

# planning tool: build-out analysis

A build-out analysis is a projection of the maximum allowable future development. The resulting mapped and numeric data can be used to assess how well current regulations are implementing plan policies. Build-out analysis results are also useful for comparing alternative development scenarios based on proposed changes to existing land use regulations.

While build-out analyses can be conducted at a range of scales from individual parcels to large geographic regions, they are most commonly conducted at the municipal level. GIS has simplified the build-out analysis process and a number of build-out software programs are now available to communities. The following discussion is based on the Community Build-Out Software, an extension for ESRI's ArcView 3.2, developed by the Addison County Regional Planning Commission and C.L. Davis Consulting Associates, which is available as a free download. The underlying principles, however, can be applied to build-out analyses conducted using other methods.

## A. Basic Build-Out Analysis

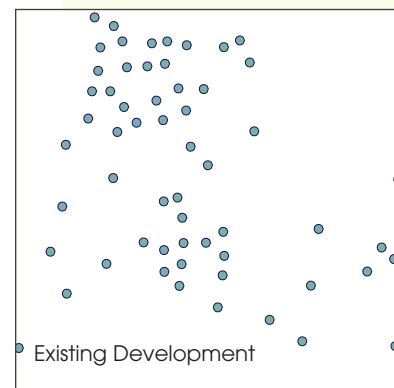
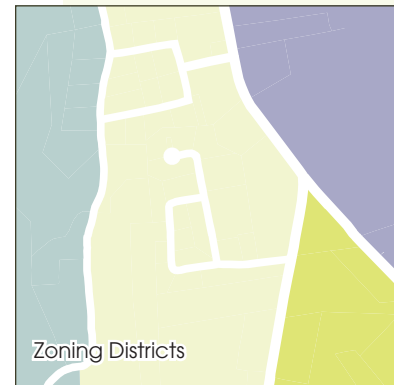
To assess future development potential, several basic pieces of information are needed:

- ✦ The location of existing development (this information is available to all Vermont municipalities from E-911 data);
- ✦ Zoning district boundaries and the intensity of development allowed in each district; and
- ✦ The current configuration of parcels (it may be possible to conduct a build-out analysis without parcel maps, although the results will be less precise).

Based on these three GIS layers, the build-out software determines which zoning district(s) each parcel is located in and calculates the acreage per parcel (or part of a parcel) per district. The maximum development potential based on minimum lot size is calculated. Any existing development is subtracted from that result to yield the maximum number of additional units that could be developed under current regulations (see Figures 1 & 2).

This basic build out does not take into consideration natural resource constraints or lands unavailable for development. The basic build out is best suited for calculating the potential for residential development. While more sophisticated models can be constructed using the

FIGURE 1  
BASIC INPUT LAYERS



Community Build-Out software and other build-out analysis tools, as described below, this simple analysis can be quite useful for testing alternative development or regulatory scenarios.

## *B. Beyond the Basic Build Out*

### Undevelopable or Unlikely to be Further Developed Lands

The build-out software can remove areas that are not developable from its analysis such as conserved lands, publicly-owned lands, parks, cemeteries, etc. One or more GIS layers can be used to remove lands that are not available for further development.

If the goal of the build-out analysis is to produce as realistic an estimate as possible of development potential, lands that are unlikely to be further developed can be removed from the analysis as well. For example, larger lots in developed residential neighborhoods may have development potential that will likely not be realized due to their use, configuration and/or ownership. A GIS layer of these lands can be used to remove such parcels from the analysis or to create a separate category for these lands within each district.

### Natural Resource Constraints

The software can simulate the effects of natural resource constraints to reduce development potential. If local regulations reduce the amount of development potential on a piece of property based upon the presence of resources such as wetlands, the build-out analysis can quantify the effects of that provision in number of units. Multiple GIS layers representing development constraints can be used to remove, reduce or relocate density.

### Commercial, Industrial and Mixed Uses

The Community Build-Out software can also calculate potential for commercial or industrial development in districts where no residential development is allowed or which are primarily non-residential. Additional data is needed to run this component of the software such as the square footage of existing non-residential buildings, the floor area ratio of existing development and the square footage of parking areas.

A new component is being developed for the Community Build-Out software that will allow it to estimate potential mixed-use development. Users will have to make some assumptions about the likely future mix of residential and nonresidential uses.

**FIGURE 2**  
BUILD-OUT RESULTS



A basic build-out analysis combines the three inputs shown in Figure 1. The amount of potential development can be calculated on each parcel of land, then totaled by zoning district. The Community Build-Out Analysis software also places “dots” representing the amount and location of potential new development.



#### Rate of Development

Another add-on to a build-out analysis is a projection of how long it will take the community to reach full build out based on anticipated population growth. Population projections can be used to present the results of a build-out analysis as a series of phases over a given number of years. This component is currently being incorporated into the Community Build-Out software.

#### Transportation Impacts

The results of the build out can be used to estimate future need for transportation improvements. Future versions of the Community Build-Out Analysis may include a component for estimating the amount and location of new roads that will be needed to serve future development and the number of additional curb cuts that can be anticipated along existing roads. The software already includes a component that calculates development potential based on road frontage, which could be used to determine the maximum number of new access points that might be developed along an existing road.

### *C. Other Modeling Tools*

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The results of the build-out analysis and/or projected growth can be used in conjunction with other modeling tools to better understand a community's development trends.

#### Land Use Allocation Model

The Land Use Allocation Model is a component of Chittenden County Metropolitan Planning Organization's Travel Demand Model. The model takes household and employment forecasts and allocates them geographically based on land use policies and travel times. This model can provide greater insight into how growth will impact the functionality of the transportation system.

#### CommunityViz

CommunityViz software developed by The Orton Family Foundation allows users to create and manipulate a virtual representation of a community and explore different land use scenarios. CommunityViz, which is an extension for ESRI's ArcGIS software, allows users to visualize and evaluate different land use patterns, and make informed decisions on issues specific to their own communities.

## *D. Resources*

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The Northwest Project Website

**Website:** [www.transportation-landuse.org](http://www.transportation-landuse.org)

**Resources Available Include:**

- ✦ Build-out analyses prepared by Addison County, Northwest and Central Vermont Regional Planning Commission.
- ✦ Links to information about other build-out analyses conducted around Vermont. (Putney, Irasville, Chittenden County RPC)

The Center for Rural Studies

**Website:** <http://crs.uvm.edu/>

**Resources Available Include:**

- ✦ Community Build-Out software and manuals available for download.

Chittenden County Metropolitan Planning Organization

**Website:** [www.ccmppo.org](http://www.ccmppo.org)

**Resources Available Include:**

- ✦ Information about Chittenden County's Land Use Allocation Model.

CommunityViz

**Website:** [www.communityviz.com](http://www.communityviz.com)

**Resources Available Include:**

- ✦ Information about CommunityViz build-out software. Case studies including projects in Morristown and Randolph, Vermont.