

# Section 3A Compliance Model User Guide

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## Key Terms

“Adjacent community” means an MBTA community that (i) has within its boundaries less than 100 acres of developable station area, and (ii) is not an adjacent small town.

“Adjacent small town” means an MBTA community that (i) has within its boundaries less than 100 acres of developable station area, and (ii) either has a population density of less than 500 persons per square mile, or a population of not more than 7,000 year-round residents as determined in the most recently published United States Decennial Census of Population and Housing.

“As of right” means development that may proceed under a zoning ordinance or by-law without the need for a special permit, variance, zoning amendment, waiver, or other discretionary zoning approval.

“Bus station” means a location with a passenger platform and other fixed infrastructure serving as a point of embarkation for the MBTA Silver Line. Upon the request of an MBTA community, EOHLC, in consultation with the MBTA, may determine that other locations qualify as a bus station if (i) such location has a sheltered platform or other fixed infrastructure serving a point of embarkation for a high-capacity MBTA bus line, and (ii) the area around such fixed infrastructure is highly suitable for multi-family housing.

“Commuter rail community” means an MBTA community that (i) does not meet the criteria for a rapid transit community, and (ii) has within its borders at least 100 acres of developable station area associated with one or more commuter rail stations.

“Commuter rail station” means any MBTA commuter rail station with year-round, rather than intermittent, seasonal, or event-based, service, including stations under construction and scheduled to being service before the end of 2023, but not including existing stations at which service will be terminated, or reduced below regular year-round service, before the end of 2023.

“Compliance model” means the model created by EOHLC to determine compliance with Section 3A’s reasonable size, gross density, and location requirements. The compliance model is described in further detail in Appendix 2.

“Determination of compliance” means a determination made by EOHLC as to whether an MBTA community has a multi-family zoning district that complies with the requirements of Section 3A. A determination of compliance may be determination of interim compliance or a determination of district compliance, as described in section 9.

“Developable land” means land on which multi-family housing can be permitted and constructed. For purposes of these guidelines, developable land consists of: (i) all privately-

owned land except lots or portions of lots that meet the definition of excluded land, and (ii) developable public land.

“Developable public land” means any publicly-owned land that (i) is used by a local housing authority; (ii) has been identified as a site for housing development in a housing production plan approved by EOHLC; or (iii) has been designated by the public owner for disposition and redevelopment. Other publicly-owned land may qualify as developable public land if EOHLC determines, at the request of an MBTA community and after consultation with the public owner, that such land is the location of obsolete structures or uses, or otherwise is suitable for conversion to multi-family housing, and will be converted to or made available for multi-family housing within a reasonable period of time.

“DHCD” means the Department of Housing and Community Development, or any successor agency.

“EOHLC” means the Massachusetts Executive Office of Housing and Livable Communities, DHCD’s successor agency.

“Excluded land” means land areas on which it is not possible or practical to construct multi-family housing. For purposes of these guidelines, excluded land is defined by reference to the ownership, use codes, use restrictions, and hydrological characteristics in MassGIS and consists of the following:

1. All publicly-owned land, except for lots or portions of lots determined to be developable public land.
2. All rivers, streams, lakes, ponds and other surface waterbodies.
3. All wetland resource areas, together with a buffer zone around wetlands and waterbodies equivalent to the minimum setback required by title 5 of the state environmental code.
4. Protected open space and recreational land that is legally protected in perpetuity (for example, land owned by a local land trust or subject to a conservation restriction), or that is likely to remain undeveloped due to functional or traditional use (for example, cemeteries).
5. All public rights-of-way and private rights-of-way.
6. Privately-owned land on which development is prohibited to protect private or public water supplies, including, but not limited to, Zone I wellhead protection areas and Zone A surface water supply protection areas.
7. Privately-owned land used for educational or institutional uses such as a hospital, prison, electric, water, wastewater or other utility, museum, or private school, college or university.

“Ferry terminal” means the location where passengers embark and disembark from regular, year-round MBTA ferry service.

“Gross density” means a units-per-acre density measurement that includes land occupied by public rights-of-way and any recreational, civic, commercial, and other nonresidential uses.

“Housing suitable for families” means housing comprised of residential dwelling units that are not age-restricted housing, and for which there are no zoning restriction on the number of bedrooms, the size of bedrooms, or the number of occupants.

“MassGIS data” means the comprehensive, statewide database of geospatial information and mapping functions maintained by the Commonwealth's Bureau of Geographic Information, within the [Executive Office of Technology Services and Security](#), including the lot boundaries and use codes provided by municipalities.

“MBTA” means the Massachusetts Bay Transportation Authority.

“MBTA community” means a city or town that is: (i) one of the 51 cities and towns as defined in section 1 of chapter 161A; (ii) one of the 14 cities and towns as defined in said section 1 of said chapter 161A; (iii) other served communities as defined in said section 1 of said chapter 161A; or (iv) a municipality that has been added to the Massachusetts Bay Transportation Authority under section 6 of chapter 161A or in accordance with any special law relative to the area constituting the authority.

“Multi-family housing” means a building with 3 or more residential dwelling units or 2 or more buildings on the same lot with more than 1 residential dwelling unit in each building.

“Multi-family unit capacity” means an estimate of the total number of multi-family housing units that can be developed as of right within a multi-family zoning district, made in accordance with the requirements of section 5.b below.

“Multi-family zoning district” means a zoning district, including a base district or an overlay district, in which multi-family housing is allowed as of right; provided that the district shall be in a fixed location or locations, and shown on a map that is part of the zoning ordinance or by-law.

“Private rights-of-way” means land area within which private streets, roads and other ways have been laid out and maintained, to the extent such land areas can be reasonably identified by examination of available tax parcel data.

“Publicly-owned land” means (i) any land owned by the United States or a federal agency or authority; (ii) any land owned by the Commonwealth of Massachusetts or a state agency or authority; and (iii) any land owned by a municipality or municipal board or authority.

“Public rights-of-way” means land area within which public streets, roads and other ways have been laid out and maintained, to the extent such land areas can be reasonably identified by examination of available tax parcel data.

“Rapid transit community” means an MBTA community that has within its borders at least 100 acres of developable station area associated with one or more subway stations, or MBTA Silver Line bus rapid transit stations.

“Residential dwelling unit” means a single unit providing complete, independent living facilities for one or more persons, including permanent provisions for living, sleeping, eating, cooking and sanitation.

“Section 3A” means section 3A of the Zoning Act.

“Sensitive land” means developable land that, due to its soils, slope, hydrology, or other physical characteristics, has significant conservation values that could be impaired, or vulnerabilities that could be exacerbated, by the development of multi-family housing. It also includes locations where multi-family housing would be at increased risk of damage caused by flooding. Sensitive land includes, but is not limited to, wetland buffer zones extending beyond the title 5 setback area; land subject to flooding that is not a wetland resource area; priority habitat for rare or threatened species; DEP-approved wellhead protection areas in which development may be restricted, but is not prohibited (Zone II and interim wellhead protection areas); and land areas with prime agricultural soils that are in active agricultural use.

“Site plan review” means a process established by local ordinance or by-law by which a local board reviews, and potentially imposes conditions on, the appearance and layout of a specific project prior to the issuance of a building permit.

“Subway station” means any of the stops along the MBTA Red Line, Green Line, Orange Line, or Blue Line, including any extensions to such lines now under construction and scheduled to begin service before the end of 2023.

“Transit station” means an MBTA subway station, commuter rail station, ferry terminal or bus station.

“Transit station area” means the land area within 0.5 miles of a transit station.

“Zoning Act” means chapter 40A of the Massachusetts General Laws.

## Compliance Model Components and Tabs

The Section 3A Compliance Model (Model) operates using a Microsoft Excel platform and has been designed with automatic formulas that calculate multi-family unit capacity and gross density of zoning districts to compare against the compliance requirements set forth in the Section 3A Compliance Guidelines (Guidelines). The Model contains eleven (11) tabs which are used to collect information from the user, including:

- Municipality name and contact information
- District names and zoning designations
- Special regulations that may impact zoning or district compliance
- Zoning parameters from the bylaw or ordinance
- Parcel information for each district from the Land Map

The quantitative and qualitative information users enter in the Model feed a set of formulas that calculate an estimated build-out of residential units on every parcel in the district(s) being evaluated. The multi-family unit capacity for each parcel is then summed and presented in a Summary Tab where users can see if district(s) are compliant with the requirements in the Guidelines. The tabs in the Model where users are asked to supply data and information are as follows:

- **Tab 1: Introduction** – This tab provides a brief overview of the Model and instructions for completion, a dropdown menu to select the community to be evaluated, and space to provide contact information.
- **Tab 2: Checklist District ID** – This tab asks users for information about existing zoning districts, overlay districts, and any other regulatory districts that overlap with the zoning district the municipality is testing. This is also the tab where users will input the name(s) and acreages associated with each district being evaluated.
- **Tab 3: Checklist Uses** – This tab asks users to answer a series of questions for each district being evaluated to ensure districts are compliant with the Guidelines.
- **Tab 4: Checklist Parameters** – This tab is where the majority of the zoning parameters are captured which are used to calculate unit capacity and district compliance in the Model. This includes parameters like open space, parking, minimum lot size, setbacks, building height, and more.
- **Tab 5: Zoning Input Summary** – This tab provides a summary of the key zoning inputs from the Checklist Parameters tab that are used to calculate unit capacity on a parcel-by-parcel basis in the Model.
- **Tabs 6-10: Districts 1-5** – The five (5) District tabs represent the actual parcel-by-parcel unit capacity calculations in the Model. These tabs are where users will paste parcel information for each district(s) and where the Model then calculates unit capacity based on that parcel information and the zoning parameters from the Checklist Parameters tab.
- **Tab 11: Summary** – The Summary tab provides the user with a district-by-district summary of key metrics such as unit capacity, gross density, land area, and land within transit station areas.

This tab is intended to help users evaluate outcomes for each district and compare them to the requirements in the Guidelines.

More detailed information on each tab and its required inputs are described throughout the remainder of this user guide.



## Compliance Model Process

There are three primary components to the compliance modeling process:

- 1) Land Map and Parcel Exports
- 2) Zoning Information and Checklist (part of the Excel workbook)
- 3) District Modeling and Summary (part of the Excel workbook)

Each component of the modeling process is designed to test zoning districts and regulations for compliance with different facets of the Guidelines. The Land Map component is where users draw the boundaries of each district(s) and export parcels from within the district(s) to test in the Model. The size and location of the district(s) are used to test for compliance with a community's requirements from the Guidelines.

The zoning information and checklist gathers information on the community's existing and/or proposed zoning districts including names, allowed residential uses, any restrictions on residential development/units, and all zoning information for any district being evaluated in the Model. This component of the modeling process is a part of EOHLC's review process for checking the zoning for compliance with the Section 3A and the Guidelines and flagging any zoning regulations or dimensional requirements that could render development of multi-family housing infeasible.

The district modeling component is where the Land Map and zoning come together to derive multi-family unit capacity on a parcel-by-parcel basis. The Model will calculate unit capacity for each district/sub district being evaluated and provide outputs on district unit capacity, unit capacity within transit station areas, and the information required to calculate the overall gross density of the district(s). These components are compared to the community's requirements as set forth in the Guidelines to evaluate compliance. Figure 1 provides a brief visual description of the modeling process and each component part.

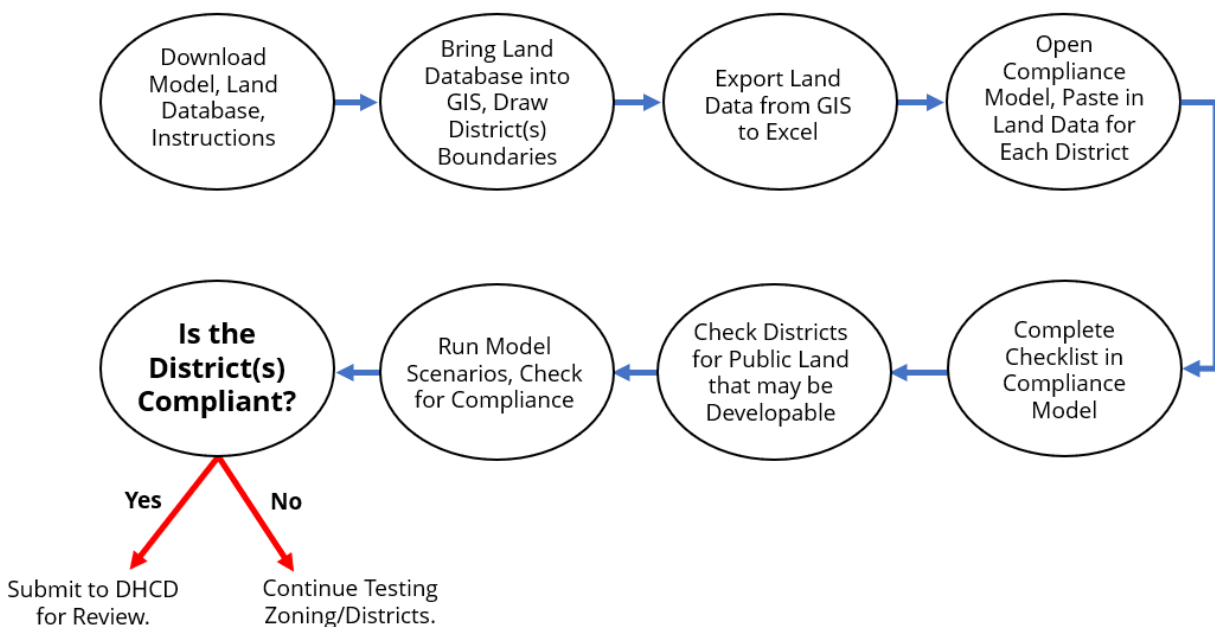


Figure 1 Compliance Model Process Outline

# Land Map Walkthrough

## 1) Access the Land Map

All components of the Land Map are available on the [Compliance Model & Components page](#). The Land Map is built on existing parcel boundaries. To ensure a consistent data set across all MBTA communities, the Land Map builds off of assessors' data as collected and standardized by MassGIS in its [statewide parcel data set](#). This data set includes the most recently submitted data from each municipality in the Commonwealth, but the effective date of the information for each municipality varies based on the last time the community submitted information.

Using this assessor's data for each community, measurements were then made of the intersections between each parcel in the community with excluded and sensitive land to create the Land Map shapefiles. The Land Map Sources and Methods document available for download on the [Compliance Model User Guide & Methodology Documents page](#) provides more information on the preparation of these layers.

There are two versions of the Land Maps available for each MBTA community.

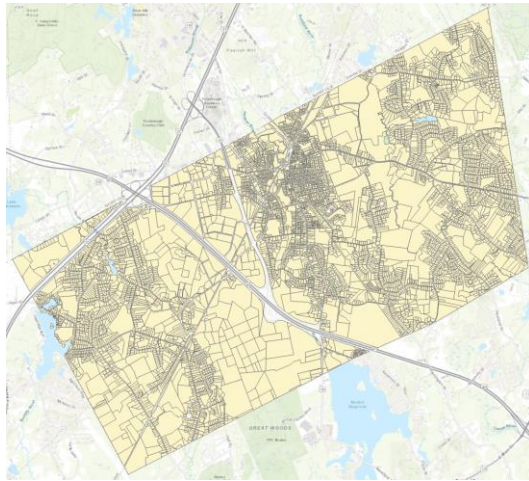
- 1) Basic Land Map records include the exact columns of information needed for inclusion in the Excel workbook of the Model. These basic records are likely the best choice for users ready to evaluate a known district boundary with the Model.
- 2) Detailed Land Map records include additional information on the intersection between each parcel in the community and each excluded and sensitive land category (see the Guidelines for definitions of excluded and sensitive land). These detailed records are likely the best choice for users exploring how various constraints intersect with neighborhoods and potential zoning district locations in the community.

Basic Land Map records are recommended when selecting records for exporting and pasting into the Excel workbook portion of the Model. This will eliminate the need to remove or modify fields when pasting selected records into the Excel workbook.

## 2) Open the necessary Land Map files in GIS software

Municipality-specific shapefile of parcel records with excluded and sensitive land measurements

Download and open the parcel-based shapefile for the relevant municipality. There is a file for each MBTA community. Below is a screen shot example of what the file looks like in GIS software, along with the attributes included in the basic Land Map shapefile.



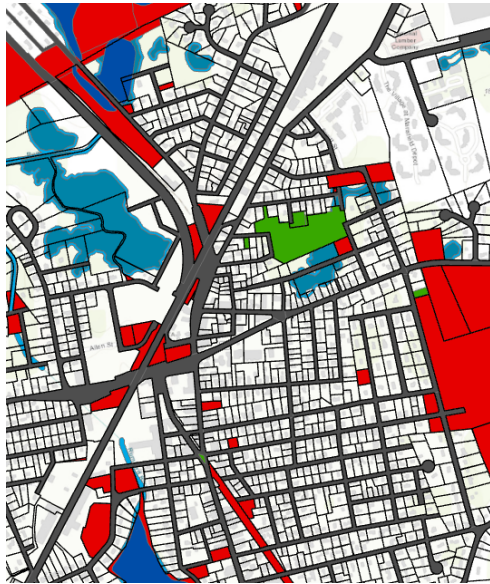
Data is on the lot (LOC\_ID) level. Fields include:

- **OBJECT\_ID** (unique record identifier)
- **LOC\_ID** (unique lot/location identifier)
- **Address** from assessor data
- **Owner Name(s)** from assessor data
- **Current Use Code(s)** from assessor data
- **Current Use Descriptions(s)** from assessor data
- **Station Area** will flag if the parcel is within half a mile of a transit station
- **Total lot area** (acres)
- **Total lot area** (sq ft)
- **Public and institutional land on parcel** (sq ft)
- **Non-public and non-institutional land on parcel** (sq ft)
- **Total excluded land area on parcel** (sq ft)
- **Sensitive land area on parcel** (sq ft)

*Figure 2 Mansfield, MA parcel-based shapefile example*

### Individual layers showing locations of excluded and sensitive land

As detailed in the [Section 3A Guidelines](#), there are several geographic areas – designated as “Excluded Land” – that are not eligible to be modeled for unit capacity in the Model. There are also areas denoted as “sensitive land.” Although areas comprised of sensitive land can be modeled for unit capacity, this information is included so that communities can consider district location relative to these areas that might have implications in terms of the environment, climate, or public health. While the parcel-based layers already have the necessary calculated overlap with excluded and sensitive land, these layers may be helpful for reference when reviewing the district and underlying parcels in GIS software. For detailed information on the sources and methods used to develop the excluded and sensitive land layers, please refer to the [Compliance Model User Guide & Methodology Documents](#) page.



*Figure 3 Map section showing excluded and sensitive land*

#### **Excluded land includes:**

- Hydrological features
- Protected/restricted open space
- Wellhead Protection Areas (Zone I only)
- Title 5 setbacks and Surface Water Protection Zone A
- Rights of way
- Most public land, except certain types

#### **Sensitive land includes:**

- Wellhead Protection Areas (Zone II and Interim Wellhead Protection Areas)
- Special Flood Hazard Areas (A or V flood zones)
- Active Farmland
- Priority Habitats of Rare Species
- Surface Water Protection Zones B & C

### Aggregated excluded and sensitive land layers

There are several important calculations that rely not just on individual excluded and sensitive layers, but on the aggregate amount of land that is excluded or sensitive land. The following additional shapefiles are available, and several are necessary for calculating key compliance metrics, such as the total district land area and the denominator for the gross density calculation. The methods needed to perform these calculations are covered in Section 4 of this document.

#### *Calculation-related layers:*

- **Transit Station Areas (Half Mile Radius)** – Shapefile consisting of polygons representing a half-mile radius from each MBTA transit station, as described in the Guidelines. This layer should be used to calculate the amount of a district’s land area that falls within transit station areas.
- **Density Denominator Deductions** – Shapefile that merges and dissolves all excluded land types that can be deducted from the total district land area to arrive at the denominator for the gross density calculation.

#### *Other composite reference layers*

- **Total Excluded Land** – Shapefile that merges and dissolves all excluded land types into one file.
- **Non-Public and Non-Institutional Excluded Land** – Shapefile that merges and dissolves all excluded land types except for public and institutional land into one file. This file is also used to calculate remaining excluded land when a waiver is processed for a parcel comprised of public or institutional land.
- **Total Sensitive Land** – Shapefile that merges and dissolves all sensitive land types into one file.

### What if there is an error or something looks incorrect?

The Land Map and all components were constructed using publicly available data sets. These data sets have differing accuracy, resolution, and vintage. The user may notice slight inaccuracies or records that need updating. While few of these errors should exist within most districts, there is an opportunity to discuss discrepancies and necessary corrections with EOHLC. Contact [DHCD3A@mass.gov](mailto:DHCD3A@mass.gov) with questions or requests.

### 3) Import or draw a district boundary

Once the land records and calculation layers are loaded, the next step is to add a map of the district to GIS. If a shapefile of the district is available, import it. Otherwise, create a feature class and draw the district. District boundaries must adhere to a consistent convention (for example, aligning boundaries with either road centerlines or parcel boundaries). The district boundary should be its own shapefile. A shapefile of the district is a mandatory component of a District Compliance application to EOHLC.

Next, review the district boundaries relative to underlying Land Map records (lots/parcels). The district should not cut across parcel boundaries. For the Model to work properly, whole existing parcels should be used. There are some circumstances where a partial parcel record may be appropriate, but these will be handled on a case-by-case basis, must be documented, and will be reviewed by EOHLC upon submission. The district used to comply with Section 3A might be a portion of an existing zoning district, or a combination of multiple zoning districts, as long as the district and its various components meet the reasonable size, contiguity, and location requirements that will be discussed later in this guide and are described in detail in the Guidelines.

If the district splits parcels, then modify the district boundaries. This operation may require intermediate GIS skills. If the district under evaluation is an existing district, consider modifying the district's boundaries to remove split parcels if other modifications to the zoning regulations are required. If the district under evaluation is a proposed district, then split parcels are not allowed.

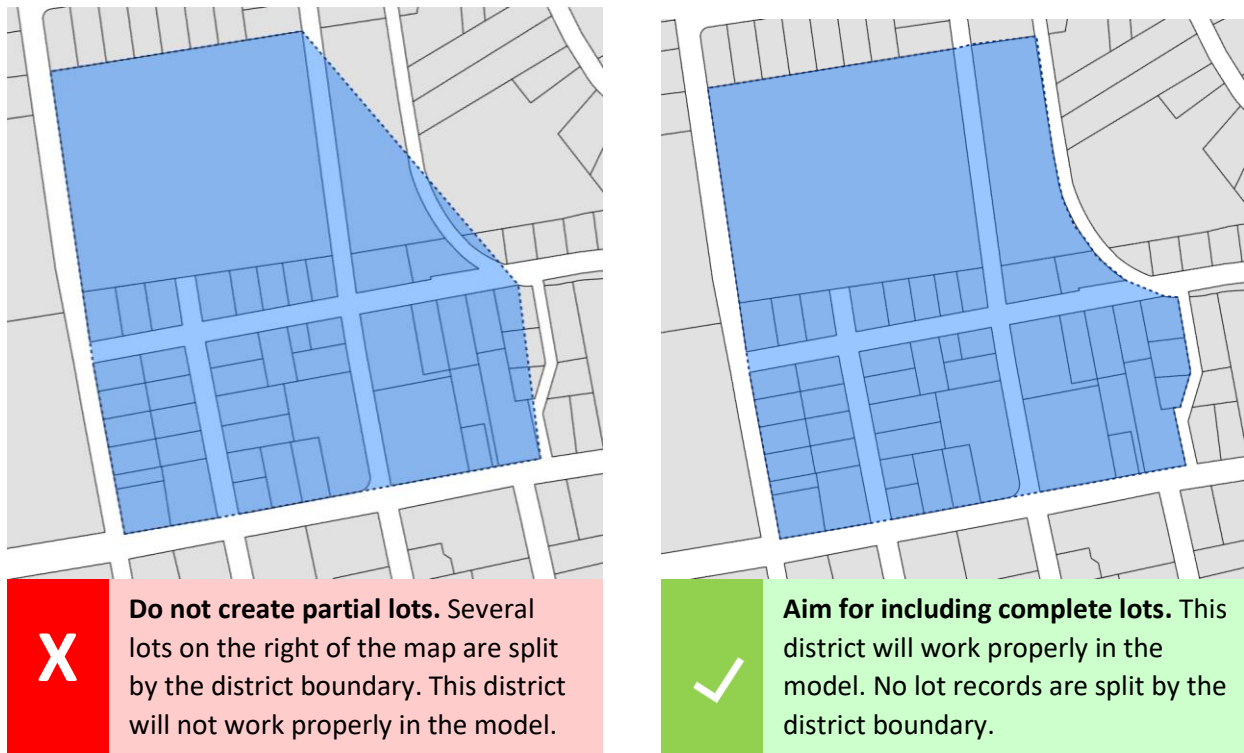
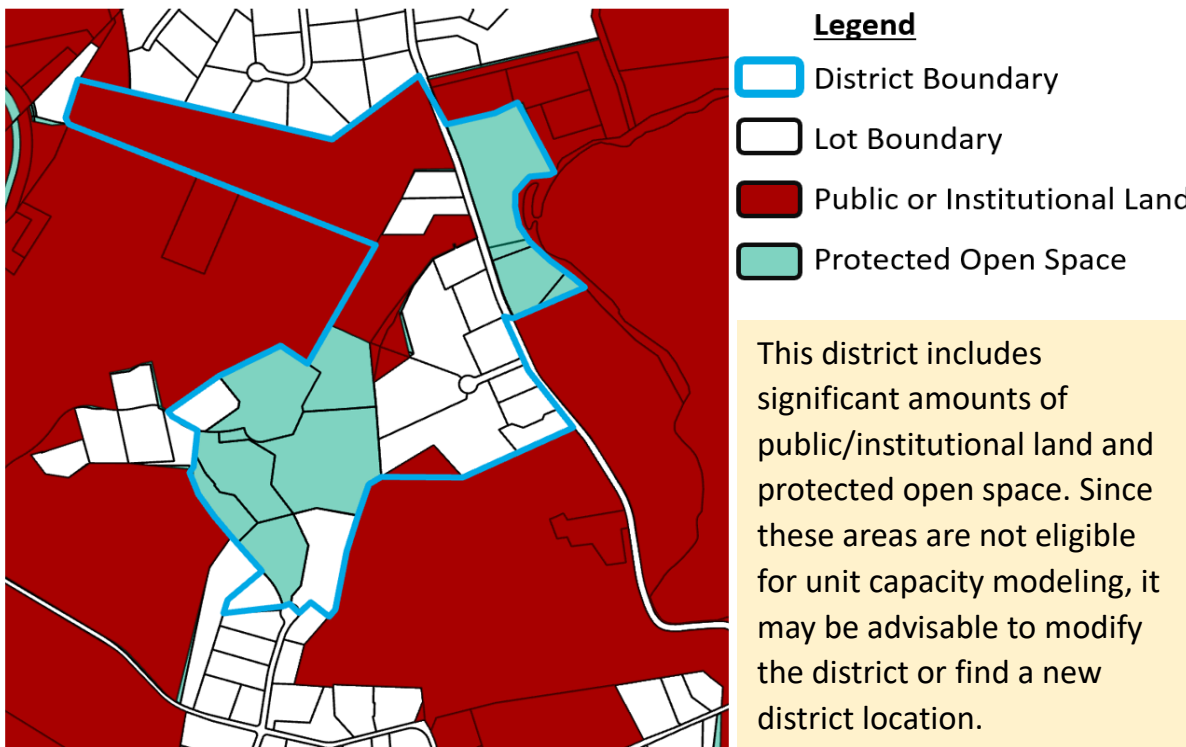


Figure 4 Include only complete parcels in the district

Once the relationship of the district boundaries to the underlying parcel records is set, visually review any excluded and sensitive land types that interact with the district. If the available excluded and sensitive land layers are not already loaded into the mapping environment, the user can download them from the [Compliance Model & Components page](#). Once loaded, review any large overlaps between these layers and the district.

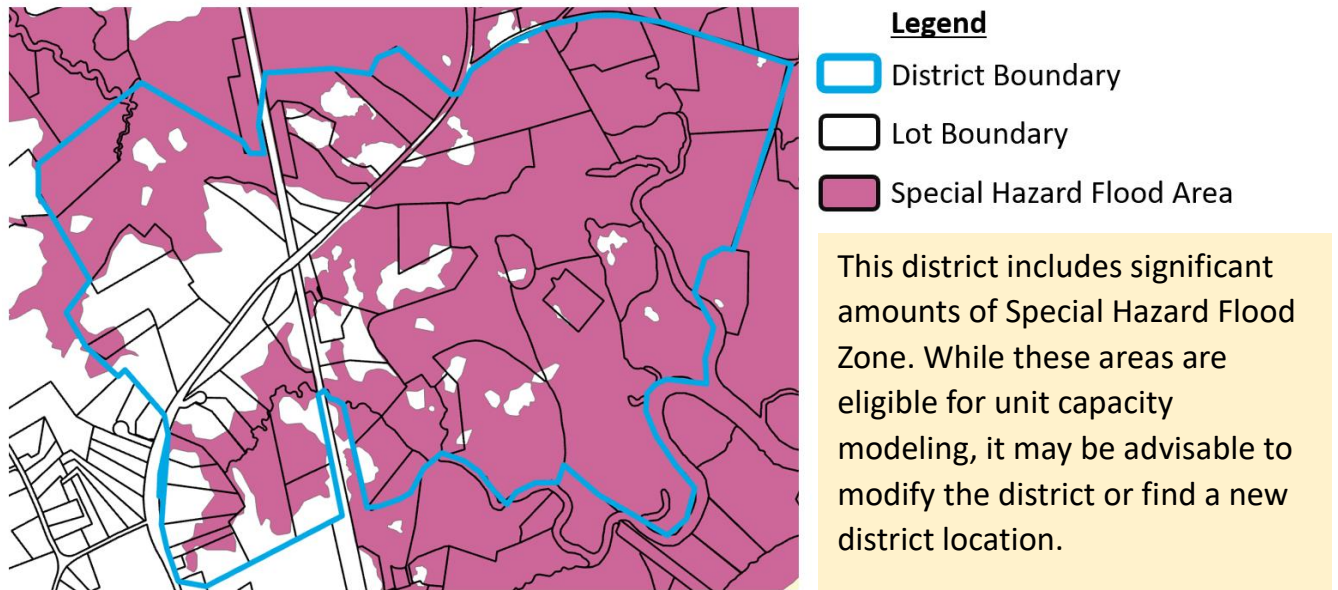
Since excluded land is not eligible to be modeled for unit capacity, large amounts of excluded land areas within the district boundary are a signal that a community may want to consider modifying or relocating the district. The below example shows a district that has a large amount of public and institutional land and restricted open space. Since these areas are not eligible for modeling unit capacity, it might be advisable to modify the district boundaries to avoid these areas.



*Figure 5 Example of an area with a lot of excluded land*



It is also advisable to review any sensitive land areas that fall within the district boundaries. Although the presence of sensitive land does not prohibit a parcel from being modeled for unit capacity, these areas may represent factors important to environmental conditions and public health outcomes. Depending on the type and quantity of sensitive land in the district, the community should consider modifying district boundaries to avoid these areas or choosing a more suitable location for the district. In the below example, much of the district is in a Special Hazard Flood Zone. Concerns around long term climate resilience might lead a community to avoid siting their multi-family zoning district in these locations.



*Figure 6 Example of a district with a lot of Special Hazard Flood Area*

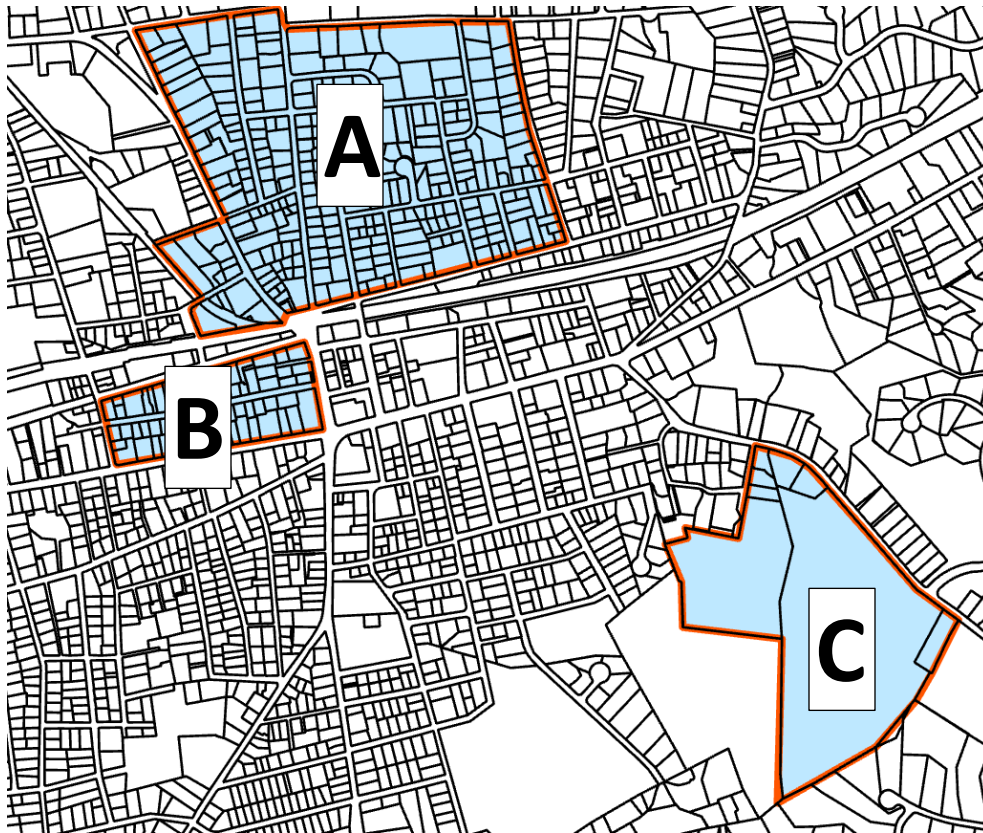


#### 4) Make district size measurements

The next step in the process is to make some important calculations related to district compliance. These calculations involve geospatial analysis and will likely need to be completed by someone with intermediate GIS skills. The instructions below provide an example of how these calculations might be made in ESRI mapping software (specifically ArcGIS Pro). Methods may differ by software version and alternative methods may be needed for those working in other mapping software such as QGIS and others.

The results of the below calculations should be stored in the district shapefile as attributes. This will ensure these calculations are available for inclusion in the Excel workbook and will also ensure that EOHLC has ready access to this information within the shapefile submitted as part of a district compliance application.

This guide will use the below hypothetical district to walk through the steps that might be used to make the calculations. This hypothetical district includes three distinct, non-contiguous areas. Some districts may only include one contiguous area. The district may also include multiple districts or sub districts that have different zoning parameters. In these cases, it is advisable to make a separate shapefile for each zoning district to ensure underlying parcels are assigned to the correct zoning district in the Excel workbook (the transfer of data from the Land Map to the Excel workbook will be covered later in this document).



*Figure 7 Example District Boundaries*

Calculate land area in acres of each non-contiguous portion of the district

Related compliance requirements:

- Non-contiguous parts of the district must be at least 5 acres (unless the required unit capacity can be achieved in less than five acres).
- At least half the district's total land area must be contiguous.

For each non-contiguous area of the district, if there are any, the land area must be measured.

OBJECTID *	Shape *	District Section
7	Polygon	A
5	Polygon	B
6	Polygon	C

Here is the initial attribute table for the hypothetical district. It includes a record for each portion of the district corresponding with the map at the start of the section. The attribute table for another community might include other fields depending on how it was created. It is important that each non-

contiguous area has a distinct record in the attribute table for the below calculations to be executed properly.

To store the acreage for each of the non-contiguous district areas, a new field should be created. In ArcGIS, this can be completed by running the “Calculate Geometry Attributes” tool or by right-clicking

on the attribute table header row and choosing “Calculate Geometry.” The adjacent screen shot shows how to fill out this form to generate shape areas in acres. The chosen coordinate system should match that of the mapping environment. The recommended projection is NAD\_1983 State Plane Massachusetts, as this is the projected coordinate system used to develop the geospatial resources in the Model. If a different coordinate system is chosen, ensure the geometry calculations are based on that same projection.

Figure 8 Calculate Geometry suggestion

OBJECTID *	Shape *	District Section	Acres
7	Polygon	A	85.480842
5	Polygon	B	14.515036
6	Polygon	C	43.386002

The above operation will result in a new field that captures the area in acres of each portion of the district. Use these calculations to confirm two Section 3A compliance criteria related to land area and contiguity.

Figure 9 Example output from Calculate Geometry

First is the requirement that each non-contiguous area of the district must be at least five acres. The attribute table indicates that the smallest area of the hypothetical district is approximately 14.5 acres. The district satisfies this criterion.

Second is the requirement that at least half the district land area is contiguous. The sample has three districts; calculate compliance with this requirement by dividing the size of the largest non-contiguous portion of the district by the sum of all district areas. In the example, 59.6 percent of the district is contiguous based on the below formula.

$$\% \text{ of district that is contiguous} = \frac{\text{land area of largest non- contiguous district portion}}{\text{total area of all district portions}}$$

Calculation for

Example District

$$59.6\% = \frac{85.48 \text{ acres}}{85.48 \text{ acres} + 14.52 \text{ acres} + 43.39 \text{ acres}}$$

For multiple districts — not just multiple noncontiguous geographies of the same district, but multiple districts or sub districts with different zoning parameters —additional interim calculations may be required to ensure accurate measurements. For example, two different zoning districts which are contiguous, may require combining numbers to derive the numerator. Additionally, the denominator must capture the sum of the areas of all portions of all districts being used for compliance with Section 3A. The below variation of the example district might be instructive for more complex cases.

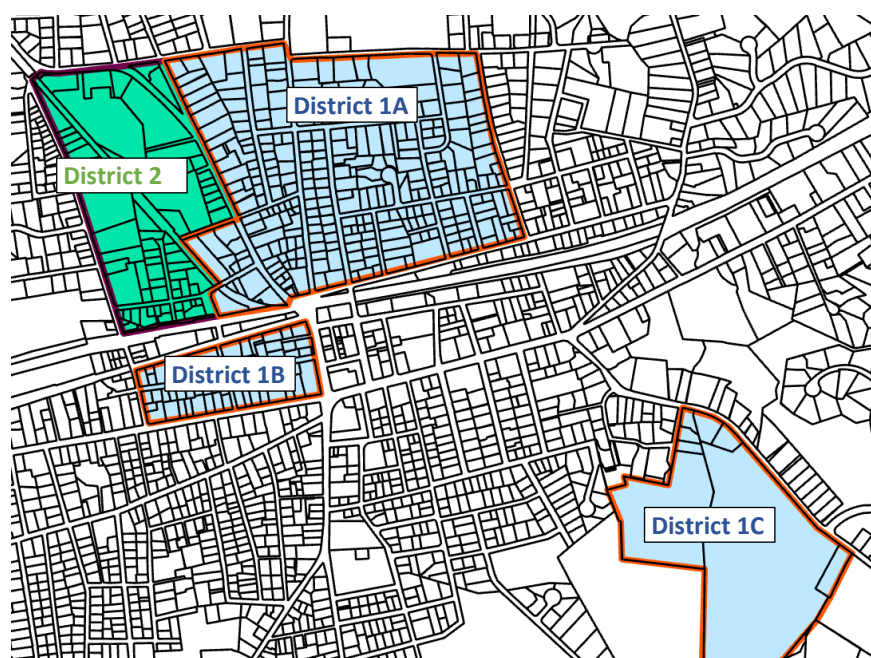


Figure 10 Multiple district example

In this example, imagine that there are two distinct zoning districts with different zoning parameters that comprise the areas being used for Section 3A compliance, District 1 and District 2. District 1 has the three original non-contiguous areas (A, B and C) and District 2 has a single area that abuts District 1A. Although District 1A and District 2 have different zoning parameters, they *can* be considered contiguous for purposes of this calculation.

To calculate the percentage of the district that is contiguous in this case, the numerator

would be the combined total of the land area of District 1A and District 2. The denominator would be the combined total land area of all four district components.

#### Calculate total district land area

Related compliance requirements:

- Minimum land area (requirements are community-specific)

The total district land area is the sum of the land areas of each portion within the district. This measurement should include any areas marked as excluded land. While excluded land is not modeled for unit capacity, it does contribute toward satisfying the minimum land area requirement.

In the initial example (single district with three non-contiguous areas), the total district area is 143.39 acres, based on the below formula.

$$\text{Total district area} = \text{District portion 1 area} + \text{District portion 2 area} + \dots + \text{District portion } n \text{ area}$$

Calculation for  
Example District

$$143.39 \text{ acres} = 85.48 \text{ acres} + 14.52 \text{ acres} + 43.39 \text{ acres}$$



## Calculate the percentage of district land area within half a mile of a transit station

### Related compliance requirements:

- Percentage of land area within transit station areas (requirements are community-specific). Only MBTA communities in the Rapid Transit and Commuter Rail community categories have this requirement. This calculation is not required for Adjacent Communities and Adjacent Small Towns.

To calculate the amount of the district land area that falls within a transit station area, download the Transit Station Areas – Half Mile Radius shapefile available from the [Compliance Model & Components page](#) (found under “Reference and calculation layers”) and add the layer to the mapping document. This data layer consists of polygons representing a circle with a half mile radius around each MBTA transit station used for determining requirements under Section 3A. There is also a layer of transit station center points available for download if that reference information is helpful.

The below screenshot shows where the example district is located relative to the transit station area. While most of the district appears to be within the circle, a portion lies outside of it. To ensure this district meets the location requirements set for the MBTA community — pretend that requirement is 40 percent for instructional purposes and that the required minimum land area is 50 acres — measure how much of the district’s land area falls within the transit station area and divide that number by the appropriate percentage of the MBTA community’s minimum land area requirement.

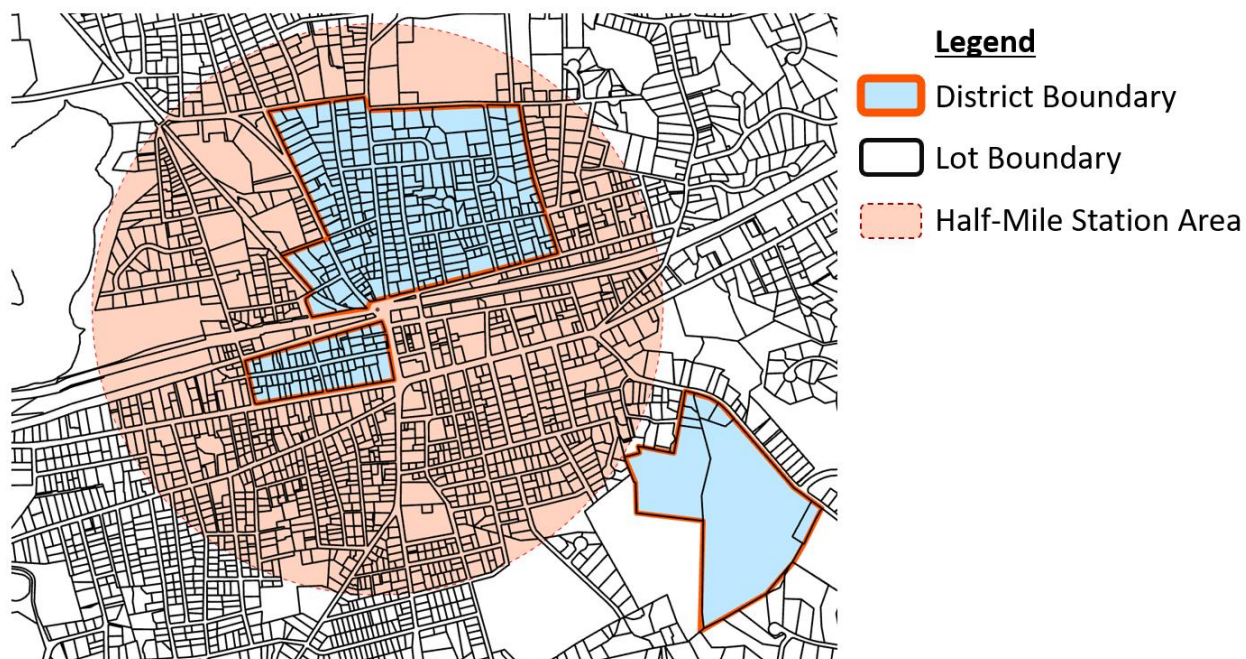


Figure 11 Example district with station area

There are several ways to make the calculation of the intersection between the district and the transit station area. The below method is just one example of how this can be achieved using ArcGIS Pro's

**Summarize Within**

**Parameters** Environments

Input Polygons  
Example District

Input Summary Features  
TransitStations\_HalfMileBuffer

Output Feature Class  
ExampleDistrict\_withLandAreaInStationArea

☒ Keep all input polygons

Summary Fields  
Field  Statistic

☒ Add shape summary attributes

Shape Unit  
Acres

Group Field

"Summarize Within" tool. "Summarize Within" takes a measurement of the overlap between two input polygons and stores the land area of that overlap in the input layer's attribute table. This can be done successfully by filling out the "Summarize Within" form using the adjacent example.

This will generate a new shapefile of the district that includes two new attributes. First is a total in acres of the land area of each district portion that falls within the transit station area. Second is a count of how many polygons fall within the transit station area, which is not a necessary field and can be deleted or disregarded. Rename the new area field with something that will indicate what this measurement is. In the attribute table pictured below, this field is "StationArea."

Figure 12 Summarize Within suggestion for station area calculation

OBJECTID *	Shape *	District Section	Acres	Station Area	Count of Polygons
3	Polygon	A	85.480842	85.486703	1
1	Polygon	B	14.515036	14.516034	1
2	Polygon	C	43.386002	0	0

Figure 13 Example output from Summarize Within operation

--	--

## Denominator for Gross Density Calculation

### Related compliance requirements:

The district must achieve a gross density of 15 units per acre or greater. A land area denominator will be entered into the Excel portion of the Model and will be used in the calculation of gross density. The district's total land area might include hydrology, wetlands, Title 5 setbacks, Surface Water Protection Zone A areas, or Wellhead Protection Zone I areas.

Based on the rules set forth in the Guidelines and the definition of gross density in M.G.L. Chapter 40A, the denominator used for the calculation of gross density differs somewhat from the total land area for the district. Hydrology, wetlands, Title 5 setbacks, Surface Water Protection Zone A areas, and Wellhead Protection Zone 1 areas must all be deducted from the total land area to arrive at the gross density denominator.. Without the ability to deduct certain excluded land areas from the gross density denominator, an incentive might exist to avoid or draw around these areas when drawing a district. Depending on the location of excluded land, this could result in districts with holes or highly irregular boundaries.

However, some types of excluded land are required to be included in the gross density denominator based on the definition of Gross Density in M.G.L. c. 40A. This means that public rights of way, public and institutional land, and restricted open space and recreational lands need to stay in the denominator.

Since these rules are somewhat granular and impact various excluded land types differently, a composite shapefile of the density denominator deductions has been created to help facilitate this calculation. This "Density Denominator Deductions" shapefile is available from the [Compliance Model & Components page](#) (found under "Reference and calculation layers") and simplifies the measurement of this important model parameter. Download this file and add it to the mapping document.

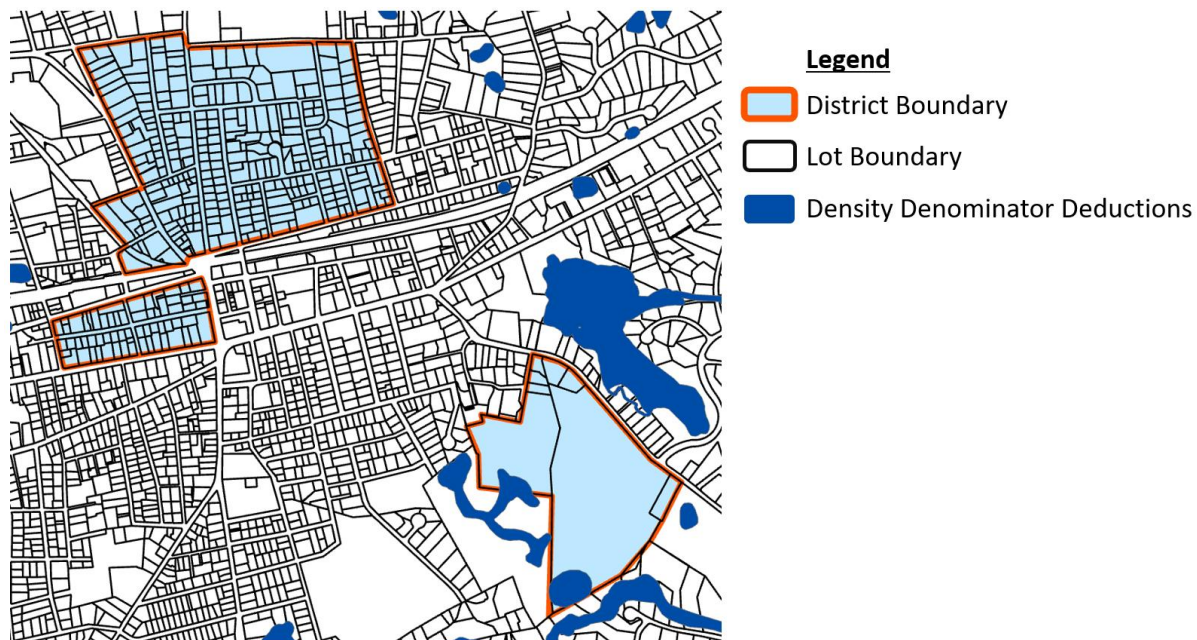


Figure 14 Example district with density denominator deduction areas



While the example does not have many density denominator deductions falling within its boundaries, there are some overlaps in the southeast corner of the map. To measure the intersection between the district and the density denominator deductions, follow a “Summarize Within” process, analogous to the earlier walkthrough of the transit station area overlap.

Figure 15 Summarize Within suggestion for density denominator deduction calculation

For the input polygons, use the output from that step as the input to this step. This will ensure that the transit station area calculations and these new calculations relative to the density denominator calculations are stored in the attribute table of the same shapefile.

The calculation of the overlap between the district and the areas that must be deducted from the gross density denominator can be calculated by filling out the “Summarize Within” form using the adjacent example.

This will generate a new shapefile of the district that includes two new attributes. First is a total in acres of the land area of each district portion that intersects with the Density Denominator Deductions layer.

OBJECTID *	Shape *	District Section	Acres	Station Area	DensityDenomDeduct	Count of Polygons
1	Polygon	B	14.515036	14.516034	0	<Null>
2	Polygon	C	43.386002	0	2.76964	2
3	Polygon	A	85.480842	85.486703	0	<Null>

Figure 16 Example output from Summarize Within function (2)

Second is a count of how many polygons have these intersections, which is not a necessary field and can be deleted or disregarded. Rename the new area field with something that will indicate what this measurement is in the attribute table. In the example district attribute table pictured below, this field has been renamed “DensityDenomDeduct.”

To calculate the gross density denominator, simply subtract the sum of the new density denominator deductions from the total district land area. For the example district, the density denominator is 140.62 acres based on the following formula.

$$\text{Gross density denominator} = \text{Total district area} - \text{Total density denominator deductions}$$

Calculation for  
Example District

$$140.62 \text{ acres} = 143.39 \text{ acres} - 2.77 \text{ acres}$$

## 5) Select Land Map records for the district

Once the necessary compliance-related calculations are completed and the results are stored, then export the community-specific Land Map records for inclusion in the Excel workbook. Please read the district boundaries section of this chapter first (section 3) to ensure the district is well-aligned with the underlying Land Map records.

When selecting Land Map records for export, selection mode matters. GIS software offers several options for selecting records by location, including selecting records that fall “within” or “have their centers located within” another layer. If district boundaries do not perfectly match up with parcel boundaries, selecting records that are “within” and some other selection methods may not grab everything required. Because slight deviations between the district boundary and the underlying Land Map records is difficult to avoid, and if there are no partial parcels within the district, the user may choose to select all parcels with centroids or center points within the district boundary. The example below shows how this can be executed in ArcGIS Pro using the layers produced in the example district.

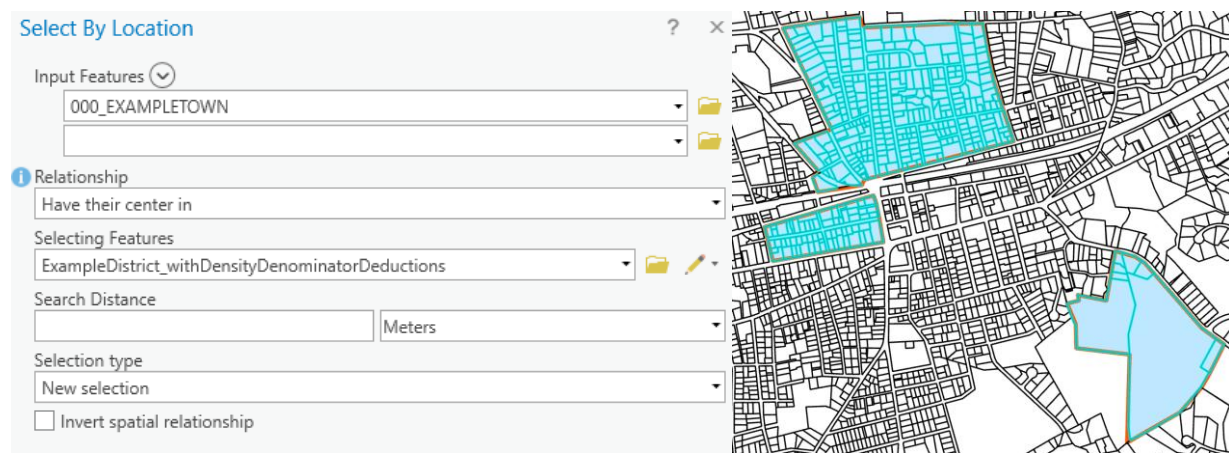


Figure 17 Example of Selecting Land Map records

## 6) Export selected Land Map records

Select the Land Map records that fall within the district boundaries, and use “Table to Excel” in ArcGIS Pro, or a similar feature in QGIS or other mapping software. As mentioned earlier in this document, use the “basic” municipality-specific Land Map files for this mapping exercise since the fields included in that version of the data set are identical to the fields where this data will be pasted into the Excel workbook. If testing multiple districts or subdistricts, execute multiple selections/exports, one for each set of district parcels/zoning parameters.

## 7) Save/Export the district shapefile(s)

District shapefiles are a part of EOHLC’s application for district compliance. Therefore, the user should save or export the district shapefile(s) to access later. The compliance-related calculations are stored within this shapefile, and this information is required for Table 4 in the Checklist Tabs of the Excel document.

## 8) Import Land Map records into the Excel Workbook

Open the file containing the Land Map records exported from the GIS software. Also open the Excel workbook, which can be downloaded from the [Compliance Model & Components page](#).

For each individual district or subdistrict, copy records and paste directly into the tabs labeled as “District” tabs. For example, records from the first district to be evaluated should be copied and pasted into the District 1 tab in the Excel workbook. There is a slight difference in naming conventions between the exported Land Map records and the paste area of the District tabs of the Excel workbook. This is because variable names are limited to a short number of characters in a shapefile. Despite these slight variations, the fields from the “basic” municipality-specific Land Map file will match up identically with the fields in the Excel workbook. Exported records from the “Detailed” municipality-specific Land Map can still be pasted into the Excel workbook, but users should be careful to only select the columns that correspond with the fields in the Excel workbook.

For multiple districts (districts with different zoning parameters), make sure to paste the correct records in each “District” tab in the Excel workbook and ensure the Land Map records are in the district tab that corresponds with the correct zoning parameters from the Zoning Checklist (covered in the next section).

## Checklist Tabs User Guide

The next step is to download the Model and open it in Excel. The five tabs of the Checklist are part of a process with the following goals:

- Identify the zoning districts to evaluate.
- Determine whether there are any immediate barriers to permitting multi-family housing as of right.
- Check the compliance of the district with certain requirements of Section 3A and the Guidelines.
- Pull the relevant requirements from the zoning districts to feed into the district modeling tabs.
- Understand which inputs feed into the Model.

**Remember: the checklist can both evaluate existing zoning district(s) and test options for modifications of new districts.** The three components (Land Map and Parcel Exports, Zoning Information and Checklist, and District Modeling and Summary) become powerful tools for scenario evaluation allowing communities to experiment with testing district boundaries and zoning parameters to meet the housing needs of a community while demonstrating compliance with Section 3A and the Guidelines.

***Please Note: The checklist will only allow users to input information in specific locations. The rest of the tabs have been locked to protect the integrity of formulas and references throughout the Excel workbook.***

### Tab 1: Introduction

On this page, use the dropdown menu to identify the community being evaluated. The information that fills the boxes below the community's name are the compliance-related requirements for the community set forth in Appendix 1 of the Guidelines. These numbers flow onto the other tabs in this workbook.

Below those boxes, enter the contact information of the community representative so EOHLC can reach out to discuss results of the Model.

The three text boxes on this page provide information about the tabs in the Excel workbook and where to find additional assistance, if needed.

### Guides within the Document

Guides and prompts provide information throughout the document.

### Text Boxes

- Text boxes that begin with INFO identify the information needed or required and, in some cases, why that information is necessary.
- Text boxes that begin with STOP, CAUTION, or GO provide guidance about the answers provided and additional steps to consider. STOP means that an answer provided indicates that the zoning may not comply with the requirements. However, the noncompliant answer may be easy to fix; it is therefore worth continuing with the analysis to see what other components of the zoning may or may not comply.

### Shaded Cells in Tables

- As the user enters information, the shade of a cell may change. The new shades may indicate either potential problems (shaded boxes with white text) or that everything is fine (shaded boxes with black text).

### Tab 2: Checklist District ID

The top of the page automatically picks up information about the community from the Introduction tab.

The Checklist District ID tab has four tables for the user to complete.

#### Table 1. Existing Zoning Districts

This table identifies all the zoning districts within transit station areas, based on type of service. This is just a list – the community may not be analyzing all of these. Enter the zoning districts for all transit station types within the community. This will assist with determining the appropriate districts to test. For example, a community may have more than one transit center type and wish to create districts or subdistricts suitable for each type of transit station. Knowing what already exists around each transit station type helps to identify the appropriate zoning districts to evaluate.

Table 1. Existing Zoning Districts		
Does your municipality have one or more zoning districts within a 0.5-mile radius of a...		
Transit Center Type	Y/N	If yes, list name of district(s)
Commuter rail station?		
Subway station?		
Ferry terminal?		
Bus station?		
Not applicable - my community is an Adjacent Community or Adjacent Small Town and no part of our community is within a 0.5-mile radius of an existing transit center type in another community.		

Figure 18 Table 1: Existing Zoning Districts

**NOTE: Remember, if it does not exist in the zoning, do not fill in the box.**

Table 2. Existing Overlay Districts

This table asks for a list of the overlay districts within transit station areas, based on type of service.

Table 2. Existing Overlay Districts		
Does your municipality have one or more overlay districts applicable to the 0.5-mile radius from a...		
Transit Center	Y/N	If yes, list name of district(s)
Commuter rail station?		
Subway station?		
Ferry terminal?		
Bus station?		
Not applicable - my community is an Adjacent Community or Adjacent Small Town and no part of our community is within a 0.5-mile radius of an existing transit center type in another community.		

Figure 19 Table 2: Existing Overlay Districts

Table 3. Other Overlay Districts that Control Development

Districts in this table are not limited to zoning overlays (for example, Designated Port Areas). The key to this table is identifying overlay districts or other regulatory structures that might restrict the development of multi-family housing not captured by the zoning districts already identified above.

Table 3. Other Overlay Districts that Control Development		
Do any of the following district types apply to the zoning districts listed above?		
District Type	Y/N	If yes, identify restrictions on building footprints, building height, or number of dwelling units allowed.
Wetlands Overlay District		
Floodplain Overlay District		
Water Conservation/Wellhead Protection Area		
Designated Port Area		
Other		
<i>List district name in the second column, along with any restrictions.</i>		
Does your municipality allow restricted areas (for example, no-build wetland buffers or surface water) to be included in the required minimum open space?		
<i>If your municipality does not have a minimum open space requirement, please enter N.</i>		

Figure 20 Table 3. Other Overlay Districts that Control Development

Table 4. Acreage Calculations

In Table 4, begin to narrow the analysis. Pull the GIS information for Table 4, noted above in the discussion of the Land Map. Please review the Land Map overview section of this document for instructions on how to properly calculate district land area, district land area within transit station areas, and the density denominator.

- Step 1. List up to five zoning districts to evaluate in this workbook. For communities testing more than five districts, or multiple subdistricts, open a new workbook.
- Step 2. Using the district size and location information from the calculations in GIS, enter the number of acres for each district, the number of acres within transit station areas, and the density denominator.
- Step 3. Excel checks the data against the requirements from the Introduction tab. For this table, Y is good, and N indicates a potential problem.

Table 4. Acreage Calculations

Table 4 should include only the zoning district(s) you are testing for compliance with the guidelines. Use the shapefiles you drew for your district (from GIS) to calculate the number of acres in each district, and enter the name of the district and the associated data for that district in the table below. The numbers should come from GIS.

**CAUTION:** If your zoning district(s) have subdistricts with different dimensional requirements for residential uses, you may want to create a district for each subdistrict in this table. If you have more than five districts/subdistricts to test, then open a new workbook.

	Name of Zoning District	Number of Acres	Acres within Station Area	Density Denominator	= or > Required Minimum Land Area? (Y/N)	= or > 5 Acres? (Y/N)
1					Y	N
2					Y	N
3					Y	N
4					Y	N
5					Y	N
TOTAL		0	0	0	N	N

**CAUTION:** Contiguity check: At least half of the multi-family zoning district land areas must comprise contiguous lots of land. No portion of the district that is less than 5 contiguous acres land will count toward the minimum size requirement.

Figure 21 Table 4. Acreage Calculations

Table 4 has a second component that uses the input to make additional calculations.

First identify whether there are non-contiguous areas among the districts chosen. The information in the Land Map overview, above, discusses why this is important and whether the district meets contiguity requirements.

**CAUTION:** Contiguity check: At least half of the multi-family zoning district land areas must comprise contiguous lots of land. No portion of the district that is less than 5 contiguous acres land will count toward the minimum size requirement.

Are any of these districts non-contiguous (i.e. the boundaries do not touch any other district)? Enter Y or N.

Figure 22 Table 4. Contiguity Check

Second, Excel will calculate whether the district(s) have enough land area within transit station areas to meet the district location requirements for the community.

**CAUTION:** Station Area Check. If the current zoning district(s) do not meet the location or area criteria, you may be able to create an overlay district that includes other areas of your municipality. However, pay attention to the percentage of land within station area. This is applied to both the number of acres and the number of units. This checklist has completed the calculations for you. When you complete the model, compare the number of units in the station area with the number above.

Minimum Land Area x Percent of Land within the Station Area =

Total Acres within station area

Difference (if this is positive, then you do not have enough acres within the station area to comply.)

0

=Required minimum number of acres in the station area.

Figure 23 Table 4. Station Area Check 1

And finally, Excel will identify the minimum number of multi-family dwelling units the community will need to zone for within transit station areas. Compare this number to calculations on the Summary page).

Minimum Multifamily Unit Capacity x Percent of Land within the Station Area =		=Required minimum number of units in the station area.
---	--	--

*Figure 24 Table 4. Station Area Check 2*

Keep evaluating the districts by moving on to Tab 3: Checklist Uses.



### Tab 3: Checklist Uses

There are only two tables on this tab. The first asks about the permitting process and the second asks about potential restrictions on multi-family housing development. Use drop-down menus to choose the appropriate response. If a question is not applicable to the zoning, please leave the box blank.

The names of the zoning districts will automatically flow through to these two tables.

### Table 5. Multi-family Housing Permissions

This table collects information about the approval process. Multi-family housing must be allowed as of right, although a site plan approval process is permissible if it is consistent with the standards described in the Guidelines. Choose the option that matches the approval process for each district from the drop-down menu.

Choices with black text (GO) indicate that the answer complies with the requirements. White text indicates either a potential problem (CAUTION) or failure to comply (STOP).

Table 5. Multifamily Housing Permissions	
Evaluate the districts you identified in Table 4 in the District ID Tab for compliance with the requirement for multifamily as of right in M.G.L. Chapter 40A, Section 3A. Make the appropriate choice for each district under Approval Process below.	
District Name	Approval Process
1 0	
2 0	
3 0	
4 0	
5 0	

INFO: This table tests whether multifamily is allowed as of right or with restrictions related to the permitting process.

Table 6 tests whether the zoning contains additional restrictions that may have a negative impact on compliance.

Figure 25 Table 5. Multi-family Housing Permissions

Table 6. Multi-family Housing Conditions

Remember, the multi-family housing must be allowed as of right, and the zoning may not require age-restrictions, or contain restricts that limit development to units that are not suitable for families with children. There are more subtle restrictions that may limit multi-family housing, and Table 6 captures these restrictions.

Each column requires a Y/N response from a drop-down menu. There are 10 question columns in all – users with a smaller screen may need to scroll right or left.

Table 6 asks the following questions about the zoning for the district(s) being evaluated:

- Restricted by Age
- Limitations on the size of unit
- Restricted to Studio, 1-bedroom, or 2-bedroom units
- Limitation on the size of bedrooms
- Restrictions on the number of occupants
- Required commercial ("active") ground floor
- Required mixed use (any floor)
- Inclusionary Zoning in the District?
- Inclusionary Zoning Town or City-wide?
- Is this a 40R District?

Answering “Y” to certain conditions may mean that the district is non-compliant; for others, a “Y” answer may indicate the need to have additional discussions with EOHLC about the zoning.

Evaluate the districts you identified in Table 5 for additional restrictions.									
HFD: These restrictions will not change the compliance model, but may restrict your municipality's ability to comply with M.G.L. Chapter 40A, Section 3A and the associated regulations from DHCD. The district names will continue to flow through from the District ID tab.									
District Name	Restricted by Age (Y/N)	Limitations on the size of unit (Y/N)	Restricted to Studio, 1-bedroom, or 2- bedroom units (Y/N)	Limitation on the size of bedrooms (Y/N)	Restrictions on the number of occupants (Y/N)	Required commercial ("active") ground floor (Y/N)	Required mixed use (any floor) (Y/N)	Inclusionary Zoning in the District? (Y/N)	Inclusionary Zoning Town or City-wide? (Y/N)
1.0									
2.0									
3.0									
4.0									
5.0									

Figure 26 Table 6. Multifamily Housing Conditions

## Tab 4: Checklist Parameters

At its simplest, estimating unit capacity is a function of the building footprint multiplied by the building height and divided by 1,000 (the model's proxy for the average unit size). However, communities have wide varieties in their dimensional restrictions. Tab 4 seeks to capture the different types of restrictions commonly found in zoning. Please add explanations next to the values where indicated to assist with EOHLC's review.

This section collects the parameters that feed directly into the Model. It also collects other information that is helpful in evaluating results.

The questions are organized into five blocks:

1. Allowable Residential Building Types
2. Lot Sizes
3. Restrictions on Building Volume
4. Restrictions on Building Footprint
5. Restrictions on Dwelling Units

Note that the district names have flowed through along the top (**row 9**). Keep track of each district by freezing panes to navigate one district at a time. To do this, make sure **columns A-F** are showing and that **row 7** is the top row. Select **cell E11**. Now go to View at the top of the ribbon and choose the drop-down menu for Freeze Panes (middle right of the ribbon). Choose Freeze Panes. This will allow the user to move each district column set next to the questions. To see the top rows, simply select Unfreeze Panes under Freeze Panes.

### 1. Allowable Residential Building Types

Multi-family housing is defined in Chapter 40A. This section asks what types of buildings are allowed in the different zoning districts and whether there is a maximum number of units per lot in the district, to ensure compliance with the statutory definition. The checklist asks whether the zoning has variations in dimensional standards based on these building types.

The next set of parameters establishes the building footprint and volume. Communities regulate these dimensions in different ways. **Remember, if the zoning district does not use a specific dimension, leave the response boxes blank.**

1. Allowable Residential Building Types		
INFO: Some zoning ordinances/ bylaws have restrictions on lot size, building height, open space, and parking by the type of residential unit.	Question Guidance	Building type and density
	Does this zoning district allow the residential building types listed to the right? (Use the drop-down boxes to answer in the Y/N column.)	Three-family? Four-family? Five or more dwelling units per lot?
	If your zoning does not have a maximum, leave this blank and explain.	What is the maximum number of units per lot?
	If your zoning allows conversion of single-family homes to more than one unit, please answer Y in the Y/N column, and provide the maximum number of units (if applicable) in the Response column.	

Figure 27 Allowable Residential Building Types

## 2. Lot Sizes

This section contains the only time the user is asked to put a zero if the zoning does not specify a dimension. If the zoning does not have a minimum lot size, please enter zero. This may be true for more urbanized communities or those evaluating a downtown or town center district, or communities with a Form-Based Code.

Please enter the minimum lot size in **square feet** for the district (not acres).

Some communities have other restrictions. For example, the district may have a base minimum lot size for the first dwelling unit and a set requirement for additional lot square footage for each additional dwelling unit. Other communities may require a certain lot size by building type. If this zoning district has either of these restrictions, then please provide more information.

2. Lot Sizes		
<b>INFO:</b> Lot size helps determine the number of units that can be built by providing input into the calculation of the building	<b>Question Guidance</b>	<b>Dimensional Standards</b>
	The size of the minimum lot in this district. <b>If there is no minimum, enter 0.</b>	Minimum Lot Size (in square feet)
<b>Building Types</b> <b>INFO:</b> See note under Section 1.	Some regulations have a base lot size for the first dwelling unit and a requirement for additional square feet for each additional unit. If that is true of your community, please enter those numbers here.	Base Minimum Lot Size (in square feet) Additional Lot Square Footage by Dwelling Unit (in square feet)
	<b>Question Guidance</b>	<b>Building type and lot size</b>
	Please indicate any requirements for lot size in square feet based on the building type and provide an explanation in the Response column. If you have a district-wide minimum lot area per dwelling unit, please add that in <i>Section 5</i> .	Three-family (in square feet) Four-family (in square feet) Five or more dwelling units per lot (in square feet)

Figure 28 2. Lot Sizes

### 3. Restrictions on Building Volume

This section asks for the following information:

- **Building height**, which must be entered in **stories**, not feet. If the zoning uses the number of feet as the dimension, divide by 10 feet to get the number of stories.
- **Floor Area Ratio (FAR)**, which must be entered as a **decimal**, not a ratio.
- Whether the district requires **stepbacks**, which require that the building façade be set back from the façade line above a certain number of stories.
- Whether height is restricted based on **proximity to other district types** or other uses.
- Whether the zoning district has **any other restrictions on height** (for example, one based on the ratio of building height to street width).

INFO: Building volume (footprint x height) helps determine the number of units that can be built.		
<b>3. a. Height</b>	<b>Question Guidance</b> If the building height is in feet, please convert to stories based on the requirements in the building code or your zoning definitions. Add the number of feet to the Response column.	<b>Dimensional Standards</b> Building Height (in stories)
STOP: Note that additional restrictions on building height may affect your final results.		
<b>Building Types</b> INFO: See note under Section 1.	<b>Question Guidance</b> If this zoning district restricts height for one or more of the following, please enter the height in stories in the Value column.	<b>Building type and height</b> Three-family (in stories) Four-family (in stories) Five or more dwelling units per lot (in stories)
<b>3. b. FAR</b>	FAR is Floor Area Ratio.	FAR (enter as a decimal, not ratio)
<b>3. c. Stepbacks</b>	Identify the story at which the stepback applies in the Response column.	Stepbacks (number of feet)
<b>3. d. Other Restrictions on Height</b>	<b>Question Guidance</b> Use the drop-down boxes to answer in the Value column. If these restrictions are applicable, please provide more information in the Response column.	<b>Dimensional Standards</b> Does this district restrict height based on the proximity to an abutting <b>residential district</b> ? Does this district restrict height based on the proximity to an abutting <b>residential use</b> ? Does this district restrict height for any other reason?

Figure 29 3. Restrictions on Building Volume

## 4. Restrictions on Building Footprint

This section asks for the following information:

- Lot coverage, which may be defined in several ways. For the purposes of this Model, please enter a number for the maximum lot coverage (**E58**) that represents the total percentage of land on a parcel that may be covered by structures (not surface parking). Some districts also use Maximum Building Coverage and Maximum Building and Parking Coverage. In other districts, Maximum Building Coverage and Maximum Lot Coverage are the same. Please enter only those standards that are relevant to the district that is being evaluated.

4. Restrictions on Building Footprint		
INFO: Lot coverage, open space, setback requirements, and parking reduce the building		
4. a. Lot Coverage	Question Guidance	Dimensional Standards
	Enter if applicable. Building coverage is only for buildings.	Maximum Building Coverage (%)
	Building + Parking is for buildings and parking.	Maximum Building + Parking Coverage (%)
	Maximum Lot Coverage can include additional ground-plane impervious	Maximum Lot Coverage (%)

Figure 30 4. Restrictions on Building Footprint: Lot Coverage

- **Minimum Open Space** Please enter the open space minimum required by the zoning district. If the zoning district does not have a minimum open space percentage, the Model will automatically use 20% to account for setbacks.
  - A change in shading indicates that the open space minimum is flagged for review.
  - Some districts also require a certain amount of open space per dwelling unit or by building type. If that is true, please enter that number here.
  - This formula looks to **Cell C43 in the Checklist District ID tab** to see if the community allows excluded land to count as open space. **Please be sure this cell is completed in the checklist. It should flow through to E63 on this tab.**

4. b. Open Space Requirements	Enter if applicable.	Minimum Open Space Required (%)
	Enter if applicable.	Minimum Open Space per Dwelling Unit (square feet)
	<b>Do not enter anything in the blue box. This value comes from Table 3 in the Checklist District ID tab.</b>	<i>Restricted space is allowed as part of open space requirement.</i>
Building Types	Question Guidance	Building type and density
INFO: See note under Section 1.	If this zoning district has an open space requirement for one or more of the following building types, please enter the requirement in square feet in the Value column.	Three-family?
		Four-family?
		Five or more dwelling units per lot?

Figure 31 4. Restrictions on Building Footprint: Open Space Requirements

- Please include any **setbacks** (sometimes referred to as yards) in this section. Although they will not directly factor into the Model since setbacks are already incorporated into the open space input above, the information is important to understand. The shading may change if the district's setbacks are high, which may be flagged for discussion and further analysis by EOHLC in their review. This question also asks about variations in setback requirements.

4.d. Setbacks	
Please enter the setbacks for this zoning district in the column to the right.	<div>Front Yard Setback (in feet)</div> <div>Side Yard Setback 1 (in feet)</div> <div>Side Yard Setback 2 (in feet)</div> <div>Rear Yard Setback</div> <div>Other</div>
Please provide more information in the Response column.	
Use the drop-down boxes to answer in the Y/N column. If these restrictions are applicable, please provide more information in the Response column.	<div>Does this district have special setbacks for corner lots? (Y/N)</div> <div>Does this district have any other restrictions on the building envelope? (Y/N)</div>
Use the drop-down boxes to answer in the Y/N column. If these restrictions are applicable, please provide more information in the Response column.	<div>Does this district have additional setbacks for lots abutting <b>residential zoning districts</b>? (Y/N)</div> <div>Does this district have additional setbacks for lots abutting <b>residential lots</b>? (Y/N)</div>

Figure 32 4. Restrictions on Building Footprint: Setbacks

- **Parking requirements** vary widely by community. The Model requires a single number of spaces per dwelling unit. However, some communities define parking by the number of bedrooms and others by the type of unit. If this district regulates parking in one of these ways, please choose a reasonable number that is representative of a best estimate of an average. For example, if the district requires one space per bedroom, 0.25 spaces per dwelling unit is not an acceptable choice! A single value must be entered in **row 86** for each district being evaluated.
  - The Model assumes surface parking for development. If structured or podium parking is demonstrated as a viable option in the district being evaluated, try testing a parking requirement of 0. The use of this will create a flag during EOHLC review, so any community using this option must be able to justify it.

4.f. Parking		Question Guidance
<b>STOP: Note that higher parking requirements will reduce the number of multifamily units either by reducing the building footprint (surface parking) or the building volume (structured parking).</b>		
	Please provide a <b>single number for parking spaces per dwelling unit</b> . If the district has requirements based on the number of bedrooms or unit type, please provide them below for informational purposes only.	Parking Spaces per Dwelling Unit (number of spaces)
<b>Building Types</b> INFO: See note under Section 1.	If this district defines parking by the housing type, please identify the requirements here. Consider an average of these or other reasonable estimate of spaces per dwelling unit to enter above.	<div>Three-family?</div> <div>Four-family?</div> <div>Five or more dwelling units per lot?</div> <div>Other</div>
	Please provide more information in the Response column.	
	If this district defines parking by the number of bedrooms, please identify the requirements here. Consider an average of these or other reasonable estimate of spaces per dwelling unit to enter above.	<div>Studio</div> <div>One-Bedroom</div> <div>Two-Bedroom</div> <div>3+ Bedrooms</div> <div>Other</div>
	Please provide more information in the Response column.	

Figure 33 Restrictions on Building Footprint: Parking

## 5. Restrictions on Dwelling Units

This is the last section of the checklist, and an opportunity to identify whether the district or the community has any other restrictions on multi-family uses, or any restrictions not included in this tab.

- Some communities require a certain amount of lot area per dwelling unit. This is different from the additional lot square footage required in Step 2. Lot Size.
- Some communities have additional restrictions on the number of dwelling units per acre.
- Some communities cap the total number of dwelling units in a specific district.

If any of these apply to this district, please add more information.

The final question asks whether there are any other restrictions on multi-family uses in the zoning district. **Please review the existing zoning thoroughly and think about any potential restrictions that may limit the community's multi-family unit capacity.**

The shade of the cell will change in the response column – this allows EOHLC to quickly review this tab for areas that may require further discussion.

5. Restrictions on Dwelling Units			
Question Guidance	Dimensional Standards	Value	Please explain your response.
<b>STOP:</b> Note that this will affect your final results if it is less than 15 units per acre and may affect your final results even if it is 15 units per acre or more, depending on the size and composition of your district. <b>STOP:</b> Note that a cap on the number of units may affect your final results.  <b>CAUTION:</b> After reviewing the questions on the checklist tabs, does your zoning ordinance/ bylaw have any other restrictions on building footprint, building height, or permission for multifamily not covered above? Please explain your response in the grey box to the right. For example, does your community require a special permit for demolition delay or accessory uses?  <b>GD:</b> The information you entered flows automatically into the District calculations. Go to the <i>Zoning Input Summary</i> tab to see how your data is applied and to the <i>Summary</i> Tab to see the results.	Lot Area per Dwelling Unit		
	Maximum Dwelling Units per Acre		
	Cap on Maximum Dwelling Units per District	Y/N	Please explain your response.
	Does your zoning have any provision for exemptions or waivers? Are there any additional restrictions not captured in the tables above?		

Figure 34 5. Restrictions on Dwelling Units



### Tab 5. Zoning Input Summary

Do not enter any data on this tab but do review it to make sure that the data was entered correctly. This tab also provides an overview of the data points that feed into the District tabs, described on the following pages.

<b>ZONING INPUTS - DISTRICT 1</b>		<b>0</b>
<b>Model Inputs for Calculating Unit Yield</b>		<b>Input</b>
Minimum Lot Size		0
Additional Lot Square Feet per Dwelling Unit		0
Open Space %		0%
Excluded Land Counted Toward Open Space		
Parking Spaces per Dwelling Unit		0.00
Building Height		0
Maximum Lot Coverage %		0%
Floor Area Ratio		0.00
<b>Zoning Restrictions that Cap Unit Counts</b>		<b>Input</b>
Lot Area per Dwelling Unit		0
Maximum Dwelling Units per Acre		0.00
Cap on Maximum Dwelling Units per District		0.00

Figure 35 Tab 5. Zoning Input Summary

## Districts and Summary Tab User Guide

Once the Checklist tabs have been completed with all zoning and compliance-related information and the parcel records from the Land Map have been pasted in each District tab, the Model is ready to be run and results summarized. The following is an explanation of the components of the District tabs and the Summary tab to support the use and interpretation of model results by the user. Although there are five District tabs in the Model, this User Guide provides one explanation for how to use and interpret the information on the District tab as each tab has the same setup. These tabs calculate and present the primary outputs EOHLC will use to evaluate whether a community meets the reasonable size, gross density, contiguity, and transit-related location requirements in the Guidelines.

**Please Note: The Model will only allow users to input information in specific locations. The rest of the Model has been locked to protect the integrity of formulas and references throughout the model.**

### District Tab Overview

Each District tab has two primary components: a set of summary calculations at the top (shaded box) and the parcel-by-parcel Model calculations that produce the unit capacity estimate. Figure 21 provides a snapshot of the summary calculation table found at the top of each District tab. The first set of summary metrics to the left relate to the land area of the entire district, the number and acreage of parcels within the district, the unit capacity for the district as calculated by the Model, and a measure of gross density (DU/AC) for each district.

The metrics on the right side of the table include information that helps the user quickly identify why a district may not achieve the unit capacity and gross density requirements. This might include too many non-conforming parcels, not enough unit capacity within transit station areas, too much excluded land in the district, or high parking ratios.

District 1 Summary Calculations					
	Number		Number	% of Total	
District Acreage	0	Non-Conforming Parcels	0	0.0%	
Total Parcels	0	Units within Half-Mile of Transit	0	0.0%	
Parcel Acreage	0	Total Excluded Land	0	0.0%	
Total Built Square Feet	0	Open Space Removed/Set Aside	0	0.0%	
Multifamily Unit Capacity	0	Total Parking Area	0	0.0%	
DU/AC	0.0	Units Forgone due to Unit Cap in Zoning	0.00	0.0%	

Figure 36 District Summary Calculations Table

## Parcel Information from the Land Map

As noted in the Land Map section of this User Guide, the District tabs are also the locations where parcel data is used to calculate the unit capacity and density metrics for each district. In the District tabs, columns **A through M** are set up to align with the column headings in the Land Map to allow users a seamless transition between the two workflows. For each district being tested, the user should copy parcel information from the Land Map and paste it into cell **A20** of the appropriate District tab. Once the parcel data is pasted in and the Checklist tabs are completed, the Model will run its calculations based on the attributes of these parcels.

OBJECTID	LOC_ID		Address	Owner	Existing Use Codes		Existing Use Descriptions
Transit Station	Parcel Acres	Parcel sf	Excluded Public	Excluded NonPublic	Total Excluded Land	Total Sensitive Land	

Figure 37 Parcel Information Column Headings in the District Tabs

**Column N (Developable Parcel SF)** returns the square footage that is used to calculate unit capacity for each parcel. If the parcel is smaller than the minimum lot size in the zoning, it will register as zero because the parcel does not allow as of right multi-family housing. This column also subtracts any excluded land from the total parcel size since excluded land cannot be used to calculate unit capacity. The developable parcel square footage for each parcel record is what is used to determine the district's total unit capacity, the number of units within transit station areas, and the numerator for calculating compliance with the minimum gross density requirements.

**Developable  
Parcel sf**

**Please Note: Each District tab is set up to accommodate 1,000 parcel records. If an individual district includes more than 1,000 parcels, please contact EOHLC for technical assistance.**

## Override Columns

- As noted in the Land Map section of the User Guide, the Model is designed to allow users to override excluded public land if the parcel (or portion of the parcel) is actively being planned or proposed to support multi-family residential development, or if the public land is already being used for housing. **Column O (Override Development SF)** in the Model allows the user to enter a square footage override equal to the amount of the parcel that will support the multi-family residential development. When calculating the value to place in this column, users should be sure to account for non-public excluded land amounts. For example, if a public parcel that is eligible for an override also contains some land in a Wellhead Protection Zone 1, the value entered in this column must continue to reflect the presence of this exclusion. Users processing an override may find it helpful to derive this value by subtracting the amount of Excluded Non-Public Land on the parcel (Column K) from the Parcel sf (Column I).

Override Developable sf	Override Note	Developable SF for Unit Calc
-------------------------	---------------	------------------------------

Figure 38 Override Columns in the District Tabs

**Column P** (Override Note) provides space for the user to explain to EOHLC why the override is being applied. This note will need to be accompanied by some documentation to allow EOHLC to verify and approve the requested override. **Column Q** (Developable SF for Unit Calc) contains a formula that adds in any overrides and becomes the final parcel square footage the model uses to calculate unit capacity for each parcel.

### Model Calculations

**Columns R through W** contain formulas that remove open space and parking from the developable portion of each parcel to determine the area for the building footprint (**Column V**). The building footprint is then multiplied by the building height from the Checklist Parameters to create the building envelope (**Column W**). Each Model calculation metric is explained in further detail below:

- **Excluded Land %** – This calculates the percentage of excluded land on each parcel using information from Land Maps. This is necessary for communities that do not allow excluded land to be counted toward the open space requirement. For those communities, both the excluded land AND the open space requirement must be subtracted independently from the total parcel size.
- **Open Space %** – This column brings in the open space requirement from the Checklist Parameters tab. The Model default and minimum requirement is 20%, even in communities with no open space requirement, so the model can account for setbacks and inefficiencies in lot configuration.
- **Open Space Removed** – This column translates the percentage of excluded land and/or open space to square feet to be removed from the total parcel size. This formula looks to **Cell C43 in the Checklist District ID tab** to see if the community allows excluded land to count as open space. **Please be sure this cell is completed in the checklist.**
- **Parking Area Removed** – This column uses the parking spaces per unit requirement from the Checklist Parameters tab to calculate the square feet to be removed from the total parcel size. The Model treats all parking as surface parking because the market, not the zoning, typically dictates how parking is built. The Model calculates a percentage of land to be removed based on the parking requirement entered and translates that percentage of land to square feet.
- **Building Footprint** – This column subtracts the open space and parking square footage from the total parcel size to estimate the two-dimensional building footprint.
- **Building Envelope** – This column multiplies the building footprint by the building height (in stories) entered in the Checklist Parameters tab. This is why the Model requires building height to be entered in stories and not feet. The building envelope is the three-dimensional representation of the building which is used to derive unit capacity in the next section. **Please be sure to translate building height to stories.**

Excluded	Open	Open Space	Parking Area	Building	Building
----------	------	------------	--------------	----------	----------

*Figure 39 Model Calculation Columns in the District Tabs*

## Unit Capacity Tests

The Model is designed to calculate unit capacity using seven (7) alternative measures. The first measure is the Model's calculation of unit capacity based on the parcel information from the Land Maps and the zoning parameters from the Checklist. **Column X** (Modeled Unit Capacity) is the parcel-by-parcel calculation of unit capacity based on the building envelope (**Column W**). The Model calculates unit capacity from the building envelope by dividing the square footage in the building envelope cell by an average of 1,000 SF per unit, which is used as a policy-level estimate for the average size of a multi-family dwelling unit in a district that allows multi-family housing suitable for families with children. This formula results in the modeled unit capacity on a parcel-by-parcel basis.

Recognizing there may be other zoning limitations placed on unit capacity within a community's zoning bylaw or ordinance, the Model has been designed to account for these added restrictions. In **Columns Y through AE** formulas are designed to calculate unit capacity based on these zoning parameters and the Model will take the smallest unit capacity metric for each parcel. The additional unit capacity tests are explained below:

- **Dwelling Units per Acre Limit** – This column looks to **Cell E103 in the Checklist Parameters tab** and determines if the community has a specific number of dwelling units per acre that cannot be exceeded on a parcel of land. If testing multiple districts or subdistricts, it is acceptable to have some districts with gross densities that are less than 15 DU/AC so long as the gross density of the combined districts is equal to or greater than 15 DU/AC.
- **Maximum Lot Coverage Limit** – This column looks to **Cell E59 in the Checklist Parameters tab** and determines if the community has a maximum lot coverage percentage. If this metric exists in the zoning, the Model calculates the maximum building footprint multiplied by the building height and then divides that building envelope by 1,000 SF per unit to calculate unit capacity. If the lot coverage limit is low, that will shrink the building footprint and potentially yield a lower unit capacity number than the Model would have otherwise calculated.
- **Lot Area per Dwelling Unit Limit** – This column looks to **Cell E102 in the Checklist Parameters Tab** and determines if the community has a requirement for lot area per dwelling unit limit. This is often expressed as a square foot number in the zoning (e.g., 500 SF of lot area per dwelling unit). The formula in this column divides the total parcel size by this lot area metric which results in a maximum unit capacity for the parcel. The higher this restriction is, the lower the unit capacity.
- **FAR Limit** – This column looks to **Cell E44 in the Checklist Parameters Tab** and determines if the community has already established a floor area ratio (FAR) limitation in the zoning. The formula in this column will apply that FAR number to the parcel and calculate unit capacity. The lower this restriction is, the lower the unit capacity.
- **Maximum Units per Lot Limit** – This column looks to **Cell E17 in the Checklist Parameters Tab** and determines if the community has a maximum number of units that can be built on a parcel. If this restriction is not present in the zoning, the Model will use the unit capacity metric from

Column X. If the maximum units per lot limit exists and is set too low, it could severely impact the unit capacity of the district.

- **Non-Conforming Lot** – This column looks to **Cell E23 in the Checklist Parameters Tab** and compares that minimum parcel size in the zoning to the parcel size in **Column I on the District Tab**. If the parcel size is lower than the minimum lot size in the zoning, it is a non-conforming lot, and the model will not calculate unit capacity for that parcel. For any parcel that is below the minimum lot size in the zoning, a “Y” will appear in this column as a visual indicator of the issue. While the Model will only identify non-conforming lots based on minimum lot sizes, EOHLC’s review may identify other dimensional nonconformities in the district that would prevent multi-family housing from being allowed as of right.
- **Maximum Units Based on Additional Lot Size Requirements** – This column looks to **Cells E25 and E26 in the Checklist Parameters Tab** and determines if the community has established a base minimum lot size needed to produce one unit of housing and any additional lot area per dwelling unit requirements for each unit above that. For example, a community may require 5,000 SF of lot area for the first unit of housing and 500 SF of lot area for every unit after that. This would mean 11 units of housing would require a 10,000 SF parcel of land.

Modeled Unit Capacity	Dwelling Units per Acre Limit	Max Lot Coverage Limit	Lot Area per Dwelling Unit Limit	FAR Limit	Max Units per Lot Limit	Non-Conforming Lot?	Max units based on addtl lot size requirements
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Figure 40 Unit Capacity Test Columns in the District Tabs

After the Model calculates unit capacity in each of these columns, the lowest resulting unit capacity estimate is used to capture the parcel’s potential under all tested zoning conditions. The Model will only calculate unit capacity for metrics that have been provided as inputs in the Checklist Parameters tab, so please be sure to complete that information thoroughly and look for any restrictions the zoning may have on unit capacity.

**Please Note: Column and cell references for Checklist Parameters Tab described above are for District 1 Tab only, and Districts 2-5 will have different reference cells in the Checklist Parameters Tab.**

## Unit Compliance Metrics

The final two columns of the District Tab (**Columns AF through AG**) calculate the final unit capacity number for each parcel in the district and a calculation of dwelling units per acre on each parcel.

- Final Lot Multi-family Unit Capacity** – This column is the actual unit capacity number for each parcel in the district. The formula looks across **Columns X through AE** and selects the minimum unit capacity value based on all existing zoning restrictions. This column is then summed to produce the district’s unit capacity. If a community only has one district, this then becomes the unit compliance number for testing against the requirements in the Guidelines.
- Dwelling Units per Acre** – This column provides a density measure of dwelling units per acre on a parcel basis. This is **not** what is used to test compliance with a community’s minimum gross density requirements, but instead provides a visual indication of parcels that may be contributing to or limiting density in the district.

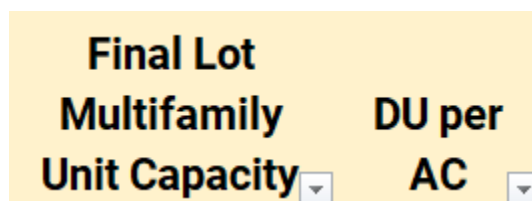


Figure 41 Unit Compliance Metrics in the District Tabs

## Summary Tab Overview

Lastly, the Model includes a **Summary Tab** which provides the user with an array of summary metrics to gauge compliance with the requirements in the Guidelines. The Summary Tab is divided into three sections:

### Unit Capacity per District Table

This table summarizes the alternative unit capacity estimates from each modeled district and presents them for comparison purposes in one table. Each of the metrics in **Rows 6 through 12** are pulled directly from the calculations in District Tab. **Row 13** is the Final Unit Capacity per District which is the unit capacity metric used by EOHLC to determine if the community’s district(s) comply with the guidelines.

Unit Capacity per District Table						
Data Metric	District 1	District 2	District 3	District 4	District 5	Totals
District Name						
Modeled Unit Capacity	0	0	0	0	0	0
Dwelling Units per Acre Limit						0
District Unit Cap Limit						0
Max Lot Coverage Limit						0
Lot Area per Dwelling Unit Limit						0
Max Units per Lot Limit	0	0	0	0	0	0
FAR Limit						0
<b>Final Unit Capacity per District</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

Figure 42 Unit Capacity per District Table in the Summary Tab



## Summary Table

The Summary Table presents additional information used by EOHLC to determine if the community's district(s) comply with the guidelines. **Rows 19-22** represent the district acreage, final unit capacity, and density measure for each district and totals across multiple districts if the community is testing more than one district. The District Acreage (**Row 19**) is the gross acreage of each district which is used to test for compliance with the minimum land area requirement in the Guidelines. Final Unit Capacity per District (**Row 21**) is pulled down from Unit Capacity per District Table above and again represents the unit capacity metric used by EOHLC to determine compliance with the minimum unit capacity in the Guidelines. Lastly, the DU/AC (**Row 22**) is used to calculate the dwelling units per acre of each district(s) to determine compliance with the dwelling units per acre requirement in the Guidelines. The DU/AC formula utilizes the District Acreage Denominator (**Row 20**) to calculate density. Per the Guidelines, some categories of excluded land must be removed from the district's gross acreage when calculating the final density metric.

**Summary Table**

Data Metric	District 1	District 2	District 3	District 4	District 5	Totals
District Name						
District Acreage (see note)	0.0	0.0	0.0	0.0	0.0	0.0
District Density Denominator (see note)	0.0	0.0	0.0	0.0	0.0	0.0
<b>Final Unit Capacity per District</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>DU/AC</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
Parcel Acreage	0.0	0.0	0.0	0.0	0.0	0.0
Total Built Square Feet	0	0	0	0	0	0
Total Units in Station Area	0	0	0	0	0	0
Non-Conforming Parcels	0	0	0	0	0	0
Total Excluded Land (sf)	0	0	0	0	0	0
Total Open Space (sf)	0	0	0	0	0	0
Total Parking Area (sf)	0	0	0	0	0	0
Units Forgone due to Unit Cap in Zoning	0.00	0.00	0.00	0.00	0.00	0

Figure 43 Summary Table in the Summary Tab

### Comparison Table of Requirements and Modeled Results

The comparison table at the bottom of the Summary Tab compares the requirements in the Guidelines for the community to the results of the Model. The key metrics to compare in this table are:

- **Minimum Multi-family Unit Capacity** – This is the comparison of the unit capacity requirement in the Guidelines to the modeled unit capacity results.
- **Minimum Land Area** – This is the comparison of the minimum land area requirement in the Guidelines to the land area of the district(s) being modeled.
- **% Unit Capacity within Transit Station Areas** – For communities that have this requirement in the Guidelines, this compares the unit capacity within transit station areas, expressed as a percentage of the community's minimum unit capacity requirement, to the community's location requirements set forth in Table 2 of Section 8a of the Guidelines.
- **% Land Area located in Transit Station Areas** – For communities that have this requirement in the Guidelines, this is a comparison of the land area within transit station areas, expressed as a percentage of the community's minimum land area requirement, to the community's location requirements set forth in Table 2 of Section 8a of the Guidelines.

**Comparison Table of Requirements and Modeled Results**

Category	Guideline Requirements	Modeled Results
Community:	Example	Example
Community Category:	Commuter Rail	Commuter Rail
2020 Housing Units (Census PL-94):	9,450	9,450
Minimum Multi-family Unit Capacity:	1,417	1,560
Minimum Land Area:	50	62.0
Developable station area:	327	327
% Unit Capacity within Transit Station Areas:	40%	72%
% Land Area Located in Transit Station Areas:	40%	66%

*Figure 44 Comparison Table of Requirements in the Summary Tab*