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OVERZONING & BUILDOUT ANALYSIS

By Erin Kilpatrick and Mark A. Wyckoff, FAICP, Planning & Zoning Center, Inc.

One of the greatest threats to growing communities is master plans and zoning ordinances that permit, if not encourage, the population to multiply 5-20 times over, without the community making the essential commitment to figure out how to pay the costs associated with servicing this growth. This is called "overzoning". It contributes to sprawl and often defers the true costs of new development to the next generation. In a rural community where the economy is based on agriculture or forest management, overzoning is akin to slowly choking the economic life out of these communities as the natural resource base is lost to large lot residential development and scattered subdivisions. Over time, huge new public service costs are created that often cannot be borne by new residents because the overall density is so low. The social impacts are also large as the original residents are overrun by new residents with a different set of social norms and public service expectations. These economic and social impacts of sprawl are neither new, nor surprising. One technique that serves as an "early warning system" to the potential for these problems is buildout analysis.

The Michigan Society of Planning Officials (MSPO) **Community Planning Handbook (1992)** says that buildout analysis "helps community decision-makers better conceptualize what plans or land use policies (on paper) may result in (on the ground) once such policies are implemented. Buildout analysis is commonly used:

- At the project level (rezoning, plat or site condo proposals)
- To evaluate the existing zoning map and/or future land use map, and;
- To compare the land use impacts of alternative regulatory strategies (e.g., various rural clustering options, different minimum parcel sizes, or changes in the configuration of zoning districts)."

This article focuses on the second of these applications. Buildout analysis is a powerful tool for illustrating the potential impact of master plans and zoning policy if all buildable land develops at the maximum permitted density. It provides a tool used by government, business, agricultural and real estate professionals to measure the impacts of total development on local resources. In Michigan, buildout analysis is most often used at the regional, county, township, city or village levels to gauge the implications of future land use on infrastructure policy.

Buildout analysis is usually performed as a "reality check". If buildout analysis re-

veals the potential for a very large increase in dwelling units and population, then the community should answer questions about its ability to meet the implicit infrastructure needs and associated impacts of this growth on community character, traffic, groundwater, surface water, and open spaces that are inherent in such a policy. When buildout is contrasted with existing population and projected future population based on current trends, then the reasonableness of the existing zoning or master plan can be more readily ascertained. If existing zoning densities result in an enormous buildout, then the community needs to reduce densities to a level which meets available, or anticipated infrastructure and public service capacity. The failure to do so will result in widely scattered development at densities which at some future time are too high to economically service. These costs are not borne by the scattered development, rather they are passed onto future generations. Many taxpayers feel this is both unwise and unfair. It is why "pay-as-you-grow" policies are so popular.

Figure 1 on the next page, shows how communities grow over time. Where development is low in density or higher in scattered subdivisions, future infrastructure costs are often excessively expensive. To find out where a community is on the growth continuum, the preparation of a "measles map" is often useful. Using a parcel base map, place a round dot, or sticker on every parcel which presently has a house on it (based on the assessors records). The resulting pattern usually looks like a case of the measles, but clearly shows the existing scattered residential development pattern. If all new homes in the last couple of years are represented on the map in a different color, the community can map the geographic trend of new home construction.

How to Perform a Buildout Analysis

Buildout analysis involves first identifying lands within a community that are not buildable because they are publicly owned (like state or Federal forests), are committed to roads or utility rights-of-way, or they consist of lakes, streams or wetlands, very steep slopes or hydric (muck) soils. These lands are omitted from the analysis and only buildable lands are considered. Next, all existing fully developed land is mapped and the number of dwelling units on these lands is recorded. Then, the existing zoning density (or proposed density in the master plan) is applied to the remaining buildable land to calculate future buildout (first in terms of dwelling units or square feet of non-residential development, then in terms

Basic Steps of Residential Buildout Analysis

1. Identify and map non-buildable lands (lakes, steep slope, right-of-way, etc.) and other lands already fully developed.
2. Multiply the area of remaining buildable land by the allowed density under local zoning (or the proposed density under the master plan). This results in the maximum dwelling unit potential for the undeveloped area under study.
3. Multiply total buildout dwelling units by the existing population per household to estimate future population. Add to existing population for an estimate of the total potential population of a given jurisdiction at buildout (it is often an unknown future time).
4. Compare buildout population with existing population, with projected population in 20 years, and with likely demands for services and infrastructure and begin to identify how these demands will be met. If there is a serious mismatch, policy must be changed. □

of population and jobs). This can be done area by area (often section by section) such as in a watershed, zone by zone as with the zoning map, or community-by-community.

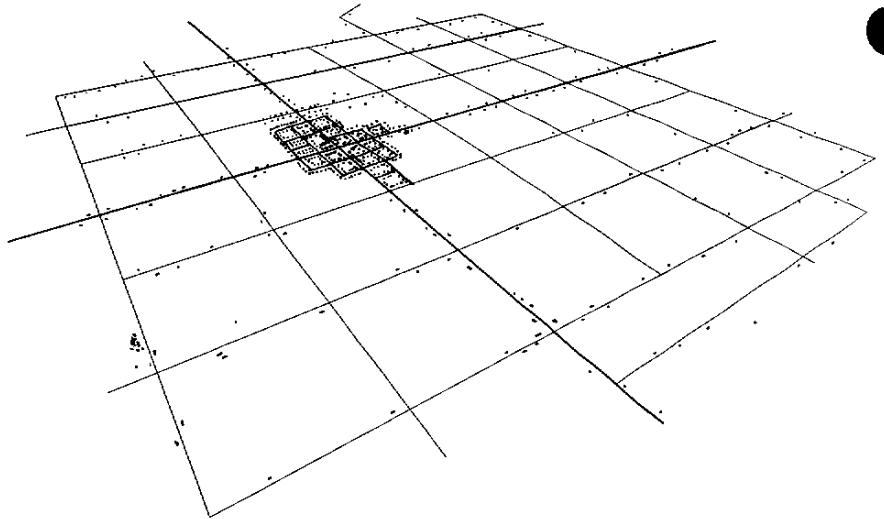
For example, in a typical Michigan township of 36 square miles with an average amount of unbuildable land and 1-acre minimum lot size zoning over most of the undeveloped land, buildout will yield between 48,000 and 54,000 persons at about 3.0 persons per household. This is often 10 times the current population and 2-3 times more than residents usually desire (though they are rarely asked). It will also require huge investment in road improvements, the likely installation of public sewer, water and storm drains as well as new schools, police and fire services. The costs of these services are rarely adequately considered when the local planning or zoning policy is set.

Methodology

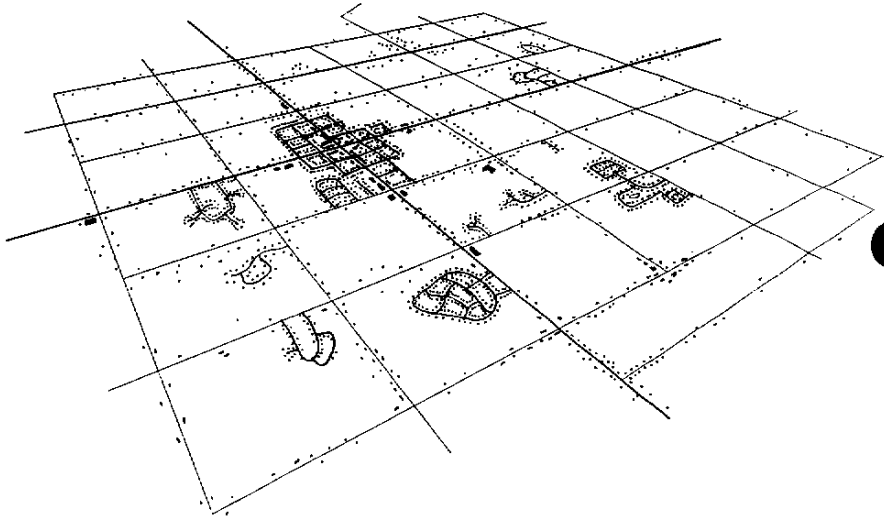
When performing a buildout analysis it is critical to document the methodology and assumptions used in the process so another individual can follow the same procedures and understand the logic of the calculations. Traditionally, buildout analysis has been done by hand with pencil, paper and calculator. A planner would combine a current zoning map and aerial photographs (to show existing developed and undevel-

Figure 1
Where Is Your Community on the Path to Buildout?

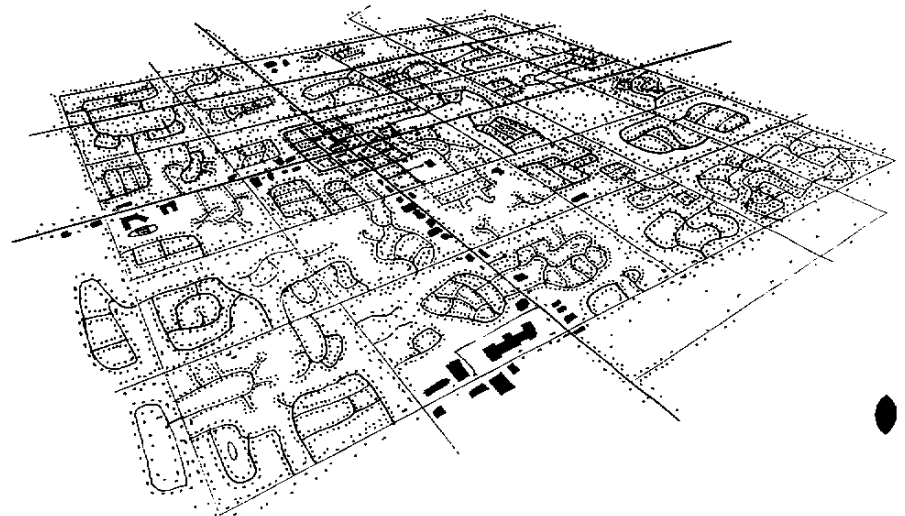
Stage 1: Compact settlement and few rural dwellings. Most people living in the country work off the land in this stage. Small town residents largely live and work in town. Open space surrounds the town in all directions. It is a community with a distinct character.



Stage 2: Scattered rural subdivisions begin to dot the countryside and the rural character is slowly transformed to that of an emerging suburb. Single family homes line most of the county roads and residents commute to jobs in town and elsewhere. Commercial development begins to strip along the main roads – usually with negative effects on the historic downtown. This stage occurs because local zoning permits, if not encourages it. Residential development is often permitted nearly everywhere at low densities and without adequate supporting infrastructure.



Stage 3: All of the rural open space is gone. The only open space is in yards, public parks and rights-of-way. Significant commercial development stretches along main roads for miles outside of town. A suburban style community with attendant congested roads and infrastructure deficiencies has evolved. The community has nearly reached buildout. It has no distinct character, it is Anywhere, USA.



Graphics by John Warbach,
Planning & Zoning Center, Inc.

oped land) to create a base map. Next, unbuildable areas including wetlands, flood plains, surface water, high risk erosion areas, designated sand dunes, or areas with slopes of greater than 12-15% are shaded so they can be excluded). Existing right-of-way is excluded and future right-of-way also needs to be eliminated as well. 10-25% of the otherwise buildable land is usually subtracted to account for future rights-of-way (the percentage depends on the density). Subsequently, an acetate grid is placed over the base map and both remaining buildable and unbuildable area are calculated.

After subtracting unbuildable areas from each zoning district, the planner would multiply the amount of buildable land for each zoning district by the permitted density of residential units to get the new dwelling units. When the number of dwelling units is multiplied by the number of persons per household, the planner has the community's buildout population for the undeveloped land. This is added to the existing population for total buildout. It is critical to double check each result, since an error during any stage or a change in a base assumption could throw the final number off significantly. (See MSPO *Community Planning Handbook* or *Workbook for Preparing or Updating a Master Plan* for more detailed, step-by-step instructions). This method is time consuming in a large jurisdiction (like a county or region). Obviously, computer spreadsheets can be used to speed up and improve the accuracy of the calculations.

Geographic information systems (GIS) are also changing the way buildout is done across the nation. For communities that have taken the time to create base maps of zoning, parcels, and non-buildable areas

(which often are in separate map layers: flood plains, steep slopes, etc.) the calculations can all be done by the computer. GIS will quickly and automatically tabulate the amount of buildable land per zoning district. With GIS, the time required to complete a buildout analysis can be dramatically reduced and the accuracy level will go way up. (See sidebar on page 13 on state of Massachusetts buildout analysis).

Case Examples County Buildout

The disparity between existing population, projected 20-year growth and potential buildout figures (based on existing local zoning ordinances) has caused a serious rethinking of public policy among local units of government in several counties in Michigan. Roger Williams, AICP, Planning Director of Grand Traverse County says, "Initially following the buildout analysis we realized we had much more land designated for development than we needed. It was a real eye opener. As a result we revised our strategy and scaled back growth areas." Table 1 illustrates the results of buildout analysis in some Michigan counties. The Projected 2020 Population column is straight line calculation based on 1990 and 2000 census figures.

These results show an increase of 100% to over 2,000%, or an increase of over 4 million persons above the 2000 population and nearly as much over the projected 2020 population. This is a preposterous result! None of these counties have infrastructure plans under development to accommodate development anywhere near these buildout numbers.

Given that buildout analysis can overstate likely buildout in a rural area for many

reasons (such as some landowners being unwilling to sell land to permit more development at any price, the creation of larger lots than minimums to meet Health Dept. requirements for septic systems, etc), there is a tendency to discount the buildout in a rural area as being valueless. But that sort of "ostrich head in the sand" knee jerk response misses the principal point. What if all these figures were high by 50%, does that make the result anymore reasonable? Of course, not, these numbers show incredible overzoning. Many master plans which reflect future development 20-30 years in the future are often more unreasonable. The implications on a statewide basis are even more incredible (see sidebar "Overzoning is a Rampant Problem"). The counties represented on Table 1 and all other jurisdictions that have used buildout analysis to reveal the folly of existing zoning policy are real heroes. It is so easy to continue the status quo without questioning the implications, that once they become apparent, it is often too late to make effective change.

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St. Clair County planners found buildout results were very educational in updating their Master Plan (which was completed in the Spring of 2000). St. Clair County planners understood going in that "the projected eventual population that results from

**Table 1
Buildout Results From Zoning Maps in Ten Michigan Counties**

County	1990 Population	2000 Population	Projected 2020 Population **	Buildout Population (Future Year Unknown)	Percent Population Increase of Buildout Population Compared to 2000 Population	Year Buildout was Calculated
Bay	111,723	110,157	107,025	465,896	323%	2000
Benzie	12,200	15,998	23,594	195,000	1119%	1999
Clinton	57,883	64,753	78,493	392,776	507%	2001
Eaton	92,879	103,655	125,207	495,012	378%	2001
Grand Traverse	64,273	77,654	104,416	400,000	415%	1992
Ingham	281,912	279,320	274,136	574,678	106%	2001
Leelanau	16,527	21,119	30,303	280,000	1,226%	1994
Manistee	21,265	24,527	31,051	602,307	2,356%	1997
St. Clair	145,607	164,235	201,491	1,025,382	524%	2000
Wexford	26,360	30,484	38,732	498,374	1,535%	2002
TOTAL	830,629	891,902	1,014,448	4,929,425	453%	

** Straight line calculation based on 1990-2000 census counts.

OVERZONING IS A RAMPANT PROBLEM: Statewide Buildout Population Is 35.2 Million Persons And Will Take 393 Years If Current Population Trends Continue

By Mark A. Wyckoff, FAICP, Editor

None of the ten counties listed in Table 1 are anywhere near fully developed. Nevertheless, they are a good cross section of urbanized, suburban and rural counties in Michigan. If all developable land in these counties were built out at the density permitted under existing zoning, the population of these ten counties would rise 5.5 times from 891,902 persons (in 2000) to 4,929,425 persons (at an unknown future time). As huge as this increase is, it is hard to wrap the mind around it. Perhaps some additional context will help demonstrate how preposterous and destructive this level of overzoning is.

What if the rest of Michigan's counties had a ratio of buildout population to 2000 population the same as these ten counties? Out of curiosity, I did the math, with one exception. I estimated buildout for the four most populous Michigan counties separately and at a much lower ratio than the average in the ten sample counties. Specifically, I used the following numbers for comparison in these four counties:

County	2000 Population	Hypothesized Buildout Population	Percent Increase
Wayne	2,061,162	2,300,000	11.6%
Oakland	1,194,156	1,600,000	34.0%
Macomb	788,149	1,000,000	26.9%
Kent	574,335	900,000	56.7%
TOTAL	4,617,802	5,800,000	25.6%

The population in 2000 of the other 69 counties in Michigan was 4,428,740 persons. Multiplied by the buildout population to 2000 population ratio of the ten sample counties (5.526868422) yields 24,477,063 persons. Add in the ten county buildout population and the 4 largest hypothesized county buildout population yields a statewide buildout of 35,206,488 persons. This is 3.54 times the 2000 population of 9,938,444. A growth of 3.5 times the present state population doesn't sound so bad until one considers that all private land would be developed at buildout. Some would be at a very low density of one dwelling per 10-40 acres, much would be at one dwelling per acre and comparatively little at a higher density. For context, a state popu-

lation of 35.2 million is about 1.3 million more people than California's population in 2000.

As startling as these comparisons are however, perhaps the one which demonstrates how outrageously overzoned Michigan would be if the buildout ratio of the ten counties applied to all but four of Michigan's other counties is the following comparison. If the population increase Michigan achieved over the last decade were averaged per year (64,315 persons/year) and divided into the net increase in total population between buildout and the 2000 census count, it would take 392.88 years to reach buildout! Is a Michigan of 35.2 million persons something you want to see happen ever (let alone in 392.88 years)? It is roughly one person per acre (there are about 37 million acres in Michigan).

Overzoning at this level basically means residences can be constructed almost anywhere anytime. It results in a very scattered rural residential develop-

ment pattern that is very difficult to efficiently service, consumes (eventually all) farm and forest land and results in a permanent loss of open space values.

Consider yet another way of putting this into perspective. In Detroit from 1950 to 2000, the population fell from 1,849,568 persons to 951,270 persons. This is a 49% decline in population. In 1950, Detroit had installed infrastructure in place that had a capacity to serve 2.25 million persons. Since 1950, Michigan's population has risen by 3,566,678 persons (a 56% increase). Since 1970 it has grown by only 1 million persons. In other words, 100% of Michigan's population increase since 1970 could have been accommodated completely within the city of Detroit and no additional land anywhere in

the state would have had to be converted to accommodate the increase if existing densities in Detroit in 1950 had been maintained. About 1.5 million acres of land were converted from farm or forest use between 1970 and 2000 in Michigan for just 1.0 million more people. Detroit alone could accommodate all those new people without converting a single acre of land elsewhere. The point here is not to suggest that all new people in Michigan since 1970 should live in Detroit, but that from a space and infrastructure perspective – they could have. Think how much new infrastructure would not need to have been created (or abandoned in other central cities), think how much land would have been retained in a variety of open space uses. Think how much more energy efficient development would be if only a fraction of that new development had occurred in Detroit, or Flint, or Grand Rapids, or other central cities that lost population over that period.

In other words, 100% of Michigan's population increase since 1970 could have been accommodated completely within the city of Detroit and no additional land anywhere in the state would have had to be converted to accommodate the increase if existing densities in Detroit in 1950 had been maintained.

Michigan must do more to ensure livable cities so more abandonment does not occur. But persistent overzoning in rural areas only undermines any effort to rebuild our cities and sets rural communities up for financial disaster once excess capacity in infrastructure and the natural capacity of soils to absorb waste is gone. It also results in the slow destruction of our farm, forest, mining and tourist industries (see article next month on the "Michigan Land Resource Project"). □

a buildout analysis is usually a surprise to local officials who often zone large areas of the community in lots of a size they believe will preserve rural character." Indeed they found that most ordinances in St. Clair County would result in more than 30,000 people per township if land were simply developed as it was zoned. This was quite contrary to what local officials perceived was the case.

They found St. Clair County had a buildout population of 1,025,382 persons if zoning was implemented as adopted. The 1998 estimated population was 160,827. The buildout population is an increase of 538% over the 1998 population and 823,891 more than the projected 2020 population for St. Clair County. Individual community buildout populations varied widely depending on such factors as size, zoning, and amount of buildable land. The huge difference between projected population and buildout led the County to conclude that communities have zoned large areas of land for relatively dense development and that there is large amount of vacant or undeveloped land in all communities.

In their Master Plan, the St. Clair County Planning Commission stated that rural communities almost never reach the buildout population because of the following factors:

- A portion of the development in the future occurs at a lower density than the site could be developed according to zoning. This could be because the owner does not want to build at the maximum density, because ac-

Table 2
Cannon Township Buildout (performed in 1993)

Zone	Acres of Land Available in the Zone	Lot Size	Number of Units at Buildout
R-1 Low Density	1,016 *	15,000 sq.ft. (.34 acres)	2,988
R-2 Med. Density	**		
R-3 High Density	80.2	½ unit/acre 10/12,000 sq.ft. (.23 & .27 acres) 3 or more units 20,000 (.46 acres) ***	174
Agricultural	16,503	2 acres	8,251
PUD	443	2 acres	
TOTAL DWELLING UNITS AT BUILDOUT (w/o PUD densities)			11,413

* less 20% for road right-of-way

** no land zoned for this district

*** Based on the largest lot size and an average of six units per site

cess costs to vacant land are too high, because topography or soils limit further development, or because the market disappears for lots at the maximum density.

- Some portion of the land zoned residential is rezoned for another needed use or is developed in a permitted, nonresidential use.
- Portions of the land zoned residential are purchased for public use, such as for schools, parks or large infrastructure facilities.
- A portion of the land that has been built upon was developed at a density lower than its current zoning.

Nevertheless, even if these factors resulted in buildout at half that actually permitted by existing zoning, it is so far from existing or likely projected population in the next twenty years, that it could only represent a situation 100 or more years in the future. By most planning standards, this is far to distant a time to reasonably apply to land use and infrastructure planning.

Township Buildout Examples

Buildout analysis helps to prove that sprawl is often aided by, if not simply the result of overzoning of rural land for low density, rural residential development. Zoning that promotes sprawl is often counter to what the Master Plan advocates. This was the case in Cannon Township (Kent County) early in the 1990's, where the proliferation of large lots was promoting sprawl and would eventually create access and transportation problems, which would increase the cost of community services to residents. When a buildout analysis was performed, Cannon Township found the following (see Table 2).

In terms of rural Township buildout, the dwelling unit projections for Cannon Town-

ship were actually lower than many suburban townships, primarily because the jurisdiction contains a large amount of unbuildable land (due to surface water and public lands). Nevertheless, a community of 7,928 persons (in 1990) was still zoned at that time to permit over 35,000 persons. This is not what Township residents desired at futuring sessions on a new master plan.

Marion Township (Livingston County) also completed a buildout analysis in the early 1990's. At the time, the existing Marion Township Zoning Ordinance followed Frank Lloyd Wright's Greenacre philosophy and generally allowed for 1-acre residential lots throughout the entire Township. They found the maximum number of dwelling units possible if the existing zoning ordinance were fully implemented, was 16,304 DU's, for a projected population of 49,075 people.

To compare how effective their zoning policies were to other approaches, Marion Township also conducted a buildout analysis for four alternative rural zoning strategies (see Table 3). These included ten acre parcels, quarter/quarter, sliding scale, and rural clustering. The ten-acre parcel zoning assumes that the minimum size of new parcels is ten acres. Under the quarter/quarter zoning alternative each landowner of more than 40 acres is entitled to one new lot per 40 acres. The number of residential lots allowed under the sliding scale approach is set by a scale, which considers the total size of the parcel. The larger the original parcel the more splits permitted, but the number of splits is proportionally smaller than are permitted on smaller parcels. Finally, rural clustering involves clustering development in small areas, retaining most of the land for open space. The calculation is based on a density of one new parcel for each ten acres owned. Since cluster development usually occurs either on small lots or avoids

LIVINGSTON COUNTY MASTER PLAN BUILDOUT ANALYSIS

In 1999, the Livingston County Planning Department conducted a county-wide buildout analysis of all the local master plans in the county. The result was a buildout population of 476,703 persons (compared to the 2000 population of 156,951). The County Planning Department assembled the entire analysis, along with community-by-community results into a publication entitled *Land Use Analysis in Livingston County, Michigan*. In addition to the buildout analysis, the report includes reactions on impervious surface analysis and tools and techniques to use for agricultural preservation. The report won an Achievement Award from the National Association of Counties. It is easy to read and understand and has color maps of Livingston County resources. Copies are available from the Livingston County Department of Planning, 304 E. Grand River Ave. Howell, MI 48843-2323; ph. 517/546-7555.

**Table 3
Marion Township Alternative Buildout Analysis**

Township	Buildable Area (acres)	Existing Zoning	Ten Acre Parcels	Quarter/Quarter	Sliding Scale	Rural Clustering
Total Dwelling Units (DU's)	15,992.6	16,304 DU's	2,991 DU's	2,395 DU's	3,230 DU's	3,336 DU's
Total Population		49,075	9,003	7,209	10,041	10,575

* Assumes 3.01 persons per household (1990 Census)

unbuildable areas, the amount of buildable area is not as important a consideration.

The results stimulated a lively debate among planning commissioners, elected officials, landowners and residents. One's perspective depended on how much land one owned and whether it was buildable. Often, large landowners and realtors wanted no reduction in permitted zoning density. Residents of small rural lots wanted permitted density greatly reduced. In the end, the status quo was retained, but as more and more development occurred, the debate shifted to how to pay for the large public utility services that became essential. Now a new Master Plan is under development.

In suburbs with full public services likely to be available, land tends to eventually build out at close to the maximum permitted zoning density. However, this can take 50 years to occur. In a more rural area, the result of overzoning is usually widely scattered homes on large lots, occasional subdivisions and site condo developments that permit no economies of scale in the provision of services, result in significant negative impacts on farm and forest land, and in major loss of rural character (especially along main roads). These impacts are usually quite the opposite of what people who moved to these areas want to enjoy. More significantly, the public service need created by development at the maximum permitted density is usually not paid for by those who created the need, instead it is deferred to future generations who must also pay for their own service needs.

Developed Communities

In metro areas, overzoning in low tax jurisdictions surrounding a central city can slowly draw the population out of older central cities, which must continue to provide a higher level of public services (than in a rural area), but with far fewer residents to pay the costs of supporting those services. This is especially evident in the Detroit and Flint metro areas.

Many Michigan cities have reached buildout, many suburbs are on the verge of achieving buildout (such as Troy, Auburn Hills, Livonia and Rochester Hills). Notably, most of these communities have developed in patterns and densities very consistent with plans adopted thirty or more years

ago. Most have compact neighborhood developments with a strong mix of commercial and industrial uses. These communities not only planned and zoned for the densities they achieved, they also developed the infrastructure and public services necessary to service the planned densities. On the other hand, very few overzoned rural communities have done anything to ensure infrastructure and services adequate to meet planned or zoned development is in place.

Cities like Troy have nearly reached buildout and are finding the last 10-15% of buildable land is very slow going. Thirty or forty years ago when many of the Detroit metro area suburbs were developing, wetlands were not an issue planners or developers were much concerned about. Dredging and filling caused the flow of water to be diverted, thereby creating water habitats where none had been before. Large portions of land left vacant today are generally the result of wetlands or other unbuildable features of the property. There are some areas of Troy where infill development is possible.

Steven Cohen, AICP, Planning Director for Auburn Hills recognizes that now that the community has virtually achieved buildout, priorities are beginning to shift significantly. Once a township itself, Auburn Hills has developed around the City of Pontiac and was incorporated as a city to meet the service needs of their growing population. The planning staff has shifted their focus from the citywide master plan to neighborhood master plans, illustrating the diverse needs and character that arise as communities reach their maximum densities.

Commercial and Industrial Buildout

A few words about commercial and industrial buildout are also appropriate. While few communities perform commercial and industrial buildout analysis (because residential land uses consume many times more land than any other use but farming or forestry), it is often an insightful activity. While strip zoning vacant land along state highways and railroad lines is fading, one occasionally still encounters this inappropriate practice. Buildout analysis can help expose the absurdity of the practice. When land is zoned for commer-

cial or industrial use far in excess of need or demand within any reasonable planning period, then the community will in essence encourage scattered uses throughout the zoned area. If the area is large or lengthy, then the ability to economically stage infrastructure is lost. In the early 70's the Wayne County Planning Department conducted an industrial buildout analysis and found

enough vacant industrially zoned land to meet all of Michigan's needs for decades just within Wayne County. That kind of rampant overzoning impedes responsible zoning for a wider range of needed land uses and undermines economical public service provision.

Lessons to be Learned From Buildout

The purpose of a buildout analysis is to create an approximation in quantitative terms of the potential future growth permitted and encouraged by a community's land use policies. If the level or type of potential future development shown in the buildout analysis is not consistent with the community's goals or vision for the future, or is unreasonable to be achieved in the foreseeable future, the residents may choose to make appropriate changes to the policies. It is clear that for communities across the entire spectrum from rural to suburban, buildout analysis can be a critical tool for smart growth.

Infrastructure Impacts

Once a community understands the number of dwelling units and potential population it might be dealing with in terms of fully implementing their zoning ordinance, it is important to take the assessment to the next step and review the qualitative impacts of such growth. In the example given earlier of the 36 square mile township that would build out between 48,000 and 54,000 people, a local planning commissioner would have to ask the question: Do we have the ability to service this much growth? This is especially pertinent if the community has less than 4,000 persons now. Since the average household generates 300 to 400 gallons of wastewater per day and if the average household size in this township is 3 persons, the township could expect between 4.8 and 7.2 million gallons of wastewater to be generated each day. Is the township prepared to stretch sewer service uniformly throughout the 36 square mile area, or will this effluent be allowed to leach into the ground water via tens of thousands of individual septic tank drainfields? How will it pay for this expense after the fact? Most sewer lines are

BUILDOUT ANALYSIS PUT TO USE: Pittsford, N.Y., Greenprint Initiative

In 1998, Pittsford, New York won an APA award for "an exemplary initiative that mediates between the conservation of local identity and the transformations associated with economic and social change." To do it, they took buildout analysis a step further.

The town of Pittsford covers 24 square miles. It had been under growth pressure since the 1950s, and while growth had slowed, residents were concerned about losing their rural lifestyles. Public debate and planning for the preservation of Pittsford's open space had been the focus of every comprehensive plan for 25 years, but the tools actually making a difference were not available under any of their plans. In 1987, Pittsford adopted one of the first mandatory cluster development ordinances in the state. Five years later came a vision statement, the Pittsford 2000 report.

Pittsford planners and consultant teams performed a buildout analysis and realized even though the community was showing growth, it would be decades before their 24 square miles would be totally built out. They felt the cluster development ordinance was a good step to preventing sprawling suburbs, however it did not go far enough to protect the open spaces and farmlands the community cherishes.

The team worked with residents in over 100 community meetings and focus groups to gather opinions and set a direction for the plan to preserve natural areas and farmland that residents felt were part of the historic character of the town. The town commissioned a detailed resource inventory and evaluation of the 94 undeveloped parcels larger than five acres. Working with the planning team was a committee including farmers, builders, engineers, residents, preservationists, local board members, and resource

agency personnel. Together they developed a method for ranking the resources on each property—agricultural, ecological, greenway, historic, and scenic. In the end, the group identified 2,000 acres that could be preserved to benefit the environment and residents for future generations.

Next the planning team created a fiscal model that analyzed the impact of future land-use patterns if buildout was achieved. This included increased demands on services and infrastructure in the town. They broke down anticipated tax increases for each household. They did the same fiscal breakdown for their ideal preservation scenario. To their surprise, they found that protection of the land would be more cost effective than building out the entire town from border to border. These findings resulted in the Greenprint Initiative.

As part of Pittsford's Greenprint Initiative the town board voted to sell up to \$10 million in bonds to buy development rights to seven farms. When the community won the APA award, negotiations were under way to buy rights to 1,144 acres of land that Pittsford believes will preserve indispensable qualities of the community. The town board predicted that implementing the Greenprint would cost the average taxpayer \$1,400 more in property and school taxes over the next 20 years. Under existing policies and zoning, the board said, the cost would be \$5,000 more. The tax increase for a \$175,000 house will be only \$46 a year rather than the \$67 estimated given buildout conditions.

Any community can do what Pittsford has done—paint a picture of the future it wants, and design a specific plan for implementation, with a financial program to support it, says John Behan, AICP, the town planner. It would be "wonderful to see in many places," Behan adds. "It's something planners can do, and provide a real value for our communities."

Source: American Planning Association website <http://www.planning.org/newsreleases/1998/ftp40498.htm>. □

once moved to these outlying areas for tax relief may find their taxes rising exponentially as local governments are forced into debt to pay for services.

Existing Use Zoning & Downzoning

So what is the alternative if your community is overzoned? One choice is existing use zoning. This is placing land uses into zones with densities that reflect existing use. That means placing land use for agricultural (or forestry) into agriculture (or forest) zones at an agricultural density (usually an average density of 1 dwelling unit per 40 acres). This is commonly achieved with quarter-quarter zoning. In areas already divided into 5-10 acre lots, it means creating a zone that reflects that lot size. In areas of 2-5 acre parcels, it means zoning land for a density no greater than the average minimum lot size. This action immediately halts the process of scattered development at too great a density, while the community determines how to meet existing public service demand and future demand from lots not yet built upon.

In an economy we like to claim is market driven, downzoning is often a dirty word to developers. However, our zoning practices do not necessarily reflect market desires. In communities with zoning policies that lead to buildout exceeding 5-10 times their current populations, the market they are planning for, in many cases, is more than a hundred years down the road. In the typical township example, even if the township grew by 1,000 people per year, the market would be saturated for the next half century, all the while establishing scattered growth patterns the community cannot maintain or adequately service. So does the township really need to zone for square mile after square mile of 1-2 acre residential lots? Or can development be clustered into pockets or urbanized centers. Open space and preserved farmland should have a place in this discussion. The community might also want to consider downzoning.

Downzoning is the practice of changing the zoning in an area to a lower density or intensity than that permitted prior to the downzoning. Sometimes downzoning is the best long-term strategy (when it is, it is sometimes referred to as "rightzoning"). If analysis shows zoning density is too great to permit the provision of necessary public services at an adequate level and reasonable cost, then land should be downzoned. Sometimes this can be done temporarily, other times it must be for the long term. If the community is rapidly suburbanizing and public infrastructure will be available over the next 10-20 years, an immediate downzoning to existing densities could be accommodated with the option to reestablish at or near the former density by special use permit, once public services become available. Oakland Township has successfully pioneered the use of this technique (see *PZN*, July 1993). If public services are

economical only if installed prior to development and at a service level of 3-5 dwelling units per acre (not 1 per acre). If neither of these situations appear to be a preferred alternative, what other options are available? After the fact, there are always far fewer economical options available.

In many ways buildout analysis makes the planning commissioner's job a little easier. If we are to plan for the demands projected to be made upon our communities, let us deal with facts. Michigan does not authorize impact fees for anything other than sewer or water, so the costs of service

demands of each new development will be borne by existing residents (not by new residents). We are not a "pay as you grow" state like most of the country. In residential districts where densities are 1 dwelling unit per acre or greater, it is likely that complete infrastructure improvements will be necessary long before buildout is achieved. Coupling the buildout analysis with a *fiscal impact analysis* of anticipated service and facilities improvements paints a clear picture of the financial blow taken by communities whose development policies do not curb sprawl. Taxpayers who

BAY COUNTY TO DO FISCAL IMPACT ANALYSIS BASED ON BUILDOUT

The Bay County Department of Environmental Affairs has released a buildout analysis for each community within the county's boundaries and now plans to couple their findings with fiscal impact analysis. Funded in part by a grant through the Saginaw Bay Watershed Initiative Network and the Bay Area Community Foundation, the project will kick-off in mid-April.

In September of 2000, Beckett and Raeder, Inc. of Ann Arbor completed *The Zoning and Land Use Plan Buildout Assessment*. According to John Iacoangeli of Beckett and Raeder, Inc. "the result of the build-out analysis concluded that when all of the respective municipalities' master plans and zoning ordinances were consolidated into one common format that Bay County was grossly overzoned compared to their forecasted population and housing needs."

Now Bay County is looking to take the next step and offer fiscal impact analysis (FIA) of the build-out assessments for its communities. Jane Fitzpatrick, consultant to Bay County says, "In a nutshell, the FIA will provide a means to measure how much more of any given public facility and service (i.e. fire apparatus, water or sewer capacity, school rooms, etc.) will be needed to serve the additional zoned or planned development in a community and at what cost." FIA first determines the quantity of public facilities and services that buildout will require, and then calculates the estimated cost to meet that quantity.

Fitzpatrick has begun developing a series of informational workshops to be held at various locations around the county to inform communities of their options. Each workshop includes a brief presentation of the buildout assessment and a discussion about the fiscal impact analysis of the buildout assessment.

Project coordinators believe fiscal impact analysis based on buildout will encourage Bay County communities to ask themselves questions like: "Does the proposed development pay for itself or is the community willing to tax itself to support new development? Conversely, if facilities and services are not expanded and the level of service degrades, is the community willing to live with the change in the quality of life in order to allow the proposed development and the benefits which that development may bring into the community?"

The fiscal impact of providing public facilities and services to new development is a critical piece of information that local communities should consider when measuring the benefits and detriments of any land use or zoning decision. Fitzpatrick explains, "The result of analyzing the cost and demand for public facilities and services may fall anywhere within a range of enhancing a community and its social, economic, and environmental vision for itself to resulting in a loss in the community quality of life." Either way, Bay County sees the benefits of understanding the fiscal impacts of buildout, including that it:

1. Provides another set of information to use when making decisions regarding land use and zoning.
2. Provides a quantifiable measure of impacts of development.
3. Provides a means to measure and document the direct impact of a particular development proposal in order to mitigate the impacts of that development.
4. Provides a means to do proactive planning and budgeting.
5. Provides a generalized forecast of capital facilities needs to be used as a sound basis for the development of a capital improvements program.
6. Provides a measurement to local governments to support the land use and zoning that their ordinances allow.

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not available at the level and type necessary to service development at the density zoned over the next 10-20 years, then these facts should be well documented and the property should be downzoned before development too dense gets scattered throughout the community.

In Michigan, developers often argue that downzoning is synonymous with an unconstitutional taking. However, using a buildout and fiscal impact analysis as a basis for de-

cision making, takings are not the threat they are sometimes made to be, as there is no viable right being eliminated. In a candid recognition of the facts, it is speculative to assume that all landowners could develop at the highest permitted density whenever they wanted. In a typical rural Michigan township composed primarily of farmland today, only one or two of the farmers in the township will likely be able to develop their land in their lifetime, at the maximum permitted density

(often one dwelling per acre). It is understandable that property owners want to be able to realize the development potential of their land, but despite superficial observations, buildout analysis usually proves there is just not enough growth to go around in the next one or two decades for even most of the farmers to do so.

Buildout analysis reveals that landownership is both an investment and a risk. This poses many questions of equity. It is not reasonable for existing residents to bear the public service costs of sprawling development in order for large landowners to capture latent development value. In communities across the state, this puts planning commissioners in the awkward position of choosing winners and losers. However, the idea of zoning all undeveloped land at the same density to allow the market to develop as it may, makes everyone in the community a loser. Not to mention the concern that perpetuating existing zoning policies, in many cases, only propagates false hopes that there is a demand to develop any land put on the market. There are other alternatives that are more equitable for landowners, developers, existing taxpayers and new home buyers.

Techniques such as Purchase of Development Rights (PDR) and Transfer of Development Rights (TDR) allow farm and forest owners to capture the development value of land, without converting it. These techniques – not overzoning – can be used to secure market value; for they do not saddle existing or future residents with unplanned public service costs, nor do they destroy the economic value of renewable natural resource lands like farmland and forests.

Other Approaches

Some townships have performed buildout analysis and learned about the negative implications of overzoning, yet still been unable to gain consensus on any number of density based zoning techniques (like quarter/quarter zoning or rural clustering). In these communities, one or two acre zoning is often clung to with near religious zeal. At the same time, there is no desire to provide public services anywhere near the level that would be required if all land developed at one unit per one to two acres. Some like the one acre lot size because it legitimately takes less agricultural land than a larger minimum lot size (like 5-10 acres), but only if part of the farm is developed. So what is a community to do?

Some townships have kept the one or two acre minimum lot size and added two elements that greatly forestall (but don't prevent) more intensive development. It usually takes both elements to have the desired effect.

First, they adopt a wide minimum lot width, usually 300-330 feet. This spaces houses along county roads and lessens the negative impact on rural character of a smaller lot width. It also reduces the total

number of lots that could be created along the roadway and leaves the center of sections open for agriculture or forestry or future development. It has the added benefit of coming closer to the required driveway separation distance for state trunklines and county primary roads. They usually also prohibit flag lots and require a width-to-depth ratio of at least 1 to 2.

Second, they prohibit any private roads. The cost of construction of a public road is such that unless 25-30 or more lots are created, the cost often cannot be economically spread across the lots. This is more lots than can often be absorbed by the market and usually requires platting as well.

Third, they refuse to accept responsibility for any waste treatment system serving multiple lots, this effectively requires individual septic systems or hooking to a nearby public sewer system. The high cost and politics of multi-jurisdictional extension of septic systems often slows subdivision development. However, this third approach sometimes results in court ordered acceptance of package treatment systems because it is the only way to otherwise build at the density allowed in the zoning ordinance. The authors dislike this approach because of its clandestine character and legal risks, but concede it can be effective for an interim period at forestalling growth. However, once market demand is great enough, this approach is likely to result in too great a density and inadequate provision of public services.

Metro Areas Step-up To the Task

Recognizing that many local governments cannot single-handedly address all of these concerns, several of the metropolitan planning organizations in Michigan are gearing-up to assist local communities with solutions. In October 2001, SEMCOG published the 2030 Regional Development Forecast for Southeast Michigan. This report provides detailed population, household and employment data. Understanding where growth is likely going to take place in a metropolitan region if existing trends continue, allows communities to foresee solutions to development and preservation impacts outside the abstract jurisdictional boundaries. It also interjects realism into the fantasy often propagated by overzoning (as revealed by buildout analysis). Other regional planning agencies periodically provide population, dwelling unit and employment projections as well.

In West Michigan, the Grand Valley Metro Council (GVMC), is working on an update to their regional master plan, Blueprint II. In an effort to balance the needs of farmers with the impacts of growth GVMC is implementing several programs to work toward "Smart Growth". The Green Space Preservation Program involves working with townships to implement a purchase and transfer of development rights program, and working with local units of government

to maximize efficient levels of residential density. Understanding that TDR is a complicated issue and not yet widely accepted, GVMC has employed the assistance of a land use educator position in the Kent/MSU extension office. The land use educator position was created with the intent of facilitating the initiation of a Purchase of Development Rights or Transfer of Development Rights program. In addition, the land use educator is charged with assisting metro area residents on Smart Growth principles like conservation design, mixed income neighborhoods and mixed use zones.

The Tri-County Regional Planning Commission (Clinton, Eaton & Ingham Counties) is nearing completion of a new future land use map (FLUM) of the region, and beginning work on the development of a consensus Action Plan to achieve the more compact settlement pattern envisioned on the FLUM. A number of tools and techniques are being examined in order to identify the "right" mix to meet the wide range of community needs and situations that exist at the present time. A buildout analysis revealed that existing zoning permits more than 1 million additional residents than presently reside in the region. This is nearly 300% more people than at present. This information is a valuable tool to educate citizens and policy makers about the inherent folly of existing zoning that essentially permits residential sprawl anywhere in the region. With strong and rapidly growing interest in PDR and TDR among farmers in the region, it is likely rural zoning policies will change to reflect existing land use, rather than a speculative future use that fuels sprawl sooner, rather than later.

Also, the legislature added new coordination requirements to all three planning enabling acts in December (see February 2002 *PZN*). These requirements are likely to stimulate new dialogue between communities on effective ways to guide and coordinate future growth.

Conclusion

While it may be true that we do not yet have all the answers to apply comprehensive and equitable solutions to all development challenges, it is also clear that ignoring the facts only digs our communities into a deeper hole. Buildout analysis provides a clear baseline of information by which land use decisions can be made. Coupled with fiscal impact analysis, buildout assessments paint a clear picture of physical development and the financial impacts that development will have on a given community (see sidebars on Bay County Michigan and Pittsford, New York). This tool sets the stage for planners to openly and candidly explain the impacts of land use decisions and the merits of comprehensive planning before adopting self-defeating zoning policies. *PZN* will provide more coverage on fiscal impact analysis in the near future. □

MASSACHUSETTS COMPLETES SOPHISTICATED STATEWIDE BUILDOUT ANALYSIS

The Massachusetts Executive Office of Environmental Affairs under the direction of Bob Durand, has prepared a buildout analysis of all 351 Massachusetts communities. Using GIS and a systematic methodology to identify buildable and unbuildable land, buildout maps and analysis were performed and then entered into a statewide computerized database. It permits quick retrieval of individual buildout maps and analyses at the local, regional or multi-jurisdictional levels. The analysis goes further than most by calculating the following buildout impacts: additional residents, school children, residential units, developable land area, commercial/industrial floor area, water demand, solid waste (recyclable and non-recyclable) and roadway miles.

The buildout analysis is easily accessible on the web, go to www.mass.gov/envir and click on "Community Preservation". A downloadable **Buildout Book**, provides a history of growth in Massachusetts, an explanation of the Community Preservation Initiative and a summary of the buildout project. It also presents the detailed buildout methodology and how to use the data locally.

An allied resource "The Alternative Futures Tool" is also available at the same website, along with a downloadable guidebook. It is a GIS tool for community planning that allows the user to run different land use scenarios and generate new buildout numbers for each scenario based on changes in land use. This will be especially useful to Massachusetts communities which are grossly overzoned, as it can easily illustrate and calculate buildout on various lower density options. Another tool on this website is software to help communities evaluate the fiscal impact on municipal finances of residential, commercial and industrial development projects. A companion guidebook entitled **Fiscal Impact Tool: A Community Preservation Tool to Assess the Fiscal Impacts of New Development on Your Community**, is also available in downloadable form.

Incidentally, Massachusetts is believed to be the only state that has completed a statewide buildout analysis. When all the regional numbers are added up, it reveals population at buildout to be 9,789,009. This is 1.5 times the 2000 population of 6,349,097. □