

Public and Municipal Perspectives Places for Homes Appendix

Methods and Results

The Homes Landscape was created through the application of suitability modeling, a method used by architects and planners as far back as the late 1900's. In this method land features of significance with available spatial data are grouped into goals and corresponding objectives, weighted according to their relative influence, and ranked by their feature attributes to determine whether or not a location may be suitable for the intended use. Further, additional information may then be overlaid with the final landscape for contextual information, as well as be informed by local knowledge. Keys to the Valley worked closely with advisors to develop the goals, weighting, ranking, and overlays that make up the Homes Landscape. These advisors came to the table with in depth experience in home construction, natural resources, affordability, and community planning.

The intent of this analysis was to "Identify land suitable for residential housing" at a coarse resolution. Three goals were laid out to meet this intent.

- » Goal 1. Identify appropriate land
- » Goal 2. Identify areas with existing infrastructure
- » Goal 3. Identify areas with existing accessibility to services and employment

Each of these goals has sub-objectives to further inform the model and corresponding datasets to meet those stated aims. The model is limited by the spatial data available from both states. For example, due to the lack of location specific broadband data in NH, the model used census block data from the Federal Communications Commission indicating the number of providers (non-satellite) working in a block group, thus informing the analysis at a coarser resolution. See Figure 1 for a visual representation of the model and Table 1 for further details on the datasets used in this analysis.

The final Homes Landscape (Figure 2) uses a scale of 1 (low suitability) to 9 (high suitability). Areas deemed "non study", including waterbodies and conservation easements, receive no score. Landscapes were created to reflect each dataset, objective and goal (Figure 4). After the landscape was completed, three analyses were performed. First, the Homes Landscape and landscapes for each goal were summarized by the amount of land under each score level (Table 2). Second, the ArcGIS Locate Regions tool was used to identify 3 square miles of land within each municipality that clustered the highest median score. This analysis was done in two stages. In stage one, two areas of approximately one square mile and at least a half mile apart were identified in each municipality. In stage two, four areas of approximately a quarter square mile at any proximity were identified in each municipality (excluding those areas identified in stage one) (Figure 3). The third analysis used information from the Vital Communities New Homes tracking initiative, which was cross referenced with the Homes Landscape. New Homes has tracked new housing units for 29 municipalities in their service area between 2010 through 2019, including location details. These locations correspond to homes with one or more units and units resulting from both new construction and the conversion of existing structures. This information was converted to a spatial format using ArcGIS geocoding, which selected a point on the landscape based on approximate location for the listed address. This resulted in rough location data of approximately 1,300 new home locations within the 27 municipalities in the Keys to the Valley region. These 1,300 locations were summarized by their corresponding score on the Homes Landscape (Table 3).

Figure 1. These five images outline the suitability model workflow used to create the Homes Landscape, goal 1 for appropriate land, goal 2 for available infrastructure, goal 3 for accessibility to services and employment, and additional overlays. These figures indicate weighting of goals and objectives, as well as ranking of dataset features.









Figure 2. *Homes Landscape* suggests the suitability of land for homes. The model takes an objective view of housing on the landscape by assessing needed features and identify where they overlap.



Figure 3. Orange areas represent clusters of high scoring land in the Homes Landscape resulting in 3 square miles within each municipality.



Figure 4. Landscape scores for each objective that informed the Homes Landscape according to the weighting indicated in Figure 1. Note – Goal 1 Objective 2 Legal Restrictions and other Non Study areas can be seen on the Goal 1 Landscape in grey.



















Dataset Name	Dataset Sources	Notes						
Goal 1. Identify appropriate land								
<i>Objective 1. Identify areas v</i>	vith physical barriers to build	ings.						
Hydric Soils	Natural Resource Conservation Service	SSURGO database. This rating indicates the percentage of map units that meets the criteria for hydric soils. Map units are composed of one or more map unit components or soil types, each of which is rated as hydric soil or not hydric.						
Slopes	US Geological Survey	Slope derived from the 3DEP Bare Earth Digital Elevation Model.						
Soils with Corrosive Effects to Concrete	Natural Resource Conservation Service	SSURGO database. "Risk of corrosion" pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens concrete. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion.						
Elevation	US Geological Survey	3DEP Bare Earth Digital Elevation Model						
Wetlands	National Wetland Inventory	The wetland mapping is conservative due to limitations of the photointerpretation techniques employed.						
In-Hospitable Habitats	National Land Cover Dataset	2016 Land Cover (CONUS). These products provide spatially explicit and reliable information on the Nation's land cover and land cover change.						
<i>Objective 2. Identify areas that are legally restrictive to development</i>								
Conservation Easements	VT Protected Lands Database, NH GRANIT Conservation Lands, and known Municipal Additions	A subset of these datasets were used including easements known as agricultural preservation, conservation easement, flowage rights of easement, historic preservation easement, protective easement, open space areas, scenic easement, and those with permanent protections or institutional mandates.						
<i>Objective 3. Identify areas t value.</i>	hat are a priority for protectio	<i>on due to ecological, cultural and hazard mitigation</i>						
Priority Habitats	VT Conservation Design & NH Wildlife Action Plan	For VT these are areas of highest priority for maintaining ecological integrity. For NH these are areas of best relative condition, particularly for Species of Greatest Conservation Need.						
Flood Hazard Areas	Federal Emergency Management Agency	Includes hazard areas identified on the Flood Insurance Rate Map with 1- and 0.2-percent-annual- chance flood, or 100 and 500-year flood respectively.						
Farmland	Natural Resource Conservation Service	SSURGO database. Farmland classification identifies map units as prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland. It identifies the location and extent of the soils that are best suited to food, feed, fiber, forage, and oilseed crops.						

Dataset Name	Dataset Sources	Notes
Waterbody Buffers	US Geological Survey & Waterbody Buffer Regulations	National Hydrography Dataset. Streams, lakes and ponds. Buffers were determined through a review of VT and NH regulations and generalized for model application.
Hospitals	OpenStreetMap	Polygon data of medical facilities for North America.
<i>Objective 4. Identify areas the contract of the content of the co</i>	hat are less suitable due to he	alth risks.
Rail & Highways	VT Agency of Commerce and Community Development & NH Department of Environmental Services	Include all rail lines, Interstate 89 and Interstate 91.
Airports	Federal Aviation Administration	This geospatial data is derived from the FAA's National Airspace System Resource Aeronautical Data Product.
Hazardous Sites & Waste Generators	VT Agency of Natural Resources & NH Department of Environmental Services	Hazardous sites, waste generators and/or solid waste facility datasets.
Goal 2. Identify areas with	existing infrastructure	•
<i>Objective 1. Identify areas the second seco</i>	hat provide infrastructure for	basic services in the home
Municipal Sewer	VT Agency of Commerce and Community Development & NH Department of Environmental Services	Sewer Service Areas.
Broadband	Federal Communications Commission	Number of providers working in census block groups with a minimum of 25 mpbs download and 3 mpbs upload.
<i>Objective 2. Identify areas t</i>	hat provide transportation an	nd mobility access
Public Transit	Local Transit Agencies	Include Amtrak, Advance Transit, Southwest Community Services, TheCurrent and StageCoach. Data was provided on stop locations. SCS provide transit route details as the bus operate may deviate up to ¼ mile to pick up riders.
Maintained Public Roads	NHDOT & VTrans	Data excluded that were identified as recreation, private, military, primitive, impassable, or not maintained.
Transportation Corridors	Tri-Commissions	Corridors based on VTrans Highway functional class dataset, including all arterials and collectors class 1-6, and UVLSRPC 2020 Transportation Corridor plan.
Village or Downtown Areas	NH GRANIT & VCGI with Tri-Commissions review	NH community centers areas & VT downtown and village center designations. These locations are intended as a proxy for the most walkable and bikeable areas in the region.

Dataset Name	Dataset Sources	Notes					
Goal 3. Identify areas with existing accessibility to services and employment							
<i>Objective 1. Identify areas w</i>	vith greatest access to employ	ment					
Employment Centers	US Census ACS 2017	On the Map interactive data application was used to identify US census block groups with 500+ jobs.					
Objective 2. Identify areas with greatest access to education							
Schools K through 12	National Center for Education Statistic	Public and private elementary and secondary schools from the Common Core of Data created by the NCSE Education Demographic and Geographic Estimate program.					
Post Secondary Schools	National Center for Education Statistic	Public and private postsecondary schools from the Integrated Postsecondary Education Data System created by the NCSE Education Demographic and Geographic Estimate program.					
<i>Objective 3. Identify areas w</i>	vith greatest access to recreati	on					
Trails	VCGI, NH GRANIT, Trailfinder and other known additions	Includes VT Class 4 and NH Class VI roads. Excluded known private for profit trail systems and primary snowmobile trails.					
Recreation Sites	VCGI & NH GRANIT	Recreation dataset identifying public parks, boat launches, playing fields, etc.					
<i>Objective 4. Identify areas w</i>	<i>Objective 4. Identify areas with greatest access to essential services</i>						
Large Grocery	infoUSA & Urban Observatory	Supermarkets included have annual sales of \$1 million or more.					
Public Libraries	Institute of Museum and Library Services	Public Libraries Survey (PLS) data for U.S. Public Libraries outlets representing the physical characteristics of the main library, its branches, book mobiles, and other outlets.					
Hospitals	Definitive Healthcare	Defines a hospital as a healthcare institution providing inpatient, therapeutic, or rehabilitation services under the supervision of physicians. In order for a facility to be considered a hospital it must provide inpatient care.					
Contextual Overlays. Infor	rmation for improved visual	l interpretation					
Objective 1. Visualize histor	ical growth patterns						
Population Growth	US Census	Change in population between 2000 and 2010 census by block groups and tracts.					
Existing Density	US Census	American Community Survey 5-year estimates 2013-2017 for number of households by municipality.					
Existing Development	National Land Cover Dataset	2016 Land Cover (CONUS). These products provide spatially explicit and reliable information on the Nation's land cover and land cover change. Only included those attributes identifying developed land.					
Objective 2. Visualize projec	ct growth						
Housing Unit Projections	Tri-Commissions	See Keys to the Valley Projections report for further details.					

Dataset Name	Dataset Sources	Notes
<i>Objective 3. Visualize inform</i>	pal-level interpretation	
Zoning and Parcels	Municipalities	Existing parcel boundaries and zoning districts, if in use and available.
Buildings	Municipalities	Identified existing structures within the municipality, including those that are underutilized or in need of significant repair.
Features of Local Priority	Municipalities	Municipalities may consider visualizing locations of local interest (small grocery, community center, etc.), recently conserved land, and other detail of benefit for local interpretation. Vermont has higher resolution data available for broadband access and septic system ratings (Soil-Based Residential Wastewater Disposal Ratings).

Table 2

	Ho Land	Homes Landscape		Goal 1 Land		Goal 2 Infrastructure		Goal 3 Access	
	Sq. Mi.	% Total	Sq. Mi.	% Total	Sq. Mi.	% Total	Sq. Mi.	% Total	
Non-Study	598	22%	598	22%	0	0%	0	0%	
3 and Less	0	0%	0	0%	293	11%	228	8%	
4	14	1%	1	0%	1128	42%	70	3%	
4.5	90	3%	26	1%	383	14%	152	6%	
5	109	4%	6	0%	566	21%	241	9%	
5.5	212	8%	12	0%	197	7%	461	17%	
6	647	24%	45	2%	75	3%	741	27%	
6.5	697	26%	125	5%	24	1%	496	18%	
7	320	12%	670	25%	18	1%	287	11%	
8 and More	9	0%	1213	45%	12	0%	20	1%	

	Goal D Physical	Obj 1 Go Barriers Legal		Goal 1 Obj 2 egal Restrictions		Goal 1 Obj 3 Protection Priority		Goal 1 Obj 4 Health Risk	
	Sq. Mi.	% Total	Sq. Mi.	% Total	Sq. Mi.	% Total	Sq. Mi.	% Total	
Non-Study	44	2%	598	22%	380	16%	0	0%	
3 and Less	0	0%		2098 78%	15	1%	38	1%	
4	0	0%			88	4%	62	2%	
4.5	0	0%			2	0%	0	0%	
5	71	3%			0	0%	0	0%	
5.5	97	4%	2098		73	3%	1	0%	
6	41	2%	1		591	26%	0	0%	
6.5	12	0%			104	4%	0	0%	
7	2115	80%			841	36%	339	13%	
8 and More	316	12%			602	26%	2256	84%	

	Goal 2 Basic S	2 Obj 1 Services	Goal 2 Obj 2 Transportation & Mobility			
	Sq. Mi.	% Total	Sq. Mi.	% Total		
Non-Study	0	0%	0	0%		
3 and Less	548	20%	0	0%		
4	1453	54%	216	8%		
4.5	14	1%	332	12%		
5	578	21%	327	12%		
5.5	0	0%	35	1%		
6	47	2%	895	33%		
6.5	32	1%	43	2%		
7	20	1%	679	25%		
8 and More	4	0%0%	169	6%		

	Goal 3 Obj 1 Employment		Goal 3 Obj 2 Education		Goal 3 Obj 3 Recreation		Goal 3 Obj 4 Essential Services	
	Sq. Mi.	% Total	Sq. Mi.	% Total	Sq. Mi.	% Total	Sq. Mi.	% Total
Non-Study	0	0%	0	0%	0	0%	0	0%
3 and Less	264	10%	251	9%	15	1%	181	7%
4	0	0%	647	24%	2	0%	136	5%
4.5	0	0%	4	0%	273	10%	227	8%
5	0	0%	17	1%	441	16%	144	5%
5.5	0	0%	129	5%	3	0%	111	4%
6	0	0%	172	6%	691	26%	669	25%
6.5	1126	42%	555	21%	988	37%	751	28%
7	942	35%	882	33%	1	0%	445	17%
8 and More	364	14%	39	1%	282	10%	32	1%

	New I	Homes
	Count	% Total
Non-Study	416	30%
3 and Less	0	0%
4	0	0%
4.5	14	1%
5	5	0%
5.5	14	1%
6	114	8%
6.5	287	21%
7	298	22%
8 and More	221	16%