

Appendix D – Data Modeling Methodology Documentation

Please visit <https://strafford.org/projects/rhna/> to view the appendix materials.

Area Opportunity Index

Methodology

This Area Opportunity Index is intended to evaluate New Hampshire's 295 census tracts' conduciveness to high quality living and economic opportunity for residents. It is comprised of four individual categories: Prosperity, Education, Housing, and Health. Each of these categories is intended to represent major pillars that comprise a neighborhood's ability to set residents up to succeed in life.

The following lists each indicator (variable) that makes up each individual category, as well as how that indicator is converted to an index score. Each indicator can either receive a 1 or a 0 for an index score, and the category score is the sum of all indicator scores in that category.

Prosperity

- Gini Index: A measure of economic inequality in a given area determined by the distribution of wealth across different income brackets (2019 *ACS 5-year estimates*, Table B19083_001)
 - If Gini index value \leq average of all census tracts, index score = 1
 - If Gini index value $>$ average of all census tracts, index score = 0
- Poverty status of individuals with full-time employment: Percentage of all employed people that were employed full-time in the last 12 months but still had annual income below the poverty level (2019 *ACS 5-year estimates*, Table B17004)
 - If percentage \leq average of all census tracts, index score = 1
 - If percentage $>$ average of all census tracts, index score = 0
- Population 16 and up who are employed: Percentage of people age 16 and up who are employed (2019, *ACS 5-year estimates*, Table B23025)
 - If percentage \geq average of all census tracts, index score = 1
 - If percentage $<$ average of all census tracts, index score = 0
- Households with broadband subscriptions: Percentage of households with broadband internet subscriptions (2019 *ACS 5-year estimates*, Table B28002)
 - If percentage \geq average of all census tracts, index score = 1
 - If percentage $<$ average of all census tracts, index score = 0

Education

- Disenfranchised youth: Percentage of unemployed people age 16-19 who are not currently enrolled in high school, unemployed, and not high school graduates (2019 *ACS 5-year estimates*, Table B14005)
 - If percentage \leq average of all census tracts, index score = 1
 - If percentage $>$ average of all census tracts, index score = 0
- High educational attainment: Percentage of people with a bachelor's degree or higher (2019 *ACS 5-year estimates*, Table B15002)
 - If percentage \geq average of all census tracts, index score = 1

- If percentage < average of all census tracts, index score = 0
- High school graduation rate: Percentage of people age 25 and over with a high school education or equivalent (2019 ACS 5-year estimates, Table B15002)
 - If percentage \geq average of all census tracts, index score = 1
 - If percentage < average of all census tracts, index score = 0

Housing

- Cost burdened owners: Percentage of people in owner-occupied housing units who are cost burdened (2019 ACS 5-year estimates, Table B25093)
 - If percentage \leq average of all census tracts, index score = 1
 - If percentage > average of all census tracts, index score = 0
- Cost burdened renters: Percentage of people in renter-occupied housing units who are cost burdened (2019 ACS 5-year estimates, Table B25070)
 - If percentage \leq average of all census tracts, index score = 1
 - If percentage > average of all census tracts, index score = 0
- Median monthly housing costs: Median monthly housing costs for both owners and renters (2019 ACS 5-year estimates, Table B25105_001)
 - If value \leq average of all census tracts, index score = 1
 - If value > average of all census tracts, index score = 0
- Vacancy-to-occupancy ratio: Ratio of total vacant housing units to total occupied housing units (2019 ACS 5-year estimates, Table B25002)
 - If ratio \leq average across all census tracts, index score = 1
 - If ratio > average across all census tracts, index score = 0

Health

- Average out-of-pocket annual medical expenses: Average annual out-of-pocket expense for medical purposes per person as a percentage of annual income (*PolicyMap and Quantitative Innovations*, 2018)
 - If value \leq average across all census tracts, index score = 1
 - If value > average across all census tracts, index score = 0
- Low food access: A measure of people's ease of access to food (*United States Department of Agriculture*, 2019)
 - If area is not Low Food Access Area, index score = 1
 - If area is Low Food Access Area, index score = 0
- Life expectancy at birth: A measure of a person's life expectancy given their place of birth (*Center for Disease Control*, 2010-2015)
 - If expected age \geq average across all census tracts, index score = 1
 - If expected age < average across all census tracts, index score = 0
- Medically underserved area status: A measure of people's access to essential healthcare facilities such as hospitals, nursing facilities, and federally qualified health centers (*Human Resources and Services Administration*, 2020)
 - If area is not a Medically Underserved Area, index score = 1

- If area is Medically Underserved Area or Medically Underserved Area-Governor's Exception, index score = 0

Census tracts can either score 0, 1, or 2 points per category. For each category, a tract's score is compared to the average of all census tracts across the state. If the score does not meet the average, the tract receives 0 points for that category. If the score does meet the average, it receives 1 point. If the score is 'well-above average', meaning it is at least one standard deviation above the average, it receives 2 points. The following table outlines the scoring scheme for each category based on the average scores of all New Hampshire census tracts. Each column indicates the number of points that a tract would receive for each category based on the category score.

The cutoff scores are based on the rounded averages and standard deviations of total scores across all census tracts. If the average score for a category has a decimal value of .5 or greater (ex. 2.65) we round the cutoff score up the nearest whole number. If the average score has a decimal value less than .5 (ex. 2.35) we round the cutoff score down to the nearest whole number.

Category	Less than Average (0 Points)	Meets the Average (1 point)	Well-Above Average (1 additional point)
Prosperity	1	2	3 or 4
Education	1	2	3
Housing	1	2	3 or 4
Health	1 or 2	3	4

Fair Share Housing Production Model Report

This report accompanies the Fair Share Housing Production Model that was created to assist New Hampshire's Regional Planning Commissions (RPCs) determine the housing production needed to meet current and future demand.

It begins with an overview of New Hampshire's Housing Needs. It then discusses the state laws that provide the rationale for the model's approach. The core section of the report discusses the model and includes a technical appendix with additional detail on the model worksheets and formulas.

New Hampshire's Housing Needs

Like many areas in New England, New Hampshire has experienced a recent and very rapid increase in housing prices. Between 2019 and 2022, the median price of a sold home increased by \$100,000—a 35% jump. The median cost of monthly rent reached \$1,510 in 2022—an increase of \$260 per month, or 21%, in three years.

Income growth has failed to keep pace with rising housing costs. Since 2000, median home values rose by 111%, and rents, by 94%—compared to a 73% increase in median income.

Homes for sale and for rent are very hard to find in the current market, as the state's housing vacancy rate is below 1%. Low vacancy rates depress the ability of households to move into housing that best meets their needs—for accessing employment, to achieve homeownership, to accommodate a growing family, and to respond to aging.

Currently,

- If only 10% of the state's low income renters were looking to move—about 7,400 renters—they would have about 350 units from which to choose. The likelihood that they would find an affordable, vacant unit is about 5%.
- If only 10% of the state's renters with income of 61 to 100% AMI were looking to buy—about 3,700 renters—they would have about 550 units from which to choose. The likelihood that they would find an affordable unit for sale is about 15%.

The state's lowest income renters face a severe shortage of affordable units. An estimated 3.5% of New Hampshire's housing units have a contract or are managed by an entity that ensures their affordability. This supply is far short of need: an estimated 23,000 renters need more affordable units or rental assistance.

Cost burden—when households pay more than 30% of their income in housing cost—has historically been very high for the state’s lowest income owners and renters. The prevalence of cost burden has widened to include moderate income renters: 60% of renters with income of \$35,000 to \$50,000 are burdened; 25% of renters with income of \$50,000 to \$75,000 are burdened.

Rates of cost burden are higher among those unemployed or out of the labor force (45% are burdened), but they are almost as high among those working in the Arts, Entertainment, Recreation, Accommodation and Food Services industry—essential industries for the state’s tourism and recreation sector.

The shortage of affordable homeownership units has led to a decline in homeownership in the state. Middle aged (ages 35 to 44) adults experienced the largest decline in homeownership between 2010 and 2020, with rates dropping from 74% to 68%. Households with income of between \$75,000 and \$100,000 also saw a steep decline in ownership, dropping from 84% to 75%. The lack of affordable homeownership products requires renters to rent longer, limiting supply, especially for the lowest income renters who are less competitive in the market.

Additional public funding can realistically only address a proportion of needs. Housing needs and future housing demand should be addressed through a combination of affordable unit production and housing cost assistance.

State-level modeling on production needs estimates that between 2020 and 2040, approximately 88,400 units will be needed to meet household growth demand and bring the state’s housing market into balance. This is in addition to units needed to respond to seasonal and second home demand.

As of 2022, to stabilize the housing market and restore it to a functional vacancy rate—5% for rental units and 2% for ownership units—10,905 additional rental units are needed and 12,764 ownership units are needed.

This report and accompanying model provides guidance for the housing production needed to address demand.

New Hampshire Workforce Housing Statute

New Hampshire’s Workforce Housing Law, RSA 674 requires every New Hampshire community to provide “reasonable and realistic opportunities” for the development of workforce housing.

That law codified the principles established in the 1991 *Britton v. Chester* case, which challenged the constitutionality of the Town of Chester’s zoning ordinances. In that case, the state Supreme Court held that when exercising its authority to regulate the use of land through zoning, every state jurisdiction must provide a reasonable and realistic

opportunity for the development of affordable housing. The Court stated that regional needs are relevant in determining a jurisdiction's proportionate or "fair share" of affordable housing—although the court did not define fair share.

Workforce housing is defined by the law as:

- Ownership housing—affordable to households with income equal to or less than 100% of the Area Median Income (AMI) for a 4-person household, as published by the U.S. Department of Housing and Urban Development (HUD) for the MSA or county in which the jurisdiction is located.
- Renter housing—affordable to households with income equal to or less than 60% of the Area Median Income (AMI) for a 3-person household, as published by HUD for the MSA or county in which the jurisdiction is located.
- Affordable means housing costs, including utilities and combined mortgage loan debt, property taxes, and required insurance, that do not exceed 30 percent of a household's gross annual income.
- Housing developments that exclude minor children from more than 20% of the units, or in which more than 50% of the units have fewer than 2 bedrooms, do not constitute workforce housing.

The Workforce Housing Law does not define how much workforce housing must be developed in a jurisdiction, nor does it prescribe a method for estimating that number. Instead, the law provides guidance, which was utilized in developing the Fair Share Housing Production Model in 2022, described in the remainder of this report. That model is an update to the 2014 model, and is meant to be used by the state's RPCs, as they advise their member jurisdictions on housing production needs and to raise awareness of the need for affordable and workforce housing.

Fair Share Housing Production Model

Overview of approach. The Fair Share Housing Production model ("model") projects the number of housing units, by tenure and Area Median Income (AMI) threshold, that jurisdictions should allow or accommodate to meet projected population and employment demand—and to support a more balanced housing market in New Hampshire.

The employment component is critical to support economic stabilization and growth, especially in the state's small towns and rural areas. A model based solely on demographic projections—which are based on historical trends—would drive housing demand into urban areas and away from rural areas that are aging. This would result in rural economies that cannot support the needs of aging residents, tourism and recreation activity—including second and vacation homeowners—and economic development.

How to use the housing production numbers. The output from the model is the number of housing units that are needed to accommodate population growth and support employment growth, and return New Hampshire’s housing market to a stable and functioning state. Housing unit numbers are provided for five-year increments in 2025, 2030, 2035, and 2040. Stabilization of the housing market is achieved through adding production to achieve a 5% rental vacancy and a 2% ownership vacancy rate. This stabilization factor is smoothed throughout the 2020 to 2040 period to best reflect the cyclical nature of housing development (v. front loading the units needed as of 2022).

The model presents *cumulative* housing production numbers for 2025, 2030, 2035, and 2040.

These housing production numbers are presented for all owners, and for owners below and above 100% AMI for a 4-person household; and for all renters and renters below and above 60% AMI for a 3-person household. The AMI is the regional AMI for the RPCs, which was developed for RPC use in regional housing needs assessments and for this model. It is based on the AMIs published by the U.S. Department of Housing and Urban Development (HUD). The accompanying memorandum, dated 7/14/2022 and entitled *Regional AMI methodology* describes the methodology used to derive the regional AMIs. In sum, the regional AMI is created through a weighted average of the HUD AMI assigned to each town in a region and occupied housing units as a share of total occupied housing units in the region.

Jurisdictions and Regional Planning Commissions (RPCs) should use these numbers as guidance for accommodating and responding to development interests. It is important to note that RPCs are not required to do fair share analyses; they undertake this exercise to support their member jurisdictions. Housing production numbers are what communities need to allow and accommodate should a developer propose to build them. There are many factors that will determine if/when units get built (e.g., developer interest, developer financing, building costs, economic development).

RPCs and communities should understand that the housing production model is not a perfect substitute for current conditions, and that other factors and data points should be taken into consideration—including current vacancy rates, wait lists in assisted housing developments, and current market data regularly provided by New Hampshire housing—when development applications are evaluated.

Hypothetical case:

Community X reviews the Fair Share Tables and notes that it should be prepared to accommodate demand for 100 units by 2025 and 299 units by 2040. Of these units, 200 should be for owners, with about half affordable to households with income of 100% AMI and less. Another 100 should be for renters, with 55% affordable to renters with income of 60% AMI and less.

Community X looks to the Development Capacity Test tab and finds that it has plenty of capacity to accommodate about 95% of the units, but may need to consider some changes in density to allow for the units on land that has water and sewer connections. Increasing the allowable density to 8 units per acre in areas near Main Street appears to be a solution that would not only allow for needed housing production, it would also meet community goals of conservation and cost-efficient development.

A developer approaches Community X with an application. This community agrees to upzone the developer's parcels with the condition that the units would be affordable to <100% AMI owner and <60% AMI renter households.

Methodology

The model begins with projected growth for 2025, 2030, 2035, and 2040 at the jurisdiction level based on demographic projections that were conducted by RLS Demographics (*State of New Hampshire State, County, and Municipal Population Projections: 2020-2050*, Robert Scardamalia RLS Demographics, Inc. and New Hampshire Department of Business and Economic Affairs).

The RLS demographic projections included projected numbers of people (not households) by age cohort. To form residents into households, the model applies a "headship ratio," which converts people into households based on the share of people to households, by age cohort, in 2020. The age cohort considerations is important to adjust for the variance in household sizes and formation through lifecycles.

Component 1—Planning for Projected Household Growth. The first part of the model allocates a share of projected household growth to housing production; the base model uses 50%. Households include all types of people projected to live in a jurisdiction: retirees, remote workers, unemployed people, and others.

To separate households into renters and owners, the model holds constant the statewide 2020 ownership rate. The statewide ownership rate is used to fairly distribute rental housing among regions and avoid replicating past exclusionary development patterns.

The model determines the share of owner and renters households that fall below and above the Area Median Income (AMI) categories of: 60% AMI for a 3-person household for renters, 100% AMI for a 4-person household for owners, with AMI defined by the regional AMI. *This is consistent with RSA 672:1.*

Component 2.—Planning for Employment Growth. The second part of the model allocates the remaining 50% of projected household growth weighted toward workforce housing needs, embracing the premise that workers should be allowed to live throughout a labor market area.

There are two parts to Component 2.

- a. The state's Workforce Housing Statute states that: *"In every municipality that exercises the power to adopt land use ordinances and regulations, such ordinances and regulation shall provide reasonable and realistic opportunities for the development of workforce housing."* To satisfy this clause, the model considers the share of the state's employment that exists in the labor market area (LMA) in which a jurisdiction is part.
- b. *"A municipality's existing housing stock shall be taken into consideration in determining its compliance..."* The model then reapportions housing production to jurisdictions based on their share of the defined LMA housing units. The model effectively says that all jurisdictions should contribute to the workforce housing needed for a functioning labor market. Those that have not contributed to historical growth must catch up to a reasonable vacancy rate and by building housing for permanent residents.

A balanced approach. We recommend weighting Components 1 and 2 equally for two reasons:

- Weighting household growth too heavily would perpetuate the state's trends of declining workforce, which is linked to lack of affordable housing;
- Weighting household growth too heavily would create labor markets where older adults exist without the workforce needed for them to age and receive adequate health care, home care, and related supportive services.

Therefore, the model assumes an equal balance between household growth and workforce growth.

The model also balances housing needed to accommodate future growth with existing needs and accounts for deficiencies in housing provision. The model includes a factor to bring the state's housing vacancy rate up to a functioning level. This reflects current need, particularly the need for units in high demand, low vacancy jurisdictions. It also corrects for past exclusionary practices that have resulted in a very low supply of workforce housing units.

The model does not factor in housing in poor condition because public data are unavailable. As such, Regional Planning Commissions should work with jurisdictions to increase their housing production numbers to account for units that are inhabitable, not appropriate for workforce housing, and/or will be demolished.

Buildable land and infrastructure considerations. Housing production can be constrained by limited public infrastructure—water and sewer systems and roads—which is often costly to extend. A similar constraint is found in difficult-to-develop land. Allocating an unrealistic number of units to jurisdictions where infrastructure and

developable land are major impediments could result in an underproduction of housing units statewide.

To correct for this risk, the Office of Planning and Development developed a worksheet that estimates the buildable area by jurisdiction after accounting for environmental constraints (water bodies, wetlands, and steep slopes > 20%), public roads, and conservation/public land restrictions. The buildable land is categorized by the number of acres that are (1) within a 500 foot buffer of public water and sewer systems; or (2) within 500 feet of one but not both; or (3) outside a 500 foot buffer from public water and sewer systems. Buildable land includes land with existing housing or other structures since some of this land could lend itself to infill development.¹

This buildable land worksheet was used to check each jurisdiction's capacity to accommodate housing production numbers (see Development Capacity Test worksheet description in the Technical Appendix). That exercise estimates new unit capacity based on two scenarios: four units/acre and one unit/acre and flags jurisdictions in which there may be insufficient capacity to meet the housing production numbers.

¹ RSA 674:58 (III) allows municipalities to take into account land that may be "unduly inhibited by natural features."

Technical Appendix

This appendix accompanies the Fair Share Housing Production model. It defines the parameter variables, describes the function of each worksheet within the Excel model (with a **How to use this worksheet** section for relevant worksheets (an absence of that indicates the formulas/worksheet is a feeder sheet), and steps through the model formulas. It is organized by worksheet tab.

Parameters. This worksheet contains the assumptions that drive the model including:

- **Headship Ratio 2020.** This assumption “fits” people into households. It is based on 2020 Census data.
- **Component weight parameters.** This assumption determines the weights applied to population and household growth v. employment-driven growth.
- **Vacancy rates.** This assumption is the statewide rental and ownership vacancy rate to achieve a functioning market that is applied to the housing production numbers.
- **Workers.** This assumption is the number of workers per household; it “fits” workers into housing units. A lower number of workers per housing unit increases housing production needed at lower AMI levels.
- **Ownership rate.** The 2020 statewide ownership rate that is held constant to determine the share of new households who will be owners v. renters.
- **Development capacity.** These assumptions feed the Development Capacity Test worksheet. They determine the share of developable land that will be residential development, the average units per acre for both land with and without public water and sewer systems, and the efficiency of a land parcel to accommodate development.

How to use this worksheet. Users can change the following fields within the worksheet to see how unit production changes with changes in economic and planning assumptions.

- **Headship Ratio 2020.** Changing the parameters will change household formation rates and therefore housing unit demand. It is advised to change the assumptions for illustrative purposes only. As this assumption is a major driver of housing units production estimates, any permanent changes should be agreed upon and applied across RPCs.
- **Component weight parameters**—could be changed if a policy decision is made by the Fair Share Allocation Committee to weight population and household growth and employment growth differently. This field flows to Component 1 and Component 2 worksheets.
- **Vacancy rates**—could be changed to increase or lower the target residential vacancy rates for owner and rental housing. Note that the current rates are those considered reasonable industry standards, which

allow households to move among units and between rentership and ownership to maximize housing choice.

- **Workers**—could be changed to reflect changing workforce to housing unit trends.
- **Ownership rate**—could be changed if sustaining 2020 homeownership rates appears to be inconsistent with trends, as new data on homeownership become available from the American Community Survey.
- **Development capacity**—could be changed to replicate realistic or changing development patterns. Changes should be agreed upon and documented to avoid inconsistencies among regions and appearance of bias.

Fair Share Tables. This worksheet contains the resulting housing production numbers by jurisdiction and region for 2025, 2030, 2035, and 2040, by tenure and AMI. The AMI thresholds by tenure used household size are determined by the State Workforce Housing law.

How to use this worksheet. These are the final housing production numbers. Users should copy and paste these tables for sharing with jurisdictions and other appropriate audiences.

This worksheet also **contains fields for a reapportionment** by RPCs based on:

- **Uninhabitable and poor condition units and Known future demolitions.** If a jurisdiction has known and significant uninhabitable housing units and/or known future demolitions, the housing production number should be increased by the number of uninhabitable, poor condition, and to-be-demolished units.
- **Buildable land and infrastructure.** RPCs should look to the Development Capacity Test worksheet Insufficient Capacity flags. Those flags indicate the units that could be developed on buildable land assuming three density scenarios (four units to an acre, 1.5 units an acre, and one unit to an acre).

If a jurisdiction does not have sufficient capacity to accommodate its housing production numbers, RPCs should contact those jurisdictions, confirm the limitation, and explore solutions.

Solutions could include:

- Modest upzoning and/or modified setbacks of land with water and sewer connections, especially in exchange for affordability of a certain share of units;
- Exploring funding to extend infrastructure in strategic locations where development is likely to occur;

- Repurposing existing underutilized property—both residential and commercial—to accommodate housing. Utilizing infill, redeveloping existing properties, and facilitating ADU development, are all reasonable solutions that should be considered in this situation.
- **Opportunity index.** The opportunity index is based on New Hampshire Housing’s opportunity index used in Qualified Allocation Plan scoring for Low Income Housing Tax Credit (LIHTC) development proposals. This index uses NH Hampshire Housing’s scores for prosperity, education, and health to measure access to economic opportunity.

Higher values indicate jurisdictions with better access. The RPCs should be mindful of reapportioning units from high to low opportunity areas without sufficient rationale. Methodology for the index is appended to this report.

- **Community resources.** This factor uses the Assessed Valuation of property as a proxy for the ability of a jurisdiction to dedicate resources and budget for growth. It is presented as the jurisdiction’s value per acre and the proportion of the RPC’s total valuation. The RPCs should look to these measures to understand a jurisdiction’s relative ability to provide services to new households and support growth in the region.

Reapportionment considerations. If an RPC needs to reapportion units, it should consider dividing that reapportionment among several, adjacent communities, rather than assign the full reapportionment to a single community. In addition:

- The apportionment should consider units by tenure and AMI (v. a broad reapportionment of total housing production numbers).
- Reapportionment should occur among communities within the same LMA, or closely adjacent LMAs. Great weight should also be given to communities with regional employment centers.
- Greater weight should be given to communities with high opportunity indices—indices that are 4.0 and higher. In keeping with typical affordable housing policies, it is reasonable to assign a 10% to 15% boost in reapportioned *affordable* units to high opportunity communities.
- After reallocating based on the opportunity index, RPCs should look to the community resources measure to ensure that communities have the capacity to support growth of the reallocated units. Communities with very low valuation per acre relative to other communities in the region are likely to have trouble absorbing growth without additional funding.

Fair Share Numbers. This worksheet adds the numbers in Component 1 and Component 2 to produce a total housing production number, by jurisdiction, by tenure, by AMI, and for 2025, 2030, 2035, and 2040.

Development Capacity Test. Total developable land by jurisdiction was determined by the Office of Planning and Development, who developed a model in GIS that estimates the buildable area by jurisdiction after accounting for environmental constraints (water, wetlands, steep slopes > 20%), public roads, and conservation/public land restrictions. The buildable land is categorized by the number of acres that are (1) within a 500 foot buffer of public water and sewer systems; or (2) within 500 feet of one but not both; or (3) outside a 500 foot buffer from public water and sewer systems. Buildable land includes land with existing housing or other structures since some of this land could lend itself to infill development.

An adjustment is applied to the total number of buildable acres to account for non-residential land (commercial, industrial, institutional); this is currently set at 20% of land and is changeable in the Parameters worksheet. The model also applies an “efficiency” adjustment—currently set at 65% and changeable in the Parameters worksheet—to account for parts of parcels that may not be developable.

The model assumes the following densities:

- 4 units per acre² for land within a 500 foot buffer of public water and sewer systems;
- 1.5 units per acre for land within 500 feet of one but not both;
- 1 unit per acre for land outside a 500 foot buffer from public water and sewer systems; and
- For Concord, Manchester, and Nashua, density is assumed at 8 units per acre rather than 4 units per acre for land within a 500 foot buffer of public water and sewer systems to reflect historical development patterns and densities.³

It then aggregates the buildable land under the above densities and removes current housing units to calculate the potential for new units. Where the potential for new units is less than the housing production numbers under the above assumptions, the model flags that condition with “1”. The column on the far right shows excess unit capacity—or, if negative, shortage—beyond what is needed to accommodate 2040 housing production needs.

Three worksheets provide the source data for the Development Capacity Test worksheet: Data Development Capacity Test, towns_polygon_Build_Watsew, and towns_build_notbuild_types

² An acre is 43,560 square feet; for example, four units per acre would be a 10,890 sq ft lot on average.

³ If this is not assumed, the model incorrectly attempts to house existing residents in densities too low to accommodate current population.

How to use this worksheet. Users should examine the “Insufficient Capacity” flag for the jurisdictions in their region. It is important to note that this flag is meant to be an initial but blunt first step in assessing development capacity. After examining the flagged data, and evaluating the capacity against the assumptions used, RPCs may want to contact jurisdictions to discuss options for increasing development capacity.

Component 1. This worksheet takes the number of projected households, separately for owners and renters, and applies the share of growth allocated to Component 1 in the Parameters worksheet. It then distributes owner and renter households to above and below AMI categories as determined by the Workforce Housing Statute: 100% 4-person AMI for owners and 60% 3-person AMI for renters.

Component 2. This worksheet allocates the remaining share of projected household growth for the State of New Hampshire overall to jurisdictions by weighting their share of state jobs and their share of housing units within the LMA.

The premise of this component is that jurisdictions are expected to support the LMAs in which they exist by providing the same share of housing for workforce that they do for all types of housing units. It also corrects for undersupply relative of housing in jurisdictions that have not contributed a fair share of workforce housing. Jurisdictions that have not been providing workforce housing relative to their share of all units will increase housing production numbers; the inverse will reduce housing production numbers.

Units are distributed according to the AMI distribution derived from average wages by industry in each LMA. For example, if the model concludes a jurisdiction needs 10 rental units, and in the LMA 20% of all employment belongs to the retail industry, then 2 units will be assigned the average wage level of the retail industry. To calculate the annual income, the annual wage level of the retail industry is multiplied by 2 workers per household. The resulting income level is then compared to the regional AMI brackets to assign the units to the appropriate AMI bracket (e.g., below or above the 60% AMI for a 3-person household).

Headship Ratio. The demographic projections conducted by RLS Demographics (*State of New Hampshire State, County, and Municipal Population Projections: 2020-2050*, Robert Scardamalia RLS Demographics, Inc. and New Hampshire Department of Business and Economic Affairs). included projected numbers of people (not households) by age cohort. To form residents into households, this worksheet applies a “headship ratio,” which converts people into households based on the share of households to people in 2020. The headship ratio is used in the Population and Households worksheet to convert projected population growth in to projected household growth.

Population and Households. This worksheet contains the population forecasts by age cohort from the RLS Demographics report. Those are presented for 2020, 2025, 2030, 2035, and 2040. The Headship Ratio is then applied to convert people into households and

then into households added, by subtracting total households from 2020 households. The Households Added fields feed the Tenure worksheet.

Tenure. This worksheet divides the households added into owners and renters.

It also contains the vacancy adjustment. The vacancy adjustment increases housing production to achieve a reasonable vacancy rate for ownership and rental housing. These numbers exclude housing that is vacant for seasonal and recreational use. Housing production numbers represent the units needed for year-round residents, including workers, families, and retirees.

That adjustment is as follows:

- 1) The projected numbers of units needed to accommodate new owners and renters are increased by the desired vacancy rates; this ensures that these new households have an ample supply of homes from which to choose.
- 2) An adjustment is applied to fix the current deficit of housing. That adjustment increases or lowers a jurisdiction's housing production number based on the county's current level of vacant for sale and for rent units and applied to the jurisdiction with a population weight. Each jurisdiction is assumed to have the countywide vacancy rate estimated by the latest New Hampshire Housing Rental Cost Survey Report; these units are then subtracted from the units needed to reach a 5% vacancy rate. To estimate vacant units for sale, the number of "vacant for sale units" from the Census is used; these units are subtracted from the units needed to reach a 2% vacancy rate. That deficit "catch up" is spread out over the 20 years modeling time period.
- 3) The result is a final housing production number with vacancy adjustments.

LMA Data. This worksheet feeds the Component 2 worksheet. It contains the share of state jobs for each jurisdiction based on that jurisdiction's inclusion in a Labor Market Area (LMA). LMAs are defined by the U.S. Bureau of Labor Statistics, a map of the LMAs used can be found here: <https://www.nhes.nh.gov/elmi/tools/documents/nh-towns-lma.pdf>

It also compares the housing units in each jurisdiction to the LMA.

The second part of the worksheet contains the distribution of jobs across industries. This distribution is used in the Renter and Owner Industry Distribution worksheets to assign workers to specific industries. The average wages of those workers by industry determine the AMI categories for housing units.

AMI Distribution. This worksheet contains the proportion of each jurisdiction's owners and renters that fall above the AMI levels determined by the Workforce Housing Statute: 100% 4-person AMI for owners and 60% 3-person AMI for renters. The regional

AMI measure is created by averaging the AMI assigned to each town in a region. The average is a weighted average where the weight represents the share of occupied housing units in a town as a percent of total occupied housing units in the region—obtained from Census counts included in table H1: Occupancy Status. See the accompanying memo "Regional AMI methodology."

Wage AMI Distribution, Renter Industry Distribution, Owner Industry Distribution. These worksheets all feed the Component 2 worksheet. They are used to fit average industry wages by profession into the above or below AMI categories for owner and renter households. Data used for this analysis can be found here: <https://www.nhes.nh.gov/elmi/statistics/qcew-ann-data.htm>

Vacancy Data. This worksheet contains the number of vacant units for sale and for rent and is used for the vacancy adjustment in the Tenure worksheet to ensure that the existing supply of vacant units that could be occupied by owners and renters are considered in the housing production numbers.

Supporting worksheets. Several worksheets appear after the Vacancy Data tab. These are informative in nature and contain the source data for the key variables in the model described in this Technical Appendix.