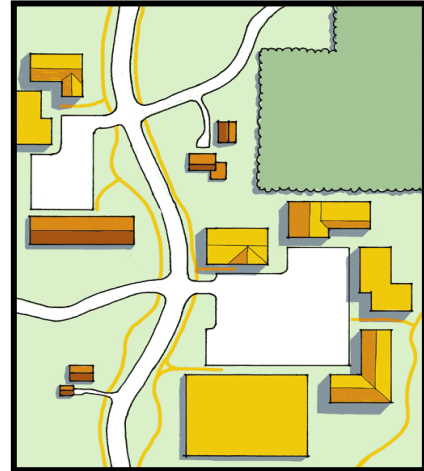


COMMERCIAL DESIGN REPORT HARVARD, MASSACHUSETTS



OCTOBER, 2016

ACKNOWLEDGEMENTS

Commercial Design Standards Task Force

Erin McBee, Chairman, Member of the Planning Board

Rich Maiore, Chair of the Economic Development Committee

Rochelle Greayer

Suzanne Dutkewych

Jim Lee

Al Combs

Wendy Cote-Magan

Harvard Planning Board

Kara McGuire Minar, Chair

Erin McBee

Don Graham

Michelle Catalina

Fran Nickerson

TABLE OF CONTENTS

Part 1: Introduction.....	1
A. Purpose.....	1
B. Applicability	2
C. Excerpt from Harvard’s Zoning By-Law – Design Review	4
D. Land Use Conditions.....	5
Part 2: Design Themes in the C District.....	7
A. Overview	7
B. Dimensional Regulations Applicable to the C District.....	7
C. Typical Development Practices in the C District.....	12
D. Purposes of Commercial Design Standards.....	14
E. Design Review Board	15
Part 3: Building Guidelines.....	17
A. Roof Guidelines.....	17
B. Façade Guidelines	19
C. Building Composition Guidelines	21
D. Guidelines for Organization of Buildings and Uses	23
E. Building Materials Guidelines	25
F. Energy Guidelines.....	25
Part 4: Landscaping and Site Standards	27
A. Parking Guidelines	27
B. Parking Lot Landscaping Guidelines.....	29
C. Site Landscaping Guidelines	32
D. Access Management Guidelines	34
E. Guidelines for Connectivity	37
F. Guidelines for Delivery Areas.....	38
G. Guidelines for Utilities and Mechanical Equipment.....	39
H. Planning for Pedestrians and Bicyclists.....	40
I. Open Space and Environment Guidelines	41
J. Lighting	43
K. Stormwater.....	46
L. Residential Conversions.....	48
Part 5: Ayer Road Village Special Permit	49
A. Overview	49
B. Discussion of Village Concepts.....	50
C. Sample Village Developments	51

Appendix 1 Draft Bylaw for a Commercial Design Review Board	55
Appendix 2 Invasive Species Lists.....	57
Invasive Plants of Massachusetts	57
Massachusetts Plant Advisory Group (MIPAG).....	61

LIST OF TABLES

Table 1: Land Use in the C-District.....	5
Table 2: Zoning Bylaw Dimensional Requirements.....	9
Table 3: Comparison of Design Review and Site Plan Review.....	16

PART 1: INTRODUCTION

A. Purpose

Harvard is an historic New England community that has actively planned to retain its charming rural character in the midst of intensive development. Interstate 495 spurred significant commercial and industrial growth along its spine and numerous employment centers catalyzed housing growth throughout eastern Massachusetts. Despite the presence of I-495 within its borders, Harvard has resisted the pressure for growth and has opted for a dispersed, primarily residential development pattern with large lots and private open space. The Town has actively purchased large swaths of open space and has worked hard to keep its remaining farms open and productive. This choice has its costs.

The tax base of Harvard is heavily residential. In FY '14, the residential sector made up 95% of Harvard's tax levy, while commercial and industrial property comprised a mere 3.4 % of the tax levy. Much of this disparity is a result of conscious zoning decisions. Harvard has just one Commercial (C) District along Ayer Road, which contains about 346 acres, or 2.3% of the Town (excluding Devens). Residents have consistently held the view that the Town should resist commercial development pressure for the inevitable changes it would bring to its pastoral quality of life. Residents here are content with limited retail and professional services and do not object to traveling outside the Town's boundaries for goods and services.

With such a heavy reliance on residential property to fund municipal and school operations, residents wish to maximize the tax revenue from its very limited commercial base. Furthermore, residents are generally dissatisfied with the quality of development in the C District. The appearance is incongruous with the character that prevails elsewhere in Harvard. There is no unifying theme to the development. Each land use appears in isolation without thought to what a "Harvard character" might entail. Indeed, Harvard's land use regulations have been largely silent on the matter, and developers have submitted projects for approval that need only comply with dimensional standards that promote highway strip development. These are approved in due course, but they have not had to conform to a coherent set of design standards. As a result, the overall pattern is a series of independent buildings on large lots, each isolated from its neighbors and lacking the context of a classic New England community.

The purpose of this document is to begin to change the character of commercial development in the C district to achieve a better appearance, improved function, and increased tax base from new growth. By articulating a set of preferred standards, new projects can help to achieve the vision residents have expressed in numerous public meetings.

Harvard will soon complete an update of its Master Plan. The process involved an extensive public outreach effort, including surveys, round tables, informational meetings, and extensive dialogues among Town boards and committees. How to best utilize opportunities for growth in the C District was a major focus of the planning process. The Plan strongly suggests adopting an

alternative development strategy for the district that changes past practices to improve the quality of development.

This report offers recommendations to help the C District achieve its potential for growth while meeting residents' expectations for distinctive development that fits the Town's character. New growth can have unwanted effects on a neighborhood due to its scale, appearance, traffic generation, noise, lighting, and a host of other potential impacts. It may not necessarily be the specific use that arouses objections; rather, it may be the manner of executing architecture and site design. This report provides a planning framework that sets forth preferred standards that will allow proposed projects to minimize impacts on surrounding neighborhoods while improving the business climate in the district. These are guidelines only. Their purpose is not to discourage creativity from the design process. Instead, the Guidelines should stimulate innovation to achieve high quality development and contribute to the C District's long-range improvement.

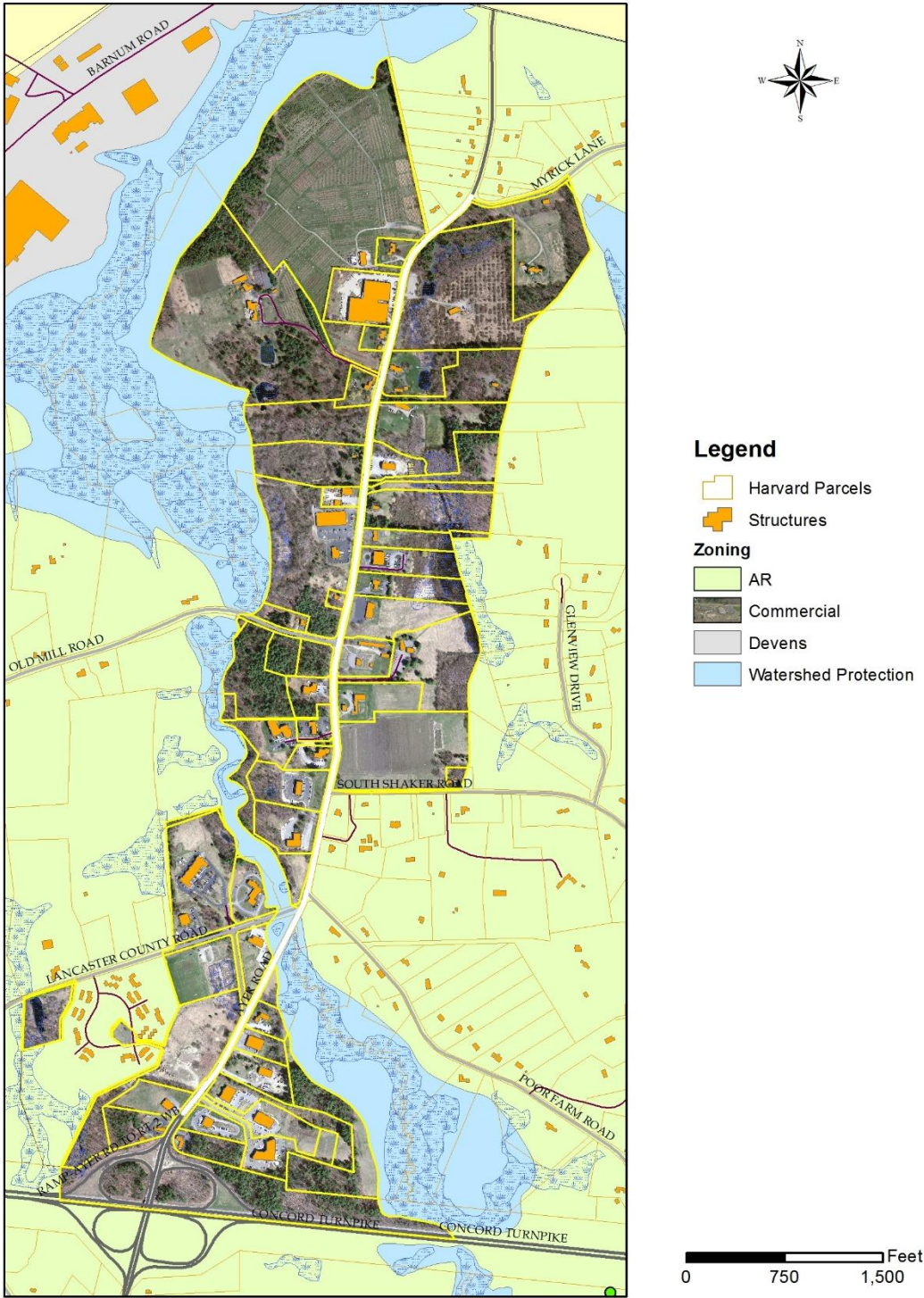
Developers should benefit from this document as well. Promulgating guidelines that communicate the Town's preference for design of commercial projects will help architects and engineers to more readily come to terms with Harvard's land use boards. Deciding on the general site and architectural parameters early in the process will preclude expensive revisions to final plans that require modification to conform to local boards' decrees. Designers can proceed to lay-out their project with a reasonable expectation that compliance with accepted principles will have a greater likelihood of approval and a less stressful review process. This report provides a basis for discussing the important conceptual elements of the plan on solid ground, with the usual trade-offs occurring from a mutual understanding of the overall vision for the district.

B. Applicability

The Commercial Design Guidelines presented in this report apply only to the Commercial district, the area located along Ayer Road north of Route 2 to about one-quarter mile south of the Ayer town line. Map 1 displays the location of the district and the parcel boundaries. Several lots are split by a zoning boundary; Harvard's zoning scheme limits commercial activity only to the portion of the lot within the C District.

These guidelines are intended to assist with the process of Design Review. §125-38.F of the Harvard Protective (Zoning) Bylaw requires Design Review as part of the Planning Board's site plan review. (See the complete text on page 4 of this report.) Design Review applies to any commercial site plan application in the C District. Paragraph 3 authorizes the Planning Board to adopt design guidelines to help define principles of good design and provide a clear basis for seeking changes to submitted plans. Thus, the foundation is in place for this report to have immediate utility in improving the quality of commercial development in Harvard.

Ayer Road Commercial District Harvard, Massachusetts



C. Excerpt from Harvard's Zoning By-Law – Design Review

§125-38.F Design review; applicability, procedure, and purpose. *[Added 3-27-2004 ATM by Art. 38]*

- (6) Site plan applications for proposed development in the Commercial "C" District shall include renderings of the proposed building(s) or addition showing the front, sides, and rear view elevations.
 - (a) Renderings shall be in color, and shall include narrative descriptions of the building facade materials; roof materials; window dimensions, materials, and details; height and slope of all roof lines; location of HVAC equipment, generators, coolers, and other utility appurtenances; and balconies, exterior stairs, steeples, chimneys, porches, porticos, or other building extensions. While not required, the applicant is encouraged, where practicable, to submit samples or swatches of facade materials and colors.
- (2) The purpose of the review conducted pursuant to this section is to assist the Planning Board to review the proposed design of buildings and its relationship to overall site layout. It is not the intent of this section to prescribe or proscribe use of materials or methods of construction regulated by the State Building Code, but rather to enhance the appearance of buildings and structures within the C District. A further purpose of design review is to help meet the objectives of the Commercial C District, including:
 - (a) Use of creative building placement and site design that promotes pedestrian activity, bicycle use, and minimizes new driveway curb cuts, sharing vehicular access, wherever possible.
 - (b) Promotion of articulated buildings that avoid excessive massing and unbroken facade treatments.
 - (c) Use of a variety of building heights and roofline articulation (as opposed to flat commercial roofs).
 - (d) Use of building style and materials compatible with the local vernacular and built form of Harvard, and avoidance of generic designs.
 - (e) Subordination of parking, on-site utilities, heating, ventilation and air conditioning equipment (HVAC), utility lines, and solid waste dumpsters to building form.
 - (f) Use of pedestrian-scale lighting and signage.
- (3) To accomplish the purposes of this section, **the Planning Board may adopt design guidelines** (emphasis added) for applicants submitting applications requiring design review and/or approval.

D. Land Use Conditions

Table 1 presents the existing land use pattern of the District from codes assigned by the Board of Assessors for valuation purposes. The acreages presented are the sum of lot area within the boundaries of the district, excluding road right-of-ways. Land developed for commercial purposes actually comprises a rather small percentage of the total area in the district, just 81 acres or 26%. Commercial land accounts for an additional 30 acres, or about 10% of the total. Thus, as presently constituted, it would appear that the amount of commercial development that could occur will be much less than the size of the district would allow. In fact, the area has a significant mix of residential uses, with 64 acres devoted to single and two family homes, and 7 acres are in multiple family use. Over time, however, some residential properties may convert to commercial activity as market forces elicit change.

*Table 1:
Land Use in the C-District*

Acres	Use	% of District
64.1	Single and Two-Family	20.6%
34.8	Residential with Agriculture or Forest	11.2%
6.9	Apartments	2.2%
3.1	Undevelopable Residential Land	1.0%
81.0	Commercial	26.0%
29.9	Commercial Land	9.6%
55.2	Agricultural	17.7%
17.9	Municipal	5.7%
18.3	Open Space	5.9%
311.2	Total	100.0%

The character of the district will gradually evolve. Older commercial property will re-develop as increased property values change the economics of the commercial market and attract tenants who can afford higher rents that improved space will command. Available commercial land will undoubtedly develop due to the fine location off Route 2 and proximity to I-495. Some residential property may convert to commercial use when current homeowners sell and potential buyers prefer not to reside on a busy road. The highest and best use, as allowed by zoning, may well be retail or office use. New owners may adapt these homes for commercial use, or they may remove the dwelling and propose a more intensive use of the property.

The Master Plan notes the lack of public water and sewer services in the C District. For the foreseeable future, availability of ground water and soil suitability for septic disposal will control intensity of development. However, the Plan recommends exploring the possibility of connecting

to the water and sewer systems in Devens, which could dramatically alter the growth potential of the district. These guidelines will apply regardless of the ultimate resolution of this question.

Two farms operate in the District. They too could convert to commercial use as permitted by zoning if existing or future owners decide to pursue higher financial returns from development rather than selling the land for farming purposes. The C District prohibits new single family dwellings. To prevent commercial development, farmland could be placed in an Agricultural – Residential (AR) district, but of course, with high values for residential land in Harvard, this action would not guarantee continuation of farming on the property. Outright acquisition and purchase of Agricultural Preservation Restrictions (APRs) are the only ways to insure the land remains open.

The main point here is that the development pattern of the District will change based on market opportunities since the Town has so little commercial land. Crafting design guidelines is an important exercise and a proactive approach. Adherence to a new paradigm of development will have positive results, not only for undeveloped properties, but as many properties re-develop, the character of Ayer Road will change in a way that is consistent with the Town's long-range vision.

PART 2: DESIGN THEMES IN THE C DISTRICT

A. Overview

The C District is not a blank slate. A significant portion of the district developed well before the advent of Harvard's current zoning requirements. Older development occurred in an era when controls were much looser than today and little thought was given to long-term sustainability. Developers perpetuated suburban sprawl along the highway, developing each lot in isolation from its neighbors and ignoring the context of its particular location. As a result, there is no overriding theme to tie the separate developments into a unifying whole that would create a unique sense of place for the district.

Regrettably, Harvard's zoning regulations perpetuate this pattern. One set of dimensional regulations apply town-wide, to residential and commercial areas alike. These requirements have a specific purpose, and are very effective in achieving a desired result in the AR district. This purpose is to limit density to that appropriate to a rural community with only on-site water and septic capability. The 1.5-acre minimum lot size and 180-foot minimum frontage requirements insure that overall density will remain low. Various provisions allow for development of back land with larger lot sizes and reduced frontage to give landowners viable alternatives to single family home development without radically disrupting the landscape. Furthermore, deep setbacks from the road and from adjacent property lines insure ample private open space on a lot and offer the appearance and reality of a quiet rural life-style.

These same standards, when applied to the Commercial District, yield a much less satisfying outcome.

B. Dimensional Regulations Applicable to the C District

Very large front setbacks from the road apply here; buildings must be set back 125' from the centerline of Ayer Road, which causes commercial buildings to be located well away from the road. Travelers lose any sense of connection with the surrounding business environment. Stand-alone commercial buildings fail to establish an identity for the district as an invigorating place for business. Furthermore, the deep setback is an invitation to locate parking lots between Ayer Road and the building. Patrons and pass-by travelers view a monotonous pattern of parked vehicles and vacant asphalt. The large side and rear yard setbacks cause each building to be placed in the central portion of its lot located a considerable distance from its neighbors. This isolates individual buildings, reduces pedestrian connectivity, requires separate driveway curb cuts, and limits the buildable area of a lot.

It is clear that the purpose of these requirements is to lower overall intensity of development in the district, which is also the purpose of these same dimensional requirements for the AR district. However, business districts have different purposes and needs than residential districts, and what works well in the AR District has dire consequences for the C District. Regulations should not impose arbitrary controls merely to lower development potential; rather, standards should

advance particular community goals for quality business development, respect environmental integrity, protect neighborhoods from adverse impacts, and provide variety and appeal for patrons.

Table 2 presents the dimensional requirements for the C District. Some of these represent abstract concepts that may be confusing at first reading. Figure 1 illustrates how these requirements operate to establish a particular style of development, one that is actually contrary to the kind of development Harvard residents have said they prefer in numerous planning workshops. Following Figure 1 are photographs of two existing commercial properties in Harvard that illustrate how these standards have produced the kind of development that prevails in the district today. Appendix 1 of this report contains recommendations to modify the Zoning Bylaw's dimensional standards to achieve a pattern more conducive to Harvard's land use and economic development goals.

Table 2:
Zoning Bylaw Dimensional Requirements

Dimensional Standard	Harvard Requirement
Minimum Lot Size of a Basic Lot	1.5 acres (65,340 sq. ft.)
Minimum Lot Width (lot width circle)	200' at 120' from road center line (i.e. the lot must contain a circle with a diameter of at least 200' located 120' from the road without touching an adjacent lot)
Minimum Frontage	180'
Contiguous Area of Buildable Land	25% of required lot area (16,335 sq. ft.), which contains at least a portion of the lot width circle.
Upland (non-wetland)	3/8 ac. (16,335 sq. ft.) exclusive of land within 50' of a wetland
Lot Shape Formula	The formula applies to Type 1, 2, 3, 4, and 5 Lots. Since only Basic Lots are permitted in the C District, the formula does not apply.
Floor Area Ratio (FAR)	Total building floor area shall not exceed 10% of the land area or 8,000 sq. ft. ¹ , whichever is larger
Height	Less than 35' and less than 3 stories. (As a practical matter buildings may not exceed 2½ stories. Perhaps the purpose is to restrict flat roofs on 3-story buildings.)
Structure Setback and Building Height	Structures other than fences shall be set back from lot boundaries by at least the height of the structure.
Structure Setback	Structures ... shall be set back from the lot boundaries by at least 20% of required lot width or of (maximum) lot width, whichever is less ²
Additional Setback from abutting property in an AR district	Commercial buildings must be set back 60' from an abutting property in an AR district. (This is a helpful protection for adjoining residences.)
Front Setback	Structures must be set back 125' from the centerline of Ayer Road. The CDM Report identifies a 50-foot right-of-way for most of Ayer Road; thus, structures must be set back 100' from the front lot line. (Such a deep setback induces developers to place parking in the front yard.)

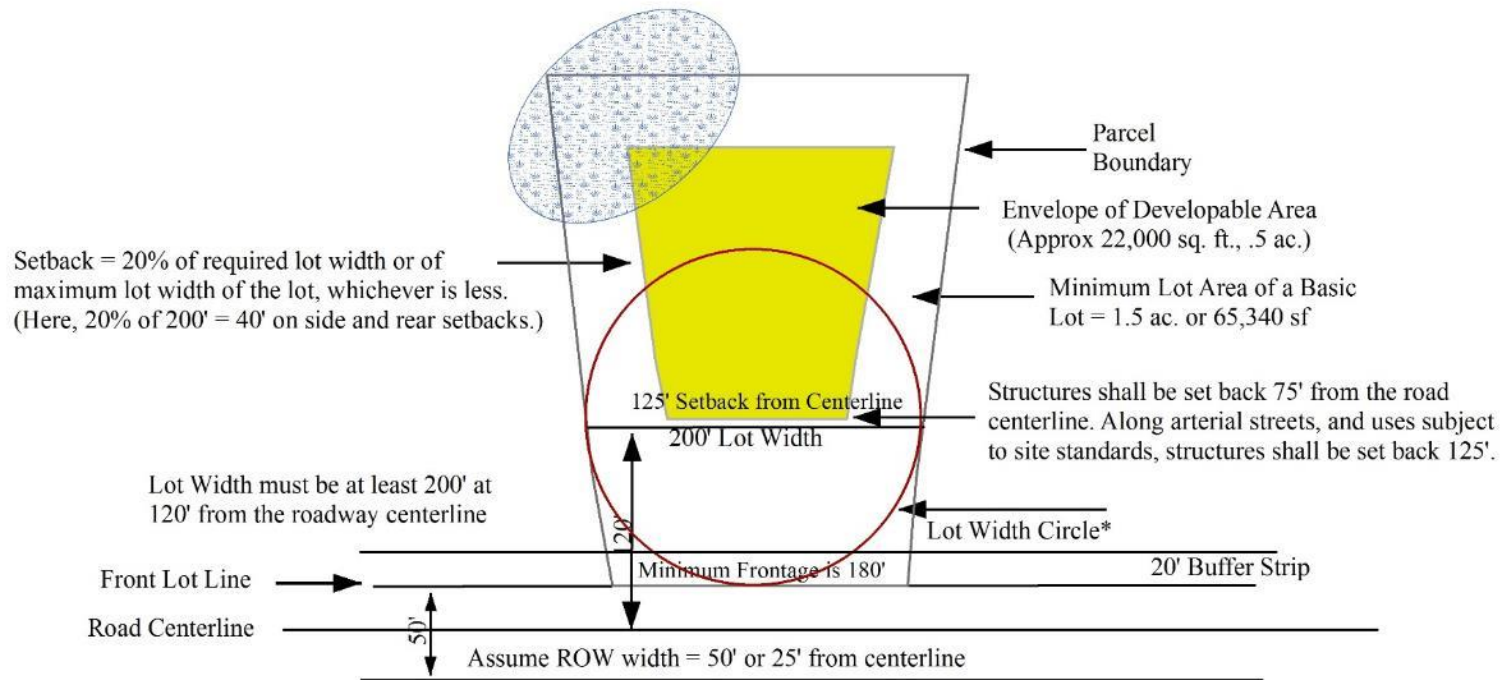
¹ For example, a 2-acre lot contains 87,120 sq. ft.; 10% is 8,712 sq. ft. In this case, the larger figure is 8,712 sq. ft.

² Since the required lot width is 200', 20% is 40'. That is, buildings must be set back 40' from all property lines. Lots that do not comply must provide setbacks of all buildings equal to 20% of the widest part of the lot. For example, if the maximum width of a lot is 150', buildings must be setback 30' from all property lines.

Dimensional Standard	Harvard Requirement
Buffer Strip	A buffer strip (green area) is required around the lot perimeter with a width at least 10% of standard lot width or the maximum lot width, whichever is less. ³ (This is a no-build zone for parking and structures. The setback provisions above apply only to structures.)
Open Space	Commercial uses shall provide a green area of at least 50% of total lot area, plus 25% of the area in excess of 3 acres. (This is much greater than most towns require.)
Major Buildings	A nonresidential building longer than 150' or having over 10,000 sq. ft. of floor area requires a special permit from the Planning Board.
Retail Buildings	Certain retail businesses, including a grocery, hardware, clothing, drug, or general store, may not exceed 15,000 square feet of building space.
Septic System Setback	Sewage disposal systems must be set back 100' from W District boundaries and inland wetlands.

³ For a conforming basic lot, this requires a buffer of 20' (i.e. 10% of 200') around the lot perimeter.

C District Dimensional Requirements Basic Lot - Area: 1.5 ac., Frontage: 180'

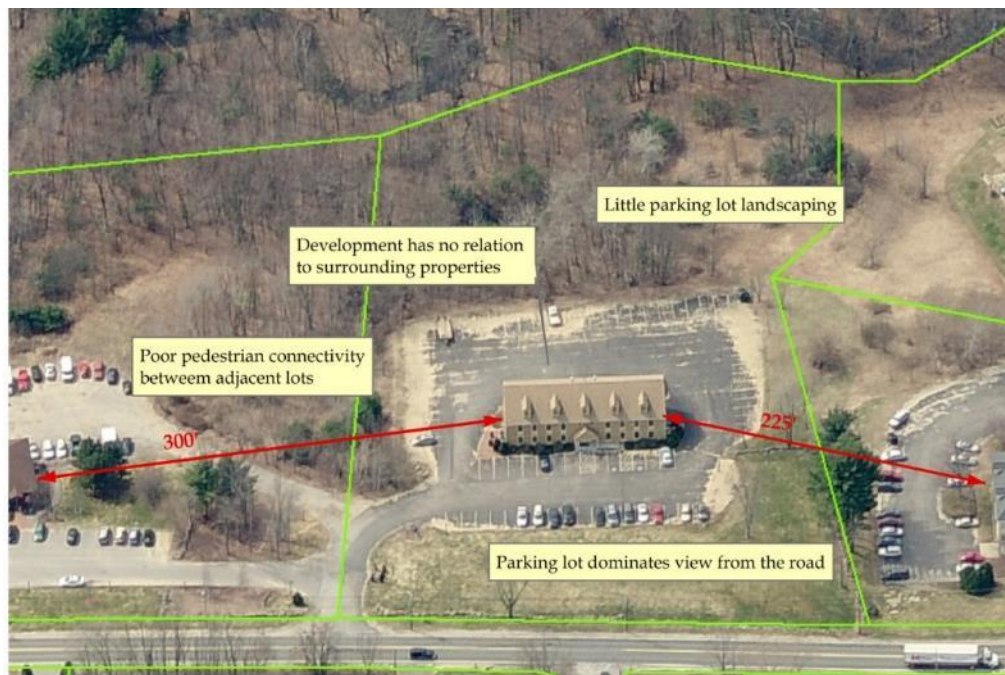


A lot shall have a contiguous area of buildable land of at least 25% of the required lot area (16,335 sf) which contains at least a portion of the required lot width circle.

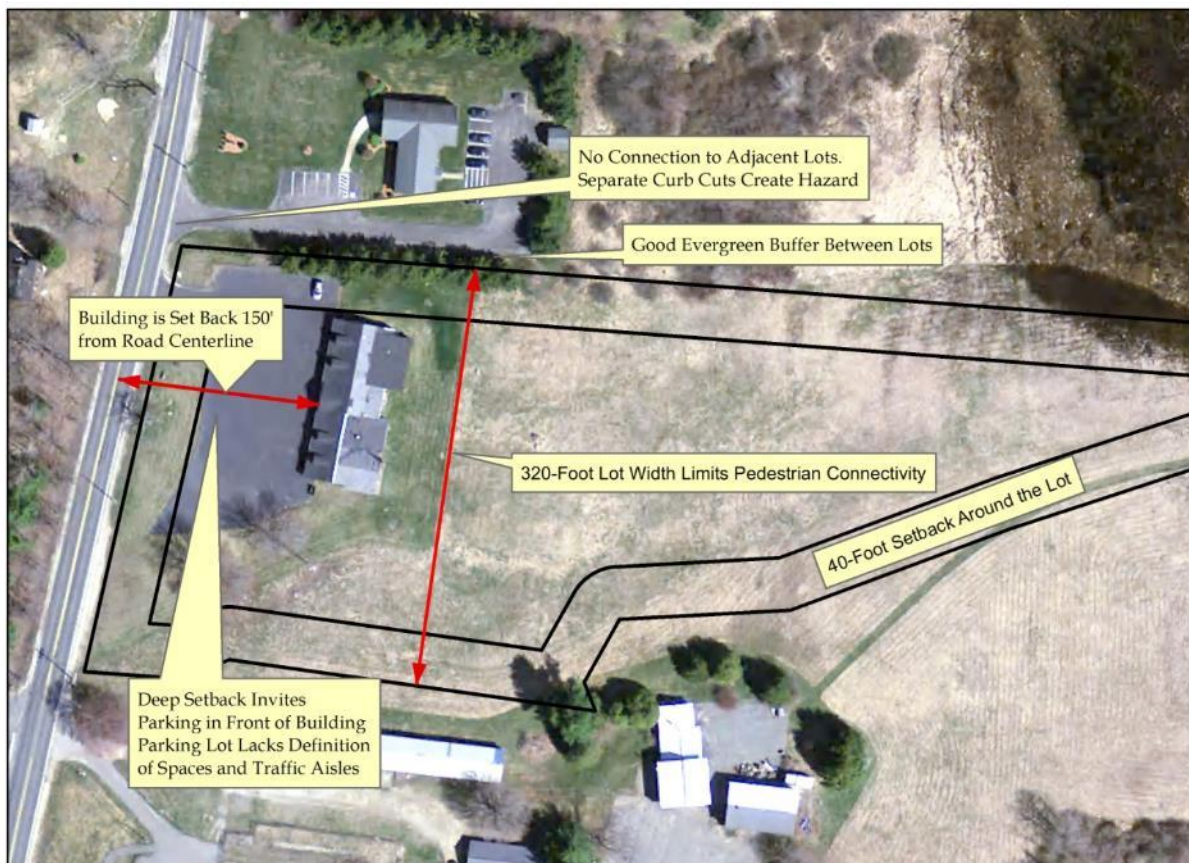
A lot must have at least 3/8 of an acre of upland, exclusive of land within 50' of a wetland.

* The lot width circle shall contain no part of an abutting lot and must have a minimum diameter of 200' at least 120' from the roadway centerline.

C. Typical Development Practices in the C District



270 Ayer Road



D. Purposes of Commercial Design Standards

1. The District should be pedestrian friendly. Visitors should find it a pleasant experience to walk in the area, both along Ayer Road and within parking lots to access building entrances. Sidewalks should provide safe access for visitors to move to neighboring lots without re-entering their vehicles. Site planning should consider pedestrian needs and provide separation from autos in landscaped pathways, where possible, to contribute to a project's welcoming form.
2. Building design should promote a "Harvard Character". Harvard has retained its small-town New England roots in residential areas, but the limited commercial development has largely ignored the Town's past. Each project should have a unifying architectural theme, and commercial buildings should be attractive and interesting. Visitors should feel that they are really in Harvard, not in a cookie-cutter franchise operation that could be anywhere. Each project should have distinguishing architectural features and fit the unique context of its site.
3. A development's site design should incorporate generous landscaping to help the project settle into its surroundings. Parking lots should not dominate the streetscape, and where possible, lots should be placed behind or to the side of buildings to minimize their visual impact. Features that may negatively affect adjacent residential uses should be appropriately buffered so that residents may enjoy their privacy. Utility boxes should be out of the public's view and suitably enclosed to minimize visual intrusion.
4. The long-term vision for the Ayer Road Corridor is to transform the strip commercial character into a cohesive Village. Distinguishing features of Villages include active street fronts with a mix of goods and services, buildings brought-in close to the street, sidewalks along building frontages to promote pedestrian activity, multi-story buildings on both sides of the street to provide a sense of enclosure, on-street parking and shared parking lots, pedestrian crosswalks, and a mix of residential dwelling types with some second floor apartments. To accomplish this Vision, Ayer Road will require significant modifications to narrow the road to slow traffic, accommodate pedestrians, and establish an inviting streetscape; and utility companies will need to re-locate their overhead lines underground. While these changes may take a decade or more to accomplish, new developments should be consistent with this long-range plan in their design.
5. Harvard residents strongly support the concept of sustainability. Development should be energy efficient, with buildings taking advantage of solar orientation and meeting energy conservation standards. Parking lots should minimize heat capture through landscaping and shading from tree canopies. Stormwater should be treated on-site through Low Impact Development (LID) techniques wherever possible. Development should retain unique natural features and have minimal impact on wetlands, wildlife habitat, and other environmental resources. As growth occurs, transit service may become viable, and projects should anticipate the ability to accommodate fixed route service for employment and shopping destinations.
6. Site design should incorporate measures to lessen congestion and preserve traffic capacity of Ayer Road. Developments should provide the minimum number of curb cuts necessary to service the development. Curb cuts should be shared with adjacent properties if possible, and locate immediate opposite cuts across the street. Provision should be made to connect to adjacent properties so traffic can afford entry onto Ayer Road. Separate left and right turn lanes should be constructed to reduce delays for through traffic.

E. Design Review Board

To further good design in the District, the Commercial Design Standards Task Force recommends passage of a town bylaw to create a standing Design Review Board (DRB). The Task Force has prepared a draft bylaw, which would establish the purpose and operating procedures for a DRB. See Appendix 1. Table 3 on the following page presents a conceptual overview of the major components of Design Review in comparison to Site Plan Review. In Harvard Design Review is one component of site plan review and is the responsibility of the Planning Board.

Submittal of a formal site plan represents an advanced stage of the permitting process. Applicants must submit detailed engineering plans of parking lots, stormwater systems, underground utilities, etc. in order for the Planning Board to properly evaluate the effect of a project on the Town or neighborhood. Applicants incur a significant expense in preparing these plans and are reluctant to make wholesale changes. Of course, the Planning Board can require changes before granting its approval to protect the overall welfare of the Town. However, building themes and the overall site layout are generally set before the Board receives the plan.

The Task Force believes that developers would benefit from an advisory design review process. The DRB would provide a forum for architects and engineers to present conceptual plans at an early stage of the design process and obtain feedback before finalizing plans that become expensive to prepare and revise. Most of the major design questions can be addressed with this informal step. The DRB might suggest alternatives to building and site elements and provide guidance to applicants on questions of importance. Harvard's Zoning Bylaw is complex, and the DRB can help interpret provisions to assist applicants in meeting the intent of sometimes contradictory sections. In sum, the DRB can be a resource to help applicants develop a design scheme that complies with the design guidelines contained in this report.

DRB members would have a range of expertise in fields such as architecture, landscape architecture, and urban design. DRB members would also include property owners, developers, and residents of the surrounding neighborhood to provide a balanced perspective. Upon completing its review, the DRB will submit an advisory report to the Planning Board or Building Commissioner. Resolving major design issues at an early stage should help expedite the Planning Board's formal Design Review and Site Plan Approval. However, the Board and Building Commissioner would not be bound to accept the DRB's recommendations, and each can exercise its independent judgment in order to grant approval.

Table 3:
Comparison of Design Review and Site Plan Review

Parameter	Design Review	Site Plan Review
Height, mass and scale of buildings	✓	
Building entrances	✓	
Exterior materials	✓	
Relationship to street and sidewalks	✓	
Parking and access	✓	✓
Pedestrian safety and accessibility	✓	✓
Landscaping	✓	✓
Public amenities, e.g. benches, bicycle racks, trash receptacles, planters, transformers	✓	✓
Façade treatments, e.g. window placement,	✓	
Building placement on the lot	✓	✓
Sign placement, materials, size and message	✓	✓
Roof shape, pitch, materials	✓	
Impacts on abutting property	✓	✓
Lighting	✓	✓

PART 3: BUILDING GUIDELINES

The following sections contain Design Guidelines to assist architects, engineers, landscape architects and other design professional to incorporate measures that exemplify traditional New England design elements in their projects.

The Guidelines serve two purposes:

- 1) To provide an expression of desired features that should actualize the Town's rural ethic in a modern form that will meet Harvard's needs for commercial services efficiently and aesthetically.
- 2) To aid Town staff and committees during project reviews and provide a baseline for discussion of major design elements of proposed developments.

Each section begins with written guidance to encourage certain design features consistent with Harvard's vision and to discourage other features that may not be appropriate here. Photos, plans and renderings help to demonstrate these principles. Specific comments further explain design aspects of the graphics. These are not meant to be unbreakable rules. Each project has its own unique elements that may make implementation of the Guideline unfeasible. The DRB will work closely with a development's designers to apply these Guidelines in a thoughtful manner to achieve the long-range goal of improving the economic climate of the Commercial district.

A. Roof Guidelines

Roofs should adhere to the following standards:

1. Provide variation in roof lines using gable, shed, and hip roofs.
2. Alter roof forms to break down large roof masses using authentic dormers, chimneys, cupolas, etc. Prohibited are non-functioning dormers that suggest unoccupied upper floors and other unrealistic appendages that create false detailing and take away from the building's integrity.
3. Overhangs and eaves should be incorporated.
4. Steep roof pitches are encouraged. Low pitches are acceptable at small roof sections such as porches, arcades, entries, etc.
5. Roofs should have sufficient depth to appear as a functional roof. Mansard roofs are discouraged. Roofing materials should not be used as siding for a top story. Roofs should read as functional over a building and not as a decorative feature added to the façade.
6. Flat roofs with articulated parapets that become an expression of the building façade are permitted but subject to review. False gable-end shaped parapets at flat roofs are strongly discouraged and should be avoided.
7. Rooftop equipment should be concealed from ground view.



Credit: Cape Cod Commission

- ❖ Dormers and gables create a varied roof line.
- ❖ Sloped roof overhang provides weather protection for pedestrians and denotes principal entrance.
- ❖ Roof forms and heights break down the building mass and help identify discrete tenant spaces.



Village Trading Co. Cataumet, MA

- ❖ Varied roof forms help to create a distinctive impression.
- ❖ Roof overhang provides safety from the elements and indicates building entrance.
- ❖ Large windows connect interior space with the outside.
- ❖ Building design invites entry from both the front and side.



Credit: Montgomery County, PA

- ❖ Various roof forms and articulated façade create numerous points of interest and reduce apparent building mass.

B. Façade Guidelines

1. Avoid unarticulated and monotonous façades that create blank walls. Incorporate columns, arcades, porches, windows, etc. to prevent uninterrupted lengths of façade greater than 30 feet.
2. Vary the building footprint so there are pronounced changes in wall planes (5 feet or greater) so there are no straight walls longer than 75 feet facing a public street or parking area.
3. Create a variety of story heights along facades.
4. Provide clearly visible and identifiable entrances that are recessed or articulated with projected coverings. In mixed use buildings, distinguish entrances for upper floor residential or commercial uses through different façade treatments.
5. Windows should make up a minimum of 30% of the total area of the front façade. There should have a sufficient quantity of appropriately scaled windows and doors with a balanced spacing and rhythm. Retail storefronts should be modestly scaled, with vertically proportioned windows articulated with muntins. Windows and glass portions of doors should be clear, non-mirrored, and non-opaque glass.
6. When parking is located to the rear of a building, provide additional windows, lighting, and possibly an entrance to create a favorable impression of the uses within.
7. Use a variety of materials or patterns in the façade to add visual interest but limit the number to avoid visual overload.
8. Encourage shadow lines and patterns using architectural elements such as overhangs, projections, reveals, etc.
9. Strive for visual simplicity rather than complexity.



Mashpee Commons

- ❖ Ample, vertically-proportioned windows enhance the façade's appearance.
- ❖ The façade contains a variety of materials and patterns that add visual interest.
- ❖ Recessed entrances are easily identified.
- ❖ Breaks in the façade occur at reasonable lengths to delineate individual storefronts and doorways to the second floor.
- ❖ Building is brought close to the street and parking is provided to the side.



Auburn, MA

- ❖ Plain building front, minimal windows, and long blank wall offer no visual interest.
- ❖ Flat roof without ornamentation lacks originality.
- ❖ Mechanical equipment on the roof is visible at street level.
- ❖ No landscaping along the road leaves feeling of barrenness.



Credit: Cape Cod Commission

- ❖ A combination of one and two-story wall heights reduces the overall perception of building mass.
- ❖ Changes in wall plane and well-articulated façade avoid monotony.
- ❖ Various roof forms and eaves break a large roof area into discrete sections.



285 Ayer Road, Harvard

- ❖ Blank wall along frontage is a missed opportunity for connection to a busy road.
- ❖ Plain roof form provides monotonous appearance to façade.
- ❖ Mansard roofs are discouraged. Roofs should not be a decorative part of the façade.
- ❖ Roof should have sufficient depth to appear as a functional roof.



Route 4, Woodstock, VT

- ❖ Ample window glass creates inviting appearance.
- ❖ Shallow setback connects the building to the street and promotes pedestrian access from the sidewalk.
- ❖ Side parking allows front yard landscaping and building form to catch the eye of passers-by.

C. Building Composition Guidelines

1. Encourage multi-story buildings. Single story buildings should be articulated with design features discussed in these Guidelines.
2. Buildings with two or 2½ stories will more readily achieve the long-range vision for the Commercial District. New development should be designed with a usable second or third story to reduce the footprint of the building and achieve a scale more appropriate for a flourishing Main Street environment.
3. Break large building volumes into smaller forms to lessen the total building mass. Step back and forth with smaller sub-masses. Use one-story projections with arcades or porches on two and three-story buildings, and address the pedestrian scale at the street level.
4. Vary the building footprint so there are pronounced changes in the wall planes.
5. Continue the main architectural treatments of the building's front façade, including the materials used, around all sides of the building that are visible from a street or pedestrian access.



200 Ayer Road, Harvard

- ❖ Many building elements help compose a distinctive architectural theme, including symmetrical windows, pitched roofs, octagonal roof, porch overhang, façade treatments, columns, and gable ends.
- ❖ Parking lot in the rear allows building features to take prominence and leaves front setback nicely landscaped.
- ❖ Materials consist of natural elements in earth tone colors.
- ❖ Building form and motif can serve as template for other commercial projects in the District.



Blanchard House, 249 Ayer Road

- ❖ Side façade visible from the road and used by customers for parking and entry contains various architectural forms.
- ❖ Numerous windows, architectural details, dormers, and steep roof pitch work in combination to create a welcoming appearance.
- ❖ Parking area on side of the building with landscaping and stone wall reduces visual impact of parking lot.
- ❖ This property is nonconforming with a shallow front setback; redevelopment enhanced site layout.



Credit: Cape Cod Commission

- ❖ Massing of building is reduced through use of various roof types, wall projections, and door recesses.

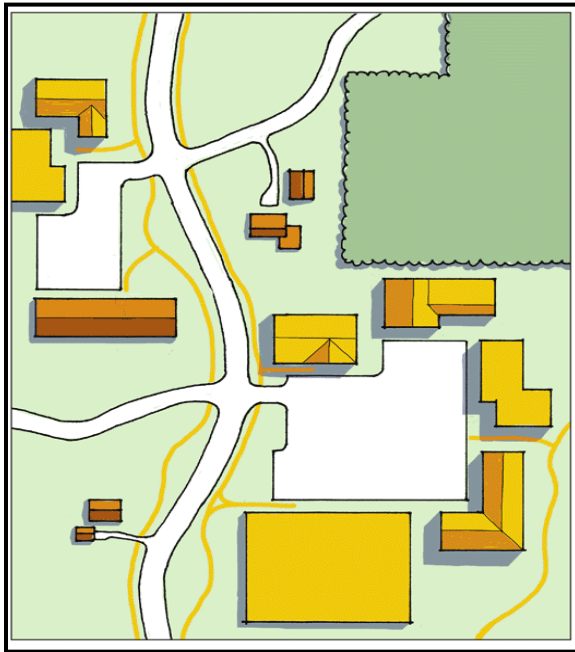


Red Mill Crossing, Route 123, Norton, MA

- ❖ Numerous pitched roof forms help define separate tenant spaces.
- ❖ Cupola adds a distinctive touch and porch provides weather protection.
- ❖ Large number of transparent windows enhances façade.
- ❖ Period, pedestrian scale lighting promotes safety without excess light.
- ❖ Many colors and textures present a pleasing contrast.

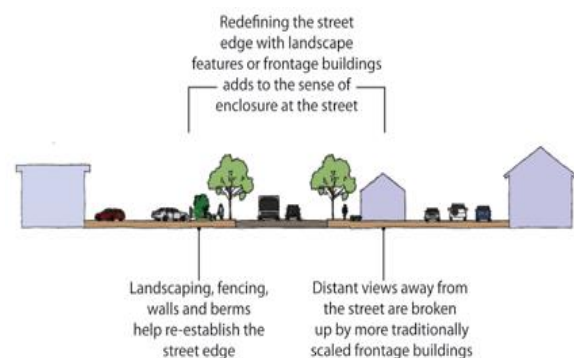
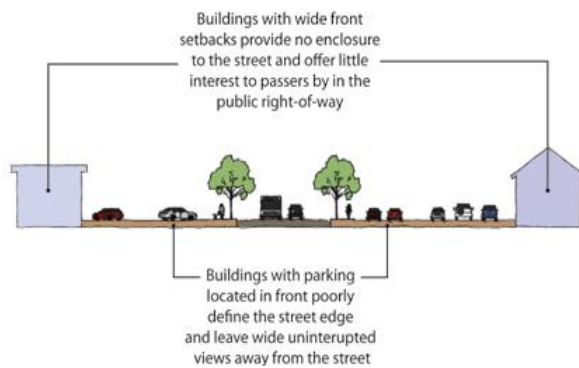
D. Guidelines for Organization of Buildings and Uses

1. Organize buildings to promote a compact pattern of development, create pedestrian-friendly spaces and streetscapes, create areas of naturalized landscaping, and screen parking areas.
2. For property with more than one building on a site, develop a coherent architectural site plan with an organized composition (e.g. buildings clustered around a central space/focal point or configured in a linear pattern).
3. For large developments, establish a visual and functional focal point (e.g. town green, outdoor sculpture, water feature, landmark structure, park, etc.).
4. Arrange multiple buildings so that their primary orientation complements one another.
5. Locate uses that generate more pedestrian activity (e.g., restaurants, retail stores) at the street level and less active uses on upper floors.
6. Design the main building entrance to be clearly visible and identifiable from the primary vantage points or public right-of-way.
7. Where nearby buildings establish a defined relationship to the street, new buildings should maintain the rhythm of building setbacks and front yard composition and foster a strong street edge.
8. The elements of building height, yards, setbacks, and architecture should establish a sense of spatial enclosure and create a comfortable human scale. A 1:3 ratio of height to width is appropriate for a commercial corridor to create a sense of place but may vary depending upon existing conditions. Street trees can contribute to spatial enclosure where lots have substantial yards and deep building setbacks.



*Phase 1 Report, Harvard Master Plan
Brown Walker Planners, and Wolf Landscape Architecture*

- ❖ Clustered, mixed use development concept for Ayer Road, with several small commercial buildings sharing a common parking lot and a single curb cut.
- ❖ Sidewalks and fewer driveway crossings reduce vehicle conflicts with pedestrians and bicyclists. Internal paths connect uses within a site and with adjacent properties.
- ❖ Village concept allows unified architectural theme and compact development pattern, leaving sufficient buffer for residential neighborhood behind.
- ❖ “Creating a density of uses encourages non-vehicular circulation between uses, allows for shared infrastructure, and provides opportunities for the creation of public spaces for circulation and gathering.” (Master Plan Phase 1 Report, page 16.)



Source: Cape Cod Commission

- ❖ Establish a strong street edge with front landscaping and buildings close to the street.
- ❖ Parking in front of buildings results in a loss of spatial enclosure.
- ❖ Wide distances between buildings creates a scale more suitable for automobiles than people.
- ❖ Fences, low walls, and plantings can continue the building line close to the road edge and shield views of parking lots.

E. Building Materials Guidelines

1. Use traditional and natural building materials that weather naturally, such as brick, stone, wooden shingles, and clapboard. Be consistent with the traditional New England building vernacular.
2. Use materials that have texture, pattern, or lend themselves to a high quality of detailing.
3. Synthetic materials and exterior insulation finish systems are discouraged.
4. Use durable, eco-friendly materials whenever possible.
5. Mix building materials where appropriate to add visual interest to the exterior.
6. Avoid metallic and reflective materials; natural colors and earth tones are preferred.
7. Contemporary forms and materials are welcome as long as they reinterpret and echo the region's traditional design forms and materials.



206 Ayer Road, Harvard

- ❖ Different materials add character and are consistent with local vernacular.
- ❖ Varying wall heights and providing breaks in the building line lend variety and depth to the façade fronting on Ayer Road.
- ❖ Steep roof pitches heighten architectural composition.
- ❖ Roof forms are consistent with traditional patterns in Harvard.

F. Energy Guidelines

1. Orient buildings consistent with energy conservation principles.
2. Encourage “green building” design, i.e. energy efficient windows and skylights, occupancy sensors, roof top gardens, active and passive solar systems, etc. (Note: Harvard is a “Green Community” and has adopted the Stretch Code to promote energy efficiency in building construction.)
3. Use building materials from recycled or renewable sources.
4. Consider roof-top solar systems and ground source heat pumps (geo-thermal) to reduce fossil fuel use.
5. Provide shade trees in parking lots to reduce pavement heat gain and help keep vehicle interiors cool.
6. Use LED lights for exterior lighting to reduce use of electricity. Convert older, high pressure sodium (HPS) lights to LED lights.
7. Place hedgerows or evergreen plantings to slow prevailing winter winds.

8. Incorporate electric charging stations in parking lots to promote the use of electric vehicles.



Credit: Cape Cod Commission

- ❖ Orient building to maximize the use of natural daylight in interior lighting and install roof-top solar panels to reduce the power use of building tenants.
- ❖ Use a variety of window forms to increase use of natural light, such as transom windows, display windows, dormers, skylights, etc.

PART 4: LANDSCAPING AND SITE STANDARDS

A. Parking Guidelines

1. Locate parking lots behind or to the side of buildings to create a strong street edge and an inviting pedestrian environment. Allow some parking in front of a building upon provision of landscaping, berms, or other design features that reduce visual impact.
2. Break up large parking lots into distinct parking areas by landscaped and curbed planting beds.
3. Parking areas should provide safe, convenient, and efficient access for vehicles and pedestrians. They should be distributed around large buildings in order to shorten the distance to other buildings and public sidewalks and to reduce the overall scale of the paved surface.
4. For side parking areas, do not locate parking closer to the street than the front line of the principal structure.
5. When a building with a front parking lot is renovated, explore options for mitigating the impact of the parking on the streetscape, such as adding additional landscaping or architectural design elements.
6. Locate lots in such a way that connections to adjacent lots are feasible in order to facilitate internal vehicular circulation and share parking among uses with different hours of peak use.



231 Ayer Road

- ❖ Parking lot between the building and road isolates the business from its surroundings.
- ❖ Parking in front detracts from building appearance.
- ❖ Lack of landscaping in the green strip along the road leaves the site unadorned and provides little comfort for pedestrians.



257 Ayer Road

- ❖ Parking area lies appropriately to the side of the building, and location below street level provides buffering from the road.
- ❖ Trees and foundation plantings provide visual relief when approaching the building.



Credit: Northborough, MA

- ❖ Strong street edge created when parking is placed to the side of the building.
- ❖ Side parking begins beyond the front edge of the building
- ❖ Weak street edge created when parking abuts the street.
- ❖ Provide a continuous landscape strip across the street frontage uninterrupted by parking areas.

B. Parking Lot Landscaping Guidelines

1. Reduce the visual impact of wide expanses of parking with landscaped islands and planting strips. Islands should include a variety of trees, shrubs, and groundcover to provide vegetation at varied heights and to achieve a visual buffer within the parking area.
2. As a rule of thumb, seek to provide one 3" caliper tree for every 10 parking spaces. Trees should have at least 50 square feet of permeable area for growth.
3. Use canopy trees as a visual break and to provide shade for vehicles and pedestrians.
4. "Parking areas shall be subdivided so that such areas shall extend no more than 160 feet along a parking access aisle or other driveway without a green area of width at least 20 feet. Alternatively, such extent shall be no more than 80 feet without a green area of width at least 10 feet." (Harvard Zoning Bylaw, §125-39.A(3))
5. Plant species appropriate for parking lot landscaping may include a mix of native and non-native vegetation, so long as the non-native vegetation is not invasive and does not cause excessive fruit drop or leaf litter. An invasive species is one that appears on a list prepared by the Massachusetts Invasive Plant Advisory Group (MIPAG) as Invasive, Likely Invasive, or Potentially Invasive (<http://www.massnrc.org/mipag/index.htm>). (See Appendix 2, but check the website as the list is updated from time to time.)
6. Parking facilities with more than (20) parking spaces should be bordered on all sides with a landscaped buffer strip at least 10 feet in width.



Renaissance Office Park, Harvard, MA

- ❖ Generous parking lot landscaping provides shade for parked vehicles on sunny days and enhances overall appearance of the site plan.
- ❖ Landscaped perimeter of the parking lot reduces visual effect of large area of pavement.
- ❖ Service uses and utility lines are hidden from public view.



Donelan's Supermarket, Acton MA

- ❖ Parking lot has a small amount of internal landscaping, but not enough to soften large area of pavement.
- ❖ Light standards are excessively tall.
- ❖ Artificial building material would not be appropriate for Harvard.
- ❖ The parking lot offers no refuge for customers walking to and from the store.
- ❖ High ratio of impervious surfaces increases stormwater runoff.

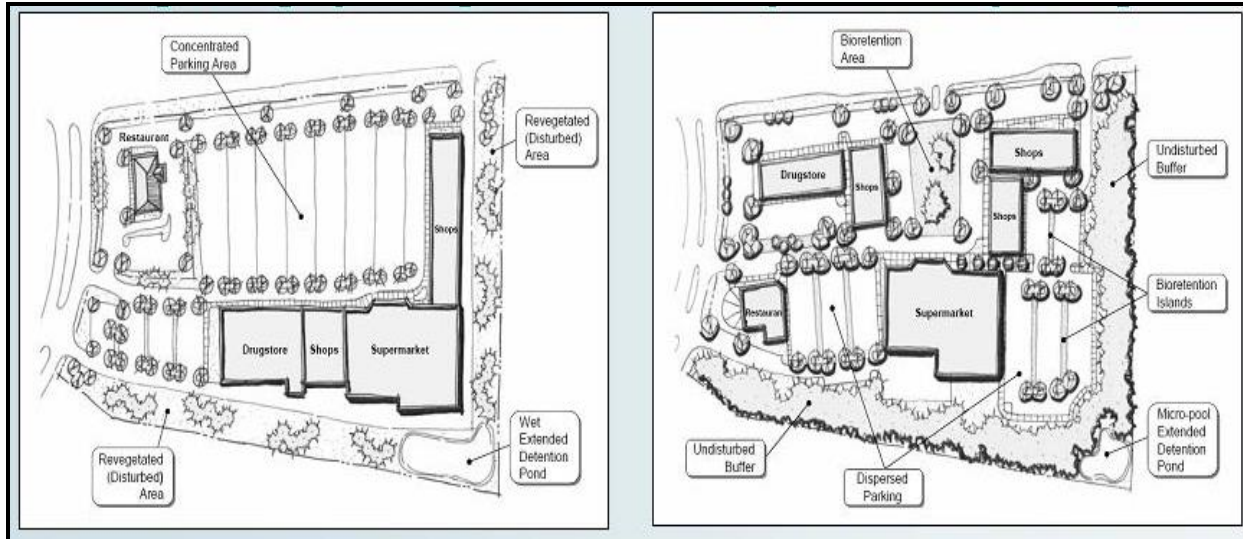


- ❖ Provide landscaping around perimeter of the parking lot.
- ❖ Provide landscaped islands in the interior of the lot for trees and shrubs. Provide sufficient width to protect trees from parked vehicles.
- ❖ Provide walks to principal entrances with different paving materials to alert motorists of internal pedestrian routes.



Holden, MA

- ❖ Landscaping along the perimeter of the lot provides effective screening for adjacent uses.
- ❖ Evergreens provide year-round screen.
- ❖ Planter contains adequate room for tree roots to spread and absorb rainfall.
- ❖ Fence and lighting are appropriate for lot in Holden's Main Street Historic District.



❖ Conventional Layout

Credit: EOEA

❖ Preferred Layout

- ❖ Breaking parking into smaller lots allows for more efficient management of stormwater and enhances aesthetics.



One-Stop Mini-Market, Holden, MA

- ❖ Parking to the side allows building features to stand out.
- ❖ Building is brought close to the road, which increases visibility of the business.
- ❖ Sidewalk, trees, and green belt adjacent to the street encourage walking.
- ❖ The Town buried overhead utility lines to improve aesthetics of Main Street (Rt. 122A).
- ❖ Natural materials, earth tone colors, steep roof pitch, decorative columns, and roof overhang incorporate New England architectural themes.

C. Site Landscaping Guidelines

1. Provide one 3" caliper street tree of varied species for every 30 feet of street frontage. Trees should have 50 square feet of permeable area for growth. Retaining existing trees within the right-of-way or front setback area may substitute for new street trees. In areas of overhead power lines, substitute ornamental trees or other shrubbery.
2. Plantings shall not obscure site entrance and exit drives and road intersections.
3. Preserve existing trees where possible, or replace removed trees with its equivalent. For example, replace a tree that had a 15-inch caliper dbh (diameter at breast height) with five 3-inch caliper dbh trees. Leave soils undisturbed under the drip line of existing trees.
4. Use natural features and landscape berms to screen buildings. Use plant materials of different size, species and textures to give depth to the screen.
5. Add depth to facades with landscaping. Use pedestrian-oriented landscape areas adjacent to the building to add variety and depth to a large building facade.
6. Landscape the front and side yards with a mix of drought-resistant plantings including ground cover, trees, flowers, shrubs, succulents, and ornamental grasses.
7. When renovating a building with minimal landscaping, incorporate landscaping upgrades into the site.
8. Do not obscure building façades with landscaping. Landscaping should focus attention on the front face of the building and screen parking areas.
9. Where possible, the landscape design should embrace natural site features such as rock outcroppings, topography, etc.
10. Planting design should give priority to native species that promote local pollinators and are drought resistant. Irrigation systems are allowed, but plants that contribute to water conservation are preferred.
11. Overhead utility lines significantly detract from a site's appearance. New construction should incorporate underground wiring wherever possible.



280 Ayer Road, Harvard

- ❖ Trees along the side yard line provide a nice buffer between uses.
- ❖ Foundation landscaping and plantings in front add visual amenity.
- ❖ Parking lot in the rear allows the more pleasant view of greenery to prevail from the road.



Bowers Brook Offices, Harvard

- ❖ Foundation landscaping complements earth tones of building materials.
- ❖ Mix of plantings provides variety in shape, height, and color and avoids a monotonous appearance.
- ❖ Removal of overhead power lines allows building design and landscape features to take prominence.



289 Ayer Road

- ❖ Lack of street plantings exposes building to plain view.
- ❖ Poor location for dumpsters close to the street, but ...
- ❖ On a positive note, tall pines shield view of property from residential neighborhoods.
- ❖ Provide screening for outdoor storage areas and locate behind front face of the building.



WPI, Gateway Park, Worcester, MA



- ❖ Perimeter landscaping buffers the lot from the road and adjacent uses.
- ❖ Interior landscaping separates parking rows, adds a visual amenity, and helps reduce pavement heat gain on hot summer days.
- ❖ Cutoff light fixtures reduce lighting impacts.



Cornerstone Office Park, Woodbury, CT

- ❖ Parking lot is located behind buildings, away from view of Main Street (Route 6).
- ❖ Wide landscaped islands provide room for trees to prosper.
- ❖ Building foundation plantings add welcome greenery.

D. Access Management Guidelines

1. Combine curb cuts where feasible. New developments should generally have no more than one entrance and one exit per street.
2. For multiple building developments, one combined entrance/exit location is preferable at the main entrance to facilitate traffic movement. A landscaped traffic island is encouraged to separate in and out movements.
3. If needed to reduce congestion on Ayer Road, construct separate right and/or left turning lanes to facilitate entry and exit from the site.
4. Reduce the number of conflict points between vehicles, between vehicles and pedestrians, and between vehicles and bicyclists to limit driver mistakes and possible collisions. For example, align driveways on opposite sides of the road and increase spacing between driveways where possible to increase driver reaction time.
5. Where it is proposed to re-develop property, evaluate existing access on Ayer Road and re-design curb cuts to improve safety and traffic flow. Remove unnecessary driveway openings in favor of fewer access points with a greater level of traffic management.
6. Driveways too close to intersections can cause conflicts with traffic entering from side streets. Seek to preserve intersection capacity by locating access driveways away from intersections.



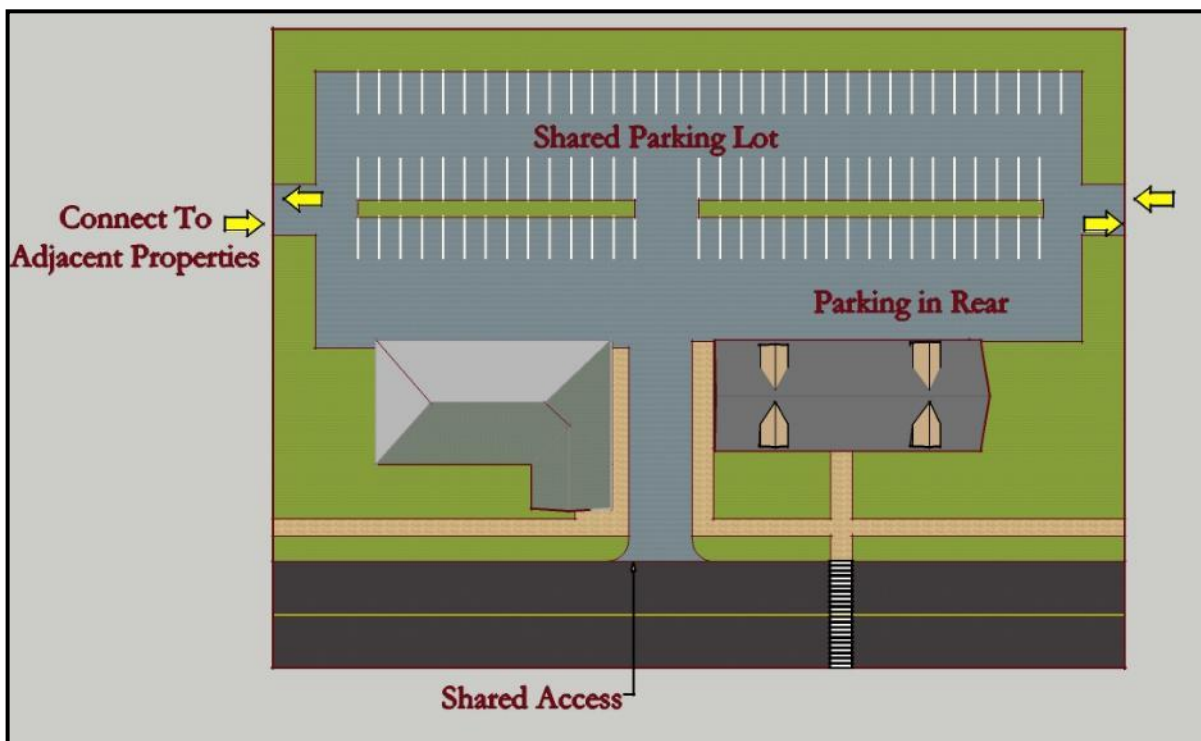
259 Ayer Road, Harvard

- ❖ Multiple curb cuts and broad openings present hazards to motorists.
- ❖ Minimal parking lot landscaping and parking in front of the building means pavement dominates the view of the property.
- ❖ Landscaping and curbing can help to channel traffic to defined driveway openings and limit conflicts with pedestrians and bicyclists.



Auburn, MA

- ❖ Mature trees, stone wall, and green belt along the street improve appearance of the business, a fast food franchise.
- ❖ Parking on the side of the building enhances appeal from the street.
- ❖ Landscaping and foundation plantings add welcome greenery to the highway strip.
- ❖ Retaining existing street trees enhanced attractiveness of the property and view from the road.



- ❖ Share driveways where possible to reduce the number of turning positions on Ayer Road.
- ❖ Provide parking behind buildings to allow architecture to inform the sense of the business.
- ❖ Sharing parking spaces can reduce the number of spaces needed to accommodate business needs, especially when uses have different times of day for peak parking demand. Fewer spaces mean less impervious surfaces and lower stormwater impacts.
- ❖ Encourage connections with adjacent lots to minimize turning movements on Ayer Road.



Route 12, Auburn, MA

- ❖ Traffic island with granite curbs and low-growth landscaping help to separate entering and exiting traffic while maintaining motorists' visibility.
- ❖ Single entrance serves multiple uses on adjoining lots, reducing the number of curb cuts onto Route 12.
- ❖ Native New England trees in perimeter of parking lot provide autumn colors and summer shading as they mature.

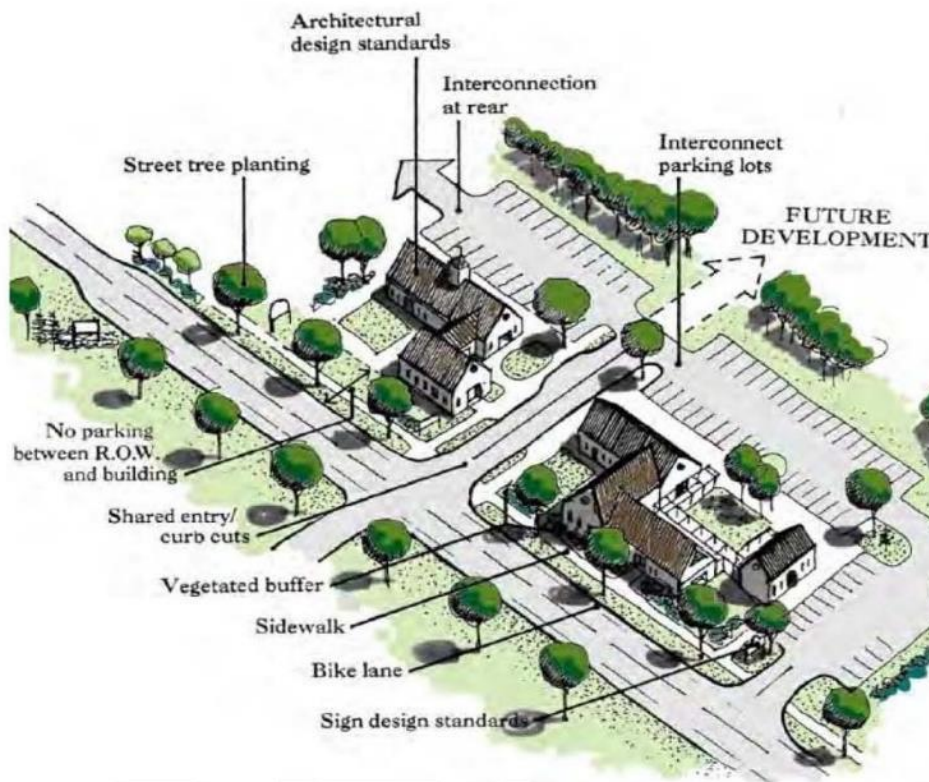


Illustration of Access Management Approach for Commercial Development

Source: MassDOT Project Development and Design Guide (2006)

Access Management Sketch recommended by the MassDOT for commercial development heralds many of the guidelines discussed in this report:

- ❖ Combine access for adjacent lots where feasible, and interconnect parking lots in the rear in order to share parking and reduce the number of spaces for each individual use.
- ❖ Do not place parking between the road right-of-way and the principal building.
- ❖ Provide landscaping in a green belt along the street frontage
- ❖ Install sidewalks for pedestrian safety and provide shoulders for bicyclists.

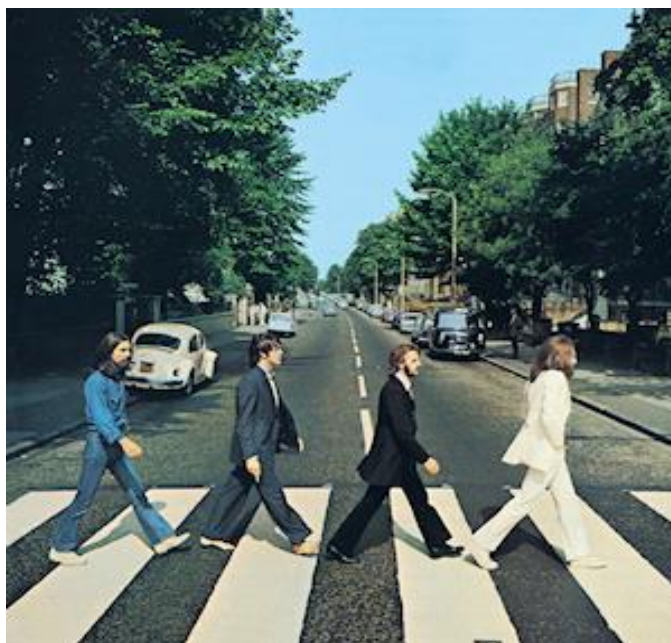
E. Guidelines for Connectivity

1. Consider interconnecting parking lots of abutting commercial properties to improve vehicle flows.
2. Encourage alternative means of travel. Develop an interconnected path network that provides choice of walking and cycling routes that lead to important destinations.
3. Provide paths on both sides of all streets if possible. Consider pedestrian easements through private property to continue an uninterrupted network over long distances.
4. Where street width permits, provide four-foot shoulders/bicycle lanes adjacent to travel lanes to improve safety for bicyclists from automobiles.
5. Connect to sidewalks and paths on adjacent properties, and extend walkways to connect to public parks, conservation areas, and other civic uses.
6. Provide bicycle parking next to building entrances.



Credit: Cape Cod Commission

- ❖ Off road bicycle paths can meander through scenic areas and provide a safe, alternative mode of transportation for recreation or business purposes.
- ❖ Landscaped green belt between the sidewalk and road protects pedestrians from passing autos and provides pedestrians a sense of safety.



- ❖ Provide crosswalks and clear signage to help pedestrians cross from one side to another on Ayer Road.
- ❖ Longitudinal lines offer more surface area to be seen by drivers.
- ❖ Textured or imprinted pavement on crosswalks provide cues to motorist to watch out for pedestrians.

F. Guidelines for Delivery Areas

1. Vehicle access to delivery areas should be away from the primary face of buildings.
2. Locate loading areas away from primary visual corridors.
3. Shield loading docks and storage areas from view by separate structures matching the building's exterior or by opaque landscaping and fencing.
4. Provide walls, fences, or dense landscape screen to muffle the noise impacts on nearby residential neighborhoods.



231 Ayer Road, Harvard



Donelan's Supermarket, Lincoln Station, MA

- ❖ Service areas behind the building lessen noise and visual impacts.
- ❖ Low level lighting provides safety without disturbing neighbors.
- ❖ Loading docks in the rear minimize noise from deliveries.
- ❖ Tree belt helps buffer unsightly views from neighbors and absorb sound.



Auburn, MA

- ❖ Loading dock at the rear of the building is unobtrusive.
- ❖ Landscaping provides buffer from service area.
- ❖ Dumpsters are hidden behind building, but could be enclosed.
- ❖ Presence of overhead power lines is a distraction.

G. Guidelines for Utilities and Mechanical Equipment

1. Screen exposed storage areas, machinery, dumpsters, service areas, generators, and other utility buildings and equipment from the view of abutting properties and streets using plantings, fences, and other building design techniques.
2. Screen garbage dumpsters with solid walls a minimum of six feet high with materials similar to the principal building materials.
3. Locate trash dumpsters, loading docks, mechanical equipment, etc. away from residential properties in a location that reduces visibility and noise intrusion.
4. Where feasible, place wire utilities underground.



- ❖ Exposed dumpster sticks out like a sore thumb and interferes with parking.



- ❖ Dumpster enclosure screens unsightly use and location does not affect parking.



Credit: Montgomery County, PA Planning Commission

- ❖ If possible, use materials to match architectural themes.
- ❖ Avoid chain link or metal for enclosures and consider vernacular materials.

H. Planning for Pedestrians and Bicyclists

1. Install sidewalks along sides of the property that abut a public street, even if sidewalks do not presently exist on such streets. This will permit extension of the sidewalks in the future. Sidewalks should be at least 6 feet in width.
2. Where sidewalks are placed along a road, provide a vegetative buffer between the road and sidewalk to shield pedestrians.
3. To help pedestrians reach store entrances, incorporate traffic calming features in parking lots to slow cars and clearly give pedestrians the right-of-way. Consider using speed tables, different paving materials, bump-outs, etc. between parking spaces and building entrances.
4. Enhance pedestrian safety by installing walkways in landscaped strips and by clearly delineating pedestrian crossings near building entrances.
5. Where pedestrians are likely to cross Ayer Road, work with the DPW Director to plan for a crosswalk with appropriate signage, markings, and road changes (e.g. raised crossing, curb extension) to allow pedestrians to cross safely. Give pedestrians priority over traffic, or install pedestrian signals if high pedestrian counts are possible.
6. Provide walkways that have a smooth surface and comply with standards of the Mass. Architectural Access Board. The accent surfaces should be durable brick, pavers, slate, or textured concrete. Asphalt sidewalks are discouraged.
7. Sidewalks that cross driveway entrances shall have a maximum cross slope of 2% to insure pedestrians in wheelchairs can safely cross the driveway.
8. Provide continuous internal pedestrian walkways, no less than six (6) feet in width, from the street to the principal customer entrances. Consider routes that connect focal points of pedestrian activity and pass through landscaped areas that include trees, shrubs, benches, flower beds, ground covers or other such materials.
9. Provide pedestrian paths, or reserve easements, to adjacent lots in anticipation of future connections to promote a multi-purpose path system throughout the district.
10. Provide bicycle parking at the rate of one bicycle space for every ten vehicle parking spaces. Separate bicycle parking facilities from motor vehicle parking areas to protect parked bicycles from damage by motor vehicles. Whenever possible, place the bicycle parking area within 50 feet of building entrances and in well-lit areas.
11. Where a proposed development abuts a trail, consider a connection between the trail and the lot to promote alternative modes of public access.



Existing Condition on Ayer Road

- ❖ Lack of sidewalks along Ayer Road puts pedestrians in peril.
- ❖ Green belt along the road would separate pedestrians from on-coming traffic.
- ❖ Utility poles may need re-location.
- ❖ Creating a sidewalk/ path system along Ayer Road will require public and private participation.



Credit: EOEA

- ❖ Internal pedestrian walkway leads from the street to the principal customer entrance and ensures pedestrian safety from unpredictable vehicular movements.
- ❖ Different paving materials help to distinguish driving surfaces from pedestrian pathways and enhance the attractiveness of the walkways.
- ❖ Low level lighting helps pedestrians navigate pathways after dusk.
- ❖ Planting beds protect trees and create pleasant site amenity.

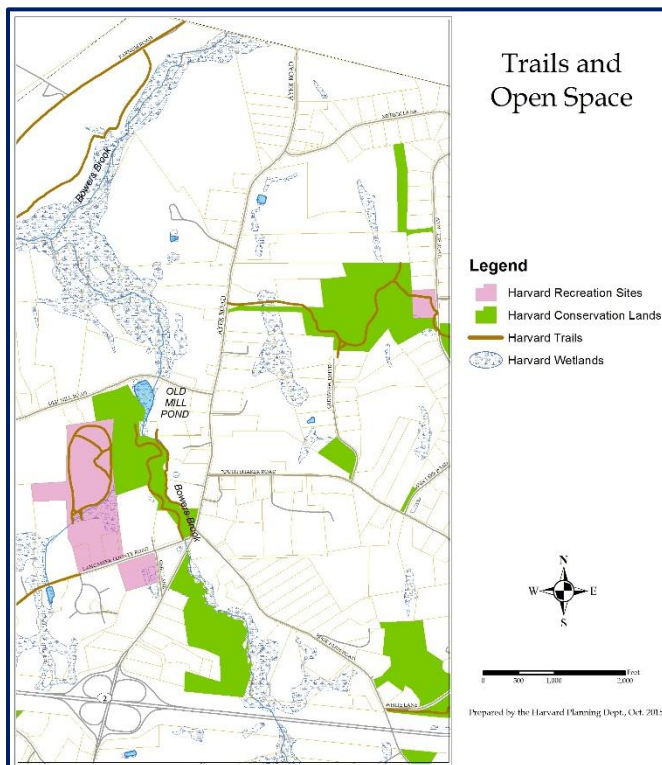
I. Open Space and Environment Guidelines

1. Consider location of property in the context of community open space and trail network and provide linkages if within reasonable proximity.
2. Provide public spaces within a development for casual interaction.
3. Provide outdoor amenities such as a patio seating area, water feature, sculpture, pedestrian plaza with benches and planters, etc.
4. Establish greenbelts along streams, with the larger side yard setbacks adjacent to the streams to help preserve ecological functions.
5. Integrate natural features and open space into the overall plan of development.



Lincoln Station, Lincoln, MA

- ❖ Public artwork invites pedestrians to enjoy a quiet moment.
- ❖ Foundation landscaping and front lawn is noteworthy for lack of pavement and view of autos.
- ❖ Internal path leads from sidewalk on street to building entrance.



- ❖ The McCurdy Track and soccer field are popular destinations, but walking there along Ayer Road without paths is difficult. Providing connections to parks and conservation areas will help promote healthy exercise.
- ❖ The Bowers Brook ecosystem shapes the natural environment and physical form of the C District. Development should preserve the environmental integrity of natural resources.

J. Lighting⁴

1. Lighting must conform to §125-40, Lighting, of the Zoning Bylaw. Its intent is to “to reduce light pollution, light trespass, unnecessary sky glow and other glare in order to preserve and enhance the natural, scenic and aesthetic character and historical environment, and to preserve the night sky as a natural resource to enhance nighttime enjoyment of property within the Town of Harvard.”
2. Building lighting should highlight the building rather than attract attention to the light fixture itself, and be appropriate to the building’s architectural style, in order to maintain a positive nighttime image.
3. Lighting should be fully shielded.
4. Light fixtures should provide an even illumination level while operating. Flashing, pulsating or similar dynamic lighting should not be used.
5. Provide lighting for sidewalks and paths that link buildings with public spaces, parking areas, and sidewalks on adjacent land wherever practical.
6. Lighting should not cast glare onto streets, public ways, or onto adjacent properties.
7. Indirect lighting should be provided where possible.
8. Illumination levels should be minimal along property lines.



Auburn, MA

- ❖ Uncontrolled lighting in parking lot casts light into the night sky.
- ❖ Unappealing concrete bases pose parking hazard.
- ❖ Poles should be lower in height, have cutoff fixtures, and be located in planting islands.
- ❖ Lot provides no pedestrian amenities whatsoever.

⁴ See §125-40 of the Protective Bylaw for zoning requirements.



- ❖ Site lighting should meet “Dark Sky” standards through the careful placement and style of lighting fixtures.
- ❖ Use energy efficient fixtures with LED luminaires.
- ❖ Select posts with classic look, and materials should be dark in color to reduce light reflectivity.



- ❖ Bollards delineate and illuminate paths with minimal glare and light spillage.



Credit: Montgomery County Planning Commission

- ❖ Traditional light fixtures create a welcoming experience for pedestrians.



Credit: Architectural Area Lighting

- ❖ Fixtures with cutoffs reduce light trespass and enhance property aesthetics.



Credit: Architectural Area Lighting

- ❖ Luminaires can have a classic or modern look provided they fit the building architecture and minimize lighting impacts.

K. Stormwater

1. Design stormwater facilities according to best management practices using naturalized and landscaped detention basins, swales, and green islands to improve stormwater quality and infiltration rates.
 2. Integrate Low Impact Development (LID) measures within the site design where feasible, such as rain gardens, vegetated swales, permeable paving, bioretention basins, infiltration structures, etc.
 3. Stormwater systems should promote long-term water quality improvements and protect the C District's natural environment, including Bowers Brook.
 4. Landscaping within parking areas should include vegetated islands with bioretention functions.
- ❖ Bioretention cells lower the rapid rate of surface runoff, allow on-site infiltration of groundwater, absorb oils and sediments, and contribute to parking lot aesthetics.
 - ❖ LID measures can be designed as part of a landscaping scheme and add green space to a parking lot.
 - ❖ Vegetated measures decentralize stormwater treatment, reduce "heat island" effects, and enhance site aesthetics.



Credit: EOEa



Credit: CalTrans

- ❖ Rain gardens filter out sediments and pollutants and recharge aquifers.
- ❖ Stormwater planters between parking rows or around the perimeter provide filtration, treatment, and infiltration of stormwater.
- ❖ Below the surface, careful construction includes geotextiles, gravel, and soil to provide stormwater treatment. Runoff from the parking lot is directed into the LID measure, where it is temporarily detained, filtered, and infiltrated.



Bio-Swale, Trader Joe's, Burlington, VT

- ❖ Bio-Swale removes silt and pollution from parking lot runoff.
- ❖ Plantings can withstand periodic saturated soil conditions.
- ❖ Gentle slope and, shallow depth maximize time water spends in the swale to trap pollutants through infiltration.

L. Residential Conversions

1. Conversions of residences to commercial uses should seek to incorporate the principles of good design expressed elsewhere in this report.
2. Provide parking to the side or rear of the residence, and share driveways with adjacent properties if possible.
3. Provide landscaped front yard and establish buffers next to adjoining residences.
4. Former homes can be readily adapted to accommodate professional offices and small-scale commercial services.



Real Estate Office



Dentist's Office

- ❖ Shallow setbacks provide a close connection of the buildings to the street.
- ❖ Parking lots are located off to the side of the buildings to minimize visual impact.



Antique Shop, Rt. 6, Woodbury, CT

- ❖ Barn in the rear provides opportunity for home business.
- ❖ Residential appearance is maintained from the road except for a small sign.
- ❖ Reuse of historic home is compatible with surrounding properties.
- ❖ Driveway leads to parking lot behind the home to preserve view of house and front yard landscaping.

PART 5: AYER ROAD VILLAGE SPECIAL PERMIT

A. Overview

Section 125-52 of the Protective Bylaw contains a special zoning provision for the Commercial District, called the Ayer Road Village Special Permit (ARV-SP). Town Meeting adopted this section in 2004 as a direct implementation measure of the 2002 Master Plan.⁵

“Harvard needs to “create mixed-use village centers [with] services, amenities, and gathering places,” “direct development toward a village pattern” and “create a village atmosphere in the commercial district” with “strong design guidelines and site standards to support town character.”

The intent of the provision is to promote a village character along Ayer Road. Residents typically view the Commercial District as containing unappealing highway strip commercial development. The ARV-SP is a means to slowly change this character to a better alternative, one that promotes mixed use development, fosters community interaction, has pedestrian activity, and provides commercial development that meets the Town’s needs for goods and services. The Planning Board is the special permit granting authority and has the responsibility of working with applicants to design projects that fit the goal of transforming the district to one that has a more “Main Street” personality.

The ARV-SP section recognizes that Harvard’s dimensional regulations are counter-productive to the Master Plan’s vision, and it offers considerable flexibility to overcome site planning limitations inherent in the Bylaw. Some of these incentives include:

- ❖ Permit alternative building siting without regard to a lot width circle.
- ❖ Permit more than one main building on a lot.
- ❖ Apply alternative building and structure setback requirements.
- ❖ Apply alternative site standards relative to parking, loading and driveways.
- ❖ Apply alternative site standards relative to lighting and signs.
- ❖ Permit up to 10% more floor area than otherwise allowed.
- ❖ Allow greater building size than permitted elsewhere, up to 30,000 sq. ft. of gross floor area.

The hallmark of an ARV-SP is to allow mixed use developments, with multiple buildings on a single lot in close proximity to facilitate walking to different uses, and with central parking areas and common access to Ayer Road to reduce the number of curb cuts compared to separate lots of comparable floor area. Section 125-52.A. states the specific objectives of the provision:

- (a) Promotion of mixed use development.

⁵ Harvard Master Plan, page 4.5, 2002.

- (b) Promotion of shared access in properties, with appropriate links to adjoining properties, lessening the need for curb openings on Ayer Road.
- (c) Promotion of development that emphasizes pedestrian accessible walkways, benches, pathways, bicycle racks, and pedestrian-scale lighting and signage.
- (d) Encouragement of building and site designs compatible with the local architecture, rather than generic designs.
- (e) Avoidance of excessive building massing and unbroken building facade treatments.
- (f) Subordination of parking, loading docks, on-site utilities, heating, ventilation and air conditioning equipment (HVAC), utility lines, and solid waste dumpsters to building form.

Many of these objectives are in step with the Design Guidelines presented earlier in this report. Whether or not a project is in a Village development, it is important to have a consistent set of Guidelines to promote the desired vision for the Corridor.

Furthermore, in a mixed use village development (MUVD) multifamily uses should constitute 30% or more of the total gross floor area. This is important because it is the principal way the Bylaw allows multifamily uses in Harvard (aside from a comprehensive permit pursuant to MGL c. 40B). MUVDs also offer the opportunity to have a 30,000-sq. ft. grocery store, a live musical entertainment establishment, and a small screen arts theater (§125-52-13(Z)). Lastly, in order to facilitate a clustering concept and greater density, privately-owned communal sewage treatment systems are allowed in an ARV-SP while prohibited everywhere else in Harvard.

The ARV-SP provision will not apply uniformly throughout the C District. Many lots are small and simply do not have enough land area to accommodate a mixed use development (although consolidation of several small parcels is possible and even desirable from the perspective of changing the land use character of the district over time). Some lots may lack the minimum frontage requirement of 300 feet, and recently developed sites will be unlikely to change due purely to financial reasons. But several large parcels are vacant and appear to be good candidates for this provision, many older properties are ripe for redevelopment, and the provision could encourage the consolidation of adjoining properties. Thus, this provision can have a lasting effect on the corridor over time.

B Discussion of Village Concepts

Village developments typically provide a variety of residential dwelling types at moderate to high densities. Various planning studies for Harvard have noted a need for alternatives to large single family homes on individual lots (1.5 acre minimum area), which are the norm in town. Village projects often contain units dedicated solely to seniors, which may be market rate or subsidized, independent or assisted living. Such units might be suitable for “empty-nesters” in Harvard who seek to down-size to smaller, maintenance-free living. (In fact, Bowers Brook Apartments, which received an ARV-SP, contains 42 units of housing for seniors 55 and over.)

Housing for families, single professionals, and first-time home buyers are also usually part of the mix. Offering multi-generational housing is attractive to many potential buyers.

Commercial activity is integral to successful Village developments. Retail uses are perhaps the most visible, but professional offices, personal services, restaurants, and medical facilities serve not only local needs but may also offer amenities that attract customers from the regional market. Retailers will concentrate along a tree-lined “Main Street”, and multi-story buildings may offer apartments above first floor shops. The approach seeks to re-create many of the components of successful town centers that developed before zoning bylaws outlawed the concept in favor of strict separation of uses. Some villages create a unique retail environment that caters to tourists or a regional audience of shoppers looking for a pleasant experience.

Central parking lots allow visitors to park in close proximity to shops and services. Lots are well-landscaped and located behind buildings to foster close connections among uses. Wide sidewalks and pedestrian amenities encourage casual strolling and window shopping. Open space on the periphery maintains a natural setting, provides opportunities for hiking, and helps to buffer the village from established neighborhoods. Villages may also offer manicured outdoor spaces such as parks or “town commons” for community events such as concerts and festivals.

Harvard’s Commercial District is an approximately 1.5-mile linear corridor with distances from the highway that range in depth from about 500 feet to about 1,500 feet. It is not clear how the drafters of the Zoning Map drew the boundaries for the district. A consequence, however, is that the narrow depth of the district in many locations poses limitations on the ability to design moderate to large scale village developments with sufficient residential density and commercial space to create self-contained entities. Therefore, to attain the desired character, a vision of a linear “Main Street” is the more likely outcome, where individual property owners work in concert and build according to the Design Guidelines described in this report.

Over time, by bringing buildings closer to the street, providing parking lots in the rear, connecting uses with pedestrian pathways and sidewalks, sharing access, planting hardy New England landscaping, mixing land uses (including residences), building two and three story buildings, etc. the Ayer Road Corridor can transform from an older strip commercial model to a more compact, pedestrian-friendly, village model. Accompanying this private sector approach, the Town should work with MassDOT to reconfigure the highway geometry to allow on-street parking in appropriate locations, insure pedestrian safety with sidewalks, crosswalks and traffic calming measures, add turning lanes where necessary to favor through movements, bury overhead utility lines, and add green belts and street trees to beautify the corridor.

C. Sample Village Developments

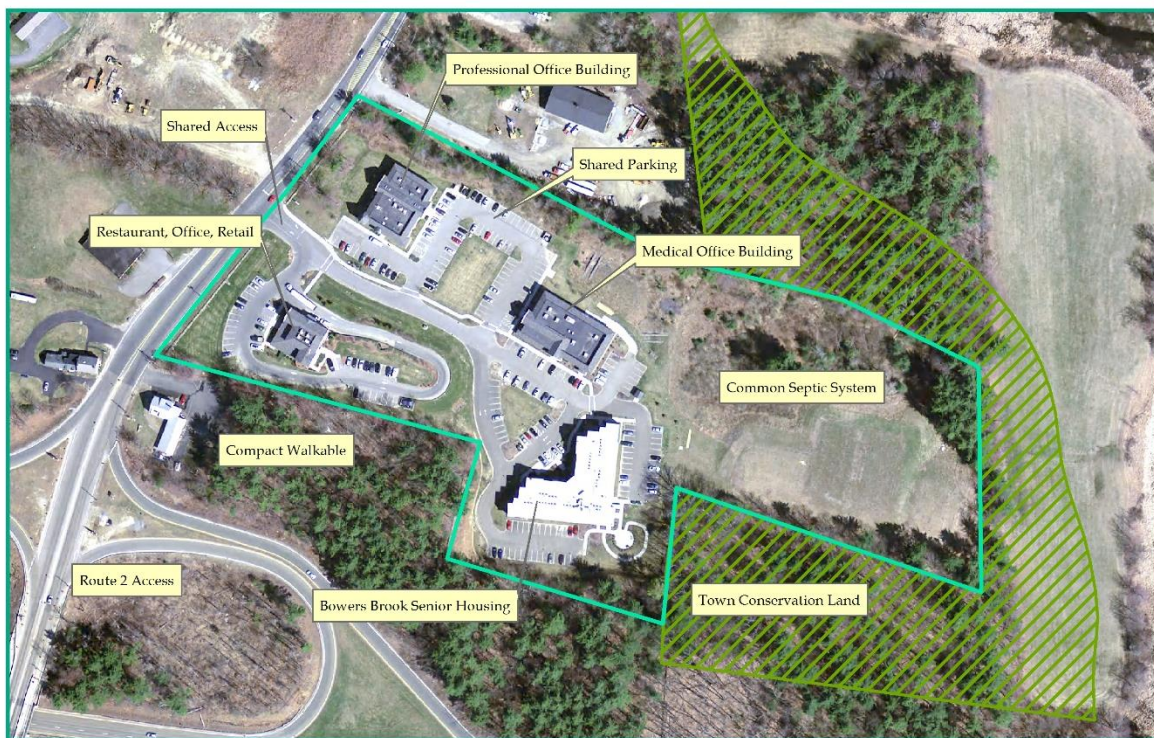
Presented on the following pages are three examples of developments that contain many characteristics of village developments. No single example is likely to encompass all of the elements discussed above, but from the representations and brief discussions of each, it is

apparent that it is not only possible to avoid the trap of single purpose, stand-alone buildings but it is desirable to mix uses in a cohesive setting to create a better development paradigm for the C District.

Ayer Road Mixed Use Development

An example of a viable mixed use development exists in Harvard today. It includes 42 units of senior rental housing in the Bowers Brook apartments. One shared driveway serves the site rather than four separate driveways serving each building. Several landscaped parking lots reduce the visual impact of automobiles on what might otherwise have required one large lot to serve the entire site. As permitted by the ARV-SP provision, a common septic system serves the project, and on-site wells operate as a public water supply under a permit from DEP. "Ayer Road Meadows", Town Conservation land, borders the property to the east and provides opportunities for passive recreation. Buildings are in close proximity, creating a compact, walkable development. The project contains 92,000 sq. ft. of floor area, with the residential component comprising about 50% of the total.

Ayer Road Village
Mixed Use Development



Easthampton, Mass.: Case Study

This example shows a redevelopment proposal of a former automobile dealership in Easthampton, MA (labeled Existing Building in the sketch). Infill development changes the lot character from strip commercial to mixed use with a moderate land use intensity and increase of taxable value. New development places a two-story building close to the street, with parking provided to the side and rear in discrete sections to break up the visual impact of parking. The street front contains a landscaped tree belt and sidewalk to accommodate pedestrian use and links the property to other commercial properties along the street. Internal pedestrian paths around the buildings and parking areas enhance safety. The plan provides a comfortable scale for the setting, and the proposed building contains architectural detail to improve the view from the street.

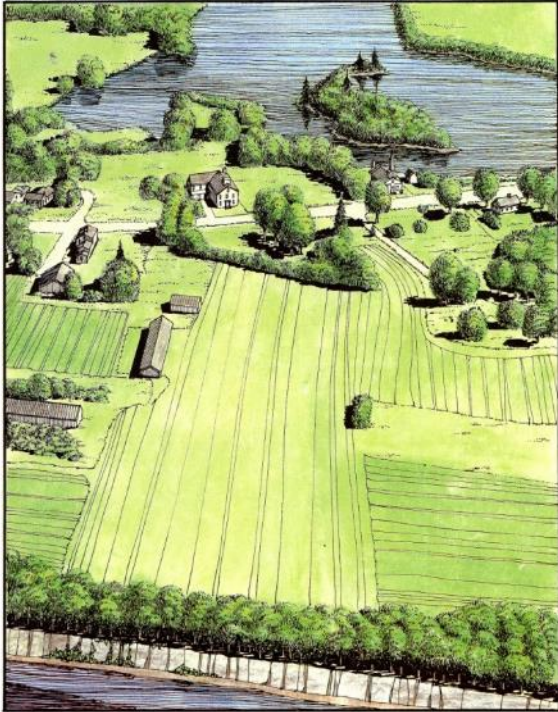


Route 10, Easthampton, MA

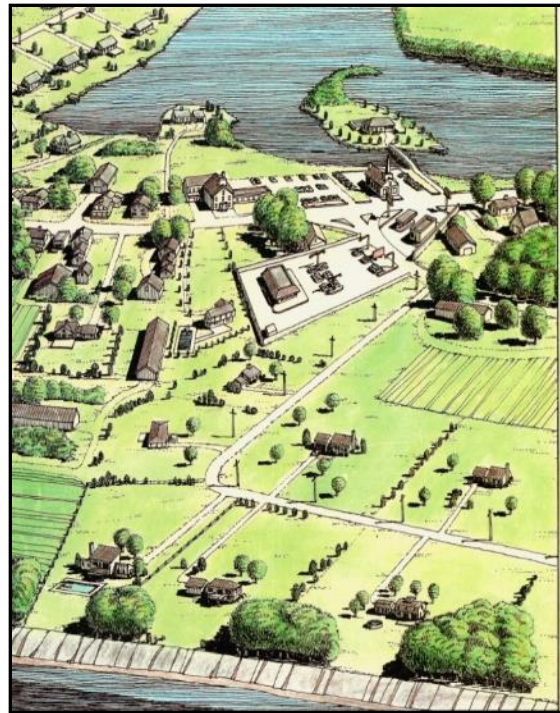
Dealing with Change in the Connecticut River Valley, A Design Manual for Conservation and Development⁶

The Report provides a third example of a compact village development. The following page shows a hypothetical development of a farm in Hadley, Mass. A conventional plan strips commercial development along the highway, and large lot single family homes consume the available farmland in both frontage lots and new subdivisions. The “creative development” concept preserves much of the farmland by clustering commercial uses together, placing parking behind the buildings, and providing generous landscaping to help screen the parking from view. Buildings are placed near the road to reinforce the street edge. The C district in Harvard contains two large, active farms, and the ARV-SP option offers a way to preserve the farms. A village-style development could yield a high economic return for the owners and allow farming to continue on the most productive farmland soils.

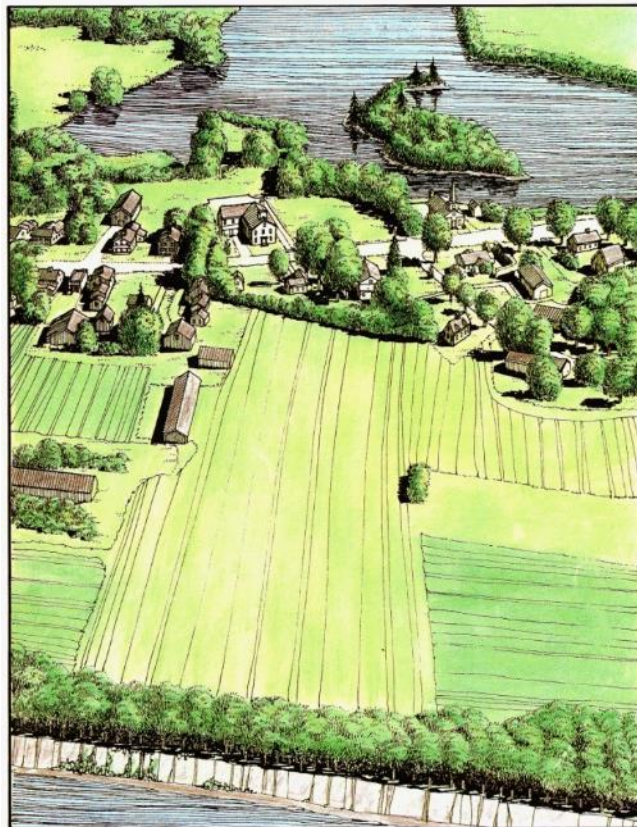
⁶ Robert D. Yaro, et. al., Lincoln Institute of Land Policy, 1988.



Aerial View of Site before Development



Aerial View of Site after Conventional Development



Aerial View of Site after Creative Development

APPENDIX 1
DRAFT BYLAW FOR A COMMERCIAL DESIGN REVIEW BOARD

A. Establishment and Purpose

There is hereby established a Commercial Design Review Board to promote principles of good design in new development and to foster growth that enhances the scenic beauty and built environment of Harvard. The Design Review Board shall promote the interests contained in §125-38F, Design Review, of the Harvard Protective Bylaw. The Design Review Board shall provide guidance to applicants in matters of architectural composition, site design, and sustainable development practices to facilitate approval by the Planning Board.

B. Applicability

The Design Review Board shall examine design elements of development proposals in the Commercial District for projects that require a building permit for new construction, an addition, or exterior alteration, or are subject to site plan review and/or a special permit granted by the Planning Board. The Design Review Board shall apply design guidelines adopted by the Planning Board that display qualities of development Harvard wishes to encourage.

C. Composition of the Board (option 1)

The Design Review Board shall consist of five members who shall serve for terms of three years. The Planning Board shall appoint two members who shall have qualifications in the fields of Landscape Architecture, Architecture, Planning, Civil Engineering, Environmental Sciences, or Urban Design. Each such member shall initially serve for one year, and thereafter shall serve three-year terms. The Board of Selectmen shall appoint two members who have development or construction experience or who own or operate a business in the Commercial district. Each such member shall initially serve for two years, and thereafter shall serve three-year terms. The Town Administrator shall appoint one resident of the Town who has worked for the betterment of Harvard through service on town boards and ad hoc committees, with preference to a resident living near the district. The Board shall annually elect one member to serve as Chair. The Design Review Board shall meet at least annually with the Planning Board to discuss procedures and consider modifications to the design guidelines.

C. Composition of the Board (option 2)

The Planning Board shall appoint a Design Review Board, which shall consist of five members. One member of the Planning Board shall serve as Chairman. One member shall be an architect or a landscape architect. One member shall be a representative of the business community. Two members shall be Town residents with expertise in design, civil engineering, natural resources, historic preservation, development, or real estate. Members shall serve three-year terms, except that the initial term shall be staggered such that one member shall have a one-year term, two members shall have two-year terms, and two members shall have three-year terms.

D. Procedures

Prior to submitting a building permit to the Building Commissioner, or a site plan or special permit application to the Planning Board, applicants shall submit conceptual renderings of proposed buildings and a preliminary site plan to the Design Review Board in accordance with procedures that the Board shall adopt. The Chair will schedule a meeting with the applicant within 21 days of submission. Meetings shall be open to the public and posted in accordance with the Open Meeting Law. The Board shall evaluate the project in relation to the Planning Board's design standards and may suggest changes to improve the quality of the design. The Board shall issue an advisory report to the Building Commissioner or Planning Board. The Building Commissioner or Planning Board may accept the recommendations of the Design Review Board or state in their decision the reasons for not accepting the recommendations.

APPENDIX 2

INVASIVE SPECIES LISTS

Invasive Plants of Massachusetts

What are Invasive Plants?⁷

Invasive plants are non-native plants that are capable of aggressively invading natural areas and displacing native vegetation. They generally lack predators and parasites, giving them a competitive edge over native species. About one-third of the established vascular plant taxa in Massachusetts are non-native (Cullina et al., 2011). However, only a small fraction (approximately 7 percent) of these introduced plants are considered invasive. Plants that qualify as invasive typically have high rates of growth, reproduction, and dispersal.

Lists of invasive plant species specific to Massachusetts and New England have been compiled by the Massachusetts Invasive Plant Advisory Group (MIPAG) and the Invasive Plant Atlas of New England (IPANE), respectively. MIPAG categorizes invasive plant species in Massachusetts as "Invasive" (known invasives) and "Likely Invasive" (species that have invasive potential but do not currently meet all of MIPAG's criteria for invasiveness). They have also identified a list of "Potentially Invasive" species, which have not yet spread to Massachusetts but are known to pose invasive threats. The IPANE list includes established/widespread invasives, early detection species (which have high invasive potential but are relatively new and have not yet become widespread), and species that are being evaluated for invasiveness.

The Massachusetts Department of Agricultural Resources, with input from MIPAG, developed a list of *Massachusetts Prohibited Plants*, which includes species identified as invasive and/or noxious. It is currently illegal to import, propagate or sell any of the plants on this list within the Commonwealth of Massachusetts. The Department derives its authority to enact this ban under Massachusetts General Law, including Chapter 128 Section 2 and Sections 16 through 31A.

Invasive plant species commonly observed in Massachusetts are listed below. Please note, this is not an all-inclusive list of invasive plants. For a more comprehensive listing, refer to the IPANE and MIPAG species lists.

Invasive Plants of Massachusetts

To sort by scientific name or common name, click on the respective column heading.

⁷ <http://www.massnature.com/Plants/Invasives/invasiveplants.htm>

Common Name	Scientific Name¹	MIPAG Category	IPANE Species	Importation, Propagation and Sale Prohibited in MA?
<u>Autumn Olive</u>	<u><i>Elaeagnus umbellata</i></u>	Invasive	Yes	Yes
<u>Barberry, Common</u>	<u><i>Berberis vulgaris</i></u>	Likely Invasive	Yes	Yes
<u>Barberry, Japanese</u>	<u><i>Berberis thunbergii</i></u>	Invasive	Yes	Yes
<u>Bittercress, Narrow-leaf</u>	<u><i>Cardamine impatiens</i></u>	Likely Invasive	Yes	Yes
<u>Bittersweet, Oriental</u>	<u><i>Celastrus orbiculatus</i></u>	Invasive	Yes	Yes
<u>Brome-grass, Drooping</u>	<u><i>Bromus tectorum</i></u>	NA	Yes	No
<u>Broom, Scotch</u>	<u><i>Cytisus scoparius</i></u>	Did not meet criteria*	Yes	No
<u>Buckthorn, Common</u>	<u><i>Rhamnus cathartica</i></u>	Invasive	Yes	Yes
<u>Buckthorn, Glossy</u>	<u><i>Frangula alnus</i></u>	Invasive	Yes	Yes
<u>Celandine</u>	<u><i>Chelidonium majus</i></u>	NA	Yes	No
<u>Colt's-foot</u>	<u><i>Tussilago farfara</i></u>	Likely Invasive	Yes	Yes
<u>Dame's Rocket</u>	<u><i>Hesperis matronalis</i></u>	Invasive	Yes	Yes
<u>Euonymus, Winged</u>	<u><i>Euonymus alata</i></u>	Invasive	Yes	Yes
<u>Fanwort</u>	<u><i>Cabomba caroliniana</i></u>	Invasive	Yes	Yes
<u>Forget-me-not, True</u>	<u><i>Myosotis scorpioides</i></u>	Likely Invasive	Yes	Yes
<u>Garlic, Wild</u>	<u><i>Allium vineale</i></u>	NA	Yes	No
<u>Goutweed</u>	<u><i>Aegopodium podagraria</i></u>	Invasive	Yes	Yes
<u>Grass, Reed Canary</u>	<u><i>Phalaris arundinacea</i></u>	Invasive	Yes	Yes
<u>Honeysuckle, Bell's</u>	<u><i>Lonicera x bella</i></u>	Invasive	Yes	Yes
<u>Honeysuckle, Japanese</u>	<u><i>Lonicera japonica</i></u>	Invasive	Yes	Yes
<u>Honeysuckle, Morrow's</u>	<u><i>Lonicera morrowii</i></u>	Invasive	Yes	Yes
<u>Honeysuckle, Tatarian</u>	<u><i>Lonicera tatarica</i></u>	Likely Invasive	Yes	Yes

Common Name	Scientific Name¹	MIPAG Category	IPANE Species	Importation, Propagation and Sale Prohibited in MA?
<u>Indigobush</u>	<u><i>Amorpha fruticosa</i></u>	NA	Yes	No
<u>Ivy, Ground</u>	<u><i>Glechoma hederacea</i></u>	NA	Yes	No
<u>Knapweed, Spotted</u>	<u><i>Centaurea biebersteinii</i></u>	Likely Invasive	Yes	Yes
<u>Knotweed, Japanese</u>	<u><i>Polygonum cuspidatum</i></u>	Invasive	Yes	Yes
<u>Locust, Black</u>	<u><i>Robinia pseudoacacia</i></u>	Invasive	Yes	Yes
<u>Loosestrife, Purple</u>	<u><i>Lythrum salicaria</i></u>	Invasive	Yes	Yes
<u>Maple, Norway</u>	<u><i>Acer platanoides</i></u>	Invasive	Yes	Yes
<u>Mustard, Garlic</u>	<u><i>Alliaria petiolata</i></u>	Invasive	Yes	Yes
<u>Nightshade, Bittersweet</u>	<u><i>Solanum dulcamara</i></u>	NA	Yes	No
<u>Pepperweed, Broad-leaved</u>	<u><i>Lepidium latifolium</i></u>	Invasive	Yes	Yes
<u>Porcelainberry</u>	<u><i>Ampelopsis brevipedunculata</i></u>	Likely Invasive	Yes	Yes
<u>Privet, Border</u>	<u><i>Ligustrum obtusifolium</i></u>	Likely Invasive	Yes	Yes
<u>Ragged Robin</u>	<u><i>Lychnis flos-cuculi</i></u>	NA	Yes	No
<u>Reed, Common</u>	<u><i>Phragmites australis</i></u>	Invasive	Yes	Yes
<u>Rose, Multiflora</u>	<u><i>Rosa multiflora</i></u>	Invasive	Yes	Yes
<u>Rose, Rugosa</u>	<u><i>Rosa rugosa</i></u>	Did not meet criteria*	Yes	No
<u>Sorrel, Sheep</u>	<u><i>Rumex acetosella</i></u>	NA	Yes	No
<u>Spurge, Cypress</u>	<u><i>Euphorbia cyparissias</i></u>	Likely Invasive	Yes	Yes
<u>Stiltgrass, Japanese</u>	<u><i>Microstegium vimineum</i></u>	Likely Invasive	Yes	Yes
<u>Swallowwort, Black</u>	<u><i>Cynanchum louiseae</i></u>	Invasive	Yes	Yes
<u>Swallowwort, Pale</u>	<u><i>Cynanchum rossicum</i></u>	Likely Invasive	Yes	Yes

Common Name	Scientific Name ¹	MIPAG Category	IPANE Species	Importation, Propagation and Sale Prohibited in MA?
<u>Tree-of-Heaven</u>	<u><i>Ailanthus altissima</i></u>	Invasive	Yes	Yes
<u>Water Chestnut</u>	<u><i>Trapa natans</i></u>	Invasive	Yes	Yes
<u>Watercress</u> **	Rorippa nasturtium-aquaticum	Did not meet criteria*	Yes	No
<u>Wintercreeper</u>	<u><i>Euonymus fortunei</i></u>	NA	No	No

Notes:

IPANE - Invasive Plant Atlas of New England

MIPAG - Massachusetts Invasive Plant Advisory Group

NA - Not applicable/not listed

* - Species was evaluated, but did not meet criteria to qualify it as invasive or likely invasive.

References

Cullina, M.D., B. Connolly, B. Sorrie, and P. Sommers, 2011. The Vascular Plants of Massachusetts: A County Checklist. First Revision. Massachusetts Natural Heritage & Endangered Species, Massachusetts Division of Fisheries and Wildlife. Westborough, Massachusetts.

IPANE: Invasive Plant Atlas of New England website, 2012. URL: <http://www.eddmaps.org/ipane/index.html>. Accessed July 7, 2012.

Massachusetts Department of Agricultural Resources, 2011. Massachusetts Prohibited Plant List. URL: <http://www.mass.gov/agr/farmproducts/prohibitedplantlist.htm>. Last modified January 3, 2011.

Massachusetts Invasive Plant Advisory Group (MIPAG) website, 2012. URL: <http://www.massnrc.org/MIPAG/index.htm>. Accessed July 7, 2012.

Plants Voted as Invasive⁸

"Invasive plants" are non-native species that have spread into native or minimally managed plant systems in Massachusetts. These plants cause economic or environmental harm by developing self-sustaining populations and becoming dominant and/or disruptive to those systems. As defined here, "species" includes all synonyms, subspecies, varieties, forms, and cultivars of that species unless proven otherwise by a process of scientific evaluation.

***Acer platanoides* L. (Norway maple)**

A tree occurring in all regions of the state in upland and wetland habitats, and especially common in woodlands with colluvial soils. It grows in full sun to full shade. Escapes from cultivation; can form dense stands; out-competes native vegetation, including sugar maple; dispersed by water, wind and vehicles.

***Acer pseudoplatanus* L. (Sycamore maple)**

A tree occurring mostly in southeastern counties of Massachusetts, primarily in woodlands and especially near the coast. It grows in full sun to partial shade. Escapes from cultivation inland as well as along the coast; salt-spray tolerant; dispersed by wind, water and vehicles.

***Aegopodium podagraria* L. (Bishop's goutweed; bishop's weed; goutweed)**

A perennial herb occurring in all regions of the state in uplands and wetlands. Grows in full sun to full shade. Escapes from cultivation; spreads aggressively by roots; forms dense colonies in flood plains.

***Ailanthus altissima* (P. Miller) Swingle (Tree of heaven)**

This tree occurs in all regions of the state in upland, wetland, & coastal habitats. Grows in full sun to full shade. Spreads aggressively from root suckers, especially in disturbed areas.

***Alliaria petiolata* (Bieb.) Cavara & Grande (Garlic mustard)**

Synonym: *Alliaria officinalis* Andr. Ex Bieb.

A biennial herb occurring in all regions of the state in uplands. Grows in full sun to full shade. Spreads aggressively by seed, especially in wooded areas.

***Berberis thunbergii* DC. (Japanese barberry)**

A shrub occurring in all regions of the state in open and wooded uplands and wetlands. Grows in full sun to full shade. Escaping from cultivation; spread by birds; forms dense stands.

***Cabomba caroliniana* A.Gray (Carolina fanwort; fanwort)**

A perennial herb occurring in all regions of the state in aquatic habitats. Common in the aquarium trade; chokes waterways.

***Celastrus orbiculatus* Thunb. (Oriental bittersweet; Asian or Asiatic bittersweet)**

A perennial vine occurring in all regions of the state in uplands. Grows in full sun to partial shade. Escaping from cultivation; berries spread by birds and humans; overwhelms and kills vegetation.

⁸ <http://www.massnrc.org/mipag/invasive.htm>

***Cynanchum louiseae* Kartesz & Gandhi (Black swallow-wort, Louise's swallow-wort)**

Synonyms: *Cynanchum nigrum* (L.) Pers. non Cav.; *Vincetoxicum nigrum* (L.) Moench

A perennial vine occurring in all regions of the state in upland, wetland, and coastal habitats. Grows in full sun to partial shade. Forms dense stands, out-competing native species: deadly to Monarch butterflies.

***Elaeagnus umbellata* Thunb. (Autumn olive)**

A shrub occurring in uplands in all regions of the state. Grows in full sun. Escaping from cultivation; berries spread by birds; aggressive in open areas; has the ability to change soil.

***Euonymus alatus* (Thunb.) Sieb. (Winged euonymus; Burning bush)**

A shrub occurring in all regions of the state and capable of germinating prolifically in many different habitats. It grows in full sun to full shade. Escaping from cultivation and can form dense thickets and dominate the understory; seeds are dispersed by birds.

***Euphorbia esula* L. (Leafy spurge; wolf's milk)**

A perennial herb occurring in all regions of the state in grasslands and coastal habitats. Grows in full sun. An aggressive herbaceous perennial and a notable problem in western USA.

***Frangula alnus* P. Mill. (European buckthorn; glossy buckthorn)**

Synonyms: *Rhamnus frangula* L.; *R. frangula* var. *angustifolia* Loud.

Shrub or tree occurring in all regions of the state in upland, wetland, and coastal habitats. Grows in full sun to full shade. Produces fruit throughout the growing season; grows in multiple habitats; forms thickets.

***Glaucium flavum* Crantz (Sea or horned poppy; yellow hornpoppy)**

A biennial and perennial herb occurring in southeastern MA in coastal habitats. Grows in full sun. Seeds float; spreads along rocky beaches; primarily Cape Cod and Islands.

***Hesperis matronalis* L. (Dame's rocket)**

A biennial and perennial herb occurring in all regions of the state in upland and wetland habitats. Grows in full sun to full shade. Spreads by seed; can form dense stands, particularly in flood plains.

***Iris pseudacorus* L. (Yellow iris)**

A perennial herb occurring in all regions of the state in wetland habitats, primarily in flood plains. Grows in full sun to partial shade. Out-competes native plant communities.

***Lepidium latifolium* L. (Broad-leaved pepperweed; tall pepperweed)**

A perennial herb occurring in eastern and southeastern regions of the state in coastal habitats. Grows in full sun. Primarily coastal at upper edge of wetlands; also found in disturbed areas; salt tolerant.

***Lonicera japonica* Thunb. (Japanese honeysuckle)**

A perennial vine occurring in all regions of the state in upland, wetland, and coastal habitats. Grows in full sun to full shade. Rapidly growing, dense stands climb and overwhelm native vegetation; produces many seeds that are bird dispersed; more common in southeastern Massachusetts.

Lonicera morrowii A.Gray (**Morrow's honeysuckle**) A shrub occurring in all regions of the state in upland, wetland, and coastal habitats. Grows in full sun to full shade. Part of a confusing hybrid complex of nonnative honeysuckles commonly planted and escaping from cultivation via bird dispersal.

Lonicera x bella Zabel [*morrowii* x *tatarica*] (**Bell's honeysuckle**)

This shrub occurs in all regions of the state in upland, wetland, and coastal habitats. Grows in full sun to full shade. Part of a confusing hybrid complex of nonnative honeysuckles commonly planted and escaping from cultivation via bird dispersal.

Lysimachia nummularia L. (**Creeping jenny; moneywort**)

A perennial herb occurring in all regions of the state in upland and wetland habitats. Grows in full sun to full shade. Escaping from cultivation; problematic in flood plains, forests and wetlands; forms dense mats.

Lythrum salicaria L. (**Purple loosestrife**)

A perennial herb or subshrub occurring in all regions of the state in upland and wetland habitats. Grows in full sun to partial shade. Escaping from cultivation; overtakes wetlands; high seed production and longevity.

Myriophyllum heterophyllum Michx. (**Variable water-milfoil; Two-leaved water-milfoil**)

A perennial herb occurring in all regions of the state in aquatic habitats. Chokes waterways, spread by humans and possibly birds.

Myriophyllum spicatum L. (**Eurasian or European water-milfoil; spike water-milfoil**)

A perennial herb found in all regions of the state in aquatic habitats. Chokes waterways, spread by humans and possibly birds.

Phalaris arundinacea L. (**Reed canary-grass**)

This perennial grass occurs in all regions of the state in wetlands and open uplands. Grows in full sun to partial shade. Can form huge colonies and overwhelm wetlands; flourishes in disturbed areas; native and introduced strains; common in agricultural settings and in forage crops.

Phragmites australis (Cav.) Trin. ex Steud. subsp. **australis** (**Common reed**)

A perennial grass (USDA lists as subshrub, shrub) found in all regions of the state. Grows in upland and wetland habitats in full sun to full shade. Overwhelms wetlands forming huge, dense stands; flourishes in disturbed areas; native and introduced strains.

Polygonum cuspidatum Sieb. & Zucc. (**Japanese knotweed; Japanese or Mexican Bamboo**)

Synonym: *Fallopia japonica* (Houtt.) Dcne.; *Reynoutria japonica* Houtt.

A perennial herbaceous subshrub or shrub occurring in all regions of the state in upland, wetland, and coastal habitats. Grows in full sun to full shade, but hardier in full sun. Spreads vegetatively and by seed; forms dense thickets.

Polygonum perfoliatum L. (**Mile-a-minute vine or weed; Asiatic tearthumb**)

Synonym: *Ampelgynum perfoliatum* (L.) Roberty & Vautier

This annual herbaceous vine is currently known to exist in several counties in MA, and has also been found in RI and CT. Habitats include streamside, fields, and road edges in full sun to partial shade. Highly aggressive; bird and human dispersed.

***Potamogeton crispus* L. (Crisped pondweed; curly pondweed)**

A perennial herb occurring in all regions of the state in aquatic habitats. Forms dense mats in the spring and persists vegetatively.

***Ranunculus ficaria* L. (Lesser celandine; fig buttercup)**

A perennial herb occurring on stream banks, and in lowland and uplands woods in all regions of the state. Grows in full sun to full shade. Propagates vegetatively and by seed; forms dense stands especially in riparian woodlands; an ephemeral that outcompetes native spring wildflowers.

***Rhamnus cathartica* L. (Common buckthorn)**

A shrub or tree occurring in all regions of the state in upland and wetland habitats. Grows in full sun to full shade. Produces fruit in fall; grows in multiple habitats; forms dense thickets.

***Robinia pseudoacacia* L. (Black locust)**

A tree that occurs in all regions of the state in upland habitats. Grows in full sun to full shade. While the species is native to central portions of Eastern North America, it is not indigenous to Massachusetts. It has been planted throughout the state since the 1700's and is now widely naturalized. It behaves as an invasive species in areas with sandy soils.

***Rosa multiflora* Thunb. (Multiflora rose)**

A perennial vine or shrub occurring in all regions of the state in upland, wetland and coastal habitats. Grows in full sun to full shade. Forms impenetrable thorny thickets that can overwhelm other vegetation; bird dispersed.

***Salix atrocinerea*/*Salix cinerea* L. (Large Gray Willow/Rusty Willow)**

A large shrub or small tree most commonly found in the eastern and southeastern areas of the state, with new occurrences being reported further west. Primarily found on pond shores but is also known from other wetland types and rarely uplands. *Salix atrocinerea* L. / *Salix cinerea* L. are either recognized as closely related species or the conspecific subspecies *Salix cinerea* ssp. *oleifolia* and *S. cinerea* ssp. *cinerea*. Forms dense stands and can out-compete native species along the shores of coastal plain ponds.

***Trapa natans* L. (Water-chestnut)**

An annual herb occurring in the western, central, and eastern regions of the state in aquatic habitats. Forms dense floating mats on water.