Program Listening Session, September 2012

Table 1.4. FTA MAP-21 project criteria.

Project Justification Criteria	Local Financial Commitment Criteria
Mobility improvements	Current financial condition
Cost effectiveness	Commitment of funds
Environmental benefits	Reliability/capacity of the financial plan
Congestion relief	
Land use	
Economic development	

Goals of the "indicator-based method"

- Indicators are characteristics of a corridor and a proposed project that may affect the project's ridership, net PMT, and cost
- The method is meant to provide a simplified way to analyze the potential success of a proposed project in a particular corridor
- Could be useful for conducting an initial evaluation of corridors and service alternatives

Previous applications of indicator-based methods

- Planners have used indicator-based methods to evaluate transit opportunities for many years
- Our method generates estimates of project ridership and change in system-level patronage based on statistical analysis, using data from 55 fixed-guideway systems built over the last 40 years.

Table 1: Transit Mode Suitability Criteria by Regional Plan Association

Transit Vehicle Mode	Minimum Downtown Size, Square Feet of Contiguous Non-Residential Floor Space (millions)	Minimum Residential Density, Dwelling Units per Acre
Local Bus	2.5	4 to 15*
Express Bus	7	3 to 15*
Light Rail	21	9
Heavy Rail	50	12
Commuter Rail	70	1 to 2*

**Varies with type of access and frequency of service*

Source: Regional Plan Association, Where Transit Works: Urban Densities for Public Transportation. *New York, 1976.*

Table 2: Transit-Supportive Density Levels adapted from Pushkarev and Zupan *(1)*

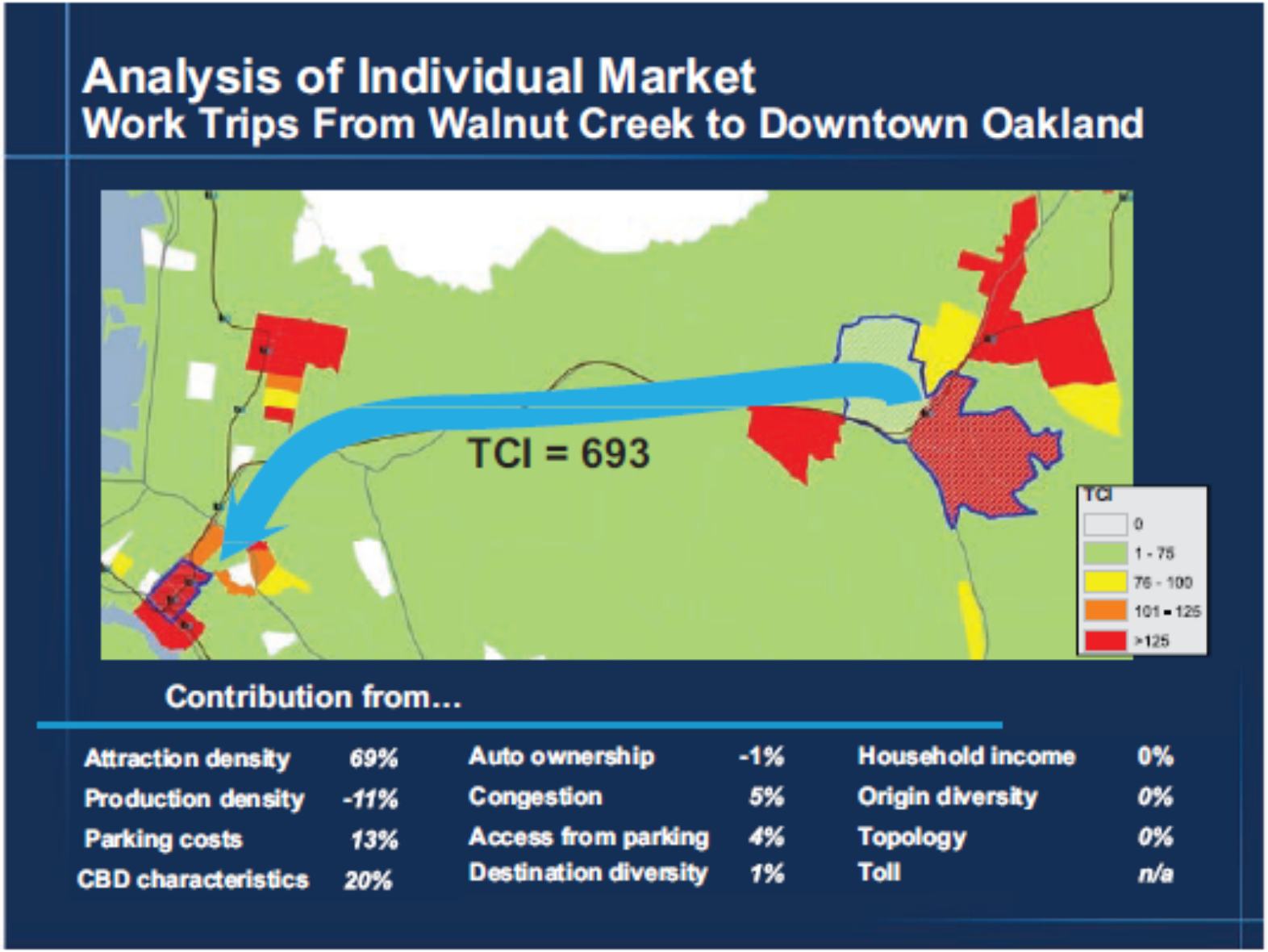
Mode: Service	Minimum Units-per-Acre Thresholds	CBD Size
Local Bus: Minimum (20 buses/day)	4	10 million non-residential CBD s.f.
Local Bus: Frequent (120 buses/day)	15	35 million non-residential CBD s.f.
Light Rail: 5-minute peak-hour headways	9 (corridor of 25 to 100 square miles)	20 to 50 million non-residential CBD s.f.
Heavy Rail Rapid Transit: 5-minute peak-hour headways	12 (corridor of 50 to 100 square miles)	50+ million non-residential CBD s.f.
Commuter Rail: 20 trains/day	1 to 2	Only to largest downtowns

Table 3: Housing Density Thresholds, MTC, San Francisco Bay Area

	BART Heavy Rail Transit	Light Rail Transit	Bus Rapid Transit	Commuter Rail	Ferry
Housing Threshold (Average Housing Units per Station Area)	3,850	3,300	2,750	2,200	750

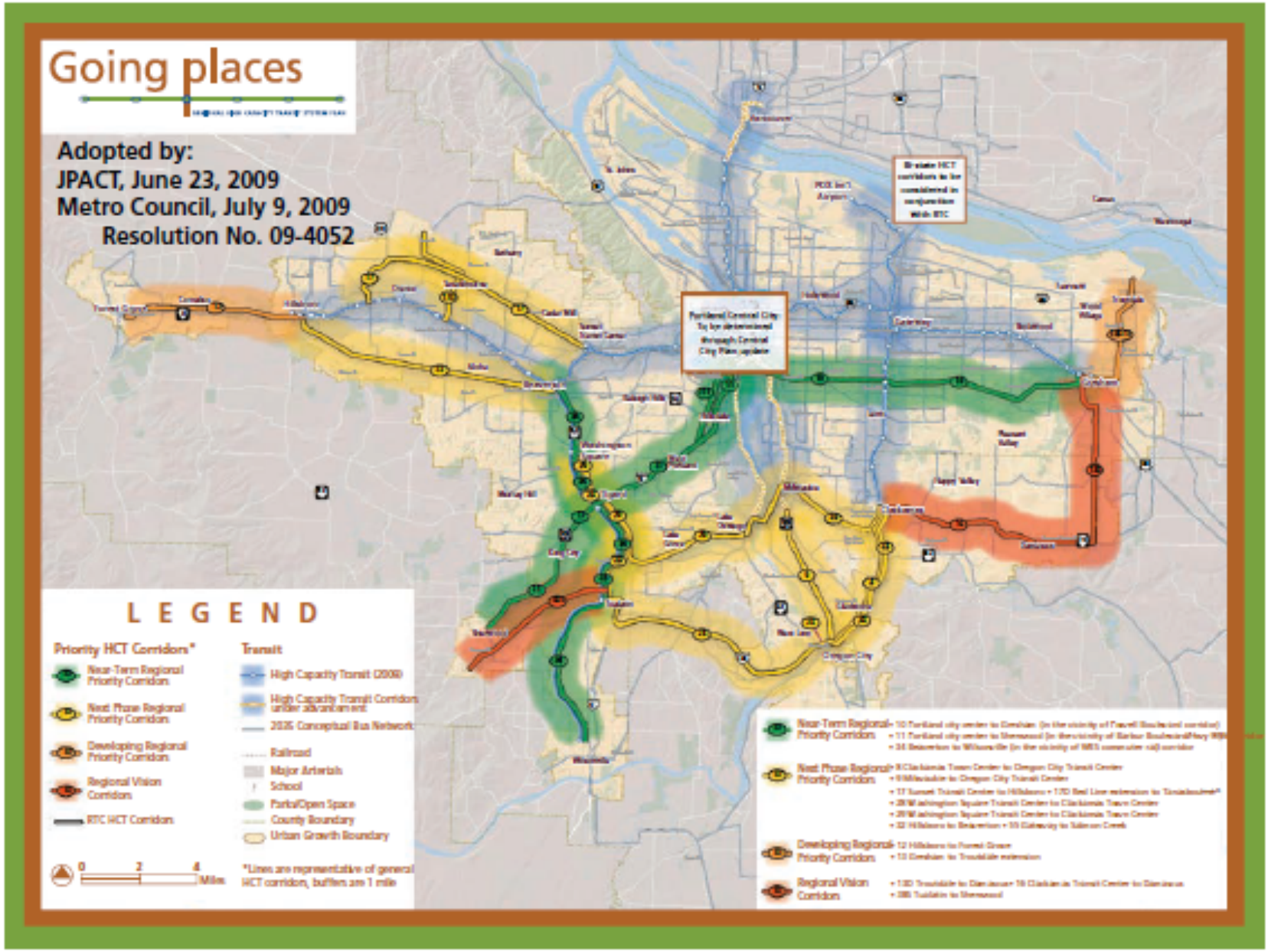
Source: MTC Resolution 3434, Attachment D-2, *as revised July 27, 2005*

Figure 3: Use of the Transit Competitiveness Index by MTC

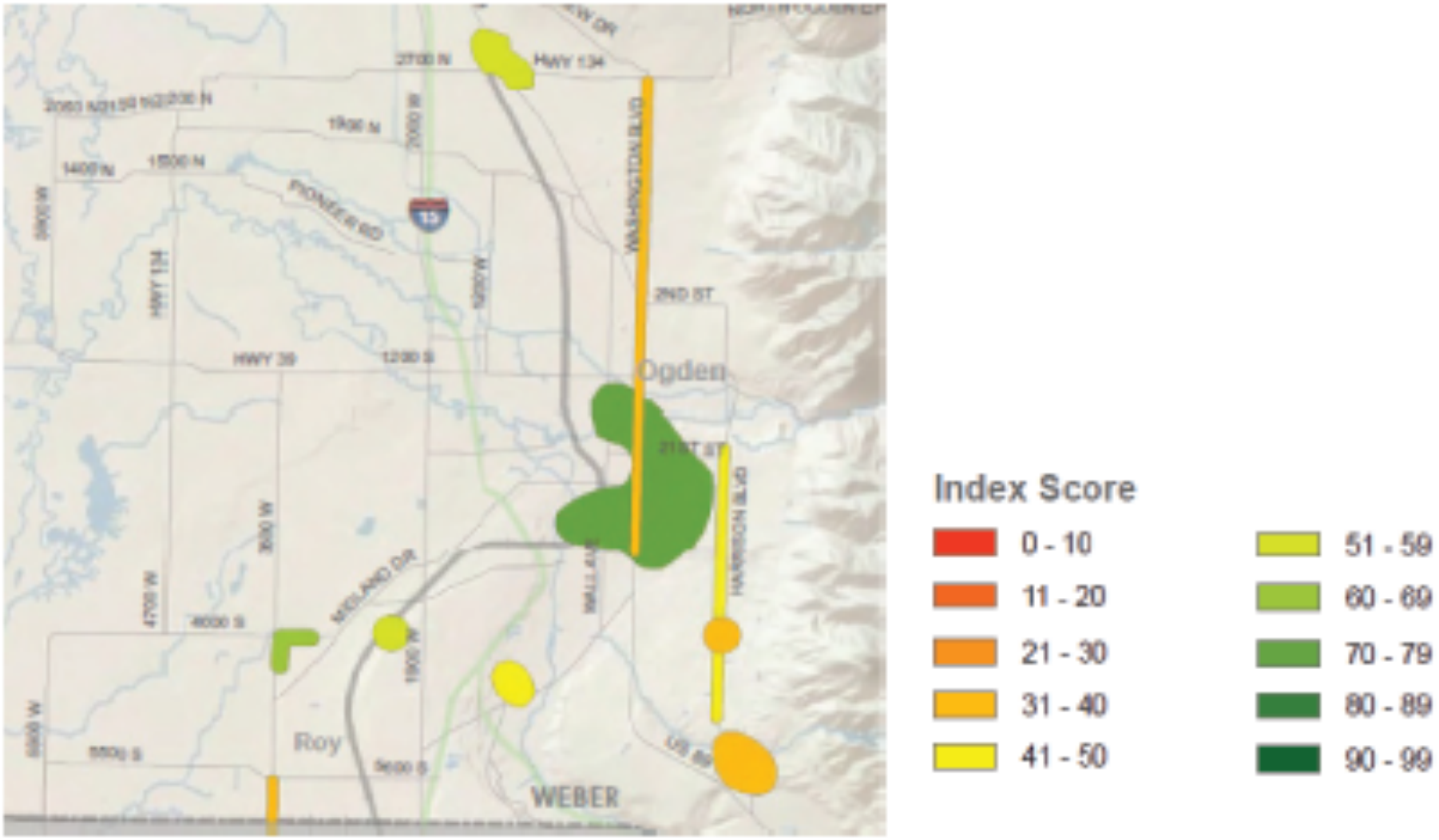


Source: San Francisco MTC and Cambridge Systematics, Inc.

Figure 4: Setting Transit Corridor Priorities in Portland



Source: Metro, used by permission



Source: Utah Transit Authority, 2005

Figure 1.1. Transit preparedness index for Weber County.

Case studies

- Diverse transit projects in six metropolitan areas to gain an understanding of how transit planning decisions had been made
- We (i.e., Ian Carlton) identified almost 20 different “rules of thumb” used by planners to choose projects or alignments