An Address Standard for Massachusetts Municipalities

Issued by:
Bureau of Geographic Information (MassGIS)
Office of Information Technology (MassIT)
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PREFACE

What is this document about?

Addresses identify locations where people live and work and play. Accurate, consistent, and complete addressing supports better communications, easier travel, and more efficient delivery of goods and services; it may even save lives by expediting emergency response. This standard provides guidance on how addresses should be assigned and how they should be stored and managed using computer software.

Who is the intended audience?

The intended audience is staff in local government who are involved in address assignment or who use addresses in their daily work, as well as the vendors that provide them with services and software.

How does this standard apply to my municipality?

Every municipality is different, so different parts of the standard will be relevant depending on what the municipality is interested in doing, and what resources it has available. The scenarios below are intended to help you decide what portions of this document will be most useful to you.

Scenario	What you should read
#1. A largely rural town with addresses recorded in written form or in simple spreadsheet format and an informal process for maintaining and sharing address information.	Sections 1, 2, 3 Sections 4.1 – 4.3 Optionally, Sections 6.1 - 6.4.6, 6.5
#2. Same as #1 but with a larger population and/or an urban center and a government with individual departments interested in managing addresses in software used for permitting or licensing activities.	Sections 1, 2, 3 Section 4 Sections 5.1 – 5.3 Sections 6.1 - 6.4.6, 6.5
#3. A larger town or city seeking greater efficiencies in managing, reconciling and sharing address information between departments. This scenario is especially relevant in municipalities interested in delivering services or interacting with citizens on a web site. A consistent, standardized approach to addressing can greatly enhance interaction with citizens.	Sections 1, 2, 3 Section 4 Sections 5.1 – 5.3 Sections 6.1 - 6.4.6 Section 6.4.8 if have GIS Section 6.5
#4. Same as #3, but for towns or cities with a significant urban area where unit-level addressing is common and where tracking address information to the building, floor, and unit level is important.	All Sections

For any city or town using a GIS, the linking of addresses with mapping of parcels and structures (locally sourced or available from MassGIS) has the potential to improve planning and decision making and to streamline operations. In that case, the discussion of map-related issues and especially the discussion of community and municipal boundaries in Sections 3.5 and 3.12 will be of particular interest.

How can I get answers to specific questions or issues?

The staff at MassGIS has created a standardized listing and a map of over 3 million addresses in Massachusetts to support 911/emergency response. Staff at MassGIS will be happy to engage with any municipality that seeks to improve its addressing practices and/or can contribute to building and maintaining the statewide master address list. Email Massgismail@mass.gov, including "address issue" in the subject line, about any question related to this standard or any other address-related issue.

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1. Introduction

This standard provides guidance for communities in Massachusetts on address assignment and address data management. It describes best practices for address assignment workflows and how to create address listings that are comprehensive, accurate, and useful.

This standard is issued by MassIT's MassGIS program under the authority of M.G.L Ch. 7D Sect. 5. It is an informational document and conformance with this standard is voluntary. It is based on national models and on the extensive experience acquired by the MassGIS program mapping a statewide address list for use in emergency response.

The intended audience is all municipalities, large and small, and the vendors that provide them with services and software, as well as the larger community of address users.

Addressing is a local responsibility and every city and town must deal with how and when streets must be named and address numbers assigned. Every municipality has the challenge of managing property records, responding to public safety emergencies, and delivering a variety of services to residents, all of which depend on use of addresses. But as noted in the preface, not all municipalities are alike – each has different capabilities and ambitions. For example, rural towns may not be too concerned with how to manage detailed "secondary" location information, such as building names or unit numbers.

1.1. Benefits of a Standard

Within municipalities, addresses are used by a variety of departments including assessing, clerk, treasurer/collector, public safety, public health, building inspections, and others. Addresses primarily serve to identify undeveloped parcels, structures, or units within a structure, although other kinds of locations may receive addresses.

- Best practices in address assignment ensure that municipal staff can quickly and easily find a given location. In particular, seconds count for public safety staff responding to an emergency call.
- A standardized address provides a precise, unique reference to structures and units. This improves the efficiency of tax collection, permitting, inspections, infrastructure maintenance, and other municipal functions.
- Standardized addresses can provide a link between records in different municipal departments. Implementation of this standard will support the centralization of IT resources and the

deployment of enterprise-wide applications for use by different departments. For example, a building inspector could find out about any public safety concerns at a particular location before going there.

In general, the public and businesses use addresses for the same purposes as local governments - for reference and identification, and to find a structure when they are not familiar with its location. **High-quality addressing benefits the public as well as municipal employees.**

1.2. Postal versus Situs Address

Most people, when they think of an address, think of a mailbox at the end of a driveway or in a building. In many cases, the distinction between a mail delivery end point and the actual location or situs address (defined more precisely below) is not too important. However, there are a number of circumstances where the difference can be problematic.

- Mail may be delivered to a US Post Office box, or to a central distribution point on a campus or other institution, rather than an actual address location. Post office boxes are obviously not valid situs addresses.
- Mail may be delivered to a location such as a cluster of mailboxes at the end of a private way, whose location relative to the actual structures being addressed is unclear. Additional detail, such as descriptions of building or unit locations, may not be used by the postal carrier but may be needed for service delivery to the actual residence or business location.
- Postal delivery areas, as reflected in the place name used for postal addressing, are not necessarily consistent with legally defined boundaries, nor are they stable. The place name or community name, as discussed below, is a very important part of a standardized address and community boundaries need to be mapped in order to establish jurisdiction and provide quality assurance for street address elements.

1.3. National Models and Sources

As it pertains to the format and content of address data, this standard is based on the following sources:

- the *Presence Information Data Format - Location Object (PIDF-LO)* specification from the Internet Engineering Task Force (IETF),
- the *United States Thoroughfare, Landmark, and Postal Address Data Standard* from the Federal Geographic Data Committee (FGDC), and

- the *NG9-1-1 Civic Location Data Exchange Format (CLDXF)* from the National Emergency Numbering Association (NENA).

These three standards, by design, are largely consistent in how they define address elements and in having a required format for address data. They extend and improve on the US Postal Service standard for mailing address layout, known as Pub. 28, but are mostly compatible with it. This means that addressing stakeholders will not lose any investment they have made in cleaning up their mailing lists by moving to the state standard.

Two communities in Massachusetts, Dedham and Belmont, provided a template addressing standard which was used as a starting point for the best practices portions of this document.

1.4. Role of MassGIS

The MassGIS program has built, and is continuing to maintain and improve, a statewide address listing and a GIS map of address locations from various local and statewide sources. The overall goal of this effort is to provide a unique, standardized format and a corresponding point location for every valid address in the Commonwealth. This will facilitate the use of addresses in a GIS environment and specifically is being used to support routing of emergency calls (see Section 1.5 Public Safety Considerations below).

The completion of a statewide assessor parcel map in GIS provided an initial link between the structure(s) on a given parcel of land and the address recorded in the assessor database. Other sources of address information included voter registration and utility customer listings.

The maintenance of this master address list and associated mapping is a significant challenge, depending on address and mapping updates from municipalities, ongoing reconciliation with address listings from utilities including telcos and other sources, review of mapping from site managers and of plans filed with the registries of deeds, research online, and finally, extensive work in the field to resolve remaining uncertainties. No single source is comprehensive or reliable, so a "belt-and-suspenders" approach is necessary. Master address listings that conform to the content and format guidelines of this standard are available from MassGIS (details below); it is hoped that these listings will provide a foundation for cooperative maintenance of shared address data by municipalities willing to adopt the standards and best practices laid out in this document.

1.5. Public Safety Considerations

This standard is compatible with the basic requirements for street address assignment established in *560 CMR 2.00 Appendix A: State 911 Department Standards for Enhanced 9-1-1*. It goes significantly beyond those legacy requirements in scope to incorporate relevant national standards governing the deployment of so-called Next Generation 9-1-1 technology. Having a

complete list of all addresses and their geographic locations is a core requirement of the Next Generation 9-1-1 system, which uses address locations to determine how emergency calls should be routed.

Addressing is particularly important to emergency responders, who must find a given location as quickly as possible. Often, responders are intimately familiar with the streets and may even know all the individual house numbers. But even they can be confused by poor addressing practices, or may need to respond into a neighboring municipality in mutual aid situations. Where time is of the essence, addressing needs to follow simple and common-sense rules.

This standard does not deal with various measures related to emergency response such as requiring adequate signage on buildings, ensuring access to gated communities, or mandating sufficient width of driveways and access roads. It deals solely with the content and format of address data and how addresses should be assigned. But it does reflect the experience of first responders and dispatchers, and is intended to support the efficient delivery of emergency services.

1.6. Local Implementation of a Master Address File and Map

Often, cleaning up addressing is the first step in moving towards more efficient use of technology to support permitting, inspections, assessing, and other municipal operations. Adoption and implementation of a standard is a pre-requisite for combining address lists currently stored in separate locations into a single master address list. It is also a necessary step if communities want to link addresses to point locations.

The following steps, typical for communities wishing to adopt and implement an address standard, are outlined in more detail in Section 6.

1. Identify and convene addressing stakeholders including representative from executive body. Identify a project lead to manage the process. Typical stakeholders are listed in Section 6.1.
2. Identify inefficiencies and problems with current addressing and with address assignment workflows. Common problems are listed in Section 6.2.
3. Establish goals in response to the problem statement. A common goal is to formally adopt an address standard, whether by incorporating it into bylaws or issuing by executive fiat.
4. Develop a plan to improve addressing practices and data quality. Determine roles and responsibilities and allocate needed resources.
5. Establish a governance structure with regular review of progress and iteration of the address improvement plan.

2. Content of This Document

This document presents standards and best practices that apply to all cities and towns. It is organized into topic areas with the intent of allowing municipalities to focus on those areas that concern them and implement the relevant portions of the standard. That said, every city and town will benefit from implementing those parts of the standard that relate to street address assignment and formatting. While much of this material will be new and some of it may be challenging, it reflects in-depth experience with the issues and problems encountered by all municipal staff who work with addressing. What follows is a summary of the remaining sections:

Section 3 - Definitions provides the necessary background on addressing concepts and definitions of terms used throughout the standard. This section deserves careful reading, especially the formal definition of address and address community.

Section 4 - Address Assignment deals with process - the operational aspects of address assignment including jurisdiction, street naming, address number assignment and sub-addressing. The standard presents best practices for address assignment going forward, while recognizing that many current addresses will remain non-conforming. Much of this material is common sense - addressing should be transparent and predictable to be useful, especially in emergencies.

Section 5 - Address Record Format and Content is focused on the address records themselves. This section presents state-of-the-art best practice relative to formatting and content. The primary emphasis is on ensuring address data quality and usefulness in automated systems. The standard covers the familiar street address and also provides structure for managing sub-address elements such as buildings, units, and other kinds of locations.

Section 6 - Suggested Implementation provides a menu of steps that communities can take in moving towards a more efficient and modernized approach to addressing.

3. Definitions

3.1. Street

Any highway, road, street, avenue, lane, private way, access driveway, or similar paved, gravel, or dirt thoroughfare that supports vehicular access. Obviously there are distinctions between all these terms, but naming and address number assignment may apply to any of them, so we are using the word "street" in the most general sense. Note that this is a more limited definition than the one for "thoroughfare" in the FGDC and CLDXF standards.

3.2. Full street name

The full street name is the full, official identifier for one or more street segments. The full street name is assigned locally and should be unique within a community ("community" is defined below). A route number should not be used as the street name if a more specific street name exists. Examples of street names: *Market Street Extension, North Beacon Street, Avenue A, 14th Street*.

3.3. Full street number

A single number, with optional prefix/suffix, or a range of such numbers, used to designate a location along a street, usually assigned in sequence. Formatting of a street number is discussed below. Examples of full street numbers: *10A*, *22 1/2*, *13-15*.

3.4. Landmark

A landmark is a place or feature which is well known and recognized within a community, such that it may usefully be referenced by name alone rather than by street address. A single building may be a landmark; for example, "*Arlington Town Hall"* in Arlington or "*The Bromfield School"* in Harvard would be known to local residents by name and thus may be designated as landmark addresses. A site (see 3.7) may or may not be a landmark – the sole criterion is whether the site name is generally recognized and associated with an identified location.

3.5. Address community

The Master Street Address Guide (MSAG) is a listing by community of valid street names and address ranges, currently maintained within the 9-1-1 system by Verizon in concert with 9-1-1 liaisons and data managers in each municipality. In this system, the **MSAG community** is the place name part of the street address. It is in most cases identical

to an official municipality. In some cases, however, a community is a neighborhood or village within a municipality; these sub-areas are used because of duplicate street names and address numbers within a municipality that would otherwise create confusion. For example, there are multiple addresses on Captain Jacs Road within the town of Barnstable that repeat in the communities of West Barnstable and Centerville. Ironically, these communities historically were separate villages until they got absorbed into the larger city or town, which is why there are duplicate street names.

Table 1: Cities and Towns with multiple MSAG Communities

1. AYER
2. BARNSTABLE
3. BOSTON
4. DEERFIELD
5. DENNIS
6. HARVARD
7. NANTUCKET
8. NORTHAMPTON
9. PALMER
10. SHIRLEY
11. SPRINGFIELD

The current 9-1-1 system is being replaced by one based on geographic locations, but the same community names (in this document, **address community** or simply **community**) are referenced in this standard and in building the statewide address listing.

Eleven municipalities in Massachusetts (listed in Table 1) are sub-divided into address communities. One MSAG community, Devens, is a special case, in that it covers areas in three municipalities. The boundaries of all address communities have been mapped by MassGIS, following the official external boundaries of municipalities and adding the internal boundaries to match the Master Street Address Guide. The list of community names and the GIS file of community boundaries can be downloaded (http://tinyurl.com/zwu6rax) from MassGIS.

3.6. Complete situs address or address

A situs address, or in this standard, simply **address**, references an actual physical location of one of the following types:

- a single structure;
- an access or entry point for a structure;
- a cluster of structures on a single lot;
- a location within a structure such as a unit in an apartment building, a room in a classroom building, a suite in an office building, or a store in a mall;
- an exterior location such as a parking lot, a playing field, or a beach.

The most common form of address is a **street address.** A street address includes a street number, street name, and community name. A street address may also have additional address elements such as a building name, unit number, or other location description. A **landmark address** is one that includes a landmark name and a community name, but does not include the required elements of a street address. Only if a building

or feature name is generally known and recognized (as specified in the definition of a landmark) can it be used by itself as a valid address. For example, *Town Hall, Lexington* is a valid address. Note that a street address may also include a landmark name, for example, *Town Hall, 1625 Massachusetts Avenue, Lexington* is a valid address, and combining a landmark reference into the street address is always a preferable approach.

Any address may have additional detail beyond the required elements to more precisely specify a location. For example, *10 Main Street* refers to an entire building, whereas *10 Main Street Unit 10A* refers to a unit on the tenth floor of that building. Both are valid addresses. The portion of the address after the street address is often identified as the sub-address or secondary address.

3.7. Site and Sub-site

The word "site" is used in a specialized sense in this document, to describe an area of one or more parcels of land in common use, occupancy, and/or ownership, often with a significant number of structures, where numbered street addressing doesn't work very well and buildings or other internal locations (see discussion of sub-sites below) need to be identified by name. Examples of sites include:

- office parks/industrial complexes
- schools, hospitals, research centers or other institutional campuses
- shopping malls or similar commercial centers
- airports or other transportation facilities
- condominium complexes or apartment complexes
- trailer parks
- amusement parks, race tracks, fairgrounds.

Other examples of sites include named recreational, agricultural or conservation areas, often with few or no structures such as:

- campgrounds
- parks or conservation areas
- playing fields or other recreational areas
- farms and orchards

A list of sites has been created by MassGIS, working with regional planning agencies, and is being maintained by staff at MassGIS. They welcome local input on what locations should be classified as sites, indicating that they should receive special attention in the review and mapping of addresses. Send email to MassGIS at massgismail@state.ma.us to request the list of

sites for any given municipality. Many site names reference generally recognized locations, and can be used as landmark addresses (see 3.4 above).

Sub-sites are locations within sites, other than buildings, which the addressing authority or address data manager has decided should be mapped and/or described, such as:

- a parking lot within an industrial, institutional or residential complex
- a playing field within a recreational area
- a picnic area, field, viewing station or similar area within a park

The concatenation of site and sub-site corresponds to the concatenation of landmark parts in the CLDXF standard into a complete landmark element in situations where the site and sub-site are generally known and recognized.

For example, Frog Pond on the Boston Common would be a sub-site, Boston Common would be site, and the concatenation of those as landmark parts would constitute a landmark element.

3.8. Parcel

A parcel is an area of land whose ownership and extent is legally recorded, including non-profit and government ownership. The boundaries of parcels are, for purposes of this standard, those shown in the standardized assessor parcel mapping from MassGIS, or more current mapping of parcel boundaries maintained by a municipality or their agent in compliance with the published statewide parcel standard.

3.9. Building

A building is defined as a vertical structure, typically with exterior walls and access from the exterior to one or more units or rooms on one or more floors. A building may be completely free-standing, or it may be separated from other buildings by interior walls with few or no openings ("firewalls") and with primary ground-floor access to each building from the exterior. Size is not a factor - trailers, guard shacks, and the like are considered buildings. But there is an expectation of permanence – a mobile home or trailer "parked" somewhere for a limited period of time would not qualify as a building. We also stretch the definition to include significant vertical structures which may not have walls or enclosed spaces, such as cell towers, water towers, kiosks, stadiums, concert shells and the like.

3.10. Floor

Within a building, a floor is a contiguous area at a single level or elevation within a building; examples include "*8th Floor*", "*Basement*" and "*Lower Level*".

3.11. Unit

An area within a building, commonly but not necessarily on one floor, consisting of one or more rooms with shared access. Separate units are usually occupied by distinct and unrelated entities, as with residential apartment units occupied by unrelated households, or commercial office suites occupied by distinct business entities. "*Unit 6A*" and "*Suite 100*" are familiar examples of unit identifiers (see 5.4.3 for content standards). But a department within a larger enterprise, such as *Building Department*, may also be a unit.

In general, a unit lies between a room and a building in scale and it may or may not include an entire floor or more than one floor. In this standard, we use the terms "unit," "suite," and "apartment" interchangeably. A condominium is generally a unit, but may also be an attached or detached building, depending on the physical configuration of ownership.

3.12. Geographic municipality

The municipality within whose political boundary the actual structure or other location being addressed is physically located.

3.13. Features

Features, in an addressing context, are physical objects to which we attach address and sub-address information at varying levels of detail. Buildings and units are features. They may be represented by polygons or by points in a GIS. As with streets, the identifier for the feature is generally composed of the feature name and the feature type.

3.14. Feature names

Feature names specify which one as opposed to feature types, which specify the kind of feature but not which one. Thus, the "Library" in *Conley Library* is a feature type, but the feature name "Conley" tells you which library you are talking about. Of course, if there is only one library at a given location or in a given community, then the type word may be sufficient. It is useful to distinguish the following kinds of feature names:

- **Proper name** – A name that generally refers to a person or place, and which is not found in the dictionary as an ordinary English word. In the example above, "Conley" is a proper name for a library building or possibly one or more rooms within a building that has other uses.
- **Descriptive name** – A name that references the function or other attribute of a feature. Thus, "Maintenance" in

Maintenance Shed is a descriptive name for a shed which is a type of building.

- **Sequential identifier** – A sequential identifier is composed of elements from one or more number or letter sequences – *Building 1, Unit 4G* and so on. The first case is a simple sequential identifier. The second case is an example of a compound sequential identifier, because the 4 is from the sequence of floor numbers, and the G is a letter identifier assigned to that unit on that floor.

3.15. Feature types

Feature types, as noted above, are used to specify the kind of feature. We define two classes of feature types:

- **Detail types** are sub-types within the general category of features associated with each sub-address field. These are English words found in the dictionary, which provide a more detailed classification of the feature. Thus, for buildings, words like "Library," "Warehouse," and "Station" are detail type words. "Basement" is an example of a detail type word for floor, and "Department" is a detail type word for unit.
- In contrast, **base types** provide no additional detail about the feature other than what the name of the sub-address field already conveys. Thus, the words "Building," "Floor" and "Unit" are base types.

4. Address Assignment Best Practices

4.1. Street Naming

4.1.1. Street naming authority

In this standard, we assume that a municipality has the authority to assign a street name to any portion of a right of way that lies within its boundaries, and conversely, may not assign an official name to any portion of any right of way outside its boundary. A single individual or designated group should be identified as the final authority on street naming in local by-law and regulations. If multiple individuals or groups are involved, there should be a well-structured and documented process for naming a street. The final step of that process should be the publication by a single individual or designated group of the official street name which is assigned to one or more street segments shown on the official street map or on recorded site plans. For private ways, the street naming authority may choose to accept names proposed by

private owners, but an addressing by-law should establish the authority to reject any such name and/or assign a new name to a private way based on public safety and other requirements. Note that in this standard, the definition of street includes private ways and other non-accepted thoroughfares.

4.1.2. When street names are needed

Any street (including driveways and access roads) that provides access to two or more developed parcels of land which have no frontage on a named street should be named regardless of whether there is a legal right of way or whether ownership is public or private. For new streets this can be a matter of course, but for existing streets and especially private ways, it is very often not the case. Figure 1 illustrates why not following this guidance can create a real addressing nightmare.

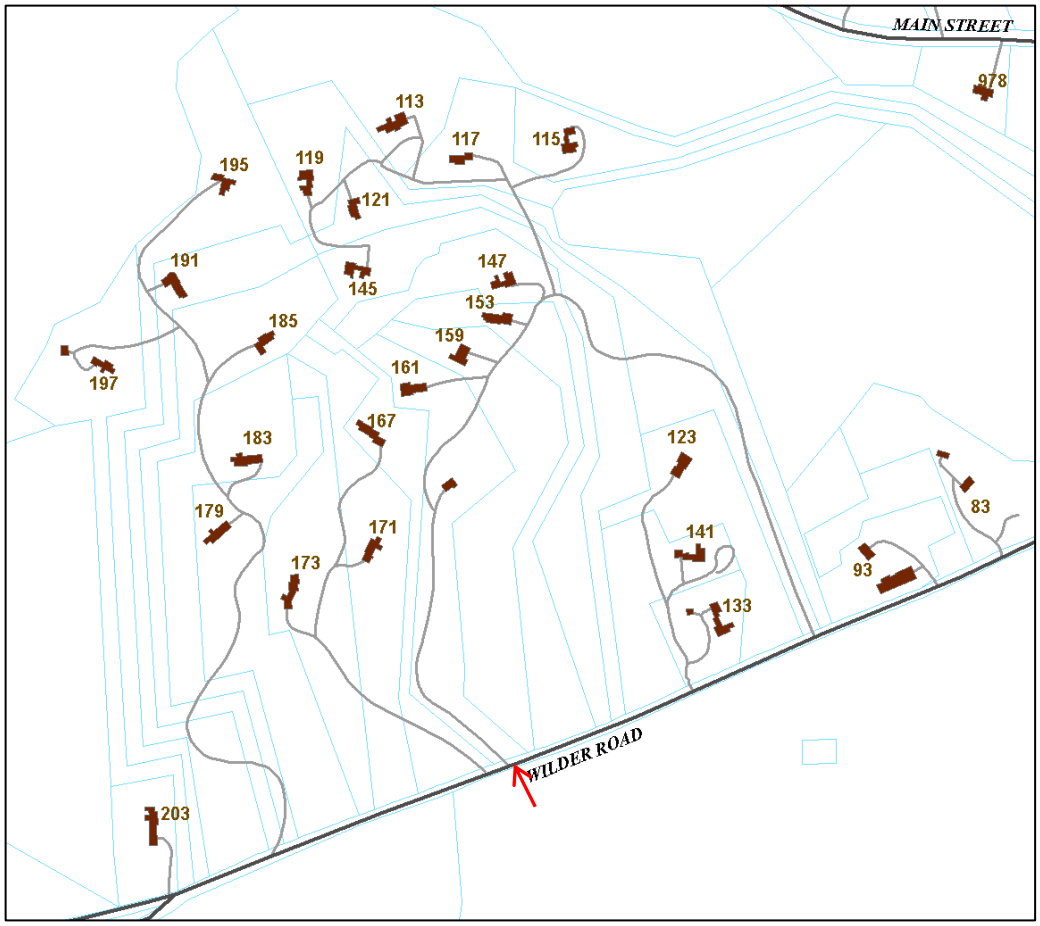


Figure 1. In the example above, light colored lines represent parcel boundaries and grey lines are access roads. All the houses are numbered off Wilder Road and none of the access roads are named. Numbers were assigned in sequence based on the parcel frontage. Unfortunately, due to the lot configuration, the numbering sequence is not based on the actual points of access along Wilder Road and is extremely confusing. For example, a responder coming up the access road indicated by the arrow, looking for number 145, would pass by 161-147 but then would encounter 115-121, and would never guess that 145 was the last number on that road. These shared access roads should be named and numbers assigned in sequence along each one. At a minimum, the numbers should be in sequence along each access road, and the ranges for each point of access along Wilder Road should not overlap.

The urgency of naming streets retroactively depends on the length of the un-named street in question and the visibility of the structures which need to be addressed from the point of access on the named street. As illustrated in Figure 1, long shared driveways providing access to multiple residences or other structures can be a real problem for public safety.

Note that assigning or approving a street name should not constitute or imply acceptance of the street by the municipality as a public way, nor should it impose any additional burden of providing services on the municipality other than what is otherwise provided for in existing by-laws and regulations.

On large sites, as defined in 3.7, where internal streets diverge to provide access to separate buildings and where signage for those buildings isn't visible from the point of divergence, the streets should be named. In common-sense terms, if you're looking for a building on a site, and the streets you need to follow aren't named, and you can't see a sign for the building from the entrance to the site, you're likely to get lost. So is an ambulance. Figure 2 illustrates a simple case for a trailer park – obviously on larger and more complex sites the need for street naming is even greater. However, naming can become frivolous and the use of vanity street names for convenience or marketing, where they are not needed, should be discouraged.

Figure 2: In the trailer park site highlighted above, internal (private) streets are named, such that units can easily be located from the entrance.

4.1.3. Guidelines for street naming

All parts of an official street name should be fully spelled out including commonly abbreviated directionals, prefixes, suffixes, and modifiers (these parts of the street name are defined below in section 5.3). However, at the discretion of the municipality, parts of the base name may be abbreviated, such as honorifics (*Lt.*, *Hon.*, *Msgr.*) or even the entire base name (*MLK* instead of *Martin Luther King*).

In assigning new street names, no new street should be given the same base name as an existing street (e.g. *Pine Street* and *Pine Lane*), or a name which sounds the same as, or very similar to, an existing name (e.g. *Beech Lane* and *Peach Lane*).

Every street should have one - and only one - correct name. While this sounds self-evident, there are cases where two different municipalities share jurisdiction over a single street (where the municipal boundary is in the middle of the right-of-way) and they have assigned it different names. A variant is the case where one municipality has jurisdiction, (the boundary is entirely on one side of the right-of-way) and the other municipality decides to assign a different name regardless. Although in the first case there is some justification (both municipalities do have jurisdiction) neither approach is best practice.

Every street should have the same name assigned to the entire length of street between significant intersections within a municipality. Street names preferably should continue straight through intersections. A street name should be essentially continuous, without gaps. Street names may change at significant intersections and also at municipal boundaries.

4.1.4. Street names at boundaries

In the ordinary case where a municipal boundary crosses a street, such that the street and the boundary are not parallel, and the street does not cross the boundary multiple times; the street name may change at the boundary, and this is an effective way to avoid any confusion, particularly on major thoroughfares where the boundary is clearly indicated and appropriate signage exists. Such a situation is illustrated in Figure 3.

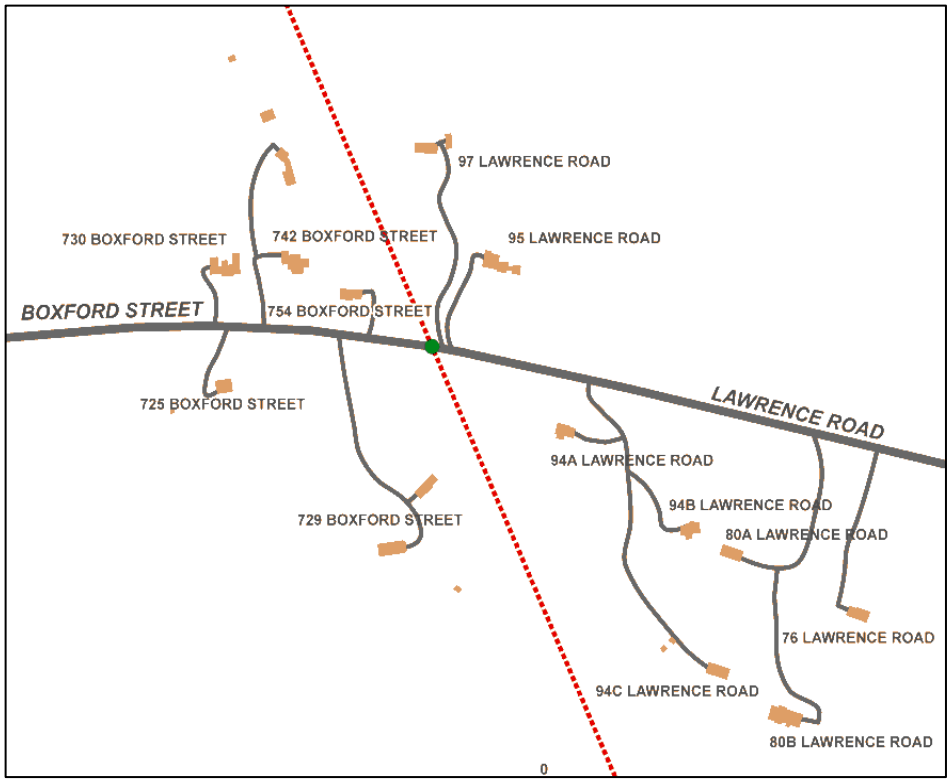


Figure 3: Often, the name of the street changes at the boundary. If the signage is clear, this is perfectly acceptable. Note that the numbering would not create any confusion.

However, when the boundary between two communities falls within or follows the centerline of a street right of way, or is offset but closely parallels the street, or crosses back and forth across the street right of way, the street name should be preserved across the boundary. Figure 4 illustrates a situation where addresses on opposite sides of the street reference different street names, with obvious potential for confusion.

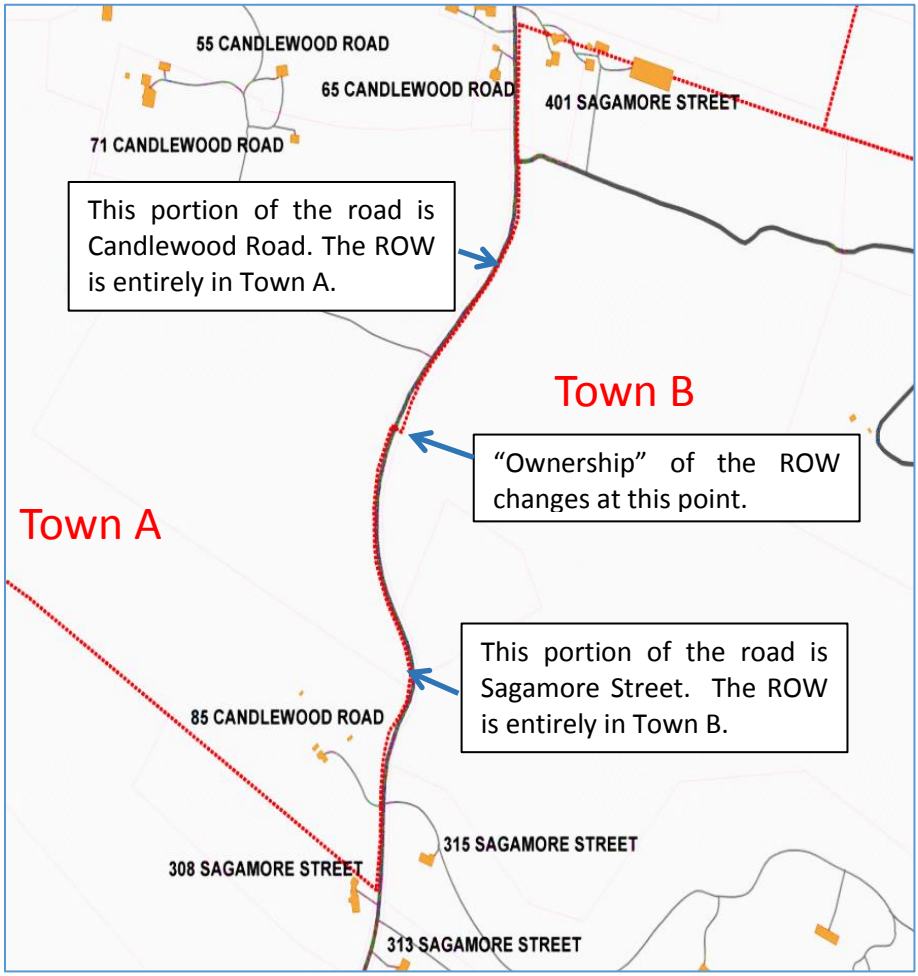


Figure 4: The boundary is shown as a dashed line which crosses the ROW at the point indicated by the arrow in the middle of the graphic. That is where jurisdiction over the street name changes; the northern portion of the ROW is in Town A and the southern portion is in Town B. But in this example, neither municipality recognizes the jurisdiction of the other. Number 85 Candlewood Road should be addressed off Sagamore Street, since that is the official street name at that point, and likewise 401 Sagamore Street should be addressed off Candlewood Road. Ideally the name of the street would not change, but at a minimum these towns need to respect each other's jurisdiction over the street name.

4.1.5. Renaming streets

When two, non-contiguous sections of an existing street in a community have the same name, consideration should be given to changing the name of one section. Ideally, the name of the street that is used for the longest distance or is most heavily traveled should be kept.

When a street connects two other streets, but has a middle section that is closed permanently, consider the following options:

1. Retain the current name for one end of the street and assign a different name to the other end of the street.
2. Assign a pre-directional to each end of the street, such as *North* Mountain Street and *South* Mountain Street.

In general, where existing street names violate best practices outlined in this document, such as two streets with sound-alike names, communities should follow the guidance in Section 6 to determine whether eliminating the confusion and risk associated with the existing street names justifies the effort and inconvenience of renaming.

4.1.6. Street name in address

The street name in the address assigned to each structure should be the name of the street which provides primary access to that structure. This rule is commonly not observed, either because the front of the structure faces a different street than the one the driveway is on, or because businesses or homeowners prefer to be addressed off a better known or more prestigious street. In the case of a corner lot which has frontage on the street name used in the address, with the driveway off a side street, this situation is acceptable. But where access involves a bigger detour than just going around the corner, or the parcel doesn't even front on the street named in the address, there is the potential for real confusion.

In cases where a structure is only accessed from another community, the street name used in the address should be the street name in the other community. Using the name of some nearby street which does not provide access simply to ensure that the street named in the address falls within the community's jurisdiction is not best practice.

4.2. Street Address Numbers

4.2.1. Address Numbering Authority

The requirement for address number is similar to that for street naming. A single person or designated group should be identified as the final authority on address number assignment in local by-law and regulations. There should be a transparent, consistent, and reasonable set of rules whereby street numbers are assigned. If multiple persons or groups are

involved, the workflow should be well-structured and documented, with the final step being the publication by a single person or designated group of any new address number assignment or change.

In cases where a structure is only accessed from another municipality, the assignment of the address number, as with the street name, must be consistent with the numbering scheme in use in that adjacent municipality.

4.2.2. When address numbers should be assigned

Address numbers should be assigned to every substantial structure with a distinct occupancy and active use. Addresses should not be assigned to structures that are simply accessory to another building or insubstantial in nature. For example, a detached garage for a single-family residence does not need an address, but a separate unit in a garage or carriage house should receive a distinct numbered address. (If a number has not been assigned, then the location must be listed as a distinct address using sub-address detail.)

Where a single building has multiple exterior entrances to physically disconnected and mutually inaccessible interior spaces, a separate address number should be assigned to each such exterior door. Where a single building has one or more doors leading to a shared hallway or lobby, only one address number should be assigned. Address numbers should not be assigned to individual units in a building unless there is a clear ground-level separation of exterior entry such as a town-house or row-house configuration.

It is common practice to assign address numbers as well to horizontal infrastructure such as parks or playing fields to facilitate identification and navigation to these locations. This is perfectly acceptable as long as number sequence and parity (discussed in 4.2.4 below) are observed with respect to the primary access to such locations.

4.2.3. Formatting of street numbers

Street numbers should be whole numbers. Often, fractional addresses (e.g. 34½ Ash Street) have been assigned to "fill in" while preserving sequence, but they should not be used for new address assignments unless absolutely necessary. Similarly, alphabetic address number suffixes (123A Main Street) are only to be used in situations where no single whole number is available consistent with the numbering sequence in place.

4.2.4. Parity, sequence, and future development

For new streets, numbers should be assigned in order along each side of the street beginning from the centerline of the intersecting street, with even numbers appearing on the left side of the street and odd numbers appearing on the right side of the street, as the numbers ascend. Existing number assignment frequently does not obey this rule. Allowance

should be made for potential future development by incrementing numbers and assigning them to fixed intervals of length along the street. A greater or lesser interval may be suitable depending on the density of development. The number assigned shall be that of the numbered interval falling closest to the driveway providing access to the structure or other location being addressed, or the walkway or pedestrian access if there is no driveway.

Addresses should always be assigned so that they are in numeric sequence. This is important even if the access is not directly off the named street. An application of this principle is shown in Figure 5.

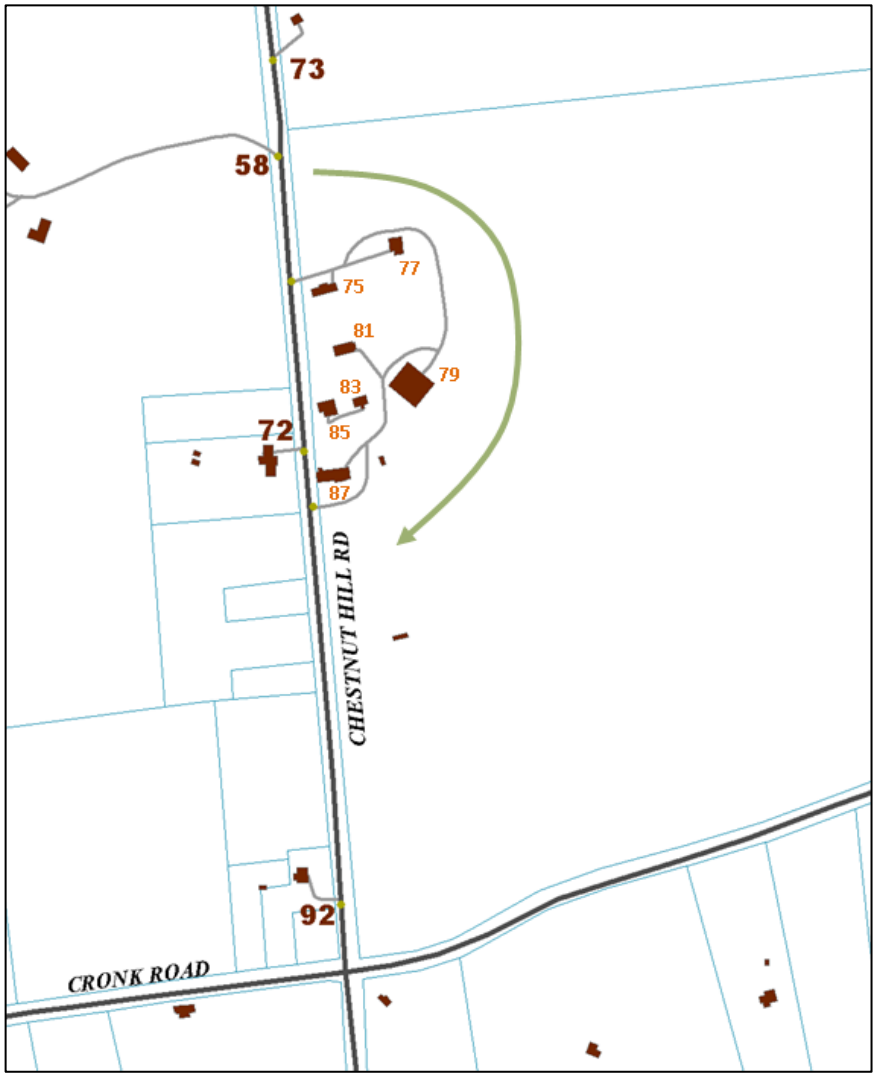


Figure 5: The existing sequence is increasing north to south on both sides, although it does not obey the even-ascending-left rule. The green arrow shows how sequence can be preserved in numbering structures off a private road that roughly parallels the named street.

As illustrated above, where a single un-named driveway runs in parallel to the named street, and provides access to multiple numbered building entrances, the numbers may be assigned in sequence as if the un-named driveway were a continuation of the main street, but with the parity of that side of the named street.

For streets that connect two other streets, numbering should originate from the intersecting street with the highest traffic volume, or from the end of the street where traffic is most likely to enter.

4.2.5. Address numbers at boundaries

If a street name does not change at a community boundary, address numbers should be assigned to avoid conflicting or confusing addresses in neighboring communities. The sequence and parity of addresses should be consistent regardless of which municipality is assigning them. Restarting the numbering sequence for the same street name is not recommended. Figure 6 and Figure 7 illustrate situations that may make it difficult to locate a particular address.

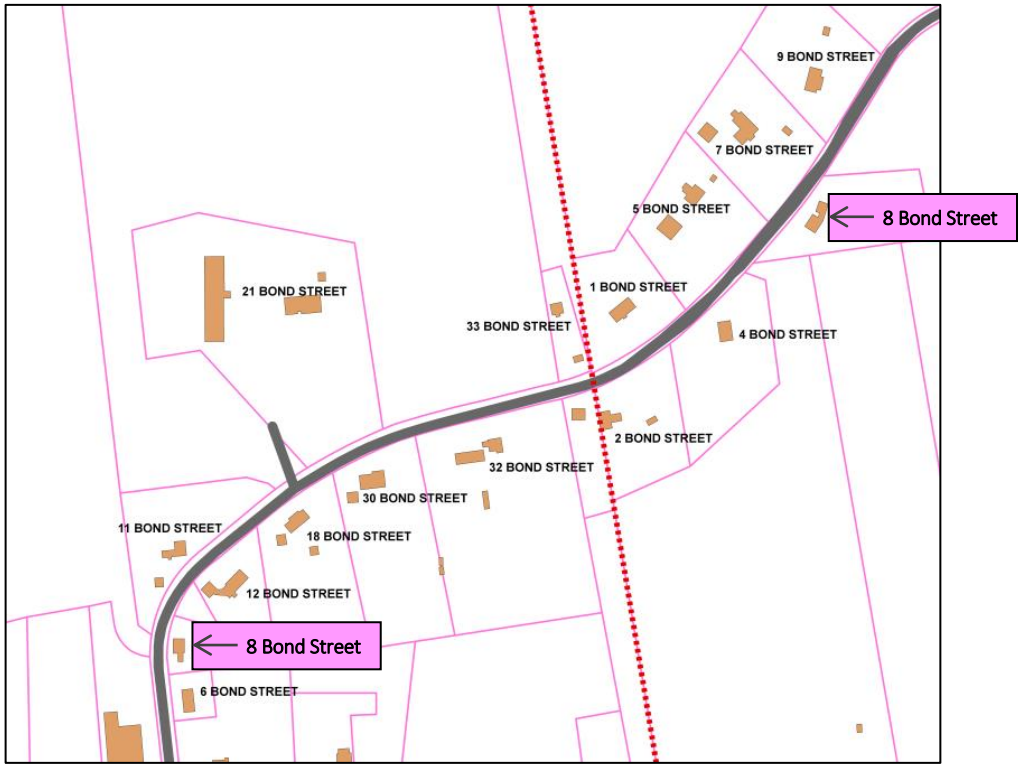


Figure 6: The dashed line is the municipal boundary. In this situation, the numbering starts over at the boundary, and number 8 actually repeats within a short distance. If the boundary is not well marked, this could cause confusion.

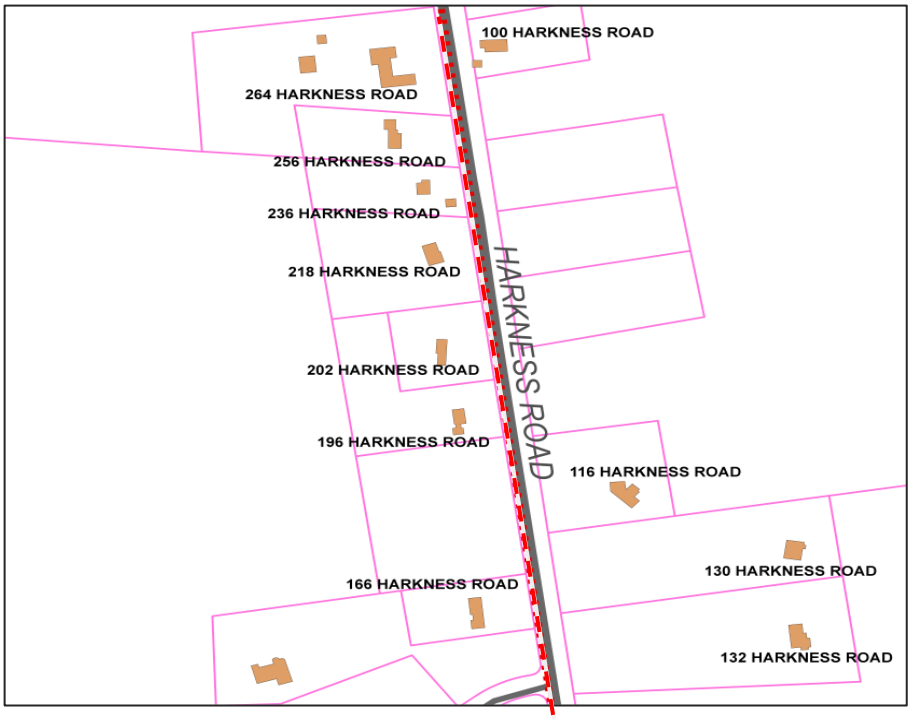


Figure 7: The dashed line is the municipal boundary. Numbers on both sides of the street are even, and the numbers go up in opposite directions!

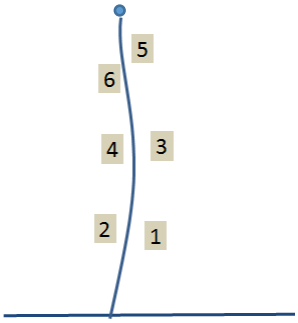
4.2.6. Infill numbering

For new construction on streets with existing addresses, the existing numbering scheme shall be followed to the extent practical, with addresses interpolated from surrounding addresses. In this circumstance, if no whole number is available, alpha suffixes should be used rather than fractions or decimals.

4.2.7. Dead end, circular, boundary and other configurations

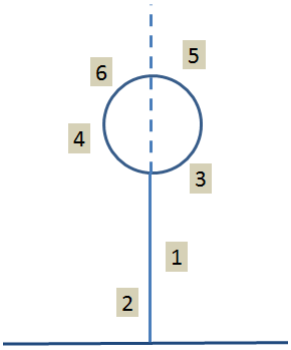
Dead End Streets

For dead end streets, numbering shall originate at the intersection of the adjacent street and terminate at the dead end with odd numbers on the right and even numbers on the left.



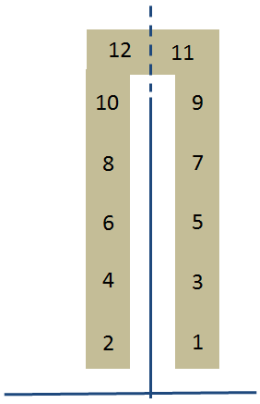
Numbering a Cul-de-Sac

Cul-de-sacs without buildings in the center portion should be numbered as if the center line of the street bisects the cul-de-sac.



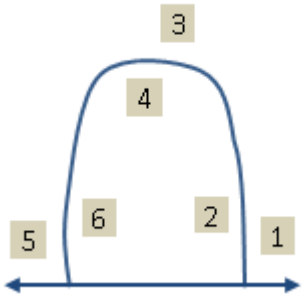
Row House in a U-configuration

At a different scale, but applying the same principle, numbering for a U-shaped row house should ascend on either side.



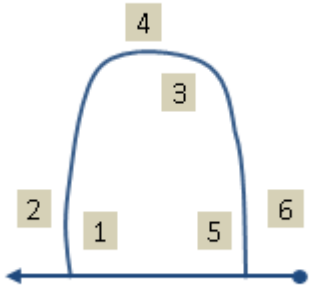
Streets that Loop Off a Main Street

Numbering of streets which have two entrances off a main street that continues in either direction should begin at the entrance first encountered on the right side.



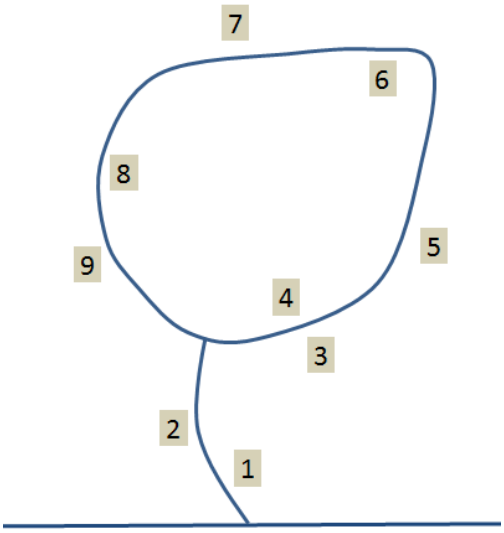
Loop off a Dead End Street

If a street loops off a dead end street, then numbering should begin at the end first encountered along the dead end street.



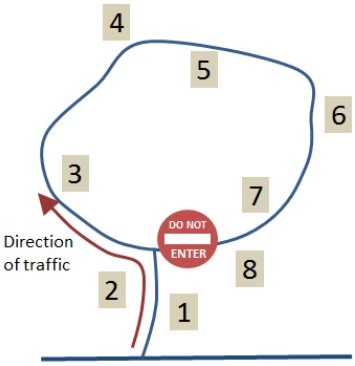
Closed Loop with Bi-Directional Travel

If a portion of a street forms a closed loop, then addressing should proceed counter-clockwise from the base of the loop unless the configuration of the street directs traffic otherwise. This follows the natural direction of travel on the right-hand side.



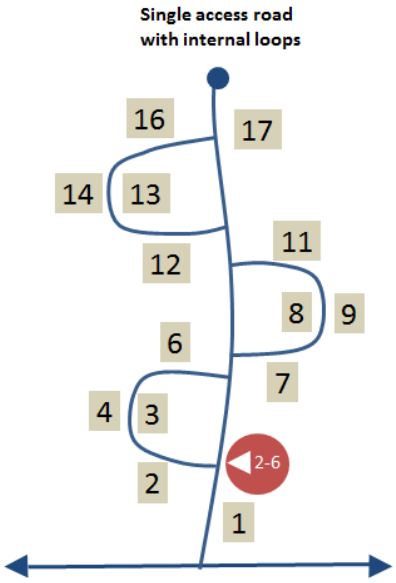
Closed Loop with One-Way Travel

If a street forms a closed loop and travel is one-way then the numbering should follow the direction of travel.



Numbering off a Single Street with Internal Loops

For condo or apartment complexes, there is frequently a single driveway with numerous loops or forks but only one name. In these (less-than-ideal) situations, the rules above can be applied to rationalize the numbering if ranges for the branches and loops are non-overlapping so that simple signage is feasible. In the example at right, the first (un-named) loop follows the loop rule and includes the numbers 2-6. The next loop includes numbers 7-11. 10 is omitted so that the next range doesn't overlap with 7-11. Thus, it is possible to place unambiguous signage for these ranges in sequence along the main stem of the access road, as illustrated for just the first intersection.

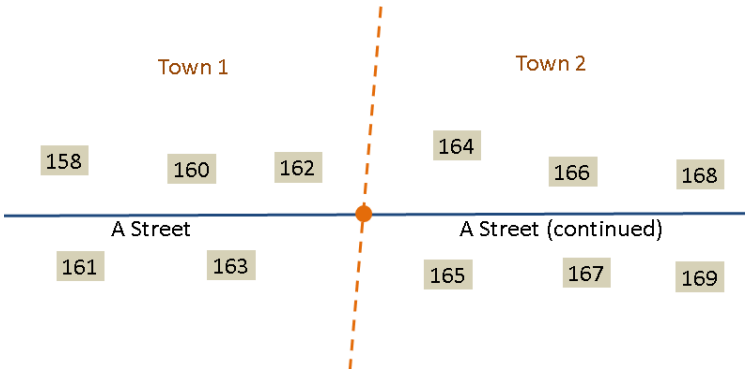


Street Name Changes at Boundary

If a street crosses a municipal boundary, and the name changes, numbering should start over but retain the same sequence to avoid any confusion. Signage should clearly indicate the street name change.

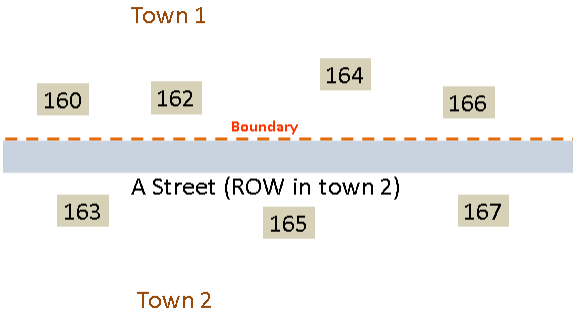
Street Name the Same at Boundary

If a street crosses a municipal boundary, but the street name does not change, the numbering should continue as if there were no boundary.



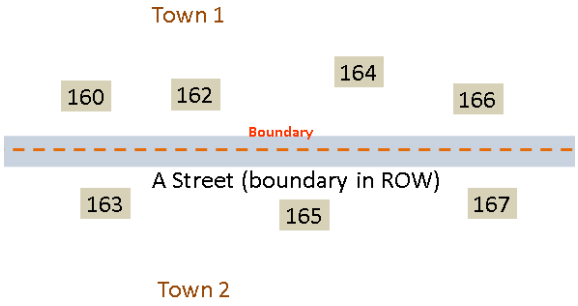
ROW Entirely in One Town

In the case where a street follows the boundary but the right-of-way is entirely in one municipality, that municipality has jurisdiction on street-naming and numbering and the other municipality should follow its lead as to sequence and parity.



ROW split between towns

In the case where two municipalities share jurisdiction over the right-of-way, they should agree on one single street name and work to coordinate numbering, again such that the location of the boundary does not affect normal sequence and parity.



4.3. Communities

4.3.1. Community names

A community name, as defined in 3.5, is a required component of every address. There are 193 different Elm Streets in Massachusetts - obviously, you need to know which Elm Street is meant. This is the purpose of the zip code, place name, or what we refer to in this standard as the community name. Most people don't realize how frequently a geographically incorrect community name is used, because postal place names are often the same as, and are confused with, community names. Or postal names may not be the same as community names at all. The key point is that postal place names and associated zip codes aren't officially mapped and don't refer to fixed geographic areas. In fact, zip codes may be updated to reflect changes in how the USPS delivers mail. Community boundaries are authoritative and much more stable - which is why we use those rather than postal place names to determine which "Elm Street" we are referring to. Figure 8 illustrates the kinds of confusion between postal place name and community name that we are trying to avoid.

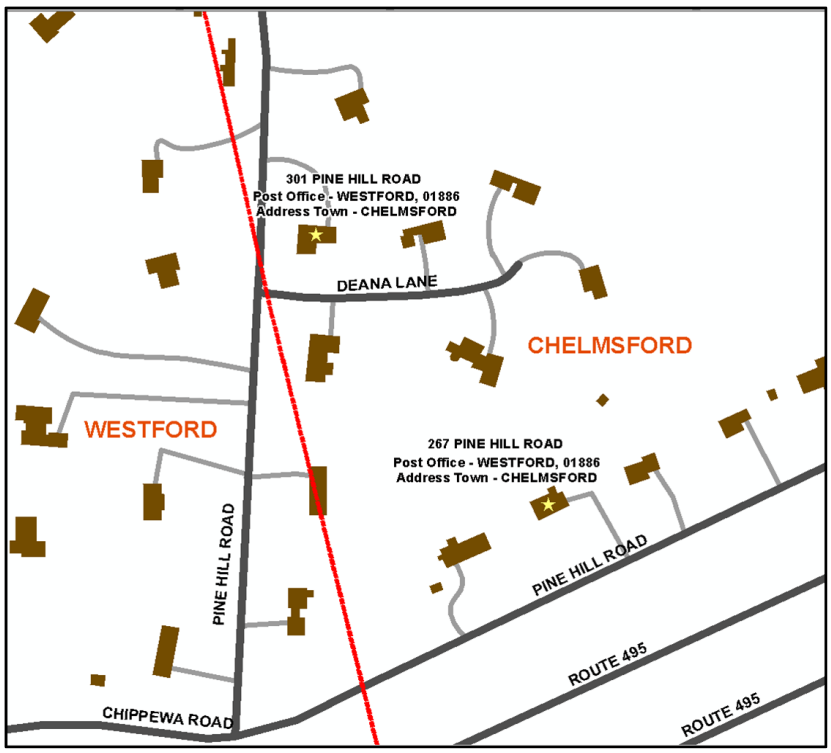


Figure 8: In this situation, the applicable ranges along Pine Hill Road are listed on the USPS zip code lookup site with a Westford zip code. This is unusual – in most cases zip codes do follow geographic town boundaries.

Technical note: the combination of community name and street name provides a unique identifier (database key) for every street segment. The location of the point of access to the structure, where the driveway or pedestrian access to that location originates on a named street, determines both the street name and the community name for that address.

Note that in situations where the point of access lies in a different community, the address number sequence, the street name and the community name are determined by the community in which the access point falls. This may lead to a confusing situation, in which the "geographic town" for the structure, the town in which the structure is physically located, is different than the "address community" determined by the access point, but this is still preferable to the ambiguity caused by referencing the "geographic town" in the address. In figure 9, for example, there might be another "Linseed Road" elsewhere in Northampton – we want the one in Hatfield. To deal with any confusion, Northampton may refer to "Linseed Road (Hatfield)" in an address list.

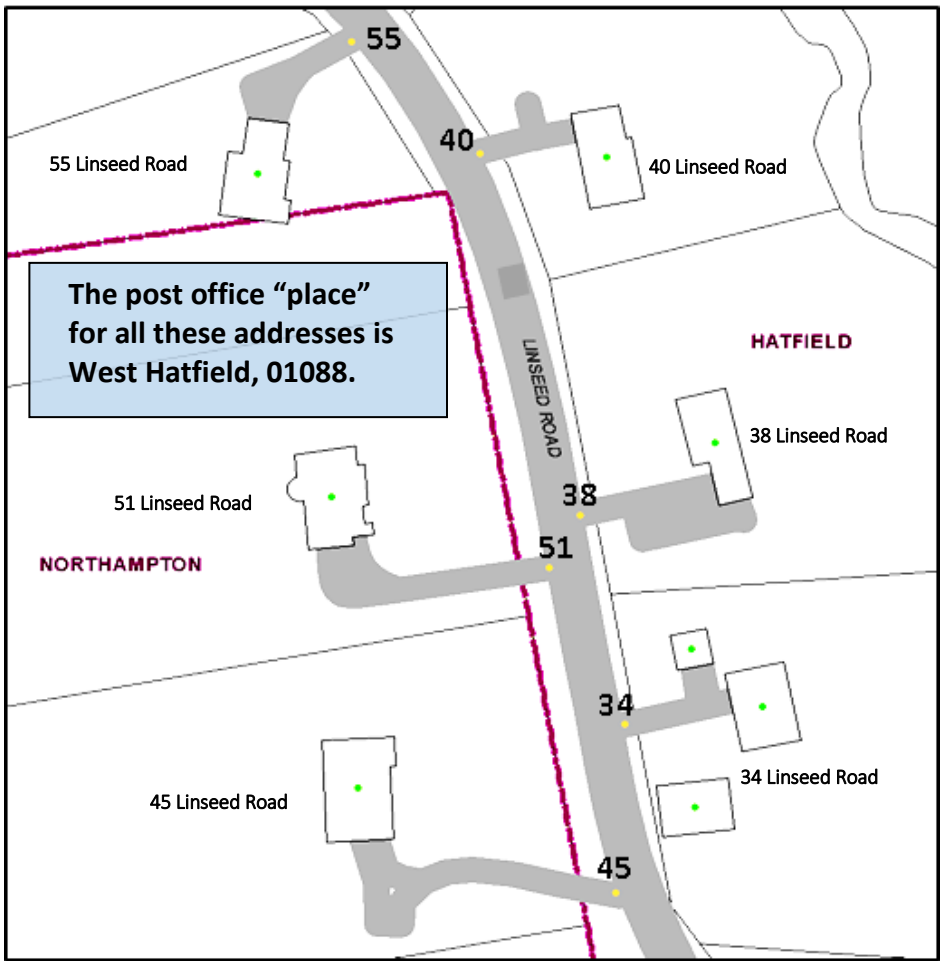


Figure 9: Here, addressing for the houses in Northampton follows the pattern for Hatfield, as it should. The purple line is the municipal boundary. The yellow dots represent access points and the green dots are structure center points. The geographic town for numbers 45 & 51 is Northampton, but the address town, as determined by the location of the access point, is Hatfield. The post office name for all these addresses is West Hatfield.

4.4. Units

4.4.1. Assignment of unit identifiers

The municipal addressing by-law or regulation should contain provisions relating to assignment of unit identifiers such that:

- the owner of any commercial or residential structure with distinct tenants occupying units is responsible for assigning unique identifiers to units within that structure, subject to review by the municipality, and
- the condominium association or property manager for any commercial or residential structure with multiple unit owners ensures that unique identifiers have been assigned to units within that structure, subject to review by the municipality.

Unit identifiers assigned should exactly correspond to visible signage, or describe location unambiguously. For example, *Unit A* means that there is a unit with "A" on the door, and *Basement Unit* means that there is one and only one unit in the basement.

4.4.2. Recommended forms of unit identifier

Within a building, units should be assigned sequential identifiers based on a readily extensible and understandable scheme. The most useful schemes are those which reference the floor in the unit identifier, and of those, using a number for the floor and a letter for units on that floor is the clearest and best (e.g. *1A, 1B, 1C* on the first floor.) But units in a multistory building can also have the floor as the first digit or two digits of the unit number, with placeholder zeroes as needed (*101, 102* on the first floor, *201, 202* on the second floor, *1101* on the eleventh floor and so on.) The primary requirement is that any unit identification scheme be consistent in the pattern used.

For sites with multiple buildings that are identified sequentially, with no detail type to differentiate them (see Definition 3.15), unit identifiers should be unique across the entire site; ideally this is done by including the building identifiers in the unit identifiers. This is preferable because many address data management software packages cannot handle any additional detail besides unit number. If the building identifier is a letter, and the unit identifier begins with a number, then the compound identifier can be readily broken down into building and unit. For example, on a site with two three-story buildings *A* and *B*, each with up to ten units on each floor, the units could be numbered *A101, A102, … A310, B101 … B310*. If the buildings are numbered *1* and *2*, with a common floor number/unit letter pattern for the unit, then the compound unit identifier could include a dash, as in *1-1A, 1-1B…2-3B*, but this option is less desirable because the "-" needs to be included in any verbal communication such as a call to 9-1-1.

Detail type words for floors, e.g. *Basement*, may be used as the unit identifier if there is only one unit on that floor, or as the first element in a compound identifier, as in *Basement A, Basement B,* and so on, if there are multiple units on that floor. The unit portion of the identifier should follow the same pattern as on other floors. Sequential numbering of units without reference to the floor is not recommended (e.g. units *1* and *2* on the first floor, *3* and *4* on the second floor). Positional identifiers for units (e.g. *Rear*) are not recommended except where there is a separate exterior entrance to the given unit.

4.5. Buildings

4.5.1. Assignment of building identifier

The municipality should also consider requiring the owners of parcels of land with multiple substantial structures, not distinguished by address number, to assign unique identifiers (whether names or sequential identifiers as defined in Section 3.14) to the structures on that site, subject to review by the municipality. The owner would also be responsible for documenting such identifiers in a manner that facilitates their use to support public safety response, such as a site plan or map.

4.5.2. Recommended form of building identifiers

Building names should be fully descriptive and serve to uniquely identify a given building on a site. Where a proper or descriptive name is assigned, a detail or base type word must also be included – thus *Cardozo Center, Engineering Building*, or *Marston Hall* are acceptable building identifiers but *Admissions* by itself would not be a suitable building name. A word describing the type of building may be sufficient to identify a building – thus *Gymnasium* or *Library* are valid building identifiers if they are unambiguous. Buildings of unspecified type may also be distinguished by sequential identifiers - in such cases the "Building" type word must also be included as in *Building 1, Building 2,* and so on. Where multiple buildings of a known detail type are sequentially identified then the type word should also be included – *Warehouse 1, Warehouse 2,* and so on.

5. Address Record Format and Content Standards

The guidance above is primarily oriented towards **process**: workflows and rules for creating and managing addresses that will serve the purpose of quickly and accurately identifying a given location to a human address user. This section is about storing addresses in a **standardized format** for use in computers. Non-standardized addresses are adequate for many purposes because humans provide interpretation - they understand that *Massachusetts Avenue* and *Mass Ave* refer to the same street and *Unit 1, Apt. 1,* and *#1* all refer to the same unit. Computers are not so smart. They can be taught to do interpretation as well, but unfortunately the ability to dynamically standardize input information to the degree required for addressing to be truly useful in automated systems is not commonly available. This really requires artificial intelligence!

Commercially available Coding Accuracy Support System (CASS) certification address-cleansing or newer, similar routines have many shortcomings for the purposes of this standard:

- they do not adequately deal with a variety of address content commonly encountered
- they do not format address data compliant with CLDXF or FGDC standards
- they do not provide any structure for sub-address information
- they are dependent on postal data, which may be incomplete, and they require constant maintenance because carrier routes change
- they do not support validation against official address lists
- they do not support the concept of geographically defined communities which can lead to very erroneous placement of addresses

For example, some address cleansing software will take zip code with a common typo such as transposed digits and completely relocate the address to a different community many miles away from the place specified in the address just because the street name matches one in that zip code!

The key to successfully standardizing address data is a set of rules such that two different individuals given the same level of detail relating to the same location will produce the same address record. As a result, the two records will match exactly in a database without human interpretation. *Mass. Ave.* and *Massachusetts Avenue* will both become *Massachusetts Avenue.* This section details the rules whereby such transformations take place.

<u>The importance of standardization cannot be over-emphasized.</u> There is no other way to efficiently create a single, authoritative listing of addresses for a municipality or any other government entity. There are usually multiple

sources for such a listing, and conflating (combining) these different listings requires the formatting and content rules discussed in this section.

As described above, customized address processing software was used to create the MassGIS statewide address list to conform to the national standards described in this document. There is no reason to duplicate this effort - communities wishing to adopt the address standard may save themselves substantial effort by working with MassGIS.

5.1. Communities

As noted in the address assignment section, the community name is a required component of a valid address. The complete list of valid community names consists of the official municipal names for those communities **not** subdivided into neighborhoods, plus the names of the neighborhoods for the eleven municipalities that **are** sub-divided, plus "Devens" which contains a portion of three municipalities (see Table 1). The use of these community names and no others as place names is necessary to ensure the integrity of the address. For those maintaining only one address for both mailing and location purposes, getting the zip code right will suffice to ensure mail delivery, but the community name must still be correct and may not be the same as the postal name.

Given the rules outlined in section 4.3 it should be apparent that awareness of community boundaries is an integral part of standardizing addresses. This highlights the importance of using online resources provided by MassGIS or having local GIS staff involved in address assignment, so that structures and access points can be precisely located relative to community boundaries in a GIS. This is the most common source of confusion and error in addressing.

5.2. Full Street Number

There are three parts to a **simple street number**:

- prefix, for example *B10 (*rare*)*
- number, *20* (decimals are not allowed)
- suffix, such as *20B* or *20 1/2*

Simple street numbers should contain no extraneous or un-necessary spaces or punctuation. Thus, format the number as *12A* instead of *12 A* or *12-A*. A space must appear between the number and the fractional suffix, but should not be used otherwise.

Often two street numbers have been assigned to a single building containing two side-by-side units which share an entrance. This is not consistent with the address number assignment guidance given earlier in this standard, but must be accounted for in the formatting of existing addresses. A **compound street number** may be created as a range of two simple street numbers – *12-14, 12-12A* etc. A **full street number** is a simple street number or a

compound street number, provided of course that the combination of street numbers in the compound number is valid.

5.3. Full Street Name

The first and most important rule is that a standardized street name must be fully spelled out, with no abbreviations. (A minor exception to this is noted in the definitions of the full street name elements below.) This is not common practice, with the result that there may be many different literal versions of the same street name. The USPS provides a set of standard abbreviations, in Publication 28, but it is woefully incomplete. In fact there is no single set of abbreviations that is universally used – people often abbreviate spontaneously, with little regard for consistency. Spelling out in full is the only approach that will likely result in two different versions of the same name (*Barlow Ave.* and *Barlow Av.*) matching in a database. Another necessary, if arbitrary, rule is that numbered street names use the spelled-out word for *First* through *Tenth,* and then the number for *11th* and above.

The second part of the national standard we are following, which will be unfamiliar to most address users, is that it identifies up to eight separate parts of a full street name (these are explained and illustrated below). In fact, the national standard requires that the full street name be split up into separate data fields for each element. There are very good reasons to do this, namely to ensure that street names are correctly formatted and that the individual parts can be checked against lists of acceptable values. However, it may seem like a lot of work and it may involve considerable expense to alter existing software. The more basic goal is to ensure that all parts of the street name are present and in the correct order to ensure that they can be separated out if necessary, whether or not eight separate data fields are used. Using a scheme with some, but not all, of the required columns is actually worse than putting everything into one field because some content will end up being "shoe-horned" into the wrong field. Unfortunately, this is the case with most municipal systems currently in use.

Here are the street name elements that we're talking about. Not all of these occur in every street name but if present they must be in the order listed here.

> **Street name pre-modifier** - any word separated from the base name by a pre-type or pre-directional (these elements defined below), as in *Old Avenue B*. This only occurs rarely.
>
> **Pre-directional** - this is any of the four cardinal or four intercardinal directions as one fully spelled-out word with no hyphen, as in *South Main Street*. Note however that if the directional word is part of a noun phrase, then it would be part of the street name element, for example, in *North Star Road*, *North Star* is most likely the street name, especially if there is no *Star Road* to be north of. Similarly, in *East*

Brookfield Road, the directional word is part of a place name, *East Brookfield*, so it would be included in the base name rather than treated as a directional.

Pre-type - a type word that comes before the name, as in *Avenue A*, *State Highway 7*. Note that the type may be a phrase as well as a single word. The most common multi-word types have a descriptor attached to a type word, like *State Highway* or *Fire Road*. A list of allowable pre- and post- types can be obtained from MassGIS. Email to massgismail@mass.gov to get the current list.

Pre-type separator - this will be unfamiliar to most address users, but it is part of the CLDXF standard and included for consistency. The pre-type separator is a prepositional phrase which separates a pre-type from the base name, as in *Avenue of the Americas*; the purpose is to allow for sorting alphabetically on the base name. It's uncommon.

Street name – base name portion of the full street name, as in *Market Street*, *Massachusetts Avenue*, etc... Some street names have the post-type "built-in" as in *Broadway, Causeway*, or similar names. All other street names must include a name and a type; either a pre-type, a post-type, or both.

Post-type – the street type following the base name as in *Orchard Street*, *Woodside Lane*, *Heather Drive*. Note that a phrase consisting of two valid type words may also be a type, so for example in *Warren Street Court*, "Street Court" is the post-type. Phrases like *Fire Road* or *State Highway* are also valid types, but by far the most common multi-word post-types consist of a common type like *Street* followed by *Extension, Bypass*, or some similar word, as in *Farm Road Extension*.

Post-directional - directional word following the base name, as in *Washington Street South* – any of the four cardinal or four intercardinal directions as one word with no hyphen.

Post-modifier - like the pre-modifier, but much more common, this is a word which follows the name and is separated from the name by a type or directional. In the street name *Chatham Street South Extension*, *Extension* would normally be part of a type phrase, but it is separated from the name and the type by the directional word *South*.

More complete discussion of these elements is available in the CLDXF standard at https://www.nena.org/?NG911CLDXF.

5.4. Sub-address Elements

An address may additionally include a building name or unit identifier, as well as other kinds of detail (room numbers within a building or the name of an outdoor location). These are often referred to as secondary location or sub-address elements. Most current approaches to managing such information in a database use one of the following approaches:

- include it in a single free-form address field, as in *20 Main Street Rear*
- store unit information in a separate, dedicated unit field
- use an unstructured "address line 2" field, e.g. for recipient name and unit, department, or room

This standard has separate fields for each level of sub-address information: **building, floor, unit,** and **room,** as well as a catch-all field for **other location** information. It is rare to find such detailed formatting for sub-address data as what is required in the national and international models on which this standard is based. Why is so much structure needed? Standardization of sub-address information has the following benefits:

- isolates address elements for validation
- facilitates comparison with existing addresses
- clarifies the context and interpretation of descriptive words like "Rear"
- supports more efficient data entry, e.g. pick lists
- allows for grouping of address records at various levels of hierarchy

However, it is not enough to simply isolate the different elements of sub-address information in their own fields - it is also necessary to have guidelines for content. As noted in the discussion of standardization, any one of *Unit 1-A*, *# 1A* or *Apt. 1A* might be used in different datasets to refer to the same location. The transformation of these different inputs has to deal with the variety of type words as well as all the ways that identifiers themselves can be formatted. We have slightly different approaches for the different fields, but the general goal, as with street names, is to have a set of rules such that two independent users will produce identical records when referencing the same location. For example, in the case of unit information, the various type words/symbols are all dropped and only the unit identifier goes into the **unit** field; the identifier is formatted according to the "minimalist" rule as *1A* with no spaces or punctuation.

What follows is based on the definitions provided earlier for building, floor, unit, and room.

5.4.1. Content Standard for Building Identifiers

Building names may be the only practical form of identification where multiple buildings share a single numbered address, as on a college campus.

The full "official" name of a building should be inserted into the **building name** field. Building names should be unique in the context of a given address record. Proper names, if they exist, are preferred to descriptive names (see Definition 3.14). However, both common practice and signage should be considered in the choice of name field content. If the *Larsen Building* is universally known, and indicated by signage as the *Arts Center*, then it is preferable to put the latter into the building name field.

As outlined in the best practices on building identification, section 4.5.2, either a detail or base type word should be included in the building name. Thus, if buildings are numbered, and no additional information given, the values in the **building name** field would be *Building 1*, *Building 2*, and so on. If a proper name is assigned, the official name likely also includes a detail building type word which must also be inserted into the **building name** field, e.g. *Conley Library*.

5.4.2. Floor Identifiers

Content in the **floor** field should consist of a simple sequential (usually numerical) identifier or a detail type word. Base type words ("Floor" and "Level") are never included. Thus, "First Floor" gets entered into the floor field as *1*, and the word *Basement* is entered rather than "Basement Level."

The floor number is so commonly embedded in sequential unit or room identifiers that it is rarely essential to include it in a separate data field. However, doing so provides essential location detail where the unit or room identifier is either a descriptive or a proper name, e.g. *Accounting Department* or *Empire Ballroom*.

5.4.3. Unit Identifiers

Unit identifiers are usually sequential, but unlike floors they are often compound sequential, with a part referencing the floor and the other part referencing the unit itself, e.g. *1A*, *1B* and so on. Section 5.4 provides guidance on appropriate sequential identification schemes. Detail type words for units, such as *Penthouse*, may also be used, as well as descriptive names like *In-law* or combinations of descriptive name and detail type like *Building Department*. The rule for **unit** field content, as with floors, is to include the identifier but not the base type word ("Unit", "Apartment", "Suite", "#", "No." or equivalent) in the **unit** field. If the addressing authority does want to retain the specific base type words for reference, they can be optionally be stored in other fields but not used for data validation or comparison.

5.4.4. Room Identifiers

Rooms, like units, are usually sequentially identified, with compound sequential identifiers referencing floor and room number commonly used. As with units, only the sequential identifier should be put into the **room** field, not the base type word. Thus, for "Room 207" only *207* would go into the **room** field.

As with units, punctuation and spaces in room identifiers are only retained if needed to avoid confusion; *207A* rather than *207-A*. However, since many room identification schemes already conflate the floor and room number this will typically only apply to alpha suffixes.

As with units, in multi-building situations where a sequential identifier has been assigned to buildings, a compound sequential room identifier that includes reference to the building as well is preferable. In cases where both the building and the room identifier are numeric, punctuation may be necessary to separate building from floor and unit identifiers.

Rooms may also be identified with a detail type word such as *Stockroom* or a combination of descriptive/proper name and type word such as *Imperial Ballroom, Utility Closet,* or *Conference Room*. In all cases where the room identifier is not sequential, the detail type or base type word must be included in the room field. This is different from the treatment of unit identifiers, where the base type word would be omitted.

5.4.5. Summary of Rules

In summary, for sequential identifiers (e.g. *1,2,3…* or *A,B,C…*) include the base type word "Building", as in *Building 1*, but do not include base type words "Unit," "Floor," "Room" or their equivalents in content for their respective fields. Do include detail type words ("*Library*," "*Basement*") in all situations.

5.5. Other Location and Site Name (Landmark) fields

The **other location** and **sitename** (CLDXF **landmark**) fields are for any location information that does not properly belong in one of the fields discussed above. The **sitename** field is the Massachusetts equivalent of the CLDXF standard (see section 1.3) **landmark** field, but is only used for non-building locations.

5.5.1. Outdoor locations or sites that are landmarks

The names of sites (such as large industrial/commercial complexes) or outdoor locations that are not individual buildings, but are commonly known and recognized by residents of that city or town, can go into the **site name** field. Thus, *Memorial Park*, *Lincoln School Playing Fields*, or *Rindge Towers* would go into the **site name** field.

5.5.2. Outdoor locations that are not landmarks

Outdoor locations that are not generally recognized as landmarks go into the other location field. Thus, "Lot 10" would go into the other location field – it's not a landmark because only someone who was involved in that particular sub-division would know where *Lot 10* was. But a built-out subdivision might qualify as a landmark and thus *Cherry Hill Estates* would go into the site name field. Similarly, for the location described by "Bridgewater State College, Parking Lot B", *Bridgewater State College* would go into the site name field and *Parking Lot B* would go into the other location field. The rationale for doing this, if it seems arbitrary, is so all addresses at a given site can be grouped and related to the site as a geographic feature.

6. Suggested Implementation Steps

This document provides guidance for address assignment and for address formatting / data management. Implementation of its recommendations can focus on either or both of those depending on municipal needs and resources. The following outline can help define the scope of any project, but is by no means comprehensive. As emphasized in the introductory sections, every municipality is different and will follow a different path.

6.1. Convene interested parties

The first step is to convene addressing stakeholders. In any municipality, most municipal staff are involved with assigning or using addresses in some way. Their needs may differ, but they all have an interest in quality addresses. Some will be intimately familiar with problems and issues at particular locations, especially public safety personnel for whom ambiguity and error are daily concerns. The staff with hands-on experience of addressing issues should be involved in any discussion of implementing best practices.

Typically, the following departments would be represented if they exist in the municipality:

- Chief executive / elected official(s)
- Building
- Assessing
- City/town clerk's office
- Planning
- Public works
- Municipal utilities (water, sewer, electric)
- Police
- Fire
- Conservation / Recreation
- Health

- Information Technology
- Housing Authority / Affordable Housing Trust

There are likely to be repositories of address information in all these departments.

6.2. Define the problem

As always, it helps to start the discussion with a problem statement. The question all stakeholders should answer is "What are the inefficiencies, errors, costs, and risks relating to current addressing?"

These may include:

- confusion caused by existing address numbering
- confusion caused by existing street naming
- issues related to un-named shared driveways
- lack of clear authority or accountability for addressing
- non-standard-compliant address assignment
- non-standardized addresses & formats
- inappropriate address creation/approval workflow
- lack of communication between departments
- redundant address maintenance by different departments
- inability to link different databases by address
- difficulty implementing systems that incorporate addresses

Most communities have established procedures in place for address assignment, but the roles and responsibilities may not be clearly understood by all staff, and there may not be adequate documentation, transparency, accountability, or consistent execution. Too often, there are exceptions made to what should be simple rules. The first step is to get past any political or "turf" issues and recognize where there are problems.

6.3. Establish goals

The goals may be short-term or long-term, incremental or comprehensive, stand-alone or part of a larger project. The only requirement is that they respond to the problem statement, and also reflect the vision of the chief executive and project lead. If the biggest problem is errors and delays in emergency response at a few locations, the goal may simply be to identify all such cases and fix the related addressing problems. If the larger vision includes integrated information technology resources for all departments, then an appropriate goal would be creation of a master address file which is centrally maintained with links into each department's records.

Completely implementing the address standard will require an executive level mandate (someone who recognizes the current problems and wants to fix them) as well as a project lead empowered to make it happen.

A useful goal in almost all cases is to establish adherence to the standard going forward as a minimum expectation for all departments and all entities doing business with the municipality. "Going forward" means that you don't necessarily clean up all existing problems or make all addresses conform to the standard immediately, but you do figure out how to make the standard apply to everyday operations and how to transition existing systems over time. Giving the standard legal force is a first step before attempting any change.

6.4. Develop a plan and formalize roles and responsibilities

A plan involves determining who needs to do what, in what order, to achieve the stated goals. What skills are required? How much outside assistance will be needed? How much will it cost? How will it affect ongoing operations?

The companion template regulations and by-law for this standard may help establish a framework for action by setting out the importance of clearly defined authorities, roles, and responsibilities. This standard offers a broad array of opportunities to improve local practice and bring it into conformance with best practices. The following are some steps that a municipality might consider.

6.4.1. Review and formalize address assignment workflow

Generally speaking, the goals that relate to the process of address assignment are common-sense. As noted above, there needs to be a clearly documented workflow, with timeframes for address assignment, review, final approval and notification.

Some questions commonly encountered include:

What triggers an address assignment? Should a building permit be issued without an address? From a public safety perspective, the earlier an address is assigned the better, because it may be necessary to respond to an accident or other incident at a construction site. Conditioning a building permit on the assignment of an address is a good practice. At a minimum, when the certificate of occupancy is issued, there should be a valid address that can be submitted to MassGIS. This is proposed as an amendment to the state building code.

Should vacant parcels receive an address? This is generally a good idea, as it provides a useful identifier for record-keeping and for fieldwork, but you need to consider what happens to the address when the parcel is subdivided or multiple structures built on it. An orderly process for "retiring" or transferring the original address is needed.

What role should site developers play – can they propose street names and address numbers? This is acceptable, as long as both street names and numbering are carefully reviewed by the municipality to conform to the published standard. Similar-sounding names, illogical numbering or other non-conforming proposals must be rejected. It is important to

ensure that developers are aware of the standards governing address assignment before proceeding with their documentation and plans.

How is the transition from a site plan with lot numbers as filed at the registry to named streets and numbered addresses managed? Every city or town has a different workflow, but typically assessors receive subdivision plans from the registry and use those in conjunction with local planning and building approvals to update assessing records. The legal description may only include lot number and the name of the development. However, the street address is what will be used in most transactions. It is useful to retain both kinds of information in municipal files, so that the local information can be linked to the registry if needed.

6.4.2. Assign new street names where needed

A common problem that was highlighted in section 4.1.2 is multiple residences sharing a long, un-named driveway. It may be helpful to work with on-line mapping or a GIS to identify these situations. As the solution for this problem involves changing existing addresses, there will be complaints that it is inconvenient and costly for private residents and especially for businesses. Often, residents have a strong emotional attachment to their existing address. However, in this case, the public safety justification is also strong.

How do we establish authority over private ways? As noted in the discussion in 4.1.2, cities and towns need to be perfectly clear that they can establish jurisdiction over naming of private ways without assuming any responsibility for maintenance, snow removal etc.

What's the best way to go about assigning new street names to shared driveways? The municipality may want to develop some criteria for where new names are needed. If the driveway is long, house numbers are not visible from the main road, or there are many structures sharing access then there is a strong case for assigning a new street name. Also, owners should be given a chance to propose a name (subject to municipal review) and there should be a mechanism for resolving disagreements, with the municipality as the ultimate decision-maker.

6.4.3. Identify "problem" addresses

There may be other kinds of existing addresses that don't comply with best practices – numbers out of sequence, street names not matching access – that are identified in the problem statement. Consideration should be given to changing these.

How do we deal with the complaints about changing addresses? As noted above, changing addresses is a difficult public relations challenge. There are two points to consider. First, why is the municipality doing this? Have the addresses in question caused a problem, or are they likely to cause a problem? The municipality needs to develop a strong justification for changes. If a number of municipal staff agree that the

addresses in question are hard to find or confusing, then they should be changed. Second, is there a concerted effort to fix all addresses? If an individual owner can be told that the city or town is implementing a comprehensive reform, then there is less likelihood of pushback. As far as dealing with complaints, facilitating emergency response will generally be considered more important than some minor cost and inconvenience. But strong executive level support and impartial application of standards are critical. And, as mentioned previously, giving some or all of the standard legal status as a city or town by-law is a good first step – so that the municipality has the authority to do what it needs to do.

6.4.4. Develop a master street name list

Another useful, common-sense step is to develop and maintain an authoritative list of street names used by the municipality that can be shared amongst user departments, with street names formatted in compliance with this standard. Many communities are already working with MassGIS to identify any discrepancies between their street names and the list maintained at the state level.

Who has the final say on street names? The designation and naming of public ways is an executive function, with authority originating in the chief elected official or decision making body and potentially delegated to a department head. The naming of private ways should be a similar process. The adoption of the standard may go hand-in-hand with the publication of an official street name list by the street naming authority.

What should we do about the situation in 4.3.1 where we have addresses that exit to a street in another community? The key point is that since the address is off a street in another community, that other community has authority over street naming and may also set the pattern for address number assignment. Municipalities need to work together, rather than each asserting their own authority. If there is potential ambiguity, the street may be referenced in the municipal records with the other community name in parentheses, as in "Market Street (Belmont)" if there is another "Market Street" elsewhere in Watertown, or if the property is accessed off the continuation of the same street into the other municipality. Ideally, an address database allows for this by providing a community name field.

How do we justify fully spelling out street names and implementing the other formatting guidelines presented in this standard? The spelling out is desirable because it avoids ambiguity and allows for linkage between different lists – even in a small town this may be useful. The formatting of street names presented in section 5.3 may be intimidating, but it

Technical note: In conjunction with this step, a municipality may want to consider upgrading systems that manage address records to integrate newly standardized information and to take advantage of the potential for improving data entry (e.g. provide pick lists for street names). *Staff will only support address standardization if it provides operational efficiencies and reduces errors and time wasted.*

provides a means of validation for directional and type words that is very useful. If storing each part of a street name in multiple columns or fields is just too difficult, it is better to put the entire street name into one column or field than to use schemes that are incomplete and lead to "shoe-horning" street name elements into inappropriate fields.

6.4.5. Develop a master address list

A next step is to develop and maintain a complete and authoritative list of street addresses. As noted earlier, the MassGIS program can provide a list of addresses exported (http://tinyurl.com/zwu6rax) from the address database developed for the new 9-1-1 system. Those addresses originated at the local level, but considerable work has been done to reconcile discrepancies between sources both within a town and across town boundaries. MassGIS welcomes engagement and feedback on specific addressing issues.

This is too much work for too little benefit! The key to making this process manageable is finding some technical capability either in house or externally so that the municipality can take advantage of the work which has already been done. The statewide addressing project has preserved links to all the original addresses that were standardized, so it's possible in most cases to just "swap in" standardized addresses for what the municipality has. As far as whether it's worth it, that's a judgement for the municipality to make, but State 911 and hundreds of jurisdictions across the country as well as the major professional and trade organizations involved with public safety and planning have endorsed the national standards on which this document is based.

6.4.6. Reconcile addresses between city/town departments

As noted in 1.6, cleaning up addressing is often part of moving towards more efficient use of technology to support permitting, inspections, assessing, and other municipal operations. Standardization is a key first step for combining address lists currently stored in separate locations into a single master address list. This is work that typically requires outside consulting assistance or some in-house expertise. The assignment of a unique identifier which can be used in database systems is often recommended.

6.4.7. Deal with sub-address information

The initial discussion of problems with addressing will likely identify places like trailer parks, campgrounds, or condo complexes where improving sub-address detail would be useful, especially for public safety and inspections. There may be a variety of different formats and conventions in use within the municipality and even within individual address lists. This is another area where implementing this standard will involve adapting or extending current address management systems to

bring them into compliance with the standard before cleaning up existing addresses.

6.4.8. Linking addresses to GIS

Standardization is a necessary step if municipalities want to realize the full benefits of GIS technology by linking addresses to point locations, since all departments are likely to have an interest in using location information attached to the address. Sharing a standardized address identifier as recommended in 6.4.6 is the most expedient way to do this.

The MassGIS program has linked over 3 million addresses to address point locations derived from mapping all structures in the Commonwealth, for use in public safety systems as described above. This information is being freely shared with communities, who have a vital role to play in enhancing and maintaining it. Beyond participating in maintaining the address list, communities may also wish to do the necessary field work to improve the mapping, for example by refining the accuracy of building-specific address locations such as entry points. Communities may do this enhancement work in-house with GIS software, or they may use online software tools provided by a vendor, or they may contract for the work to be done in accordance with the guidance provided in this standard. The goal is to support sharing between levels of government as well as between municipal departments.

The complexities of managing GIS features related to addresses are outside the scope of this document, but in general there should be a way to manage the "many-to-one" relationship between addresses and address points, or at a minimum to associate a location with each address. MassGIS has done this by putting an address point identifier into each address record. Storing addresses and address points separately simplifies editing, but requires using a relational database to manage the data.

6.5. Making high-quality addressing sustainable

The execution of a plan to improve addressing practices must be sustainable. The following should be considered as part of the long-term strategy:

6.5.1. Documentation and training

Written descriptions of standards, procedures, roles and responsibilities are important. These should be developed as part of the planning effort and should be incorporated into training for all municipal staff involved in addressing. Provision must also be made for documenting decisions

made about particular addressing situations. Such documentation will be an important part of orientation for new employees who assign or use addresses, particularly since a "new way of doing things" may be unfamiliar to incoming staff who worked in other jurisdictions.

6.5.2. Quality assurance

Regular review of addresses for conformance with locally adopted standards is important. If necessary, "refresher" training should be provided. It is also important to track timely execution of addressing responsibilities. Delays in address assignment can have serious consequences.

6.5.3. Communication

A systematic way of informing all interested staff of address changes as they occur is important. The formation of an addressing committee or some similar step to ensure regular communication between address users may also be helpful. For example, if emergency responders are regularly experiencing difficulties associated with poor or missing addresses, this may provide a means to communicate such issues to other departments and to make senior management aware of them.

Finally, as emphasized throughout this section, an appreciation of the importance of good quality addressing by chief executive/elected officials is key to the success of any municipal effort to put in place best practices.

Our experience with addressing leads us to believe that such a commitment, coupled with disciplined execution of the plan, will lead to greater efficiencies, reduce risks and improve public satisfaction with municipal operations.