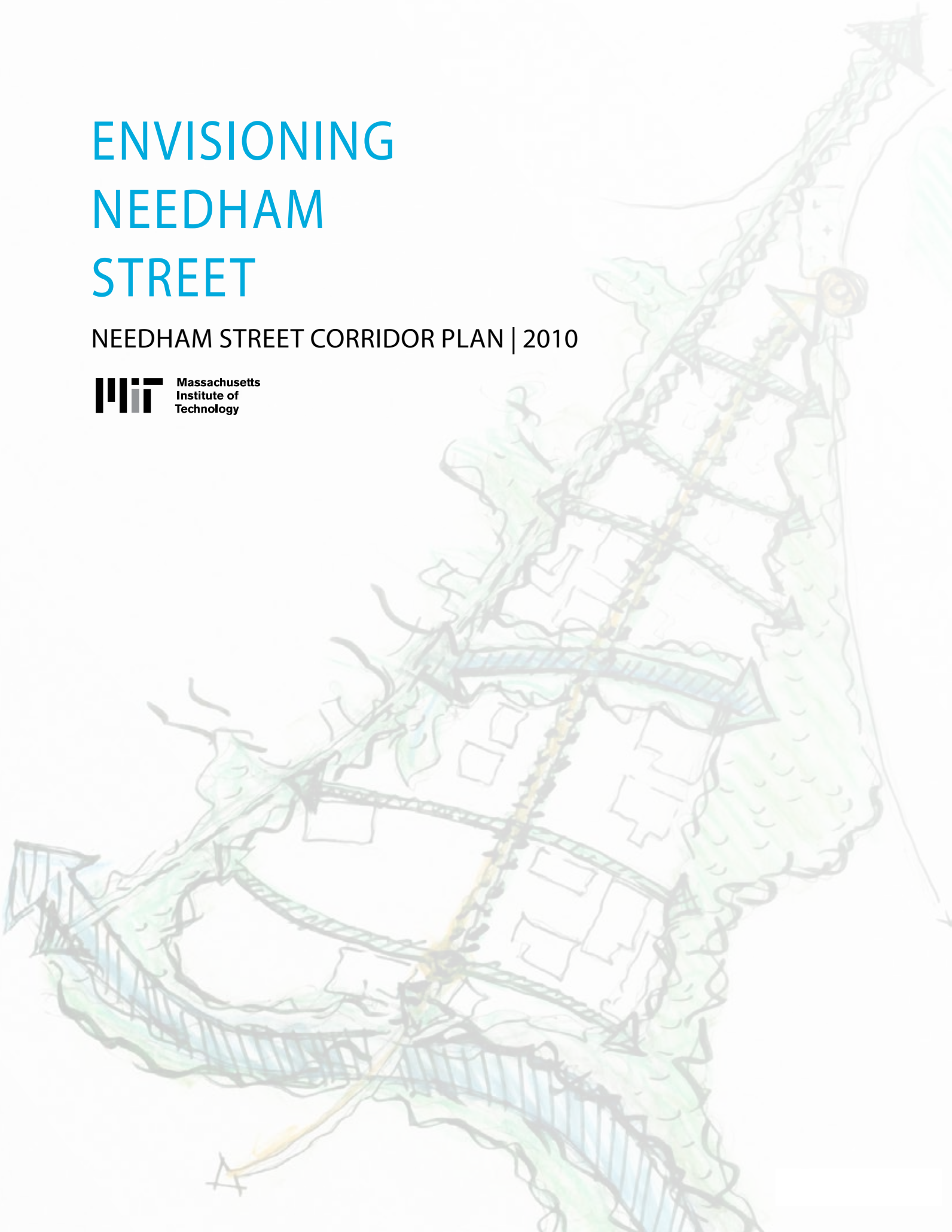
ENVISIONING NEEDHAM STREET

NEEDHAM STREET CORRIDOR PLAN | 2010

Massachusetts Institute of Technology



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11.360 COMMUNITY GROWTH AND LAND USE PLANNING PRACTICUM

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Above: The Seal of the City of Newton, MA

EXECUTIVE SUMMARY

Envisioning Needham Street outlines a vision, objectives, and key recommendations for the future of the Needham Street corridor in Newton, Massachusetts.

The plan was developed by graduate students in the Community Growth and Land Use Planning course at the Massachusetts Institute of Technology (MIT). The City of Newton's Department of Planning and Development engaged the MIT class to envision redevelopment along the Needham Street corridor and recommend implementation strategies to make the plan a reality. This project is an outgrowth of the 2007 Newton Comprehensive Plan, which identified Needham Street as the city's most promising location for commercial and residential growth but acknowledged the lack of a vision for the future of the corridor.

The vision for Needham Street described in this plan was developed after thorough analysis of the local and regional context, existing site conditions, stakeholder input, and Comprehensive Plan and economic development goals for the Needham Street corridor.

Proposed Vision

In support of the goals set forth in the Comprehensive Plan, this plan encourages the City to build on the Needham Street corridor's assets by making a set of incremental changes to improve the pedestrian experience, aesthetics, connectivity, and function of the ecological system, creating a vibrant, livable, mixed-use gateway to Newton.

Two Zones, Five Objectives

The Needham Street corridor today exhibits two zones with distinct scales of development and physical characteristics. This plan recommends that the corridor's zoning be realigned with these two districts and that physical improvements be made throughout the corridor to express the proposed vision. Proposed improvements fall under the following five objectives:

Objective 1: Promote fine-grain mixed-use development

The Needham Street corridor should continue to accommodate industrial, office, retail, and residential uses and should incorporate vertical mixed-use developments. Multi-family residential uses should be allowed by right throughout the corridor, as they will bring character and vitality to the area. Commercial uses should remain a primary feature of Needham Street; additional commercial development should be encouraged, augmenting income, employment, and commercial real estate tax bases. Other recommendations include amended floor-area ratio (FAR) and dimensional requirements to promote fine-grain mixed use and a streamlined development review process to facilitate new investment along the corridor.

Objective 2: Create a more cohesive and attractive physical environment

Several actions are recommended to help create an identity for Needham Street, promote cohesive design, and enhance the aesthetics of the built environment along the corridor. Zoning modifications can help create a more uniform street edge, manage the amount of parking provided, minimize parking lots that abut the street, and require incorporation of public spaces in large developments. The plan also recommends adding additional form-based regulations and creating design guidelines to improve the quality of the corridor's built environment.

Objective 3: Create a safe, comfortable, and efficient streetscape

Given Needham Street's significant vehicular traffic flows, it is important both to improve multimodal access and to maintain traffic flow. Key interventions include streetscape improvements to better accommodate bicycles and pedestrians, new access roads to relieve some of the corridor's vehicular traffic, and the addition of gateways to Needham Street at the Winchester Street and Dedham Street intersection and the Tower Road and Industrial Place intersection.

Objective 4: Connect site to surrounding ecological system and open space network

This objective aims to incorporate Newton's overall landscape and ecological priorities and tie Needham Street into the regional open space network. Specific recommendations include integrating water remediation strategies into the streetscape and open spaces, and converting the abandoned rail right-of-way into a green corridor for pedestrian and bicycle circulation while maintaining flexibility for a potential Massachusetts Bay Transportation Authority (MBTA) Green Line extension.

Objective 5: Promote connections among parcels and with neighborhoods

Several interventions are recommended to improve the connectivity of the Needham Street corridor and to better integrate the street with the surrounding neighborhoods. Recommendations include new pedestrian and bicycle connections to Upper Falls through the abandoned rail right-of-way; new vehicular connections to Route 9, Route 128, and points northward; and improved vehicular connections among sites within the corridor. Additionally, land uses and the scale of the built environment along corridor edges should be complementary with the existing surrounding neighborhoods.

Catalyst Sites

The plan includes concepts for two key areas along the Needham Street corridor to illustrate the new vision for Needham Street and to provide inspiration for future developments.

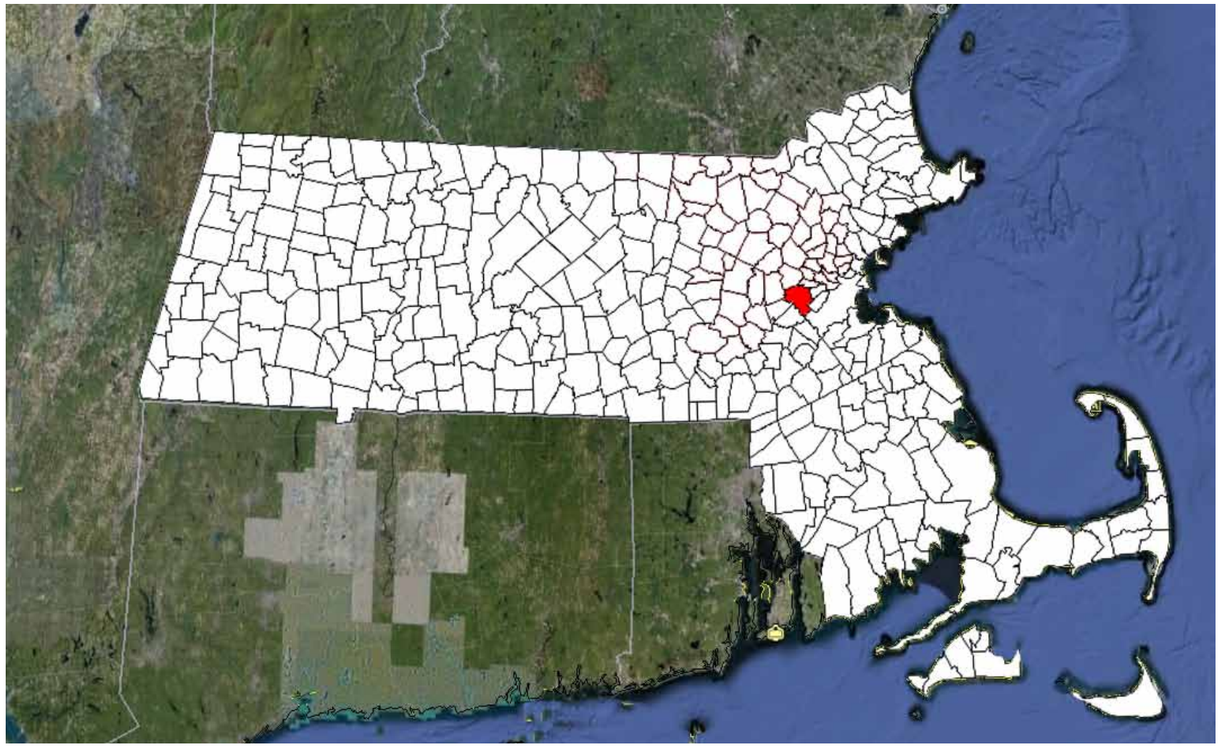
NORTHERN SITE: This scenario re-envisions several blocks located adjacent to the Avalon Bay apartment complex and the Newton Technology Park office complex. It features smaller-scale commercial buildings that front the street and have shared parking lots to the side and in the middle of the block, as well as residential townhouses that address the neighborhood to the east. It provides improved pedestrian infrastructure, a connection to the abandoned rail right-of-way and Upper Falls, and a central civic space.

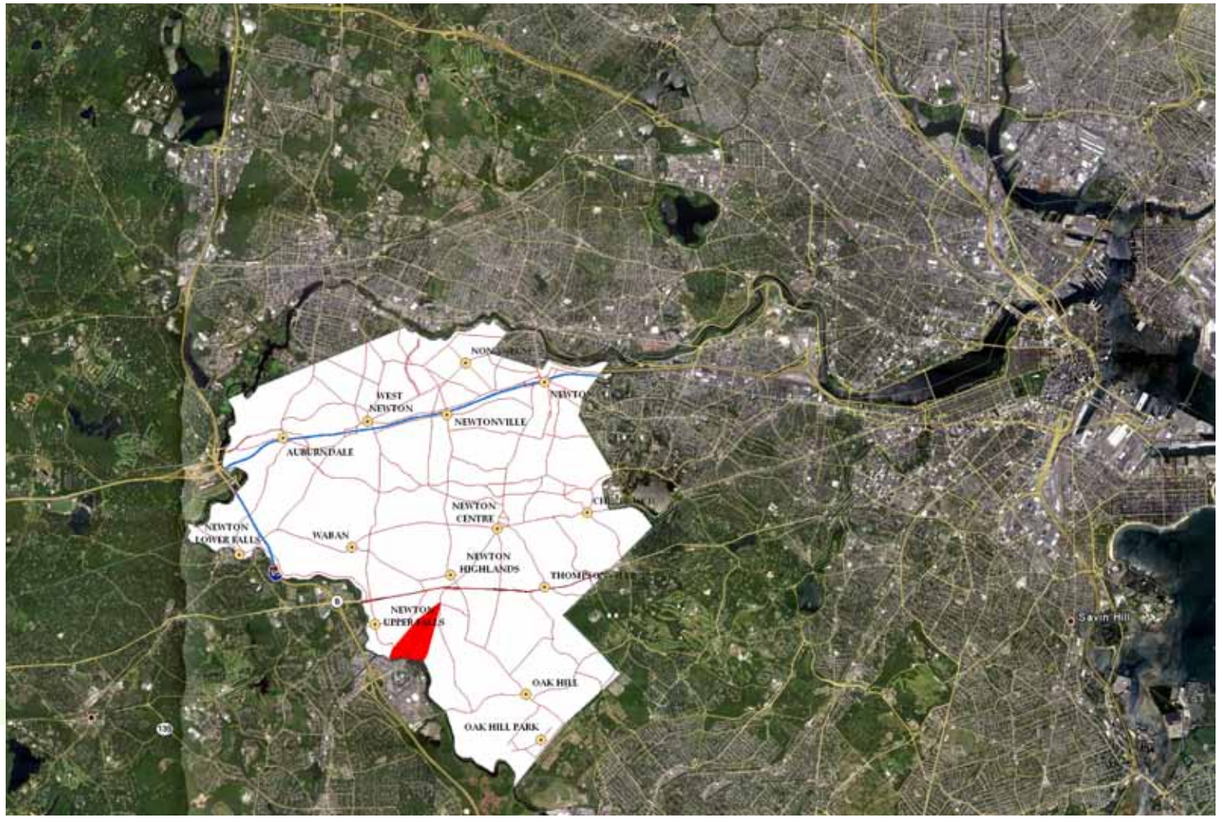
SOUTHERN SITE: This scenario re-envisions several parcels adjacent to The Mill at the Charles and the rail right-of-way. It proposes a phased transition from overly generous parking lots and existing industrial and commercial buildings to a mixed-use commercial and residential development with two civic open spaces, internal circulation, a water remediation strategy, and connections to the rail right-of-way and surrounding neighborhood. The scenario allows for larger building footprints as compared to the northern site, but will promote increased design coherence and development intensity, as well as greater sensitivity toward the Upper Falls neighborhood.

Implementation

The plan concludes with several strategies to support the implementation of the recommendations. Zoning incentives can be an effective way to encourage developers and property owners to incorporate desired elements. The plan recommends density bonuses for actions such as mixed-use developments, shared parking lots, reduced curb cuts, and reduced peak hour trips. Public-private partnerships are another strategy that can help implement streetscape, transportation, and aesthetic improvements, such as undergrounding utility wires. The plan also summarizes a number of financing strategies for implementing the recommendations, with a focus on financing local transit options and undergrounding wires.

Envisioning Needham Street provides a vision for an improved Needham Street and a road map to achieving that vision. With the foundation provided by this plan, the City of Newton can guide development along Needham Street in a way that fulfills the goals of the Comprehensive Plan while enhancing the function and character of the corridor.





1 INTRODUCTION

This report was developed by a group of nine graduate students in the Department of Urban Studies and Planning at MIT, as part of the semester-long Community Growth and Land Use Planning course taught by Professor Terry Szold and Annis Whitlow Sengupta.

The City of Newton's Department of Planning and Development engaged the class to propose a new vision for the Needham Street corridor that will guide the future development of this unique part of Newton. The City also asked the class to propose various implementation recommendations that will make the plan a reality, and to identify financing strategies to ensure that the recommendations are feasible. This project is an outgrowth of the 2007 Newton Comprehensive Plan, which identified Needham Street as the city's most promising location for commercial and residential growth but acknowledged the lack of a vision for the future of the corridor.

Needham Street is a major opportunity for all of Newton. As both an arterial road and a regional shopping area, the corridor acts as a natural magnet that draws people to the city. Unfortunately, these two roles are sometimes at odds with one another, as Needham Street struggles to serve as both a thoroughfare and a commercial destination. Along with this dilemma, Needham Street also suffers from noticeably antiquated infrastructure: crumbling and incomplete sidewalks, a lack of bike lanes, vehicular traffic at or near its capacity, poor circulation management, and a tangled mess of overhead wires. In addition, parking dominates the streetscape, there is a lack of public space, and building designs and configurations do little to help make the street more inviting.

Opposite:
(Above) Map of Massachusetts, City of Newton in red;
(Below) Satellite image of southwest Boston, City of Newton in white and Needham Street corridor in red

Satellite image of Needham Street corridor

The street nevertheless holds great promise for becoming a more attractive and efficient destination. With a more diverse mix of uses, some traffic management and streetscape improvements, and increased attention to site design, Needham Street has the potential to become a dynamic place with a coherent identity of its own. It can transform into a vibrant gateway to the city that will encourage people to live, work, shop, and enjoy civic interaction along the corridor.

This plan addresses a wide array of topics, including land use, form of the built environment, transportation and circulation, ecology and open space systems, community connections, and economic development. Some of the salient concerns that the team grappled with included:

- Whether Needham Street's identity as a commercial strip would change and, if so, what interventions and redevelopment proposals would be necessary to facilitate such change.
- Are streetscape, use, and form-based planning rules and guidelines sufficient and appropriate measures to serve as catalysts for the plan's broader vision?
- Can the street support the traffic increases generated by proposed interventions and development projects?

In order to offer appropriate solutions to a complex set of issues, the team began the planning process by collecting background information on Needham Street's past and present. The team made multiple site visits, developed a detailed zoning diagnostic, examined historical documents, conducted traffic counts, studied local and regional economic trends, generated and analyzed an array of maps, researched regional ecological systems, characterized and analyzed the existing built form, and explored adjacent neighborhoods. Past planning proposals for Needham Street were also referenced to gain a sense of the corridor's lengthy planning context.

Next, the team interviewed a variety of stakeholders, including Newton Aldermen, Planning and Development Department staff, interested residents, local developers, business people, and leaders of community task forces. The stakeholders were asked some specific questions about Needham Street, but were also encouraged to speak freely on the issues that concerned them the most. In this way the team gained a sense of what members of the community—the real Needham Street experts—truly valued. Similarly, about two months into the process the team held a public meeting at Newton City Hall to present findings and preliminary recommendations and ask for reactions and feedback from community members. Later phases of data collection and analysis built upon this public input to develop a more nuanced understanding of the forces at work along the corridor.

This background research and stakeholder feedback frames the plan's vision. After analyzing Needham Street's current strengths and weaknesses, a number of recommendations and strategies were developed to achieve the proposed vision. The process culminated in a second public meeting in December 2010, at which the team shared penultimate recommendations with the community. Stakeholder comments again helped refine and further develop the recommendations, which are presented to the City of Newton in this report. The team hopes that this work will be continued and built upon in the coming months and years, so that Needham Street can realize its potential as a thriving corridor.

Public meeting regarding Needham Street vision, Newton City Hall, December 2010

2 CHARACTERIZING NEEDHAM STREET

Needham Street today is an important local and regional auto-oriented shopping destination. Businesses on the street provide a significant source of tax revenue for the city, and there is a strong local consumer base to support them. Needham Street is also well connected to regional transportation networks. However, the corridor faces a number of significant challenges to future development, including traffic congestion, a poor pedestrian environment, a lack of connectivity with local neighborhoods, no cohesive visual or physical identity, and limited public open space amenities. This section will discuss the area's history and current site conditions, and will evaluate the assets and challenges presented by the physical environment and function of the corridor.

Above and opposite: Scenes illustrating Needham Street's auto-oriented character

History of Needham Street

Needham Street is currently an incongruity in a city known for its history and picturesque, well-maintained neighborhoods. Newton became one of Boston's first streetcar suburbs in the late 19th century and continued to grow as a desirable residential retreat well into the 20th century. The city has maintained a unique identity as a prosperous, progressive, and dynamic inner suburb. Interventions on the Needham Street corridor should be careful to consider the surrounding context and extend these qualities while preserving or restoring cultural, physical, and natural assets.

The southwestern neighborhoods that border the Charles River and Needham Street played important roles in the region's manufacturing history. Even today, the impact of the mills that dotted the

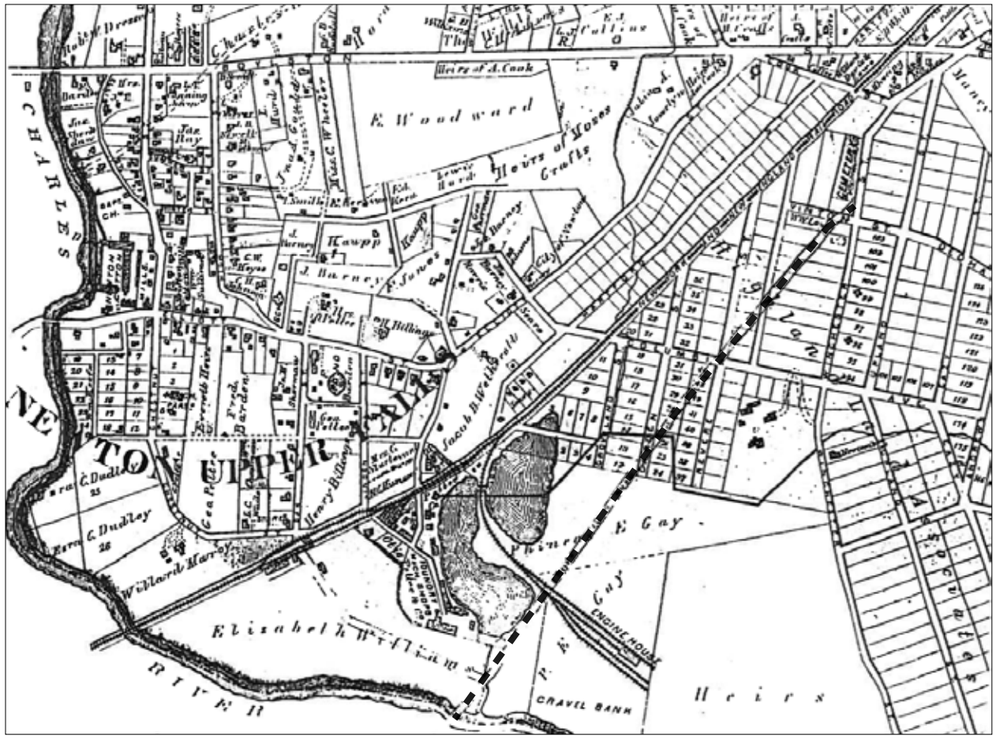


Figure 1: Historic map of Needham Street showing adjacent railroad line, Needham Street along dashed line

landscape along the Charles remains as a legacy of this area's productive history. The Needham Street area was originally developed following manufacturing activity near the Charles River Upper Falls, which was first dammed for mill use in the late 17th century. Originally, the land in the Needham Street corridor was used for farming, but in the early 19th century, property in the southern section of the corridor was developed into a machinery manufacturing business. The railroad line that is located parallel to Needham Street was in 1852, transforming the area adjacent to Upper Falls into a bustling village. At the end of the 19th century this railroad carried the fill that was used to create Boston's Back Bay. To the east, the Newton Highlands area began to grow in the 1870s. Although the area around Needham Street was initially subdivided for residential uses, the plots near the railroad tracks were less attractive to residential developers, so larger parcels were assembled and sold for industrial development.

The street itself was originally constructed in 1875 to connect Newton Highlands and the town of Needham, but its major growth period occurred after World War II, as industry all over the United States moved from inner cities to suburbs. The existing built form had a strong influence in directing new development, leading to a patchwork of large and small lots and buildings and contributing to its current discontinuous character. Regulations at the time required industrial development to be set back from the road by 40 feet, laying down a pattern that persists today along parts of the corridor. Through the early 1970s the street was a manufacturing zone, but as industry continued to move farther from the metropolitan center vacant sites were left along the corridor. These former industrial parcels were converted to office and retail uses, beginning with the construction of the Marshalls site in 1979. At the same time, Needham Street became an important automobile route, connecting Route 9 and Route 128. Today the street remains an important auto-oriented corridor, prioritizing vehicular traffic over pedestrians, and lacks a cohesive or visually distinct identity.

Needham Street Today

The Needham Street corridor today is both an active roadway and a shopping destination, but there remain a variety of opportunities and challenges that will impact future development along its length.

Land Use and Connectivity

Current land use regulations governing the corridor constrain the possibilities for the site's future development. As it stands, the majority of Needham Street is zoned as Mixed Use 1 (MU1) and Mixed

Figure 2: Existing land uses

Use 2 (MU2), which allows for commercial and industrial uses, as well as residential uses by special permit. This zoning scheme has led to the development of a mix of uses along the corridor ("horizontal mixed-use"), but the street has very few mixed-use buildings ("vertical mixed-use").

The corridor is roughly organized with retail and commercial uses sited closer to the street and industrial uses more deeply set back. Particularly in the southern section, the street's uncharacteristically large parcels are unique in Newton and represent an opportunity for types of development that could not occur elsewhere in the city. Additionally, through infill development, there is great opportunity to use existing properties along the street to help create a more pedestrian-friendly scale.

Unfortunately, the street's role as an auto-oriented corridor has led to its isolation from neighboring Upper Falls and Newton Highlands, both physically and psychologically. Although the corridor's character is not currently conducive to forging links with surrounding neighborhoods, there is opportunity for this to change. Careful consultation with these communities is necessary to ensure that the city matches community goals with the future development of Needham Street, but there is certainly the potential to make positive connections. Integration with the surrounding neighborhoods is paramount if Needham Street is to become an interesting and attractive place with an identity that enhances the livability of those surrounding neighborhoods.

Buildings, Lots, and Density

A drive down Needham Street reveals a diverse set of building types, styles, and arrangements, corresponding to a variety of parcel sizes and orientations. The corridor is home to multi-family residential, office, small- and large-scale retail, and industrial uses. These uses are housed in a range of building types, including single-story retail strip malls, multi-story office buildings, and a one-of-a-kind historic mill. Although The Mill at the Charles is the best-known historic building on Needham Street, the corridor is also home to buildings of many different ages and architectural styles. Some properties, such as 55 Needham Street and 100 Needham Street, while not classified as 'historic,' were built prior to World War II and exhibit interesting period architectural details that add to the street's multi-faceted character.

Unfortunately, this eclectic mix means that the experience of traveling along Needham Street can feel haphazard, with buildings arranged at differing distances and angles from the road and some lacking

Examples of varied building typologies on Needham Street: (top to bottom) office, multi-family residential, historic, industrial, small-scale retail

street-facing front doors. Without any sort of standardization in the way buildings address the street, the corridor is truly automobile-oriented, and lacks a cohesive visual identity. On a gross level, the corridor has a floor-area ratio (FAR) of under 0.5, meaning that total building square footage represents less than half of the land area along the corridor. Existing zoning regulations allow an FAR of up to 2.0, which indicates that zoning would allow a significant amount of new development in the corridor on an overall basis.

Streetscape and Aesthetic Quality

Needham Street is an important transportation conduit, but any attempt to improve conditions along the corridor must include a host of interventions to improve and upgrade the street right-of-way. The lack of cohesive identity begins with the streetscape, where pedestrians and drivers alike first experience the corridor. Aside from the roadway itself, pedestrian accommodations along the corridor are particularly poor, with sidewalks degraded or non-existent in many places, parking lots open to the street, many curb cuts, a lack of street 'furniture,' and no safety buffers to help protect pedestrians from vehicular traffic. The corridor also has an insufficient number of crosswalks, making it extremely difficult to safely cross the street. Visually, the overhead wires lining the street dominate the landscape. Without buildings facing the street, proper pedestrian facilities, and inconsistent building setbacks, the 'edge' of the street is poorly defined.

The corridor does have a variety of parcels on which pleasant landscaping vastly improves the

Below and right: Poor pedestrian accommodations along Needham Street

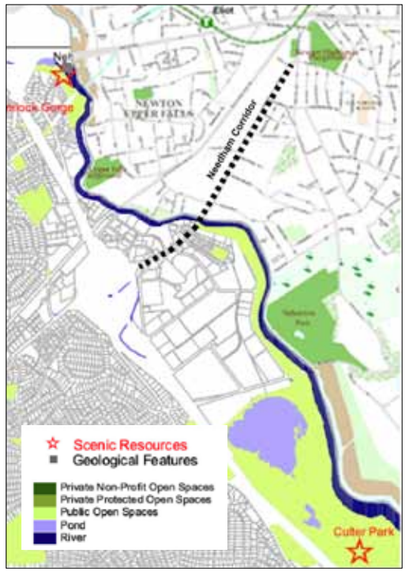
environment, and the nearby Charles River serves as an ecological and historical asset. The street does not, however, provide the same quality of environment that one comes to expect from Newton's well-maintained and unified villages, nor does it take advantage of a variety of potential assets, such as its history, notable buildings, and proximity to recreational open space. The corridor's lack of pedestrian amenities and jarringly varied scale prevent people from walking between parcels, and a poorly maintained street inhibits further investment from property owners.

Ecology and Open Space

Newton is a community that prides itself on being "The Garden City," and has long been recognized for its environmental leadership in its recycling and waste management programs, as well as in its pursuit of high performance design standards for new facilities. Considering this, the subject of ecological systems, open space, and recreation ought to be a high priority in the planning and development of Needham Street.

The creation of an open space framework for the Needham Street corridor requires careful consideration of the site within the regional ecological context of the Boston metropolitan area. At the city scale, two diagrams (Figures 3 and 4) help illustrate the surrounding open space context of the Needham Street corridor.

As of September 2007, only 2,300 of Newton's more than 11,000 acres of land could be considered open space. Of this, just over 2,000 acres remain in a predominantly natural state. Approximately 1,000 acres are privately owned (more than half by golf courses), about 300 are open water, and the rest is land shaped primarily to serve human residential use. The remainder is publicly owned, and is primarily in the form of parks and playgrounds.



Figures 3 and 4: Surrounding open space context

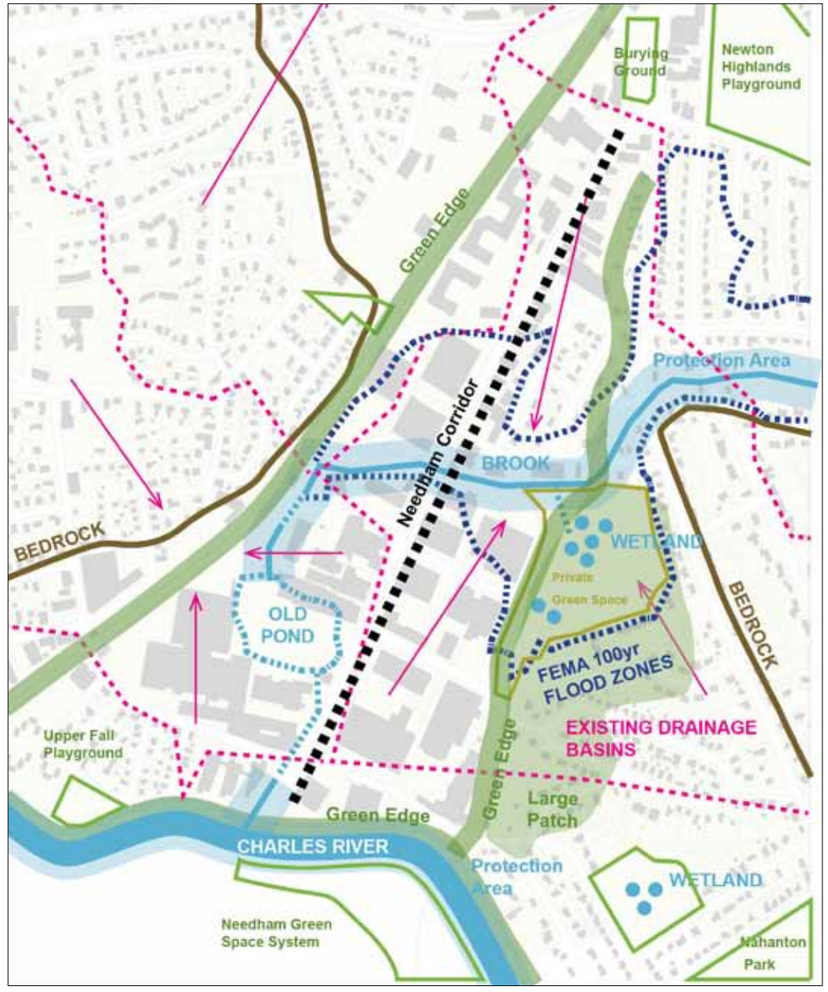


Figure 5: The corridor sits between two sheets of bedrock and within three drainage basins. The brook, which runs through the center of the site, primarily affects parcels in the southwestern section of the site. A buried floodplain sits beneath the Marshalls plaza parking lot and its hundred year floodplain stretches up to the Newton Technology Park parcels. The site is bounded to the south east by a wetland, to the west by the green corridor along the rail right of way, and to the south by the green corridor along the Charles River.

Above: Brook and rail corridors

Opposite: Existing open space on abandoned rail-bed and along the Charles River

Safeguarding water resources is also a high priority for Newton. The Comprehensive Plan and Newton's Recreation and Open Space Plan call for the protection of natural bodies of water, and for the prevention of stormwater pollution from the roadways. Newton has 12 miles of riverfront property along the Charles River (more than any neighboring community), and a vast amount of the city's stormwater drains into it. There is a broad commitment to limiting and managing stormwater runoff by using containment and bio-retention techniques. Over the past few years Newton has been systematically investigating and addressing crossovers between stormwater and sewer systems.

The Needham Street corridor is clearly demarcated on the east and west sides by two linear strips of green that run from north to south, roughly paralleling the abandoned railroad tracks, and along the Charles River from east to west along its southern edge. A large patch of wetland exists on the central eastern side, and is linked to a brook that runs through the site, providing important ecological assets to the corridor (Figure 5). However, Needham Street is lacking in terms of an effective water remediation system, and includes little to no usable public open space.

SITE GEOLOGY, TOPOGRAPHY, AND WATERSHED BOUNDARY

In terms of surficial geology, the corridor is located mostly on sand and gravel deposits, with two bedrock and till areas on the eastern and western edges of the corridor. The area does not present steep topography except on the parts that coincide with the rock layer; the average change in topography does not exceed 20 feet along its length. The corridor crosses three drainage basins, which converge along the existing brook that passes through the middle of the site (Figure 5).

WETLANDS AND FLOODPLAINS

A floodplain cuts the corridor from east to west, corresponding with an existing brook that is buried at the Needham Street crossing but otherwise open. In addition, a pond was formerly located just to the south of the terminus of Tower Road. On the eastern boundary of the corridor (at the end of Industrial Place) there is a large wetland area full of deciduous species typical of southern New England such as buttonwood, red maple, ash, and American elm. The southern portion of the site borders the Charles River, and directly ties into its ecosystem. These factors make the corridor prone to flooding, presenting the need for more intensive and creative water remediation strategies.

RECREATIONAL OPEN SPACES

No public recreation areas are currently located within the Needham Street corridor. However, four parks are located in close proximity: Newton Highlands Playground to the north, Upper Falls Playground to the southwest, Nahanton Park to the southeast, and the larger Cutler Park to the south on the Needham side of the river. These parks could be easily incorporated into a network of open spaces accessible from Needham Street. Further, a privately owned historic cemetery lies at the northern terminus of the corridor and could be used to strengthen the open space network.

Transportation Infrastructure and Mobility

Needham Street today functions as an important traffic corridor. Although very limited Massachusetts Bay Transportation Authority (MBTA) bus service exists along the corridor, the reality is that most visitors destined for Needham Street must drive there. There is ample parking in lots located along the corridor, but it is predominantly commercially owned and not for use by the general public unless they are patronizing local businesses. A middle turning lane helps alleviate some congestion, but the large number of curb cuts means that automobiles frequently cross or block traffic as they turn into and out of various shopping centers and commercial establishments. Drivers attempting to turn left out of these parking lots have a particularly detrimental impact on traffic flow. While there are opportunities to improve the efficiency of traffic flow on Needham Street, future development plans may be limited by traffic impacts in light of these and other constraints.

For pedestrians and bicycles, Needham Street currently presents an uncomfortable, confusing, and unsafe environment. Cyclists navigate the street despite the lack of dedicated bicycle lanes or bicycle route demarcation. Sidewalk and crosswalk conditions are sorely insufficient for such an important commercial area.

Northeast Needham Street

GENERAL TRAFFIC PATTERNS

Traffic flow through the Needham Street corridor is constrained at peak periods during weekday morning and evening commuting hours and on Saturday afternoons. Levels of service, or the quality of movement through the street as experienced by vehicle occupants, are adversely affected by congestion resulting from peak-hour traffic. Some congestion can be attributed to bottlenecks at discrete points along the length of the street. However, much of the congestion can also be attributed to regional traffic movements.

Bottlenecks caused by vehicular movement within the 0.8 mile stretch of Needham Street can be principally attributed to two issues: an excessive number of curb cuts and a lack of signaling at certain critical intersections. There are thirteen curb cuts in just the southern section of the Needham Street corridor, a very high number for an arterial/connector road. The northern section contains not only numerous curb cuts but also many segments where there is virtually no physical separation between streets and property lots. Most of these curb cuts offer ingress and egress to parking lots of commercial sites, and almost all of these turning points are unsignaled. The excessive curb cuts and unsignaled left turns out of commercial lots impede movement on the street. This disruption of traffic flow causes greater congestion than would be expected for the volume of traffic on the road.

Depending upon the time of day, different destinations within the Needham Street corridor contribute to internal bottlenecks caused by turning vehicles. Fast food outlets and convenience stores attract large numbers of motorized vehicles across lanes at all times of day. National Lumber attracts a substantial proportion of the heavy-goods vehicles traversing the roadway segment throughout the day, while other heavy-goods vehicles provide numerous retailers with periodic shipments. During weekday commuting and lunch periods, traffic entering and exiting parking lots of offices, retailers, and restaurants, especially in the southern portion of Needham Street, contributes to peak-hour bottlenecks. Retailers and restaurants are largely responsible for Saturday afternoon peak-hour congestion.

While curb cuts and a lack of signaled intersections contribute to localized bottlenecks, much of the congestion within the Needham Street corridor stems from regional demand. First, much of the volume traversing the Needham Street corridor during peak hours is through traffic. According to a 2008 Vanasse, Inc. study, the Institute for Transportation Engineers (ITE) generally estimates that through traffic (i.e., traffic for which Needham Street is not a final destination) comprises about 25-34% of all traffic for corridors similar to Needham Street. However, the Comprehensive Plan estimates Needham Street through traffic at 47% of the total. This may result from congestion of nearby regional highways such as Route I-95/128 and Route 9. The Massachusetts Department of Transportation (MassDOT) estimates average traffic on Route I-95/128 going past the Needham Street/Highland Street interchange to be between 135,000-145,000 vehicles per day, and average traffic on Route 9 to be about 50,000 vehicles per day. Thus, many drivers may use Needham Street to avoid the high levels of congestion on these major highways. A second regional factor contributing to high levels of corridor traffic is the fact that many of the land uses attract regional visitors. This is beneficial from an economic standpoint, but causes high traffic volumes on Needham Street during weekday commuting, weekday lunch, and Saturday afternoon peak hours.

As for daily volume on Needham Street itself, recent traffic studies suggest the average volume of traffic currently ranges from about 18,000 to 20,000 vehicles per day of combined northbound and southbound traffic, depending upon the day of week (Sunday exempted). A 2010 study completed by Precision Data Industries on behalf of the City of Newton measured the direct weekday volume of traffic on the southern section of Needham Street between Christina Street and Charlemont Street to be between 19,150-19,400 vehicles per day. Morning peak counts averaged about 1,425 vehicles per hour while evening peak counts averaged about 1,225 vehicles per hour. The Vanasse Study of a proposed redevelopment project near the Tower Road and Industrial Place intersection estimated an average daily volume just north of Tower Road of 19,500 vehicles per day on weekdays (1,690 during the peak evening hour) and 18,300 vehicles per day on Saturdays (1,793 during the peak afternoon hour).

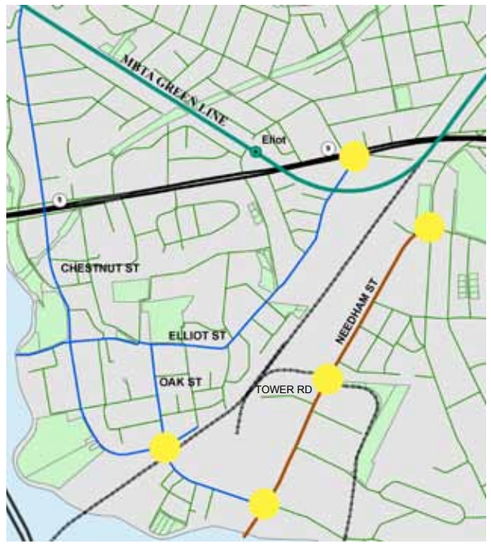
INTERSECTIONS

In order to contextualize these traffic counts, it is helpful to focus on peak-hour volume at key intersections (signaled and unsignaled) and to analyze existing constraints specific to each. This analysis will help provide an understanding of the potential impact of different transportation and development interventions on traffic conditions on Needham Street.

NEEDHAM STREET, OAK STREET, AND CHRISTINA STREET (SIGNALED)

The Needham Street, Oak Street, and Christina Street intersection is the first intersection on Needham Street northbound after crossing into Newton and is heavily congested during weekday and Saturday peak hours. A pre-timed signal allows for two phases, northbound-southbound and eastbound-westbound, and left turns are not allowed exclusive signaling priority in any direction. These left turns contribute to congestion within the intersection in all directions. Right-on-red turns by vehicles from Oak Street onto Needham Street southbound contribute to backups, sometimes into the intersection, due to upstream bottlenecks on Highland Street in Needham. The fact that Oak Street and Christina Street are geographically offset also appears to adversely affect westbound and eastbound movement through the intersection. Table 1 details the Vanasse Study estimates of average daily volume at this intersection.

Figure 6: Key intersections in the Needham Street corridor



The study suggests an overall level of service of "D" for the Oak Street and Christina Street intersection during the weekday evening peak hour ("C" for Saturday), and forecasts an overall level of service of "E" ("D" for Saturday) in 2013. Following the 2000 Highway Capacity Manual, published by the Transportation Research Board, level of service is rated on a scale from "A"-"F" ("A" signaling free movement and "F" signifying severe congestion), and is evaluated by a combination of speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. It is generally advisable to consider mitigating interventions or capacity enhancement at intersections with level of service ratings of "D" or lower. A 2010 preliminary design study by McMahon Associates suggests interventions that would result in a more geometrically aligned intersection.

NEEDHAM STREET, TOWER ROAD, AND INDUSTRIAL PLACE (UNSIGNALED)

The unsignaled intersection of Tower Road and Industrial Place with Needham Street offers ingress and egress to several larger area retailers. The center turn lane allows for left turns onto either Tower Road or Industrial Place, while through traffic remains in northbound and southbound lanes. Vehicles entering from either of the two side streets must wait until a sufficient gap opens between through traffic lanes on Needham Street, which is difficult for vehicles making left turns. Table 2 details the Vanasse Study estimates of average daily volume at this problematic intersection.

According to the Vanasse Study, much of the traffic delay attributed to this intersection occurs on the two side streets, resulting in a level of service rating of "F"

Northern Needham Street

for both Tower Road and Industrial Place during the Saturday peak. Further complicating movement through this intersection is the fact that the side streets are geographically offset, resulting in the effect that drivers perceive two separate "T"-shaped intersections within close proximity of one another. While left (and right) turns from this intersection often constrain southbound and northbound traffic on Needham Street, it is also important to recognize that much of the traffic is already slowed during peak periods.

NEEDHAM STREET, WINCHESTER STREET, AND DEDHAM STREET (SIGNALED)

The northernmost intersection of Needham Street, Winchester Street, and Dedham Street is controlled by a three-phase signal. The pre-timed signal allows exclusive movements from Needham Street northbound into the intersection, followed by exclusive movements southbound from Dedham Street into the intersection, and finally two-way movements eastbound and westbound on Winchester Street. The northbound approach includes an exclusive left-turn lane, a center through lane that permits left turns, and an exclusive right-turn lane. The Winchester Street eastbound approach includes an exclusive right-turn ramp and a through-lane that permits left turns. Dedham Street southbound and Winchester Street westbound approach the intersection via single, three-directional lanes. The configuration and signal cycle reflect the fact that a substantial percentage of vehicle movement through the intersection consists of left turns from Needham Street northbound and right turns from Winchester Street eastbound.

Since no current traffic counts are available, the team analyzed traffic movements through the Needham Street intersections with Winchester Street and Dedham Street, as illustrated in Table 3.

For the most part, the intersection configuration and signaling pattern accommodate peak hour vehicle movements with minimal queue time. Nearly all vehicles entering the intersection from all four directions are able to pass through within one cycle. Back-ups into the intersection usually occur due to upstream bottlenecks. Left turns out of commercial parking lots onto Needham Street northbound; bottlenecks on Winchester Street westbound near Route 9; and traffic entering and exiting the Tedeschi grocery parking lot can cause minor delays. Similar conditions were also observed for evening peak-hour traffic. Longer queues form during Saturday afternoon peak periods as well.

Table 1: Needham Street, Oak Street, and Christina Street intersection traffic counts and projections in vehicles per hour

PEAK TRAFFIC COUNTS	2008	2013
Weekday Evening	1741	1846
Saturday Afternoon	1941	2062

Table 2: Needham Street, Tower Road, and Industrial Place intersection traffic counts and projections vehicles per hour

PEAK TRAFFIC COUNTS	2008	2013
Weekday Evening	1713	1831
Saturday Afternoon	1825	1954

Table 3: Morning peak hour traffic volumes: Needham Street, Winchester Street, and Dedham Street intersection, observed Tuesday, December 9, 2010 from 8:02am to 9:01am. Green time excludes yellow time and lost time. Winchester Street includes right-turn-on-red volume.

CATEGORY	DATA	UNIT
Approximate Cycle Time	80	seconds
Approximate Green (NB)	30	seconds
Approximate Green (SB)	12	seconds
Approximate Green (WB/EB)	23	seconds
Needham Street Northbound	766	vehicles/hour
Winchester Street Westbound	248	vehicles/hour
Winchester Street Eastbound	1112	vehicles/hour
Dedham Street Southbound	314	vehicles/hour
Estimated Intersection Volume	2440	vehicles/hour

While the existing intersection configuration and signaling protocol generally appears to respond well to the traffic patterns observed during peak hours, there remain a number of weaknesses. First, pedestrian crossings can be dangerous, especially across Needham Street. Second, curb cuts located near the intersection pose hazards for drivers and pedestrians alike. Finally, the intersection does not appear to safely accommodate bicycles.

OAK STREET AND CHESTNUT STREET (SIGNALED)

The Oak Street and Chestnut Street intersection in Upper Falls does not fall within the Needham Street corridor but should be considered in any transportation or land use intervention. The intersection provides access to Route 9 from the Needham Street corridor via a left turn from Oak Street westbound onto Chestnut Street northbound, or access to Needham Street from Route 9 via a right turn from Chestnut Street southbound onto Oak Street eastbound. A number of restaurants, stores, and small offices are located at this intersection, as is both on-street (metered) and off-street parking.

As observed during a weekday lunch hour, the Oak Street and Chestnut Street intersection services a moderate volume of traffic, and most vehicles pass through within one cycle. Based on a sample 15-minute observation, the two dominant lanes by volume, Oak Street westbound and Chestnut Street southbound, each see approximately 350-400 vehicles per hour during the peak lunch hour. It is unlikely that the intersection could accommodate substantially higher volumes of traffic without additional capacity or mitigation measures. Traffic patterns are dominated by left turns from Oak Street onto Chestnut Street (observed 55% of Oak Street westbound traffic) and right turns from Chestnut Street onto Oak Street (observed 90% of Chestnut Street southbound traffic). Traffic generally flows freely on green cycles except when more than one or two vehicles enter the intersection during a cycle from Oak Street eastbound. This disrupts the heavy left-turn flows from Oak Street westbound onto Chestnut Street.

ELLIOT STREET AND ROUTE 9 (SIGNALED)

The intersection of Elliot Street and Route 9 does not currently factor prominently in traffic movements to and from the Needham Street corridor. However, any intervention that increases access to Upper Falls must consider this intersection since Elliot Street is, along with Oak Street and Chestnut Street, likely to carry most resulting through traffic. The intersection of Elliot Street and Route 9 includes a small regional shopping center and a short green signal. Since Route 9 is a major state highway, it is likely that cycle times exiting Elliot Street onto Route 9 will be minimal, thus risking back-ups into the Upper Falls neighborhood.

NEEDHAM STREET BRIDGE

Having provided access across the Charles River to Needham since the Industrial Revolution, the Needham Street Bridge has earned its place on the National Register of Historic Places. However, the bridge limits traffic between the Needham Street corridor and the Route I-95/128 interchange to two lanes of traffic (northbound and southbound). Given the current lack of alternative modes of transportation and the lack of connections within the corridor to other regional road infrastructure, this constraint effectively places an upper limit on the commercial development potential.

The Town of Needham is considering widening Highland Street, which becomes Needham Street in Newton, to four lanes. Furthermore, Route I-95/128 is currently under expansion. The Needham Street Bridge is a critical variable in determining opportunities for the Needham Street corridor to reap the economic benefits of expanded infrastructure capacity to the west. As MassDOT has hired a design team to comprehensively consider improvements to both Highland Avenue and Needham Street, it is expected that widening of the Needham Street bridge may be considered.

TRANSIT

The opportunities to improve transit access to the Needham Street corridor are limited in the short and medium terms. The Needham Street corridor is served by MBTA Bus Route 59, ending in Watertown Square and Needham Junction (an MBTA commuter rail stop). There is no current passenger rail transit service to Needham Street, although the MBTA does own the rail right-of-way that forms the western boundary

of the Needham Street corridor. Based on existing public reports and discussions with local and regional transportation planners, the likelihood of increasing bus service or reactivating MBTA Green Line light rail service through the Needham Street corridor is low for the foreseeable future.

The most recent MBTA biannual bus service plan (2008) recommends no changes to Route 59. The MBTA issued this most recent plan on the assumption that any changes would have to be "resource neutral," so increases in service along one route must be offset by decreases in service elsewhere. The plan analyzes each route based on five criteria: span of service, frequency of service, vehicle loading, schedule adherence, and net cost per passenger. The current Route 59 met all criteria for weekdays and weekends, except frequency of service on Sundays and Saturdays (e.g., intervals of over 60 minutes). The MBTA plan envisions no changes, citing that larger weekend intervals are an acceptable trade-off for the implementation of a new service program that has increased total weekend ridership on Route 59.

Activation of Green Line light rail service through the MBTA right-of-way is proposed in the 2009 MBTA Program for Mass Transportation (PMT), but funding is not currently available to proceed with this plan. Previous studies, recently confirmed through interviews with regional and local transportation planners, have ranked the proposal as a low priority for the foreseeable future.

3 COMMUNITY AND PLANNING CONTEXT

Needham Street exists within a larger physical, economic, and cultural-historical context both in Newton and regionally, and these attributes help form a foundation for the new vision for the corridor. Further, previous planning efforts focused on Needham Street provide important guidance for its future. This section will discuss regional economic and demographic trends, regional transportation patterns, the street's function as a commercial corridor, neighborhood context, and how the plan fits within the framework of Newton's Comprehensive Plan.

IN THIS SECTION

- Economic and demographic trends
- Transportation connectivity
- Commercial significance
- Adjacent neighborhoods
- Planning context

Regional Context

Economic and Demographic Trends

Any interventions within the Needham Street corridor will occur within a larger regional context. Thus, it is important to understand demographic and economic trends in the State of Massachusetts and the Boston Metropolitan Area, particularly in the inner suburbs to the west of Boston such as the City of Newton and the Town of Needham. This context helps shape the opportunities and constraints within the Needham Street corridor, which will help determine future potential.

The Massachusetts Executive Office for Labor and Workforce Development has published statewide industry and employment forecasts covering the ten-year period from 2006-2016. The Office projects total job growth of 6.3% across the state, though industry-specific forecasts vary widely. Jobs in professional, scientific, and business services are expected to grow by 18.1%, while jobs in education

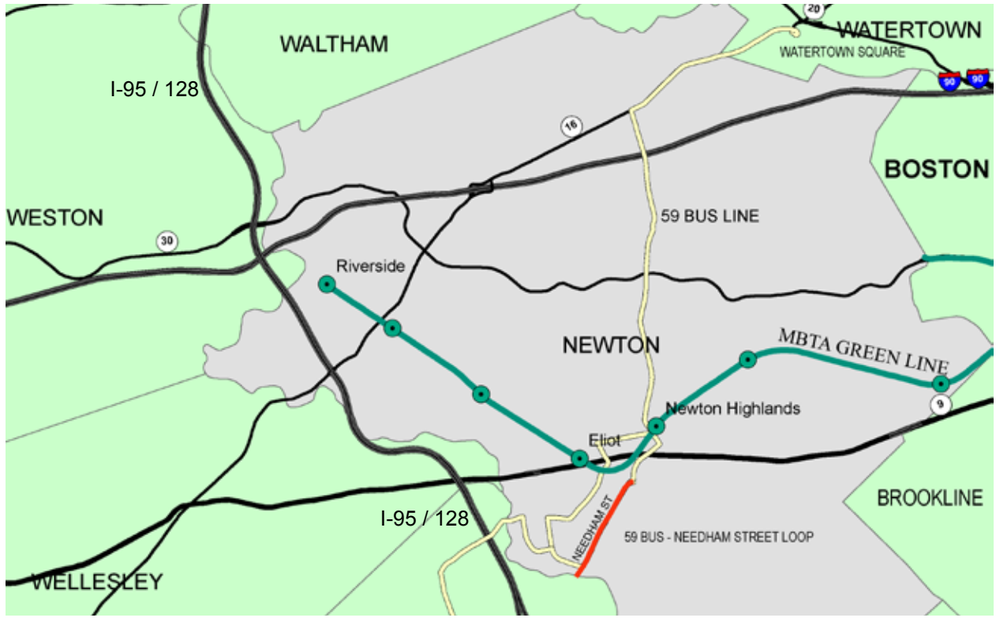
Opposite: Entering Newton on Needham Street

and health services are expected to grow by 16.8%. Leisure and hospitality industries, including dining establishments, are projected to expand workforces by 9.2%. Conversely, manufacturing employment is expected to decline by 13.8%, driven in large part by the continued loss of jobs in durable goods sectors, which face stiff international competition. Two sectors within the manufacturing industry are, however, projected to grow rapidly: pharmaceutical and medical manufacturing, with a combined growth rate of 44.6%. Wholesaling (up 2.8%) and retail jobs (down 1.6%) offer limited new opportunities due to consolidation within the former and a combination of slower economic growth and increased online shopping in the latter.

For the purposes of this plan, three regional sub-categories corresponding to the Needham Street corridor help narrow the scope of opportunities and constraints within the Boston metropolitan area context. First, the Needham Street corridor is located within the "Inner Core" of Metropolitan Boston, as defined by the Metropolitan Area Planning Council (MAPC). Second, the Needham Street corridor is located within the "Metro-West" suburbs of Boston, as defined by numerous state and regional economic and transportation bodies, such as the MBTA. Finally, the Needham Street corridor falls within the wider economic catchment area of the Route I-95/128 corridor, one of Metropolitan Boston's most significant engines for commerce and employment.

The MAPC groups Newton within the "Inner Core" of Metropolitan Boston, to which it forecasts slow baseline demographic and job growth. In its MetroFuture report, the MAPC forecasts a baseline 30-year (2000-2030) population growth rate of 5-8% in the Inner Core, the lowest in the region, and a job growth rate of 6-13%. The report suggests that this area benefits from good access to transit;

Figure 7: Regional highway (black), light rail (yellow), and bus services (yellow). Corridor highlighted in red.



key regional economic generators such as hospitals, universities, and high technology; and a recent resurgence in population and investment. However, the report warns that a combination of lower job growth, high costs of housing, and a potential lack of resources for social and physical infrastructure threaten longer-term prosperity. Newton also shares some characteristics with "Maturing Suburbs," such as Needham, in that its crime rates are relatively low and schools perform well, but it lacks the vacant space for new single-family housing growth still available in this class of suburbs.

The 2009 Program for Mass Transportation (PMT), published by the MBTA and the Boston Metropolitan Planning Organization's Central Transportation Planning Service, forecasts economic and demographic growth trends throughout Metropolitan Boston for the purpose of planning and programming transit improvements. The report groups Newton and Needham within the Metro West corridor, which radiates from the boundaries of Boston and Brookline westward towards Worcester. The 2009 PMT suggests that through 2030 the Metro West corridor will have the lowest job growth (13%) in metropolitan Boston and lower than average job growth compared to the larger Boston metropolitan area (17% vs. 19%). Furthermore, two-thirds of new jobs will be located in exurban parts of the Metro West corridor near Route I-495, especially in Framingham, Natick, and Marlborough.

Finally, the Needham Street corridor is located close to the Exit 19 interchange with Route I-95/128, which forms an inner ring of limited-access highway roads about 15-20 miles outside of Boston. This highway corridor is one of the most important economic and job engines in Metropolitan Boston, with large employment centers throughout. Route I-95/128 has been adversely impacted by the recent economic recession. In its 2nd Quarter 2010 report on commercial real estate trends along the Route I-95/128 and Route I-90 corridors in Metropolitan Boston, Jones Lang LaSalle reports that Class A office rents (a good proxy for economic growth) have declined from the high $30s to the high $20s per square foot between 2007 and 2010. An excess of supply over demand pushed vacancy rates up and rents down. However, absorption rates are just now beginning to improve and there is little new construction at this time, so rents and vacancies appear to be bottoming out. In the long term, it appears that development will eventually increase again along the Route I-95/128 corridor as the state's economy continues to improve. In fact, the Town of Needham has prepared for increased development along Route I-95/128 for several years, beginning with its 2001 study of Highland Avenue (the continuation of Needham Street in Needham) that suggested a number of zoning and other recommendations to entice large commercial development along the Exit 19 interchange. Route I-95/128 is currently under expansion, and the State and Town of Needham are also discussing plans to widen Highland Avenue.

OPPORTUNITIES

An analysis of state and regional trends suggests several important opportunities for the Needham Street corridor. First, forecasted growth in professional business services, medical and education services, and leisure and hospitality industries offers opportunities to attract new office and restaurant development to the area. Second, while Inner Core and near-in Metro West communities may face slower rates of population and job growth, much

of that growth will occur near suburban interstate highways such as Route I-95/128. Third, a general need for affordable housing could offer opportunities for residential development.

CHALLENGES

Regional trends also suggest several challenges to development within the Needham Street corridor. First, large-scale development plans for the Highland Street corridor near the Exit 19 interchange with Route I-95/128 offer competition for large commercial tenants. Second, the few remaining manufacturers in the Needham Street corridor will continue to face challenges from low-cost competitors. While existing industries may continue to prove resilient, it is difficult to imagine many opportunities for manufacturing growth, save for some medical or high-tech research and development. Finally, the population of Newton is growing at a relatively slow rate. Therefore, opportunities for economic development cannot depend upon natural growth, and likely must instead center on increasing regional incomes and attracting retail patrons from the larger metropolitan region.

Transportation Connectivity

Needham Street is located within a larger network of transportation infrastructure within the State of Massachusetts and, specifically, the Boston Metropolitan Area. The scope and reach of this network, and the quality of accessibility through these linkages, helps southwestern Newton residents, businesses, and visitors access economic and cultural opportunities in the region.

The Needham Street corridor is located near important state and regional transportation infrastructure. The street has good access to major regional roads and highways and moderate access to metropolitan transit options. Figure 7 illustrates the proximity of the Needham Street corridor to regional transportation infrastructure.

Residents in southwestern Newton and businesses along Needham Street benefit greatly from nearly direct access to major regional vehicular road connections to economic generators in Boston and along the Route I-95/128 corridor. In particular Needham Street is accessible within approximately one mile to Route I-95/128, a major interstate limited-access highway ring, and a corridor that is a leading economic generator for the Boston Metropolitan Area. The Needham Street corridor also lies within one mile of Route 9, a major state highway that provides access between generally prosperous western suburbs and a dense cluster of job centers in and around Boston. Needham Street is also located within a 15-minute drive (without congestion) of the Massachusetts Turnpike (I-90), running approximately parallel to Route 9, which provides interstate highway access between Boston and major employment centers in Boston's western suburbs.

The quality of regional transit service varies depending upon the location within or near the Needham Street corridor. Residents in the far northern section of the Needham Street corridor, from the Avalon Bay development north, are located within about one quarter mile of the Newton Highlands station of the MBTA Green Line-Riverside Branch. Other locations further south are outside a reasonable walking distance from the Green Line. Residents and patrons of the Needham Street corridor may also access the MBTA's Route 59 bus to Watertown Square (east) or Needham Junction (west). While the 59 bus route operates at frequencies of approximately 30 minutes during weekday peak hours, some stops receive less-frequent service, including many within the Needham Street corridor.

In summary, Needham Street benefits from proximity to and quality of accessibility within the larger road system in Metropolitan Boston. However, transit access is more limited and likely accounts for a very small percentage of travel for local residents, workers, and consumers.

Local Context

Important Commercial Destination

The Comprehensive Plan identifies Needham Street as one of six corridors in Newton that serve both local and regional constituencies. These corridors are distinguished by high levels of vehicular traffic and serve as focal points of activity that drive area development. Thus, the Needham Street corridor is a critical asset to the City of Newton in formulating strategies that could leverage commercial development to diversify property tax revenues and expand employment.

According to the Comprehensive Plan, half of the commercial floor space within the city is concentrated on Needham Street, Chestnut Hill, and Wells Avenue. Needham Street has about 2.5 million square feet of existing commercial floor space, with a potential to add roughly 3 million square feet. Thus, despite the fact that Needham Street is already one of the primary commercial corridors within Newton, existing floor space is less than half of the existing zoned maximum buildout.

Though Needham Street is a vibrant commercial corridor, it is suburban in nature. Therefore, future economic viability will depend upon motor vehicle access to destinations within its boundaries. Local developers suggest that the ability to provide vehicular access and parking according to the consumer

Figure 8: Additional commercial area at buildout, from the Newton Comprehensive Plan

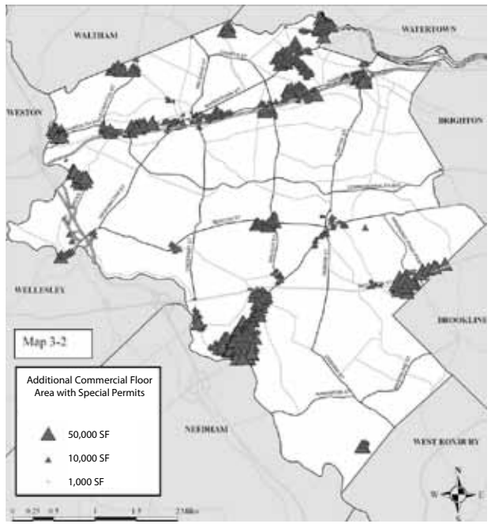


Figure 9: Villages of Newton, Needham Street demarcated by dashed line

preferences of suburban shoppers is critical to commercial success. Given the amount of vacant retail and office space along the roadway, the competition from other nearby suburban corridors, and the importance of the corridor for generating city revenues, the link between motor vehicle access and economic growth is an important consideration in any future visioning exercise.

Adjacent Neighborhoods

The Needham Street corridor forms a dividing line between two of Newton's thirteen villages: Upper Falls and Newton Highlands. The Upper Falls neighborhood abuts the Needham Street corridor to the west of the abandoned rail right-of-way. Newton Highlands borders the Needham Street corridor to the north and east. It is important that any redevelopment along Needham Street be sensitive to the defining characteristics of the neighboring areas and take steps to mitigate any traffic impacts on the surrounding residential areas.

NEWTON HIGHLANDS

Newton Highlands borders the Needham Street corridor to the north and east. As implied by the name, much of Newton Highlands is characterized by hilly topography. Other defining characteristics include a village center along historic Lincoln Street, accessibility to the MBTA light rail network via Newton Highlands and Eliot stations of the MBTA Green Line-Riverside Branch, and residential areas largely comprised of single-family homes. The village roughly corresponds to the following boundaries: Beacon Street to the north; Walnut Street and Dedham Street to the east; Rachel Road, Wallace Street, and Christina Street to the south; and Needham Street, the MBTA Green Line-Riverside Branch right-of-way, and several large open spaces to the west, as illustrated in Figure 10.

Newton Highlands enjoys good vehicular connectivity to the wider region via numerous connectors, major and minor arterials, and highways including Walnut Street, Winchester Street, Dedham Street, Needham Street, Beacon Street, and Route 9. Major commercial areas include large shopping centers along Route 9 and a variety of small to large retailers and restaurants along the other major roads throughout the village. Lincoln Street offers an intimate, pedestrian-oriented environment consistent with an urban main street design concept.

Newton Highlands and the Needham Street corridor interact primarily at the intersection of Needham Street, Dedham Street, and Winchester Street. Most other areas of Newton Highlands are physically separated from Needham Street either by distance or by buffers such as large conservation areas.

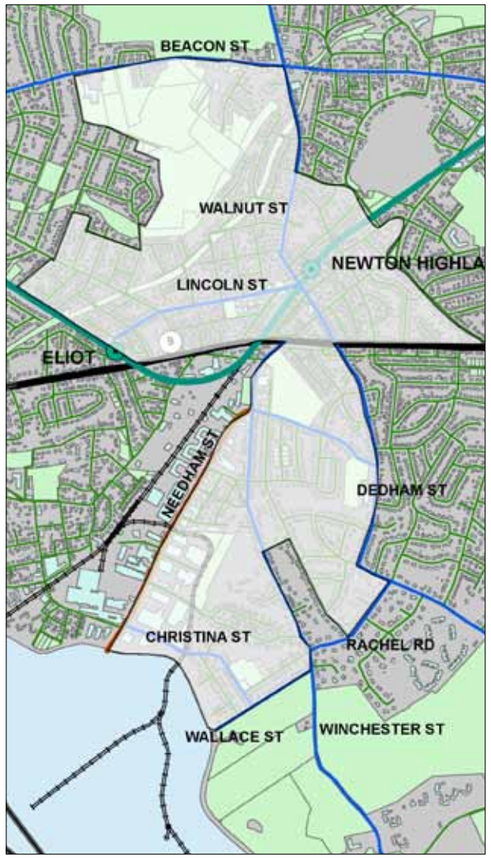


Figure 10: Newton Highlands

There are at least three major considerations for the redevelopment of the Needham Street corridor with respect to Newton Highlands:

TRAFFIC AND DEVELOPMENT IMPACTS ON RESIDENTIAL AREAS WITHIN THE NEEDHAM STREET CORRIDOR

A small grouping of residential dwellings within the approximate boundary of Needham Street, Winchester Street, Jaconnet Street, and Columbia Avenue could be impacted by any redevelopment within the Needham Street corridor. These

properties, mostly single- and two-family houses, are already impacted by retail traffic and parking in the northeastern section of the corridor. There is currently very little definition between residential and commercial areas, and any redevelopment in the northern areas of Needham Street should be sensitive to and strive to enhance the residential fabric of this neighborhood.

ACCESSIBILITY VIA MOTOR VEHICLE FROM DEDHAM STREET AND WINCHESTER STREET

Dedham Street and Winchester Street are important collector/arterial routes though neighborhoods within Newton Highlands, and offer primary access to Newton South High School. Any interventions along Needham Street should be sensitive to impacts on throughput at the intersection, and accessibility within Newton Highlands and its educational institutions.

PEDESTRIAN ACCESSIBILITY AT THE NEEDHAM STREET, DEDHAM STREET, AND WINCHESTER STREET INTERSECTION

This intersection represents a physical and psychological barrier separating Newton Highlands from the Needham Street corridor. There are currently marked crosswalks near the intersection from all cross streets except Needham Street northbound. Physical interventions to the intersection of Needham Street, Dedham Street, and Winchester Street should strive to enhance the safety and attractiveness of pedestrian mobility.

UPPER FALLS

Upper Falls is distinguished by its historic connection to the Charles River, its proximity to a once-bustling freight rail corridor, and its industrial and manufacturing legacy. Upper Falls offers a quiet residential setting nestled in a hilly topography, with generally narrow roads, a variety of housing types, small neighborhood-serving businesses, and ample open space. The village corresponds generally to the following boundaries: Needham Street to the east, the Charles River to the west, and Route 9 to the north, as illustrated in Figure 11.

Three two-way roads provide internal connections to larger arterial, connector, and highway road systems: Oak Street, Chestnut Street, and Elliot Street. Most of the neighborhood's small businesses, including many small dining establishments and markets, are located on these three streets. The local restaurants have many patrons during mealtime hours. Dining establishments on the corner of Oak and Chestnut Streets draw employees of Needham Street businesses during lunch hours, often by foot, and restaurants along Chestnut Street near the Echo Bridge draw many patrons at night.

There are at least four major considerations for the redevelopment of the Needham Street corridor with respect to Upper Falls:

TRAFFIC IMPACTS AT THE OAK AND CHESTNUT STREET INTERSECTION

Increasing access from corridor parcels to Route 9 via Oak and Chestnut Streets can relieve traffic from Needham Street, but could impact the Oak and Chestnut Street intersection. There is currently a moderate amount of volume at this intersection during peak hours, and queue time is minimal. When proposing recommendations for interventions on Needham Street, it is important to mitigate against substantial traffic increases between Needham Street and Route 9 along Oak and Chestnut Streets, and in particular at the intersection of these two roads.

TRAFFIC IMPACTS AT THE ELLIOT STREET AND ROUTE 9 INTERSECTION

Any proposal to increase vehicular connectivity from the Needham Street corridor to Upper Falls must also account for impacts to Elliot Street, which is a two-way road running approximately parallel to Needham Street through Upper Falls. Route 9 is the highest order road connected to Elliot Street, via a signaled intersection at its northern terminus. Mitigating interventions at the Route 9 intersection should supplement any proposal which adds vehicular access to Elliot Street.

COMMUNITY IMPACTS OF CREATING CONNECTIONS INTO THE UPPER FALLS NEIGHBORHOOD

The majority of properties abutting the abandoned rail right-of-way are small businesses operating out of former industrial sites, and single- or two-family homes with small yards. Elsewhere, Upper Falls consists of mostly single-family homes mixed with some two-family and larger multi-family homes. The area is serviced by roads that are already challenged by accommodating two-way traffic, with the exception of Oak Street, Chestnut Street, and Elliot Street. Thus, there is little margin for adding additional vehicular connections without disrupting the character of the existing fabric of Upper Falls. Additionally, because several residential areas of Upper Falls abut the Needham Street corridor, proposed interventions must be sensitive to the surrounding housing.

CITY-OWNED LAND ALONG THE MBTA RIGHT-OF-WAY

The City of Newton owns nearly all the land abutting the western side of the rail right-of-way from approximately the Avalon Bay apartment complex (located northwest of the intersection of Needham and Rockland Streets) to the intersection with Winchester Street. This land houses a fire station—currently under redevelopment—and a large Department of Public Works parking and storage facility. While these lands are important for city operations, much of the space is underutilized. This offers one of the few opportunities for adding connectivity from the Needham Street corridor to Upper Falls (via Elliot Street) without directly impacting privately-owned land in the village.

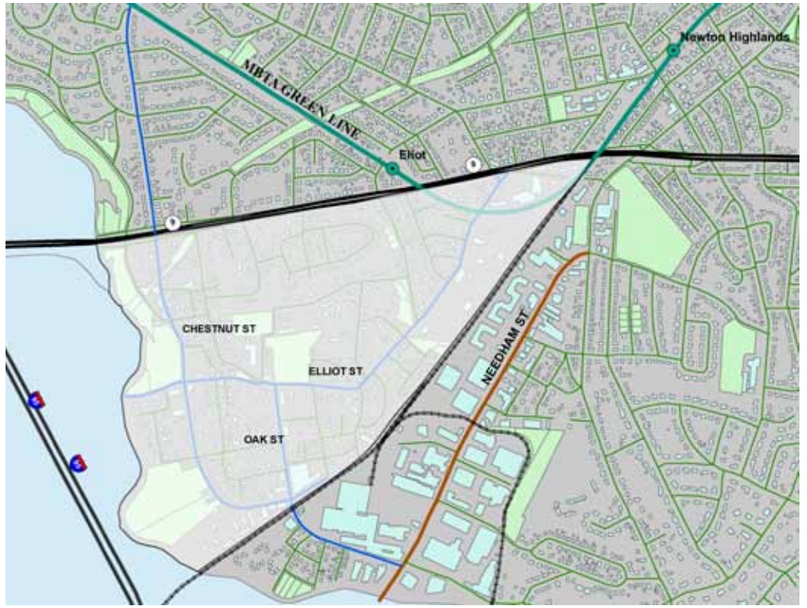


Figure 11: Upper Falls

Planning Context

This plan outlines an original vision for Needham Street that rests upon a strong foundation of prior planning work within Newton. The Comprehensive Plan, in particular, has guided the development of this document by establishing clear overarching goals for Newton and suggesting policies by which to realize those goals. Adherence to the Comprehensive Plan, however, still provides flexibility for the specific recommendations of this plan: the Comprehensive Plan sets forth a vision for Newton that must be interpreted by many successive planners and informed citizenry, and thus refrains from specifying exactly how to bring about "the Newton that we want." Furthermore, the entirety of Newton falls within that plan's scope, whereas this plan focuses solely on the Needham Street corridor.

The Comprehensive Plan's primary objectives revolve around the concepts of place-making and managing Newton's growth, with an emphasis on ensuring that such growth occurs in appropriate forms and locations. The plan acknowledges a number of key principles that serve that vision: context-sensitive design, support for multimodal accessibility throughout Newton, encouragement of "smart growth" in land use, and environmental sensitivity. Newton's plan itself derives great inspiration from its regional predecessors, including planning efforts by the MAPC and the Office of Commonwealth Development (OCD). Importantly, the Comprehensive Plan pays great attention to Newton's existing assets as foundations for improving the quality of life in Newton. Newton's village centers receive special emphasis in the plan's land use section as models for desirable urbanism: "Land use is to be guided with the intention of enhancing village centers, supporting their vitality." Because Needham Street departs from the village center pattern but plays a crucial economic role in Newton, its future course assumes great importance. The Comprehensive Plan states, "The character of a major area of the City as well as the loss of a significant portion of the City's business base is at stake."

4 A VISION FOR NEEDHAM STREET

This plan's vision for Needham Street draws upon the findings discussed above and the direction the Comprehensive Plan provides. Its intent is to preserve or enhance the aspects of the street that currently work well, and to improve the elements that do not.

IN THIS SECTION

Vision

In support of the goals set forth in the Comprehensive Plan, this plan encourages the City to build on the Needham Street corridor's assets by making a set of incremental changes to improve the pedestrian experience, aesthetics, connectivity, and function of the ecological system, thus creating a vibrant, livable, mixed-use gateway to Newton.

This vision applies to the Needham Street corridor as a whole. The team anticipates, however, that the northern and southern areas of the corridor will maintain their distinguishing features, which are the products of existing land uses, scales of development, and physical characteristics. The plan therefore addresses the corridor as two distinct parts, which are defined as northern Needham Street and southern Needham Street.

Northern Needham Street extends from the intersection with Winchester Street to where the abandoned railroad tracks cross the road, between Newton Technology Park and Jiffy Lube. Northern Needham Street contains several large properties, such as the Avalon Bay apartment complex and Newton Technology Park. The majority of the properties in the northern half, however, are small-scale retail businesses. This plan's goal for the northern section

Opposite: Rendering of vision for streetscape along the Needham Street corridor

of the street is to preserve and take advantage of this existing pattern, envisioning northern Needham Street as more of a pedestrian-oriented area where small-scale buildings and parcels allow for fine-grain mixed use. The emphasis for northern Needham Street will be on supporting local clientele, much like Newton's village centers.

Southern Needham Street extends from the abandoned railroad tracks to the Charles River. The majority of the properties in the southern half of the corridor are large-scale retail and industrial buildings. This area should continue to accommodate regionally oriented retail, office, and industrial uses, which serve an important economic development purpose. The plan envisions southern Needham Street as a location for larger-scale vertical and horizontal mixed-use development, with larger building footprints and parcel sizes. The southern half of the corridor will remain more car-oriented as a result, but the plan's goal is to make it walkable and pedestrian friendly as well.

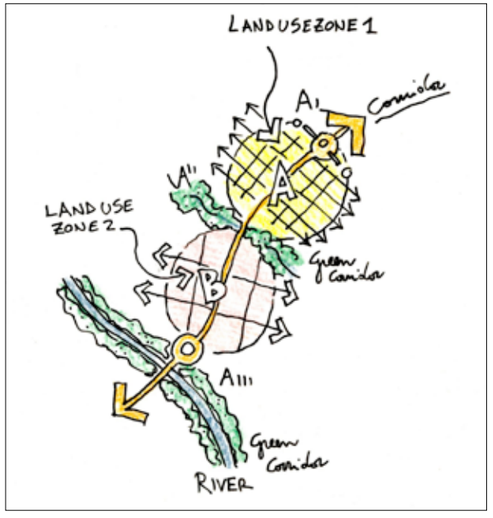


Figure 12: Two-zone concept diagram

(Top) Existing building in northern zone

(Bottom) Existing building in southern zone

OBJECTIVES

To achieve this vision, the team has developed five objectives for the Needham Street corridor:

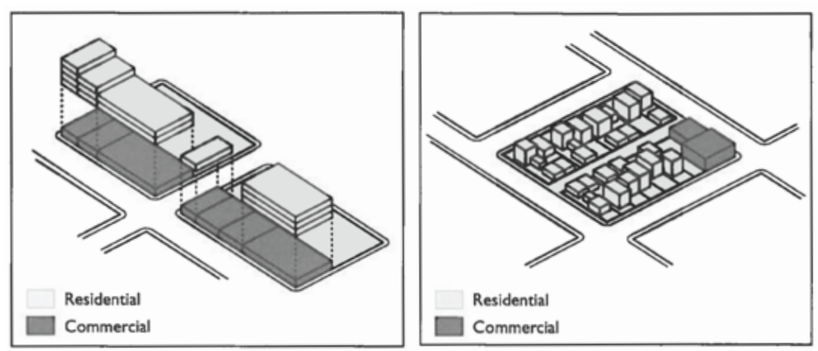
1. Promote fine-grain mixed-use development
2. Create a more cohesive and attractive physical environment
3. Create a safe, comfortable, and efficient streetscape
4. Connect the site to the surrounding ecological system and open space network
5. Promote connections among parcels and with surrounding neighborhoods

The following sections provide detailed recommendations that support each of these objectives. These recommendations are meant to guide the City of Newton in achieving the aims of the Comprehensive Plan along the Needham Street corridor.

Objective 1: Promote fine-grain mixed-use development

The central aim of this objective is to promote the mix of uses prescribed for Needham Street in the Comprehensive Plan, which includes

Figure 13: Vertical (left) and horizontal mixed-use (right)



industrial, office, retail, and residential uses. Further commercial development in the corridor will allow for the flexible, moderate growth envisioned by the Comprehensive Plan, augmenting Newton's real estate tax base as well as its income and employment bases. Additional residential development on Needham Street will bring character and vitality to the area and will promote both typological and economic diversity in housing.

This vision of mixed-use development includes both vertical and horizontal forms of mixed use. Vertical mixed use means multiple uses within a building, such as retail on the first floor with office space or residential units above. Horizontal mixed use means multiple uses in separate buildings but in close proximity, such as within a parcel or among neighboring parcels.

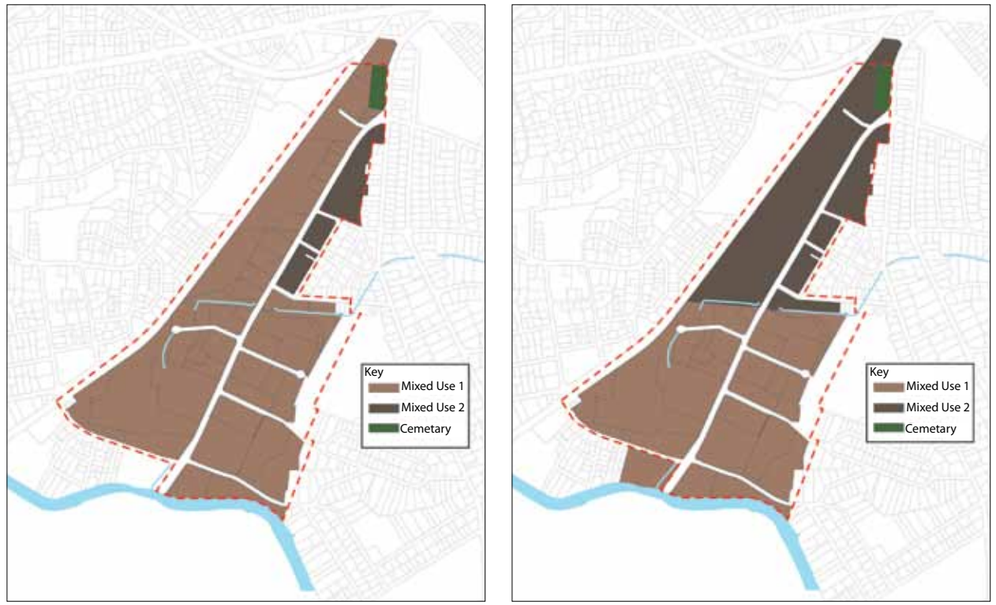
Both horizontal and vertical mixed use should be pursued at a fine-grain scale. Fine-grain development creates a diverse, pedestrian-oriented built environment that will support small businesses and add character to the Needham Street corridor. This type of development should be preserved and enhanced in northern Needham Street and introduced to southern Needham Street, which is currently dominated by larger buildings.

Recommendations

REZONE NORTHERN NEEDHAM STREET TO MIXED USE 2

The team recommends that the City of Newton change the zoning of the Needham Street corridor to reflect and support the differences between the northern and southern areas of the street. Needham Street is currently zoned Mixed Use 1 (MU1) and Mixed Use 2 (MU2). MU1 covers the majority of the corridor; MU2 is limited to parcels on the east side of Needham Street between Winchester Street and Jaconnet Street. The entire northern half of the corridor should be rezoned as MU2. This will allow the MU1 and MU2 zones to be tailored to the different characteristics of the corridor's southern and northern sections. In the north, uniform zoning guidelines will also enhance a sense of place and ensure that development on the west side of the street is compatible with the more fine-grain environment that currently exists on the east side of the street.

Figure 14: (Left) Existing zoning; (Right) Proposed zoning



ALLOW DESIRED USES BY RIGHT

Vertical and horizontal mixed use can be encouraged by changing the use types allowed in the MU1 and MU2 zones. While the existing zoning code does not explicitly prohibit vertical or horizontal mixed-use development, it does not encourage these uses. Second-story residential units are allowed by right in MU2, which could create vertical mixed-use buildings, but this use is not currently allowed in MU1. Allowing second-story residential uses and mixed-use buildings and developments as a by-right use in both MU1 and MU2 will facilitate development of these building forms.

This plan therefore recommends that some uses currently requiring a special permit should be allowed by right instead. For MU1, the existing by-right uses (office, research and development, and industrial) should be preserved. To that list should be added by-right uses that are currently allowed in the MU2 zone, including retail, personal services, and restaurants. The team also recommends adding multi-family residential as a by-right use. Finally, combinations of office, retail, services, restaurants, and residential use within a building or a development should also be explicitly allowed.

For MU2, all existing by-right uses (office, research and development, retail, personal services, and restaurants) should maintain that status. Multi-family

MIXED USE 1 (SOUTHERN NEEDHAM STREET)

- Office
- Retail
- Restaurant
- Personal services
- Multi-family residential
- Manufacturing
- Assembly or fabrication
- Research and development
- Combinations of office, retail, restaurant, and residential use

MIXED USE 2 (NORTHERN NEEDHAM STREET)

- Office
- Retail
- Restaurant
- Personal services
- Multi-family residential
- Research and development
- Combinations of office, retail, restaurant, and residential use

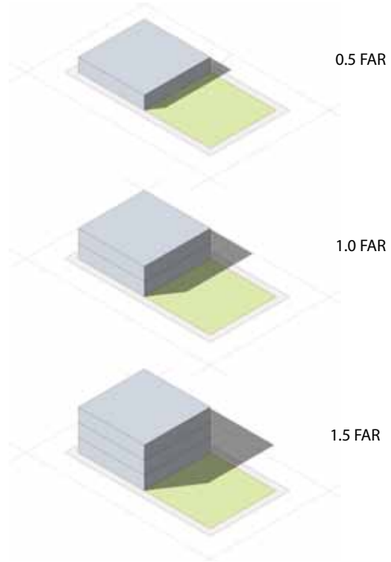


Figure 15: Illustration of building floor-area ratio (FAR)

residential and combinations of office, retail, services, restaurants, and residential use should also be allowed by right.

It is important to note that large developments that include by-right uses will still require a special permit from the Board of Aldermen. The size-based special permit will provide the necessary review process for developments that could create neighborhood impacts. However, eliminating the use-based special permit requirement for desired uses will promote small-scale mixed-use development and support the goals of the Comprehensive Plan. (Please see recommendations under Objective 2 below for additional information.)

REVISE DENSITY AND DIMENSIONAL REQUIREMENTS

In addition to specifying the types of use allowed in an area, the zoning code also sets requirements for the density and dimensions of new development. These requirements currently include maximum building height, FAR, and the required lot area per dwelling unit.

The maximum building height and maximum FAR should stay the same in MU2, but the requirements for MU1 should be decreased to match those of MU2. Decreasing the by-right height and FAR will allow the City of Newton to offer density bonuses to incentivize positive development characteristics, such as mixed use. (Please see the Implementation section below for additional information.) The proposed height and FAR requirements will create the desired scale of development in the corridor, which balances vibrancy and walkability with Newton's suburban context.

The required lot area per dwelling unit should decrease from 10,000 square feet to 1,200 square feet in both MU1 and MU2. Requiring a minimum of 10,000 square feet per unit is unduly restrictive to residential development. Reducing the required lot area to 1,200 square feet per unit is more consistent with the rest of Newton's business and multi-family residential districts.

Finally, a new dimensional requirement should be introduced to prohibit retail buildings above a certain size threshold, in order to prevent massive big box stores. The big box building type does not meet this plan's objectives for a mixed-use and pedestrian-oriented environment. Individual building footprints should therefore be limited to a maximum of 40,000 square feet.

To summarize, the recommended density and dimensional requirements for both zones are as follows:

Maximum building height

- By right: 2 stories
- Special permit: up to 4 stories

Maximum FAR

- By right: 1.0
- Special permit: 2.0

Lot area per dwelling unit

- 1,200 square feet

Maximum building footprint

- 40,000 square feet

REVISE DEVELOPMENT REVIEW PROCESS

In addition to changing the uses and densities allowed by right, revising the development review process will help facilitate desired development. First, design guidelines should be added to the site plan review process. Design guidelines explain how the community wants new development to look and feel in terms of building scale and massing. If done well, these guidelines tell developers what to expect and add predictability to the review process. (Please see Objective 2 below for additional information on design guidelines.)

Making the design guidelines explicit would allow for a more efficient review process. For example, the design of small developments might be reviewed administratively, by the Planning and Development Department, while the Design Review Commission would review medium-sized developments. Approval by the Board of Aldermen, with input from the Design Review Commission, could thus be reserved for large developments. These changes to the review process would incentivize compatible development while still ensuring oversight and community input. The result would be more economic development and better design.

It is important to note that these thresholds only address the size of the proposed development. Some uses would still require a special permit regardless of the development size. Decisions involving special use permits would remain within the purview of the Board of Aldermen.

Table 4: Proposed tiered review thresholds

DEVELOPMENT SIZE	REVIEW PROCESS	REVIEWING BODY
10,000-19,999 SF	Site Plan Review	Planning Department
20,000-29,999 SF	Site Plan Review	Design Review Commission
30,000+ SF	Special Permit	Design Review Commission and Board of Aldermen

Objective 2: Create a More Cohesive and Attractive Physical Environment

The following recommended actions will help Newton create an identity for Needham Street, promote cohesive design, and enhance the aesthetics of the built environment along the corridor.

Recommendations

STANDARDIZE FRONT SETBACKS

Buildings along Needham Street are currently positioned at varying distances from the street, creating a jagged, undefined street edge. This contributes to the corridor's sprawling, haphazard feel, which detracts from the experience of the pedestrian, bicyclist, or driver using the street. A discontinuous street edge can occur when the zoning code requires a minimum but not a maximum front setback, as Newton's zoning code currently does. Implementing a maximum front setback will help to standardize building placement, creating a stronger street edge and a better-defined street while enhancing the pedestrian

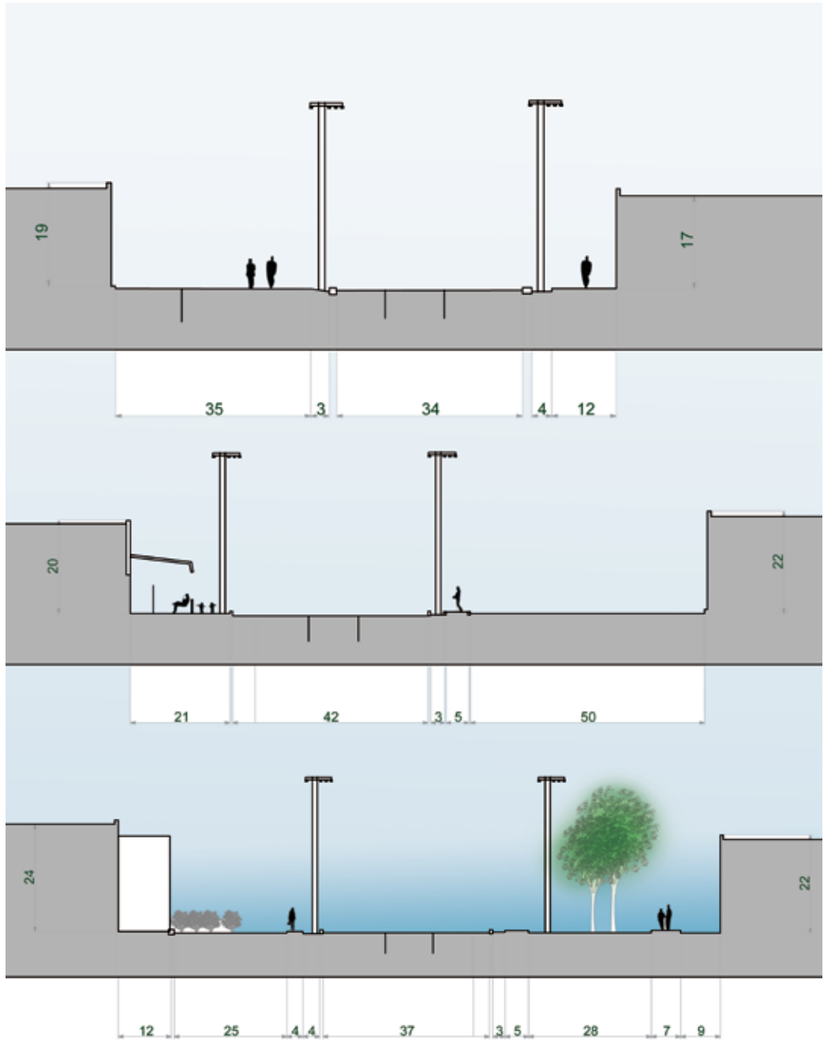


Figure 16: Existing street dimensions and alternative building setbacks, taken at International Bicycle Centers, Fresh City, and Filene's Basement, respectively.

experience. Figure 16 illustrates the impact of the existing front setback requirements.

Table 5 outlines existing and proposed front setback requirements. In MU2, where smaller-scale developments and more pedestrian-oriented uses are envisioned, the team recommends a 0' maximum setback, essentially creating a "build to" line. This proposal assumes that the road's right-of-way is large enough to contain the recommended streetscape improvements, including bike lanes and landscaping. The recommended maximum front setback in MU1 is slightly larger (15') in response to the large building sizes envisioned for that section of the street.

Lack of transparency in building facades along Needham Street

Table 5: Existing and proposed front setback requirements

	EXISTING	PROPOSED
MU1	Minimum: 15' or building height if higher than 1 story	Minimum: 0' Maximum: 15'*
MU2		Minimum: 0' Maximum: 0'*

*Or higher to allow for beneficial open space, as approved by the reviewing body

The team recognizes, however, that public areas like plazas or patios can also enhance the pedestrian experience. The site plan review process should therefore maintain some flexibility regarding maximum front setbacks. The reviewing body, such as the Design Review Commission or the Board of Aldermen, should be able to grant a larger maximum setback in order to allow for "beneficial open space" in front of a building. Beneficial open space could include plazas, patios, or other spaces that provide a public benefit. (Please see page 52 for additional information)

USE FORM-BASED REGULATIONS AND DESIGN GUIDELINES TO IMPROVE THE QUALITY OF THE BUILT ENVIRONMENT

Incorporating additional built form considerations into the MU1 and MU2 zoning code and developing design guidelines for these zones can help to create a built environment consistent with this vision for Needham Street. Certain form requirements are appropriate for inclusion in zoning code regulation. Newton's current zoning code includes standard form requirements such as height, sign regulation, and building setbacks. The following built form requirements should be added to the zoning code for both MU1 and MU2 to improve the pedestrian

experience and overall quality of the street:

- **Require transparent windows along Needham Street.** Improved transparency will help engage buildings and uses with the street. To add specificity, the zoning code could also include a requirement for the percentage of a building's façade facing Needham Street that consists of windows.
- **Require that all commercial, retail, or restaurant uses fronting Needham Street have at least one main entrance on Needham Street.** Requiring an entrance on Needham Street will reinforce the street's pedestrian orientation.
- **Require that all commercial, retail, or restaurant uses fronting Needham Street have at least one sign addressing Needham Street**. Requiring signage facing Needham Street, rather than the parking lot, will further improve the street's pedestrian orientation.

Topics that are more nuanced and thus might require more discretion and flexibility are best incorporated into design guidelines. The City of Newton does not currently have design guidelines, and while there is a Design Review Commission, that commission has traditionally focused on signage regulation. Review of building and site design is incorporated into special permit review conducted by the Board of Aldermen. As discussed under Objective 1, design guidelines would give direction to developers and architects working on Needham Street and provide a standard against which to review projects. Design guidelines could be incorporated into all levels of review, as outlined under the recommendations for Objective 1.

Although writing design guidelines for Needham Street is beyond the scope of this plan, the City should initiate a process to develop appropriate guidelines. To aid in this process and to ensure that proposed development is consistent with the character and built form envisioned by this plan, it is recommended that the design guidelines include the following components:

- All development should create favorable impressions of the community through increased architectural, design, and landscaping standards, including gateway enhancements, streetscape, and wayfinding.
- Development should be compatible with the character and land uses in the surrounding neighborhoods. Development should be appropriately integrated with these neighborhoods in terms of building massing and scale, streetscape character, and overall design, while providing appropriate setbacks and buffering or screening from nearby residential properties.
- Development should balance the need for automobile traffic with strong design for pedestrian and bicycle safety and connectivity. The number of curb cuts and driveways should be minimized in order to enhance pedestrian safety. Shared site access and shared parking between neighboring parcels should be encouraged.
- Within small commercial properties, clear boundaries between street edges, sidewalks, and surface parking lots should be made. Greater sidewalk definition should be encouraged, especially in the MU2 zone.
- Within large commercial properties, clear pedestrian rights-of-way should be established. Pedestrian access should be appropriately placed to encourage walking to and through the development. Development should include provisions for crossing all driveway entrances and internal roadways. Barriers to pedestrian circulation among parcels should be discouraged.
- Where possible, off-street parking should be subordinated to the side or rear of a building. Walkways and landscaping should be encouraged between parking areas.
- Building detailing should provide small-scale elements of interest to both pedestrians and drivers. Details such as doors, windows, eaves, and railings should be carefully designed and constructed to promote a more pedestrian-focused built form and streetscape.
- Building facades should be articulated to reduce the typical large-scale and uniform impersonal appearance of typical commercial and industrial buildings. Articulations can be produced by paying close attention to rooflines, window groupings, bay windows, and subtle changes in materials. As much as possible, box-like, flat-roofed structures should be discouraged.
- Exterior building materials should be aesthetically pleasing and compatible with materials and colors used in adjoining neighborhoods.
- Signage should be compatible with a pedestrian-oriented streetscape.
- Limiting the amount of impervious surface within a development should be encouraged, in order to manage stormwater runoff and protect water quality.

Table 6: Existing and proposed parking requirements

	EXISTING	PROPOSED	
	Minimum	Minimum	Maximum
MULTI-FAMILY	2.0/DU (can go down to 1.25/DU with Special Permit)	1.0/DU	1.5/DU
OFFICE	1/250 GFA up to 20,000SF 1/333 above 20,000SF	1/500 GFA	1/333 GFA
RETAIL	1/300 GFA	1/500 GFA	1/250 GFA

DU = dwelling unit; GFA = gross floor area

MANAGE THE AMOUNT OF PARKING

The amount of parking can have a significant impact on the look and feel of a place. Large parking lots encourage driving, discourage alternative modes of travel, and detract from the physical environment's visual character. Currently, Newton's zoning code requires establishments to provide a minimum

Figure 17: (Top) Existing parking lot size;
(Bottom) Proposed parking lot size, image of the Marshalls plaza

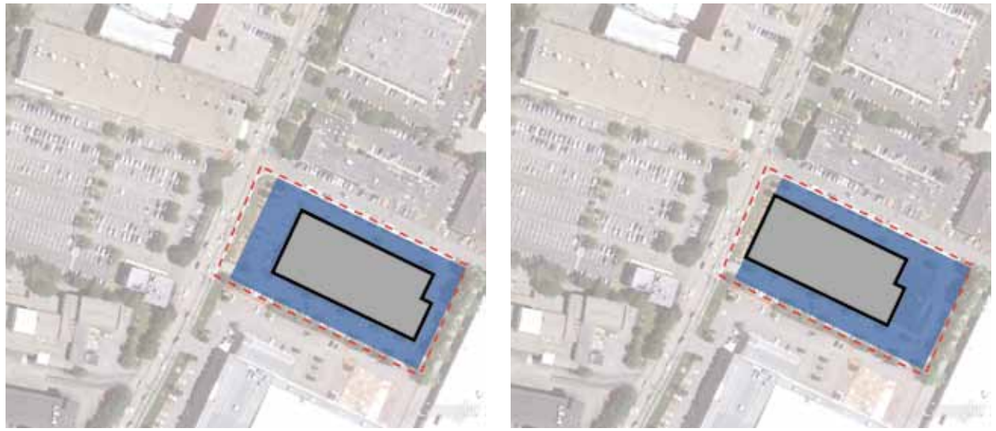


Figure 18: (Left) Existing parking frontage; (Right) Proposed parking frontage, TJ Maxx property

number of parking spaces. Requiring a minimum number of parking spaces but no maximum allows developers to provide excess amounts of parking. The Marshalls plaza on Needham Street, for example, has more than three times the required minimum parking. To better manage the amount of parking provided and allow for more efficient land use patterns, the team recommends that the zoning code be revised to include parking minimums and maximums. Table 6 outlines the current and recommended parking requirements for the three predominant uses in MU1 and MU2. These parking recommendations are based on current ITE standards, requirements from similar suburban towns, and smart growth best practices. Figure 17 illustrates the impact of the proposed parking maximum on the parking provided for the Marshalls plaza.

Newton's zoning code should also encourage shared parking lots by allowing transfers of parking between properties located within 300 feet of each other. A property owner could reduce the parking provided on-site if an adjacent property has superfluous parking and the property owner can demonstrate that they have entered a shared property agreement with the owner of that parking lot. A shared parking agreement could also potentially be arranged between adjacent uses in which parking lots are used at different periods of the day (for example, office and residential uses).

LIMIT PARKING ABUTTING THE STREET

Large parking lots abutting the street diminish the street environment's vitality and signify the importance of the car over the pedestrian. Currently, parking lots make up a significant portion of Needham Street frontage. The team recommends that the City of Newton use zoning to address the location of parking, encouraging its subordination to the side or rear of buildings. This can be accomplished by limiting the amount of street frontage that can be devoted to parking and by prohibiting parking in the space between a building and Needham Street. A maximum of 40% of street frontage as parking is recommended. As shown in Figure 18, 40% parking frontage would allow for side parking lots. Side parking lots are visible from the street—a quality important to retailers—while allowing the building, instead of the parking, to take precedence along the street and thus creating a better pedestrian environment.

The city should also encourage shared side and rear parking lots through incentives and design guidelines. Specific zoning incentives are discussed in more detail in the implementation section of this plan.

REQUIRE BENEFICIAL OPEN SPACE FOR LARGE PARCELS

The incorporation of civic spaces along Needham Street can help create an identity for the street while improving its aesthetic quality. One way to create civic spaces along the corridor is to require that significant new developments in MU1 and MU2 include "beneficial open space" for public use. Newton's zoning code defines beneficial open space as areas not covered by buildings or structures, including landscaped areas, playgrounds, walkways, plazas, patios, terraces, and recreational areas, and excluding circulation walkways, surface parking, or areas accessory to housing or commercial units (§30-1). Specifically, the team recommends that developments in both zones with parcels of at least 40,000 square feet be required to dedicate at least 20% of the parcel area to beneficial open space.

Examples of beneficial open space

Objective 3: Create a Safe, Comfortable, and Efficient Streetscape

Needham Street faces substantial circulation challenges, and the street's physical characteristics cause or reinforce many of those challenges. The objective of creating a safe, comfortable and efficient streetscape requires a careful balancing of the pedestrian, cyclist, and transit rider's needs against those of the automobile, as safety and efficiency have different meanings for different transportation modes. The Comprehensive Plan emphasizes "accessibility for all residents of Newton in all parts of the City, including the 30% of the population that does not drive." Furthermore, the plan calls for "transportation change that promotes rather than degrades the kind of city that is being sought." Nonetheless, Needham Street's importance to car traffic cannot be discounted, and the majority of Newton's residents do drive. Streetscape improvements must acknowledge each of the street's present and future roles.

Currently, Needham Street's design sacrifices the pedestrian's comfort and safety for maximum automobile access—a trade-off that manifests itself in several forms. Countless curb cuts, vague definition

of pedestrian paths and sidewalks, and unsafe street crossings all encourage potential walkers and bikers to climb back into their cars. Drivers and non-drivers alike encounter on Needham Street a visually chaotic and poorly defined environment with little identity, in contrast to the distinctive village centers that characterize the rest of Newton. Finally, Needham Street has much room to improve its vehicular efficiency as well, by rationalizing traffic patterns to make the most of its current capacity. A variety of cost-effective interventions to improve the corridor's streetscape will make Needham Street safer, more comfortable, and more efficient for travelers by all modes.

Figure 19: Illustrations of phased streetscape improvements

Figure 20: Proposed right-of-way improvements

Recommendations

SIDEWALKS, CENTER MEDIANS, CROSSWALKS, AND MULTI-MODAL CIRCULATION

A variety of cost-effective traffic-calming measures on Needham Street will improve pedestrian safety while enhancing the street's visual definition and aesthetic appeal. This category of improvements will encourage walking as a viable mode of circulation throughout the corridor, instilling within visitors the sense that Needham Street is not designed solely for car travel. Few people currently travel Needham Street by foot, as the corridor's existing streetscape makes the pedestrian experience uncomfortable. Poor sidewalk conditions and disproportionate space allocated to the car in comparison to the pedestrian, along with a poor demarcation of the territory belonging to each, contribute to pedestrian discomfort.

While pedestrian needs occupy a central position in this vision for Needham Street, the interventions that serve those needs must calm traffic and protect pedestrians without impeding the flow of vehicular traffic on Needham Street. A single lane currently carries traffic in each direction while a central third lane allows left turns, affording little opportunity to reduce Needham Street's width without significant capacity reductions. Although Needham Street can and should become more pedestrian-oriented, automobiles will certainly retain a high mode share along the corridor, and it will remain an important link within the region's road network. Needham Street must continue to carry high traffic volumes and the needs of separate needs must be sensibly balanced.

This plan recommends several specific streetscape improvements that will protect pedestrians on Needham Street without adversely impacting traffic:

- **Improved sidewalks:** Needham Street's sidewalks currently exhibit various degrees of disrepair. Long stretches of sidewalk are too narrow for more than one person—despite

Figure 21: Illustration of proposed streetscape improvements

unused space on both sides—and sidewalks often dissolve into parking lots, creating confusion for pedestrians. The corridor's sidewalks should be widened and repaved where necessary, and the sidewalk paving design should continue across parking lots to define a clear pedestrian right-of-way. Street trees should line the sidewalk where it meets the curb, establishing a buffer between cars and pedestrians. Figure 20 depicts suggested standard widths and layouts of sidewalks with respect to Needham Street, and this basic design should be adhered to wherever possible.

- **Reduced curb cuts:** Curb cuts are necessary for Needham Street's vehicular circulation, but their presence along Needham Street is excessive and endangers pedestrians. Every business must have direct vehicular access to Needham Street, but the City should identify and close surplus curb cuts. Imposing maximum building setbacks and reorienting parking—as well as encouraging shared parking and entrances through design guidelines and zoning incentives—will also reduce curb cuts.

- **Center median:** An intermittent center median should divide Needham Street's two traffic lanes for much of the corridor's length, occupying the lane currently dedicated to left turns and leaving many portions of the lane for that purpose. This median will contain trees and planters to visually enhance the street and give it identity, while facilitating safe pedestrian crossings by functioning as a handicap-accessible traffic island at crosswalks. The median will also enhance traffic flow by rationalizing left turns in the center lane, clearly defining where left turns can and cannot occur.

- **Raised crosswalks:** Safer pedestrian crosswalks on Needham Street should use brick paving that is slightly raised above street level, allowing cars to comfortably drive over them while making them more noticeable. As a result, the pedestrian's path will receive clearer definition and crossing Needham Street will become a more inviting experience.

- **Undergrounding utility wires:** Undergrounding utility wires is an expensive proposition, but one that could increase the value of street-front property, enhance the aesthetic appeal of users, and create flexibility for non-vehicular movement through the corridor. With respect to this last point, utility poles and wires are obstructions to the use of the full road right-of-way. Removal could allow for the expansion of sidewalks, discussed above, and possibly the implementation of dedicated bicycle lanes. Objective 4 discusses linking Needham Street to the larger regional bicycle network, so discussions about undergrounding utility lines should occur concurrently. The Implementation section of this report discusses costs and financing options in greater detail.

- **New road connections:** More connections to the regional road network will take some capacity pressure off Needham Street itself and improve overall mobility within and around the corridor. A road or pedestrian connection between northern Needham Street to Elliot Street through city-owned land would provide improved access between Route 9 and Newton Highlands, with minimal impact on neighborhoods in Upper Falls. A road connection between Tower Road and Oak Street would offer internal circulation to a site that is likely to undergo major redevelopment in the near future. Also, additional connectivity to Oak Street would help spread traffic in southern Needham Street over a wider array of network options, such as Oak and Chestnut Streets (to Route 9) and Christina and Winchester Streets toward Needham. Specific details on design and alignment will be discussed in the Catalyst Sites section.

Figure 22: Illustrations of phased streetscape improvements

MARK TRANSITIONS

A valuable tool for good street design is to apply various traffic-calming measures to promote safety and awareness at nodes where drivers and pedestrians interact and, in some instances, to mark the transition between two segments of a roadway. A gateway at the intersection of selected streets can support these dual goals. The 2009 New York City Department of Transportation's Street Design Manual defines a gateway as a "combination of traffic-calming and visual measures used at the entrance to a low-speed street to slow entering vehicles and discourage through traffic."

Gateways are an appropriate strategy for creating a safe, comfortable, and efficient transition between the northern and southern sections of Needham Street. The intimate scale of mixed residential and commercial uses envisioned for the northern section of the corridor suggests a need to increase drivers' awareness of pedestrians and to reduce vehicular speeds. Finally, the desired mix of road users requires special attention to the nodes in which different modes of transport interact, especially at major intersections.

This section discusses three potential interventions by which to fulfill this recommendation, including two options for the Needham Street intersection with Dedham Street and Winchester Street and one option for the intersection of Needham Street with Tower Road and Industrial Place, both of which serve as gateways into northern Needham Street.

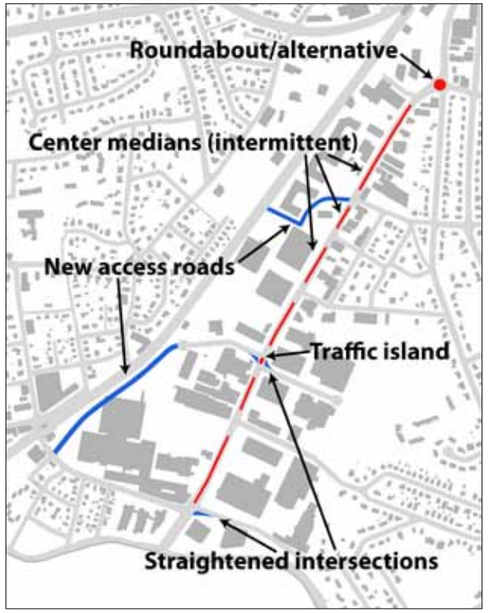


Figure 23: Proposed roadway improvements

NORTHERN GATEWAY: ROUNDABOUT

The Federal Highway Administration's (FHWA) technical study, Roundabouts, suggests that roundabouts offer benefits for safety, aesthetics, and, in some contexts, operations and capacity. According to the FHWA, empirical estimates of improvements to both vehicular and pedestrian safety consistently demonstrate dramatically positive results. Aesthetic improvements are also well documented, and roundabouts have been effectively deployed to serve as gateways between contrasting roadway and land use typologies. Delay time savings accrue through the elimination of lost time from signaling (start-up time and red and yellow phases), and through allowance of simultaneous (but usually slower) flow through the intersection from all approaches. Roundabouts are most effective at enhancing flow in less congested intersections and during non-peak travel times, but also demonstrate efficiency benefits at more congested intersections when capacity is not overwhelmed and context-specific mitigations provide supplementary traffic flow management.

According to the FHWA, roundabouts are not always an appropriate intervention for improving the efficiency of a road intersection. For example, roundabouts can increase delays through some intersections vis-à-vis electronic signaling. In heavily congested roundabouts, back-ups into the traffic circle can cause stagnant traffic in all directions.

Table 7: FHWA summary of roundabout design and capacity guidelines

DESIGN ELEMENT	MINI ROUNDABOUT	SINGLE-LANE ROUNDABOUT	MULTI-LANE ROUNDABOUT
Desirable maximum entry design speed	15 to 20 mph (25 to 30 km/h)	20 to 25 mph (30 to 40 km/h)	25 to 30 mph (40 to 50 km/h)
Maximum number of entering lanes per approach	1	1	2+
Typical inscribed circle diameter	45 to 90 ft (13 to 27 m)	90 to 180 ft (27 to 55 m)	150 to 300 ft (46 to 91 m)
Central island treatment	Fully traversable	Raised (may have traversable apron)	Raised (may have traversable apron)
Typical daily service volumes on 4-leg roundabout below which may be expected to operate without requiring a detailed capacity analysis (veh/day)*	Up to approximately 15,000 veh/day	Up to approximately 25,000 veh/day	Up to approximately 45,000 veh/day for two-lane roundabout

*Operational analysis needed to verify upper limit for specific applications.
veh = vehicle

Furthermore, where there are substantial directional imbalances during peak hours, roundabouts can prevent ingress of vehicles entering the intersection from approach roads with lesser volumes. This is because levels of conflicting flow from higher-volume approach roads create conditions where there are few gaps allowing entry from lower-volume approaches.

Following FHWA guidelines, it is possible to design roundabouts in places with constraints suggested above in such a way as to mitigate potential risks and maximize benefits. Interventions can include metering at roundabouts during peak hours to permit entry from lower-volume approaches, or designing lane movements to optimize the use of road space to accommodate unbalanced flows.

The team recommends that the City of Newton seriously explore the possibility of adding a roundabout to the northern gateway of the Needham Street corridor at the intersection with Winchester Street and Dedham Street. As demonstrated in Figure 24, the intersection (approximately 100 feet in diameter through the center) should be able to accommodate a single-lane roundabout and the current average daily motor vehicle volume. Due to traffic volume imbalances during peak hours, however, the City should explore two context-specific modifications to the base design. First, the City could consider a hybrid 1.5-lane roundabout, which would allocate additional capacity to left turns from Needham Street northbound onto Winchester Street westbound. Second, the City could consider adding a traffic signal that should normally be configured as a blinking yellow light in all directions, but could be programmed when necessary to meter traffic entering into the roundabout during peak periods. Figure 24 provides a conceptual illustration of the design. The illustration also demonstrates how bicycles can be safely accommodated by relocating the bicycle lanes (in blue) inside sidewalks as they pass through the intersection, and it depicts raised crosswalks at a safe distance from the roundabout.

NORTHERN GATEWAY: ALTERNATIVE PROPOSAL

The roundabout proposal for Needham Street's northern gateway at Winchester and Dedham streets requires further traffic analysis to supplement the limited traffic counts conducted for this study. Pending such closer examination, the roundabout's viability remains uncertain. An alternative plan for this intersection omits the roundabout in favor of traffic-calming measures that more closely resemble the strategies pursued elsewhere on Needham Street. This scaled-down alternative, while less ambitious, will accommodate a wider variety of traffic flow patterns. Future data collection may reveal the need for this flexibility at the intersection of Needham, Winchester and Dedham Streets.

Figure 25 depicts the alternative northern gateway proposal. Instead of a roundabout at the intersection's center, it remains signaled. This approach is an appropriate response to traffic flow imbalance in an intersection; more detailed traffic counts at this intersection will yield important insight into which alternative will work best. The raised crosswalks that accompany the roundabout remain in place, and bump-outs will augment these crosswalks at the lower-flow crossings on Dedham and south Winchester streets. The planted center medians will extend along the current Needham Street median to the intersection with Winchester Street. Finally, the borders separating streets from sidewalks will receive clearer definition with brighter, painted striping and reduction of curb cut widths.

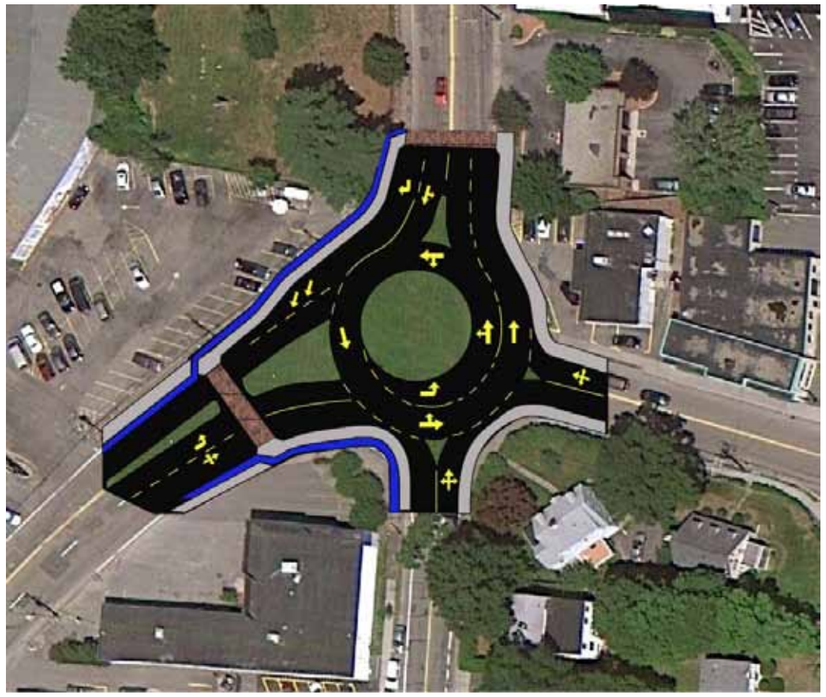


Figure 24:
Conceptual design of northern gateway roundabout

Figure 25:
Conceptual design of northern gateway alternative

Both alternatives for this intersection seek the same ends: traffic calming, pedestrian accommodation, provision of a visual gateway to the corridor, and maintenance of intersection capacity. This alternative prioritizes capacity at the slight expense of the other three aims.

SOUTHERN GATEWAY

A combination of interventions to the intersection of Needham Street, Tower Road, and Industrial Place could serve as a gateway to smooth the transition from the larger-scale land use pattern in the southern section of Needham Street to the smaller-scale pattern in the northern section. The team recommends the implementation of the following improvements:

One recommendation is to geometrically straighten the intersection in order to increase the efficiency of traffic movements. A break in the new center median should not only allow for access across Needham Street, but also for the reappearance of left-turn lanes on both northbound and southbound approaches from Needham Street. This would continue to allow through traffic along Needham Street to proceed through the intersection without excessive queuing behind left-turning lanes; however, it would also create an opportunity to develop formal crosswalks across all four approaches to the intersection, allowing for safe passage of pedestrians and bicycles. Crosswalks could be raised and marked by alternative materials to asphalt, such as brick. Thus, the rationalization of this intersection can serve multiple purposes: increasing the efficiency of traffic and fostering a more pedestrian-friendly environment.

Figure 26: Conceptual design of southern gateway traffic circle

Following these changes, one of several potential interventions could more concretely mark the gateway to northern Needham Street. The City should consider each of these strategies as part of its comprehensive circulation plan for the corridor:

- **Traffic circle:** A small traffic circle could serve as a mini-roundabout allowing four-way traffic, eliminating left turns, and reducing the need for an electronic signal. Such an intervention would also be likely to decrease capacity into the northern section of Needham Street, which could both dissuade through traffic and exacerbate congestion. Physical space may constrain this option, which is modeled in Figure 26.

- **Signaled intersection:** The Vanasse Study and a McMahon Associates study both envision signalizing this particular intersection, which would improve access from Tower Road and Industrial Place to Needham Street. A 2009 McMahon Associates peer review of the Vanasse Study, however, points out that while a signaled intersection can increase levels of service for Tower Road and Industrial Place, it might decrease levels of service on Needham Street. A signaled intersection can also serve as a gateway, but would do little to dissuade through traffic.

- **Signage and landscaping:** Signage and changes in landscaping within the center island immediately after northbound Needham Street traffic passes through the intersection can also signal a change in the scale, use, and vehicular speed. Signage can directly mark the entrance to a distinct district, which can be reinforced by changes in the scale of center median plantings and other streetscape elements. Such interventions could also be considered along with the implementation of a signaled intersection.

LOCAL TRANSIT

Given the funding constraints of the MBTA, local transit offers a flexible, realistic short-term strategy for improving the modal split of passengers through the Needham Street corridor. Newton experimented with local transit with Nexus bus, but the program was discontinued in 2003 due to a lack of ridership. However, there may be opportunities for a more flexible, context-specific option for the Needham Street corridor.

A public-private or privately-supported mini-bus service between commercial sites and MBTA Green Line-Riverside Branch stations would be appropriate for the Needham Street corridor, particularly in the context of increased development envisioned in this plan. Developers may welcome the opportunity to draw patrons from the larger network of rail commuters. The city could engage developers and commercial property owners with this proposal, offering public coordination (e.g., arranging for bus stops) or other types of development incentives in return for private contributions to capital and operations. This possibility is discussed further in the Implementation section.

TRAFFIC IMPACTS AND MITIGATION

Traffic congestion has become a problem on Needham Street and will likely remain so for the foreseeable future. As mentioned previously, the road's capacity is limited to one lane in each direction, and approximately 18,000-20,000 cars travel on it each day. The increased densities this plan suggests will add to the vehicular demand on Needham Street in the form of local trips, while a separate category of traffic (nearly 50% of all trips along the street, by one estimate) will continue to pass through without stopping. Both traffic types lead to congestion, and plans for Needham Street must anticipate traffic growth while developing strategies to mitigate that growth's impact. The Comprehensive Plan states the following goal for Newton: "We seek to assure development densities well related to both neighborhood character and infrastructure capacity." Here, realizing this aim means ensuring that proposed development on Needham Street will not exceed the street's effective capacity. Needham Street will inevitably remain the area's most suitable corridor for heavy automobile traffic.

This plan reflects a decision not to expand Needham Street's capacity by widening the road itself. The plan also attempts to improve traffic flow through the corridor by concentrating on overall corridor mobility, circulation, and road network connectivity rather than focusing solely on monolithic movement of traffic volume through a single segment. The Comprehensive Plan and this plan both seek to enhance multimodal transportation options (along with density). Widening Needham Street would only inhibit transit, bicycling, and walking while its potential to relieve traffic congestion is questionable. Various forecasts anticipate increased traffic flow on Needham Street, and the proposed capacity expansion on Route 128 (four lanes in each direction by 2017) could contribute to that congestion; however, widening Needham Street would likely provide only temporary congestion relief before attracting higher levels of traffic that would strain its capacity anew. The lost opportunities associated with widening Needham Street, however—a strengthened automobile presence at the expense of other modes and a better streetscape—would likely be permanent.

Table 8: Estimated trip generation of proposed development (ITE)

TRIPS / MIN. (PEAK HOUR)		
	AM	PM
Northern Catalyst Site	4.3	5.6
Southern Catalyst Site (Phase I)	7.9	9.8
Southern Catalyst Site (Phase II)	7.6	9.7

Table 8 roughly forecasts the traffic impacts of this plan's land use changes. The additional development at the catalyst sites (discussed in detail below) will result in higher densities along Needham Street and will generate additional trips. The ITE publishes trip generation rates (per square foot or residential unit) for various land use types, and these rates facilitated estimation of each site's total trip generation by phase. The precise mix of office and retail types cannot be known now, so this estimate used a representative mix based upon expected development patterns. As the table shows, aggregate trip generation could be substantial, but proper phasing and mitigation measures will alleviate those impacts. Mitigation measures, as discussed in detail above, include the full range of traffic rationalization strategies for the corridor along with a small degree of mode shift toward walking and bicycling. New access roads near the catalyst sites, described later in this plan, will move certain local trips off of Needham Street itself. Beyond these measures, development phasing becomes critical to successful traffic impact management. If earlier phases produce more congestion than expected, the flexibility to reduce the scale of later development phases offers a means of stabilizing that development's impact.

VEHICULAR CIRCULATION

This section has described a complete set of proposals for improved traffic circulation on Needham Street: new access roads that can accompany proposed catalyst site developments, as well as interventions to rationalize vehicle movements on Needham Street itself. These interventions can improve the total vehicular throughput on Needham Street while encouraging certain trips, especially locally oriented ones, to circulate on side streets. Additional opportunities to improve circulation and alleviate congestion by adding new vehicular roads near Needham Street likely exist. The new roads proposed in this plan serve the western half of the Needham Street corridor, while its southeastern section offers fewer apparent opportunities for such interventions.

Furthermore, proposed transit improvements on Needham Street would benefit the western half more than the eastern half. Charlemont Street, which is interrupted near the abandoned rail bed east of Needham Street, offers one obvious possibility for a new vehicular connection, but support from adjacent stakeholders, including H.C. Starck and residents of nearby neighborhoods, would be important in order for this to occur.

Objective 4: Connect to Surrounding Ecological System and Open Space Network

The Needham Street corridor is sited in a region with a dynamic existing open space network and rich ecological resources. This objective seeks to build on existing plans while developing new, site-specific interventions and design strategies. Changes to the corridor must consider ecological priorities, such as conservation of biodiversity and the urban ecology principles of patches, corridors, and natural water flows, as well as linkages to Newton's broader open space network. The provision of new and active open space is important to the plan's overall strategy of enhancing the quality of the Needham Street corridor and promoting it as a destination. The recommendations outlined below describe the proposed locations of new open spaces that integrate recreational and passive uses as well as aesthetic concerns to improve the function and quality of Needham Street.

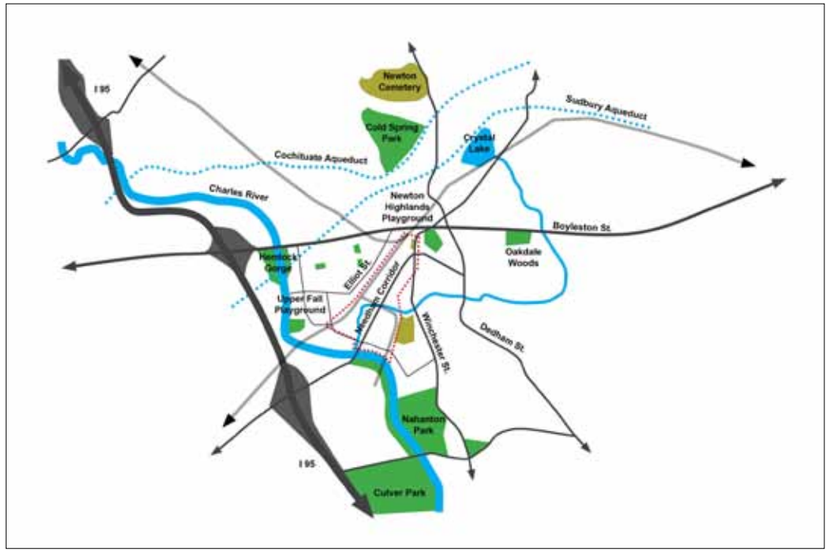
Recommendations

CREATE AND ENHANCE OPEN SPACE PATCHES

Patches, relatively homogenous green spaces that differ from their surroundings, are fundamental to urban landscape ecology. One of the prevailing examples of a patch is a park. Patches are an important resource for species diversity, as they start an ecological chain reaction to smaller parks and gardens in a city—the larger the patch, the greater the benefits.

- **Large patches:** The large patch that exists on the northwestern edge of the corridor, Newton Highlands Playground (see Figure 27), should be protected, and could also be re-oriented to strengthen its ability to protect aquifers. This will ensure that it continues to act as a hydrological sponge in the case of flooding. This patch also has the potential to sustain a variety of species, providing a core habitat and escape cover, while regulating the needs of native plant species.
- **Medium to small patches:** A series of medium- and smaller-sized patches would be necessary to act as stepping stones between the larger patches. This plan recommends creating these patches alongside other kinds of development on Needham Street. In order for the smaller patches to be used for wildlife movement and the potential housing of new species types, minimum sizes need to be mandated and replicated. Transition zones of shrubbery and ground cover between trees has proven effective; vertical layering of such vegetation would promote habitat diversity even further.

Figure 27: Existing open space patches



USE OPEN SPACE SYSTEM AND LANDSCAPE ELEMENTS TO MANAGE STORMWATER

Several strategies are recommended to incorporate water management into Needham Street's proposed landscape and open space system. These strategies, which include natural and artificial stormwater management, could eventually become a model for other areas in the city.

New parks and retention ponds can be used to manage stormwater by providing a location for natural filtration to occur. To fulfill this role, new parks should be located with consideration of the area's watersheds (see Figure 28) and, where possible, retention ponds should be integrated into these green spaces. This system will help reduce pressure on the City's drain infrastructure.

One proposed location for a park is near the existing brook on the southwestern side of Needham Street. A park in this location could provide an opportunity for "daylighting" (reestablishing the waterway in its original natural channel where feasible), or to recreate the wetlands and the pond that previously existed on the site (see Figure 28). The advantages of this strategy include increased hydrologic efficiency (by slowing and infiltrating runoff), and new habitat opportunities. The brook's biological integrity could be preserved by reestablishing and protecting its surrounding floodplain and riparian buffer. Ideally the buffer should be at least 65 feet in width, the minimum needed to mitigate effects on aquatic life, although the impact on adjacent properties would also need to be considered.

Bioswales are landscaped elements that are purposely sloped in order to trap silt and pollution from runoff (see Figure 29) and should be introduced along Needham Street, either in the proposed center median or as a buffer between the sidewalk and street. Street intersections, especially potential new civic spaces, and parking lots could also incorporate these remediation structures.

Generally, the use of impervious surfaces along Needham Street should be limited, and replaced with alternatives whenever possible to improve infiltration and percolation. Encouraging pervious surfaces can be incorporated into design guidelines, as discussed under Objective 2.

Figure 28: Green corridors and water systems

(Above) Examples of water remediation strategies from Portland, Oregon.

(Left) Figure 29: Proposed water remediation interventions

CREATE RECREATIONAL CORRIDOR ALONG ABANDONED RAIL RIGHT-OF-WAY

The abandoned rail right-of-way to the west of Needham Street should be converted to a recreational corridor, creating a path for wildlife, a connection to the Charles River and existing open spaces to the southwest and northeast, and contributing to a regional recreational network. By enhancing the connectivity between existing and proposed corridors and patches, this action will improve the overall function of the regional open space network.

However, it is important to consider the possibility that the rail right-of-way will be re-activated at some point in the future. As this is a long-term

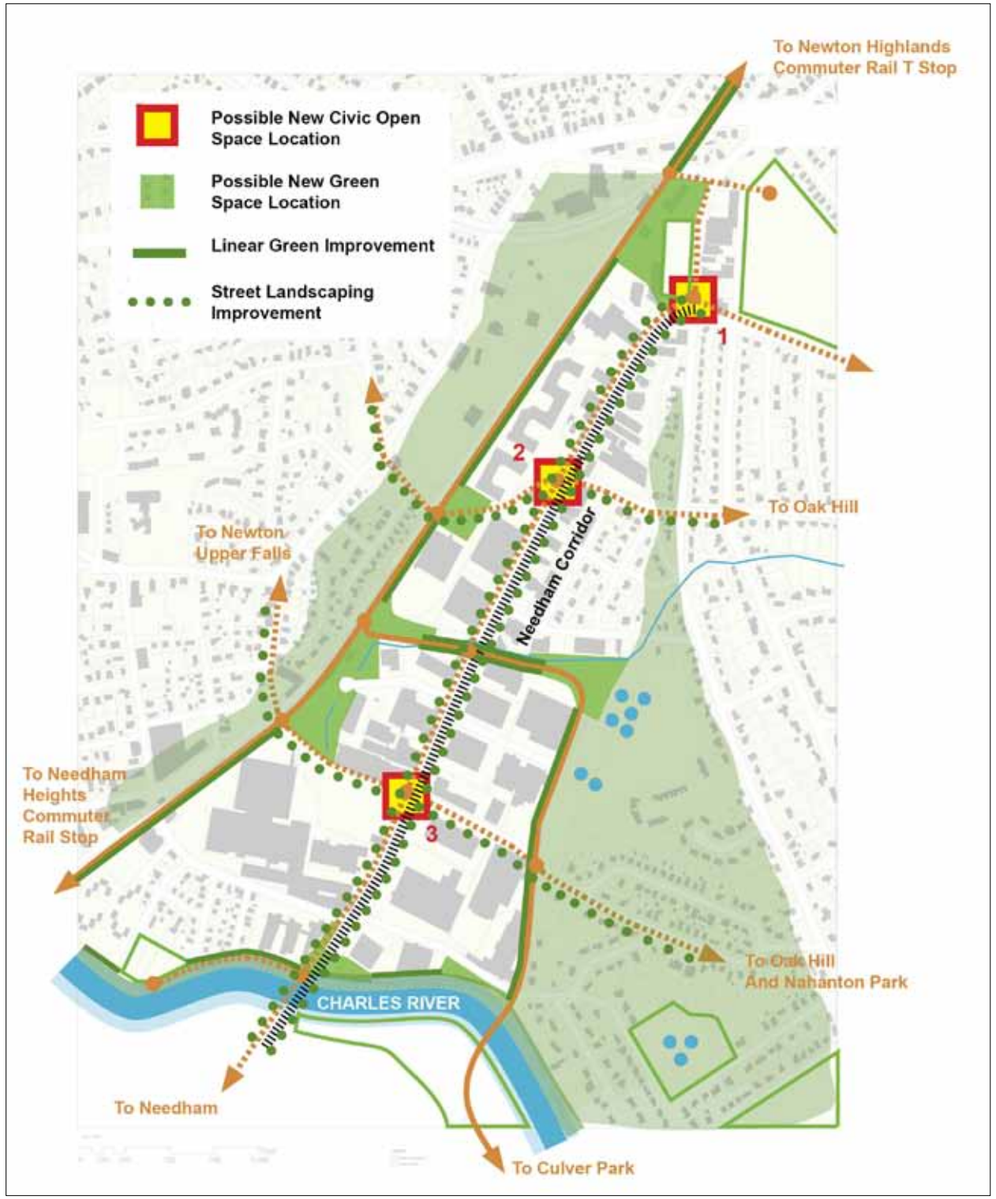


Figure 30: Proposed ecological system and open space network

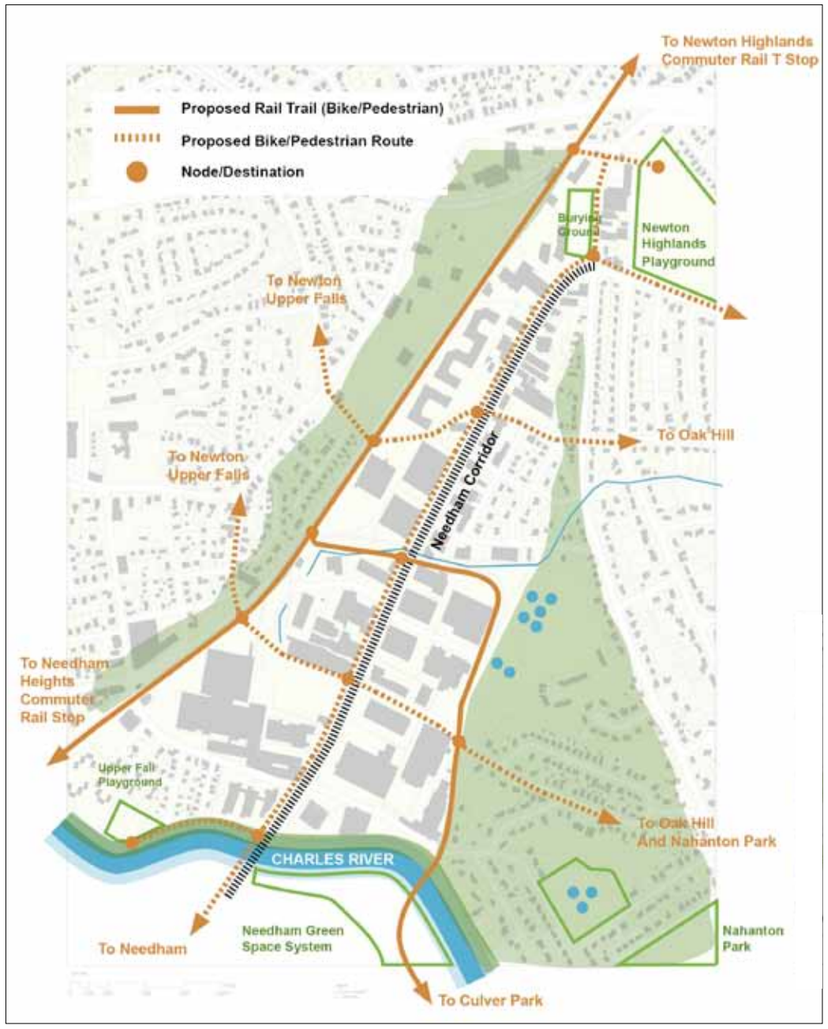
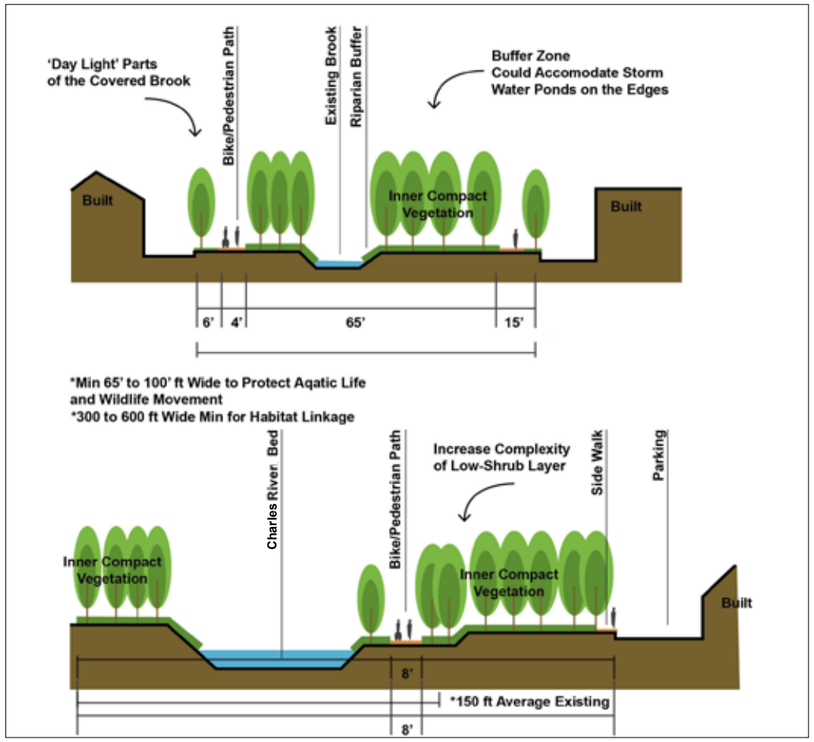
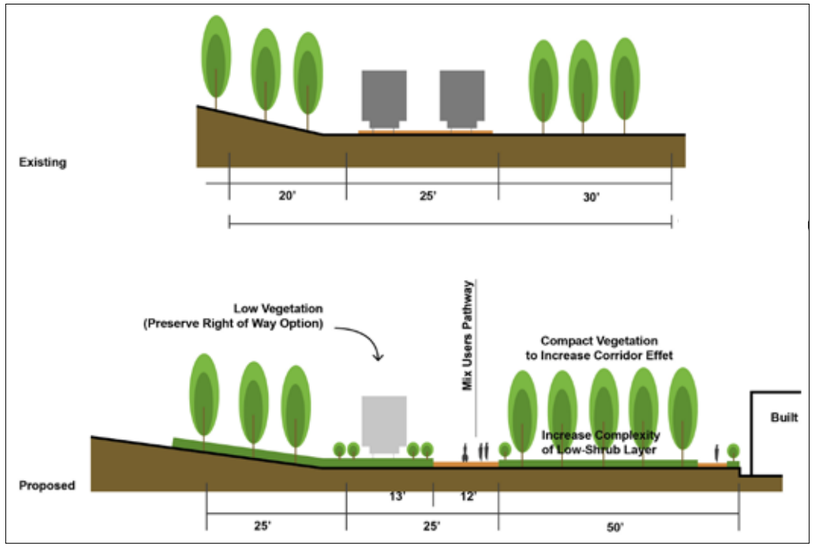


Figure 31: Proposed recreation network

goal, the short- and medium-term creation of a recreational corridor could greatly benefit area residents. This plan recommends that any interventions along the corridor retain maximum flexibility for the long-term MBTA addition of a Green Line extension, while in the meantime encouraging the use of the corridor for pedestrian and bicycle use. Any such use ought to work with right-of-way boundaries and incorporate the right-of-way corridor into the larger open space and ecological plans.

Figures 32: Proposed integration of ecological and recreational networks for the brook, Charles River, and rail corridor





Objective 5: Promote Connections among Parcels and Within Neighborhoods

The central aims of this objective are to integrate the proposed street network, open space system, and connections between parcels in order to create a more cohesive place. In a city that defines itself as a collection of human-scaled village centers, Needham Street is a place apart. Better integrating the corridor with its surrounding communities will help to fulfill the Comprehensive Plan's call for "greater excellence in place-making." In order for Objectives 3 and 4 to succeed, the previously discussed improvements to circulation and open space within the Needham Street corridor must be complemented with increased connectivity. Improved connectivity entails both internal and external dimensions. Separate parcels and land uses must become more accessible to one another, while the entire corridor must become more porous with respect to the residential communities that surround it. Improved connectivity serves several related purposes: greater pedestrian and bicycle accessibility, shorter travel distances, enhanced recreational opportunities, and ecological continuity. These networks overlap and form an interconnected system that will link the corridor to its surroundings. While these interventions will help foster continuity between the corridor and surrounding areas, there is potential for increased traffic in nearby residential areas, so impacts must be carefully monitored and mitigated.

Recommendations

REDUCE BARRIERS AND IMPROVE CONNECTIONS AMONG PARCELS

Significant physical and psychological barriers—buildings, fences, parking lots, etc.—now limit Needham Street's connectivity with its surroundings to an unnecessary degree. Rectifying those conditions will have few drawbacks. This will become particularly important as redevelopment promotes internal circulation networks within large parcels, providing new walkable districts.

ADD AN ADDITIONAL PEDESTRIAN CONNECTION TO UPPER FALLS

Currently Upper Falls is only connected to Needham Street via Oak Street, an indirect route for much of the community. This configuration forces people to drive longer distances, contributing to traffic and ecological problems while discouraging alternative modes of movement to and from the corridor. The community would benefit greatly from more direct access to the commercial activities on Needham Street, which exceed any retail concentration currently found within Upper Falls itself. One option is to provide a pedestrian connection between Upper Falls and Needham Street through the recreational corridor created in the abandoned rail right-of-way. Access to the right-of-way could be created in strategic places along the corridor.

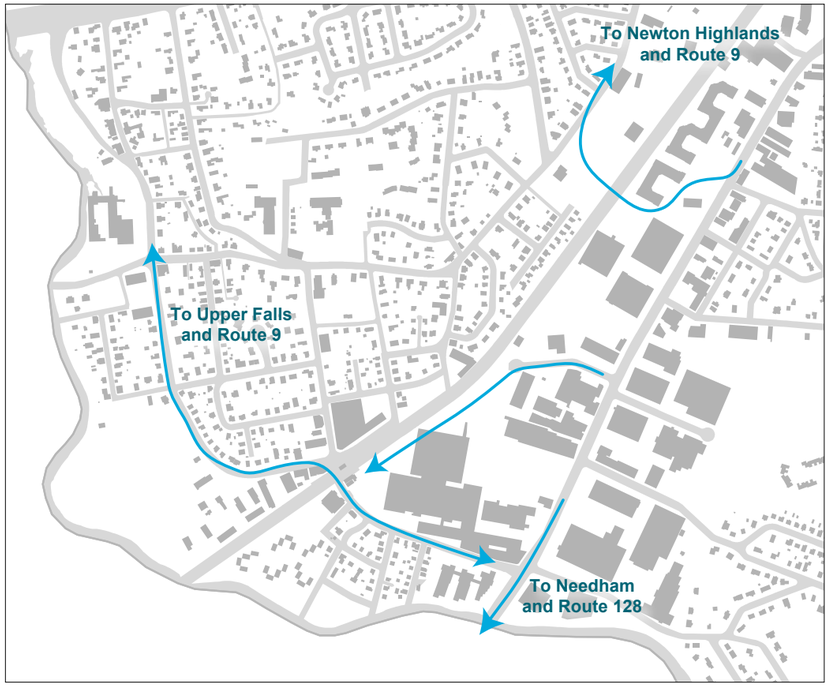
Needham Street's high traffic volumes and congestion mean that new outlets for that traffic could bring an unwanted nuisance into previously quiet neighborhoods. Improving external connectivity will require careful management of vehicular access.

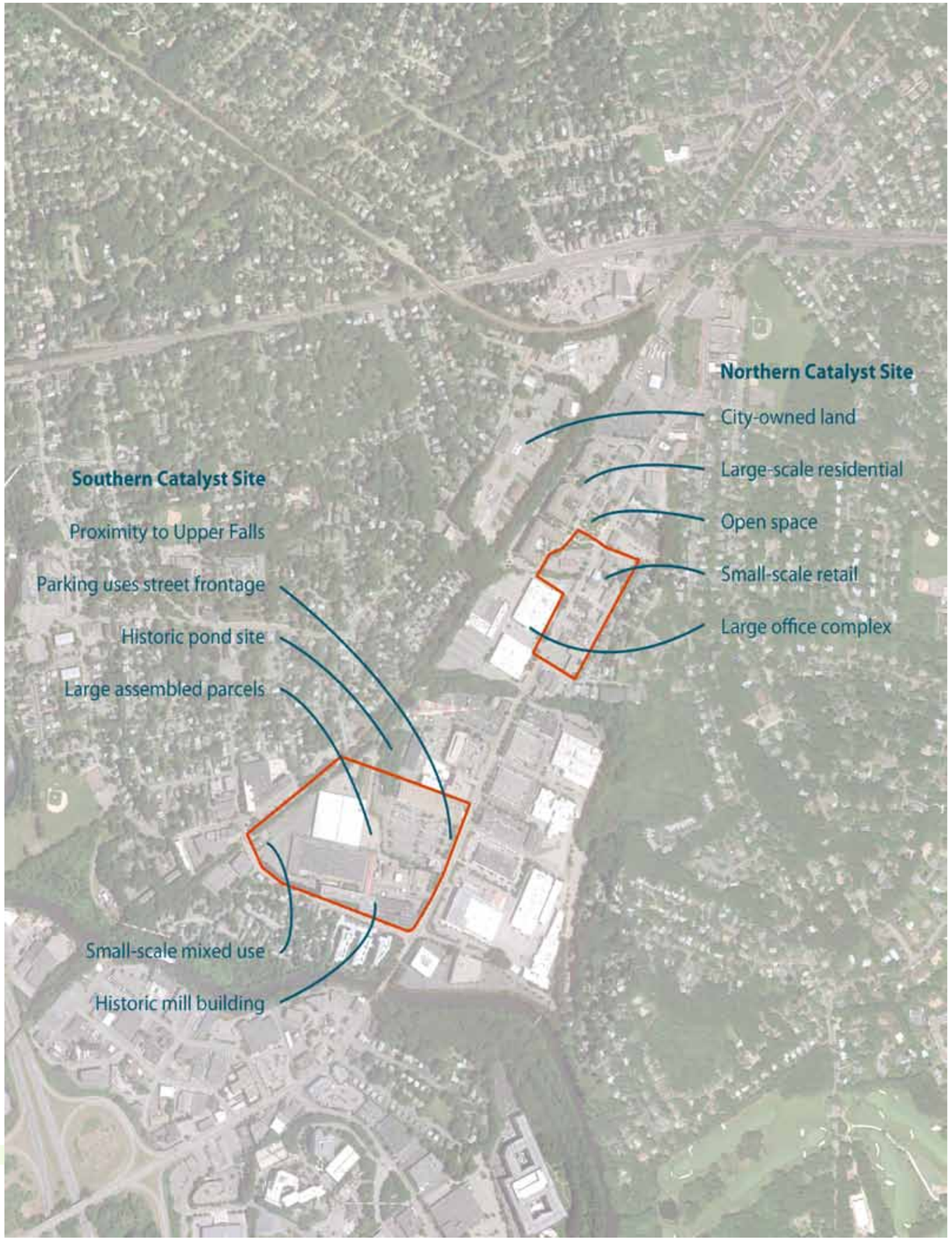
Limiting new vehicular access roads to strategic points in the network in order to minimize shortcuts through residential neighborhoods will strike a balance between connectivity and residents' priorities. More aggressive traffic calming techniques could also be implemented to discourage large volumes of traffic from using the streets.

TARGET APPROPRIATE USES AND SCALES ADJACENT TO RESIDENTIAL NEIGHBORHOODS

Beyond circulation, the objective of connecting Needham Street to its surroundings means continuity of built form. The design guidelines proposed in prior objectives can establish this by softening the contrast between single-family homes and larger retail stores. It is especially important for new development to be sensitive to its surroundings, including the Upper Falls and Newton Highlands neighborhoods. Development should be scaled to provide a transition from higher intensity on the corridor to lower intensity at the edges. A less jarring transition between uses and types within such short distance will reduce the perception of Needham Street as fundamentally separate from the rest of Newton, and will create a more natural transition between the commercial and residential areas.

Figure 33: Traffic routes via new neighborhood connections





5 CATALYST SITES: TWO ACTION AREAS

To illustrate the new vision for what Needham Street can become, and to provide the City with inspiration for future development, concept plans were developed for two key areas identified along the corridor. These 'catalyst' sites are intended to jump start redevelopment, providing the opportunity for the tenets of this vision to manifest themselves in the physical environment along Needham Street and to facilitate future positive change.

IN THIS SECTION

Several relevant factors were considered in selecting these key sites, including changes in property values over time; available or underused land; historic architecture; location along the corridor and transitions to surrounding neighborhoods; and building typologies, configurations, and façade treatments. The ultimate goal is to use new development to complement and highlight existing assets, while responding to current challenges.

Encompassing an approximately three-block area surrounding the Needham Street and Rockland Street intersection, the northern catalyst site exemplifies how smaller-scale development changes can have a significant impact on the overall character of a place. This area was chosen for several reasons: the adjacent large-scale residential and office complexes currently offer active daytime and nighttime constituencies and demand a consistently high level of service and functionality in the northern part of the corridor. A mix of small-scale retail and service spaces complements these larger developments across the street. Existing uses should be retained, but the buildings and the overall physical environment would benefit from incremental site and streetscape improvements. Avalon Bay already provides area residents with an attractive open space along the street

(Opposite) Figure 34: Catalyst site attributes

front, and tightly knit neighborhood fabrics on both sides of the catalyst site call for increased attention to appropriate transitions and connections.

The southern catalyst site comprises the large parcels of land currently used by the Marshalls plaza and the Northland development group, an area bounded on the south by Oak Street and the railroad right-of-way to the west. The specific properties of this site present unique opportunities and challenges for intervention design. Much of the site area is occupied by parking, which consumes valuable street frontage and diminishes the interface between street and site. Currently, flooding is a problem here due to insufficient pervious surface; however, the site formerly contained a pond and could potentially incorporate alternative water remediation and recreation strategies. One of the site's most noticeable assets is the historic Mill at the Charles building, which anchors its southern edge. Land parcels assembled and managed by the same owner present a unique opportunity for large-scale redevelopment to occur, while a minor patch of small-scale mixed-use historic buildings (at the corner of Oak Street and the rail right-of-way) currently acts as a model for a sensitive transition to the adjacent Upper Falls neighborhood.

Overall, the convergence of the aforementioned circumstances presents a great opportunity for Needham Street to receive short- and long-term benefits from carefully considered and directed growth. What follows is one possible interpretation for what these sites could become and how they might spearhead the transition to a more vibrant and livable Needham Street.

(Top to bottom) Bird's eye views of corridor from north to south

Northern Catalyst Site

This scenario redesigns several blocks located adjacent to the Avalon Bay residential development and the Crosspoint property (currently housing Trip Advisor, among other tenants). It focuses mainly on smaller-scale commercial development, with buildings that front the street and parking areas subordinated to the sides of buildings and to the middle of the block. These buildings might be redeveloped to more suitably house existing and future tenants. Behind the commercial buildings lining Needham Street, this scenario envisions residential townhouses lining the other sides of these blocks and helping to ease the transition into the adjacent residential neighborhood. The catalyst site provides improved pedestrian infrastructure, a connection to the abandoned rail right-of-way and Upper Falls, and a central civic space.

Two alternatives are presented for the parcel located adjacent to both Avalon Bay and the Crosspoint property. The first option provides a new road on the west side of Needham Street, extending Rockland Street across the railroad tracks and over to Elliot Street in Upper Falls. This provides an important connection to this neighborhood, and crosses city property to the west of the railroad tracks. By providing vehicular access to Needham Street, it allows for greater access to shopping and amenities on the corridor and allows certain local trips to avoid travel on Needham Street itself. The second option does not include this new road connection, but instead provides a new pedestrian and bicycle connection to Upper Falls in its place. This would allow neighborhood residents to enter and make use of this enhanced retail area without using a car. Each option allows for a central civic space, albeit in slightly different configurations, and includes a variety of improvements to the physical environment.

Satellite image of northern catalyst site

Northern Site by the Numbers

As envisioned here, the first alternative (including a new road) will add nearly 79,000 square feet of building area, resulting in a total building area of 153,000 square feet throughout the entire site (see Table 9). The proposed plan will be composed of 41% retail, 23% office, and 37% residential uses. Based on this development intensity, the revised parking requirements call for a range of 250 to 438 required spaces, with the site plan providing 316.

Table 9: Proposed development at northern catalyst site

	ALTERNATIVE 1	ALTERNATIVE 2
Existing Square Feet	74,300	74,300
Additional Square Feet	78,700	102,000
Total Square Feet	153,000	176,000
Retail	41%	39%
Office	23%	29%
Residential	37%	32%
Required Parking	250-438	297-514
Parking Spaces Provided	316	346
Site FAR (gross)	0.67	0.79

The second alternative (with non-vehicular access to Upper Falls) will add more than 100,000 square feet of building area, bringing the site's total to 176,000 square feet (see Table 9). Of this, 39% will be retail, 29% will be office, and the remaining 32% will be residential. The plan provides 346 parking spaces, which is within the required range.

Addressing the Five Objectives

The five objectives that frame the new vision for Needham Street are reflected and referenced throughout both configurations of the northern catalyst site concept plan. Thus, these two alternative development scenarios can illustrate the power of the vision's five objectives in action.

OBJECTIVE 1: PROMOTE FINE-GRAIN MIXED-USE DEVELOPMENT

The proposed interventions call for full integration of vertical and horizontal mix of uses. This includes first-floor retail space with offices—and potentially a small number of residential units—on second stories. Horizontal integration with existing residential, office, civic, and retail uses on neighboring parcels is encouraged. These uses will be complemented by an array of new residential and civic spaces, in addition to the aforementioned vertically-mixed commercial buildings.

Figure 35: Proposed plan for northern catalyst site (alternative 1)

OBJECTIVE 2: CREATE A MORE COHESIVE AND ATTRACTIVE PHYSICAL ENVIRONMENT

The key to this objective is encouraging engagement between the street and buildings. The plan recognizes and is fully compatible with proposed changes to the zoning code regarding parking. This includes reducing parking requirements, increasing shared parking, and subordinating the majority of parking to the sides or rear of buildings while still maintaining visibility through periodic sight line openings. Buildings of slightly higher density than existing uses should address the street with more uniform setbacks, greater attention to architectural detail, and increased interaction with the street as fostered by large windows, transparent doors, and appropriate sign placement and design.

Figure 36: Proposed plan for northern catalyst site (alternative 2)

OBJECTIVE 3: CREATE A SAFE, COMFORTABLE, AND EFFICIENT STREETSCAPE

The first step towards achieving this goal is to improve sidewalk condition and definition, landscaping (street trees and plantings), and pedestrian amenities (seating, lighting, and crosswalks) along the length of the corridor. Re-striping the road and increasing signage will call attention to bikers using the marked shoulder. Additionally, the parking plan significantly reduces the number of curb cuts and eases in-site traffic flow through designated one-way circulation patterns. By coordinating parking lot ingress and egress, in combination with curb cut reductions, traffic slowdown can be partially mitigated. These interventions will be complemented by a proposed center median, which will be broken to allow designated left turn opportunities at strategic parking area entrances.

OBJECTIVE 4: CONNECT SITE TO SURROUNDING ECOLOGICAL SYSTEM AND OPEN SPACE NETWORK

In addition to making marked improvements in the overall pedestrian circulation network, this concept plan calls for a quality outdoor civic space to serve as a central node for public activity and interaction in the northern catalyst site. If the civic space is a green space, it would contribute to the goal of increasing patches along the corridor. The new open space is also consistent with the new beneficial open space requirement for larger developments in the amended zoning code. Other smaller green areas throughout the catalyst site further enhance the corridor's green spaces, providing pedestrian refuges, improving aesthetics, and increasing the ratio of permeable to impermeable surface covering the site to facilitate stormwater management. A pedestrian and bicycle path will connect the civic space and streetscape to the rail right-of-way, providing a recreational alternative to on-street circulation and improving connectivity with the regional open space network.

OBJECTIVE 5: PROMOTE CONNECTIONS AMONG PARCELS AND WITHIN NEIGHBORHOODS

In recognition of the needs and concerns of adjacent neighborhoods, the plan proposes sensitive solutions at the periphery of the site. Along the eastern edge, small two-family townhouses will address the residential fabric of Newton Highlands and provide a buffered transition from Needham Street's busy commercial activities to a quieter residential neighborhood. The western side of the catalyst site, abutting the rail right-of-way, will provide a much-needed connection, whether pedestrian or vehicular, to Upper Falls. This physical link will traverse the city-owned land on the western side of the railroad tracks, minimizing potential negative impacts from traffic or construction on existing private residences.

Figure 37: Illustration of proposed plaza space in northern catalyst site

Figure 38: Illustration of streetscape in northern catalyst site

Southern Catalyst Site

Located on the southwest corner of the Needham Street corridor, this site proposes a more significant shift from existing uses than the northern site does. As envisioned, the site would eventually comprise retail, office, and residential uses in a substantially different form than exists today. Rather than its current large industrial footprints and expansive areas dedicated to parking, the site could ultimately be home to vertically-mixed office and retail buildings, as well as residential townhouses, and would feature an internal street network with both on-street and structured parking. The aim is for the site to be walkable and both pedestrian- and car-friendly. The proposal also features a public event space and plaza, which could accommodate a variety of activities, including outdoor events, dining, recreational uses, and celebrations of the newly reconceived Needham Street. The intensity of use on the catalyst site would be highest at the Needham Street edge, and would gradually transition to lower intensity residential uses near the interface with the rail right-of-way and Upper Falls.

The proposal envisions two major stages in development: Phase I and Phase II. In Phase IA, a new civic space will be built at the front of the parking lot at the present-day Marshalls shopping center. Behind this, two new buildings will frame the open space and contain office and retail uses. In the northwest corner of the site, adjacent to a new pedestrian connection to Upper Falls, a significant flood and stormwater retention area will be created, serving to both restore a more natural landscape and allude to a pond that existed on the site during Needham Street's industrial heyday. Phase IB involves the reprogramming or replacement of the current Marshalls building (with an additional story of leasable space) and adds a third commercial building along a new road within the site that connects with Tower Road (currently a dead end). Finally, Phase II brings more substantial change to the site, with the removal of the underutilized industrial buildings, the addition of internal circulation roads, more intense commercial development and new residential units. The historic Mill at the Charles would be preserved, serving as an attractive site anchor, a recognizable gateway into the new Needham Street corridor, and an inspiration for future context-sensitive development.

Satellite image of the southern catalyst site

Southern Site by the Numbers

As envisioned in this interpretation of the southern catalyst site, Phases IA and IB will add approximately 90,000 square feet of building area to the Needham Street corridor, leading to a total of 170,000 square feet across the site (see Table 10). Uses on the site will be evenly split between retail and office, and the site will have an FAR of 0.64. Parking provision will be 430 spaces, well within the range required by the revised zoning code. Phase II will expand upon the earlier phases, adding 426,000 square feet and bringing the site's total building area to 690,000 square feet. The site's new FAR will be 0.82. The development will include 18% retail, 43% office, and 38% residential uses. The number of parking spaces will increase to 1,211, the majority of which will be accommodated in structured parking.

Table 10: Proposed development at southern catalyst site

	PHASE 1A+1B	PHASE II
Existing Square Feet	80,000	264,000
Additional Square Feet	90,000	426,000
Total Square Feet	170,000	690,000
Retail	50%	18%
Office	50%	43%
Residential	0%	38%
Required Parking	340-595	979-1690
Parking Spaces Provided	430	1,211
Site FAR (gross)	0.64	0.82

Addressing the Five Objectives

As with the northern catalyst site, the proposed plan for the southern site reflects the five objectives of the overall vision for an improved Needham Street. The specific ways in which each stage of development addresses these objectives are outlined below.

PHASE IA + IB

OBJECTIVE 1: PROMOTE FINE-GRAIN, MIXED-USE DEVELOPMENT

In the near term, new construction will be vertical mixed-use, responding to market trends. As it now stands, office and retail space reflect the growth sectors proposed in the Comprehensive Plan. Retail will be located on the first floor and office uses will locate on upper floors. Although it does not exist along the corridor today, residential use above retail may be possible, but this decision will be within the discretion of the developer and subject to market demand for such units.

Figure 39: Phase IA of southern catalyst site proposal

OBJECTIVE 2: CREATE A MORE COHESIVE AND ATTRACTIVE PHYSICAL ENVIRONMENT

Building footprints, as illustrated, should remain within the 75' - 100' width range to support predicted uses. The recommended site design builds on existing dimensions between buildings, except that it subordinates the bulk of the parking to the back of the site. In addition, the plan proposes a civic space along Needham Street for flexible programming. Retailers will benefit from this space because it will serve as a draw for the community. It is supported by a range of shopping and services within relative proximity. A small café or retail building and landscaping will be positioned as a buffer on the edge abutting Needham Street.

OBJECTIVE 3: CREATE A SAFE, COMFORTABLE, AND EFFICIENT STREETSCAPE

Even in Phase I, significant site improvements are called upon to create a more walkable and safer pedestrian environment, including reprogramming the parking area to include clearly delineated walking paths. The plaza provides a refuge and invites pedestrians on Needham Street into the site, where they might patronize local businesses, attend events, or relax and enjoy the space.

OBJECTIVE 4: CONNECT SITE TO SURROUNDING ECOLOGICAL SYSTEM AND OPEN SPACE NETWORK

The southern site should connect with the proposed bike and pedestrian trail running along the rail right-of-way. This can also serve as a pedestrian connection to Upper Falls via Mechanic Street. Also during the first phase, a large flood and stormwater retention area will be added to the natural end of the corridor's flood plain. This space will serve as both public open space and an intermittent overflow pond for stormwater. There is an opportunity to use bioswales and water retention technologies at the junctions of major pedestrian paths, such as the proposed civic space. These permeable surfaces can simultaneously

Figure 40: Phase IB of southern catalyst site proposal

be decorative, functional for water management, and protective as a delineation between pedestrian paths and roadways.

OBJECTIVE 5: PROMOTE CONNECTIONS AMONG PARCELS AND WITH NEIGHBORHOODS

The design proposes a connection to Upper Falls across the proposed trail on the rail right-of-way. In addition, it uses internal streets to connect Tower Road with the new development. As mentioned earlier, pedestrian paths will also link the site to the Upper Falls neighborhood. Small-scale commercial activity that is currently located near the corner of Oak and Chestnut Streets will continue to operate, helping to integrate the new project into the existing scale of the neighborhood.

PHASE II

OBJECTIVE 1: PROMOTE FINE-GRAIN MIXED-USE DEVELOPMENT

When appropriate, redevelopment of the larger industrial buildings on site is proposed in order to create a softer transition to the surrounding neighborhood. In addition to a vertical mix of uses, the plan calls for horizontal variety, with commercial uses located toward Needham Street and residential uses toward Upper Falls. The site can accommodate larger building footprints, and thus the design calls for larger footprint office buildings close to the Mill at the Charles. The on-site density achieved through this proposal necessitates structured parking to achieve FAR and open space goals.

OBJECTIVE 2: CREATE A MORE COHESIVE AND ATTRACTIVE PHYSICAL ENVIRONMENT

The plan proposes using similar planting, lighting, and pedestrian strategies to extend Phase I retail into the office and residential fabric. The aesthetic and material character of the existing retail and office buildings should be considered in order to maintain a visually cohesive development.

OBJECTIVE 3: CREATE A SAFE, COMFORTABLE, AND EFFICIENT STREETSCAPE

The plan proposes to continue on-street parking along the edges of vertical mixed-use buildings and, in some cases, residential uses. Structured parking should be nested within commercial and office spaces, wrapped by the building façade in order to minimize the street frontage of the parking garage structure. The additional development proposed in this phase will likely result in additional trips along Needham Street, though the site design should partially address this by providing internal circulation and reducing extraneous trips on the main corridor. Although the timing and funding climate are uncertain, this phase would be complemented by an increase in public transit—either the potential Green Line rail extension or additional bus service.

Figure 41: Bird's eye view of proposed plaza and civic space

Figure 42: Phase II of southern catalyst site proposal

OBJECTIVE 4: CONNECT SITE TO SURROUNDING ECOLOGICAL SYSTEM AND OPEN SPACE NETWORK

The proposed design further develops the open space and retention pond with additional amenities, such as an athletic field and park to serve new residential uses.

OBJECTIVE 5: PROMOTE CONNECTIONS AMONG PARCELS AND WITH NEIGHBORHOODS

The plan proposes additional interior streets, connecting Needham Street with the internal block and providing greater access. This phase also brings a continuation of Tower Road to the rest of the site.

Figure 43: Illustration of proposed plaza and civic space

Pedestrian connections allow residents to move between the site and Upper Falls in several locations. Commercial activity that is currently taking place near the corner of Oak and Chestnut Streets will continue to operate and will be slightly extended, incorporating elements of existing building scales and styles into the new development.

6 SUMMARY OF RECOMMENDATIONS

Envisioning Needham Street offers many recommendations to achieve the five objectives that compose the outlined vision. The following section summarizes the specific recommendations made throughout this plan.

Zoning

Note: the following recommendations apply to both MU1 and MU2 unless specified.

Zones

- Redraw the zones for MU1 and MU2 such that MU2 covers all of northern Needham Street (both the east and west sides of the street north of Jaconnet Street), while MU1 covers all of southern Needham Street.

Land uses

- Expand by-right uses in MU1 to include multi-family residential, mixed-use developments and buildings, and uses currently allowed by right in the MU2 zone, including retail, services, and restaurants.
- Expand by-right uses in MU2 to include multifamily residential and mixed-use developments and buildings.
- Encourage complementary uses and building types adjacent to surrounding neighborhoods.

Density and dimensional requirements

- Reduce minimum lot area per dwelling unit to 1,200 square feet.
- Limit building footprints to 40,000 square feet.
- Allow maximum building height of 2 stories by right, and up to 4 stories with a special permit. A height incentive of 3 stories by right could be provided for desired actions such as mixed-use buildings and developments, shared parking lots, reduced curb cuts, shared access, reduced peak hour trips, land dedication, and undergrounding utilities.

- Allow FAR of 1.0 by right, and 2.0 with a special permit. A density incentive of 1.5 by-right FAR could be provided for the desired actions described above.
- Revise front setbacks to include a minimum and maximum, with maximum setbacks equal to 15’ in MU1 and 0’ in MU2. The maximum setbacks can be increased by the reviewing body in order to allow for beneficial open space in front of a building.
- Incorporate additional form-based aspects into the zoning code, including requiring transparent windows, entrances, and signage facing Needham Street.

Parking

- Modify parking requirements to reduce minimums and set maximums.
- Limit parking frontage to 40% of lot frontage abutting Needham Street and do not allow parking to be located between main buildings and Needham Street; instead, encourage shared side and rear parking lots.
- Allow transfers of parking among adjacent parcels.

Open space

- In parcels over 40,000 square feet, require that 20% of parcel area be dedicated as “beneficial open space.”

Process

- Revise the development review process to facilitate desired development, allowing for different levels of review for different sized developments.
- Develop design guidelines to aid the review process and improve the quality of the built environment.

Transportation

Streetscape improvements

- Widen and repave sidewalks where necessary.
- Clearly define pedestrian rights-of-way when sidewalks cross parking lots.
- Plant street trees along the sidewalks.
- Encourage reduced curb cuts through zoning incentives and site plan review.
- Install an intermittent center median to divide traffic lanes and rationalize left turns.
- Install raised pedestrian crosswalks.

Marked transitions

- Consider implementing a roundabout or traffic calming measures for the northern gateway to Needham Street (intersection of Needham, Winchester, and Dedham Streets).
- Straighten the intersection at the southern gateway to Needham Street (intersection of Needham, Oak, and Christina streets).
- Consider a small traffic circle, signaled intersection, or signage and landscaping changes to mark the transition between the southern and northern sections of Needham Street.

Neighborhood connections

- Create a new pedestrian connection from southern Needham Street to Upper Falls via the rail right-of-way.
- Consider adding a vehicular or pedestrian connection from northern Needham Street to Elliot Street through the city-owned parcel to the northwest of Needham Street.

Circulation within and among parcels

- Reduce physical and psychological barriers that currently limit Needham Street's connectivity with its surroundings.
- Encourage vehicular and pedestrian connections within and among parcels through design guidelines and site plan review.

Local transportation

- Encourage creation of a local transportation system, such as a shuttle service along Needham Street connecting with nearby MBTA Green Line stations.

Open Space and Recreation

- Increase the connectivity to the existing open space network.
- Create a recreational corridor for bikes and pedestrians along the abandoned rail right-of-way; the corridor can serve as a link between the Charles River and existing open spaces to the northeast and southwest.
- Create and enhance open spaces; new open spaces should be located with consideration for wildlife movements and natural ecology.
- Integrate water management into streetscape and open spaces through bioswales, stormwater retention ponds, and wetland areas.

7 IMPLEMENTATION

Realization of the new vision for the Needham Street corridor will require the City of Newton to undertake a series of coordinated actions in the short and medium terms. The most critical actions include establishing appropriate zoning incentives to support fine-grain mixed-use development and circulation plans; determining and executing financing strategies for infrastructure improvements; and initiating executive, legislative, and community processes necessary to continue the planning process.

IN THIS SECTION

Zoning Incentives

Zoning incentives can be an effective way to encourage developers and property owners to cooperate with the City in implementing several of the recommendations outlined in this plan. In exchange for implementing the following actions, developers could receive density bonuses in the form of additional height limits (e.g., three stories by right) and/or increased by-right FAR.

- Mixed-use buildings and developments. To promote the mixed-use character envisioned in this plan, the City could offer an incentive for buildings or developments that include at least two of the following uses: retail and personal services, residential, office, and/or restaurant, such that the smallest use is at least 20% of the development's gross floor area.

- Shared parking lots. Incentives could be provided for developments that share parking lots with adjacent properties.

- Reduced curb cuts and/or shared access roads. Site plans that reduce curb cuts along Needham Street or feature access roads shared by neighboring properties, which would have the effect of reducing curb cuts, would improve traffic circulation and the pedestrian environment along Needham Street and should be encouraged with density bonuses.
- Reduced peak hour trips. Incentives can encourage developments that take steps to reduce the estimated peak number of trips through actions such as flexible work schedules or a mix of uses that spread trips over different times of the day. Reducing peak trips will improve traffic circulation along Needham Street during the most congested periods of the day.
- Undergrounding utilities. Properties that pay for undergrounding utility lines could receive density bonuses.
- Contribution to a transit service fund. Developments that agree to pay for alternative transit such as a shuttle service connecting Needham Street to nearby MBTA Green Line stations could be allotted higher densities.

Infrastructure Finance

This section discusses implementation strategies for financing several potentially high-cost infrastructure initiatives. Since state funding is available for design and improvements to Needham Street surface infrastructure (roads and sidewalks), this section focuses instead on undergrounding utility lines, mass transit, and local transit infrastructure. The following discussion covers possible strategies and the benefits and drawbacks of each.

Undergrounding Utilities

One proposed streetscape intervention, the undergrounding of electric, telecom, and cable wires along the Needham Street corridor, is very expensive. An initial estimate prepared in 2006 by NStar for the City of Newton pegs the approximate cost of earthwork, installation, and removal of existing wires at about $5 million. This figure could very well be much higher considering inflation (though minimal in recent years), the cost of insurance, and the cost of traffic management during construction. Moreover, the costs may increase in later stages as the City and designers factor in the location of additional subterranean infrastructure, and the associated costs posed by such obstructions. Costs could also rise based on geotechnical factors such as the presence of ledge, which NStar estimates could increase costs by 10 to 20%. Moreover, there will be additional costs associated with making underground connections to individual properties, which can be borne by either private property owners, the City, or a combination of both. One large property owner on Needham Street indicated that his company received a quote of approximately $1 million for such a connection.

Though the costs of undergrounding utility wires are high, the benefits to property values and economic development could provide sufficient counterweight. In determining how to pay for undergrounding utilities, the City should consider the following guidelines for assessing financing options.

- **Massachusetts General Law, Chapter 166:** If the City of Newton believes that the benefits of undergrounding extend to the entire city, then it may consider invoking Section M of Massachusetts of General Law, Chapter 166. This law would require utility companies to place utility lines underground. Electric and phone companies can recover their costs through a 2% surcharge to all customers in the City (Section 22M), and cable companies can recover costs as well.
- **Special assessment zones and tax increment Financing:** If the City of Newton believes that the benefits of undergrounding wires are sufficiently localized within the Needham Street corridor, it might consider working with local property owners to establish a special assessment zone, whereby a surcharge could be added to annual property taxes within the area over a period of time to finance development. Tax increment financing involves the securitizing of expected future increases in property taxes in a given geographic zone resulting from an intervention. The downside of tax increment financing is that it deprives a city of revenues needed to provide other vital public services to an ostensibly growing area. Discussion with local property owners and detailed financial analyses should be conducted prior to using any of these mechanisms.
- **Developer incentives and contributions:** The City of Newton could also offer various incentives, including the density incentives discussed previously, to developers in return for a contribution toward the undergrounding of utility wires throughout the corridor. In the case of large redevelopment projects, the owners may have strong individual financial incentives to support undergrounding of utilities in the corridor, as the improvements may increase the value of their properties. Therefore, the developer may see this type of contribution as mutually beneficial.

The City of Newton can choose among the above mechanisms to finance utility line undergrounding. However, there must be a thorough analysis of the distribution of costs and benefits that is based, at least in part, on the benefit boundaries of such an improvement.

Mass Transportation Finance

There are currently limited opportunities for investment that would increase mass transportation capacity in the short term. However, it is important to continue discussions with appropriate federal and state officials regarding long-term investments in corridor mobility. Due to the long lead times on such projects, it is never too early to begin positioning the Needham Street corridor to receive such funding opportunities.

Federal surface transportation programs are authorized under the Safe, Accountable, Flexible, Efficient Transportation Equity Act – A Legacy for Users Act (SAFETEA-LU, Public Law 109-59), which has expired but is operating under a temporary continuing resolution. Most federal funding available for investments in large transit infrastructure under SAFETEA-LU derives from flexible use of FHWA formula funds and competitive grant programs. While the U.S. Congress could alter existing funding programs when it reauthorizes federal highway and transportation programs, SAFETEA-LU is the best guide for federal funding opportunities in the present and near future.

Table 11 describes federal programs for financing mass transportation investments and services such as the proposed MBTA Green Line extension to Needham Junction, the acquisition of new buses, and the subsidization of local transit services. The table focuses on those programs most relevant to the Needham Street corridor. It is also important to acknowledge that many of these opportunities must be coordinated in conjunction with the State of Massachusetts and the Boston Metropolitan Planning Organization transportation plans in order to be eligible for funding.

SAFETEA-LU also authorized (or re-authorized) a number of innovative financing mechanisms for transportation infrastructure investment. Among these programs are federal guarantees and direct loans for public-private infrastructure development, securitization of future federal funding streams to finance large infrastructure projects, and a variety of revolving fund programs. Table 12 briefly summarizes major programs relevant to mass transportation.

The State also has a number of transportation financing programs. According to the 2007 findings of the Massachusetts Transportation Finance Commission, Transportation Finance in Massachusetts: An Unsustainable System, however, nearly all state-funded programs are heavily underfunded and most rely on federal funds to help meet budget gaps. Debt instruments used to support past construction largely preclude the State from securitizing future revenue streams. The report describes how funding distributed to fifteen regional transit agencies is small compared to that of the MBTA, and how Massachusetts cities and towns actually subsidize MBTA operations. Though the State has recently reorganized transportation agencies and policies, it will likely be a long time before substantial investmentss can be made with state funds for new infrastructure.

Given the competitive nature of federal grant funding and high levels of debt in state transportation finance accounts, any expansion of transit service within the Needham Street corridor may require creative private or public-private efforts. For example, commercial property owners and developers may want to encourage patrons and employees to use alternative means of transportation to access sites on Needham Street. It might be possible to build a coalition of property owners willing to help finance a mini-bus operation running between destinations within the Needham Street corridor and the Eliot or Newton Highlands stations of the MBTA Green Line. Such a proposal should be explored, especially alongside any large-scale redevelopment proposal within the Needham Street corridor.

Next Steps

Following detailed descriptions of the vision and specific recommendations for implementation, this section turns to immediate next steps. Tables 13 and 14 broadly outline immediate next steps to begin the realization of this comprehensive vision for the Needham Street corridor. Interventions are roughly grouped into two broad categories: next steps for land use and development, and next steps for infrastructure and public land improvements.

Table 11: Federal transit funding opportunities under SAFETEA-LU

HIGHWAY PROGRAMS	
National Highway System	• Formula grants to states based on lane-miles of roadway • Up to 50% of state funds can be transferred to transit programs
FEDERAL-AID TRANSIT PROGRAMS	
Capital Investment Grants/Fixed Guideway (Section 5309)	• Capital investment grants for the New Starts, Small Starts and other competitive grant programs • Funding for fixed guideway, rail, and bus modernization
Urbanized Area Grant (Section 5310)	• Grants for public transportation capital investment and services in areas with populations fewer than 200,000 persons • Apportioned based on population, population density and other transit demand metrics
Elderly/Disabled Transit (Section 5310)	• Funding to support public transportation services for the elderly and disabled • State formula funding
Job Access and Reverse Commute (Section 5316)	• Formula grant funding for local programs (urban and rural) offering job access and reverse commute service to low-income individuals
New Freedom Program (Section 5317)	• Formula grant services for beyond the minimum required by the ADA for persons with disabilities

Source: California Department of Transportation

Table 12: Federal alternative financing programs for transportation infrastructure

FEDERAL INNOVATIVE FINANCING PROGRAMS	
Transportation Infrastructure Finance and Innovation Act	• Provides credit assistance (loan guarantees, direct loans, and lines of credit) to support financing of surface transportation projects of national and regional significance • Must have a public sponsor and private partner • Covers all modes of transportation infrastructure
Grant Anticipation Revenue Vehicles	• Any of a variety of state debt instruments that securitizes future anticipated funds from Title 23 (Highways) to fund up-front construction costs for transportation facilities
State Infrastructure Banks	• Authorizes states to set up revolving accounts backed by a portion of federal highway and transit funds to finance capital projects • Massachusetts Legislature is currently considering legislation that would create such a bank

Source: Federal Highway Administration

Table 13: Land use development next steps

CONTACT	TOPIC	PURPOSE
City of Newton Department of Planning and Development	Needham Street Corridor Plan	• Feedback and recommendations from City planning staff • Development of additional studies, drawings, and communication tools as needed to support submission of formal recommendations to appropriate City agencies, committees of the Board of Alderman and citizen-legislative task forces
City of Newton Board of Aldermen	Comments and Public Hearings	• Comments and recommended changes to the Needham Street corridor vision plans and recommendations • Initiation of full Board and/or committee hearings to begin public discussion of specific corridor policy recommendations (land use and transportation) and potential budget and legislative actions
	Amendments to Comprehensive Plan if needed	• Initiation of any amendments to the City of Newton Comprehensive Plan to incorporate changes pursuant to the Needham Street corridor vision plan and any modifications thereof
	Budgeting and Administration	• Initiation of legislative process for required changes to local laws in order to implement the Needham Street corridor vision plan • Coordinate with the City Executive Department on consideration of budget and financing requirement to implement the plan budgeting and administration
Zoning Task Force	Zoning Changes	• Request approval of proposed zoning changes to the Needham Street corridor, pursuant to the Needham Street corridor vision plan and any supplemental documents submitted by City of Newton Planning and Development staff

Table 14: Infrastructure and public land improvement next steps

CONTACT	TOPIC	PURPOSE
MassDOT	Needham Street Design and Improvements	• Request inclusion of the Needham Street corridor vision plan for infrastructure/signaling improvements as part of the Needham Street/Highland Street design contractor scope-of-work • Secure any additional funding for street improvements • Request approval of any required bicycling plans • Initiate transfer of Needham Street right-of-way to the City of Newton upon completion of roadway improvements
MBTA	Rail Right-of-Way Easements	• Request easements within and across the MBTA rail right-of-way for roadway, bicycle, and pedestrian path crossings, as well as underground infrastructure, public space, and ecological improvements
Infrastructure Providers, City of Newton, Businesses, and Citizens	Undergrounding Wires	• Estimate of costs and benefits of undergrounding electrical and telecommunications wires • Initiate discussion on options for funding improvements (tax increment financing, special assessment financing, public-private partnerships) • Engage NSTAR, Verizon, and Comcast as to the most consumer-friendly method of implementation
	Land Transfers and Easements	• Reach out to selected property owners with regard to land transfers to facilitate infrastructure improvements, including roadway improvements • Request easements as necessary for above and below ground infrastructure improvements (e.g., bioswales)
City of Newton Executive Office	Approval, Programming, and Financing	• Comments and approval of the Mayor of Newton for additional executive departmental action • Initiation of budget forecasting, planning, programming, and financing process for proposed improvements in coordination with the City of Newton COO, CFO, Treasurer, and Comptroller
City of Newton Department of Public Works	Feedback and Recommendations	• Comments and suggested modifications of road / infrastructure improvement plans, including construction traffic mitigation • Comments and suggested modifications of underground infrastructure and stormwater management plans (bioswales, floodplain plans, etc.)
	Reprogramming of Land	• Request reprogramming of land within the DPW storage facility properties on Elliot Street for a potential new road right-of-way
City of Newton Fire Department	Transfer of Land	• Request transfer of property (if necessary) within the City Fire Department's property on Elliot Street to the DPW for a road right-of-way
City of Newton Parks and Recreation	Feedback and Recommendations	• Comments and suggested modifications for plans for open space and recreational improvements along the MBTA right-of-way and rail spur
City of Newton Fire and Police	Feedback and Recommendations	• Request feedback on City Fire and Police first responder requirements during roadway improvements

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