

# FIVE

## Analysis and Comparison

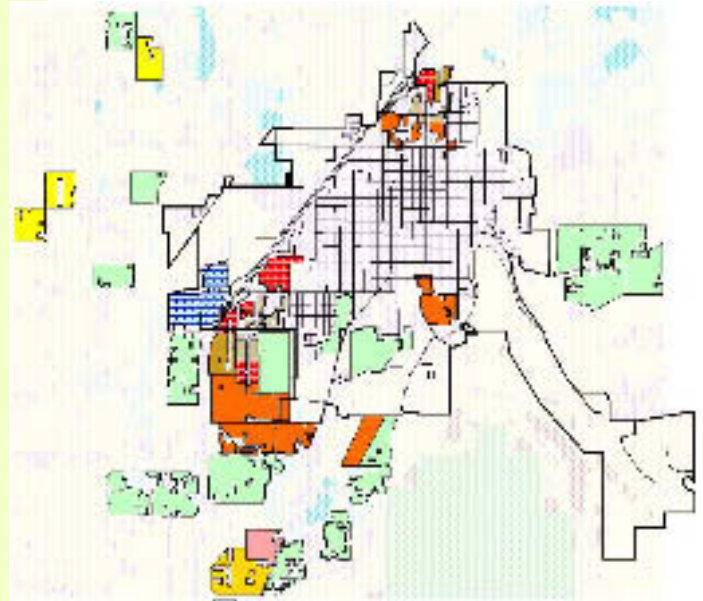


The Quality Growth Efficiency Tools (QGET) Technical Committee used quantitative modeling to provide growth related information for policy makers and the public in the areas of land use, transportation, air quality, water, and infrastructure. The technical analysis of the Nebo Vision scenario showed mixed results for these indicators when compared to the Baseline scenario. This was in part because small land use changes were more difficult to represent in the model and did not significantly change modeled results. QGET did not perform qualitative analyses such as those addressing quality of life and the benefits of open space, though some of these aspects are implicitly considered in the modeled results. The most critical model results are included here. Additional analyses are available on the project CD or through QGET.

Land-use varied widely by community basis. Each community selected varied types of development to accommodate new growth. Compared to the baseline, the Nebo Vision scenario:

- Conserved 9,234 acres of new land developed.
- Transportation modeling showed little difference in speeds and trip time between the Baseline and the Nebo Vision.
- Air quality experts did not find significant differences in mobile emissions.
- Water modeling demonstrated that density and overall municipal area affected water consumption.
- Infrastructure modeling demonstrated that dispersed patterns of growth cost more overall than clustered development because the infrastructure system required more materials for connections.

QGET seeks to improve the quality of information available to plan for Utah's future. The QGET Technical Committee consists of technical experts from state and local government, as well as private practice. These representatives analyze growth issues related to demographics, economics, transportation, air quality, land use, water availability, and infrastructure costs. The Governor's Office of Planning and Budget (GOPB) coordinates QGET's work. QGET does not consider what the future "ought to be like" but instead provides analysis for individuals to understand what the future may be like under a specific plan. The Nebo Community Vision process represented the first time that local land use plans, transportation, air quality, and water demand modeling, were integrated into a single study. Bringing each of these disciplines and entities together provided insight into how planning could be improved in the future.



## ANALYSIS METHODOLOGY

### *Limitations*

Nebo Community Vision represented a unique modeling challenge. While the study area was subset of a larger planning region, it was also a composite of 10 local communities with individual and distinct land use plans. Because analyses focused on a sub-region of a larger modeling area, small land use changes did not generally impact modeled results in a significant way. Policy changes that reflected actions taken by a much greater population over broader area would be more visible to the larger regional models, such as the transportation and air quality models.

The technical analysis of the Nebo Community Vision was meant to provide relevant information to policy makers and the public about the possible future for the region. It should be thought of as a work in progress, the findings of which will evolve as new and better information becomes available. The estimates reported in the analysis are conservative, and additional benefits may be found when it is

considered as part of the overall greater Wasatch area. All modeling was conducted at the regional or community scale, and was not intended for site-specific evaluations. The quantitative analyses were limited to the subject areas of transportation, air quality, land use, water, and infrastructure costs. However, a discussion of community and regional open space and associated benefits are also included here.

### *Study Area*

State-of-the-art GIS (Geographic Information System) was used as the basis for all modeling. Every effort was made to ensure that modeling was as accurate as possible and that the futures being considered were based on common assumptions. The first step was to define the Nebo study area. Technical constraints required this area to maintain rectangular coordinates so a square was drawn around the furthest dimensions of the 10 Nebo communities' annexation declarations, including land beyond the community boundaries.

### Demographics

The Nebo Community Vision study area was unique in its demographic characteristics as compared to the nation, and even the State of Utah. The 2000 Census confirmed the historical trends in Utah County. Utah County remains characterized by large household sizes, a young population, high fertility rates, and population increases attributed largely to local birthrate. At 2.59 people, the average household size of the United States was significantly lower than that of Utah, which was 3.13 people. Utah County's average household size of 3.59 was even higher than the state average and was over 35% higher than the national average. Similarly, the median age of 23.3 years in Utah County was 3.8 years younger than the State of Utah (27.1), and 12 years younger than the United States (35.3).

Due to its demographics and large amounts of developable land, the Nebo Community Vision area experienced significant population growth in the past decade. This trend is expected to accelerate in the future as the Wasatch Front continues to expand southward and as more people seek the semi-rural setting of the Nebo area. Between the year 2000 and 2020 the population of the Nebo Community Vision area was projected to nearly double.

### Baseline Land Use

In order to represent the future based on current plans, local planners were enlisted for their knowledge of local trends to create a land-use baseline scenario with a 20-year time horizon. One difference between local and regional plans is timing. Local plans change more frequently than regional plans, and thus, regional plans may represent differing local plans at any given time. Another difference is the use of population and employment constraints along with a given timeline. The time extent for local plans may vary from two to seven years whereas regional plans take a much longer view, usually 20 to 30 years. The Baseline was an amalgam of current planning practices, and therefore did not always represent the true effects of potential land use changes.

### Nebo Vision Land Use

Three public workshops were conducted throughout the Nebo region to determine how the public thought development should occur. First, partici-

pants identified and connected open spaces of significance and value *before* placing chips representing households by development type, area, and density. The green space designs became *de facto* constrained areas, as most people chose to preserve them by locating development elsewhere. Workshop maps and responses were analyzed and synthesized to arrive at the Nebo Community Vision, which QGET then programmed into the GIS, forming the basis for the quantitative analysis of both the Baseline and Nebo Vision futures.



### Open Lands

The Nebo communities enjoy a small town feeling created by tree-lined country lanes, mountain views, abundant wildlife, recreational opportunities and expansive open farms. Though not analyzed in the formal spatial modeling conducted by QGET, open space provided context and played an important role in the generation of the alternative scenarios created by the public. Workshop participants had a very difficult time sacrificing open space to accommodate future development. Almost without exception, they opted to utilize alternative development types—such as conservation subdivisions and higher density urban types—to cluster households and protect their valued open space. This approach was so popular that the total number of acres dedicated to low density development (defined as lots from one to ten acre) dropped from 12,944 in the baseline scenario to only 817 in the vision scenario. This shift in thinking was evidenced in the vision scenario as an incredible 4,568 acres were designated as conservation subdivisions. The amount of designated open space also changed considerably. While 472 acres (less than 2%) of unconstrained land were added to the plan as open space in the Baseline, 88% of the study area was identified as open space in the Nebo Vision Scenario.

# MODELING RESULTS

**TABLE 3** **BASELINE INFRASTRUCTURE REPLACEMENT COSTS**  
(in millions of dollars)

## *Infrastructure*

	Road	Water*	Sewer*	Total
Springville	\$32.7	\$36.0	\$24.4	\$177.6
Mapleton	\$16.9	\$17.9	\$13.5	\$97.1
Spanish Fork	\$30.8	\$32.6	\$23.0	\$168.4
Salem	\$8.5	\$9.6	\$6.8	\$48.6
Woodland Hills	\$3.5	\$3.4	\$2.7	\$12.0
Elk Ridge	\$5.5	\$5.5	\$4.3	\$18.9
Payson	\$31.6	\$32.2	\$23.3	\$169.3
Santaquin	\$20.3	\$17.9	\$12.1	\$93.3
Genola	\$1.9	\$1.8	\$1.5	\$6.4
Goshen	\$0.8	\$0.8	\$0.7	\$2.9
Unincorp. County	\$7.0	\$6.9	\$5.4	\$23.9

*\*Note: Figures exclude facility costs.*

The infrastructure cost analysis for the Nebo Community Vision project utilized both QGET's Infrastructure Cost Assessment Model (ICAM) and its Municipal Infrastructure Cost Assessment Model (MICAM). The ICAM model was used on the smallest four communities, along with the unincorporated area in southern Utah County. This model fit these areas most appropriately because:

- The existing development pattern was dispersed.
- There was a small incremental increase of expected development over the study time horizon.
- New development was expected to occur in the form of relatively large residential development.

For the remaining six communities, the QGET analysis utilized the new MICAM model. This model allowed QGET to consider both residential and commercial development impacts according to density and location, relative to the core community, at which incremental development occurred. Primary considerations to infrastructure costs were the relative mix of land use between activities, the den-

sity and quantity of development, along with the effect on the municipal boundary in order to service new development. For this reason the MICAM model results included an account of land use in the form of net density. In this case, net density excluded public easements for density calculations.

For the region, infrastructure costs totaled \$442 million for the Baseline and \$447 million for the Nebo Vision. These figures are comprised of: \$159 million in roads for the Baseline and \$164 million for Nebo Vision; \$165 million in the Baseline for water conveyance and \$166 million for the Nebo Vision; and \$118 million for sewer conveyance in the Baseline and \$116 million in the Nebo Vision. Though density decreased in the Nebo Vision for the six large communities, the pattern of development continued away from the urban core. The land-use accounting framework showed significant potential for infill development within all of these communities. Location of development proved to be the primary driver behind infrastructure costs.

**TABLE 4 NEBO VISION INFRASTRUCTURE REPLACEMENT COSTS**  
*(in millions of dollars)*

	Road	Water*	Sewer*	Total
Springville	\$36.2	\$38.5	\$25.6	\$187.8
Mapleton	\$17.6	\$18.2	\$13.3	\$49.1
Spanish Fork	\$30.0	\$31.4	\$21.3	\$157.3
Salem	\$9.8	\$10.7	\$7.7	\$55.1
Woodland Hills	\$3.5	\$3.4	\$2.7	\$12.0
Elk Ridge	\$4.9	\$4.9	\$3.8	\$16.8
Payson	\$33.4	\$33.4	\$24.0	\$174.8
Santaquin	\$21.6	\$17.9	\$11.2	\$90.8
Genola	\$1.8	\$1.7	\$1.4	\$6.1
Goshen	\$0.8	\$0.8	\$0.7	\$2.9
Unincorp. County	\$5.1	\$5.3	\$4.0	\$17.9

*\*Note: Figures exclude facility costs.*

*“It is not development that causes problems, only patterns of development” - Tony Hiss*



While these analyses reveal the trend of compact development being more efficient, cost-effective, and resource conserving, participants in the Nebo Community Vision project knew instinctively many of the same things. Quality of life is something hard to measure, but easy to recognize. The Nebo Vision Scenario was created with this wisdom. The West is the most urbanized region of the county. Westerners are used to living in towns or close to them, and are not outright opposed to dense development. What they most often oppose is development that diminishes the qualities that brought them here - the views, wide open spaces,

easy opportunities to get away from the city, outdoor recreation, casual lifestyle and an independent mindset. Throughout the workshops and discussions, the emphasis was on preserving the essence of the western lifestyle, by any means available. Higher densities are a trade off for large open lands, shorter commutes, less taxes going to roads and utilities. And planning for long term, with an eye on making the most of the land, makes all of these benefits attainable.

*Land Use*

Region wide, new development in the Nebo Vision scenario consumed 9,161 new acres of land, roughly half the 18,875 acres used in the Baseline. Of the new land consumed in the baseline, 13,971 acres were taken out of agricultural use as compared to the 6,574 acres in the Nebo Community Vision. These results varied widely on a city-by-city basis. It is interesting to note that of the 9,714 acres of land saved between the Vision and the Baseline, 65% of the land savings was in the unincorporated county.

The Nebo Community Vision represents a plan that can help perpetuate the region's character. Land use can impact a community's character, size, and feel; the location of every day destinations; water resources required to service the community; and infrastructure costs. Modeling results showed that variations in community planning could have an effect on the quality of life. The results discussed here suggest that the Nebo Community Vision could provide a cost effective strategy that does not compromise, but enhances, community values.

**TABLE 1 SUMMARY OF BASELINE DEVELOPMENT TYPES**

<b>Development Type</b>	<b>Households (per 50 Acres)</b>	<b>Lot Size (acres)</b>	<b>Households (placed)</b>	<b>Acres (built)</b>
Rural/Agriculture	5	10.00	897	8,972.14
Rural/Residential	10	5.00	273	1,404.34
Low Density	50	1.00	2,530	2,568.31
Residential	125	0.40	1,976	795.84
High Density	200	0.25	10,375	2,740.39
Multi-Family	325	0.15	3,074	488.72
Retail	na	na	0	786.99
Industrial/Commercial	na	na	0	440.42
Open Space	na	na	0	369.62
Agriculture	na	na	0	101.92
Special Mapleton		2.00	103	206.58
<b>Total</b>			<b>19,228</b>	<b>18,875.27</b>

**TABLE 2 SUMMARY OF NEBO VISION ALTERNATIVE DEVELOPMENT TYPES**

<b>Development Type</b>	<b>Households (per 40 acres)</b>	<b>Lot Size (acres)</b>	<b>Households (placed)</b>	<b>Acres (built)</b>
Rural	5	8.00	40	200.38
Residential	40	1.00	616	617.27
Residential	100	0.40	1,220	489.89
Residential	160	0.25	4,920	1,232.66
Residential	240	0.17	3,120	521.85
Neighborhood	400	0.10	1,700	170.45
Main St.	480	0.08	1,361	130.41
Retail/Commercial	na	na	0	788.43
Industrial	na	na	0	441.20
Conservation Subdivision A	varies	varies	1,135	1,142.58
Conservation Subdivision B	varies	varies	5,116	3,425.79
<b>Total</b>			<b>19,228</b>	<b>9,160.91</b>