Aurora Station Area Planning and Design
Portland Firm Beats National Competition


- Making downtown pedestrian friendly.
- Creating a balanced transportation system.
- Connecting downtown with the surrounding neighborhoods.

With these goals in mind, Portland becomes the perfect role model.

Portland’s TriMet MAX light rail transit system, TriMet’s Max, and the recently expanded retail center Pioneer Place also serve as models, making downtown Portland and its surrounding neighborhoods vibrant and livable. Portland’s housing opportunities have also increased dramatically with many new downtown and Pearl District developments.

On Lake Michigan, a Glimpse

Revolitzing America’s Cities
**Process & Schedule**

**Phase 1 - Starting**
- Kick-off Meeting/Steering Committee Mtg. #1
- Existing Conditions and Inventory Analysis
- Develop Base Map
- Steering Committee Mtg. #2
- Community Workshop #1 - Develop Objectives

**Phase 2 - Designing**
- Analysis of Alignment, Parking, Platform Locations, and Bus Transfer Facilities
- Develop Land Use & Circulation Alternatives
- Technical Reviews of Alternatives
- Steering Committee Meeting #3
- Community Workshop #2 - Review Alternatives
- Refine Preferred Alternative

**Phase 3 - Implementing**
- Draft Design Standards
- Draft Implementation Strategy
- Steering Committee Mtg. #4
- Public Open House - Review Preferred Alternative
- Finalize Station Area Plans, Design Standards and Implementation Strategy (Station Area Report)
East Corridor

Gold Line

West Corridor

I-225 Corridor

Southeast Corridor

Southwest Corridor

Denver and Aurora Light Rail System
What is a Station Area Plan?

- Establishes the community’s vision

- Establishes land use and circulation framework plans for any future development

- Guides possible policy and zoning changes

- Identifies infrastructure improvements

- Establishes project funding priorities

- Establishes implementation schedules and identifies responsibilities
What can a Station Area Plan do?

- Create developer interest where there may be none today

- Provide certainty and predictability for property owners and neighbors

- Be flexible- anticipate changes in future market and other conditions
Ideal Station

Neighborhood Hub
Grocery Store
In-Line Retail Shops
Office
Support Services
Public Gathering Area

Light Rail
1/4 Mile
1/8 Mile
Routes to Station
Moderate Density Residential
High Density Residential
Ideal Transit Oriented Development (TOD) Assumptions

The Ideal Transit Oriented Development (TOD) characteristics:

- Occurs on vacant land
- Includes retail, leisure, and support services
- Neighborhood Hub (Grocery store, retail, support services)

Assumptions:

1/8 Mile
- Medium Density Residential - 12 units/acre
- High Density Residential - 24 units/acre

1/3 Mile
- Neighborhood Hub (Grocery store, retail, support services)

1/2 Mile
- LRT

The Ideal Transit Oriented Development Potential:

Assumptions:

Gross Area:
- Within 1/8 mile of station: 31.4 acres
- Within 1/8 mile to 1/4 mile of station: 94.2 acres

Developable Area (subtract 25% for streets & public facilities):
- Within 1/8 mile of station, (31.4 acres x 75%): 23.6 acres
- 1/8 mile to 1/4 mile of station, (94.2 acres x 75%): 70.7 acres

Households & Employment:
- 23.6 acres x 24 units/acre: 565 units
- 70.7 acres x 12 units/acre: 848 units
- Employment, 3 acres x 95 employees/acre: 285 employees

Generated Trips:
- 1,413 dwelling units x 10.8 trips per day: 15,260 trips per day
- 285 employees x 24.88 trips per day: 7,091 trips per day

Generated Trips:
- 22,351 trips x 10% on transit: 2,235 trips per TOD

Ridership
Transit Oriented Neighborhoods
### Fundamental Characteristics

**The Best Transit Neighborhoods**

<table>
<thead>
<tr>
<th>City Block</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>
Fundamental Characteristics

The Best Transit Neighborhoods

- Great Streets
- Great Retail
- Great Public Space
- Signature Street
- Great Transit
Typical Land Ownership

Private Ownership

Private Ownership

Private Ownership

Private Ownership

Private Ownership

Private Ownership

Public Streets (60’ Right-Of-Way) 41%

Private Ownership

Private Ownership

Private Ownership

Private Ownership

Private Ownership

Private Ownership

Private Ownership

Private Ownership

59%
Great Streets = Great Neighborhoods
Bad Streets = Bad Neighborhoods
Fundamental Characteristics

The Best Transit Neighborhoods

Great Streets

Great Retail

City Block
Traditional Retail Main Street

- Grocery Store
- Retail
- Department Store
- Parking
- Parking
- Parking
Fundamental Characteristics

The Best Transit Neighborhoods

- Great Streets
- Great Retail
- Great Public Space
Park (Active)
Fundamental Characteristics

The Best Transit Neighborhoods

- Great Streets
- Great Retail
- Great Public Space
- Great Transit
Fundamental Characteristics

**Great Transit**

- Frequent service
- Dependable service
- Direct connections to the downtown
- Transfers minimized
- A variety of modes (light rail, streetcar, bus)
Bus
Fundamental Characteristics

The Best Transit Neighborhoods

- Great Streets
- Great Retail
- Great Public Space
- Great Housing
- Great Transit

City Block
TOD Housing – Portland, OR
TOD Housing
Housing Mix (20 Market Rate Blocks & 5 Affordable Blocks)
Market Rate
Market Rate Rental
Pedestrian/Bicycle Connections
Aurora Station Area Land Use Vision

TOD Land Use Emphasis:
- Employment
- Housing
- Downtown (Employment/Housing/Retail)
**Option A**
- Commercial
- Office
- Housing
- RTD Lot
- RTD Structure
- 1,500 Spaces

**Option B**
- Commercial
- Office
- Housing
- RTD Lot
- RTD Structure
- 500,000 SF
- 1,600,000 SF
- 2,000 Units
- 750 Spaces
- 750 Spaces

**Option C**
- Commercial
- Office
- Housing
- RTD Lot
- RTD Structure
- 500,000 SF
- 2,000,000 SF
- 2,900 Units
- 550 Spaces
- 1000 Spaces

**Peoria-Smith Options**
Land Use
Employment Land Use
Required Ground Floor Commercial Uses
Park Blocks
Active Edges
Build-to Lines
Peoria-Smith Station

Development Summary

<table>
<thead>
<tr>
<th>Category</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial</td>
<td>106,000 SF</td>
</tr>
<tr>
<td>Office</td>
<td>2,500,000 SF</td>
</tr>
<tr>
<td>Residential</td>
<td>2,400 Units</td>
</tr>
<tr>
<td>Park-n-Ride (Aurora)</td>
<td>1,775 Spaces</td>
</tr>
<tr>
<td>Park-n-Ride (Denver)</td>
<td>1,000 Spaces</td>
</tr>
<tr>
<td>New Open Space</td>
<td>17 Acres</td>
</tr>
</tbody>
</table>

$1 Billion Private Investment
I-225 Alignment Alternatives
Elevated Stations
Fitzsimons-Colfax Station – Aurora, Colorado

EXISTING STATION
Investment Potential
$7 million

RELOCATED STATION
Investment Potential
$55 Million

Fitzsimons-Colfax Station - Aurora, Colorado
Station location determines development potential.
**Option A: Single-Sided Development**

- **Office**: 80,000 SF
- **Housing**: 180 Dwelling Units
- **RTD Parking Lot**: 270 Spaces

**Option B: Double-Sided Development**

- **Office**: 88,000 SF
- **Housing**: 220 Dwelling Units
- **RTD Parking Lot**: 270 Spaces

---

**13th Avenue Station Options**
Fitzsimons-Colfax Station - Land Use & Development Potential
New and Enhanced Streets
13th Avenue LRT Platform - Looking North
# 13th Avenue Station

## Development Summary

<table>
<thead>
<tr>
<th>Category</th>
<th>Details</th>
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<tbody>
<tr>
<td>Commercial</td>
<td>161,500 SF</td>
</tr>
<tr>
<td>Office</td>
<td>220,000 SF</td>
</tr>
<tr>
<td>Residential</td>
<td>3,800 Units</td>
</tr>
<tr>
<td>Structured Park-n-Ride</td>
<td>640 Spaces</td>
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<tr>
<td>New Open Space</td>
<td>3 Acres</td>
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</table>

**$1.2 Billion Private Investment**
### Abilene-2nd Avenue Station Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Station Retail</th>
<th>Housing</th>
<th>Park-n-Ride</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option A</td>
<td>10,000 SF</td>
<td>1,100 Units</td>
<td>380 spaces</td>
</tr>
<tr>
<td>Option B</td>
<td>10,000 SF</td>
<td>1,100 Units</td>
<td>370 spaces</td>
</tr>
<tr>
<td>Option C</td>
<td>20,000 SF</td>
<td>1,100 Units</td>
<td>370 spaces</td>
</tr>
</tbody>
</table>
Abilene - Land Use and Development Potential
<table>
<thead>
<tr>
<th>Category</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retail</td>
<td>54,000 SF</td>
</tr>
<tr>
<td>Commercial</td>
<td>93,000 SF</td>
</tr>
<tr>
<td>Residential</td>
<td>4,300 Units</td>
</tr>
<tr>
<td>Park-n-Ride Lot</td>
<td></td>
</tr>
<tr>
<td>New Open Space</td>
<td>6 Acres</td>
</tr>
</tbody>
</table>

$1.3$ Billion Private Investment
Iliff Ave.

Iliff Station Light Rail Platform Location
Fundamental Concept
Primary Pedestrian & Bicycle Circulation
TO STATION

ADA Parking

RTD Parking Structure

Bus Transfer Along Anaheim Extension

HARVARD AVE.
Public Investments
Private Investments
Investment Ratio

$ 43 Mil.
$ 332 Mil.
8:1
Mobility-Oriented Districts

Crandall Arambula PC
Critical Issues

Environmental
  - Global warming
Economic
  - Energy shortage
  - Rising energy costs
Health
  - Child and adult obesity
Representative CA Projects

Downtown Revitalization Master Plans
- Fairbanks, AK
- Oak Park, IL
- Whitefish and Missoula, MT
- Lincoln, NE
- Santa Fe, NM
- Knoxville, TN
- Racine, WI

Transit Oriented Development (TOD) Projects
- Denver and Aurora, CO
- Portland, OR
- Bellevue, Redmond and Spokane, WA
- Edmonton, Alberta, Canada
Portland Energy Conservation Project - 1977

American Planning Association, National Award, 1978
U.S. Energy Use by Sector:

- Industrial: 32%
- Transportation: 29%
- Residential: 21%
- Commercial: 18%
Strategies for Saving Energy

- Industrial
- Transportation
- Residential
- Commercial
Local Actions

State Actions

Strict Conservation Standards

Industrial

Transportation

Residential

Commercial

Strategies for Saving Energy
Strategies for Saving Energy

State Actions
- Industrial
- Transportation
- Residential
- Commercial

Local Actions
- Mobility-Oriented Districts

Strict Conservation Standards
Strategies for Saving Energy
Strategies for Saving Energy

- Industrial
- Transportation
- Residential
- Commercial

Local Actions

- Commercial Hot Spots
- Protected Bikeways

State Actions
Strategies for Saving Energy

- Industrial
- Transportation
- Residential
- Commercial

Local Actions

- Mobility-Oriented Districts

State Actions

Strict Conservation Standards

Fewer & Shorter Auto Trips
1 Mile Radius

Typical Residential District
1 Mile Radius

**Household Auto Travel**

- Miles/household each year: 21,253
- Miles/day/household: 58
- Miles/vehicle trip: 10

*2001 National Household Travel Survey*
## Auto Travel*

<table>
<thead>
<tr>
<th></th>
<th>Vehicle Trips</th>
<th>Vehicle Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>To/from Work</td>
<td>21.9 %</td>
<td>27.3%</td>
</tr>
<tr>
<td>Work Related</td>
<td>4.1</td>
<td>8.4</td>
</tr>
<tr>
<td>Shopping</td>
<td>20.9</td>
<td>14.2</td>
</tr>
<tr>
<td>Other family/personal business</td>
<td>25.4</td>
<td>19.3</td>
</tr>
<tr>
<td>School/church</td>
<td>4.9</td>
<td>3.7</td>
</tr>
<tr>
<td>Medical/dental</td>
<td>2.2</td>
<td>2.2</td>
</tr>
<tr>
<td>Vacation</td>
<td>0.4</td>
<td>1.7</td>
</tr>
<tr>
<td>Visit friends/relatives</td>
<td>6.2</td>
<td>9.4</td>
</tr>
<tr>
<td>Other social/recreation</td>
<td>13.6</td>
<td>13.1</td>
</tr>
<tr>
<td>Other</td>
<td>0.4</td>
<td>0.7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100.0 %</strong></td>
<td><strong>100.0 %</strong></td>
</tr>
</tbody>
</table>

* 2001 National Household Travel Survey
1 Mile Radius
Typical Residential District
Autos
Long Auto Trips

Autos leave development for most trips
(personal business, shopping, social, recreational and work related)
Commercial Hot Spot

- Jobs
- Shopping
- Business/government
- Medical/dental
- Social/recreation
- Cultural
- School/church
- Open space

Commercial Center District
1 Mile Radius

Commercial Hot Spot

Transit

Autos

Commercial Center District
1 Mile Radius

Transit

Shorter Auto Trips

**Autos travel to Center for most trips**

(personal business, shopping, social, recreational and work related)

Commercial Center District
1 Mile Radius

- Protected Bikeway
- Commercial Hot Spot
- Transit
- Autos

Bicycle Centered District
Protected Bikeways
Shorter & Fewer Auto Trips

Autos & bicycles travel to center for most trips (personal business, shopping, social, recreational and work related)
Types of Cyclists

7%
Capable but Cautious

60%
Strong, Fearless, Enthused & Confident

33%
No Way No How
Strong & Fearless Cyclists
On-street Bike Lanes (Best case ridership, 10% of all trips)
10% Solution

Safety Concerns Limit Bike Ridership
Survey after survey and poll after poll has found again and again that the number one reason people do not ride bicycles is because they are afraid to be in the roadway on a bicycle. When they say they are “afraid” it is the fear of people driving automobiles.

Four Types of Cyclists
Roger Geller, Bicycle Coordinator
Portland Office of Transportation
“When you get right down to it, it’s the strong and experienced vehicular cyclist who are happy with the current system. That’s because they are more worried about being forced off the main road than about attracting large new numbers of riders.

The current system primarily serves a population that is white, that already bicycles, that already is healthy. Women are generally more risk adverse and don’t want to cycle without some separation from traffic.”

Ann Lusk, Harvard University School of Public Health

Pedaling Revolution
“I think separated cycle paths (protected bikeways) are what are next for the U.S.” - Noah Budnick, Transportation Alternatives, New York

“The most important approach to making cycling safe and convenient is the provision of separate cycling facilities along heavily traveled roads and intersections...” - John Pulcher, Rutgers University

Pedaling Revolution
# Bicycle Use Comparison

<table>
<thead>
<tr>
<th></th>
<th>Bike</th>
<th>Walk</th>
<th>Transit/Auto</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>1%</td>
<td>3%</td>
<td>96%</td>
</tr>
<tr>
<td>Netherlands</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Utrecht</td>
<td>31%</td>
<td>23%</td>
<td>46%</td>
</tr>
<tr>
<td>- Wageningen</td>
<td>41%</td>
<td>18%</td>
<td>41%</td>
</tr>
</tbody>
</table>

Crandall Arambula
www.ca-city.com
Capable but Cautious Cyclists
Types of Cyclists

- 10% Strong, Fearless, Enthused & Confident
- 60% Capable but Cautious
- 33% No Way No How
Types of Cyclists

- **40%** Capable but Cautious
- **33%** No Way No How
- **60%** Strong, Fearless, Enthused & Confident

- **7%** Capable but Cautious
- **10%** No Way No How
- **40%** Strong, Fearless, Enthused & Confident
40% Solution

**Strong & Fearless**
Will ride with auto traffic
(will ride within on-street bike lanes and on bike boulevards)

**Capable but Cautious**
Will NOT ride with auto traffic
(will only ride on protected bikeway)

7% Strong & Fearless

60% Capable but Cautious

33% No Way No How

Potential Bike Riders
Protected Bikeways (Ridership, over 40% of all trips)
Protected Bikeways (Ridership, over 40% of all trips)

40% Solution
Separating Cars & Bike Stimulates Bike Travel
Potential Energy Savings
Typical Development

Bicycle Centered District

Household Gasoline Expenditure*

* 20 miles/gallon @ $4.00 per gallon = $0.20 per mile
Typical Development

Bicycle Centered District

Household Gasoline Expenditure*

21,253 miles/yr  
$4,251 /year

8,926 miles/yr  
$1,785 /year

30% Reduction in Av. Trip Length

+40% Of Trips by Bike

* 20 miles/gallon @ $4.00 per gallon = $0.20 per mile
Typical Bicycle Centered Development

Potential Transportation Energy Savings Over 50%

8,926 miles/yr
$1,785/year

30% Reduction in Av. Trip Length

* 20 miles/gallon @ $4.00 per gallon = $0.20 per mile

Hot Spot Household Gasoline Expenditure

30% Reduction in Auto Trips
Local Economic Stimulus

Development Prototypes
Typical Development

Bicycle Centered District

Household Gasoline Expenditure*

21,253 miles/yr  
$4,251/year

8,926 miles/yr  
$1,785/year

Annual Local Economic Stimulus**

$0 stimulus

$84 million

* 20 miles/gallon @ $4.00 per gallon = $0.20 per mile

** Energy savings times a multiplier of 3 for money spent locally
### Potential Annual Economic Stimulus*

<table>
<thead>
<tr>
<th>City</th>
<th>Population</th>
<th>Annual Stimulus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aurora</td>
<td>319,057</td>
<td>$971 million</td>
</tr>
<tr>
<td>Portland</td>
<td>545,140</td>
<td>$1,560 million</td>
</tr>
<tr>
<td>Salem</td>
<td>142,940</td>
<td>409 million</td>
</tr>
<tr>
<td>Lake Oswego</td>
<td>37,000</td>
<td>106 million</td>
</tr>
</tbody>
</table>

* $84 million for every 27,600 population

**Crandall Arambula**

[www.ca-city.com](http://www.ca-city.com)
Strategies for Saving Energy

- Industrial
- Transportation
- Residential
- Commercial

Local Actions
- Commercial Hot Spots
- Protected Bikeways

State Actions
- Industrial
- Transportation
- Residential
- Commercial
Strategies for Saving Energy

- Industrial
- Transportation
- Residential
- Commercial

State Actions
- Strict Conservation Standards
- Commercial Hot Spots
- Protected Bikeways
- Great Transit

Local Actions
1 Mile
1/4 Mile
Hot Spot
Protected Bikeway
5 minute ride

BCD (Bicycle Centered District)
1/2 Mile

1/4 Mile

5 min. walk

Transit (HCT)

TOD (Transit Oriented Development)
1 Mile
1/4 Mile
Hot Spot
Protected Bikeway
5 minute ride
5 minute walk
1/4 Mile
Transit (HCT)
Streetcar
TOD + BCD = MOD (Mobility-Oriented District)
1 Mile

1 Mile

1/2 Mile

1/4 Mile

Hot Spot

Protected Bikeway

15,000 Transit Trips (10% on transit)

5 minute ride

5 minute walk

5 min.

5 min. walk

Hot Spot

1/4 Mile

Transit (HCT)

Streetcar

3,000 Transit Trips (10% on transit)

1/4 Mile

Transit (HCT)

MOD

TOD
TOD (Five minute walk)
TOD (Five minute walk) & MOD (Five minute bike ride)
TOD (Five minute walk) & MOD (Five bike minute ride)
MOD Contribution
+168,000 Transit Trips
(10% on transit)

TOD (Five minute walk) & MOD (Five minute bike ride)
Potential Economic Benefits

<table>
<thead>
<tr>
<th>Description</th>
<th>Annual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic Stimulus* (12 MOD)</td>
<td>$ 1,008 million</td>
</tr>
<tr>
<td>Farebox Revenue** (168,000 trips/day)</td>
<td>$ 95 million</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>$ 1,103 million</strong></td>
</tr>
</tbody>
</table>

* $84 million for every MOD
** $2.25/trip

CRANDALL ARAMBULA
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Critical Issues

Environmental
- Global warming

Economic
- Energy shortage
- Rising energy costs

Health
- Child and adult obesity
Aurora Station Area Planning and Design

Cran dall Aramb u la
Revitalizing America’s Cities

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