THE BRIMBAL AVENUE BUILD-OUT ALTERNATIVES STUDY

Funding provided by the District Local Technical Assistance program

Prepared for
City of Beverly

Prepared by
Metropolitan Area Planning Council
60 Temple Place, 6th Floor
Boston, Massachusetts 02111
Tel (617) 451-2770
www.mapc.org
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Executive Summary

MAPC was asked by the City of Beverly to look at possibilities for enhancing economic development opportunities around the area of the existing Route 128/Brimbal Avenue interchange, and how those opportunities could be turned into productive revenue for the City. In response to this request, MAPC analyzed two potential buildout alternatives for the study area: Existing Zoning and Smarter Growth. Both alternatives quantified the maximum potential for future development, job creation and trip generation within four sub-areas around the existing interchange. MAPC recommends that the City of Beverly implement the Smarter Growth alternative, which is projected to yield more developable square footage, housing units and job growth versus developing under the Existing Zoning alternative.

Key Findings under the Smarter Growth Alternative:

- The Smarter Growth alternative is projected to yield over 400,000 additional square feet of development, over 700 additional housing units and 336 additional jobs when compared to the Existing Zoning alternative.
- Focusing economic development south of Route 128 will bring new job growth closer to housing, daily service needs and transportation options, potentially reducing automobile trips.
- Providing higher density housing options south of Route 128 will bring residents closer to job opportunities, daily service needs and reliable public transit options.
- The Smarter Growth alternative provides a higher potential for tax revenue to the City by intensifying development in areas already served by existing public infrastructure.
- The Smarter Growth alternative provides economic development opportunities in each sub-area, even absent the Brimbal Avenue interchange investment.
- The Smarter Growth alternative encourages more growth resulting in more jobs than what is projected under the Existing Zoning alternative. It is anticipated that as new economic development and housing opportunities come online under the Smarter Growth alternative, automobile trip generation will remain similar to what is projected under the Existing Zoning scenario. This is the result of an estimated 9% reduction in total automobile trips based on a projected increase in walking, carpooling and public transit trips. The Smarter Growth alternative is projected to have more growth with similar transportation impacts when compared to the Existing Zoning alternative.
Only square feet of office, commercial and industrial development: does not include housing units.

**The Southeast of the Landfill sub-area only contains new housing units.

*Smarter Growth includes a 9% trip reduction factor based on increased mode share in walking, transit and carpooling.

**Trip generation was calculated for square feet of office, commercial and industrial development as well as housing units.
Recommendations for Accomplishing the Smarter Growth Alternative

MAPC recognizes that in order to implement the Smarter Growth alternative, the City of Beverly will have to make changes to the zoning of parcels and the City’s zoning ordinance, invest in transportation infrastructure improvements and work with property owners, businesses and developers to create future economic development opportunities. The following recommendations outline some steps the City should take to implement the Smarter Growth alternative:

- **Zoning:**
  - Apply the City’s RSD zoning category to the area southeast of the landfill.
  - Promote higher density development in the northeast of Brimbal Avenue sub-area, which would allow buildings up to three stories.
  - Develop special permitting process for office development in the southwest of Brimbal Avenue sub-area which allows for an increase in density in exchange for a commitment to significantly reduce single-occupant vehicle trips through the use of Transportation Demand Management solutions.

- **Transportation:**
  - Develop a well-connected network of sidewalks between sub-areas.
  - Work with employers and the North Shore Transportation Management Association to develop transportation demand management strategies.
  - Work with the MBTA to provide bus connections between development areas and the commuter rail stations.
  - Enhance pedestrian and transit connections to the Montserrat and North Beverly commuter rail stations for employees and residents.
  - Require transportation mitigation improvements for new businesses that increase vehicle trips in the study area.

- **Economic and Residential Development:**
  - Work with existing business/property owners to increase densities and job growth under the new zoning recommendations.
  - Market available properties to new businesses and developers.
  - Market available property to housing developers under new zoning recommendations.

**Challenges to Smart Growth**

Developing this area under a Smarter Growth concept is not absent of challenges. The existing land uses are segregated into pockets of residential, commercial, office, and industrial with few internal transportation connections among them. The existing locations of housing developments make connecting housing and employment more difficult, and the distance of most developed areas to existing public transportation connections poses a challenge for linking people to transportation options. With that said, the recommendations in this study can provide development patterns which are conducive to connecting land uses and facilitating trips by modes other than the automobile.
I. OVERVIEW OF THE PROJECT AND THE STUDY AREA

1. Overview of the Project

MAPC was asked by the City of Beverly to look at possibilities for enhancing economic
development opportunities around the area of the existing Route 128/Brimbal Avenue
interchange, and how those opportunities could be turned into productive revenue for the
City. Working with two different future alternatives, Existing Zoning and Smarter Growth,
MAPC developed two potential buildout alternatives for the study area. Both buildout
alternatives analyzed the maximum potential for future development and estimated
potential square footage, job creation and trip generation. The study also includes
recommendations for transportation improvements. This study also highlights the short-term
economic development potential that is available to the City while long-term plans for the
possible interchange are explored.

A scope of work was developed consisting of the following tasks:

- Task #1: Buildout under Existing Zoning.
- Task #2: Buildout under a Smarter Growth alternative with the area rezoned to allow
denser, more mixed use development.
- Task #3: A comparison of the auto trips generated under each alternative along with
the potential for trips to be made by walking, biking, and transit, including the use of
the nearby commuter rail stations.
- Task #4: Evaluate transportation opportunities. For the alternative development
scenario, MAPC will work with city staff to identify a range of transit and transportation
improvements necessary to optimize development and preservation priorities, such as
enhanced commuter rail access, bus or shuttle routes to connect new development to
commuter rail stations and to downtown Beverly, as well as any key roadway, bike and
pedestrian improvements.

Following the general principles of Smart Growth, MAPC developed alternatives in all four
sub-areas where economic potential could be maximized through higher intensity mixed-use
development, redevelopment of existing low-intensity uses, and the provision of
transportation infrastructure that makes walking and public transportation viable
alternatives to driving. Developing this area under a Smart Growth concept is not absent of
challenges. The existing land uses are segregated into pockets of residential, commercial,
office, and industrial with few internal transportation connections between them. The lack
of housing integration makes connecting housing and employment more difficult. The
distance of most developed areas to existing public transportation connections also poses a
challenge for linking people to transportation options. Finally, the proximity of the study area
to Route 128 provides close access that facilitates travel by single occupant vehicles.

Additional development increases the potential for negative externalities such as traffic
congestion and air quality degradation. Trip generation calculations were conducted to
determine the increase in auto trips that may result from additional development in the
study area. Therefore, it is critical to promote alternative modes of transportation and public
transit options for both new and existing development in order to help reduce the number of
trips taken by single occupant vehicles. A combination of infrastructure investments and policy directives need to be put in place to accompany development within each of the four areas. MAPC understands that the current peak hour congestion in and around the existing Route 128 interchange poses both operational and safety concerns for travelers. Any additional development in the study area should be accompanied by traffic and/or safety mitigation measures to help offset the additional trips generated. MAPC also recommends that the City examine ways of upgrading the existing interchange and roadway network to help relieve congestion and improve traffic safety.

2. The Study Area

The study area consists of Norwood Pond in the north to the Montserrat commuter rail station in the south, and in between Essex St in the east and the Newburyport commuter rail line in the west. The area consists of parcels in both public and private ownership that range in size. The area is served by local roadways and by an interchange on Route 128, and is zoned for residential uses in some areas and for industrial uses in others. The area includes an industrially-zoned 40 acre capped landfill and abuts a 140 acre city-owned open space parcel (around Norwood Pond) that currently has no vehicular access or parking facilities.

The tract has significant industrial and residential development possibilities. About 140 acres nearest to Route 128 are zoned for uses such as office, research and development and manufacturing. The 60 acres nearest the commuter rail station are zoned for single-family homes at a density of 2-3 lots per acre.

The study area has been sub-divided into four sub-areas. These are shown in Figure 1.

3. The Proposed New Interchange

One of the reasons for studying land use in this area is the proposal for a new highway interchange. The area is served by an existing highway interchange which MassDOT believes is unsafe because of its substandard design. MassDOT believes that it is inadequate to handle recent and projected traffic volumes and that its layout creates significant safety issues, traffic backups and air quality concerns. MassDOT’s Highway Division is currently funding design studies to improve the existing interchange under MassHighway Project File No. 604369.

As part of these proposed improvements, some existing ramps will be upgraded while others will be replaced. A series of design alternatives has been developed and a “preferred alternative” designed by MassDOT. Otis Road would be used to create a new road over Route 128. Sufficient funding is in place to advance the designs to the 25% design level and that is expected to occur by year end. Plans for the interchange cannot be reviewed by the federal government until the project is in the Regional Transportation Plan. The consultant for the interchange design is Jacobs, Inc. There is a draft EIR for the interchange which has not been formally submitted yet.

MAPC has undertaken this land use analysis without assuming that the proposed interchange will be constructed. The proposal would be expensive and would have to go
through many more steps before approval and construction. The goal of this land use analysis was to determine how the City’s economic development goals could be met with improvements that are limited to the existing land use and transportation system.

II. THE BUILDOUT ANALYSIS

1. What is a Buildout Analysis?

A buildout analysis is an attempt to determine the maximum amount of additional development that could occur by right under a community’s existing zoning. It does not make any predictions about when or if this level of development will occur. The purpose of a buildout analysis is to provide a way for a community to look at its future, to assess potential impacts and to decide if that level of development is desirable. Buildout starts with existing zoning but is often coupled with an analysis that takes the same existing physical conditions
(level of development, lot configurations, etc.) and applies other zoning parameters to provide an alternative for the purpose of comparison. It allows planners to experiment with “what if” scenarios such as; what if we changed the building height, allowed structured parking or reduced the minimum lot size.

The buildout analysis was done by dividing the study area into four sub-areas. These sub-areas are depicted in Figure 1. For each sub-area, two buildout alternatives were run. The first alternative in each sub-area represents the maximum amount of development that could occur if all parcels were developed with the most likely mix of high intensity by-right uses allowed under existing zoning. The second alternative in each sub-area represents a mix of uses and alternative densities that present a desirable future applying smart growth development principles as embodied in the regional development plan, MetroFuture.

2. What is Smart Growth?

Smart growth means different things to different people and must be considered in the context of existing development and constraints. Smart growth as envisioned in MetroFuture embodies a number of principles including but not limited to:

- Compact, dense development
- Focusing growth in areas where people, jobs, and infrastructure already exist.
- Reuse of land and buildings.
- Brownfields revitalization.
- Growth in existing town and village centers.
- Growth near transit.
- Preservation of open space and agricultural land.
- Sharing the benefits and impacts of growth equitably among various groups within the population.
- A transportation system that includes more options for commuters and residents and facilitates more walking and biking.
- A transportation system that lessens suburban congestion.

Since smart growth is based on growth where development already exists, it always involves working within existing conditions which requires compromises. The goal is often “smarter growth,” bearing in mind that it is very difficult to meet all of the above parameters. For this reason the term “smarter growth alternative” will be used to denote an alternative to buildout that meets some but not all of the above principles.

3. Buildout North of Route 128

This sub-area consists of 221 acres and has 281,448 square feet of existing development. A little over half of the area (121 acres) is the City owned Norwood Pond property which is zoned Open Space Recreation (OSR). The remaining acreage is zoned IR. This area also includes the North Shore Music Theater, Dunham Office Park and a few parcels that are used for warehousing and industrial uses. There was some interest by developers in the possibility of subsidized elderly housing in this area but this would not be desirable from a smart growth perspective because there is no retail and no services within walking distance of the developable parcels.
Future development in this area would probably require improvements to Dunham Road as well as utility work. Public utilities in Dunham Road stop before the North Shore Music Theater and then become private. The key land use issues are access to Norwood Pond and intensification of land uses in a manner that adheres to smart growth principles. There is pedestrian access to Norwood Pond via a 10 foot wide right-of-way with a dirt road off of Dodge Street between Elnew Road and Whitaker Way. There is a small sign indicating pedestrian only access to Norwood Pond. There is no parking available. The city would like to improve this access and create additional access with parking off of Dunham Road, perhaps through the Dunham Corporate Office Park property which is currently for sale.

The North Shore Music Theater (NSMT) is a major land use in this sub-area. The new owner of the NSMT currently has no plans to do anything else on the property but has expressed some interest in using a portion of the site for elderly housing. The property is being used for shows, concerts and acting classes. There is also a restaurant on the site. On nights when there is a show, traffic can back up on the breakdown lane of Route 128 with traffic waiting to enter the site. At times, the owner has tried to use both lanes of Dunham Road to enter the site, which is a problem for adjacent residents.

Buildout Alternative #1: Existing Zoning – IR zoning allows a number of different uses but the intent of this buildout alternative was to determine the maximum amount of development that could occur under existing zoning. Office uses allow for higher intensity development than industrial uses and therefore, all parcels were built out for office development. This alternative assumes no additional theater development but includes office space on the unused portions of the theater property. It also assumes that the low intensity industrial uses would be redeveloped as office. The build out assumes that offices will be in 5-story buildings with surface parking and 40% open space on the parcel. This equates to an effective floor area ratio (FAR) of 0.32 based on building height, percentage of open space and parking although this FAR is not spelled out in the zoning ordinance.
Under existing zoning, development could increase by 1,006,653 square feet to 1,288,101 square feet. These 1,288,101 square feet of development could generate 13,173 vehicle trips per day which would be a significant increase from the existing 2,855 vehicle trips per day.

**Buildout Alternative #2: Smarter Growth** – The Smarter Growth alternative was developed to reflect the fact that this area currently lacks good access and as such, is better suited for low intensity industrial development. Therefore, the Smarter Growth approach which was taken was to stress industrial development here to ensure that these uses would have a suitable location and to allow for low intensity uses in other sub-areas to relocate and free up land for higher intensity uses elsewhere. This alternative also recognizes that there is the potential for additional office development on the 50 Dunham Road parcel and includes intensification of office development on that parcel. The areas that are built out as offices assume 5 story buildings with surface parking and 40% open space while the areas built out as low intensity industrial assume 1 story manufacturing with limited associated offices. Under the Smarter Growth alternative, development could increase by 965,334 square feet to 1,246,782 square feet of developed area. These 1,246,782 square feet of development could generate 9,359 vehicle trips per day. This number includes a 9% reduction in the number of vehicle trips per day based on an anticipated increase in mode share for walking, carpooling and transit.

**4. Buildout Southeast of the Landfill**

This sub-area consists of 161 acres and includes a YMCA, the Hannah Elementary School and a portion of the capped landfill. The area is zoned R-15 and currently has 140,562 square feet of commercially developed space. This does not include the existing residential development along Brimbal Avenue. Of the total 161 acres only 46.09 acres were assumed to be available for buildout.

This is an area that has some potential for transit-oriented development. There is some interest in denser residential development in the vicinity of the YMCA and school properties. Denser residential development would require a zoning change and might not be acceptable to residents. However, development here could be considered transit oriented development because of the proximity to the Montserrat train station. The location of the train platform at Montserrat is a problem. When the train stops, it blocks traffic. The city is interested in having the platform moved to eliminate this cause of traffic congestion.

**Buildout Alternative #1: Existing Zoning** - This alternative assumed that all undeveloped portions of the sub-area (46.09 acres) would be developed under the existing R-15 zoning which allows for 2.2 lots per acre. This would result in the creation of 101 new dwelling units. The 101 dwelling units in addition to the Hannah School and the YMCA, could generate 3,915 vehicle trips per day.

**Buildout Alternative #2: Smarter Growth/RSD Zoning** - The development of alternatives for this sub-area was based on the area’s proximity to the Montserrat train station. One of the principles of Smart Growth is to build new development adjacent to or close to public transportation. The city’s existing RSD zoning was applied to this area for the purposes of
buildout. This zoning district allows approximately 12 units per acre and would result in approximately 718 housing units. Those 718 housing units plus the YMCA and the Hannah School could generate an estimated 6,438 trips per day. This number includes a 9% reduction in the number of vehicle trips per day based on an anticipated increase in mode share for walking, carpooling and transit.

![Figure 2](image)

**Figure 2**
Buildout Alternatives for the Residential Portion of the Area Southeast of the Landfill

5. Buildout Northeast of Brimbal Avenue

This sub-area consists of 94 acres of land which are zoned for IR. This sub-area includes the industrially zoned portion of the capped landfill, a number of small retail establishments, several industrial properties, and vacant land classified by the assessor as potentially developable. There is currently 113,828 square feet of developed space. The landfill has been capped for ten years and is still in the monitoring phase. The readings on the venting gases have been better than expected at this stage and the landfill is 5-10 years away from being ready for development. The grade of the site is an issue, but commercial developers have indicated they are confident they can work with DEP on a grading plan.

There was interest in using some of the land for soccer fields, but additional fields have since been developed so this need is no longer as strong. A number of big box developers have shown interest in the site but the city is lukewarm to that idea and would prefer higher paying research and development (R&D) jobs instead of lower paying retail jobs.

Otis Road is private, but the City has rights to use it to access the landfill.

**Buildout Alternative #1: Existing Zoning** - This alternative assumes a mixture of retail and R&D. The retail development would be all one story, as currently exists, with 40% open space and surface parking. The R&D development assumes two floors of office over one floor of industrial with 40% open space and surface parking. The buildout under existing zoning results in a total of 112,328 square feet of retail and 673,952 square feet of R&D for a total of 786,278 square feet. That level of development could result in an estimated 13,318 vehicle trips per day.
Buildout Alternative #2: Smarter Growth – The Smarter Growth alternative intensifies development by assuming all future development would be at three stories. This would result in future development of 892,694 square feet which could generate an estimated 13,337 vehicle trips per day. This number includes a 9% reduction in the number of vehicle trips per day based on an anticipated increase in mode share for walking, carpooling and transit.

6. Buildout Southwest of Brimbal Avenue

This sub-area consists of 88 acres which are zoned for IR. There is currently 938,118 square feet of developed space. This area is a prime area for existing and additional medical uses due to its proximity to Beverly Hospital. The area is largely developed with one and two story buildings. There is a housing development but the area is primarily industrial and commercial.

The site of the proposed North Shore Common project

Buildout Alternative #1: Existing Zoning - This alternative assumes that development would be maximized under current zoning with 5 story offices, surface parking and 40% open space on those parcels currently used for office and two stories of office over one story of manufacturing for those uses that are currently R&D. This would result in future development of 1,159,962; an increase of 221,844 square feet. This development could generate an estimated 15,860 vehicle trips per day.

Buildout Alternative #2: Smarter Growth - Under this Smarter Growth buildout alternative it was assumed that all areas currently developed as office would be built out as higher density office under a special permit process by which the height is increased, the percent required open space is decreased and the parking requirements are reduced in exchange for a commitment for significant (40%) reduction in single occupancy vehicle trips through the use of Transportation Demand Management programs. This higher density office use would be assumed for four parcels (55 Tozer Road, 2 Bomac Road, 30 Tozer Road and 26 Tozer Road). The majority of other parcels would be built out as R&D except for the CEA parcel. That parcel is expected to be built out under the IR Overlay District according to a
proposal submitted as the North Shore Commons. For that parcel MAPC used the square footage from the North Shore Commons proposal as follows:

- Office: 18,000 sf
- Childcare: 10,000 sf
- Restaurants: 14,000 sf
- Retail: 23,300 sf

This Smarter Growth alternative would increase development from the existing 938,118 square feet to 1,519,713 square feet, an increase of 581,595 square feet. Vehicle trips per day could increase from 10,488 to 16,970 vehicle trips per day, an increase of 6,482. This number includes a 9% reduction in the number of vehicle trips per day based on an anticipated increase in mode share for walking, carpooling and transit. Potential mitigation measures for this alternative are discussed in the section on transportation.

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<th>Sub-area</th>
<th>Acreage</th>
<th>Existing square feet of developed space</th>
<th>Future development</th>
<th>Net change from existing development</th>
<th>Future development</th>
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<tr>
<td>North of Route 128</td>
<td>221</td>
<td>281,448</td>
<td>1,288,101</td>
<td>1,006,653</td>
<td>1,246,782</td>
<td>965,334</td>
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<tr>
<td>Southeast of landfill</td>
<td>115</td>
<td>140,562</td>
<td>101 dwelling units</td>
<td>NA – Res. only</td>
<td>718 dwelling units</td>
<td>NA- Res. only</td>
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<td>Northeast of Brimbal Avenue</td>
<td>74</td>
<td>168,779</td>
<td>786,278</td>
<td>617,499</td>
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<td>938,118</td>
<td>1,159,962</td>
<td>221,844</td>
<td>1,519,713</td>
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<td>3,234,341</td>
<td>1,845,996</td>
<td>3,659,190</td>
<td>2,270845</td>
<td>1,920,555</td>
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1 Of the total 115 acres only 46.09 acres were assumed to be available for buildout.
2 Another alternative that was considered was development under zoning densities that would qualify for benefits under the state’s 40R program. This analysis is provided in Appendix A.
Figure 3 shows the total potential square feet of economic development under the two buildout scenarios in each sub-area. The Southeast of the Landfill sub-area is not included in this chart because this sub-area only includes the development of future housing units, and no square feet of office, commercial or industrial space.

![Figure 3: Square Feet of Development by Sub-Area for Two Buildout Scenarios](image)

**III. TRANSPORTATION**

1. **Existing Conditions**

**Roadway Network**

The study area is well connected to both major and minor roadways which facilitate automobile travel in and out of Beverly. Two interchanges connect the study area to Route 128, one at Exit 19 between Sohier Road and Brimbal Avenue and the other at Exit 18 about a mile east of Brimbal Avenue. A number of collector streets provide local access in and around the study area including; Brimbal Avenue, Essex Street, Sohier Road, and Tozer Road, with each experiencing average daily traffic counts between 2,000 and 20,000 vehicles per day.

**Sidewalk Coverage**

Sidewalk coverage in and around the study area varies depending which area a pedestrian is walking in. Generally, the likelihood of a roadway having sidewalks on both sides increases as a pedestrian gets closer to the Montserrat commuter rail station and Downtown Beverly. North of Herrick Street/Thompson Road, sidewalk construction is more limited and typically found on only one side of a roadway or not constructed at all. This pattern of sidewalk construction is most likely indicative of the land use patterns in the area which consist of single-use commercial buildings and larger industrial complexes. In areas
where single-family and multi-family residential are predominant, sidewalk coverage increases. Figure 5 shows the network of sidewalks.

Bicycle Facilities

There is no existing on-street or off-street bicycle facilities located within the study area. However, a current on-street route for the East Coast Greenway is located approximately one mile west of the study area routed along Cabot Street and McKay Street.

MBTA Services

Commuter Rail

The City of Beverly falls under the Massachusetts Bay Transportation Authority’s (MBTA) secondary assessment district, which means that the MBTA still provides transit service to the City but not at the same level as is found in their primary assessment area. While transit coverage and headways may not be as good as in the Inner Core, Beverly does have access to five commuter rail stations along the Newburyport/Rockport Line providing service from Beverly into Boston and out to Newburyport and Rockport. The Beverly commuter rail stations include:
- Beverly Station
- Montserrat Station
- North Beverly Station
- Prides Crossing Station
- Beverly Farms Station

Headways for commuter rail service out of Beverly into Boston during the weekday span from 5:30AM to 11PM. Outbound service from Boston during the weekday span from 6:30AM to 12:10AM.

The two stations closest to the study area are the Montserrat and North Beverly stations. The Montserrat station is about a ½ mile from the southeastern portion of the study area,
and the North Beverly station a little over a ½ mile from the northwestern portion of the study area. The standard catchment area for a transit station is a ½ mile radius, or about a ten minute walk. In the case of a commuter rail station, it is often appropriate to look at a one-mile catchment area. Expanding to a one-mile radius around the two commuter rail stations covers a majority of the future development areas. Figure 2 also shows the commuter rail lines and the two nearest commuter rail stations.

**MBTA Fixed-Route Bus Service**

The MBTA also operates one fixed-route bus service line that runs through the western portion of the study area. The Route 451 bus provides service between the North Beverly commuter rail station and the Salem commuter rail station. The route only travels through the study area on Sohier/Tozer Roads during certain times of the day, and has hourly headways. The 451 Inbound Bus Route from Beverly into Salem travels along Sohier/Tozer Roads between 2PM and 7PM, while the Outbound Route from Salem to Beverly travels along Sohier/Tozer Roads between 6:30AM and 12:45PM. This routing and headway scheme makes linking the bus route to the commuter rail station difficult for commuting and reverse commuting purposes at the North Beverly commuter rail station.

**The RIDE**

Finally, the MBTA operates “The RIDE”, a demand-responsive service for disabled individuals who qualify for the program.

**Additional Transportation Services**

**Beverly Council on Aging Service**

The Beverly Council on Aging (COA) operates a demand-responsive transit service for Beverly seniors over the age of 60 and disabled residents who qualify. The service is primarily used for medical-related trips. The service operates Monday-Friday from 8:30AM to 3:00PM and requires a 48 hour advance reservation. The COA van service is free of charge to qualified Beverly residents.

**North Shore Transportation Management Association (NSTMA)**

The North Shore Transportation Management Association, founded in the summer of 2008, is a non-profit organization working to address transportation issues in Beverly, Danvers, Lynn, Peabody, and Salem. The mission of the North Shore TMA is to “bring together businesses, institutions, developers, organizations, and municipalities to address shared traffic-related issues and to reduce traffic congestion and vehicle emissions while improving access to and within the North Shore.”

The NSTMA offers a variety of transportation demand management services including, but not limited to: Ridematching, Vanpools, Guaranteed Ride Home, Biking/Walking Resources, Telework Resources, and General Transportation Information and Assistance. These services are provided to members for an annual membership fee which is based upon the
size of the business, number of employees, or in the case of residential properties, the number of units in the development.

2. Future Development and Transportation Impacts

In order to facilitate an increase in mode share among active modes of transportation (walking, biking and transit), the land use pattern and buildout associated with the Smarter Growth alternative needs to be coupled with transportation improvements. Some of these improvements may be related to new infrastructure, while others may include increasing awareness of existing programs or improving connectivity among multiple modes of transportation. It is critical that steps be taken to improve travel choices for both residents and employees in Beverly to lessen the impact of future development and ease traffic and congestion on roadways like Route 128, Sohier Road and Brimbal Avenue. Utilizing Smart Growth principles by linking land use and transportation will lead to more sustainable growth patterns and travel options.

Trip Generation Calculations

As part of this land use analysis, an estimated trip generation was completed for the existing conditions and the two future buildout alternatives broken out by sub-area. The trip generation calculations are meant to provide an estimated point of comparison between the two buildout alternatives. Trip generation estimates were based on the ITE Trip Generation Manual 7th Edition, trip generation calculations from the Florida Department of Transportation and previous trip generation estimates performed by MAPC throughout the region.

The ITE trip generation analysis estimates total vehicle trips. Trips taken by other modes of transportation, such as walking, biking, public transportation, and carpooling are not counted as part of the trip generation. To account for additional walking, public transportation, and carpooling trips in the Smarter Growth alternative, the total number of vehicle trips for each sub-area was reduced by 9%. This is equal to a 3% increase in each of the following mode categories: walking, public transportation and carpooling. The overall estimate of 9%, and the 3% per category, are based on a comparison of 1990 and 2000 Census travel statistics for the City of Beverly. The change over time was used to estimate the 9% increase in trips taken by modes other than single-occupant vehicles. In order for the 9% mode shift to occur, development in the study area must be accompanied by infrastructure improvements that facilitate higher mode shares in each of these three categories and reduce overall vehicle trips. These infrastructure improvements may come in the form of state and local improvements or as part of a developer’s transportation mitigation package.

Developing under the principles of Smart Growth provides can produce more efficient travel patterns and options when development is coupled with the provision of infrastructure that supports walking, biking and public transportation. The successful mixing of uses on a single parcel can increase the percentage of trips taken by modes of transportation other than personal vehicles. Mixed use development can also create higher internal trip capture rates where multiple trips can be satisfied within the same development. These trips are
often shifted from vehicle trips to walking trips if multiple uses are located within a close walking distance. For example, a mixed-use development which includes offices, retail shops and a restaurant allows an office worker to walk to a retail shop and have lunch in the same development where he or she works. The walking proximity of these uses to the employee’s workplace captures two additional daily trips that may have otherwise been taken in a personal vehicle. For this study, a reduction factor was not figured into the trip generation for internal capture. Trips were calculated based on the number of square feet for commercial, office or industrial development, or on a per dwelling unit basis for residential development.

**Trip Generation Results**

Factoring in the 9% vehicle trip reduction percentage, the Smarter Growth buildout alternative is estimated to have about 150 less vehicle trips per day over the existing zoning buildout alternative. The lower trip generation in the Smarter Growth alternative is the result of building out parcels north of Route 128 as lower-intensity industrial uses instead of office uses as projected under the existing zoning buildout. Office developments have a higher trip generation rate compared with lower-intensity industrial uses. The number of vehicle trips in the Smarter Growth alternative is about 0.4% lower than what is estimated in the existing zoning alternative. At the same time, the projected level of additional square feet of development in the Smarter Growth alternative is about 13% higher than that in the existing zoning alternative. Additional development was achieved in the Northeast of Brimbal Ave and Southwest of Brimbal Ave sub-areas. The number of residential units projected in the Smarter Growth alternative is also much higher than what is projected in the existing zoning alternative. Table 2 shows the estimated trip generation for each alternative broken out by sub-area.

<table>
<thead>
<tr>
<th>Sub-Area</th>
<th>Existing Conditions</th>
<th>Existing Zoning Buildout</th>
<th>Smarter Growth Buildout*</th>
</tr>
</thead>
<tbody>
<tr>
<td>North of Route 128</td>
<td>2,855</td>
<td>13,173</td>
<td>9,359</td>
</tr>
<tr>
<td>Southeast of the landfill</td>
<td>2,751</td>
<td>3,915</td>
<td>6,438</td>
</tr>
<tr>
<td>Northeast of Brimbal Ave</td>
<td>4,895</td>
<td>13,318</td>
<td>13,337</td>
</tr>
<tr>
<td>Southwest of Brimbal Ave</td>
<td>10,488</td>
<td>15,860</td>
<td>16,970</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td><strong>20,989</strong></td>
<td><strong>46,266</strong></td>
<td><strong>46,104</strong></td>
</tr>
</tbody>
</table>

*The Smarter Growth alternative includes the 9% reduction in trips taken by walking, public transportation and carpooling.
To aid in the reduction of vehicle trips and boost higher mode share for active modes of transportation in the Smarter Growth alternative, there are some recommended transportation improvements that should be considered for implementation. These recommendations are outlined in the next section.

3. Transportation Improvement Recommendations

The following recommendations highlight potential transportation improvement options that may help reduce congestion and increase travel options under the Smarter Growth alternative.

Roadway Improvements

While the purpose of this study was not to look at the feasibility of constructing a new interchange along Route 128, MAPC recognizes that new development will create additional traffic along local roadways. According to the analysis completed by Mass Highway and their consultants, the existing Exit 19 Route 128 interchange is currently experiencing operational and safety challenges that are compounded by its existing configuration. Without the implementation of some operational improvements in and around the existing interchange, traffic issues will continue to worsen as a result of the proposed development. MAPC has laid out a plan for expanding economic development potential in the four sub-areas which represent a near-term solution to economic development concerns expressed by the City of Beverly. Development proposals in this area need to be coupled with a careful analysis of the traffic impacts and appropriate mitigation efforts should be identified. If new
development does locate in the study area, the City should work with the developer to identify transportation strategies and improvements to be paid for by the developer as mitigation for the development.

**Sidewalk Improvements**

Walking is a cost-effective and environmentally beneficial mode of transportation that can be made accessible to almost all residents. The current sidewalk network in and around the study area needs additional infrastructure improvements if auto trips are to be shifted to walking trips. Some of the key local and collector streets have either a sidewalk on only one side of the street or no sidewalk at all. Sidewalks should be added to Brimbal Avenue, Tozer Road, and Sohier Road where they are currently missing. Adding these facilities will enable both residents and employees to walk to work, walk to a nearby train or bus stop and provide walking access for local trips to restaurants, commercial/retail centers, etc.

If higher intensity redevelopment options are going to be considered for the sub-area northeast of Brimbal Avenue, better pedestrian facilities are needed. Providing sidewalks on both sides of Tozer Road and Sohier Road, at a minimum, would allow employees to walk to future retail areas and provide walking access to the North Beverly commuter rail station and stops along the 451 bus route.

Under the higher density 40R alternative, the parcels northeast of Brimbal Avenue are recommended for higher density residential. In order to provide safe walking facilities for future residents, sidewalks need to be provided on both sides of Essex Street and Brimbal Avenue. This would accommodate a safe walking route for residents who wish to access the Montserrat commuter rail station and the small commercial area near the station. An effort should be made to connect any future residential streets with the existing street network of surrounding developments to avoid cul-de-sacs and dead end streets. Internal walking connections should also be established between future residential development and the Sterling YMCA.

**MBTA Transit Services**

While the study area does have multiple options for commuter rail travel, fixed-route bus service is lacking. The current routing of the 451 bus only travels along Sohier/Tozer Roads during specific times for the inbound and outbound service routes. The way the current timing and route is set up, it is difficult for commuter rail riders to use the 451 bus to travel from the North Beverly commuter rail station south to the industrial/office area along Tozer Road. The 451 travels inbound from North Beverly along Cabot Street during the AM peak commuting hours and outbound along Cabot Street toward North Beverly during the PM peak commuting hours, virtually eliminating bus access from Tozer Road to the North Beverly station during key commuter hours. If the current industrial/office area along Tozer Road is to be redeveloped at a higher intensity in the future, it would be pertinent to explore the option of looping the 451 bus route along both Tozer Road and Cabot Street during the AM and PM peak commuting times to provide service to the North Beverly station.
If bus service is improved in the future and service is provided to North Beverly during key commuting hours, it would be important to coordinate the headways of the commuter rail and the 451 bus to eliminate lengthy wait times for commuters using both the rail and bus services to get to and from work. Coordinating these services will be a critical piece in making this rail/bus connection a viable commute option for employees in the area.

**TMA Services**

As described on page 20, the North Shore TMA currently offers a multitude of services to members. Three key services that the TMA offers which are directly applicable to reducing congestion in the study area are ridesharing, van pooling and the guaranteed ride home program. The TMA ridesharing program matches commuters based on origin and destination and commuting times and then provides them a framework with which they can coordinate their ridesharing.

The vanpooling program works in a similar way, but on a larger scale. Once the TMA has a minimum group size of 10 participants who live within a few miles of each other and a departure time within an hour of each other, the TMA will set up a vanpool. The TMA will provide the group with a van to use for commuting purposes. The van pool not only reduces the number of cars on the road, but also allows the users to split the cost of tolls, gas and insurance saving everyone money.

Finally, the TMA offers a guaranteed ride home program which is a crucial complementary service to both the ridesharing and vanpooling programs. Commuters who use alternative means for their commute, such as ridesharing or vanpooling, are often concerned about emergency situations arising and not having access to a car. The guaranteed ride home program allows a TMA member to receive a free ride home in case of an emergency, illness or unexpected overtime.

The TMA plays a valuable role in reducing congestion on the roadways and providing commuters with viable travel options other than personal automobiles. In order to increase the services offered by the TMA, additional membership is needed. The City of Beverly should examine the practice of requiring new developments and/or businesses to enroll in the TMA for a minimum of three years as part of their permitting process. This requirement will not only benefit the TMA and the employer, but will also provide vehicle trip reduction benefits for the entire community.

**Commuter Shuttles**

Commuter shuttles can be used as an alternative to traditional fixed-route transit service or as a complementary component to the overall transit network. Commuter shuttles typically run for several hours during the AM and PM commute periods, and provide transportation service between a rail station or bus station and places of employment. This service is useful, especially in cases where employment centers are located outside of a comfortable walking distance from transit hubs. There are examples of both publicly and privately funded commuter shuttle services.
Some examples from the MAPC region include:

- Shuttles run by the 128 Business Council TMA
- ClockTower commuter shuttle run by the ClockTower Place in Maynard
- MinuteVan Commuter Shuttle in Acton

Commuter shuttles can often help address the issues of long headways/wait times and uncoordinated schedules between bus and rail transit service. It can be much easier to coordinate a small commuter shuttle schedule to coincide with the commuter rail than it can be to coordinate a fixed-route bus and a commuter rail schedule.

If the Smarter Growth alternative is pursued as a buildout alternative in the study area, a commuter shuttle may be the most cost-effective and efficient way of connecting employees to surrounding transit services. Under the Smarter Growth alternative higher density and lower parking ratios would be allowed if the developer provided Transportation Demand Management (TDM) options in the Southwest sub-area. The TDM measures are meant to offset the parking spaces that would be necessary if the typical number of employees were commuting using automobiles. Under the Smarter Growth alternative, a percentage of the employees would access the workplace using modes other than automobiles thereby eliminating the need for additional parking.

There are various methods for financing TDM measures such as the pooling of financial resources by current and future employers to fund shuttle services. There is also the possibility of engaging the North Shore TMA as a potential source for organizing and operating the commuter shuttle, although the TMA does not currently offer these services. In order to attract the largest pool of users for the shuttle service, it may be useful to reach out to employers outside the study area and develop a looping shuttle that connects employers to both the North Beverly and Montserrat stations. One possible route for a shuttle could start at the North Beverly station, head south on Dodge/McKay Streets serving the Cummings Center, then loop around to the Montserrat station, and finally head north on Sohier/Tozer Roads serving the existing and future businesses in that area.
Figure 5: Sidewalk Coverage and Commuter Rail Location
Figure 6: Radius around Transit Stations
IV. ECONOMIC DEVELOPMENT IMPLICATIONS

In order to begin to understand the economic development implications of the various buildout alternatives, the potential square feet of development needs to be translated into a number for potential employees or jobs. There are many variables that determine the number of employees that various types of development might generate. These are very rough approximations, but can be used to compare the various buildout alternatives. The methodology employed was similar to the method of estimating vehicle trips per day. The Institute of Transportation Engineers (ITE) has measures to calculate vehicle trips per day, as well as the number of employees per thousand square feet of development. Table 3 shows the numbers used to calculate trips per 1,000 square feet and employees per 1,000 square feet.

Table 4 and Figure 7 both show the number of potential jobs that could be generated under the two buildout alternatives for three of the four sub-areas. No calculations were done for the area southeast of the landfill because all future development here is assumed to be residential.

The most significant job growth could be generated by developing the area southwest of Brimbal Avenue. While this would result in significantly more vehicle trips per day, this type of density would also allow for more transportation management options that could mitigate some of the projected traffic.
Table 3
Employees per Thousand Square Feet

<table>
<thead>
<tr>
<th>Type of Use</th>
<th>Trip/Emp</th>
<th>Trip/1000 Sq Ft</th>
<th>Emp/ 1000 Sq Ft</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OFFICE</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Office</td>
<td>0.48</td>
<td>1.56</td>
<td>3.25</td>
</tr>
<tr>
<td>Corporate HQ</td>
<td>0.44</td>
<td>1.47</td>
<td>3.34</td>
</tr>
<tr>
<td>Single Tenant</td>
<td>0.52</td>
<td>1.78</td>
<td>3.42</td>
</tr>
<tr>
<td>Medical/dental</td>
<td>0.8</td>
<td>3.6</td>
<td>4.50</td>
</tr>
<tr>
<td>Office Park</td>
<td>0.43</td>
<td>1.74</td>
<td>4.05</td>
</tr>
<tr>
<td>Research and Devel.</td>
<td>0.43</td>
<td>1.24</td>
<td>2.88</td>
</tr>
<tr>
<td>Business Park</td>
<td>0.45</td>
<td>1.43</td>
<td>3.18</td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td></td>
<td>3.52</td>
</tr>
<tr>
<td><strong>RETAIL</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bldg Material and Lumber*</td>
<td></td>
<td></td>
<td>1.19</td>
</tr>
<tr>
<td>Free Standing Discount</td>
<td>2.94</td>
<td>5.82</td>
<td>1.98</td>
</tr>
<tr>
<td>Specialty Retail*</td>
<td>22.36</td>
<td>6.41</td>
<td>0.29</td>
</tr>
<tr>
<td>Hardware/Paint</td>
<td>5.33</td>
<td>4.91</td>
<td>0.92</td>
</tr>
<tr>
<td>New Car Sales</td>
<td>0.67</td>
<td>1.84</td>
<td>2.75</td>
</tr>
<tr>
<td>Tire Stores*</td>
<td>7.29</td>
<td>3.45</td>
<td>0.47</td>
</tr>
<tr>
<td>Discount Club</td>
<td>4.48</td>
<td>6.46</td>
<td>1.44</td>
</tr>
<tr>
<td>Furniture Store</td>
<td>2.16</td>
<td>0.78</td>
<td>0.36</td>
</tr>
<tr>
<td>Video Rental *</td>
<td>6</td>
<td>13.6</td>
<td>2.27</td>
</tr>
<tr>
<td>Drive-In Bank</td>
<td>9.65</td>
<td>35.18</td>
<td>3.65</td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td></td>
<td>1.53</td>
</tr>
<tr>
<td><strong>INDUSTRIAL</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Light Industrial</td>
<td>0.48</td>
<td>1.01</td>
<td>2.10</td>
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<tr>
<td>General Heavy Industrial</td>
<td>0.4</td>
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<tr>
<td>Industrial Park</td>
<td>0.43</td>
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<td>1.91</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>0.39</td>
<td>0.78</td>
<td>2.00</td>
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<tr>
<td>Warehousing</td>
<td>0.55</td>
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<td>1.04</td>
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<tr>
<td>Mini-Warehouse</td>
<td>7</td>
<td>0.28</td>
<td>0.04</td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td></td>
<td>1.46</td>
</tr>
</tbody>
</table>

*Small Sample Size
## Table 4
Jobs under Two Buildout Alternatives

<table>
<thead>
<tr>
<th>Sub-Area</th>
<th>Jobs under Buildout: Existing Zoning</th>
<th>Jobs under Smarter Growth Buildout Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td>North of Route 128</td>
<td>4,521</td>
<td>3,364</td>
</tr>
<tr>
<td>SE of the Landfill</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>NE of Brimball Avenue</td>
<td>2,113</td>
<td>2,555</td>
</tr>
<tr>
<td>SW of Brimbal Avenue</td>
<td>3,483</td>
<td>4,534</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td><strong>10,117</strong></td>
<td><strong>10,453</strong></td>
</tr>
</tbody>
</table>

*Figure 7 does not include the Southeast of the Landfill sub-area because only housing growth is projected in the sub-area.*
APPENDIX 1
Buildout under 40R Densities

MAPC also prepared a buildout for the Southeast of the Landfill sub-area using the densities and assumptions of a 40R district. This alternative was prepared to provide the City of Beverly with information on the potential benefits of developing a 40R district in this sub-area. Chapter 40R of the Massachusetts General Laws encourages cities and towns to establish new overlay zoning districts to promote housing production and, more generally, Smart Growth development. Chapters 40R and 40S both provide financial incentives to communities to adopt these new zoning districts. The district must provide a minimum allowable density of eight units per acre for single-family homes, 12 units per acre for two and three family buildings, and/or 20 units per acre for multi-family dwellings. A primary purpose of Chapters 40R and 40S is to provide a financial incentive to communities to build housing that is consistent with Smart Growth principles. Four types of incentives are offered:

- **Zoning Incentive Payments**: Upon approval of a district a municipality receives a zoning incentive payment. The amount of the incentive payment is based on the potential number of new housing units.
- **Bonus Payments**: A community will also receive a bonus payment of $3,000 for each new housing unit built in the district, which is payable once the building permit has been issued for the housing unit.
- **Educational Costs (Chapter 40S)**: Communities are reimbursed for any net cost of educating students living in new housing in a Smart Growth district.
- **Funding Preference**: When awarding discretionary funds, DHCD and the Executive Offices of Environmental Affairs, Transportation, and Administration and Finance must give preference to municipalities with an approved Smart Growth zoning district.

The area MAPC analyzed as a potential 40R district is located on approximately 60 acres of land in the Southeast of the Landfills sub-area. The 60 acres analyzed are currently vacant, but are portions of larger parcels, such as the land owned by the Hannah School and YMCA, which do have structures on them. Under the 40R alternative, development would occur at a density of 20 units per acre, resulting in a total of potential buildout of 1,197 residential units. Combined with the existing development on adjacent parcels, these new units would generate an estimated 10,697 vehicle trips per day.

This development site was chosen for 40R under this alternative because of its proximity to the commuter rail station at Montserrat. The southern portion of the potential 40R district is within a half-mile walking distance of the Montserrat station, and provides the closest access for new residential development to commuter rail transit service. This site is also within walking distance of the Hannah School, the YMCA and commercial development along Essex Street.

If the zoning district was an approved 40R district, the city would be eligible for a zoning incentive payment of $600,000 upon approval of the zoning and a development incentive payment of up to $3,500,000 as the area is developed. The development would also result in 239 affordable units.