Volume 1

# DENSITY through DESIGN

## Design Recommendations

## Sudbury & Medway

Volume I consists of two separate design and regulatory recommendation reports for:

**Sudbury, Massachusetts**

**Medway, Massachusetts**

This project was a collaboration between students of regional planning, landscape architecture and architecture at the University of Massachusetts Amherst. It was directed by Professors Elisabeth Hamin and Dean Cardasis who were assisted by Michael DiPasquale of the CPTC and Nedim Kemer.

The project was funded by a grant from the 495/MetroWest Corridor Partnership.

## SUDBURY DESIGN RECOMMENDATIONS / Executive Summary

The following report is the product of a studio project developed by the Department of Landscape Architecture and Regional Planning at the University of Massachusetts-Amherst, in conjunction with the 495/MetroWest Corridor Partnership and the Town of Sudbury, Massachusetts. Central to our assignment was to develop an innovative design and regulatory solution for the Melone property in Sudbury Massachusetts. Because the Melone Property is a gravel pit expected to be totally excavated within two years, Sudbury has selected it as a prime location for future development. The development of this site served as a vehicle to address the core issues of the study, which are: increasing residential density, providing workforce housing options, and encouraging environmentally sustainable development.

We found Sudbury to be a community well aware of the need for lower cost workforce housing, and open to ideas on how to manage it. Sudbury is predominately made up of single-family homes, and the average home price at $681,000 is well out of range to even someone earning the local median household income of $130,000. Development of the Melone Site provides the town with the opportunity to address the issues of density, workforce housing and sustainability.

The findings in this report represent research including: an extensive site analysis of the physical and working conditions of the parcel; site visits to photograph, sketch, study and assess the site; conceptual design work to model existing conditions and preliminary concepts; a market analysis to study the existing economic, housing and school costs of Sudbury; a regulatory analysis to examine existing Bylaws, Subdivision Regulations and the Master Plan; interviews and meetings with local planning officials and stakeholders as well as experts from the Metropolitan Area Planning Council. Close contact was also kept with the town and planning officials from Sudbury.

The site analysis shows that the Melone property has amenities that make it a prime location for residential development. Once excavation is complete, the site will offer a “blank slate” for development. Abutting wetlands and conservation area are some of the natural features the area has to offer and trailheads to these areas lead right up to the site. The unique slopes of the Melone site will offer protection from cold northwest winter winds, and offer maximum solar orientation and spectacular views. Our market analysis suggests that a project with lower-cost but well-designed homes could be highly successful in the marketplace.

The regulatory recommendations made by this study strive to help Sudbury's housing goals align with the vision documented in their Master Plan (2001), which encourages a greater diversity of housing opportunities in the town. Our report recommends the following:

- "Sustainability" Overlay Zone
  - A new overlay zone to promote smaller, more ecologically efficient houses to reduce the financial burden of rents and mortgages.
- Inclusionary Zoning
  - A broader approach to inclusionary zoning, creating a provision for workforce housing rather than only statutorily-affordable housing.
- Amendments to the Cluster Development Bylaw
  - The integration of attached housing to encourage a diverse housing stock and provide for different household sizes and as well as household incomes.
- Accessory Apartment Dwelling Units.
  - Amending the current bylaws and creating incentive programs to stimulate the development of Accessory Dwelling Units, and maximize their potential as an option for workforce housing.

While these recommendations are designed for Sudbury we believe that they will be applicable to other communities within the I-495 corridor.

Two different design schemes for the Melone property have been created. Both design concepts maximize open space and increase density through sustainable measures. The Drumlin Scheme remains true to the historic architectural of Sudbury, arranging the architecture and vegetation to form a connection of large, open spaces and smaller community spaces. The Orchard Scheme brings more contemporary feel to the site. A grid arranges the architecture, and a path system provides capillary movement to large, open terraces, while affordability is enhanced by using modular dwellings.

***Figure A:*** *Architectural concept*

**Figure B:** *Typical neighborhood clusters*

Through our recommendations and research, our team aspires to increase the diversity and density of the housing stock in the town of Sudbury through sustainable design and the preservation of community character. By using the Melone property as a pilot project for what density can look like in the MetroWest region, we seek to encourage other communities within the corridor to undertake similar projects.

## MEDWAY DESIGN RECOMMENDATIONS / Executive Summary

Medway, Massachusetts, is one of dozens of municipalities in I-495/MetroWest corridor experiencing a shortage of low- to moderately-priced homes. This lack of "workforce housing" poses financial hardships for residents and discourages companies from locating in the region. As a result, communities in the region have witnessed an exodus of young professionals and families during the last decade. Without new solutions to this problem, Massachusetts' economy and quality of life are at risk.

This report offers an innovative design for a workforce housing development at a 100-acre site in Medway, supported by market analysis, regulatory recommendations and implementation strategies. It has been generated during a graduate level interdisciplinary studio at the University of Massachusetts at Amherst involving students and faculty in regional planning, landscape architecture and architecture. The work was completed as part of a unique collaboration with the Arc of Innovation/495 MetroWest Partnership, which represents the interests of Medway and 31 other municipalities in the region. While the site design and recommendations offered are specific to Medway's Oak Grove Bottle Cap Lots site, the lessons are of value to many communities in the region.

### The Problem

#### *Homes are Unaffordable and Don't Meet the Needs of the New Century*

Massachusetts housing costs are very high, forcing many residents to move out of state; between 2000 and 2005, the population of 25- to 34-year olds in the Commonwealth declined by 82,572 (U.S. Census). Retention of this group is crucial for high tech and corporate employers to remain competitive. In Medway, the average home price has risen from $166,500 in the 1990s to $430,000 in 2005. Medway is 189 units short of meeting the 10% affordable goal set by Massachusetts General Laws Chapter 40B (U.S. Census 2000). Those earning above the maximum to qualify for affordable housing also face housing challenges. "Work force housing" buyers, such as teachers, nurses and fire fighters can only afford houses priced at approximately $170,000 (Bureau of Labor Statistics, Warren Group, & Ginnie Mae Foundation).

Along with lower prices, different housing styles will be needed by the future residents of Medway. Currently, 81% of units in Medway are single family detached (U.S. Census 2000). Medway's 55-plus population is expected to grow by about 2,000 people by 2030 (MAPC 2004). Married couples with children are no longer the majority household in the U.S. Today, 76% of all households are single

parents, and singles or couples without children (U.S. Census 2000). Taken together, these trends demonstrate a strong need for smaller, more affordable homes.

***Lack of Tax Base Diversity***

In Medway, homeowners bear a much larger share of the municipal budget than the average town (Town of Medway, Assessors Database; Municipal Finance Task Force 2005). This is a concern because typically every residential tax dollar received requires that a town pay out $1.19 worth of services--whereas for every commercial and industrial tax dollar received, the town provides only $.29 worth of services (American Farmland Trust 2000).

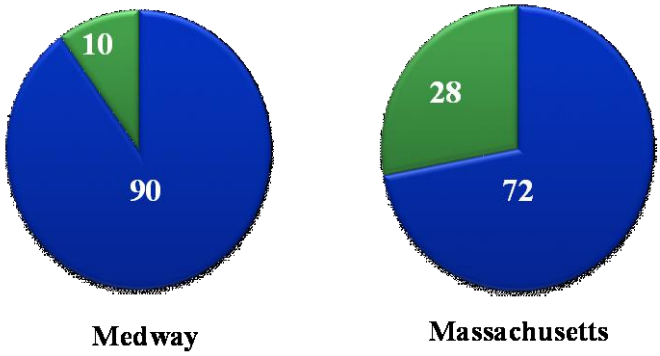


***Figure C:*** *Residential (blue) versus commercial (green) share of municipal budget*
Source: Town of Medway, Assessors Database, Municipal Finance Task Force 2005

***Outdated Zoning***

Mandatory large-lot (one house per acre and higher) zoning poses a significant barrier to the creation of affordable housing. Land costs are high and costs are passed on to homebuyers. Mixed-use zoning can lessen auto dependence, use existing infrastructure, create a lively community and widen retail customer bases, yet few municipalities in the 495 Corridor have zoning to allow this flexibility of uses.

**Proposed Solutions**

***Workforce Housing with a Traditional Neighborhood Density***

Oak Grove Village is a workforce housing proposal for the 100-acre Bottle Cap Lots site along Route 109 at Medway's western border. It includes 180 two- and three-story townhouses at 10 units/acre and 120 apartments at 15 units/acre. This density is similar to neighborhoods built immediately before and after World War II. The proposed homes are affordable and reasonably-priced market-rate units with attractive architecture that incorporates sustainable materials and features. Connectivity is provided with a proposed transit connection to commuter rail (at the Franklin MBTA station), walkable streets, sidewalks and hiking trails. Sustainability is enhanced by maximizing solar gain and low-impact on-site storm

water management. The proposal includes a high percentage of publicly accessible open space, provided through the preservation of existing woodland and the creation of parks and plazas.

***Figure D:*** *Traditional neighborhood density in a wooded context in Medway*

***Mixed-Use and Industrial Development***

Adjacent to Oak Grove Village is approximately 200,000 square feet of proposed industrial space and 185,000 square feet of proposed commercial, retail and office space. The property tax revenue from this build out would help to reduce the tax burden on homeowners.

The design proposes enhancing Route 109 as the western gateway to Medway with attractive mixed-use office, commercial, retail and apartments. Because market fluctuation is difficult to predict, this approach provides flexibility that will be a future asset. Continuing the industrial portion of the site to the south is crucial for maintaining and enhancing the presence of Medway's largest employer, Cybex, an exercise equipment manufacturer. While the commercial/industrial markets have been challenging in recent years, market research shows improvement, with positive absorption, declining vacancies and growing asking rents for industrial, retail and office sites in 2007 in the Route 495 sub-region (Grub and Ellis).


***Figure E:*** *Mixed uses: commercial below: residential above*

***Regulatory Recommendations***

Oak Grove Village could not be permitted under Medway's existing zoning regulations. Therefore, two regulatory options are offered: a Mixed Use Overlay and a Form-based Overlay. Both options:

- Facilitate the implementation of the recommended site design.
- Offer developer incentives, such as density bonuses and mixed-use tenant flexibility.
- Maximize the new sewer infrastructure to be built by the Town.

The proposal illustrates the potential of sites outside town centers to qualify as "Smart Growth Districts" under Massachusetts Chapter 40R program, which may include reimbursement for additional public school costs from new pupils.

***Recommendations for Community Engagement and Implementation***

A key challenge to implementing the proposal will be achieving a two-thirds rezoning vote at a Town Meeting. Therefore, our recommendations focus on raising community awareness of workforce housing needs, communicating the benefits of the plan and building coalitions. The Town can utilize Requests for Proposals (RFPs) as opportunities to set the agenda. Engagement at the regional and state levels includes promoting appropriate eligibility requirements and securing funding for 40R and 40S, as well as promoting zoning reform legislation (Community Planning Act II.)

**Conclusion**

As land becomes more scare and expensive, developing at low densities will be increasingly impractical. Building at greater densities is one of the best strategies for reducing land costs and accommodating growing populations while reducing development pressure on natural areas.

This workforce housing proposal would allow Medway to better serve its current and future residents and prepare for demographic changes. This report provides research and analysis that show how new development at traditional neighborhood densities can be marketable, politically feasible, and environmentally sustainable.

Volume 1

# DENSITY through DESIGN

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## Sudbury & Medway

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## 1. INTRODUCTION

The driving force behind this studio project is the shortage of workforce housing in Massachusetts. Housing costs are now so high that many individuals and families are choosing to leave the MetroWest region, and even search out of state, to find a more manageable cost of living. This problem is particularly critical in the 25 to 34 year old age group. These young people are the very segment of the workforce that high tech and corporate employers in the I-495 region need to retain in order to remain competitive. These people are well educated and highly skilled, and often first time homebuyers.

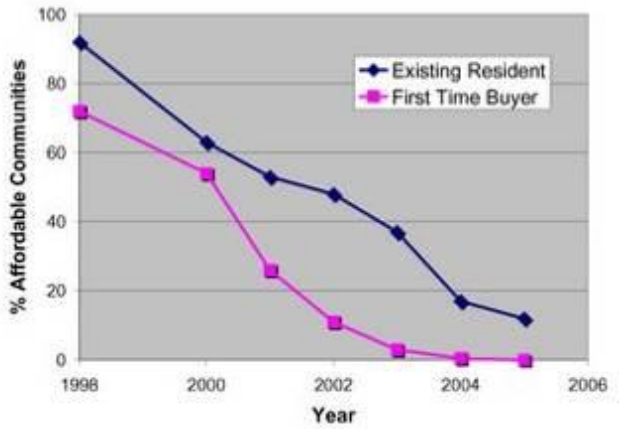


***Table 1.1***. *Affordability Massachusetts (CURP)*

According to the US Department of Housing and Urban Development's (HUD) standards for housing affordability; there are no cities or towns in the Commonwealth where a first time home buyer who earns 80% of the area median income can afford a median priced home (CURP, chart). The workforce-housing problem is most evident within the state's smaller municipalities. In Sudbury, the median home price has skyrocketed in the last 15 years, to $681,000. Salaries simply have not kept up. According to MAPC, even people who earn the median income in Sudbury, which is relatively high at about $128,000 per year, cannot afford the median price home.

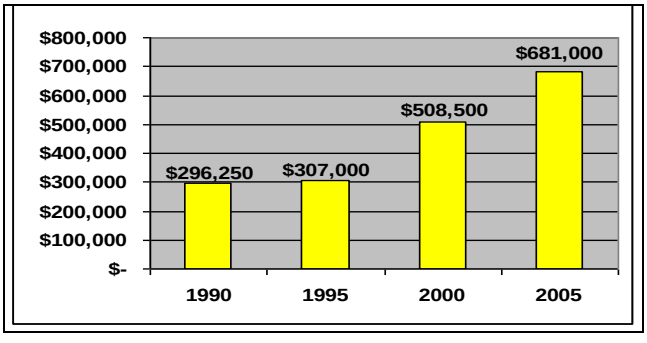


***Table 1.2.*** *Median Home Prices in Sudbury 2000 Census Data*

### 1.1. Project Overview

The Department of Landscape Architecture and Regional Planning at the University of Massachusetts-Amherst, in conjunction with the 495/MetroWest Arc of Innovation and the Town of Sudbury, Massachusetts have produced the following report to identify and design the type of sustainable community that would support density alternatives related to workforce housing in the Town of Sudbury and to recommend a viable regulatory approach for the safe, reliable and cost-effective provision of such services. This will allow for planned development of the region, while addressing community concerns associated with high-density developments.

The clients for the following report were the University of Massachusetts-Amherst, 495/MetroWest Corridor Partnership and the Town of Sudbury, Massachusetts. The report assesses community, ecological, cultural and historic resources of Sudbury. Recommendations for the community are made in such a manner to promote housing for moderate incomes (90%-120% AMI), community connections, recreational opportunities, as well as various regulatory approaches. Implementation and community outreach programs are also suggested.

### 1.2. Goals

The team consists of students from the disciplines of regional planning, landscape architecture and architecture. It is through this collaboration that the final deliverables of site designs and regulatory options would be made possible.

The goals of this project are to address the impediments to workforce housing in Sudbury, Massachusetts, by increasing the stock and diversity of housing. The project will aim to increase the appeal of higher densities and small lots, all the while seeking to preserve community character. Research and study will be focused on the physical design, regulatory and market feasibilities for high-density residential development on the Melone site in the Town of Sudbury, MA.

### 1.3. Objectives

a. To create an innovative design solution that addresses the need for sustainable workforce housing in the town of Sudbury, Massachusetts.
b. To examine existing barriers to sustainable design, and develop creative regulatory solutions.
c. To produce an economically viable and socially responsible design through the examination of market analyses, conceptual designs schemes, architectural typologies and implementation techniques.

d. To address the salability of the design, through the investigation of the town's needs, environmental and cultural concerns, including addressing public participation processes.

### 1.4. Methods

The team used a combination of research and creative design processes throughout the project. The context of the area will be analyzed at three specific scales: regional (I-495/MetroWest area), local (the town of Sudbury) and site specific. A study of the town and region's housing and density needs, as well as a market analysis was useful to identify the most viable solution for the area. Knowledge of the town's current zoning regulations was necessary to identify ways regulations support higher density housing. The site analysis looked at such items as parcel configuration, pedestrian and vehicular access, land use restrictions, wildlife habitat, scenic value and potential connectivity to the town.

The team created conceptual diagrams, site plans and sections at scales that show stringent detail. Typical building floor plans and sections were also produced. Other graphic materials, such as models, photographs, sketches and computer-aided simulations, support the design solution. The team provides recommendations and rationales for the regulations that Sudbury should adopt in order to implement the final design solution. This is also supported by a recommendation for a community outreach process for plan implementation.

## 2. CONTEXT - SUDBURY

### 2.1. History

Incorporated in 1639 with a population of 476, Sudbury is one of the oldest towns in New England. A major battle of King Philip's War was fought in Sudbury in 1676, the Sudbury militia helped fire the "shot heard round the world" at Lexington green, and Longfellow wrote tales of the town's historic Wayside Inn. Primarily agricultural until after World War II and the ascendancy of the automobile, Sudbury is now a suburb of Boston, and largely a bedroom community. The colonial flavor of the town-center and winding roads bordered by stonewalls provide for a historic, semi-rural ambience for the town (http://sudbury.ma.us/, 2007).

### 2.2. Community Profile

The town of Sudbury is located in Middlesex County, Massachusetts. Sudbury borders Marlborough to the west, Framingham to the south, Wayland to the east and Concord to the north. It is divided by Rt-20 and Rt-117, which run east to west, and Rt-27 running north to south. Sudbury is approximately 20 miles

outside of Boston and 26 miles east of Worcester (http://sudbury.ma.us/, 2007). It is located between I-495 and MA-128, in a section of the state known as the MetroWest region. Sudbury is one of the 32 municipalities that comprise the Arc of Innovation.

### 2.3. Demographics

Sudbury is thriving, economically, with more than 6,000 jobs within the community. The total population in Sudbury is 18,207; the population density is 425 people per square mile. Within the town there are 5,590 dwelling units, which results in an average household size of 2.2 people per home. Over 92 percent of Sudbury's 5590 housing units are owner occupied. The remaining 8 percent, or 444 units, are assumed to be rental units (http://sudbury.ma.us/, 2007).

### 2.4. Economics

Sudbury's estimated average household income is $138,815. However, the average single-family home in Sudbury sells for approximately $681,000 (http://sudbury.ma.us/, 2007). The Department of Housing and Urban Development (HUD) considers housing to be "affordable" when a household pays no more than 30 percent of their income on housing (mortgage or rent). The maximum home price affordable to the average household income was $512,372. This cost is not approachable for the workforce of the town or the surrounding region. The lack of reasonably priced housing affects Sudbury, as well as the entire state of Massachusetts. Nurses, firefighters, policemen and those in entry-level positions cannot afford to move to, or maintain the housing costs of Sudbury.

Because of these figures, it is with little surprise that only 4.6% percent of Sudbury's housing stock is considered affordable under the Chapter 40B definition. Until Sudbury's housing stock is 10% affordable a developer can override local zoning laws. For this reason the issue of housing density has become a focal issue in the town of Sudbury. The town is aware of its high housing costs and is proactively pursuing more affordable options.

### 2.5. Growth and Development Patterns

In the last decade, over 1000 acres of land have been developed into single-family homes, adding over 640 new lots to the town of Sudbury. A recent analysis determined that at full build-out, Sudbury would have 1,000 additional residential lots, for a total of 6500 potential dwelling units (Sustainable Sudbury, 2001). If not developed and managed properly, this build out will most likely result in additional single-family units.

Sudbury consists of around 85% single-family homes and only 15% multi-family housing. Some citizens believe that the character of the town is threatened by new residential construction, and that its style and size may displace open space. There is also concern that new developments and design may not blend in with existing neighborhoods. Sudbury is aware that clustering and planned development can result in smaller lot sizes and the avoidance of fragmenting open space (Sustainable Sudbury, 2001).

### 2.6. Open Space and Natural Resources

Sudbury's town character is perhaps best described as semi-rural, historic and residential. The town chose to recognize the importance of open space and natural resources by implementing an Open Space Plan and Recreation Plan. The purpose of Sudbury's Open Space and Recreational Plan is to:

- Formulate strategies for the town to preserve its natural, scenic and historic resources;
- Meet the diverse recreational needs of local residents;
- Guide public land acquisition; and
- Increase open space opportunities.

The plan also includes an environmental inventory and analysis of the Town, an inventory of conservation and recreation lands, an outline of community goals and needs, and a detailed five-year action plan. The Environmental Task Force of the Strategic Planning Committee evaluated this plan and created a series of recommended actions to support its goals.

Equally important to Sudbury's open space and natural resources is the work of the Sudbury Conservation Commission. Established in 1962 to protect local natural resources and features, the commission also acts as a steward of the town's conservation properties. Currently, Sudbury has twelve town-owned conservation lands, ranging from forested to agricultural parcels. The town also has areas of significant historic importance, including the Wayside Inn. In addition to the town's wide-open space, Sudbury has provided residents with a range of recreational facilities, from baseball and football fields, to ice hockey rinks, basketball, tennis and volleyball courts, and a swimming pool (http://sudbury.ma.us/, 2007).

### 2.7. Town Master Plan Goals

Sudbury's recently revised Master Plan entitled "Sustainable Sudbury" establishes a vision for the town. The Master Plan formulates goals, objectives, and implementation strategies in the areas of: land use, economic development, natural and cultural resources, housing, transportation, and community facilities and services. The plan, with a focus on sustainability, created over arching goals for the town that seek to:

- Strive for comprehensive, integrated land use decisions;
- Promote economic development that sustains Sudbury's natural resources and traditional, semi-rural town character, and balances revenue sources;
- Ensure the preservation of the town's natural resources;
- Preserve the town's cultural and historic resources;
- Support the existing recreational facilities create additional areas for recreation;
- Encourage greater diversity of housing opportunities;
- Promote a transportation system that is safe, convenient, accessible and economical without adversely impacting Sudbury's character; and
- Ensure that Sudbury's public facilities and services are adequate to meet the needs of the population as it grows toward full build-out (Sustainable Sudbury, 2001).

### 2.8. Sudbury Demographic Analysis

Sudbury is a suburban town outside of Boston that is home to roughly 18,000 people. In comparison to many other towns in Massachusetts and nationally, Sudbury is extremely affluent with a median household income of about $130,000 per year and a per capita median income of about $53,000 per year. In addition, the average level of education of the Sudbury population is higher than most with over 70% of people having a college degree or higher. 37% Sudbury's residents have a graduate or professional degree, which helps to explain the high median household income in this area.

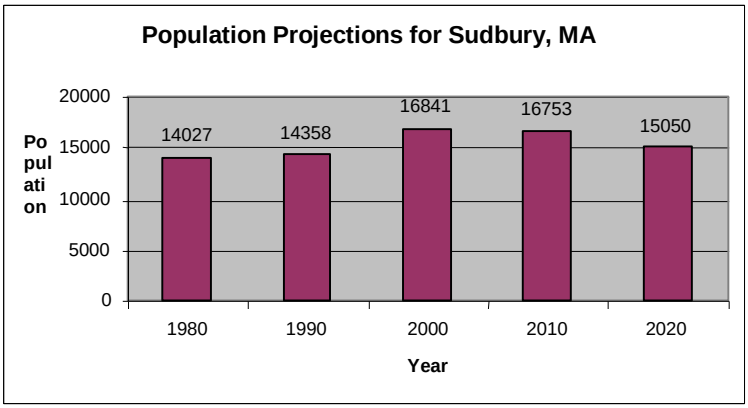


***Table 2.8.*** *Source: Metropolitan Area Planning Council*

Ethnically, the town is predominantly white, comprising 94% of the population. Asians follow at about 4%, and Hispanics, Blacks, and Native Americans make up about 2.25% of the population combined (U.S. Census, 2000). Interestingly, the population was steadily rising until the year 2000, but, like other towns within Massachusetts, it is projected that Sudbury's population will decline from 16,841 to 16,753 between 2000 and 2010, and then continue declining to 15,050 by the year 2020 (MAPC, 2006).

Approximately 6,500 residents commute to jobs that are located outside of Sudbury. Only about 1,500 individuals both live, and work within the town boundaries. 57% of people who live in Sudbury have a commute to work that is longer than 30 minutes (U.S. Census, 2000).

### 2.9. Sudbury School Costs Analysis

The town of Sudbury spends 74% of their budget on their schools. At current, per pupil spending in grades K-8 is $8,172 per year compared to $11,014 in other Metrowest towns. In the high school, spending per pupil is $11,192 which is also lower than the Metrowest average of $11,469. The cost of Sudbury's special education programs is roughly comparable to other school districts in the area. 14.7% of Sudbury's k-8 students participate in these programs and they consume about 21% of the K-8 budget (Sudbury Finance Committee). 16.5% of high school students participate in special education programs which consumes about 17.9% of the high school budget. The average cost of special education state-wide is 18.9%. At this time no schools in Sudbury are filled to capacity, and the Lincoln-Sudbury Regional High School is new. When the schools are filled to capacity, it takes on average five years to complete a new school.

**Sudbury School Capacities**

| School | Current # of Students | # of Students at Capacity |
|---|---|---|
| Pre K - Grade 5 | | |
| Noyes | 685-692 | 740 |
| Haynes | 446-462 | 478 |
| K - Grade 5 | | |
| Loring | 599-604 | 604 |
| Nixon | 516-526 | 550 |
| Grade 6 - Grade 8 | | |
| Curtis | 1,032-1,103 | 1,143 |
| Grade 9 - Grade 12 | | |
| Lincoln - Sudbury | 1,611 | 1,800 |

***Table 2.9.*** *Source: Sudbury School Committee*

### 2.10. Sudbury Market Analysis

As an exclusive leafy suburban community situated sixteen miles outside of Boston, it could be said that Sudbury is lovely place for a family. A starter home costs well over $400,000, and is likely to be less than 2,000 square feet and require repairs, while a new home costing less than $1,000,000 and smaller than 4,500 square feet is difficult to find. Exclusive is perhaps an understatement, as the average home price is $681,000, yet many young families are attracted to Sudbury, leaving residential vacancy rates at only

1.5% (U.S. Census, 2000). Despite the high price of homes, Sudbury's excellent public schools, rural setting and proximity to all of the amenities that the greater Boston region has to offer, make it an attractive location for young families to settle.

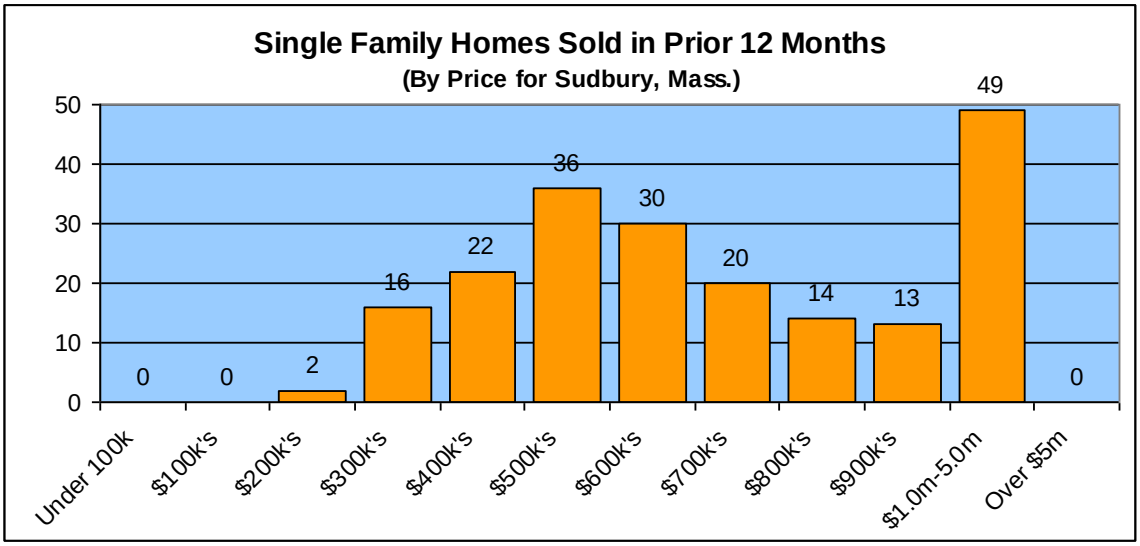


***Table 2.10 a.*** *Source: Coldwell Banker Residential Brokerage Business Information Department.*

Within the town itself, there is a lot of inter-movement. Many people and families choose to stay in Sudbury, but frequently find their 1,200 square foot ranch that costs $425,000 is not big enough as their families grow. In a sense, these people opt to move "up" instead of "out." Typically, those who live in Sudbury are two working parent households, and the median household income in Sudbury is $160,114 (U.S. Census, 2000). As they become more established, these families tend to trade in their ranches for something in the $850,000 price range. It is typical for families from surrounding towns whose schools are not as good to move to Sudbury as they become more established and buy homes in the $600,000 range. While the $1,000,000+ range is the most common range to be bought and sold, these homes tend to be purchased by well-established families (Michael Hunter, 2007).

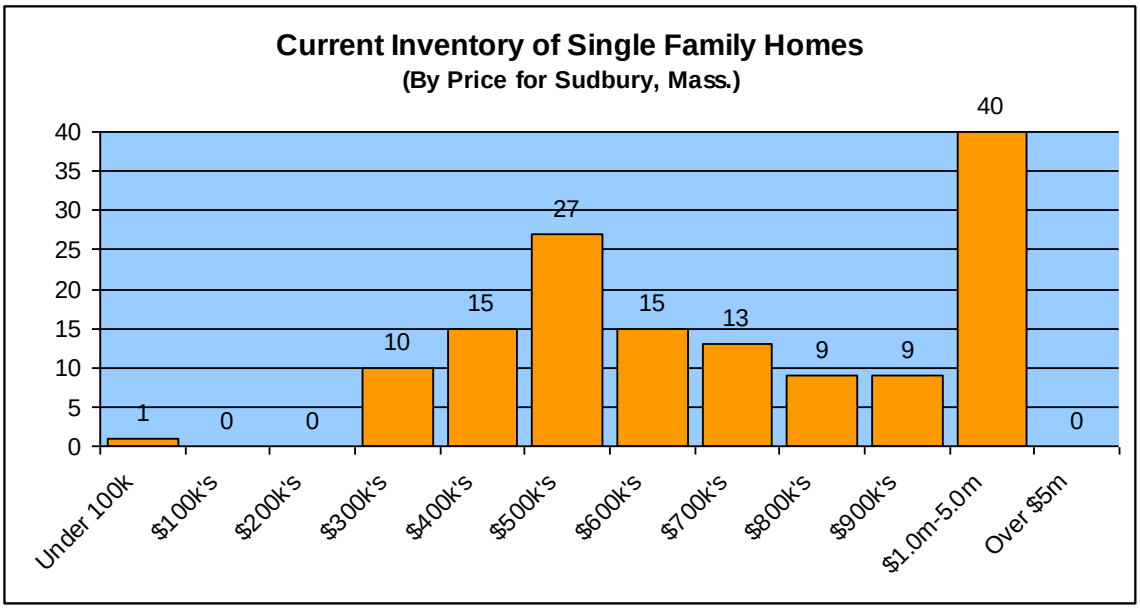


***Table 2.10 b.*** *Source: Coldwell Banker Residential Brokerage Business Information Department.*

Overall, there is demand in Sudbury at all income levels (Shaylor et al, 2007). While 96% of Sudbury's housing is currently single-family that does not mean there is not interest in other types of housing. Framingham and Marlborough have a larger supply of rental properties, which allows greater options for renters. Occasionally rental housing does open up in Sudbury, but when it does, it tends to be very expensive and averages between $1,800-2,000 for a small house. Rental properties typically do not stay on the market longer than a few days, and currently there are only four rental units available (Hunter, 2007). As of 2000, the homeownership rate in Sudbury was 91.9%, leaving a very small percentage of renters (U.S. Census, 2000). Additionally, condos sold in Sudbury in the past year stayed on the market an average of 79 days, and sold at a median price of $848,000. It should be noted that condos stay on the market on average 100 days shorter than the higher end ($1 million +) single-family homes (Hunter, 2007). Currently, there are 14 condos on the market, with a median price of $895,000.

Within Sudbury there are two market discount age restricted housing developments, and several other affordable developments. Using the $130,000 household median income, and the guideline that no more than 30% of income be directed towards housing, an affordable housing in Sudbury is considered to be housing that costs $512,372 or less , though only 4.6% of Sudbury's housing is considered affordable, as defined and counted by the State. It has been echoed by realtors, residents, and planners alike that lower priced housing is not only needed, but also very marketable. These units in Sudbury are sold or leased very quickly, and the same is true of a brand new affordable complex in neighboring Concord whose

affordable units are 100% leased at preconstruction, with one remaining affordable unit (priced at $170,000) for sale (CHAPA, 2007).

While it is generally agreed by realtors in Sudbury that anything priced "right" for today's market will sell, it is also agreed that selling price is most impacted by condition, location, and value (Taylor, 2007). While most homebuyers are looking for homes with four bedrooms or more, three bedroom homes are still considered to be quite marketable to families. Moreover, the lack of supply of smaller units with fewer bedrooms explains the lack of potential buyers looking for smaller units. Additionally, many people are looking for homes in move-in condition that need few repairs, but feature luxury kitchens with cherry cabinetry, granite countertops, sub-zero appliances as well as updated bathrooms. Fireplaces or gas fireplaces and attached two car garages are also considered to be a major selling point (Hunter, 2007).

A comparable development to what the Sudbury Design Team is proposing is the Meetinghouse Lane development in Southborough, Massachusetts. A development of 45 attached two-bedroom units (clustered in groups of two, three, and four units) ranging from 1,810-2,290 square feet priced between $399,900-529,000 (preconstruction) is being constructed. The smaller units do not have attached garages; the medium sized units have one-car garages, while the largest units have attached two car garages. Each home features a covered porch, two bedrooms including a master suite, a 300 square foot basement, and storage room. The site also features an athletic practice field and conserved open space. Since January 2007, seven of the units have been reserved, nine are currently available, and the rest have been sold.

### 2.11. Summary

As an exclusive leafy suburban community situated sixteen miles outside of Boston, it could be said that Sudbury is not exactly a picture of reality. A starter home costs well over $400,000, and is likely to be less than 2,000 square feet and require repairs. Likewise, a new home costing less than $1,000,000 and smaller than 4,500 square feet is difficult to find. Exclusive is perhaps an understatement, as the average home price is $681,000, yet young families are attracted to Sudbury by the dozens, leaving residential vacancy rates at only 1.5% (U.S. Census, 2000). With excellent public schools and stable home values, the debate as to why young families choose Sudbury is settled.

# 3. SITE ASSESSMENT AND ANALYSIS

## 3.1. Site Assessment

The Melone Property is a town-owned sand and gravel pit within Sudbury, Massachusetts. Currently under active excavation, the site is scheduled to be inactive and ready for development within the next year and a half. This site is located on the northern edge of the town, along route-117/North Rd on the Sudbury/Concord line.

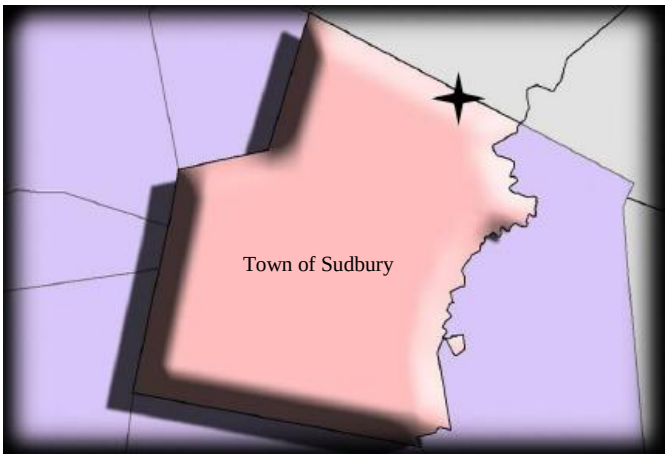


***Figure 3.1.*** *Site Location*

## 3.2. Land Use and Zoning

The adjacent land uses to the property are varied. The area consists of forests, pasture and croplands, as well as commercial and both low and high-density residential development. The site itself is zoned for Research. This allows uses such as senior housing, business and professional offices, bed and breakfasts and light manufacturing, but no residential. The zoning for the property leaves room for the study to be creative, which will be addressed in the regulatory section of this study.

## 3.3. Geology and Water Resources

The area's surrounding geology consists of sand and gravel deposits, ledge, fine grain deposits, and floodplain alluvium. The Melone property sits within the sand and gravel deposit region. The parcel exists within a Zone II Aquifer Contribution Zone. An aquifer is an underground formation of permeable rock or loose material that can produce useful quantities of water when tapped by a well. There is a public water supply source directly across from the site.

Wetlands are present on the eastern portion of the parcel. The buffer zone extends into the access to the site. The wetlands and nearby stream system are part of a natural corridor, which provides habitat for many species of wildlife, including great blue herons, hawks and beavers, as well as larger migratory animals. These wetlands offer future residents an abundant source of natural amenities to enjoy.

### 3.4. Parcel Configuration

The entire parcel selected is fifty-five acres, consisting of five different sections. Twenty and one half acres is the active sand and gravel pit within Sudbury. There are another sixteen and one half acres in Concord, which is considered developable land, due to a possible land exchange between Sudbury and Concord. A triangular portion of seven and two-tenth acres is owned by the Sudbury Water District, which the town wishes to leave for recreation, parking and on-site storm water mitigation. There is one acre of the abutting Wagner property, which is being considered in the site design process. Approximately ten acres is land protected by the Conservation Commission. This is an area where building is restricted.

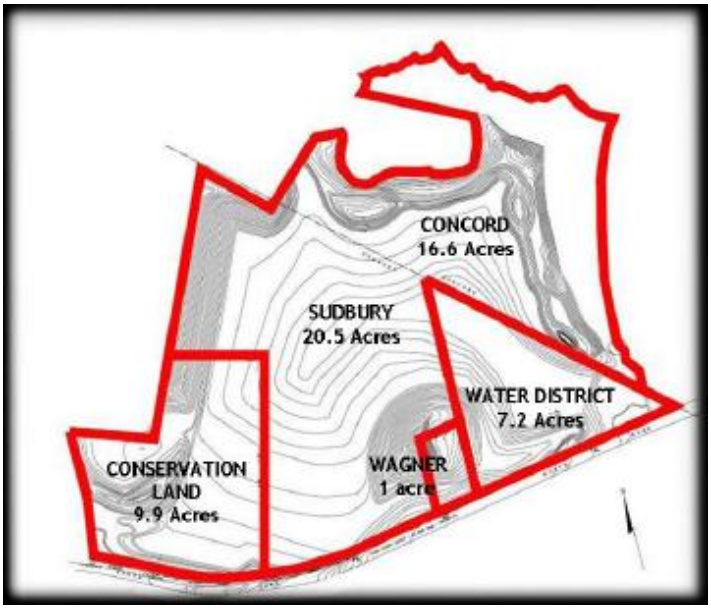


***Figure 3.4.*** *Parcel Configuration*

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A careful study of the details of the town's regional and local context, as well as the surrounding site context will aid in the successful integration of a solution into the surrounding character of the town of Sudbury.

### 3.5. Topography

Due to the results of heavy excavation as an active gravel pit, the site consists of one low plateau surrounded by steep slopes. The slope on site ranges from 2% in the flat area and 25-25% side slopes. There are two high points on site, at an elevation of about 190 and one low point, at about an elevation of 120. There is a 70-foot grade change within the site (See Map Appendix D). This topography creates a unique landscape with which to work. Future homes built into this slope have the potential for spectacular views.

### 3.6. Solar Orientation and Climate

The site is situated for maximum solar orientation, with the steep slopes situated to the west and north. This allows for maximum solar exposure throughout both the summer and winter, creating a warm sun pocket. The site is also advantageously situated to reap the maximum benefit from the northern climate. The steep slopes block the cold northwest winter winds and the prevailing summer winds flow into the heart of the site, cooling it (See Map Appendix D). Both the solar and climate orientation will aid in the creation of sustainable architecture and extended use outdoor spaces.

### 3.7. Soils

The soils of the parcel consist of four main categories:

- Freetown Muck: typical of wetland areas and can be ponded.
- Hinckley Loamy Sand: fine grained texture.
- Merrimac Sandy Loam: ranges in slope, but also has a sandy quality to it.
  - Both the Merrimac and the Hinckley soils are excessively well drained, and typically the depth to bedrock is about twelve feet.
- Gravel: not suited to farmland or woodland because of the very low available water capacity; suitable for residential and recreation.

A map of the distribution of these soils can be seen in Appendix D.

### 3.8. Vegetation

The western portion of the site is the town-owned conservation land. However, due to the intensive excavations, the majority of the site is clear of vegetation with only the perimeter forested. This vegetation is mainly Pine-Oak forest, consisting of White Pine, Black and White Oaks, as well as Birches, Maples, Ash and Sumac (See Map Appendix D).

A totally excavated site is a blank canvass for the development, and to reshape the landform. Our team took careful consideration to create plans that will incorporate the local vegetation into the new plans, and to create seamless boundaries with the abutting conservation and wetlands.

### 3.9. Hydrology

Currently on site there is a small body of water named Bear Pond located in the conservation area. Another small pond, dammed by beavers, is located on the eastern border. This is pond part of a small stream that runs north south along the site perimeter. In conjunction with the stream is a wetland area, with an existing trailhead located on its edge.

The run-off on site drains down the steep side slopes, where erosion could become an issue, and into the center of the Melone property and flows to the low point by the site's current entrance. This existing flow provides for ease in locating the area for a proposed detention basin for on-site stormwater (See Map Appendix D).

### 3.10. Circulation

The defined circulation exists off-site on North Road, with the site's only entrance on the far western edge. The circulation within the site is ambiguous and undefined. However, there is also an extensive trail network surrounding the parcel, which leads into the town of Concord and to Sudbury's active trail system (See Map Appendix D). Connecting designs to these trailheads will not only add a recreational amenity to the development, but also help connect it, physically, to the town.

### 3.11. Utilities

The only utility located within the Melone property is a cell phone service station and tower. This was erected under the conditions of the Wireless Overlay District. According to the Sudbury town planner, the cell tower on the Melone property is owned by Sprint. Sprint is in full compliance with all local, state and federal regulations and they intend to renew their permit indefinitely. Our designers have taken every opportunity within their plans to locate housing on the site at a distance that is both within the overlay's safety requirements, but also in a manner that would minimize the visual obstruction of the tower (See Map Appendix D).

There is no sewer on site or in the town itself; and town water is served along North Road. There are current zoning restrictions concerning the lack of sewer and there are no future plans to sewer the site. An

on-site package treatment facility is a necessity for this site because of the lack of sewer and public water supply protection.

### 3.12. Views

Steep side slopes block external views into the site. Though one poor view exists, in conjunction with the cell phone tower, the internal views within the site can be quite spectacular. Some residences within the designs have been set into the hillsides to maximize these views.

***Figure 3.12***.

### 3.13. Summary

The detailed contextual assessment and site analysis provide a basis for a design program and innovative solution for developing the Melone property. It also gives emphasis to the necessity of well-designed, dense workforce housing. The project provides the opportunity to create a resolution that addresses the need for high density and affordable housing in the town of Sudbury, as well as to examine existing regulatory and community barriers to these issues.

Working with an excavated gravel pit provided our team with a clean slate, but also with many challenges. The fragmented parcel, including a water district, conservation land and acreage in another town provided a particular challenge. The 70-foot grade slope as a result of excavation offered the designers a unique opportunity to do something creative with the site. For example these same slopes offer the development protection from harsh weather and place potential homes at a vantage point for great views.

## 4. CONCEPTUAL DESIGN RECOMMENDATIONS

### 4.1. The Drumlin Scheme

*Concept: The design takes inspiration from the historic geological landscape. It utilizes the arrangement of the architecture and vegetation to form a connection of large open spaces and smaller community spaces.*

The neighborhood's traditional style architecture forms large open terraces and small communal spaces. The community provides amenities for the residents and town's people alike. The largest terrace serves for the town's recreational needs. An integrated path system provides for neighborhood and community connection, as it links to existing surrounding trails.

***Figure 4.1a.*** *Conceptual Design -Drumlin Scheme*

This design accommodates 150 units total or 7.5 units per acre, and provides the requested 2 parking spaces per unit, while preserving over half of the buildable land for open space. Stormwater is managed on-site through the use of swales and bio-retention basins.

The architecture forms small community spaces and is organized with a single 22' wide spine of loop road. Town house clusters and those small open spaces knit together to form one large central multifaceted open space. The main space, which is centered on a beautifully terraced pond, serves as a wonderful amenity as well as the main bio retention feature, providing for a variety of different activities. The upper northwest space, which is forested with a single open glade, allows for an area of quiet and rest. The largest space serves as an open field to anchor the form and will serve the town's practice recreational needs, fitting two regulation size football fields sufficiently. Within the design, homes relate to the central open space, as well as to the surrounding conservation lands. The design maximizes the use of the slope by setting homes into the hillside and providing for connectivity with a trail along the northern rim of the bowl that connects to existing trailheads. The development is then successfully tied to the larger community of Sudbury.

The design focuses on the interconnection of house and garden in a manner similar to the townhouse clusters and space that they form. The open floor plan of the homes, which ranges in size from roughly 900-1500 square feet, weaves together with a large private garden space of 375 square feet, extending the feel of the home to make small square footage feel larger. The gardens offer privacy through the use of screens and hedges, as well as cables, vines and trellises for overhead structure. In this clustered instance, parking is provided for in cluster lots with short walks to the homes. The small open space formed by the architecture then links to the larger central open space, as well as to the surrounding conservation lands.

| | 1BR-1000sf | 1BR-900sf | 2BR-1200sf | 2BR-1500sf | 3BR-1500sf | 3BR-1500sf | Total | % Project |
|---|---|---|---|---|---|---|---|---|
| Affordable | 5 | 4 | 12 | 10 | 4 | 6 | 41 | **27%** |
| Mid-Range | 5 | 2 | 12 | 10 | 5 | 7 | 41 | **27%** |
| Market | 7 | 0 | 18 | 20 | 10 | 13 | 68 | 45% |
| Total | 17 | 6 | 42 | 40 | 19 | 26 | 150 | 100% |
| % Project | 11% | 4% | 28% | 27% | 13% | 17% | 100% | |

***Table 4.1*** *Breakdown of Housing Options for the Drumlin Scheme*

It is forecasted that a developer's profit from this design will be 12.10%, based on calculations of square footage, an estimated cost per foot to build and the sale price of the unit. The percentage considers subsidies for affordable and mid-range housing options.

# Sudbury Architecture – Drumlin Concept

***Figure 4.1b:*** *Drumlin Concept; Typical elevation of town houses*

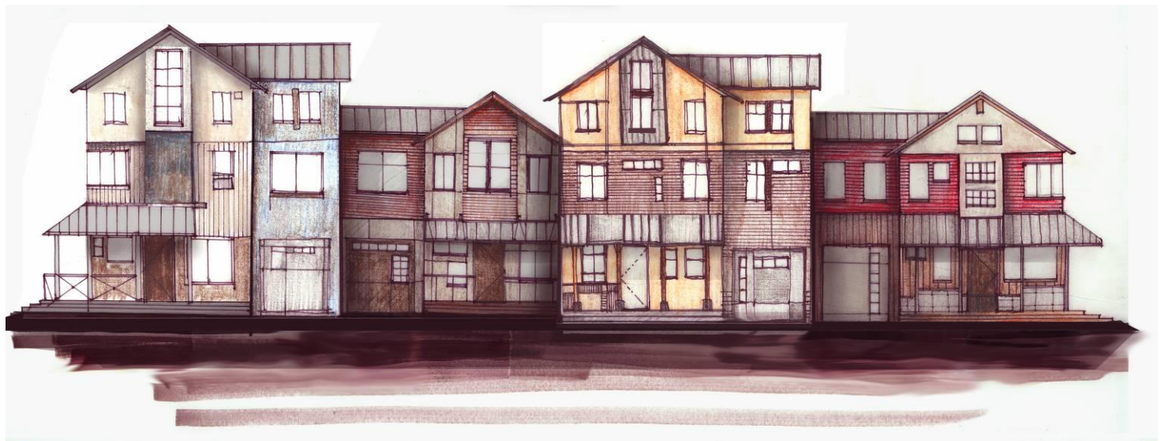

***Figure 4.1c****: Drumlin Concept; Alternate elevation of town houses.*


***Figure 4.1d:*** *Drumlin Concept; Typical floor plans.*

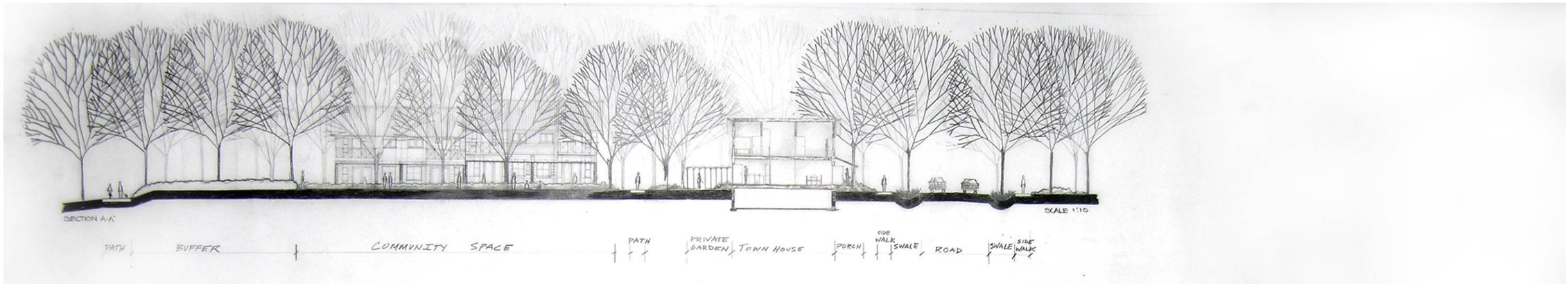


***Figure 4.1e:*** *Drumlin Concept; Section through community open space, private garden, row housing and streetscape.*


***Figure 4.1f:*** *Drumlin Concept; Section through private garden, row housing, parking court and streetscape.*

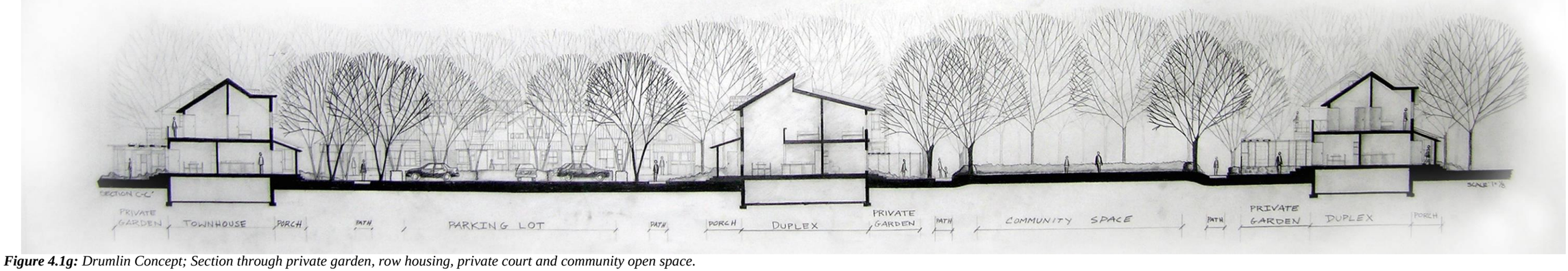


***Figure 4.1g:*** *Drumlin Concept; Section through private garden, row housing, private court and community open space.*

## 4.2. Orchard Scheme

*Concept: The design takes inspiration from the historic past of the landscape. A grid provides for the arrangement of the architecture; as well as a path system that leads to large open terraces.*

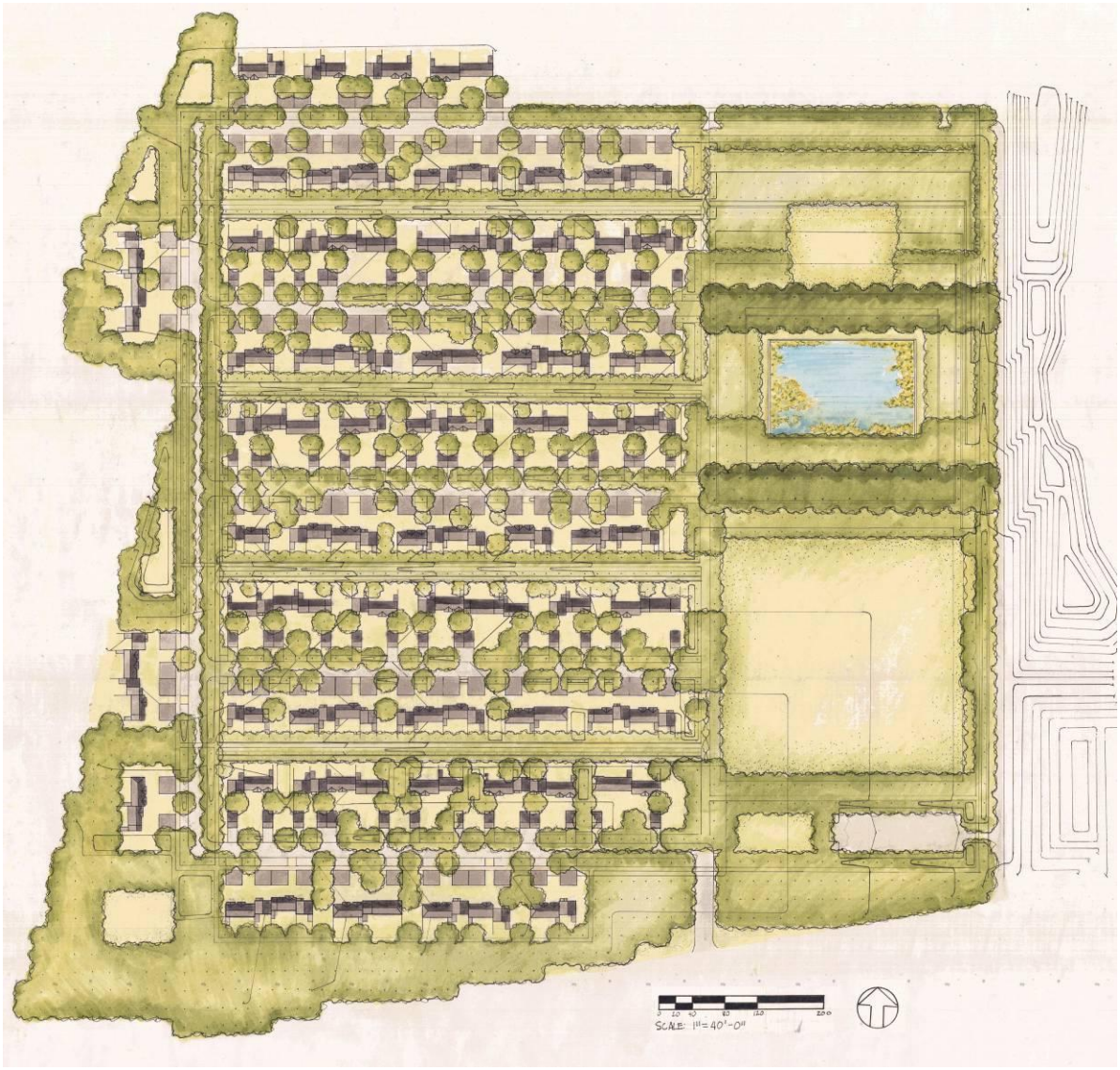


***Figure 4.2a.*** *Conceptual Design - Orchard Scheme*

The design's modern feel and arrangement provide for a unique experience, which lends itself to the sustainability of building and garden. The large open terraces contribute to the community's recreational needs, and the linear vegetation work with the town's desire to re-establish its nursery.

As with the other concept, the housing density is approximately eight units/acre, with a parking provision of two spaces per unit (covered and open).

Likewise, stormwater is managed on-site through the use of swales and bio-retention basins.

The Orchard Scheme offers a more modern feel to the site through cost-efficient modular dwellings. A grid arranges the architecture, and a path system provides capillary movement to the large, open terraces.

# Sudbury Architecture – Orchard Concept

***Figure 4.2b:*** *Orchard Concept; Typical front elevation*

***Figure 4.2c:*** *Orchard Concept; Sketch showing private gardens and lineal community open space.*

***Figure 4.2d:*** *Orchard Concept; Sketch of typical entry courtyards.*

***Figure 4.2e:*** *Orchard Concept; Typical front elevation*

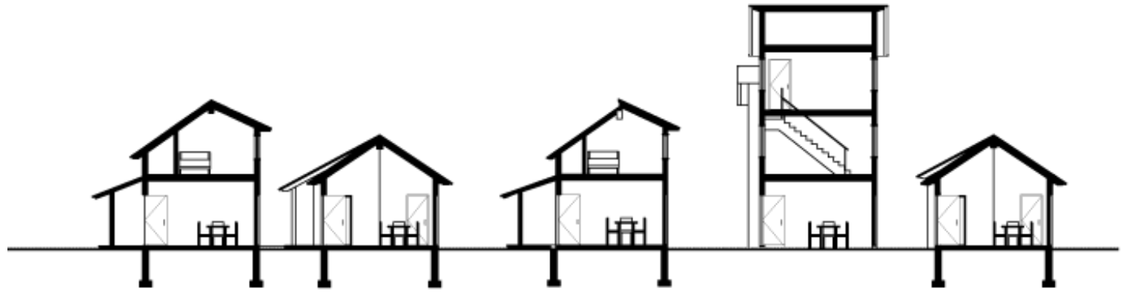

***Figure 4.2f:*** *Orchard Concept Typical building sections*

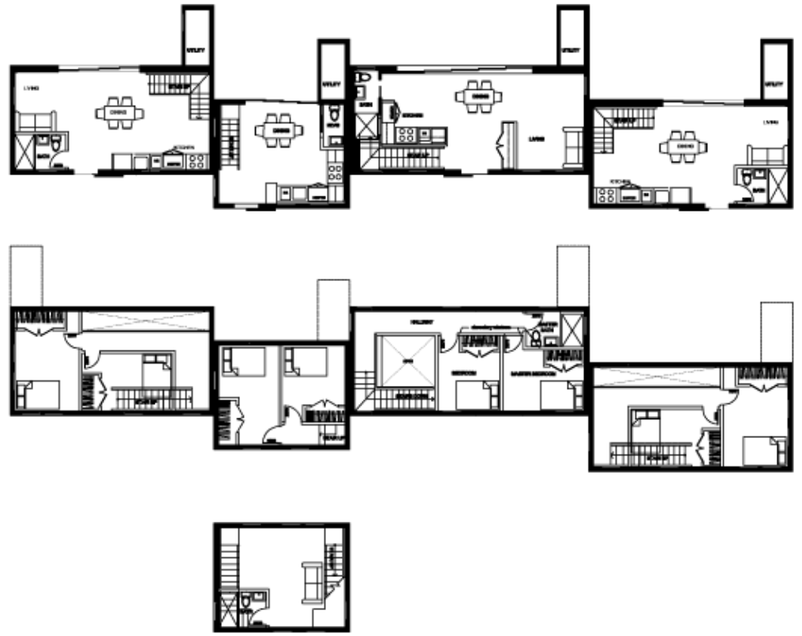

***Figure 4.2g:*** *Orchard Concept; Typical floor plans*

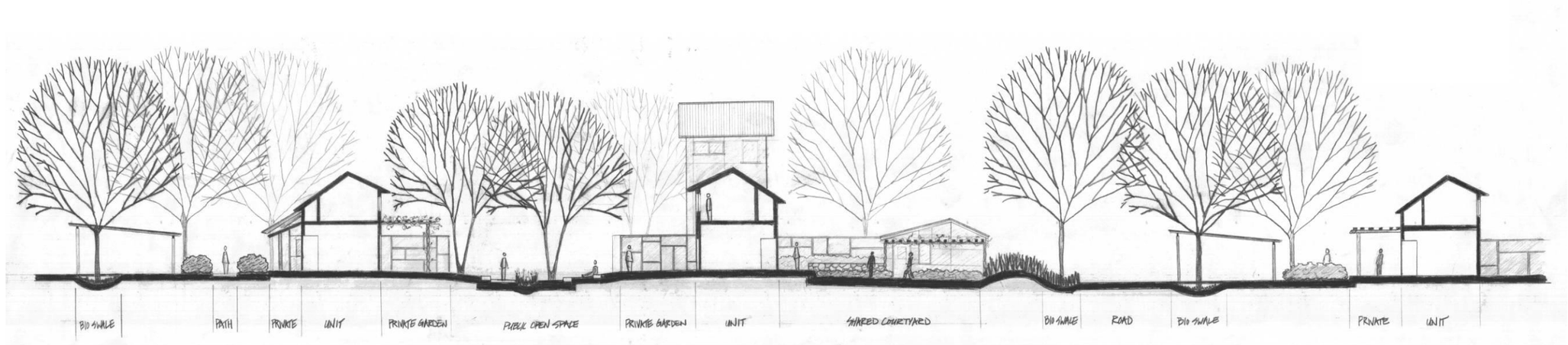


***Figure 4.2h:*** *Orchard Concept; Section through entry courtyards, modular row housing, private gardens and lineal community open space.*

| | 1BR-725sf | 1BR-770sf | 1BR-900sf | 1BR-960sf | 2BR-900sf | 2BR-960sf | 2BR-1000sf | 3BR-1100sf | Total | % Project |
|---|---|---|---|---|---|---|---|---|---|---|
| Affordable | 7 | 2 | 6 | 6 | 5 | 10 | 4 | 4 | 44 | **28%** |
| Mid-Range | 7 | 2 | 2 | 6 | 5 | 13 | 5 | 4 | 44 | **28%** |
| Market | 8 | 4 | 0 | 8 | 10 | 23 | 9 | 10 | 72 | **45%** |
| Total | 22 | 8 | 8 | 20 | 20 | 46 | 18 | 18 | 160 | 100% |
| % Project | 14% | 5% | 5% | 13% | 13% | 29% | 11% | 11% | 100% | |

***Table 4.2a*** *Breakdown of Housing Options for the Orchard Scheme:*

It is forecasted that a developer's profit from this design will be 39.93%, based on calculations of square footage, the estimated cost per foot to build and the sale price of the unit. This considers a decreased cost per foot based on modular components. The percentage considers subsidies for affordable and mid-range housing options.

| | DRUMLIN | ORCHARD | Notes: |
|---|---|---|---|
| **Road Width** | 22’ (main road) | 22’ (main road) | 18’ alleys |
| **Cul-de-Sac Length** | None | None | Orchard: 10+’ pedestrian path to double as an emergency lane at the end of the alleys |
| **Farthest Distance from Car to House** | 150-200’ | 150-200’ | |
| **Setback from Road** | Average of 20-30’ (20 to garage) – wide enough to fit 10’ swale, 5’ path and 18-20’ drive (drive may include swale and path) | | |
| **Lot Width** | N/A – use of row housing | | |
| **Distance Between Houses** | Minimum Average: 10’ between clusters of 2-6 | | |
| **Amount of Developed Land** | N/A | N/A | Building on 20 of 55 acres – houses and open space |
| **Amount of Impervious Surface** | N/A | N/A | Designs promote more use of permeable materials |
| **Common Driveways** | Shared between 2 dwellings | | |
| **Building Heights** | 3 story = 34'-6"<br>2 story = 26'-6"<br>1 1/2 story = 22'-6"<br>1 story = 17'-6" | 3 story = 32'-6"<br>2 story = 24'-6", 26'-0", 28'-0"<br>1 1/2 story = 20'-0"<br>1 story = 16'-6" | There should be a height cap at 34'-0" except when building into a hillside, could be taller with special permit |
| **Parking Spaces** | 2 per dwelling | | |
| **Sight Distance** | Corresponds with current regulations | | |
| **Sidewalks** | Minimum 5’ – larger at 10’ to accommodate bikes | | |
| | | | |
| * **Designs are also promoting**: sustainable architecture; community open space and smaller clustered open space, walkability, connection to trails, on site stormwater management (swales, bio-rent.), diversity in arch styles/buildings/etc and in open space functions. | | | |

***Table 4.2b.*** *Design Components*

*Legality of the Proposed Designs*

Current zoning at the Melone parcel leaves little to work with for a residential project. Presently zoned within Sudbury’s Research District, the table below illustrates the limitations that this sets upon our proposed designs. As it stands, legal inconsistencies within the design of this parcel, are consistent the nature of this “friendly” 40B project.

| Current Residential Zoning For Sudbury Research District | | |
|---|---|---|
| USE | By Right | Special Permit Required |
| Single-Family Dwelling | NO | NO |
| Residential Apartments | NO | NO |
| Boarding House | NO | NO |
| Cluster Development | NO | NO |
| Flexible Development | NO | NO |
| Senior Residential Community | NO | YES |
| Incentive Senior Development | NO | YES |
| Residential Care Facility | YES | NO |
| Source: Town of Sudbury Zoning Bylaw, 2006 | | |

***Table 4.2c***.

## 4.3. Architecture

The architecture proposed for the Orchard and Drumlin concept has three driving goals:

- **Sustainability** - Achieving close to Zero-Energy Homes through building design, orientation, and building materials.
- **Careful use of space** - By using an open floor plan and stressing the connection of interior and exterior spaces small footprints and square footages feel much larger.
- **Connection to local vernacular** - Incorporating elements of historic architecture as massive as building shape (saltbox) to as detailed as cladding (clapboard) into contemporary design can create an architecture that is both modern, efficient and still holds the character of the much loved traditional vernacular of Sudbury.

### *Sustainability*

Residential buildings in the United States account for 21 percent of total nationwide energy use, and building an average home today results in over 3 pounds of waste per square foot[1]. As our planet is less and less able to endure the environmental strain of the built world it is becoming quite clear that we must begin to build and think more sustainably. Sudbury must begin to think differently about building as it builds into the next generation.

It is suggested that all new homes in this development must meet LEED Silver standard (see appendix E), at a minimum, and by following guidelines for the pilot program LEED Neighborhoods, Sudbury will not only create an environmentally friendly place to live but will insure that these homes will be

[1] Nuclear Information and Resource Service. Factoid #11 -- Energy Use in Buildings can be cut by 14 Percent by 2020 Through Short-term Efficiency Policies. http://www.nirs.org/alternatives/factoid11.htm

exponentially valuable as the need for efficiency grows greater by the day. Below are examples of techniques, many included in the LEED checklist, that are essential to creating efficient housing.

*Construction Techniques:*

Innovative framing techniques (framing the home with 2x6 studs spaced at 24 inches allowing increased insulation) can reduce lumber requirements without compromising structural integrity (see Appendix F - detail 1) and using engineered lumber and wood products can save on destruction of old growth forests. Using durable and recycled materials can significantly cut down on the embodied energy of the material. Examples of this would be, roofing materials (standing seam metal roofs) with 40- or 50-year warranties, recycled floor tile and carpet, and cladding such as Hardi-Plank that has an extended life and almost never needs to be repainted (Build It Green, 2005).

Following strict weatherproofing and insulation practices are essential to a tight home. Structurally Integrated panels (SIPs) are advised as an option to 2x6 framing. These insulated panels interlock creating airtight seams and greatly cut down on labor and construction waste. As homes get more and more airtight, heat & energy recovery ventilators become an important feature (see Appendix G). Proper roof venting must also be looked at in detail.

By building with future additions in mind future cost and material waste can be minimized. By framing for potential additions less of the home will need to be destroyed in the future and the addition will most likely be better and more safely placed.

Some of the units will have a full basement, but many will have a slab foundation system. By running a radiant heating system through the slab it greatly diminishes any chance of freezing and cracking or warping and makes slab much easier to use in the Northeast (see Appendix F – detail 2). A properly installed foundation drainage system is another extremely important feature. The following are some of the key elements (www.masstech.org, 2007):

- Soil grade sloped away from the home;
- Gutter system with downspouts directing away from the foundation;
- Foundation wall drainage panel; and
- Footing perimeter drainage system.

By designing a passive solar building, the sun's heat is naturally let in during the day through large south facing windows and with the help of thermal mass (concrete floors) warms interior spaces as heat is let

off at night (see Appendix F – detail 3). Passive cooling involves using overhangs and other exterior shading devices to keep the sun out in summer and in the winter (see Appendix F – detail 4). Trellises and shade trees can selectively control solar heat gain through windows. Orienting the home with the long axis running east west and minimize north-facing windows to improve passive solar performance should be the first step in the layout of a building design.

Windows must be designed to catch prevailing breezes and provide cross ventilation. Using casement windows can greatly improve airflow through the house. Installing operable clerestory windows, skylights or cupolas along with low windows create a stack effect that naturally removes hot indoor air and replaces it with cool exterior air (see Appendix F – detail 5). The recommended south glazing for passive solar buildings is low-e hard coat, heat receiving glazing with a U-factor of .33 and a solar heat gain coefficient (SHGC) of 65 (Build It Green, 2005). (Taken from Alameda County Waste Management Authority & Source Reduction and Recycling Board, New home construction green building guidelines)

Below are some appliances and systems that should be incorporated into the design of the building (Build It Green, 2005):

- □ Tankless Water Heaters with Energy Factor >0.62;
- □ High Efficiency Furnace (AFUE 90 % or higher);
- □ High Efficiency Air Conditioner (SEER >13) with a Thermostatic Expansion Valve (TXV);
- □ Only Energy Star Appliances;
- □ Radiant Floor heating;
- □ Solar hot water panels (that can be hooked up to Radiant Floor heating) for hot water and heating;
- □ Geothermal heating system; and
- □ Photovoltaic panels

The appliances and systems listed above all have an extra initial cost (as do many of the building materials and techniques). However, a simple payback analysis will show that most of these tools and techniques pay themselves back rather quickly.

***Careful Use of Space***

By incorporating an open floor plan (see Appendix H), high ceilings and windows, and lofted spaces, small units appear much larger By incorporating large sliding exterior doors, ample porches and patios, and a floor plan that creates interior/exterior movement the connection to the outdoors is strengthened.

First and second story porches and close proximity between buildings enhance communication between residents and neighbors/passerby's. This transparency to the outdoors aids in creating the sense of a larger space. The private garden, detailed with trellises and partitions defining each unit's private space.

***Connection to Local Vernacular***

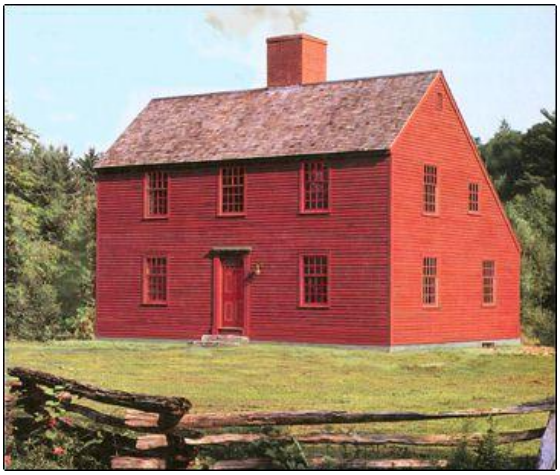

***Figure 4.3.*** *Traditional New England Saltbox S*ource: www.mckieroth.com/images/saltbox.jpg

Through studying traditional New England vernacular key forms such as the saltbox could be used in the design. The saltbox traditionally is a passive solar design with a small square footage. By incorporating the familiar roofline into these efficient and contemporary designs, our designs instantly became more grounded into Sudbury's landscape. People easily identify with the architecture they grew up with and live around. By incorporating key iconic elements into our design (such as the saltbox form, clapboard, cornices, and other detailing), the more modern design becomes more palatable to the average future resident. In the site design, incorporating stonewalls into the private partitions creates a remembrance of the beautiful stonewalls that meander throughout Sudbury, again tying these homes into the local built environment.

### 4.4. Stormwater Treatment

Sudbury requires that all stormwater be treated on site and that they meet or exceed Mass DEP requirements, specifically that no additional runoff rates shall be introduced due to new construction (Sudbury, 2006). Our proposed designs incorporate several features of Low Impact Development (LID), where a site's natural hydrology is mimicked in order to treat runoff at its source. According to the Executive Office of Environmental Affairs, implementing an LID program requires both a change in the practice of planning and the review of development plans (http://www.ma-smartgrowth.org, 2007)

### 4.5. Wastewater Treatment

The new Melone development will have 160 units contributing approximately 26,904 gallons per day (gpd), which would require a package treatment facility. In a package treatment facility, incoming sewage first passes through a pre-treatment device to break it down and trap untreatable materials. Pre-treatment is done via a comminutor, bar screen or trash trap. Pre-treated liquids then enter an aeration chamber, where they are thoroughly mixed and where diffusers installed in the chamber bottom inject fresh oxygen. This oxygen provides the perfect environment for the multitude of safe, aerobic bacteria that completely digest all organic material. After 24-hours of complete treatment in the aeration chamber, the treated liquid flows into the settling/clarification chamber for the final phase of treatment. Small particles are removed and the purified effluent is ready for discharge. Only clear, highly treated wastewater remains at the top of the settling chamber. It then flows over the edge of the effluent weir, returning safely to the environment (leachfield) (Norwelco, 2007). A groundwater discharge permit from MassDEP is required for any discharge greater than 10,000 gpd. Our site plan will also have to incorporate sufficient Nitrogen reduction systems, as nitrogen loading should be below 10 milligrams per liter. Maintenance is an important consideration and is generally included in the purchase of package treatment facilities. Monitoring must be conducted to ensure that nitrates are functioning properly.

Conveyance from homes to the package treatment facility and to the leachfield is done through small diameter plastic (pvc) pipe. PVC pipes are used so that no leakage into the pipe will occur. This is a typical problem with traditional concrete sewer pipes, which would increase to flow volume by gallons per day. The pitch of the conveyance pipe should be at a 2% to 10% pitch to keep velocity in pipe gravity flow to plant.

The requirements for the leachfield are: 26,904 gpd/.74 gallons per sq foot = 36,356.756 sq ft needed for drainage. The .74 number is an effluent-loading rate derived from a percolation rate of less than 2 minutes (Campbell, 2007).

Table 4.5a

| Waste water production | 1BR-1000sf | 1BR-900sf | 2BR-1200sf | 2BR-1500sf | 3BR-1500sf | 3BR-1500sf | Total |
|---|---|---|---|---|---|---|---|
| # of units | 17 | 6 | 42 | 40 | 19 | 26 | 150 units |
| Ppl per unit | 2 | 1 | 2 | 3 | 4 | 4 | ave ppl/unit |
| Ppl/units | 34 | 6 | 84 | 120 | 74 | 104 | sum: 422 ppl |
| Typical flow rate-gpd/capita | 76 | 97 | 76 | 66 | 53 | 53 | ave gpd/per person |
| Sum totals | 2584 | 582 | 6384 | 7920 | 3922 | 5512 | 26,904 gpd- |

***Table 4.5a***

*In House Treatment Options and Ideas for Reducing Flow to Plant*

- Low flow toilets and showers for all homes
- Market rate homes would have more expensive sustainability options like in house separation of graywater from blackwater, composting toilets, Nutrient removal
  - These home may be off the community system all together to reduce total flows (and added costs) going to the plant
  - Use recycled graywater for irrigation in nursery and greenhouse

*Melone Site Package Treatment Facility Permitting Process*

A valid Groundwater Discharge Permit is required for any facility that discharges over 10,000 gallons per day (GPD) or more into the ground (there may be instances, particularly in nitrogen sensitive areas, where a ground water discharge permit will be required for flows less than 10,000 gpd). Applications to build a new wastewater treatment facility or to modify an existing one must include an engineering report along with a statement by a Registered Professional Engineer that the plans and specifications have been prepared in accordance with the regulations 314 CMR 5.00. Along with the report, applications must include hydro geologic studies of the disposal site and its surroundings as well as a ground water monitoring plan. The plans and specifications must describe in detail the collection, treatment and disposal components of the facility (MassDEP, 2007).

| **Stage 1** | **Applicant submits application (forms, technical documents)** | |
|---|---|---|
| | **If** | **Then** |
| | Permit is new | Use Application # BRP WP 06, 08 |
| | Permit is for renewal | Use Application # BRP WP 11, 12 |
| **Stage 2** | **DEP reviews application** | |
| | Step 1 | Administrative review for 30 days |
| | Step 2 | Technical review:<br>New permits 200 days<br>Renewals 120 days |
| | **If** | **Then** |

| | | |
|---|---|---|
| | A new application has technical problems, omissions, other deficiencies; | Applicant has 200 days to address. |
| | An application for renewal has technical problems, omissions, other deficiencies; | Applicant has 180 days to address. |
| | After application is resubmitted, DEP has an additional period for technical review that is equivalent to the initial one (200 or 180 days). | |
| **Stage 3** | DEP Approves plans and reports. (This is simply approval of plans and reports; it does not mean a permit is approved.) | |
| **Stage 4** | Applicants provide 30 days public notice period and notice is placed in an area newspaper. If permits are issued, applicants may proceed with construction of the facility. | |
| | **If** | **Then** |
| | No comments are received within 30 days; | DEP either issues or denies permit. (If issued, the permit becomes effective immediately.) |
| | Adverse comments are received; | DEP either issues or denies permit. If issued, the permit becomes effective 30 days from that date. |

http://www.mass.gov/dep/water/approvals/gwperm.htm

***Table 4.5.b***

### 4.6. Local Wetlands Bylaw and State Level DEP Streamlining

***Local***

The Massachusetts Wetlands Protection Act regulates development in and around wetland resource areas. Sudbury's Conservation Commission implements and enforces the Act. The local Conservation Commission had identified additional areas of interests and special value including: erosion and sedimentation control, agriculture, and passive recreation, vernal pools and smaller ponds. Upland areas within 100 feet of wetlands, and within 200 feet of rivers and streams, have been given resource status as adjacent upland resources and are fully protected. Wetlands permits are required for all work within 100 feet of a wetland resource area and within 200 feet of all perennial streams. The Conservation Commission publishes a list of native species for plantings (Sudbury, 2007).

***State***

Governor Patrick himself has identified our permitting process as one of many reasons for our housing crisis and the out-migration of both businesses and workers. In response, he is moving ahead with a

streamlined permitting program passed by the legislature last summer. The legislation sets up a new $4 million agency known as the Mass Permit Regulatory Office. The goal is to process 90% of permits that have to be issued by the Department of Environmental Protection within 180 days. Local municipalities have to opt into the program, which may require a two-thirds vote of town meeting or city council. This Act is strictly for utilization by business. There is a perception that Chapter 40B already accomplishes the same permit expediting for the residential market. The new act is controversial for this very reason, but it illuminates the problem with permitting that hopefully will translate into innovative permitting processes for homebuilders.

# 5. ZONING RECOMMENDATIONS

## 5.1. Introduction

The zoning regulations in the town of Sudbury have contributed to a lack of available workforce housing. Sudbury, like many towns, has succeeded in maintaining its rural character through its restrictive zoning bylaws. Residential zoning for one-acre lots was originally adopted six decades ago, and this continues to be the predominant zoning in the town today. This type of zoning contributes to an ever-increasing cost of land, which is reflected in Sudbury's high home prices. Sudbury's zoning restrictions on the construction of multiple dwelling units have resulted in a housing stock that is composed of 96% single family dwellings (Sudbury Community Housing Plan, 2005). Representatives from various boards acknowledged the regulatory challenges presented by this large-lot zoning when our group met with town officials to establish the goal of this project.

Table 5.1 creates a picture of what the primary zoning districts in Sudbury, the minimum lot size in those districts, and the amount of acreage that these districts cover.

**Minimum Lot Area for Primary Zoning Districts**

| Zoning District | Minimum Lot Size | Acreage | Percent |
|---|---|---|---|
| Single Residence A | 40,000 sq. ft. | 10,880 | 69.83% |
| Single Residence C | 60,000 sq. ft. | 2,291 | 14.70% |
| Single Residence Wayside Inn Historic Preservation | 5 acres | 1,166 | 7.49% |
| Business | None | 44 | 0.28% |
| Limited Business | None | 53 | 0.34% |
| Village Business | None | 30 | 0.19% |
| Industrial | None | 93 | 0.60% |
| Limited Industrial | 100,000 sq. ft. | 143 | 0.92% |
| Research | 8 acres | 151 | 0.04% |
| Industrial Park | 100,000 sq. ft. | 7 | 0.97% |
| Open Space | None | 721 | 4.63% |
| | Total | 15,580 | 100% |

***Table 5.1 a.***

Table 5.2 displays the names of the overlay districts in Sudbury.

| Overlay Districts: |
|---|
| Flood Plain |
| Historic Districts: |
| Old Sudbury |
| Hudson Road |
| Wayside Inn 1 |
| Wayside Inn 2 |
| King Phillip |
| Water Resource Protection |
| Wireless Services |
| Flexible Development |
| Cluster Development |

***Table 5.1.b***

### 5.2. Regulatory Approach to the Melone Site

Town Meetings occur each spring (last meeting-April 4, 2007) or a special Town Meeting can be called for specific items that cannot wait until that annual Town Meeting. To change the current zoning of a research district to any other type of zoning, the project would have to go before Town Meeting and pass with a two-thirds majority vote. In order to avoid a Town Meeting vote, the Melone site could be developed as a "Friendly 40B project".

### 5.3. Chapter 40b

Chapter 40B encourages the production of affordable housing in all cities and towns throughout the Commonwealth by allowing developers to bypass local zoning ordinances if the project meets a minimum requirement of 25% affordable units. These units can then be sold to lower income households who earn no more than 80% of the area median income (or rental housing, the project can provide 20% of the units to households below 50% of median income). Currently, Sudbury has 5,582 year round housing units (based on 2000 Census) and 256 affordable units accounting for a 4.6% of the required 10%. Sudbury must have a 10% affordable inventory in order to be able to override the 40B process.

### 5.4. Friendly 40b

The Melone Parcel could be developed as a Friendly 40B, contributing to Sudbury's goal of providing at least 10% of its housing stock to low-income households. The nature of a Friendly 40B is that it overrides local zoning regulations, but also facilitates collaboration between developers and the town officials to

achieve a high quality design. A Friendly 40B is a win-win situation for the town and the developer. The town is able to play a significant role in negotiating the design of the project, and the developer is able to meet with abutters and other concerned parties to identify and resolve issues early on in the process. Sudbury is familiar with the Friendly 40B process, also called the Local Initiative Program which was started in 1990 in response to Chapter 40B. Development of the Melone parcel under the provision of a Friendly 40B gave the designers certain flexibility to incorporate ideal elements such as: diversity in housing stock and tenure, open space, and sustainable design and materials. These ideal elements where used to make town-wide zoning recommendations.

### 5.5. Outline of Recommendations

We have made four regulatory recommendations; two of these recommendations are entail new provisions, while two build on existing bylaws to supply modifications. The two new recommendations include:

- A Sustainability Overlay, and
- An Inclusionary Zoning Bylaw.

The two modifications on existing bylaws are:

- A Cluster Development Bylaw, and
- An Accessory Dwelling Unit Bylaw.

All the regulatory suggestions work in cooperation with goals and objectives set forth by Sudbury's master plan, "Sustainable Sudbury", documents produced by the town's community housing committee, and the Arc of Innovation's key priorities.

### 5.6. Recommendation #1: "Sustainability" Overlay

*Recommendation: The town of Sudbury should create a new overlay zone to promote smaller, more ecologically efficient starter homes to reduce the financial burden of rents and mortgages. The implication of this is to foster a change in the way residents of Sudbury and the region view their homes (less of an investment, more of a place to live).*

The purpose of this recommendation is to create a performance-based sustainable overlay zone. This overlay will utilize components that create more ecological and sustainable development while providing affordable, workforce and market rate housing units for rental and homeownership. It will also

incorporate sustainable design techniques utilized in the concepts put forth by this UMass studio project. Key characteristics of this overlay are:

- Affordability: 25% of all units reserved for deed-restricted affordable housing that meets 80% of AMI
- 25% of units sold to mid-range income households (90-120% AMI)

***Starter Homes***

State representative Kevin Honan (Brighton) has proposed new legislation in Massachusetts to encourage voluntary local zoning and permitting for modest priced "starter" homes. Municipalities will be financially empowered through local aid and additional bonuses to implement changes to their housing stock. The current dimensional framework for this proposal includes 1,700 square foot, 3 bedroom units at a density of 5-8 units per acre. The units will be more affordable than conventional market rate homes at 150% of AMI. Since the "starter home proposal" is designed to fill the needs of families, the legislation also includes funding from the state for school costs related to this type of development (Bluestone, 2007).

As an ancillary zoning tool, this overlay would be linked to the base-zoning map as applied to individual town-owned parcels that could be developed for affordable and workforce housing. Privately owned parcels could be considered for this zone, however in order to keep developer's opportunity costs and home prices low, it may not be feasible. Therefore issues with spot zoning are avoided. Another alternative zoning technique, such as floating zones, which are affixed to particular parcels through amendments to the zoning map, is not a feasible avenue of approach in this circumstance as a rezoning process would be necessary for each parcel developed "sustainably." This process would discourage this type of development. The legislation targets non-profit developers who will purchase the land at a reasonable rate

This zone emphasizes collaboration between the Planning Board and Developer in order to determine appropriate lot sizes and dimensions for each individual development. Community owned space would become the norm to encourage neighborliness. A specific design process must be followed but decisions from the Planning Board will be given within 180 days. A good design shall be rewarded with a good review.

- Incentives
  - By-right with site plan review (creates incentive)
  - Collaborative and expedited permitting (180 days), opportunity to meet with technical review committee

- Density (smaller homes create greater opportunities for density)

The site planning process would be similar to a cluster subdivision in which a minimum amount of open space is preserved (at least 40 percent).

- Open space must protect wildlife habitat, wetlands and prime agricultural soils.
- To save this valuable land, the lot sizes will be kept very small, and dimensional requirements will be eliminated in order to formulate appropriate maximum lot coverage for each design.
- Agricultural uses and structures can be permitted by the Board in the open space to preserve historic farming character and charm.

Incentives, by way of density bonuses are utilized as an automatic incentive for this type of housing development. Twenty-five percent of the units should be reserved for perpetually deed-restricted affordable homes and another 25% should target workforce households. Guidelines similar to the Comprehensive Permit Law (40B) can be utilized to ensure affordability.

- Because of the prescriptions of this overlay, the Zoning Board of Appeals will not grant a Chapter 40B permit. Developers should be interested in this novel approach to housing in eastern Massachusetts, not only for the design flexibility, but also to reap profits from efficient multi-family units.

Innovative and sustainable practice criteria must be utilized in order to qualify for the primary incentive: a streamlined permitting process.

***Sustainable Practices***

- Smaller footprints, impervious surface coverage calculations will be performed and should not exceed 18%
- Emphasis on individual site designs and cooperation between developer and planning board
- Increased density of 8 or more dwelling units per acre
- Preservation of open space or agricultural lands and soils as well as wildlife corridors
- Requires preservation of open space (minimum 40%)
  - Portion of open space will become community owned space
  - Agricultural use permitted on open space
- Low Impact Development (LID) and Best Management Practices (BMPs) for onsite stormwater management
- Package treatment facility for onsite wastewater treatment

- Lot sizes will be kept very small; dimensional requirements eliminated
- No minimum parcel size for development
- Multifamily homes to increase efficiencies of scale for builder and buyer
- Rental homes

**Note:**
The multi-family criteria and streamlined permitting process are components of this overlay, but are also separate recommendations (amendment to Cluster Development Bylaw section and Appendix XX, respectively).

The administrative impacts of this recommendation are increased than status quo. However, it is expected that the quality and expedition of developments will improve with increased applications. It is predicted that developers will enjoy working within the constructs of this overlay, thus increasing Sudbury's reputation for taking developer's time seriously.

Table 5.3 is a sampling of properties previously identified for consideration under this overlay by the Community Housing Committee (see Appendix C):

| Parcel ID | Description |
|---|---|
| C12,100 | Melone Gravel Pit (North Road). 30.2 acres. Currently being mined for gravel. |
| J07,049 and J08,001 | Land adjacent to the DPW facility on Old Lancaster, Pine Ridge and Washbrook Road. Approximately 4 acres. Currently vacant (but under investigation for wastewater treatment potential). |
| G09,200 | Parkinson Land behind Ti-Sales off Hudson and Maynard Roads. 13.56 acres. Currently recreational use. |
| F09,006 | Austin Drive, adjacent to Featherland Park. 5.77 acres. Currently vacant. |
| K11,006 | Sudbury Training Field, Old County Road. 3.17 acres. Currently vacant. Historic site. Not supported for housing by the Sudbury Historical Commission. |

***Table 5.6*** *Community Housing Plan, 2005*

### 5.7. Recommendation #2: Inclusionary zoning

*Goal: To stimulate a mixed-income community in Sudbury, by expanding and dispersing the workforce housing stock*

Inclusionary zoning is a regulatory concept which requires developers to designate a certain amount of housing to be made available to low and moderate-income households. Inclusionary zoning combats exclusionary zoning practices, such as the large lot zoning found in Sudbury, which drives up the cost of housing and excludes lower-income families from the community (www.realtor.org, 2007). Although Sudbury unsuccessfully attempted to pass an inclusionary ordinance back in 1994, this type of zoning has become a more common practice within the state of Massachusetts in more recent years. Currently, over 100 Massachusetts communities have adopted inclusionary zoning policies (http://www.ma-smartgrowth.org/smartg/smartg_housing.htm, 2007).

The recommended components of the new inclusionary bylaw are:

- A provision for workforce housing, instead of affordable housing
- An Area Median Income (AMI) set at 80-120%

Developer Incentives to encourage the use of this inclusionary bylaw such as:

- Zoning variances
- Density bonuses
- Expedited permitting

It is recommended that Sudbury take a more innovative approach to inclusionary zoning creating a provision for workforce housing rather than affordable housing. An Area Median Income (AMI) of 80-120% is more attractive for developers, allowing them to charge more for a mid-range house than a low-range one. The Massachusetts' Smart Growth Tool Kit offers a model inclusionary zoning bylaw to guide communities, like Sudbury, who wish to create such an ordinance.

***Community Involvement***

Inclusionary Zoning can be a very effective tool for stimulating affordable housing development; many factors have to come into play before it can work correctly. Any change in zoning policy needs the support of an organized community. Policy makers and those advocating for change need to reach out to everyone who lives and works in the community. In addition, relationships with key stakeholders and corporate leaders should be made, and knowledge of the community's political climate needs to be assessed. The current economy, land use and housing needs have to be assessed to answer important questions that will determine if inclusionary zoning will work. For example: what is the appropriate compensation for developers depending on the cost of land? Finally, technical and legal assistance is imperative for drafting a solid zoning ordinance. (www.policylink.org, 2007). Once these factors are in

place, it does not guarantee that an inclusionary zoning ordinance will work. Inclusionary zoning can receive strong opposition from developers, the real estate community and even public officials opposed to affordable housing.

### 5.8. Recommendation #3: Ammendments to the Cluster Development Bylaw

*Goal: The integration of multiple housing will encourage a diverse housing stock and provide for different household sizes and as well as household incomes.*

***Existing Regulations:***

Purpose: The Town's cluster development provision encourages the preservation of land for conservation by promoting suitable siting of the buildings and better overall site planning.

The Cluster Development Bylaw is an overlay that applies to the following districts:

Single Residence "A" (A-Res)

Single Residence "C" (C-Res)

Wayside Inn Historic Preservation Residential Zone District.

| DISTRICT | A-Residence | C-Residence | Wayside Inn |
|---|---|---|---|
| Structures Permitted | Single-family (detached)/accessory dwelling | Single-family (detached)/accessory dwelling | Single-family (detached)/accessory dwelling |
| Minimum Parcel | 10 acres | 10 acres | 10 acres |
| Minimum Lot Size | 20,000 sq.ft | 30,000 sq. ft | 2 acres |

***Table 5.8***

Since the cluster development provision was adopted in 1988 there have been 13 cluster applications, accounting for 22% of all subdivisions approved since that date. The Town would also be able to encompass goals to increase workforce housing through several amendments to this article of the zoning ordinance.

Amending these articles of the bylaw to allow two-family and multi-family dwellings would diversify Sudbury's housing stock, which is now predominantly single-family housing. As of the year 2000, 4% of total housing in the town of Sudbury was multi-family. Currently, the Village Business District (VBD) is the only district that allows the new construction of multi-family housing. The VBD accounts for only

.19% of Sudbury's total land area. By contrast, the cluster development bylaw is an overlay that applies to 92% of Sudbury's land area.

*Size Amendments:*

- Reduction of the minimum tract size: (10 acres) to 5-8 acres to accommodate for greater density (City of Beverly, Milford; Town of Southwick, Land Development Ordinance).
- Reduction of minimum lot sizes to encourage developers to design smaller, more affordable units.

*Creating Developer Incentives:*

- Density bonus: allowing the number of units per square foot to increase in return for affordable housing (80% of AMI), workforce housing (80-120% of AMI) or multi-family housing.
- Allowing cluster development by-right.

*Inclusionary Component:*

- Require that a certain percentage of the housing constructed under the cluster development provision be multi-family or workforce housing.
- Lot sizes should be adjusted to reflect a difference between detached single family and two-family or multi-family housing.
- Emphasize the design of high quality, usable open space, particularly for multi-family housing
- Examine performance design standards to ensure that development is constructed in a way that is consistent with the town's character.

*Apply "major" vs. "minor" development provision:*

- Major residential development = the creation of five or more residential lots
- Minor residential development = the creation of four or fewer residential lots.
- The town requires all new "major developments" designate 20% of housing to be multi-family or workforce.
- "Minor developments" would not be mandated to include a multi-family or workforce housing component; this would be optional.

The recommendation to amend the cluster development provision to include multi-family housing aligns with the Town Master Plan's overall theme of sustainability, as well as specific recommendations to utilize the remaining developable land (<20% of Sudbury's current land) wisely by avoiding low density

development and promoting the clustering of developments to preserve open space (Town of Sudbury, Master Plan 2001).

### 5.9. Recommendation #4: Accessory Dwelling Units

*Goal: Maximize Sudbury's potential for workforce housing by increasing rental stock in the Town.*

***Existing Regulations***

Purpose: To compensate the existing patterns of development through the creation of housing units for parents and children of Sudbury residents, in addition to persons of low and moderate income.

Definition: Accessory apartments can be a part of an existing home, or be a detached structure on the residential lot separate from the main building. Apartments must be self-contained, meaning they provide complete living accommodations for the tenants who live there including provisions for living, sleeping, eating, cooking and sanitation (http://www.mass.gov/envir/smart_growth_toolkit/, 2007).

| DISTRICT | A-Residence | C-Residence | Wayside Inn |
|---|---|---|---|
| Occupants permitted | Family member, domestic servant, low-, mod-income family | Family member, domestic servant, low-, mod-income family | Family member, domestic servant, low-, mod-income family |
| Maximum Floor Area | 1,200 sq. ft. | 1,200 sq. ft. | 1,200 sq. ft. |

***Table 5.9***

*Other Requirements:*

- No more than 1 single accessory dwelling unit per lot.
- The owner of the accessory dwelling unit must reside in the principal dwelling unit.
- Accessory Dwelling Unit must have at least one-off street parking space.
- Number of accessory dwelling units is not to exceed 5% of the total number of single-family residences.

Sudbury's existing regulations in Apartment Dwelling Unit (ADU) Bylaw establish some strict requirements for building an ADU. While the goal of affordable housing is at the core of these requirements, loosening these regulations could actually help encourage the creation of more accessory units; diversifying the town's housing stock and creating more affordable and workforce rental options. Sudbury is aware of the need to lessen restrictions and the Town's Zoning Board of Appeals is resistant to

recently proposed new amendments, concerned that changes might result in duplex housing. Taking this into consideration, the following recommendations are proposed to help spur the creation of ADUs.

*Recommended Amendments:*

- Reduce maximum square footage from 1,200 sq. ft to 1,000 sq. ft.
- Eliminate restrictions as to who can occupy them.
- Allow by-right development for affordable and market rate accessory dwelling units.
- Create an incentive program for affordability/workforce units.
- "Residents First" Clause

One of the ways the designs for the Melone parcel worked to achieve affordability was through smaller square footage. This same process could be applied to ADU's by reducing the maximum square footage from 1,200 square feet to 1,000 square feet. In order to increase rental stock for everybody, not just family members of the principal dwelling unit or low- moderate- income families the occupant restrictions should be eliminated. As Sudbury is aware, this type of development would become more attractive to homeowners if the permitting process was eliminated and ADU's were built by right.

Sudbury could also look at communities like Newton and Lincoln, who have incentive-based programs that provide tax abatements or refunds to homeowners who create affordable accessory dwelling units on their property. Sudbury could also provide workforce housing in this program, and include a residents-first clause. A "residents-first clause" would ensure that the residents of Sudbury, their children, and municipal employees, have rental preference on new Accessory Dwelling Units. This program would help keep valuable workforce residents from moving out of town by giving them affordable housing options. In addition to providing a lower priced rental option, ADUs also provide the homeowners with additional income to help maintain their house and mortgage (http://www.mass.gov/envir/smart_growth_toolkit/, 2007). This may be another creative solution to housing the workforce population, who could supplement their income with an on-site rental property.

***Examples of Incentive-based Programs***

**City of Newton**

Several communities in Massachusetts have very progressive accessory apartment bylaws and programs. The City of Newton has an Accessory Apartment Incentive Program. This program, run in conjunction with the Community Living Network, grants up to $90,000 from the city to homeowners looking to build an Accessory Apartment onto their existing home. This money can be used towards the permitting, design

or even construction of the project. However, the money will only be allocated if the apartment is rented to low or moderate-income tenants. This particular program was started in August of 2006. Since that time, five accessory apartments are in different stages of development through aid from the program. Newton has had similar programs in one form or another for the past nine years, but these older versions were under used and less defined (http://www.ci.newton.ma.us/, 2007).

**Town of Lincoln**

Lincoln Massachusetts has had success with its Accessory Apartment Affordability Program. Part of the Town's 2003 Consolidated Housing Plan, this program encourages affordable accessory apartments through incentives to homeowners in the form of property tax abatements or refunds. Apartments are granted through special permits granted to the homeowner with the understanding that they will comply with the affordability terms stated in the Accessory Apartment bylaw (Town of Lincoln Consolidated Housing Plan. 2003).

## 5.10. Analysis of Recommendations

The four recommendations: a sustainability overlay, an inclusionary bylaw, as well as amendments to the cluster development bylaw, and the accessory dwelling unit bylaw, have been paired with goals in Table #5.6 in order to create a sense of how each compares with the others. The sustainability overlay has the potential to fulfill most of these goals followed by the cluster development, accessory dwelling unit bylaw, and inclusionary zoning. Ideally all of these recommendations would be applied together however, the innovative nature of the sustainability overlay makes its implementation the most politically challenging. The other three recommendations range from medium to high in terms the politically feasibility of each implementation outcome. The cluster development and the accessory unit bylaw have a high measure of political feasibility because they are modifications to existing regulations. While, the inclusionary bylaw has a medium measure of political feasibility since it is a new bylaw.

| | **Sustainability Overlay** | **Inclusionary Zoning** | **Cluster Development** | **Accessory Dwelling Unit** |
|---|---|---|---|---|
| **Design Flexibility** | YES | N/A | NO | N/A |
| **Increases Density** | YES | NO | YES | YES |
| **Affordability** | YES | YES | YES | YES |
| **Developer Incentives** | YES | YES | YES | YES |
| **Supports Mixed-Income** | YES | YES | YES | YES |
| **Diversity of Housing** | YES | NO | YES | YES |
| **Preserves Open Space** | YES | NO | YES | NO |
| **Political Feasibility** | CHALLENGING | MEDIUM | HIGH | HIGH |

***Table 5.10***

## 6. IMPLEMENTATION

There are a number of steps to take in order for plans to be well received by Sudbury residents. This section will recommend some of the measures that could be taken in order to increase the support for plans amongst residents. The section will be laid out in the following aspects of addressing the public:

- Media;
- Visualization Tools;
- Word Choice; and
- Community Engagement.

### 6.1. Media

The local newspaper is a great place to start with public relations because of wide-spread distribution and regional focus. It is a way to disseminate and promote information to the citizens of the community and an important way of gaining the public's support. People who read the newspaper are likely the people who can form the main obstacle to development. Therefore, disseminating information prior to a large public meeting can help allay fears and counteract misperceptions (Porter, 2002). Working with the media allows planners to address issues in a less heated manner before or after the issue goes public.

Newspaper coverage gives planners the chance to clearly explain why citizens of the community should support the issue at stake. If a public hearing is scheduled to gather feedback on changes to a town's zoning by-law that will enable a particular development, a letter to the editor explaining why this initiative is important to citizens of the community will aid in the project's goals. Municipality should show the local newspaper as well as the public how important planning-related issues are to the community. Planners should:

- Personally invite reporters to meetings;
- Supply reporters with press releases; and
- Share the good and the bad—Alerting the paper to a potentially controversial issue that will be broached at an upcoming meeting affirms that the planning department or board values the democratic process.

Another important media tool that planners should utilize is a website. Even though almost every municipality maintains a web site, planners need to make sure that it is updated regularly. An up-to-date web-page is useful to inform a community because concerned citizens often go straight to a

municipality's web-site to see when and where meetings are, what the upcoming agenda or issue is, and any other information. The municipal website can be a useful medium for showing maps and other visual aids that may have been utilized at public workshops or hearings.

If the town is conducting a public education campaign on density, it may be useful to link the municipal homepage to an interactive, design game that shows how different design alternatives for a parcel may work. In addition, there are websites that have older versions of mainstream, popular games available for free download, including: Sim City, City Creator, City Life, Lin City, and Civilization. With the inclusion of multi-media learning tools and access to materials, the town's website can not only become valuable resource for the community, but can also encourage a greater public involvement.

### 6.2. Visualization tools

The most important component to the realization of a development plan is the understanding and acceptance of the general public. Often, the average citizen becomes lost among regulation jargon, maps, analysis and wordy comprehensive plans. However, visualization software can help to narrow this gap of understanding. Planners, urban designers, landscape architects, and other planning professionals can use computerized visualization techniques to encourage public participation. Many of the techniques they employ—digital maps, digital imaging and video, urban simulation, virtual reality, and Web-based interactive maps—can be incorporated into public meetings to garner a visual understanding among residents of a community. Sometimes the easiest and most effective visualization tools are the ones that are simplest to create or access. Even materials like sketches or photographs can help a community understand what a potential plan will look like and how it will fit into their community. By allowing the public to understand development projects or scenarios, the municipality increases the chance of obtaining public approval for a future proposal. The ability to visualize different design scenarios, then, would be a strong method for engaging and fostering local involvement in the effort to change one's zoning by-law (Porter, 2006).

Three-dimensional digital modeling constructs a physical model from the base up, layer by layer. These physical models, created from three-dimensional GIS or CAD data, can display more information than a flat screen image or paper printout. With virtual reality, the viewer is projected into a computer-generated three-dimensional space that creates the illusion of reality. Virtual reality can be applied to two types of simulations—real environments, such as the interior of a building or a streetscape, and imagined environments that can incorporate proposed development changes (www.esri.com, 2007).

The challenge with these types of visualization software comes with the required technical skills. Most development companies have the software and personnel. Therefore, a municipality may want to require in their contract with the developer that the proposed development plan or growth scenario be visualized. That way, the municipality can use this visual toolkit at future meetings. With visualization tools, local and regional planning agencies and development organizations can create simulations that foster public participation.

### 6.3. Word choice

Proper word choice during meetings and presentations is important when speaking to a public about potential changes that could be taking place within their community. The way a planner presents themselves during such meetings can help or hinder any trust that they may build with the public. A careful balance between syntax, semantics and discourse styles must be found and used carefully. Effective communication will engage, comfort or even entertain the public planners are reaching out to (Trenholm and Jensen, 1992).

***Avoid Loaded Words***

Ineffective communication will impede the exchange of good ideas and information. The term *"affordable housing"* may not necessarily be the appropriate phrase for the plans being proposed. Often, the term has a negative connotation and is associated with poverty, crime, and other undesirable elements. "Affordable housing" refers to housing designed for those who make at or below 80% of the area median income. An alternative term like "workforce housing" has a much more positive connotation. This "workforce" housing includes housing to be made accessible for the firefighters, police, nurses and teachers who work in town but cannot afford to live there.

*"Density,"* has also become a negative word in the field of planning (Porter, 2002). Although planning officials should emphasize the benefits associated with an increase in residential density, it is important to convey these sentiments using alternative words. Consider the example of a traditional neighborhood development. Planning officials should steer clear of mentioning what is in fact the essence of this type of residential development pattern—compact, dense form—and instead reinforce how it is *traditional*. The success of neotraditional residential projects demonstrates a popularity for the 'traditional (Landon, 1994).' Focus attention on the development's other defining characteristics such as walkability. Let community members draw their own conclusions on the type of density traditional neighborhood development brings. The same concept goes for cluster developments. Planning officials should speak to

the *value of open space preservation*, not to dense housing. Too often language skews an idea and paints a picture before the entire proposal can be explained thoroughly and defended.

***Forgo Technical Lingo***

The use of acronyms and industry jargon can confuse and distance the public. Speaking in a way that the public can easily understand is likely to reduce resentment and distrust. For example, planners use too many acronyms like "PUD" or "TOD" that do not translate to reporters, which, in turn, cause these concepts to lose meaning when presented to the public in the paper (McCarron, 2001). By speaking in layman's terms, a planner will convey the message more clearly in addition to fostering an environment where the public is comfortable asking questions about the proposed plans.

***Outline the Consequences of Inaction***

The *Planner's Communication Guide* suggests a planner remain clear about whether challenges or opportunities in the community are seen as immediate or in the distant future. Excitement generally builds if the issue is viewed as pressing. First, this requires creating a sense of urgency about an issue, then outline the consequences of inaction. For example, in the case of Sudbury, one might explain that if the town does not take some kind of action to account for the need for workforce housing, important community members such as firefighters, nurses, utility workers and others might find themselves needing to move out of town to find housing that they can afford. The bottom line: enlightened, excited publicity can motivate your community to respond favorably to current and forthcoming issues you are advocating (Planner's Communication Guide, 2006).

**6.4. Community Engagement**

It is important that the city councilors or board of selectmen as well as the chief elected official voice support for proposed changes to zoning or special permits. Citizens elected these officials to lead them, so it makes sense that they would pay attention to whether or not these officials endorse the proposed plan. If elected officials do not see the merits of the proposed plan, the initiative will likely result in failure.

Communities need jobs in order to provide employment for residents and stabilize a municipality's tax-base. Business support, then, is important to obtain because the future well being of these corporations is tied to affordable workforce housing. Businesses are important community stakeholders too. They need to be shown that inaction will do them a disservice in the long-term. For these reasons, corporations should *publicly* voice support for new residential development projects (Chicago Metropolis, 2002).

## 7. COMMUNITY VISIONING

### 7.1. Managing Resistance

Many well-intentioned developments never come to fruition because of community resistance. This resistance can stem from well-meaning objections from residents, and the occasional strategic objection. Some of these objections may be based on misunderstandings or faulty assumptions, and others are real differences in opinion. However, we believe the best way to meet each point of resistance when planning for the common good is with information and education. In order to manage resistance there is a delicate balance, which must be observed between the interests of the public, and maintaining the vision of the experts. In keeping with the goals listed in the Sudbury's Master Plan to increase the diversity of housing options, and in conjunction with our own goals to provide sustainable housing alternatives, we have compiled a set of if-then statements that relate to the most common objections in Sudbury, and several additional objections that can become points of resistance in the near future.

- If the objection is a **loss of open space** and **environmental impact**, then there are several counterpoints that can be used. First and foremost, sprawling low-density development consumes far more land than higher density compact development, and results in more loss of open space. Second, contiguous open space is more beneficial to core habitats and wildlife corridors. When smaller parcels of open space form a patchwork across an area, the efforts are less effective because animals are not generally inclined to travel two miles to the next allotted open space. Additionally, new development does not mean a total loss of open space, but frequently offers new open space and recreational opportunities with the new creation of trailheads and paths, athletic fields, sledding hills, swimming spots, and so on. Last, the environmental impact of a new residential development can be decreased by using green building practices that decrease the footprint of the development, as well as high density housing results in less automobile dependency (Pendall and Caruthers, 2003).

- If the objection is **increased school costs**, then a counterpoint should be that higher density housing yields less school children than larger single family homes, and ultimately more people paying into the school budget without drawing from it (Haughey, 2005). Also, per capital school costs are 18% higher in low-density areas (The Donahue Institute, 2005) partially because busing costs are much higher when walking, biking, and ride sharing become less viable options (The Donahue Institute, 2000). The bottom line is that while it is true given the ways in which public schools are financed turns school age children into a fiscal burden; the impact varies by type of development. Finally,

given that Sudbury's schools are not filled to capacity, costs to absorb the children from a moderate number of units may not be the financial catastrophe it is assumed to be.

- If the complaint is **increased cost of town services**, then the best counterpoint to make is that is more costly to maintain roads, sewer, water, and utilities in low density areas, and that there are more people consuming less space and services who pay taxes in high density areas (Haughey, 2005, O'Toole, 2003).

Overall, sprawling low density developments are linked to a number of things that residents do not want. The goal of assuaging fears related to new development is to help residents understand that the things they do not want are things that are created by inaction. The people of Sudbury have identified that they do not want to lose open space, increase educational and town service costs, or have the character of their community compromised. In order to achieve the things they want it is best that they understand that the ways to achieve them do not have to be drastic and scary, simply minor adjustments that would help alleviate the costs of sprawl.

| If the objection is: | Then your counterpoint should be: |
|---|---|
| Loss of Open Space | • Sprawl consumes more land.<br>• Contiguous open space is more beneficial to core habitats and wildlife corridors.<br>• New development can offer new open space opportunities (walking paths, trails, athletic fields, etc.). |
| Increased Education Costs | • Higher density housing yields less school age children per unit, and more people paying taxes.<br>• Per capita school costs are 18% higher in low-density areas.<br>• Busing costs are lower in high density areas as walking and ride sharing become more viable options.<br>• Sudbury's schools are not filled to capacity. |
| Increased Town Service Costs | • It is most costly to maintain roads, sewer, water, and utilities in sprawling areas. |
| Environmental Impact | • Inefficient land use destroys farms and open space.<br>• High-density lessons auto dependency.<br>• Green building practices and the smaller environmental footprints of smaller, denser housing decreases environmental impact. |
| Increased Congestion or Traffic | • Single-family housing generates more traffic.<br>• We are proposing development away from Route 20 in a research zone increasing walk-to-work and rideshare opportunities. |
| Degradation of Community Character | • High-density housing is not always ugly, nor what people imagine it is.<br>• Architecture for multifamily housing can be attractive and complimentary to local vernacular.<br>• Sprawl is linked to decentralization and lack of community connectedness. |

***Table 7.1:*** *Points and Counterpoints*

## 8. CONCLUSION

As the MetroWest region continues to feel the effects of an expanding Boston, the issues of residential density, workforce housing and sustainability have become issues that cannot be ignored. By looking at these issues through the prism of the Melone property and the town of Sudbury, this study hopes to show that it is possible to increase the affordability options in the region through sustainable measures while making higher densities and smaller lots more appealing.

This study looked into the details of the Melone property, but also at the needs of Sudbury and the entire I-495 region. After an exhaustive analysis of the region's economy, zoning regulations and existing development, the final result is two highly marketable and sustainable design plans for the Melone property that will also uphold the character of the community. Due to the current zoning conditions of the site, as well as the central issue of workforce housing, new regulatory suggestions have also been proposed to ensure the successful development of the proposed plans.

We found Sudbury to be a community well aware of the challenges they face, and one open to ideas on how to manage it. Development of the Melone Site will provide the town with the opportunity to address the issues of density, workforce housing and sustainability.

Weeks of extensive research consisted of: An Extensive Site Analysis of the Melone parcel, along with numerous site visits to photograph, sketch, study and assess the site. Conceptual design work was done to model existing conditions and preliminary concepts were made to flesh out design ideas. A market analysis was conducted to study the existing economic, housing and school cost conditions of Sudbury. Likewise, a regulatory analysis was done to examine existing bylaws, subdivision regulations and the Master Plan. Numerous interviews were conducted with local and state planning officials, and our team was careful to keep close contact with the town and planning officials from Sudbury to ensure that we were creating designs and regulations that lived up to their community's expectations.

Our market analysis determined that although Sudbury's typical housing is unaffordable, even to its own community, the community has a promising future if its build out is managed properly. The regulatory recommendations made by this study strive to help Sudbury's housing goals align with the vision documented in their Master Plan (2001), which encourages a greater diversity of housing opportunities in the town. This report recommended the following:

- "Sustainability" Overlay Zone
  - A new overlay zone to promote smaller, more ecologically efficient houses to reduce the financial burden of rents and mortgages. The implication of this is to foster a change in the way residents view their homes (less of an investment, more of a place to live).
- Inclusionary Zoning
  - A more radical approach to inclusionary zoning, creating a provision for workforce housing rather than affordable housing.
- Amendments to the Cluster Development Bylaw
  - The integration of multiple housing will encourage a diverse housing stock and provide for different household sizes and as well as household incomes.
- Accessory Apartment Dwelling Units
  - To encourage the amendment of current bylaws and the creation of incentive programs in order to stimulate the development of Accessory Dwelling Units and maximize their potential as an option for workforce housing.

The two design schemes for the Melone property were created to add affordability options to the town of Sudbury. Both design concepts maximize open space and increase density through sustainable measures. The Drumlin Scheme remains true to the historic architectural of Sudbury, arranging the architecture and vegetation to form a connection of large, open spaces and smaller community spaces. The Orchard Scheme brings more a modern feel to the site through modular dwellings. A grid arranges the architecture, and a path system provides capillary movement to large, open terraces.

Through our recommendations and research, our team aspires to increase the diversity and density of the housing stock in the town of Sudbury through sustainable design and the preservation of community character. Ultimately, it is the hope of this study that through the analyses of the local regulations, market and the region itself, that the proposed designs and recommendations will become a reality and serve as a model for workforce housing and residential density within the Arc of Innovation.

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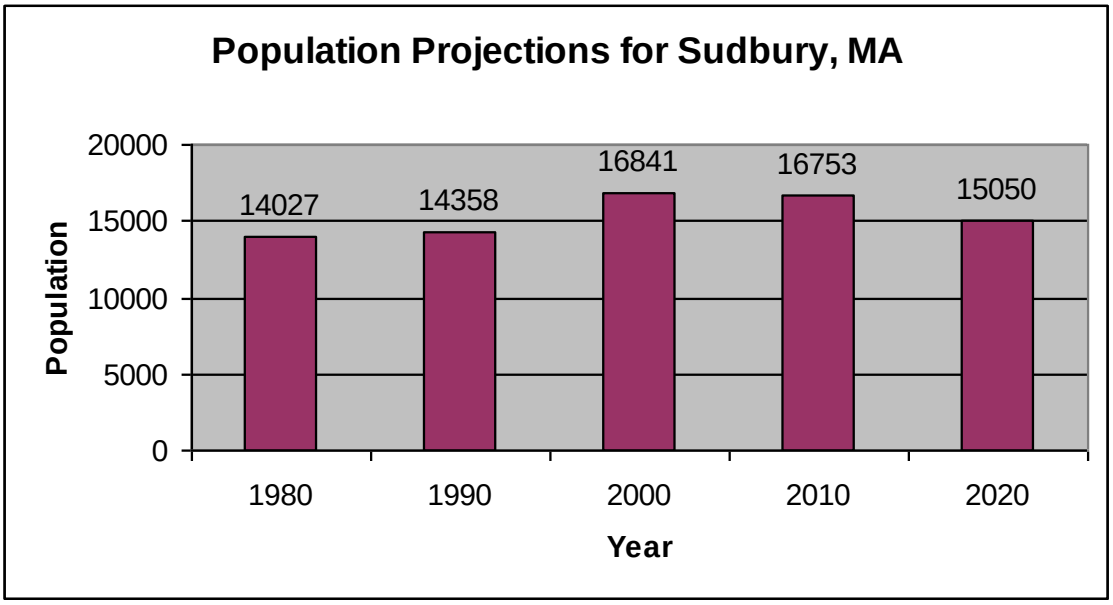
## 10. APPENDICES

### Appendix A. *Demographic Information*

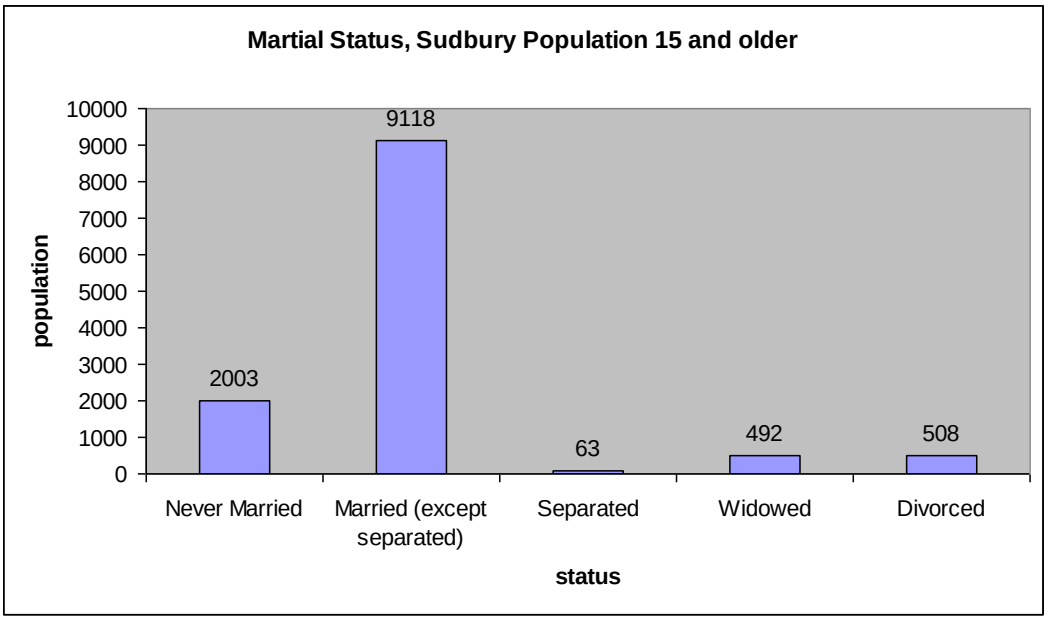



Metropolitan Area Planning Council, 2006

**Sudbury Labor Force by Sector**

| Sector | 2000 | 2010 | 2020 | 2030 |
|---|---|---|---|---|
| Natural Resource, Mining, Construction | 212 | 242 | 261 | 275 |
| Manufacturing | 1383 | 1303 | 1223 | 1156 |
| Trade, Transportation, Utilities | 1141 | 1221 | 1263 | 1297 |
| Information | 302 | 333 | 351 | 365 |
| Financial Services | 165 | 181 | 190 | 197 |
| Professional and Business Services | 472 | 537 | 578 | 611 |
| Education and Health Services | 1256 | 1380 | 1458 | 1521 |
| Leisure and Hospitality | 483 | 534 | 585 | 591 |
| Other Services | 240 | 268 | 286 | 300 |
| Government | 236 | 248 | 254 | 258 |
| **Total** | **5890** | **6246** | **6428** | **6571** |

Metropolitan Area Planning Council, 2006

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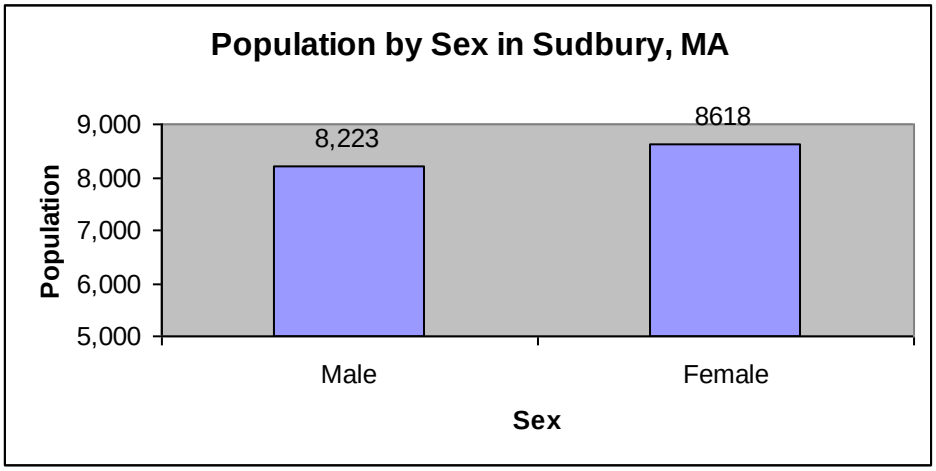


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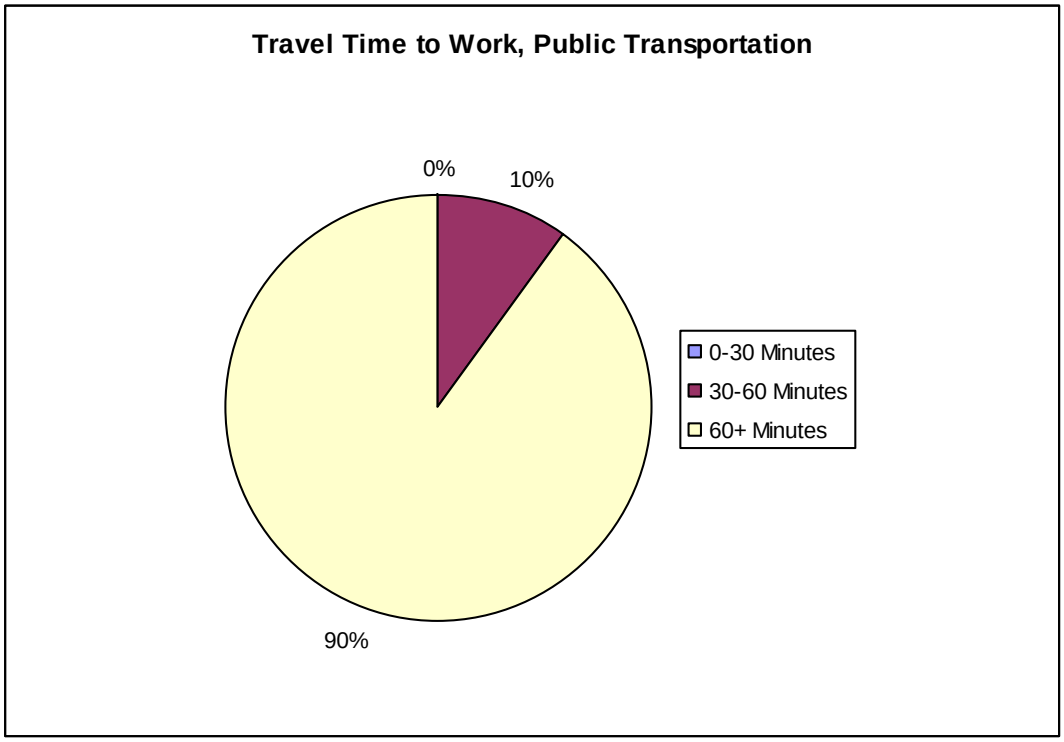


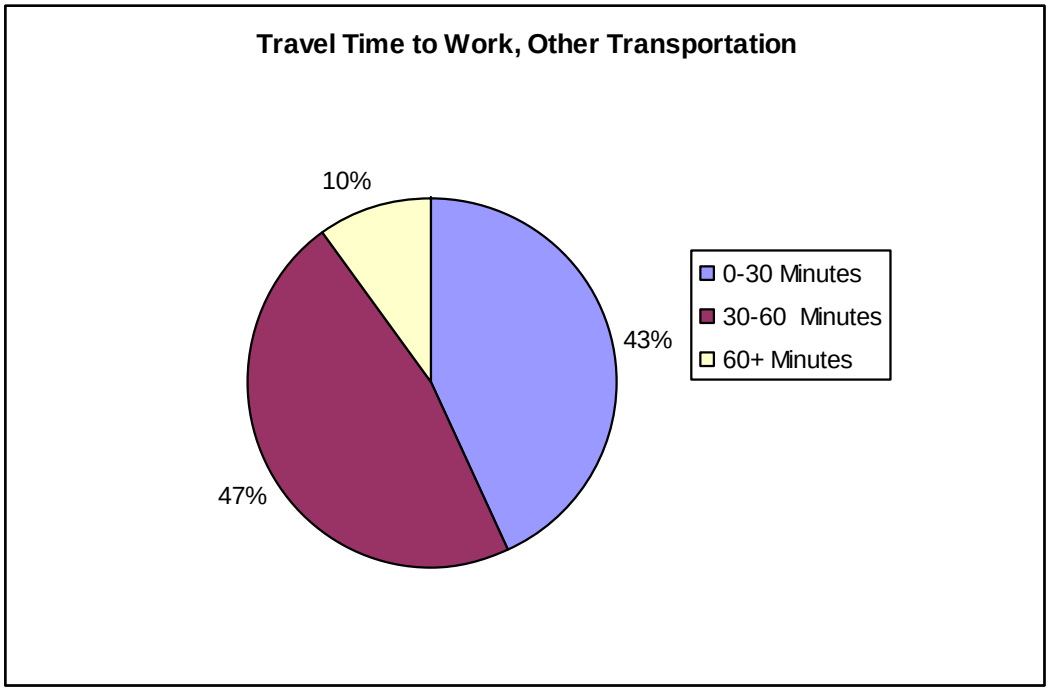


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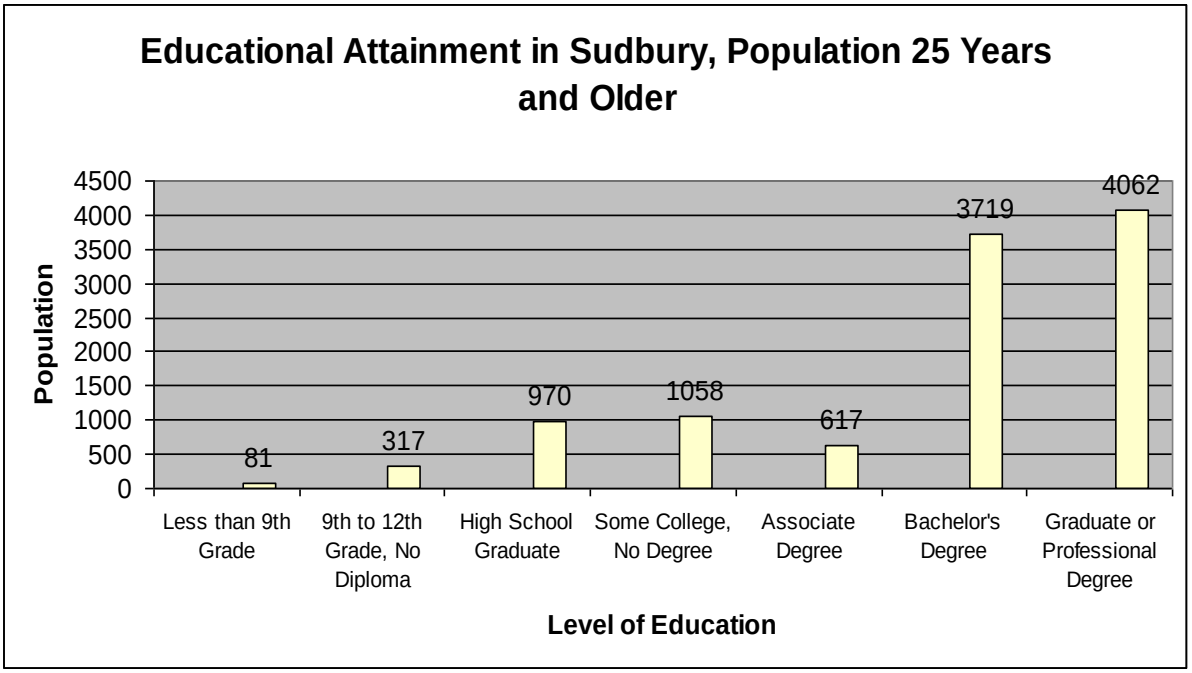


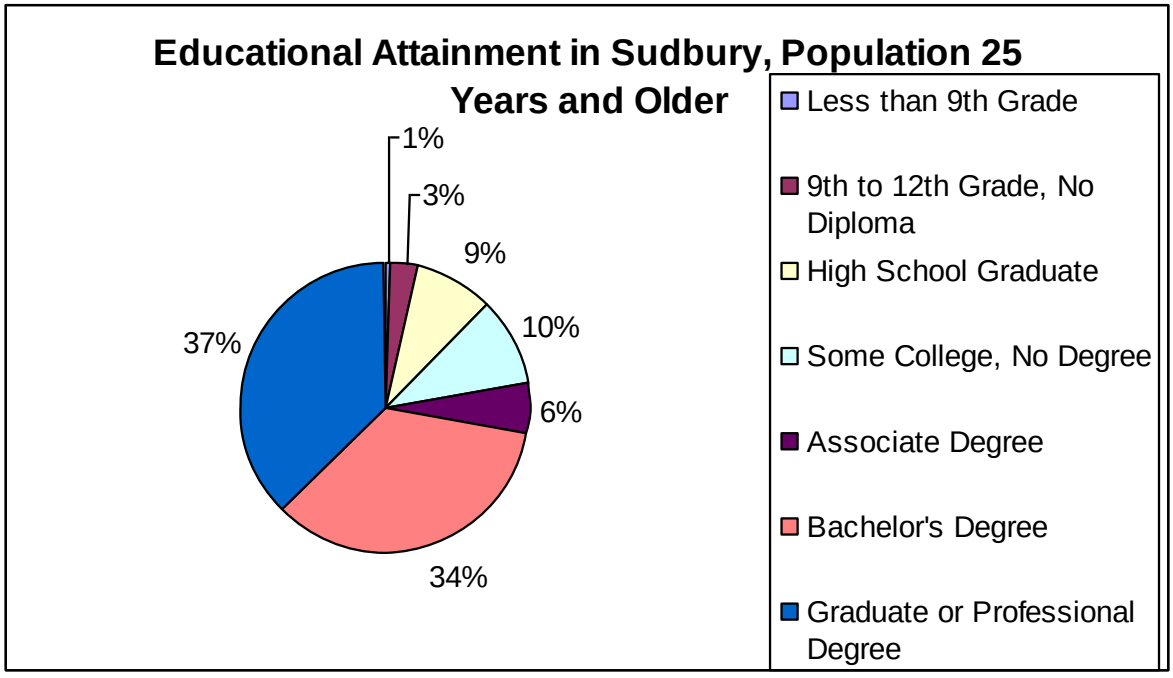


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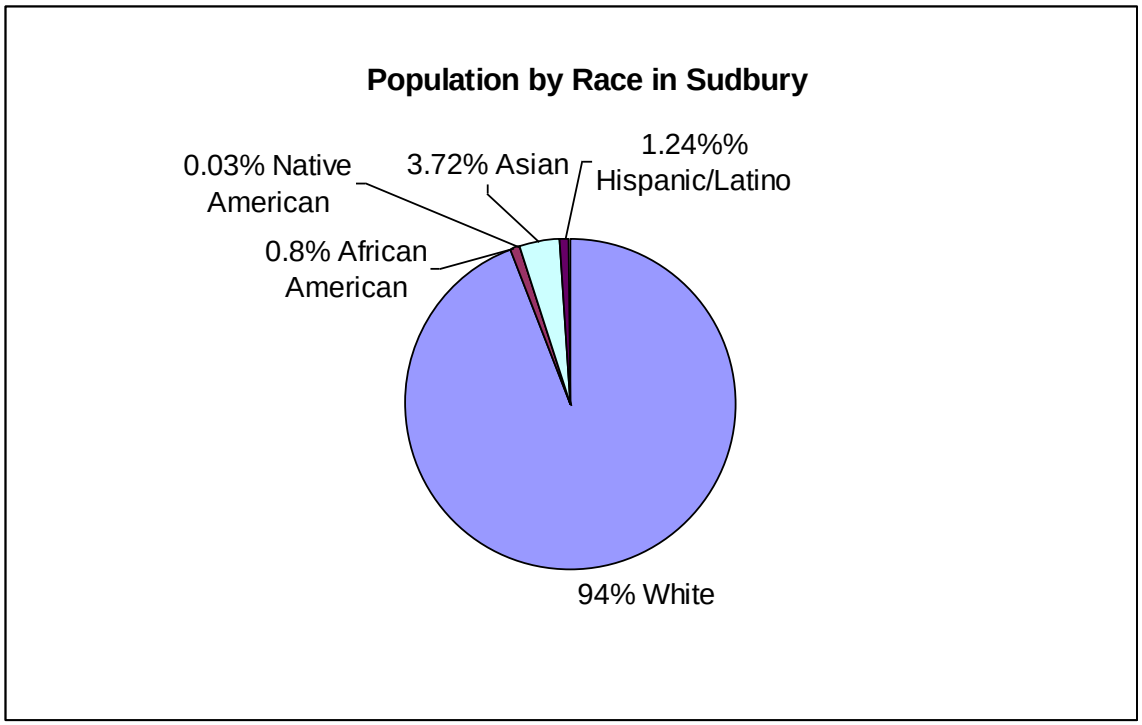


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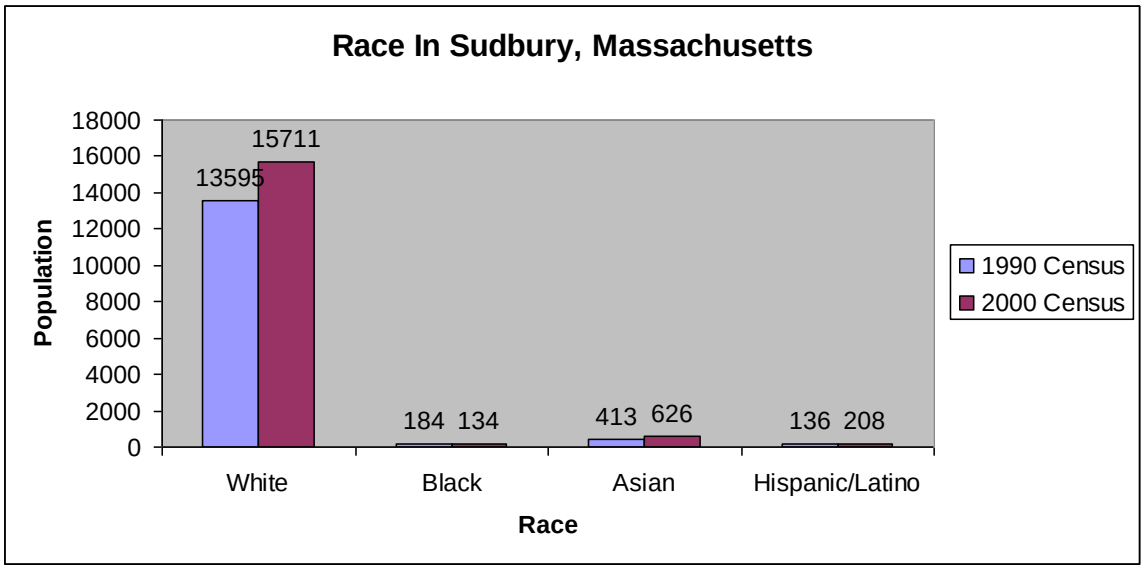


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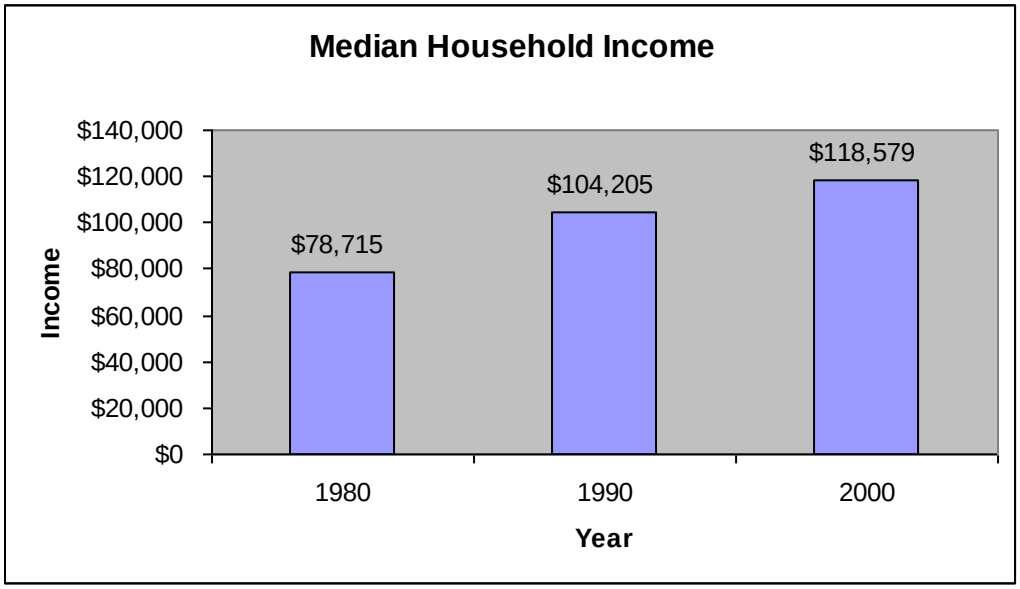


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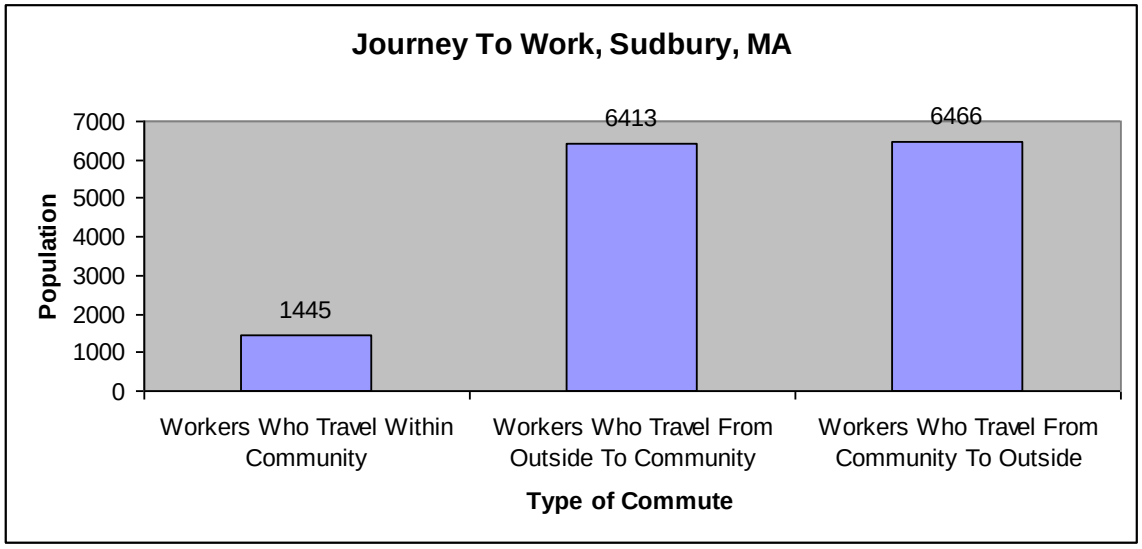


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## Appendix B. *Fiscal Analysis*

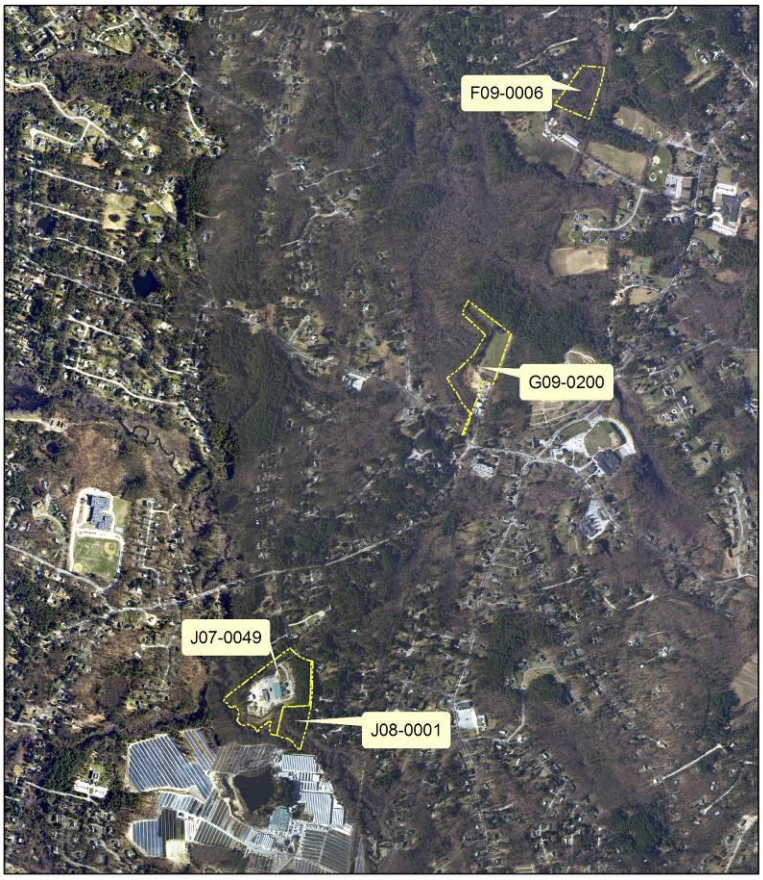
Part I-Developer's Profits from development (any profit above 10% is do-able for a non-profit developer)

| **DRUMLIN CONCEPT** | # Units | Sq Ft | Cost per Ft | Cost per unit | Total cost | Sales Price | Total Proceeds | Profit (Loss) |
|---|---|---|---|---|---|---|---|---|
| 1 BR Affordable | 5 | 1000 | $225 | $225,000 | $1,125,000 | **$140,000** | $700,000 | -$425,000 |
| 1 BR Mid-range | 5 | 1000 | $235 | $235,000 | $1,175,000 | **$250,000** | $1,250,000 | $75,000 |
| 1 BR Market | 7 | 1000 | $245 | $245,000 | $1,715,000 | $400,000 | $2,800,000 | $1,085,000 |
| Total 1BR | 17 | | | | $4,015,000 | | $4,750,000 | $735,000 |
| | | | | | | | | |
| 1 BR Affordable | 4 | 900 | $225 | $202,500 | $810,000 | **$140,000** | $560,000 | -$250,000 |
| 1 BR Mid-range | 2 | 900 | $235 | $211,500 | $423,000 | **$250,000** | $500,000 | $77,000 |
| 1 BR Market | 0 | 900 | $245 | $220,500 | $0 | $400,000 | $0 | $0 |
| Total 1BR | 6 | | | | $1,233,000 | | $1,060,000 | -$173,000 |
| | | | | | | | | |
| 2 BR Affordable | 12 | 1200 | $225 | $270,000 | $3,240,000 | **$160,000** | $1,920,000 | -$1,320,000 |
| 2 BR Mid-range | 12 | 1200 | $235 | $282,000 | $3,384,000 | **$350,000** | $4,200,000 | $816,000 |
| 2 BR Market | 18 | 1200 | $245 | $294,000 | $5,292,000 | $500,000 | $9,000,000 | $3,708,000 |
| Total 2BR | 42 | | | | $11,916,000 | | $15,120,000 | $3,204,000 |
| | | | | | | | | |
| 2 BR Affordable | 10 | 1500 | $225 | $337,500 | $3,375,000 | **$160,000** | $1,600,000 | -$1,775,000 |
| 2 BR Mid-range | 10 | 1500 | $235 | $352,500 | $3,525,000 | **$375,000** | $3,750,000 | $225,000 |
| 2 BR Market | 20 | 1500 | $245 | $367,500 | $7,350,000 | $500,000 | $10,000,000 | $2,650,000 |
| Total 2BR | 40 | | | | $14,250,000 | | $15,350,000 | $1,100,000 |
| | | | | | | | | |
| 3 BR Affordable | 4 | 1500 | $225 | $337,500 | $1,350,000 | **$180,000** | $720,000 | -$630,000 |
| 3 BR Mid-range | 5 | 1500 | $235 | $352,500 | $1,762,500 | **$400,000** | $2,000,000 | $237,500 |
| 3 BR Market | 10 | 1500 | $245 | $367,500 | $3,675,000 | $600,000 | $6,000,000 | $2,325,000 |
| Total 3BR | 19 | | | | $6,787,500 | | $8,720,000 | $1,932,500 |
| | | | | | | | | |
| 3 BR Affordable | 6 | 2000 | $225 | $450,000 | $2,700,000 | **$180,000** | $1,080,000 | -$1,620,000 |
| 3 BR Mid-range | 7 | 2000 | $235 | $470,000 | $3,290,000 | **$400,000** | $2,800,000 | -$490,000 |
| 3 BR Market | 13 | 2000 | $245 | $490,000 | $6,370,000 | $600,000 | $7,800,000 | $1,430,000 |
| Total 3BR | 26 | | | | $12,360,000 | | $11,680,000 | -$680,000 |
| | | | | | | | | |
| Total | 150 | | | | $50,561,500 | | $56,680,000 | $6,118,500 |
| | | | | | | | | |
| | | | | | | | | **12.10%** |

| ORCHARD CONCEPT MODULAR UNITS | # Units | Sq Ft | Cost per Ft | Cost per unit | Total cost | Sales Price | Total Proceeds | Profit (Loss) |
|---|---|---|---|---|---|---|---|---|
| 1 BR Affordable | 7 | 725 | $185 | $134,125 | $938,875 | **$140,000** | $980,000 | $41,125 |
| 1 BR Mid-range | 7 | 725 | $195 | $141,375 | $989,625 | **$160,000** | $1,120,000 | $130,375 |
| 1 BR Market | 8 | 725 | $205 | $148,625 | $1,189,000 | $225,000 | $1,800,000 | $611,000 |
| Total 1BR | 22 | | | | $3,117,500 | | $3,900,000 | $782,500 |
| | | | | | | | | |
| 1 BR Affordable | 2 | 770 | $185 | $142,450 | $284,900 | **$140,000** | $280,000 | -$4,900 |
| 1 BR Mid-range | 2 | 770 | $195 | $150,150 | $300,300 | **$200,000** | $400,000 | $99,700 |
| 1 BR Market | 4 | 770 | $205 | $157,850 | $631,400 | $250,000 | $1,000,000 | $368,600 |
| Total 1BR | 8 | | | | $1,216,600 | | $1,680,000 | $463,400 |
| | | | | | | | | |
| 1 BR Affordable | 6 | 900 | $185 | $166,500 | $999,000 | **$140,000** | $840,000 | -$159,000 |
| 1 BR Mid-range | 2 | 900 | $195 | $175,500 | $351,000 | **$250,000** | $500,000 | $149,000 |
| 1 BR Market | 0 | 900 | $205 | $184,500 | $0 | $275,000 | $0 | $0 |
| Total 1BR | 8 | | | | $1,350,000 | | $1,340,000 | -$10,000 |
| | | | | | | | | |
| 1 BR Affordable | 6 | 960 | $185 | $177,600 | $1,065,600 | **$140,000** | $840,000 | -$225,600 |
| 1 BR Mid-range | 6 | 960 | $195 | $187,200 | $1,123,200 | **$225,000** | $1,350,000 | $226,800 |
| 1 BR Market | 8 | 960 | $205 | $196,800 | $1,574,400 | $275,000 | $2,200,000 | $625,600 |
| Total 1BR | 20 | | | | $3,763,200 | | $4,390,000 | $626,800 |
| | | | | | | | | |
| 2 BR Affordable | 5 | 900 | $185 | $166,500 | $832,500 | **$160,000** | $800,000 | -$32,500 |
| 2 BR Mid-range | 5 | 900 | $195 | $175,500 | $877,500 | **$250,000** | $1,250,000 | $372,500 |
| 2 BR Market | 10 | 900 | $205 | $184,500 | $1,845,000 | $325,000 | $3,250,000 | $1,405,000 |
| Total 2BR | 20 | | | | $3,555,000 | | $5,300,000 | $1,745,000 |
| | | | | | | | | |
| 2 BR Affordable | 10 | 960 | $185 | $177,600 | $1,776,000 | **$160,000** | $1,600,000 | -$176,000 |
| 2 BR Mid-range | 13 | 960 | $195 | $187,200 | $2,433,600 | **$275,000** | $3,575,000 | $1,141,400 |
| 2 BR Market | 23 | 960 | $205 | $196,800 | $4,526,400 | $350,000 | $8,050,000 | $3,523,600 |
| Total 2BR | 46 | | | | $8,736,000 | | $13,225,000 | $4,489,000 |
| | | | | | | | | |
| 2 BR Affordable | 4 | 1000 | $185 | $185,000 | $740,000 | **$160,000** | $640,000 | -$100,000 |
| 2 BR Mid-range | 5 | 1000 | $195 | $195,000 | $975,000 | **$225,000** | $1,125,000 | $150,000 |
| 2 BR Market | 9 | 1000 | $205 | $205,000 | $1,845,000 | $375,000 | $3,375,000 | $1,530,000 |
| Total 2BR | 18 | | | | $3,560,000 | | $5,140,000 | $1,580,000 |
| | | | | | | | | |
| 3 BR Affordable | 4 | 1100 | $185 | $203,500 | $814,000 | **$180,000** | $720,000 | -$94,000 |
| 3 BR Mid-range | 4 | 1100 | $195 | $214,500 | $858,000 | **$300,000** | $1,200,000 | $342,000 |
| 3 BR Market | 10 | 1100 | $205 | $225,500 | $2,255,000 | $400,000 | $4,000,000 | $1,745,000 |
| Total 3BR | 18 | | | | $3,927,000 | | $5,920,000 | $1,993,000 |
| | | | | | | | | |
| Total | 160 | | | | $29,225,300 | | $40,895,000 | $11,669,700 |
| | | | | | | | | |
| | | | | | | | | **39.93%** |

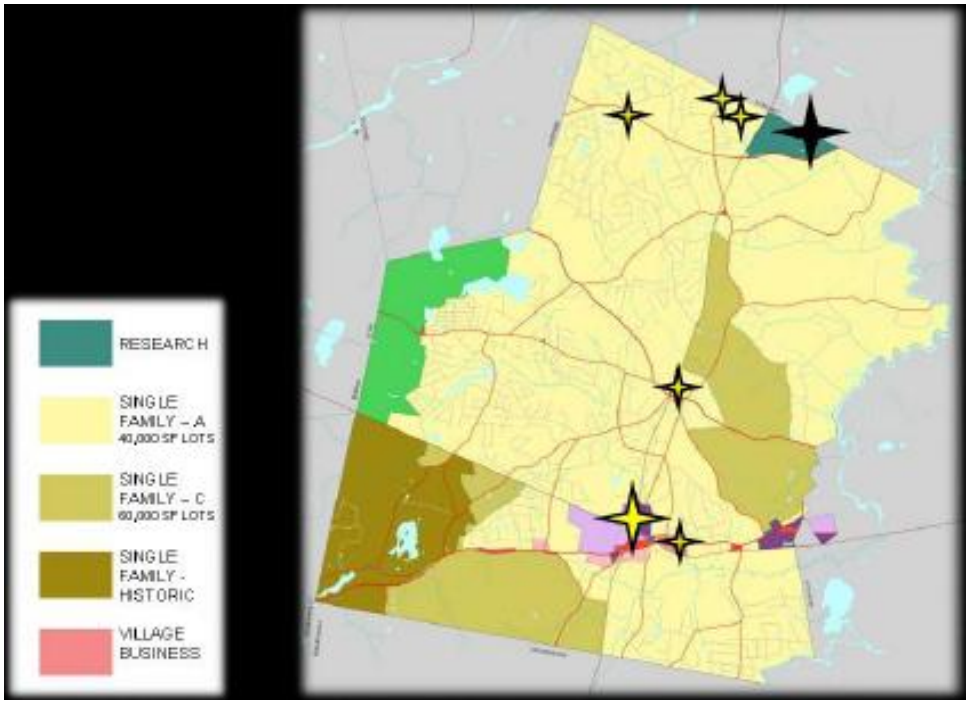
## Appendix C. *Potential Parcels*

Sample of parcels identified by Community Housing Committee as potential areas for affordable housing construction



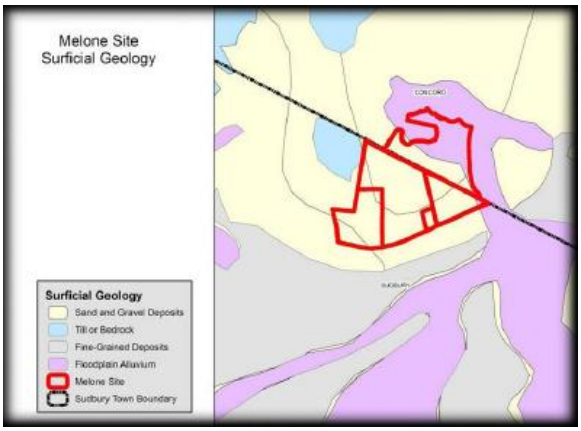
## Appendix D. *Site Context Maps*

SUDBURY ZONING




MELONE SITE LAND USE

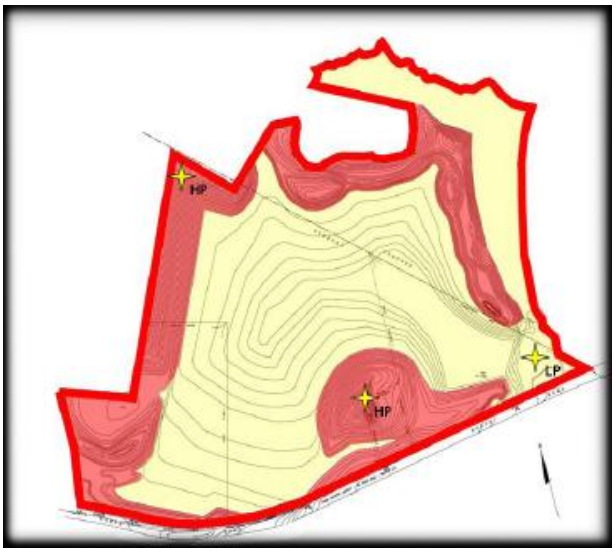

MELONE SITE



MELONE PARCEL HYDROLOGY

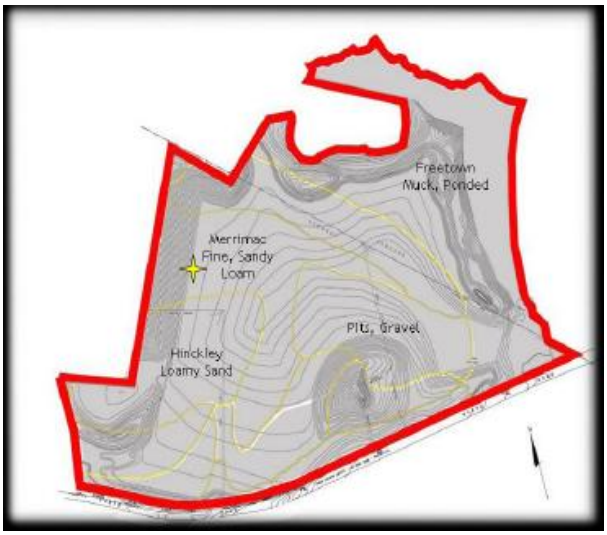

MELONE PARCEL WETLANDS


MELONE PARCEL TOPOGRAPHY/SOLAR ORIENTATIONS



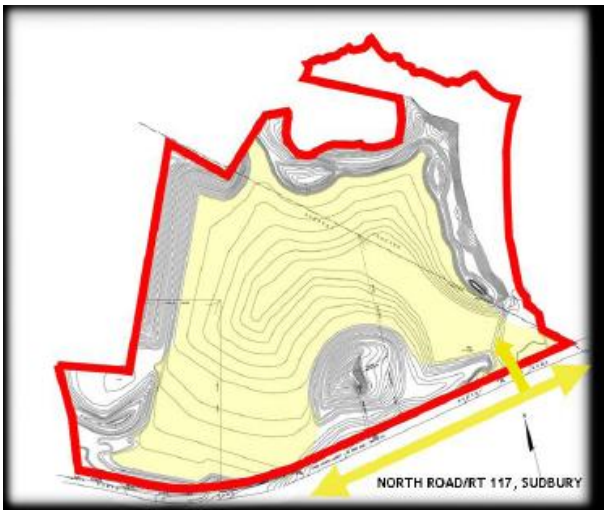

MELONE PARCEL CLIMATE

MELONE PARCEL SOILS

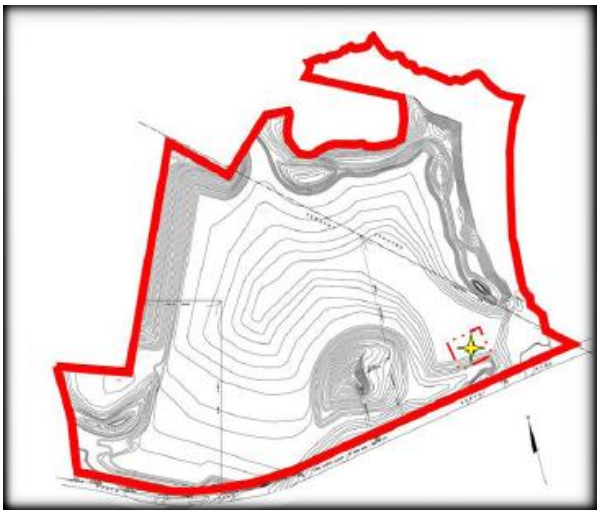



MELONE PARCEL VEGETATION

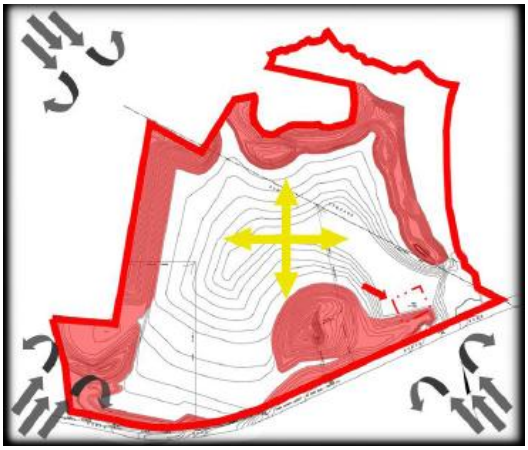
MELONE SITE CIRCULATION




MELONE SITE UTILITIES (LOCATION OF CELL TOWER)



MELONE SITE VIEWS



## Appendix E. *Leeds Silver Standards*

### Project Checklist
LEED for Homes

*Builder Name:*

*Home Address (Street/City/State):*

*Input Values:* No of Bedrooms: 4 Floor Area (SF): 2400

*Minimum No. of Points Required:* Certified: 45 Silver: 60 Gold: 75 Platinum: 90

*Detailed information on the measures below are provided in the companion document "LEED for Homes Rating System"*

| Y / Pts | No | N/A | | | | | | Max Points Available |
|---|---|---|---|---|---|---|---|---|
| **Innovation and Design Process (ID)** | | | | | | (Minimum of 0 ID Points Required) | | **9** |
| | | | | 1.1 | **Integrated Project Planning** | Preliminary Rating | | Prerequisite |
| | | | ✓ | 1.2 | | Integrated Project Team | | 1 |
| | | | ✓ | 1.3 | | Design Charrette | | 1 |
| | | | ✓ | 2.1 | **Quality Management for** | Durability Planning; (Pre-Construction) | | Prerequisite |
| | | | | 2.2 | **Durability** | Wet Room Measures | | Prerequisite |
| | | | | 2.3 | | Quality Management | | Prerequisite |
| | | | | 2.4 | | Third-Party Durability Inspection | | 3 |
| | | | ✓ | 3.1 | **Innovative / Regional Design** | Provide Description and Justification for Specific Measure | | 1 |
| | | | ✓ | 3.2 | | Provide Description and Justification for Specific Measure | | 1 |
| | | | ✓ | 3.3 | | Provide Description and Justification for Specific Measure | | 1 |
| | | | ✓ | 3.4 | | Provide Description and Justification for Specific Measure | | 1 |
| *0* | | | | Sub-Total | | | | |
| Y / Pts | No | N/A | | | | | | |
| **Location and Linkages (LL)** | | | | | | (Minimum of 0 LL Points Required) | OR | **10** |
| **HOLD** | | | | 1 | LEED-ND Neighborhood | | **LL2-5** | 10 |
| | | | ✓ | 2 | **Site Selection** | Avoid Environmentally Sensitive Sites and Farmland | **LL1** | 2 |
| | | | | 3.1 | ***Preferred Locations*** | Select an Edge Development Site | **LL1** | 1 |
| | | | | 3.2 | ***OR*** | Select an Infill Site | **LL1** | 2 |
| | | | | 3.3 | | Select a Previously Developed Site | **LL1** | 1 |
| | | | | 4 | **Infrastructure** | Site within 1/2 Mile of Existing Water and Sewer | **LL1** | 1 |
| | | | | 5.1 | **Community Resources** | Basic Community Resources / Public Transportation | **LL1** | 1 |
| | | | | 5.2 | **& Public Transit** ***OR*** | Extensive Community Resources / Public Transportation | **LL1** | 2 |
| | | | | 5.3 | ***OR*** | Outstanding Community Resources / Public Transportation | **LL1** | 3 |
| | | | | 6 | ***Access to Open Space*** | Publicly Accessible Green Spaces | **LL1** | 1 |
| *0* | | | | Sub-Total | | | | |
| Y / Pts | No | N/A | | | | | | |
| **Sustainable Sites (SS)** | | | | | | (Minimum of 5 SS Points Required) | OR | **21** |
| | | | | 1.1 | **Site Stewardship** | Erosion Controls (During Construction) | | Prerequisite |
| | | | | 1.2 | | Minimize Disturbed Area of Site | | 1 |
| | | | ✓ | 2.1 | **Landscaping** | No Invasive Plants | | Prerequisite |
| | | | ✓ | 2.2 | | Basic Landscaping Design | | 2 |
| | | | ✓ | 2.3 | | Limit Turf | | 3 |
| | | | ✓ | 2.4 | | Drought Tolerant Plants | | 2 |
| | | | ✓ | 3 | **Shading of Hardscapes** | Locate and Plant Trees to Shade Hardscapes | | 1 |
| | | | ✓ | 4.1 | **Surface Water Management** | Design Permeable Site | | 4 |
| | | | | 4.2 | | Design and Install Permanent Erosion Controls | | 2 |
| | | | | 5 | **Non-Toxic Pest Control** | Select Insect and Pest Control Alternatives from List | | 2 |
| | | | ✓ | 6.1 | **Compact Development** | Average Housing Density ≥ Units / Acre | **LL1** | 2 |
| | | | ✓ | 6.1 | ***OR*** | Average Housing Density ≥ 10 Units / Acre | **LL1** | 3 |
| | | | ✓ | 6.3 | ***OR*** | Average Housing Density ≥ 20 Units / Acre | **LL1** | 4 |
| *0* | | | | Sub-Total | | | | |
| Y / Pts | No | N/A | | | | | | |
| **Water Efficiency (WE)** | | | | | | (Minimum of 3 WE Points Required) | OR | **15** |
| | | | ✓ | 1.1 | **Water Reuse** | Rainwater Harvesting System | | 4 |
| | | | ✓ | 1.2 | | Grey Water Re-Use System | | 1 |
| | | | ✓ | 2.1 | **Irrigation System** | Select High Efficiency Measures from List | | 3 |
| | | | | 2.2 | | Third Party Verification | | 1 |
| | | | ✓ | 2.3 | ***OR*** | Install Landscape Designed by Licensed or Certified Professional | **WE 2.2** | 4 |
| | | | | 3.1 | **Indoor Water Use** | High Efficiency Fixtures (Toilets, Showers, and Faucets) | | 3 |
| | | | | 3.2 | **OR** | Very High Efficiency Fixtures (Toilets, Showers, and Faucets) | **WE 3.1** | 6 |
| *0* | | | | Sub-Total | | | | |

## Project Checklist (cont'd)

HERS Index Value Achieved: 86
IECC Climate Zone: 1
EA 1.2 Pts Achieved: 0.0

| Y / Pts | No | N/A | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Energy and Atmosphere (EA)** | | | | | | (Minimum of 0 EA Points Required) | | OR | **38** |
| | | | | 1.1 | **ENERGY STAR Home** | Meets ENERGY STAR for Homes with Third-Party Testing | | | Prerequisite |
| | | | | 1.2 | | Exceeds ENERGY STAR for Homes | | **EA 2-10** | 34 |
| | | | ☒ | 7.1 | **Water Heating** | Improved Hot Water Distribution System | | | 2 |
| | | | | 7.2 | | Pipe Insulation | | | 1 |
| | | | ☒ | 11 | **Refrigerant Management** | Minimize Ozone Depletion and Global Warming Contributions | | | 1 |
| *0* | | | | Sub-Total (or Sub-Total from Adendum A - Prescriptive EA Credits) | | | | | |
| Y / Pts | No | N/A | | | | | | | |
| **Materials and Resources (MR)** | | | | | | (Minimum of 2 MR Points Required) | | | **14** |
| | | | ☒ | 1.1 | **Material Efficient Framing** | Overall Waste Factor for Framing Order Shall be No More than 10%. | | | Prerequisite |
| | | | | 1.2 | | Advanced Framing Techniques | | | 3 |
| | | | | 1.3 | *OR* | Structurally Insulated Panels | | **MR 1.2** | 2 |
| | | | ☒ | 2.1 | **Environmentally Preferable** | Tropical Woods, if Used, Must be FSC | | | Prerequisite |
| | | | ☒ | 2.2 | **Products** | Select Environmentally Preferable Products from List | | | 8 |
| | | | ☒ | 3.1 | **Waste Management** | Document Overall Rate of Diversion | | | Prerequisite |
| | | | | 3.2 | | Reduce Waste Sent to Landfill by 25% to 100% | | | 3 |
| *0* | | | | Sub-Total | | | | | |
| Y / Pts | No | N/A | | | | | | | |
| **Indoor Environmental Quality (IEQ)** | | | | | | (Minimum of 6 IEQ Points Required) | | OR | **20** |
| | | | | 1 | **ENERGY STAR with IAP** | Meets ENERGY STAR w/ Indoor Air Package (IAP) | | **IEQ2-10** | 11 |
| | | | | 2.1 | **Combustion Venting** | Space Heating & DHW Equip w/ Closed/Power-Exhaust | | **IEQ 1** | Prerequisite |
| | | | | 2.2 | | Install High Performance Fireplace | | **IEQ 1** | 2 |
| | | | ☒ | 3 | **Moisture Control** | Analyze Moisture Loads AND Install Central System (if Needed) | | **IEQ 1** | 1 |
| | | | ☒ | 4.1 | **Outdoor Air Ventilation** | Meets ASHRAE Std 62.2 | | **IEQ 1** | Prerequisite |
| | | | | 4.2 | | Dedicated Outdoor Air System (w/ Heat Recovery) | | **IEQ 1** | 2 |
| | | | | 4.3 | | Third-Party Testing of Outdoor Air Flow Rate into Home | | | 1 |
| | | | ☒ | 5.1 | **Local Exhaust** | Meets ASHRAE Std 62.2 | | **IEQ 1** | Prerequisite |
| | | | | 5.2 | | Timer / Automatic Controls for Bathroom Exhaust Fans | | **IEQ 1** | 1 |
| | | | | 5.3 | | Third-Party Testing of Exhaust Air Flow Rate Out of Home | | | 1 |
| | | | ☒ | 6.1 | **Supply Air Distribution** | Meets ACCA Manual D | | **IEQ 1** | Prerequisite |
| | | | | 6.2 | | Third-Party Testing of Supply Air Flow into Each Room in Home | | | 2 |
| | | | | 7.1 | **Supply Air Filtering** | ≥ 8 MERV Filters, w/ Adequate System Air Flow | | **IEQ 1** | Prerequisite |
| | | | | 7.2 | *OR* | ≥ 10 MERV Filters, w/ Adequate System Air Flow | | | 1 |
| | | | | 7.3 | *OR* | ≥ 13 MERV Filters, w/ Adequate System Air Flow | | | 2 |
| | | | | 8.1 | **Contaminant Control** | Seal-Off Ducts During Construction | | **IEQ 1** | 1 |
| | | | | 8.2 | | Permanent Walk-Off Mats *OR* Shoe Storage *OR* Central Vacuum | | | 2 |
| | | | ☒ | 8.3 | | Flush Home Continuously for 1 Week with Windows Open | | | 1 |
| | | | ☒ | 9.1 | **Radon Protection** | Install Radon Resistant Construction if Home is in EPA Zone 1 | | **IEQ 1** | Prerequisite |
| | | | ☒ | 9.2 | | Install Radon Resistant Construction if Home is not in EPA Zone 1 | | **IEQ 1** | 1 |
| | | | | 10.1 | **Garage Pollutant Protection** | No Air Handling Equipment OR Return Ducts in Garage | | **IEQ 1** | Prerequisite |
| | | | | 10.2 | | Tightly Seal Shared Surfaces between Garage and Home | | **IEQ 1** | 2 |
| | | | | 10.3 | | Exhaust Fan in Garage | | | 1 |
| | | | | 10.4 | *OR* | Detached Garage or No Garage | | **IEQ 1** | 3 |
| *0* | | | | Sub-Total | | | | | |
| Y / Pts | No | N/A | | | | | | | |
| **Awareness and Education (AE)** | | | | | | (Minimum of 0 AE Points Required) | | | **3** |
| | | | ☒ | 1.1 | **Education for Homeowner** | Basic Occupant's Manual and Walkthrough of LEED Home | | | Prerequisite |
| | | | ☒ | 1.2 | **and/or Tenants** | Comprehensive Occupant's Manual and Multiple Walkthroughs / Trainings | | | 1 |
| | | | ☒ | 1.3 | | Public Awareness of LEED Home | | | 1 |
| | | | ☒ | 2.1 | **Education for Building Mgrs** | Basic Building Manager's Manual and Walkthrough of LEED Home | | | 1 |
| *0* | | | | Sub-Total | | | | | |
| *0* | | | | **Project Totals (pre-certification estimates)** | | | | | *130* |

for Homes

## Project Checklist, Addendum A

### Prescriptive Approach for Energy and Atmosphere (EA) Credits

*Detailed information on the measures below are provided in the companion document "LEED for Homes Rating System"*

| Y / Pts | No | N/A | | Energy and Atmosphere (EA) (Minimum of 0 EA Points Required) | | | OR | Max Points Available 38 |
|---|---|---|---|---|---|---|---|---|
| | | | 2.1 | **Insulation** | Third-Party Inspection of Insulation, At Least HERS Grade II | | **EA 1** | Prerequisite |
| | | | 2.2 | | Third-Party Inspection of Insulation, Grade I AND 5% above code | | **EA 1** | 2 |
| | | | 3.1 | **Air Infiltration** | Third-Party Envelope Air Leakage Tested </= 7.0 ACH50 (CZ 1-2) | | **EA 1** | Prerequisite |
| | | | 3.2 | | Third-Party Envelope Air Leakage Tested </= 5.0 ACH50 (CZ 1-2) | | **EA 1** | 2 |
| | | | 3.3 | | ***OR*** | Third-Party Envelope Air Leakage Tested </= 3.0 ACH50 | **EA 1** | 3 |
| | | | 4.1 | **Windows** | Windows Meet ENERGY STAR for Windows (See Table) | | **EA 1** | Prerequisite |
| | | | 4.2 | | Windows Exceed ENERGY STAR for Windows (See Table) | | **EA 1** | 2 |
| | | | 4.3 | | ***OR*** | Windows Exceed ENERGY STAR for Windows (See Table) | **EA 1** | 3 |
| | | | 5.1 | **Duct Tightness** | Third-Party Duct Leakage Tested </= 4.0 CFM25 / 100 SF to Outside | | **EA 1** | Prerequisite |
| | | | 5.2 | | Third-Party Duct Leakage Tested </= 3.0 CFM25 / 100 SF to Outside | | **EA 1** | 2 |
| | | | 5.3 | | ***OR*** | Third-Party Duct Leakage Tested </= 1.0 CFM25 / 100 SF to Outside | **EA 1** | 3 |
| | | | 6.1 | **Space Heating and Cooling** | Meets ENERGY STAR for HVAC w/ Manual J & refrigerant charge test | | **EA 1** | Prerequisite |
| | | | 6.2 | | HVAC is Better than ENERGY STAR | | **EA 1** | 2 |
| | | | 6.3 | | ***OR*** | HVAC Substantially Exceeds ENERGY STAR | **EA 1** | 4 |
| | | | 7.1 | **Water Heating** | Improved Hot Water Distribution System | | | 2 |
| | | | 7.2 | | Pipe Insulation | | | 1 |
| | | | 7.3 | **Water Heating** | Improved Water Heating Equipment | | **EA 1** | 3 |
| | | | 8.1 | **Lighting** | Install at Least Three ENERGY STAR labeled Light Fixtures (or CFLS) | | **EA 1** | Prerequisite |
| | | | 8.2 | | Energy Efficient Fixtures and Controls | | **EA 1** | 2 |
| | | | 8.3 | | ***OR*** | ENERGY STAR Advanced Lighting Package | **EA 1** | 3 |
| | | | 9.1 | **Appliances** | Select Appliances from List | | **EA 1** | 2 |
| | | | 9.2 | | Very Efficient Clothes Washer (MEF > 1.8, *AND* WF< 5.5) | | **EA 1** | 1 |
| | | | 10 | **Renewable Energy** | Renewable Electric Generation System (1 Point / 5% Reduction) | | **EA 1** | 10 |
| | | | 11 | **Refrigerant Management** | Minimize Ozone Depletion and Global Warming Contributions | | | 1 |
| *0* | | | Sub-Total | | | | | |

By affixing my signature below, the undersigned does hereby declare and affirm to the USGBC that the LEED for Homes requirements, as specified in the LEED for Homes Rating System, have been met for the indicated credits and will, if audited, provide the necessary supporting documents.

| Builder's Name | | Company | |
|---|---|---|---|
| Signature | | Date | |

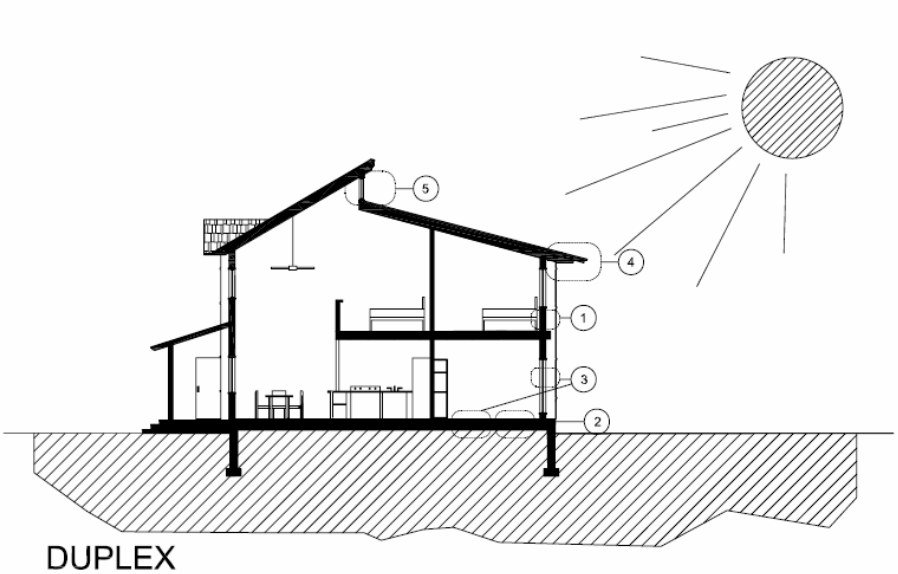
By affixing my signature below, the undersigned does hereby declare and affirm to the USGBC that the required inspections and performance testing for the LEED for Homes requirements, as specified in the LEED for Homes Rating System, have been completed, and will provide the project documentation file, if requested.

| Rater's Name | | Company | |
|---|---|---|---|
| Signature | | Date | |

By affixing my signature below, the undersigned does hereby declare and affirm to the USGBC that the required inspections and performance testing for the LEED for Homes requirements, as specified in the LEED for Homes Rating System, have been completed, and will provide the project documentation file, if requested.

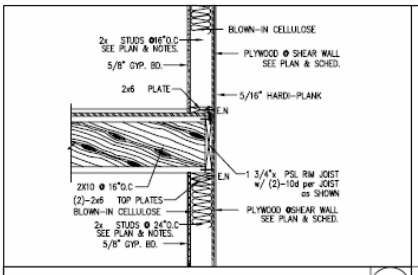
| Provider's Name | | Company | |
|---|---|---|---|
| Signature | | Date | |

## Appendix F. *Solar Orientation*

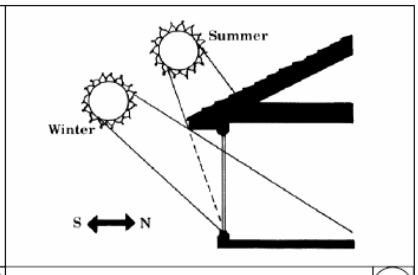



DUPLEX

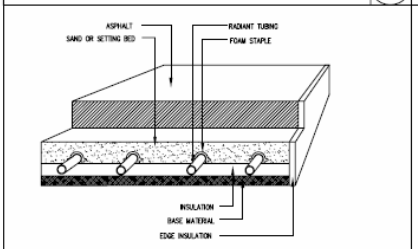
SECTION SCALE: NTS



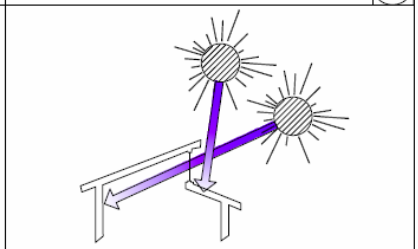

SECTION DETAIL AT FLOOR 1




OVERHANG DIAGRAM 4




RADIANT SLAB DETAIL 2



CLERESTORY DIAGRAM 5

DETAILS

SECTIONS & DIAGRAMS SCALE: NTS

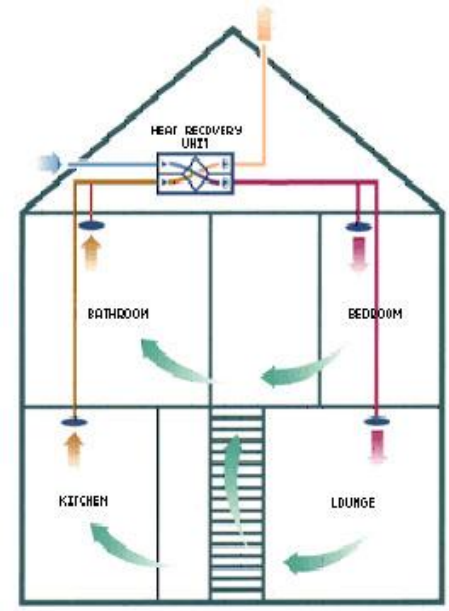
## Appendix G. *Ventilation Heat Recovery*

We breathe by inhaling air and utilizing the oxygen content and exhaling the waste. We all work in conditioned offices, shops, and factories while paying little attention to our homes and the quality of air we breathe. Buildings need to breathe in a similar fashion to us to maintain a fresh and habitable state. We open windows to "air" our houses and refresh them. We lose heat by this method and effectively throw our hard earned dollars out the window, as we have had to pay dearly for the privilege of heating our homes.

A certain amount of air changes in any habitable building are required to maintain this freshness of air. This means that an amount of air needs to be taken in and the same quantity extracted out. The problem is that most of the time the external air is at the incorrect temperature for our consumption and can be costly to heat or cool to our desired temperature. The solution to this problem is to use the heat or cold from the air being exhausted to temper the incoming fresh air. As this is a process of recovering heat from the outgoing air, it is called Ventilation Heat Recovery.

*How it works:*

It works by passing the two air-streams, the incoming and the outgoing, close by each other in a heat exchanger without actually mixing the two. This enables the incoming fresh air to be heated or cooled by the outgoing exhausted air.




The system is in effect an AHU (Air Handling Unit) in your attic / roof space with air ducts running to / from it to every room in your house. The AHU has a number of key elements to it. It has two fans, one for exhaust and one for fresh air intake / supply. It also has the heat exchanger where the two different air-streams will travel through, with the air to be exhausted heating / cooling the supply air. The AHU also has filters to clean the air and remove impurities before it is consumed.

*Why Heat Recovery:*

In the current days of global warming and serious environmental issues we are all urged to conserve energy by as many methods as we can. We can all contribute to this by making our homes as energy efficient as possible. It is increasingly more important that we strive to stray away from oil based energy products. (Oil is due to hit all time high and natural resources of same depleting all the time).

Ventilation Heat Recovery utilizes tiny amounts of electricity to power the fans in the AHU, (comparable to running 2 no 75W light bulbs) so we would claim, given the efficiency of the unit, a significant reduction in your annual energy bills. Ultimately this means you are recovering heat from your outgoing air and heating up your incoming fresh air so your heating thermostat doesn't allow the boiler to "kick in" as frequently.

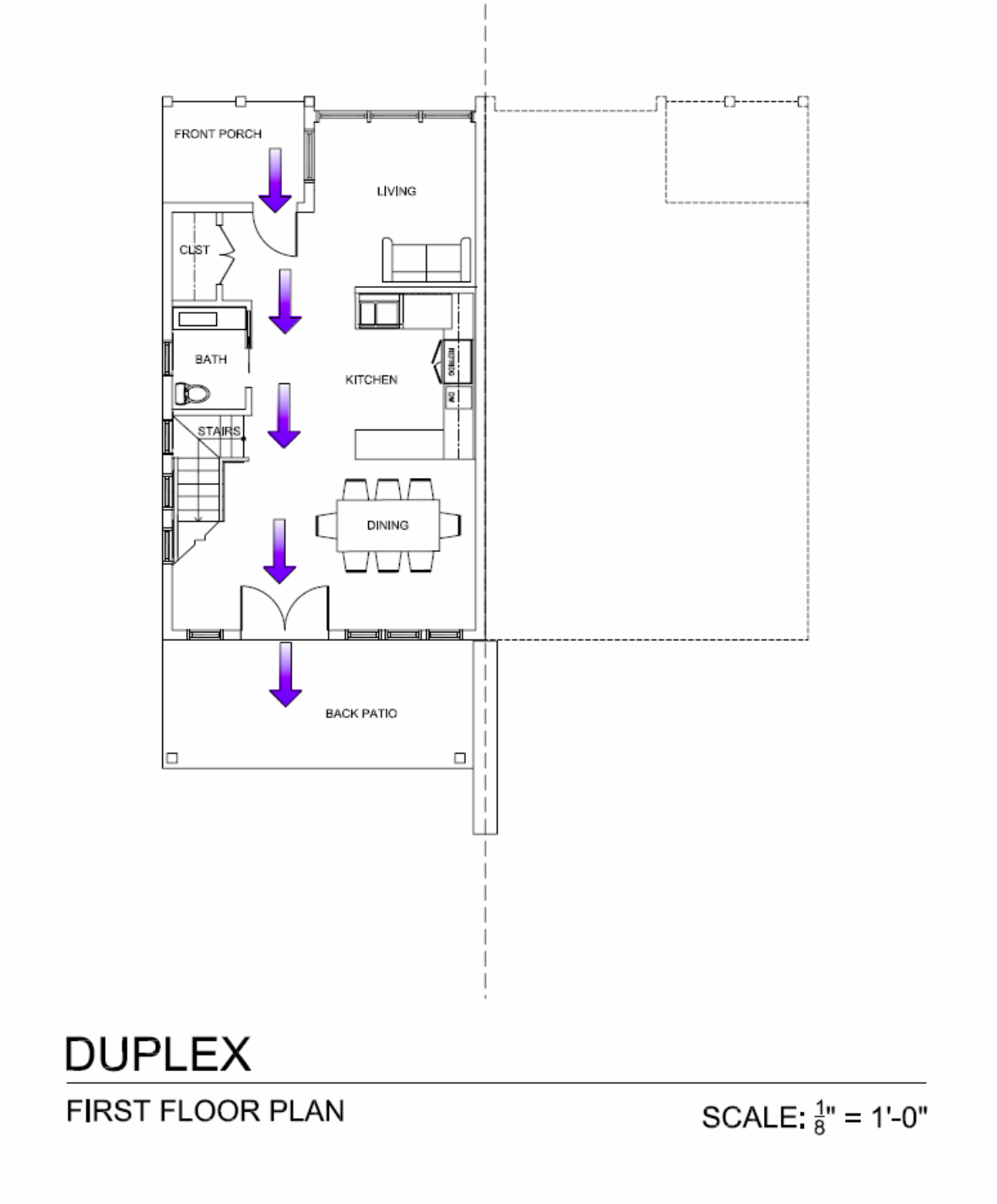
This type of concept is not new and has been used by our friends in Scandinavia and Canada for decades but is becoming increasingly popular in mainland Europe in the last ten years or so. Like all technologies,

improvements have been made to design year upon year and the current efficiencies are almost doubled in the recent years.

This system boasts an efficiency of 92% in certain conditions. This means the fresh air supplied through your AHU is almost at the same temperature as the air being exhausted irrespective of how cold or hot the external temperature is. The Ventilation Heat Recovery system is not designed to replace any heating or cooling system in the domestic environment but to compliment them and increase the total energy efficiency of homes


**www.eco-vent.com/heat_recovery.html**

## Appendix H. *Floor Plan*



## Appendix I. *43D's Applicability to Sudbury*

The Town of Sudbury has a workable permitting process, facilitated in part by a comprehensive guide to permitting processes in the town written by the League of Women Voters. The explanatory flow charts and matrices along with the contact information contained in the guide are the substance found in State reports that illustrate exemplary permitting processes. This section strives to offer additional methods to streamline permitting processes, increasing Sudbury's pro-business regulatory environment.

Massachusetts General Law Chapter 43D, which was signed into law on August of 2006 (and programmatically begun on December 1, 2006), is the newest vehicle available to municipalities to facilitate streamlining local permitting processes and promotes commercial development (Anderson, 2007). To date eight towns and cities have passed 43D, and fifteen additional municipalities have 43D articles on their Town Meeting warrant or City Council agenda for the spring of 2007. Towns and cities that take advantage of 43D have the ability to promote commercial development on pre-approved parcels, called priority development sites, by offering expedited local permitting on those parcels. The expedited permitting in addition to the aggressive marketing of priority development sites offers communities a valuable economic development tool (Executive Office of Economic Development, 2007).

Application of 43D for municipalities begins by each municipality's selection of one or more priority development sites. The priority development sites must meet the following criteria:

- Sites must be zoned commercial or industrial
- Sites must be eligible for the development/redevelopment of a minimum of 50,000 square feet of gross area
- Sites must be approved by the local authority and the state's Interagency Permitting Board

Should Sudbury decide to pass 43D the Town will be able to look toward the Regional Planning Agency, MAPC and MassDevelopment, a quasi-public agency to provide assistance in determining the best location for priority development sites, the best way to develop the sites, and finally best practices for streamlining the Town's permitting processes (Anderson, 2007; Raitt, 2007).

As part of 43D communities are eligible for technical grants (up to $150,000) to improve the efficiency and transparency of their permitting process. Suggestions for utilizing the grant funds include, but are not restricted to: increasing staff capacity, hiring consultant expertise, or purchasing software to create an electronic permitting process (Executive Office of Economic Development, 2006) Although these funds

specifically address the facilitation of streamlined permitting for priority development sites, municipalities can use results as a model to streamline other permitting processes.

Recommendations for the town to pass 43D align with several objectives of Sudbury's Master Plan. Specifically, land use objective C states that the Town needs to encourage land use options that are directed toward sustainability in the commercial and industrial sectors, in order to balance residential growth with the Town's ability to provide necessary services. 43D will address Sudbury's implementation strategy under this objective to streamline permitting processes, particularly within commercial development. (Town of Sudbury, 2001).

Difficulties, however, in utilizing 43D will most likely occur for Sudbury in achieving a majority vote at town meeting.

## Appendix J. *Implementation through Streamlined Permitting*

There are some simple, low-cost/no-cost methods that the Town of Sudbury can use to expedite permitting processes without requiring a majority vote at town meeting, including:

- A technical review committee
- Concurrent meetings
- Comprehensive checklists

The role of a technical review committee would be to provide comprehensive information to each applicant; informing applicants on committee is not intended to replace presentations to other boards, rather to act as important preface to ensure that applicants would be prepared to present in front of these boards, thereby providing mutual benefits to both the town and the applicant (Department of Housing and Community Development, date missing). pertinent information such as: the number and type of permits necessary and the estimated response time for each board. The technical review

Another approach is to hold a technical meeting involving the land use and service departments in order to get all the boards together to evaluate preliminary plans. Both the towns of Lunenburgh and North Andover have been successful in this approach, creating a process that enables relevant boards to offer preliminary input to the applicant. Lunenburgh and North Andover's technical meetings also establish a route for future contribution and provide efficient and comprehensive preliminary feedback to the applicant (Benson, 2007). The Town of Northampton goes a step further by scheduling sequential board meetings on the same night so applicants can move from board to board to get necessary permits (Feiden, 2007). Another financially conservative suggestion would include the formulation of a developer checklist from the flow charts already contained in the comprehensive guide to permitting. This checklist would give developers a concrete road map and save town officials from having to go over the process with each developer.

Expedited permitting can increase the attractiveness of a community to developers, who want to conduct business in an environment that is efficient and upfront about regulatory expectations. However, when expedited permitting is implemented the opportunity for public involvement is also cut down. It becomes vital for planners to continue to take steps to educate the public on new developments within this shortened timeframe. This education comes in the form of mandatory public notices transmitted to community groups in addition to the routine newspapers and public spaces. Sudbury will soon be

soliciting resident participation in the upcoming Master Plan. The solicitation of this participation should emphasis that local zoning is developed in consistency with master plans. Residents' participation in the master planning process will ensure that their goals are integrated into the future development vision for the town.