Memo

To: Melanie Needle, *CCRPC*
CC: Charlie Baker, *CCRPC* and Jonathan Slason, *RSG*
From: John M. Dellipriscoli and Robert A. Chase, *Economic & Policy Resources*
Date: March 8, 2017
Re: Revision to Municipal Forecasts – Population, Employment, and Households

After presenting the results of our initial population, employment, and households forecasts for Chittenden County and its respective municipalities in the February 15, 2017 CCRPC Board Meeting, EPR has adjusted each forecast. The adjustments to the forecasts take into consideration the comments from the municipal representatives to CCRPC and the Planning Advisory Committee ("PAC") in response to the materials provided in the February 15 meeting, as well as a re-specification of each forecast model based on an adjustment to the historical data. Please note that all of the adjustments were made at the municipal level, as we have accepted the county level forecasts as final. This is in line with our methodology for each forecast – the population, employment, and household forecasts are derived from the June 2016 county forecasts provided by Moody's Analytics. The municipal forecasts are correlated to the overall county forecast and don't specifically address individual indicators in the municipalities.

We will briefly provide an explanation on what has changed in each forecast and specifically address comments and questions provided to us from the PAC and other municipal representatives. If we do not address a particular question or comment specifically it is because we hope that the updated explanation of the forecast will address it.

Summary Points

Before getting into the details of the revised forecast, just a few points that can help resolve some outstanding comments/questions:

- With these population and employment forecasts, Chittenden County is expected to be the leader in Northwest Vermont and the State of Vermont in population and employment growth.
- We have focused on using "data-driven" techniques in our methodology. Rounds of revisions and reallocations of population and employment to municipal areas are done within the context of comments and questions from CCRPC staff and the PAC however are ultimately backed by statistical relevance.
- To clarify this point even further, the municipal forecasts are driven by the county forecasts. We are confident in the county forecasts although there is a significant degree of error and room for re-specification regarding the municipal forecasts. EPR typically

400 Cornerstone Drive, Suite 310 | P.O. Box 1660 | Williston, VT 05495-1660
(802) 878-0346 | (800) 765-1377 | info@epreconomics.com | www.epreconomics.com

ECONOMIC, POLICY, AND FINANCIAL ANALYSTS

uses a shares-based methodology to first try and explain the variation at the municipal level and then make adjustments based on other factors specific to the municipality. This comes from our own research but mainly in this process from the comments and suggestions of the local planners and officials that make up the CCRPC. We want to get the numbers to a level that makes sense from the point of view of the municipal experts as well as have some statistical reliability and most importantly an overarching county demographic explanation.

- The 2040 – 2050 population, employment, and household numbers are projections based on the trends in the earlier years. Adjustments and re-specifications may be necessary based on the revisions however more focus should be spent on the near term forecasts.

Population Forecast Revisions

The major revision to the population forecast is a function of a correction back to the actual population estimates from the U.S. Census for the historical years. We believe the initial municipal forecast model was not correctly specified in trying to correct for the initial revision we made to the county level population forecast in December 2016. Rather than using adjustments that corresponded to American Community Survey ("ACS") data which are projections, we reverted to the actual population estimates for each municipality in order to get a more accurate view of what was going to happen in the future. You will see in the attached forecast the 2010 and 2015 population estimates correspond to the U.S. Census estimates and have not been adjusted.

We also reverted to a shares-based forecast for each municipality to start the revision based on the share of county population in 2015. After evaluating and comparing the shares-based numbers, we made adjustments similar to the previous round of forecast – accounting for 2010 to 2015 population growth as well as 2010 – 2015 housing growth provided to us by the CCRPC staff. Along with those adjustments, we ran a vector auto-regression ("VAR") for each municipality against the county population forecast and evaluated to see if it was more appropriate to use the results from a VAR forecast for a municipality rather than a shares-based forecast. The VAR forecasts were utilized for Bolton, Charlotte, Colchester, Hinesburg, Jericho, Richmond, St. George, and Underhill. The use of regression-based forecasts for some municipalities normalized their population growth and in most cases (except for Charlotte, which stayed nearly the same as the initial forecast) decreased the population in each period when compared to the previous forecast.

The reduction in forecasted population in those municipalities, as well as the reduction in forecasted population in some municipalities due to the reversion to the actual Census data and

400 Cornerstone Drive, Suite 310 | P.O. Box 1660 | Williston, VT 05495-1660
(802) 878-0346 | (800) 765-1377 | info@epreconomics.com | www.epreconomics.com

EPR
ECONOMIC & POLICY RESOURCES

ECONOMIC, POLICY, AND FINANCIAL ANALYSTS

PAGE 2

the shares-based methodology, led to the existence of a residual population in the county that required a reallocation to municipalities. Based on the comments from the PAC and considering the data that indicates more housing in the metro-areas of the county, we reallocated residual forecasted population throughout Burlington, South Burlington, Williston, Shelburne, Essex, and Milton. This reallocation accounted for some of the scale issues that we faced in the initial forecast, namely that Williston was increasing at levels that might have been unrealistic especially when compared to other areas like Burlington and South Burlington

The attached revised forecast shows the results for each municipality as well as a comparison of the change from the initial forecast.

Employment (Jobs) Forecast Revisions

Similar to the revised population forecast, we thought it was best to return to a shares-based methodology to examine whether our initial forecast needed to be dramatically altered in order to align with some of the PAC comments and better understandings of each municipal outlook. For instance, we noted that our employment forecast for Essex (Town and Junction) did not align with the projection from GBIC. The GBIC predicted that the share of county employment would increase in Essex in the future. In our initial forecast, we had Essex's share of county employment actually falling. To arrive at a compromise, we fixed the share of Essex's employment at its 2015 level through 2050. This resulted in an increase of nearly 13,000 jobs from 2015 through 2050 for Essex when compared to the initial forecast.

For some municipalities, reverting to a 2015 shares-based methodology decreased the forecasted levels of jobs when compared to the initial forecast. This included Bolton, Charlotte, Colchester, Milton, Richmond, St. George, Underhill, Westford, and Williston. For areas in which we believed the initial employment forecast was well specified, we kept the initial forecasts results. This included Hinesburg, Huntington, Jericho, and Winooski.

Similar to the revised population forecast, after making some preliminary adjustments to municipalities' employment forecasts, there were residual jobs forecasted in the county that we needed to reallocate to other municipalities. In keeping with the theory that these jobs would more likely be found in the metro areas, we reallocated the residual jobs to Burlington, Colchester, Milton, South Burlington, and Williston.

The attached revised forecast shows the results for each municipality as well as a comparison of the change from the initial forecast.

EPR
ECONOMIC & POLICY RESOURCES

400 Cornerstone Drive, Suite 310 | P.O. Box 1660 | Williston, VT 05495-1660
(802) 878-0346 | (800) 765-1377 | info@epreconomics.com | www.epreconomics.com
ECONOMIC, POLICY, AND FINANCIAL ANALYSTS

PAGE 3

Household Forecast Revisions

The household forecast revisions are mainly driven by the revised population forecast. In this case, we allowed the county level number of households and household population to fluctuate with the revisions to the municipal forecasts, since we did not actually do that much revision. The major change is the change in households in Burlington, which we were urged to reconsider given the residential development plans. To revise this, we simply fixed the household size forecast for Burlington and allowed the number of households to move with the change in the household population forecast, which is anchored to the revised population forecast – again, data driven but within the context of local comments. Further, we corrected for the population forecast revision for Huntington, Richmond, St. George, Underhill, and Westford. The rest of the forecasted municipality households we left unchanged.

A reminder that the original household forecast was comprised of regression forecasts based on the growth at the State level. For this reason, we thought it more prudent to keep the household levels fixed for most of the municipalities in the revised forecast but allow the population living in households fluctuate. This results in revised forecasted household sizes for the county (because we allowed the total households in the county fluctuate even though county level population was unchanged) and municipal areas.

Some comments related to the fact that some areas have rather flat household growth and this is what we would expect when we run a regression with an area which did not show strong historical growth in households, at least in the 2010 – 2015 time period.

The attached revised forecast shows the results for each municipality as well as a comparison of the change from the initial forecast.

400 Cornerstone Drive, Suite 310 | P.O. Box 1660 | Williston, VT 05495-1660
(802) 878-0346 | (800) 765-1377 | info@epreconomics.com | www.epreconomics.com

ECONOMIC, POLICY, AND FINANCIAL ANALYSTS

PAGE 4