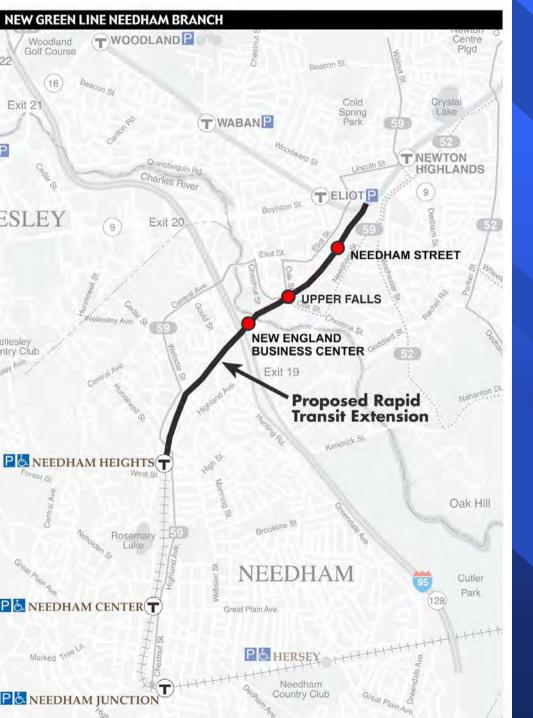
### NEWTON - NEEDHAM LIGHT RAIL

### AN OPPORTUNITY FOR ECONOMIC AND COMMUNITY GROWTH

Srdjan S. Nedeljkovic, M.D.

Newton Highlands Neighborhood Area Council Comprehensive Planning Advisory Committee





### New Newton-Needham Rail Extension

#### Three new stations:

Newton Upper Falls New England Business Center

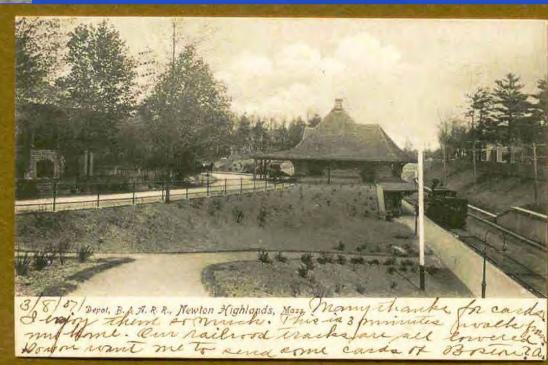
#### **Line extends from:**

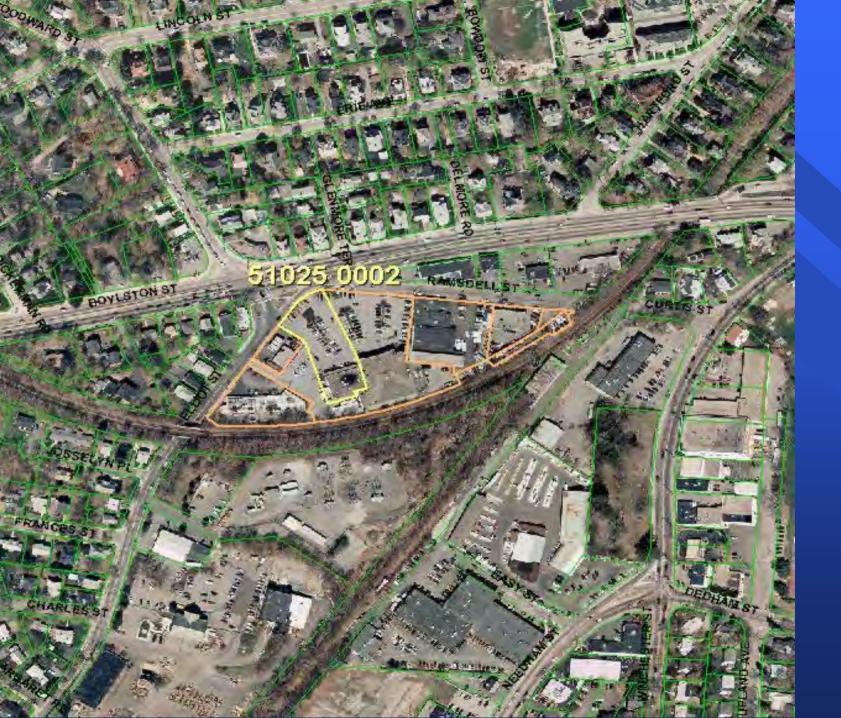
**Newton Highlands Needham Heights** 



## Newton Highlands Station

The Newton Highlands station will be where the "D" branch of the Green Line diverges to Riverside or to Needham Heights





The two Green Line branches diverge at the **NSTAR** substation behind **National** Lumber



## Needham Street Station

The Needham Street Station will be located at the end of Chandler Place, off Eliot Street, adjacent to the Avalon Bay Apartments





## **New Green Line in Newton:**

The new branch will continue parallel to Needham Street, about one mile to the Newton Upper Falls Depot



# Newton Upper Falls Station

The historic Newton
Upper Falls depot is
a convenient location
for a station, adjacent
to a village center and
potential new growth



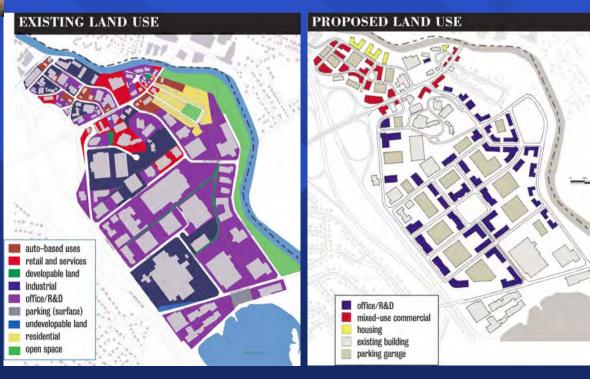
#### Executive Summary

Land Use, Zoning and Traffic Study: New England Business Center/ Highland Avenue Corridor/ Wexford Charles Street Industrial District



New England
Business Center
Station

The Needham Industrial Park will undergo massive development over the next decade





## Needham Heights Station

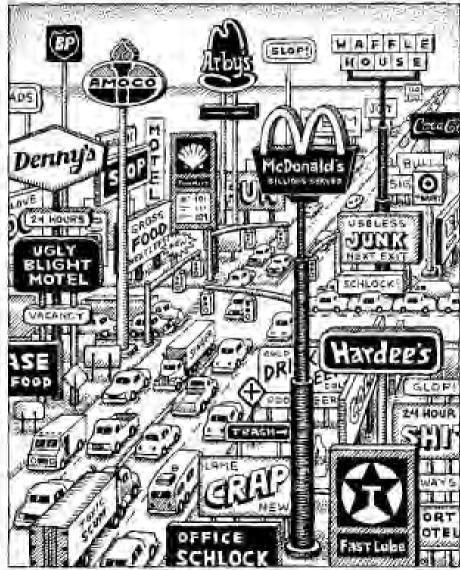
The Needham Heights station is the current Terminus of the South Station to Needham Commuter rail. Light rail would terminate here from the direction of Newton. There are 243 parking spaces at this station.



#### **The Problems of Needham Street:**

Congested and polluted
Hostile to pedestrians
Poor access to businesses
Multiple safety concerns
Aesthetically repulsive
Barrier between neighborhoods

#### Credit: Jane Holtz Kay



#### The Problems of Needham Street

- Places have become dirty, crowded, with bumper to bumper traffic and a lowering of the quality of life.
- Sprawl a degenerative urban form that is:

   Too congested to be efficient
   Too chaotic to be beautiful
   Too dispersed to possess diversity or vitality
- Every place become like every other place, all adding up to Noplace.

## The Opportunities of Needham Street

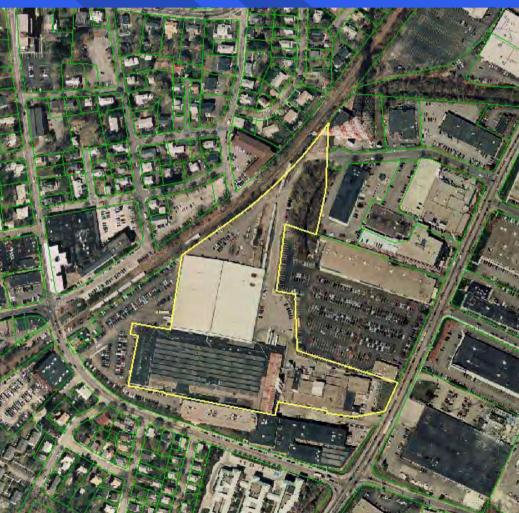


Avalon Bay Apartments: The largest new source of affordable housing in Newton The IVEX company: An 11-acre site from Oak Street to Tower Road - For Sale!





## Opportunities on Needham Street



A new village at Newton Upper Falls



- History of rail transit in corridor
- Overview of project
- Policy concerns and transit
- Economic feasibility
- Is there a demand for rail service?
- Ridership and cost analysis
- Integrating transportation and land use

#### History of rail in Newton:

- 1834: Boston-Worcester (via W. Newton)
- 1852: Charles River RR (Bos-Dover-Belling.)
- 1884: "Circuit" railroad (NH-Riverside) (Charles River and Circuit meet at Cook St.)
- 1886: Charles River extended to Woonsocket

History of rail in Newton:

- 1898: NY, NH, and Hartford RR assumes control of Charles River branch
- early 1900s: service reversed to travel from Newton Upper Falls to Needham
- 1927: NUF passenger service terminated
- 1953: spur track built across Needham St.

History of rail: Recent status

- 1973: Right of way acquired by state, MBTA
- 1970s: CASS study
- 1982: Bay Colony RR granted trackage rights
- 1980s: Passenger service re-established to Needham Heights via West Roxbury
- 1990s: Infrequent freight service to HC Stark and IVEX companies

History of rail: Current status

- 2001-2002: Freight service to HC Stark ends
- Jan. 2003: MBTA and CTPS Program for Mass Transportation studies line for light rail service
- Sept. 2003: Boston MPO Transportation Plan includes Newton-Needham link in Universe of Projects
- Sept. 2003: Mayor Cohen supports further study
- Oct. 2003: IVEX property for sale

#### Overview of project

- Re-establish rail line from Newton Highlands to Newton Upper Falls.
- Dual-track, electrified.
- Three stations: Needham Street
  Newton Upper Falls
  New England Business Center
- Terminal: Needham Heights Commuter Rail

#### Overview: Benefits of rail facilities

- New and expanded businesses.
- Increased employment.
- Stronger local tax base and revenues.
- Higher real estate values.
- Greater safety, less air pollution.
- Tourist revenues.

#### Overview: Enhanced economic activity

- Improved access to business for customers.
- Increased perception that community is desirable.
- Cheaper to build than roads, lower accident rates.
- Money saved by using rail reinvested in local economy.

#### Overview: Community Benefits

- Adds to community sustainability.
- Enhances air quality.
- Shifts people away from roads.
- Speeds up trips.
- Integrated with regional transit system.
- Make community more "livable."
- Catalyst for economic development.

#### TRANSIT IMPROVEMENTS

Overview: Two stations in Newton

- Transit stop at end of Chandler Place.
- Create new public park/playground.
- Transit stop in Newton Upper Falls.
- Many multi-family dwellings within 1/4 mile

These two transit stops would place most of the area south of Rt. 9 within transit range

**Newton Upper Falls station** 

- Population: 501 dwelling units 1/4 mile
- Average density: 10 d.u./acre
- Commercial: 1,169,222 sq.ft. leasable space



## Newton Upper Falls Parking

Currently, the Newton Upper Falls depot area has 35 designated spaces and 15 on-street spaces





### The IVEX Property 11 acres For Sale

The IVEX property extends from Oak Street to Tower Road and from the railroad at the Newton Upper Falls depot to Needham Street



Chandler Place station (Needham St. station)

- Population: 700 dwelling units 1/4 mile
- Average density: 10 d.u./acre 30 d.u./acre
- Commercial: 899,398 sq.ft. leasable space





#### Needham Street corridor has many attributes:

- Convenient to large core of population.
- High concentration of businesses, large tax revenues.
- Potential for future growth/development.
- Capacity to make change still exists.

Potential: Rail can create a community that thrives on coexistence between residents and businesses, a vibrant new neighborhood of the 21-st century

The Alternative to Rail:

Sprawl lacks the fundamental qualities of a community:

- Lack of pedestrian scale.
- No identifiable center and edge.
- Poorly integrated diversity of use and population.
- Ill defined public space, or lack thereof.

#### POLICY CONCERNS AND TRANSIT

- Traffic congestion
- Environmental concerns

Quality of Life issues

Policy Concerns: Traffic congestion

- Growing at 30-60% last decade
- Cost \$73 billion per year
- Represents 2% of GNP

Policy Concerns: Environment

- Cars responsible for 40% hydrocarbon and nitrogen oxide emissions
- Cars produce 70% carbon monoxide
- Roads consume 30% developable land
- 50% of petroleum used in US is burned by cars

#### Policy Concerns: Quality of Life issues

 Sprawl involves auto-oriented lifestyle: (driving to work, driving to the store, driving from place to place)

VS

Traditional towns: (wide sidewalks, mixed housing, retail, offices)

Thirty percent of our society cannot drive (old, young, disabled)

#### Will people walk?

- 800 ft.: average distance car to work
- 1380 ft.: NY city distance transit to work
- 2000 ft.: most people walk transit to work
- 2300 ft.: maximal length people walk
- 3000 ft.: limit of pedestrian zone

Overview: Transit oriented development

- Relates to land use, residential and commercial density
- Interconnected to other transit centers
- High density near stations
- Pedestrian access

Fact #1

Multi-use pedestrian-oriented development generates greater direct economic and tax benefits vs single-use auto-oriented projects

Fact #2

Centers of multi-use pedestrian-oriented activity stimulate area-wide investment --- which is the engine of our economy

### Newton TOD economic study compared:

- Tax valuation
- Land use
- Land valuation
- Leasable space
- Building valuation
- Land use

- Needham Street
- Newton Upper Falls
- Town-oriented development
- Supermarkets
- Shopping centers and malls

Pedestrian/transit oriented development vs auto-oriented development:

- Multi-use pedestrian development yields 2x to 5x economic benefit compared to single-use auto-oriented use.
- Less traffic generated

Results of Newton land-use/economic study:

- Needham St. commercial valuations: \$46.45 per sq.ft.
- Newton Upper Falls commercial: \$31.65 per sq.ft.
- Pedestrian centers (Newton Center, Newton Highlands, Newtonville): \$61 \$80 per sq.ft.

Is there a demand for rail transit?

An overview of the Program for Mass Transportation (PMT) and the prioritization of transit projects (March, 2003)

PMT prioritization process - performance measures

- Utilization
- Mobility
- Cost Effectiveness
- Air Quality
- Service Quality
- **Economic and Land Use benefits**
- Environmental Justice

Performance Measures: Utilization

- Line passes through densely populated areas (7-10 dwelling units per acre)
- High concentration of commercial/office space (2 million sqft. in Newton, 5 million sqft. in Needham)
- Likely ridership: 5000 daily riders
- Ridership with full build-out: 10-15,000 per day
- Comparison: Riverside line west of NH = 3000/day

Performance Measures: Mobility

- Mobility is constrained by traffic congestion (Newton's "Traffic Triangle of Despair")
- Auto traffic: Route 9 = 50,000 per day

Route 128 = 150,000 per day

Needham St = 30,000 per day

- Faster trip for transit riders (20 minutes to Copley)
- Reduce traffic congestion (5000 trips per day)

Performance Measures: Cost Effectiveness

- Low costs: Utilize existing rail-bed
  No property takings
  Only 2 miles of construction
- Maximum benefit: Large ridership
   Excellent farebox recovery
   Favorable cost/trip ratio

Performance Measures: Air Quality

Transit vehicles generate no point-of service pollution or emissions

Reduced air pollution because of reduced reliance on the automobile, and therefore less production of pollutants both locally and on a regional level

Performance Measures: Service Quality

- Light rail, rapid transit = frequent trips
  - Current commuter line runs once every 1-2 hours
  - Light rail will run 6 times per hour
- Travel times to Boston will be quicker
  - Light rail: 20 minutes to Copley
  - Commuter rail: 35 minutes to Back Bay/Copley
  - Automobile: 45 minutes to Copley

Performance Measures: Economic/Land Use Benefits

- Potential for large scale growth
  - Newton: Moderate to high density development (Avalon Bay and IVEX site, as examples)
  - Needham: 2.7 million sq.ft. of new commercial space envisioned (New England Business Center)
- Growth currently constrained by congestion on inadequate infrastructure in densely populated area

Performance Measures: Environmental Justice

- Rail expansion will allow for reverse commuting
- High concentration of lucrative jobs
- Entire Boston area will have access to these jobs
- Connection to the "Urban Core"
- Easy and inexpensive travel for city residents to suburban jobs

Ridership and Cost Analysis

A critique of the Program for Mass Transportation (PMT) analysis and prioritization schema

Ridership and Cost Analysis

- Scope of project: Line should extend to Needham
  Heights and not Needham Junction
- Ridership: must take into account all of the aspects of the current base demographic and economic situation
- Build-out analysis: ongoing and planned development must be accounted for

Ridership and Cost Analysis: Scope of Project

- Line should terminate at Needham Heights
  - Already have existing commuter line in Needham
  - Little new development planned further into Needham
  - Less densely populated area, less utilization
- Combined station at Needham Heights will be within one mile of most of population of Needham
- Cost decreases from \$100 to \$60 million

#### Ridership and Cost Analysis: Utilization

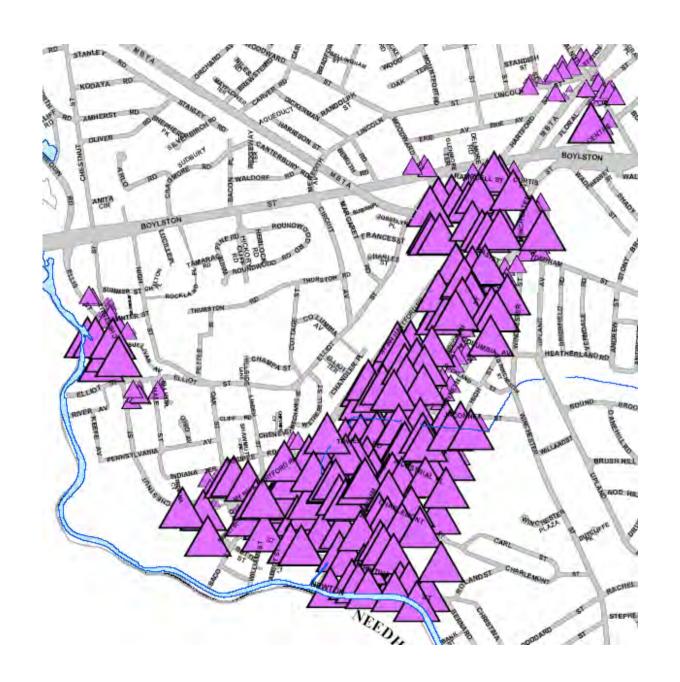
- PMT predicts 3400 riders, net increase 500 riders
- Current demographics: US census tract 3741 has 3964 residents, plus AvalonBay = 4500 persons
- At 15% transit share: 650 new riders in Newton
- Commercial space: 2.5 million sq.ft. in Newton
- At 766 sq.ft. per worker = 3200 employees
- ☐ If 15% take transit = 550 workers per day on transit

#### Ridership and Cost Analysis: Utilization

- Needham commercial space: 5 million sq.ft. with 2.7 million sq.ft. planned
- Currently, Needham Industrial Park generates 6500 trips per day
- Full build-out trips = 10,000 per day
- At 15% usage: 1500 trips per day on transit
- Total new riders: 3000/day; Total riders: 10,000/day

#### Effect on Development

- Newton: tremendous potential future growth in Needham Street corridor
- New growth can take shape of transit-oriented development
- Single story buildings and parking lots can become walkable pedestrian-oriented zones
- Manufacturing uses will turn into mixed-use projects



#### Effect on Development

- Needham Street (current):
  - 55 parcels
  - Land area = 2.7 million sq.ft.
  - Leasable commercial space = 900,000 sq.ft
  - FAR = 0.3
- Adjacent streets
  - Land area = 2.3 million sq.ft.
  - Leasable commercial space = 1.1 million sq.ft

#### Effect on Development

- Needham Street (with light rail access):
  - Can increase FAR to 0.5 (in some places, 0.8)
  - Would add 1 million sq.ft. space
- Adjacent streets
  - Would add 700,000 sq.ft. space by increasing FAR to 0.5 0.8
- Oak/Chestnut/Elliot (Newton Upper Falls Village)
  - Now: land area 1.4 million sq.ft., 500,000 sq.ft. space, FAR 0.3
  - Future: with FAR 0.6, space increases by 500,000 sq.ft.

#### Effect on Development - Light rail will support:

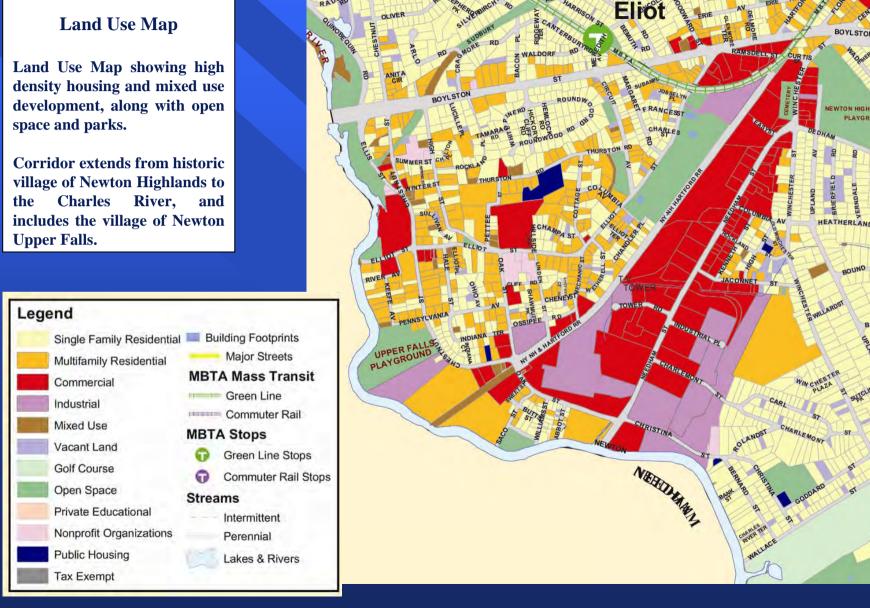
- 2.2 million sq.ft. of new development within 1/4 mile radius of stations
- About 3000 jobs will be created (at 766 sq.ft./employee)
- Development will lead to 450 additional new transit riders
- ☐ If residential development (600 new units) about 200 additional new transit riders will be added
- If zoning allows a higher FAR, number of riders higher

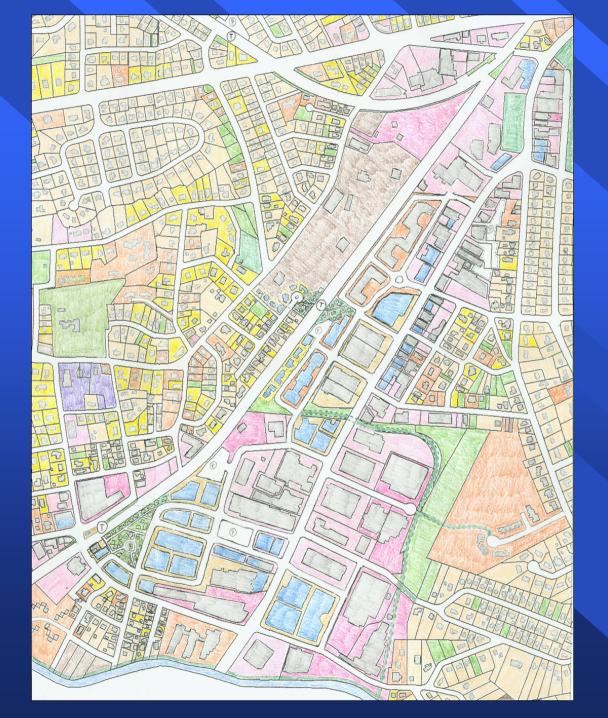
Light Rail will support pedestrian oriented, mixed use growth

- Interconnected street system
- Local destinations within walking distance
- Pedestrian-friendly design
- Topography suitable for walking
- Density and pedestrian scale: footprint size and heights of buildings will give the area a human feel, inviting character

#### **Needham Street Corridor Newton**

#### **Land Use Map**





#### **Needham Street**

# Creating a Transit-Oriented Pedestrian-Friendly Neighborhood



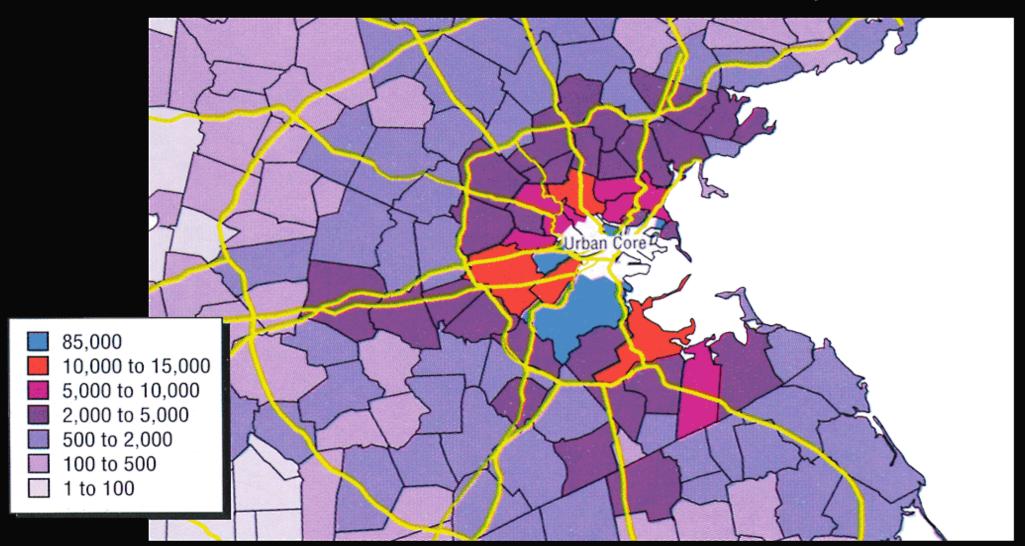
#### Effect on travel patterns

- Newton's "Triangle of Despair" is one of the most congested, overloaded traffic areas in the entire area
- Needham travel delays: 86.74 vehicle-hours
- Transit will allow 5000 fewer car trips per day
  - Route 9 traffic will be reduced 10%
  - Needham Street traffic will be reduced 20%
- Auto drivers will also benefit from transit

#### Effect on travel patterns

- Census 2000 Journey to Work Data
  - Most frequent work destination for Newton residents is Boston (12,917 workers per day)
  - Most of Newton's reverse commuting is from Boston (5,971 workers per day)
- Transit utilization for non-work trips is usually about 30% of journey-to-work utilization

#### Number of Commuters to the Urban Core, 1990



40 cars on the road







40 people in a bus

40 people out and about



#### Reduction of pollutants

- Reduced carbon monoxide levels (100 tons)
- Reduced nitrogen oxide levels (10 tons)
- Reduced carbon dioxide levels (2500 tons)
- Reduced particulate matter
- Travel time Needham to Boston reduced 1.5 million hours
- Net decrease in annual regional energy consumption = 50,000 million BTU's

#### Improved Safety in Corridor

- Project area includes high crash locations:
  - Highland Ave. at Rt. 128/95: 197 crashes (78 bodily injury)
  - Highland Ave. at Webster St: 39 crashes (15 bodily injury)
  - Highland Ave. at Wexford St: 41 crashes (14 bodily injury)
- Reduced auto dependence will improve safety
- Safety to pedestrians will be improved

#### **Improved Transit Service Quality**

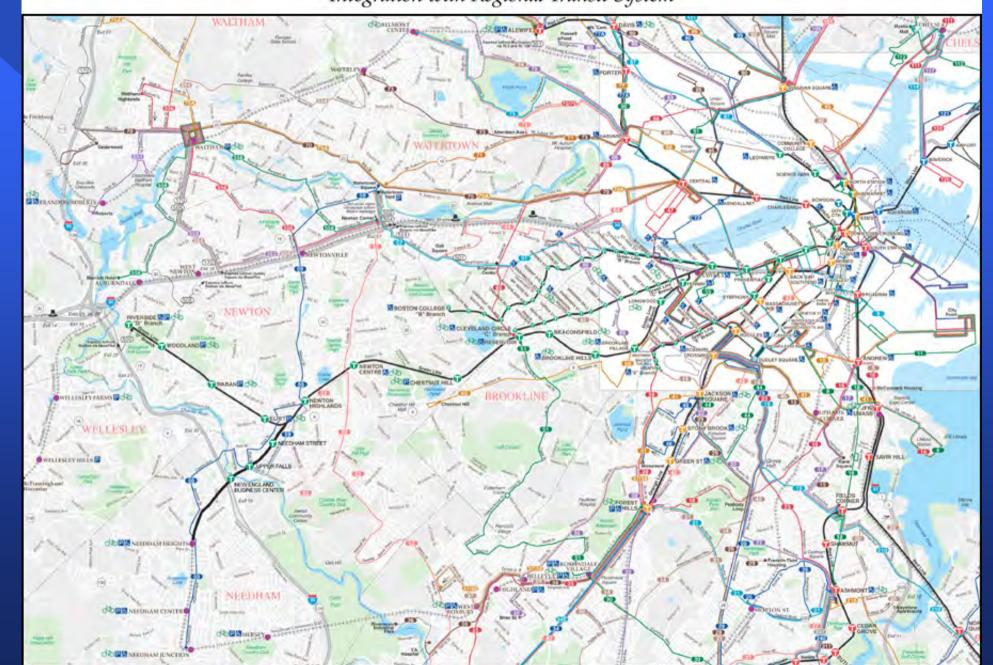
- Poor transit access with Rt. 59 bus, commuter rail
- Bus operations end around 7 PM
- Current bus patronage does not reflect future rail use
- Rail travel time Needham to Boston: 25-30 minutes
- Pricing: \$3.50 round trip (less with monthly pass)
- $\blacksquare$  Car cost 20 miles at \$0.34/mile = \$7.00 + \$20 for parking

#### **Environmental Justice**

- New rail line will access 10 million sq.ft. real estate
- Will provide access to jobs for 10,000 workers
- Bus routes 9, 1, 66, 51 all feed into this line
- Excellent opportunities for jobs for low income residents
- Significant reverse commuting opportunities
- Next to largest affordable housing complex in Newton

#### Newton - Needham Light Rail Connection

Integration with Regional Transit System



#### Capital Cost of New Line: \$60 million

Operating Cost:

Daily ridership increase on mode:

6,000 riders Net increase in daily transit ridership:

Capital cost per new transit rider:

Operating cost per new transit rider:

Capital cost/Travel time benefit:

Operating cost/Travel time benefit:

Travel Time Savings (to Copley):

\$10,000 per weekday

15,000 riders

\$10,000

\$1.66

\$15,000 per hour

\$2.50 per hour

4000 hours/day

Costs of Implementing and Running new service:

- Operating Costs: \$1.66 per new transit rider
- Base passenger fare (\$2.50) more than covers cost
- Boston MPO Transportation Plan 2004-2025 has capital funds totaling: \$10.885 billion
- Proposed Newton-Needham service is less than 1% of that budget (\$60 million)

#### Costs compared to other projects

	Capital	Net daily	Capital \$/	Operating \$/
Project	Cost	↑Ridership	New Rider	New Rider
Extend Blue Line to Lynn	\$357 million	6,300	\$ 56,752	\$11.50
Commuter Rail New Bedford	\$670 million	7,090	\$ 94,499	\$ 9.75
Fairmount Line Improvements	\$ 70 million	310	\$318,182	\$ 8.95
Green Line to West Medford	\$112 million	3,540	\$ 31,571	\$11.79
Green Line to Needham	\$ 60 million	6,000	\$ 10,000	\$ 1.66

#### **Effect on Other Transit**

- Line would add only 6 trips/hr in central subway
- New capacity could easily be accommodated
- Option to reverse direction at Kenmore loop
- Service for 3000 riders west of Newton Highlands preserved
- Headways 10 min on new line, 6 min on Riverside line
- Peak hour headways on joint service: 4 minutes
- Improved service for 17,000 riders east of Newton Highlands

#### Other Benefits

- Connectivity: intermodal connections, bicycle and pedestrian connections will be encouraged
- Accessibility: new link will offer access regardless of physical limitations, economic status, age, or ethnicity.
- Modernization of existing system: best possible use for the abandoned right-of-way, best transit project since Riverside
- Public support and involvement: supported by business owners and residents, public officials from both communities
- Community character: complements historic pattern of development of Newton/Needham, reintegrates neighborhoods

Newton's Comprehensive Planning Advisory Committee

Land Use:

Compact village center

Mixed use development

Broadens housing opportunities

Supports public space and open space

Transportation:

Reduce reliance on automobile

Provide for public transportation

Improve pedestrian facilities

#### Newton's Comprehensive Planning Advisory Committee

- Newton is a community of villages with central commercial areas.
- Continue to build on our structure of villages.
- Maintain balance of land uses enhance aesthetics which we value.
- Promote compactness of development, preservation of open space

- Create a balance of residential diversity, small scale commercial, space for offices, open space, and public amenity.
- Walkable streets with development clustered where it is accessible by transit or foot..
- Mix of housing options and prices.
- Minimize congestion while encouraging a mix of transportation options.
- Infill growth in underutilized parcels.

#### Suburban Infill Development

#### **Before**



**After** 











Smart growth and walkable environments (friendly to transit, pedestrians and the environment).

# Suburban Infill Development



Existing use - Shopping mall surrounded by surface parking.

# Suburban Infill Development



Mixed use neighborhood with range of housing options, transit, ground floor shops and pocket parks.

## Redevelopment and Affordable Housing





Reinterpreting historic standards while reflecting economic diversity

- Promote safe and comfortable community street
- Height of buildings, visual complexity, spacing
- Street level clear windows, diversity
- Mix of uses to attract mix of people
- Gates, fountains, ornamental lights, plazas

- Create a neighborhood of form, order, and structure.
- Patterns of arrangement, methodological organization of a succession of parts.
- Contrast, compactness, intensity, diversity.
- Doorways, windows, facades, and trees.

- Intersections 200 ft. and 400 ft. apart.
- Building facades 80-100 ft. long.
- Three to five entrances per building.
- Entrances 30-50 ft. apart.
- Trees 20-30 ft. apart, grow 30-40 ft.
- Cornices, frames, signs, lights, shutters.

- Height to width ratio 1:1 1:2.5
- Building heights 20-30 feet.
- Buildings should be built to property line, continuous facades, no setbacks.



Interconnecting streets could be developed with new restaurants, small-scale retail and housing off of Needham Street.



Zoning incentives for open and civic space could help create a sense of place to the corridor



The industrial district could be transformed into a walkable mixed-use center anchored by a new park.



- Creates major presence of life and focus.
- Human presence: offices, homes, businesses.
- Economic diversity: supportable local stores, services within walking distance.
- Connects with Upper Falls neighborhood.
- Residential: transition public/private realm.

☐ Fight the "inevitability hypothesis"

Human habits and trends can be changed when problems develop or when a better solution is found

Past trends in urban transportation can be changed!







