Estimating the Fiscal Impact of Alternative Futures for the Capital Region

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Prepared by

Capital District Regional Planning Commission

Capital District Transportation Committee &

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Executive Summary

The Capital Region has experienced modest growth during the last 30 years. Recent announcements and initiatives such as the probable location of a chip plant at the Luther Forest Tech Park and International Sematech to the Albany NanoTech research complex at UAlbany suggest the opportunity for more rapid growth, both in population and employment. As such, how can we accommodate growth in the Capital Region and maintain, if not enhance, our quality of life while avoiding the negative consequences of growth - the costs of sprawl. In collaboration with, and funding support provided by, the Center for Economic Growth a research team that included the Capital District Regional Planning Commission, Capital District Transportation Committee, and the University at Albany Department of Geography and Planning was created to evaluate the issue of growth and its fiscal impacts on the region.

This research investigates the fiscal implications of alternative growth patterns in the Capital Region. It builds upon three existing reports produced by the joint efforts of the Capital District Regional Planning Commission and the Capital District Transportation Committee. The 2005 *Effects of Alternative Development Scenarios in the Capital District* (hereinafter referred to as the *Alternative Development* report) report presents two different population forecasts under two different distribution scenarios through 2040. One forecast suggests the region will grow by almost 73,000 persons by 2030. The second forecast assumes the region will grow at the projected national average of approximately 1% annually, adding just over 229,000 persons by 2030. The population forecasts in the *Alternative Development* report form the basis from which the research team estimated the fiscal impact of the alternative growth scenarios for the Capital Region over the next three decades. The second paper, *Larger Than Regional Policy Concepts* presents an analysis of the policy issues that extend beyond municipal boundaries and offers a menu of potential responses to cross-cutting objectives regarding regional development policy. The third report, *New Visions for Capital District Transportation, 2021* was initially adopted in 1997 after extensive public participation. It was later amended in 2004 as *New Visions for Capital District Transportation, 2025* (hereinafter referred to as *New Visions*). The *New Visions* plan articulates the community consensus into policy that reflects the larger regional policy alternatives. The Fiscal Impact study bridges these documents, using the population forecasts of the *Alternative Development* report to link the policy questions raised in the *Larger Than Regional Policy Concepts* paper and the policy recommendations asserted in *New Visions*. As the Capital Region builds consensus for the update of the *New Visions* planning guidelines presently underway, this research provides an empirical assessment of how different growth patterns might affect the Capital Region's overall financial burden to support the growth. The authors envision this report providing a foundation for an informed regional dialogue regarding future growth in the Capital Region.

The research estimated the public costs of providing the critical infrastructure necessary to support additional growth in the region for two alternative distribution patterns based on the two population projection scenarios noted above. The Trend distribution pattern assumes the region will continue to spread into currently undeveloped areas, resulting in a more dispersed, less concentrated pattern. The second alternative, Concentrated Development,

assumes a denser settlement pattern would emerge due to a combination of policy and evolving consumer preferences shaped by changing demographics; public policy; energy prices; and improving quality of life in urban places, among other stimuli. It is important to note that the assumptions about the forecast and distribution of the population for the four growth scenarios do not fully account for the extent of the changes that some suggest may result from the region's investment in Nanotechnology, including the Luther Forest project. However, the authors' professional judgment is that the trend lines established by comparing and contrasting the Trend impacts and Concentrated Development impacts will remain and the differences should be accentuated.

The fiscal impacts of five public infrastructures were examined: 1) transportation; 2) potable water supply and distribution; 3) waste water collection and treatment; 4) primary and secondary education; and 5) fire protection and EMS services. The provision of transportation, water and sewer infrastructure are often drivers of where development will occur. Conversely, primary and secondary education as well as Fire and EMS service are provided by communities in response to actual or anticipated growth. The research team took a conservative approach to the estimates, meaning our assumptions erred on the side of caution. For example, our assumptions regarding future water use do not reflect increased per capita use with rising income as is documented in the research. Holding the per capita use flat most likely under estimates future demand and therefore the cost to provide potable water. Furthermore, our definition of the region as the four core counties (Albany, Rensselaer, Saratoga, and Schenectady) does not fully capture the impact of spillover growth in adjacent counties such as Columbia, Greene, Montgomery, Schoharie, Warren, and Washington. The qualitative analysis of the impact of growth in adjacent counties suggests that they are not well prepared for growth and would benefit from improved coordination of planning activities with the four core counties as well as among the communities within their own counties.

Research on fiscal impacts has documented that more dispersed development patterns incur significantly higher costs for providing the infrastructure to support it. Furthermore, less dense settlement patterns limit opportunities for alternatives to the automobile as a means of transportation, threatens water supplies, increases stormwater management mitigation costs, and consumes valuable open space and prime farmland. Our findings suggest the Capital Region is not immune to these negative consequences if we continue on the current development trajectory. In contrast, a more concentrated development pattern could save the region nearly a billion dollars in infrastructure costs (excluding transportation) over the next 25 years if our economic development efforts are moderately successful and we accelerate our growth rate to that of the nation. If the region continues to grow at its current rate, the fiscal impacts of continuing our current urban form are marginal. This suggests that the faster the region grows, the more critical it is to manage the growth. If not, escalating infrastructure costs will result in higher taxes eroding our economic competitiveness. In addition, under the trend scenarios, the cost to maintain and/or replace existing infrastructure will be borne by a smaller and less wealthy population. Private costs associated with septic systems and wells will also be substantially greater with the more dispersed development patterns represented by the trend growth scenarios.

More dispersed development patterns also come with high private costs for transportation in terms of increased commuting time and more vehicles miles traveled leading to higher fuel costs. Given the volatility of fuel costs, our estimate of an additional $3.79 billion in personal fuel costs for a one percent per-annum population increase in the current Trend pattern is quite conservative. Still it underscores the need for alternative transportation options which can only be supported through a more concentrated development pattern that emphasizes mixed uses with pedestrian friendly cores and corridors. In addition, a growth management strategy with an urban redevelopment component would create opportunities to implement innovative transportation policies that have been identified as desirable by the community, including a world class trail system and improved transit services.

The case studies of four regions that have linked infrastructure investments to land development practices revealed the need to view the policy responses that can mitigate the negative externalities of development in three complementary scales: state, regional, and local. In the Twin Cities, Albuquerque, and Portland an environmental catalyst stimulated a change in development policy to a more regional perspective. In all three cases, the policy change was driven by a regional consensus across diverse constituents. In both Minnesota and Oregon, State government was key to their success, though in Albuquerque the role of the state is less prominent as a result of a different legal context. The local government initiatives in the Denver region reveal a plethora of local government policy options that can spur the development of "town centers" that support transit oriented development, conserve open space, and provide varied housing options.

The final chapter of the study articulates Regional, State, and Local policy options to foster the development of a more economically competitive region with an enhanced quality of life. In order to be successful, a public/private/not-for-profit collaborative effort is critical with bold leadership required to implement the policy suggestions designed to promote regional solutions to address common problems.

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Introduction

The future of development in the Capital Region will be determined by decisions made today regarding its public infrastructure investments, land use planning, and regional cooperation. Other communities have successfully integrated capital planning for critical infrastructure (transportation, water, and sewer) with land use planning, making these regions more economically competitive; improving the quality of life; saving scarce public money; and preserving cherished natural assets. In light of the potential for Nano-Tech development to radically change the Capital Region's development trajectory, it is imperative that the Region engage in a regional dialogue about its future.

Research on fiscal impacts has documented that more dispersed development patterns incur significantly higher cost for providing the infrastructure to support it. Furthermore, less dense settlement patterns limit opportunities for alternatives to the automobile as a means of transportation, threaten water supplies, increase stormwater management mitigation costs, and consume valuable open space and prime farmland. Our findings suggest the Capital Region is not immune to these negative consequences if we continue on the current development trajectory. In contrast, a more concentrated development pattern could save the region nearly a billion dollars in infrastructure costs over the next 25 years, assuming our economic development efforts are moderately successful and we accelerate our growth rate to that of the nation. If the region continues to grow at its current rate the fiscal impacts differences due to our urban form are marginal. This suggests that the faster the region grows, the more critical it is to manage the growth. If not, escalating infrastructure costs will result in higher taxes further reducing our economic competitiveness. A growth management strategy with an urban redevelopment component would also create opportunities to implement innovative transportation policies that have been identified as desirable by the community, including a world class trail system and improved transit services.

1.1 Background

This report estimates the potential fiscal impacts regarding key public infrastructure based on four alternative development patterns forecasted in the 2005 CDRPC report, *Effects of Alternative Development Scenarios in the Capital District* (hereinafter referred to as the *Alternative Development* report). The *Alternative Development* report presents two different population forecasts under two different distribution scenarios.[1] The first forecast suggests the region will grow by just under 73,000 people during the next 25 years (see table 1.1). This is referred to as the status quo trend forecast and assumes that the region will continue to grow moderately by attracting new residents for job opportunities to offset losses due to declines as a result of an aging population of baby boomers. The second alternative selected for analysis was the hyper-growth forecast, which assumes that the region will grow at the projected national average rate of approximately 1% annually, adding just over 229,000 new people by 2030 (CDRPC 2005).

[1] A third scenario, though not considered in the report were projections prepared by the Cornell Institute for Social and Economic Research which, after a slight increase, projects a decline in the region's population by 2030.

The *Alternative Development* report evaluated two possible distribution patterns for the forecasted populations. The first, assumes that the existing outward expansion into suburban and rural areas will continue unabated. The second considers the possibility of a more concentrated development pattern, including higher density in the inner suburban communities and repopulating our existing urban centers. The forecasted growth and distribution patterns for each scenario are displayed on Maps 1-1 to 1-4. Each of the four development scenarios has different fiscal impacts for the region as a whole and for each of the counties. The overall tendency is that a more concentrated development leads to smaller capital cost for developing the infrastructure necessary to support population and employment increases.

Table 1.1: Alternative Futures Report Population Projections by County

Alternative Development Scenarios	2000	2010	2020	2030	Percent Change 2000-2030	Total Change 2000-2030
Albany County						
Status Quo Trend	294,565	302,162	307,201	311,707	5.82%	17,142
Concentrated Growth	294,565	306,361	314,528	321,529	9.15%	26,964
Trend Hyper-Growth	294,565	312,598	329,914	348,568	18.33%	54,003
Con. Hyper-Growth	294,565	318,141	342,450	368,022	24.94%	73,457
Rensselaer County						
Status Quo Trend	152,538	156,602	158,579	159,895	4.82%	7,357
Concentrated Growth	152,538	158,644	162,873	166,506	9.16%	13,968
Trend Hyper-Growth	152,538	162,184	168,978	174,426	14.35%	21,888
Con. Hyper-Growth	152,538	164,880	176,778	188,776	23.76%	36,238
Saratoga County						
Status Quo Trend	200,635	219,391	233,633	246,647	22.93%	46,012
Concentrated Growth	200,635	208,667	214,225	218,991	9.15%	18,356
Trend Hyper-Growth	200,635	245,155	294,097	347,969	73.43%	147,334
Con. Hyper-Growth	200,635	230,990	260,439	291,209	45.14%	90,574
Schenectady County						
Status Quo Trend	146,555	147,939	148,694	148,751	1.50%	2,196
Concentrated Growth	146,555	152,422	156,481	159,974	9.16%	13,419
Trend Hyper-Growth	146,555	149,840	152,435	152,671	4.17%	6,116
Con. Hyper-Growth	146,555	155,766	165,757	175,626	19.84%	29,071
Capital District						
Status Quo Trend	794,293	826,094	848,107	867,000	9.15%	72,707
Concentrated Growth	794,293	826,094	848,107	867,000	9.15%	72,707
Trend Hyper-Growth	794,293	869,777	945,424	1,023,634	28.87%	229,341
Con. Hyper-Growth	794,293	869,777	945,424	1,023,633	28.87%	229,340

Source: CDRPC - 2005.

1.2 Policy Lessons

The combined empirical results and case study analysis suggests that even within the home rule planning framework of New York State , policy makers have tools at their disposal to decrease the fiscal impacts, improve the Region's quality of life, and make our region more economically competitive. At the local level there are a myriad of design oriented solutions that are discussed in more detail in Chapters 5 and 6. These local policies can be coupled with regional strategies such as linking land use planning to capital expenditures for fixed in-

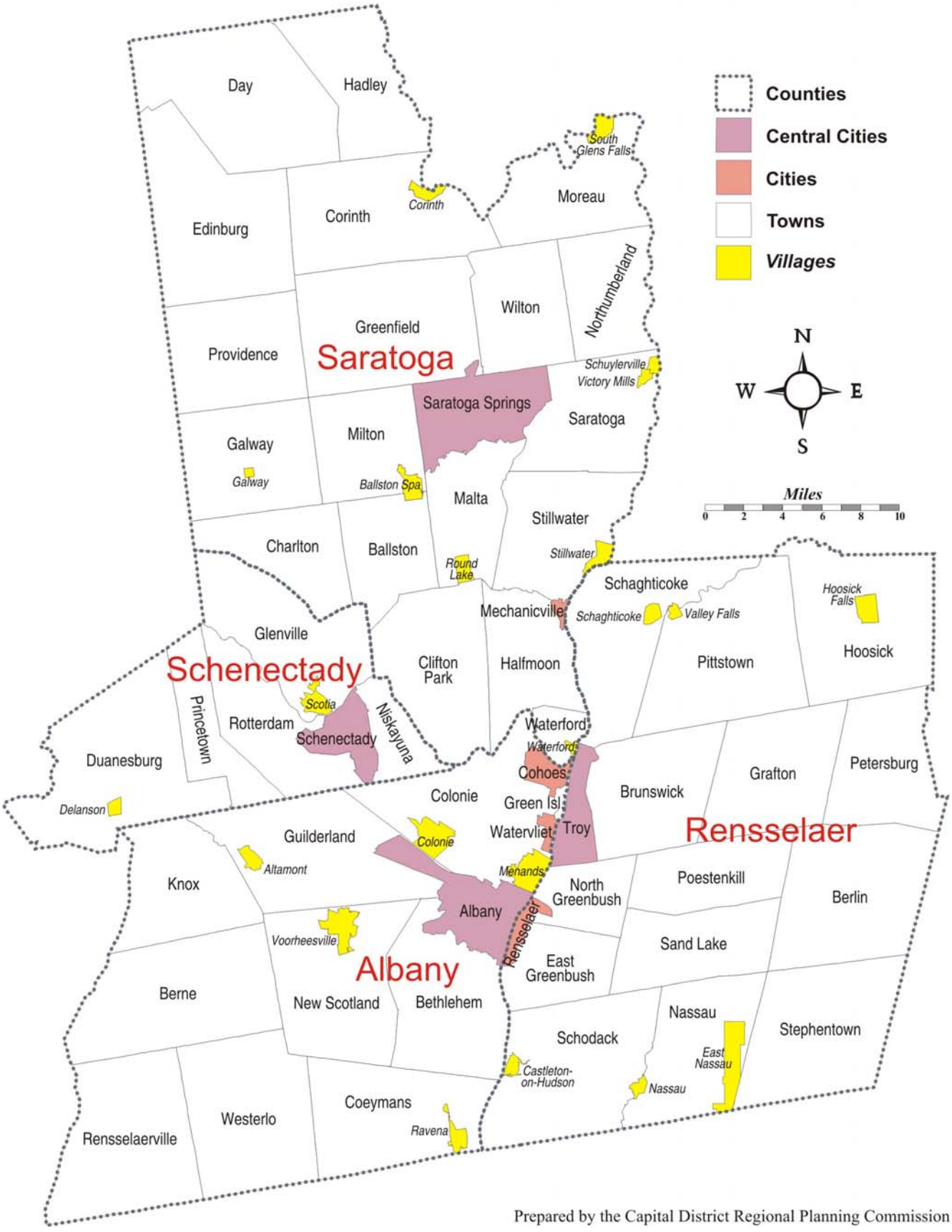
place, development driving infrastructure including transportation, water, and sewer. This can increase efficiency, create economies of scale to reduce costs, and manage development into desirable locations that protect our water resources and preserve our open spaces as demonstrated in the Twin Cities, Portland and to a lesser degree Albuquerque. State level policy could complement the local and regional efforts by offering incentives for communities to share infrastructure and services, reducing economic incentives for more dispersed development, and developing a comprehensive and cohesive urban redevelopment policy.

1.3 Report Summary

The intent of this report is to enrich the regional dialogue of the Region's future development pattern first outlined in the *Alternative Development* Report. Its focus is the potential fiscal impacts of each of the development scenarios articulated in the study. Case studies of other successful regions indicate that a meaningful public debate that forges a consensus view of the future is critical to the success of a regional strategy.

This report begins with a review of the state-of-the-art knowledge on the costs of providing public infrastructure in the context of various development patterns. This information was used to guide the development of the methodological approach to the research presented in Chapter 3. Chapter 4 articulates the fiscal findings for the provision of transportation, water, sewer, primary and secondary education, as well as fire and EMS infrastructure under the different development scenarios evaluated in the *Alternative Development* report. A qualitative analysis of the spillover effects into adjacent counties is also presented in Chapter 4. To better understand what potential policy options assuage the negative impacts of growth, case studies were conducted in four regions: 1) Minneapolis-Saint Paul, MN; 2) Albuquerque, NM; 3) Denver, CO; and 4) Portland, OR. The results of the case studies are articulated in Chapter 5. The report concludes with policy options sensitive to the home rule planning framework in New York State. These options are presented at three different levels: local, regional, and state in Chapter 6.

Capital District Minor Civil Divisions



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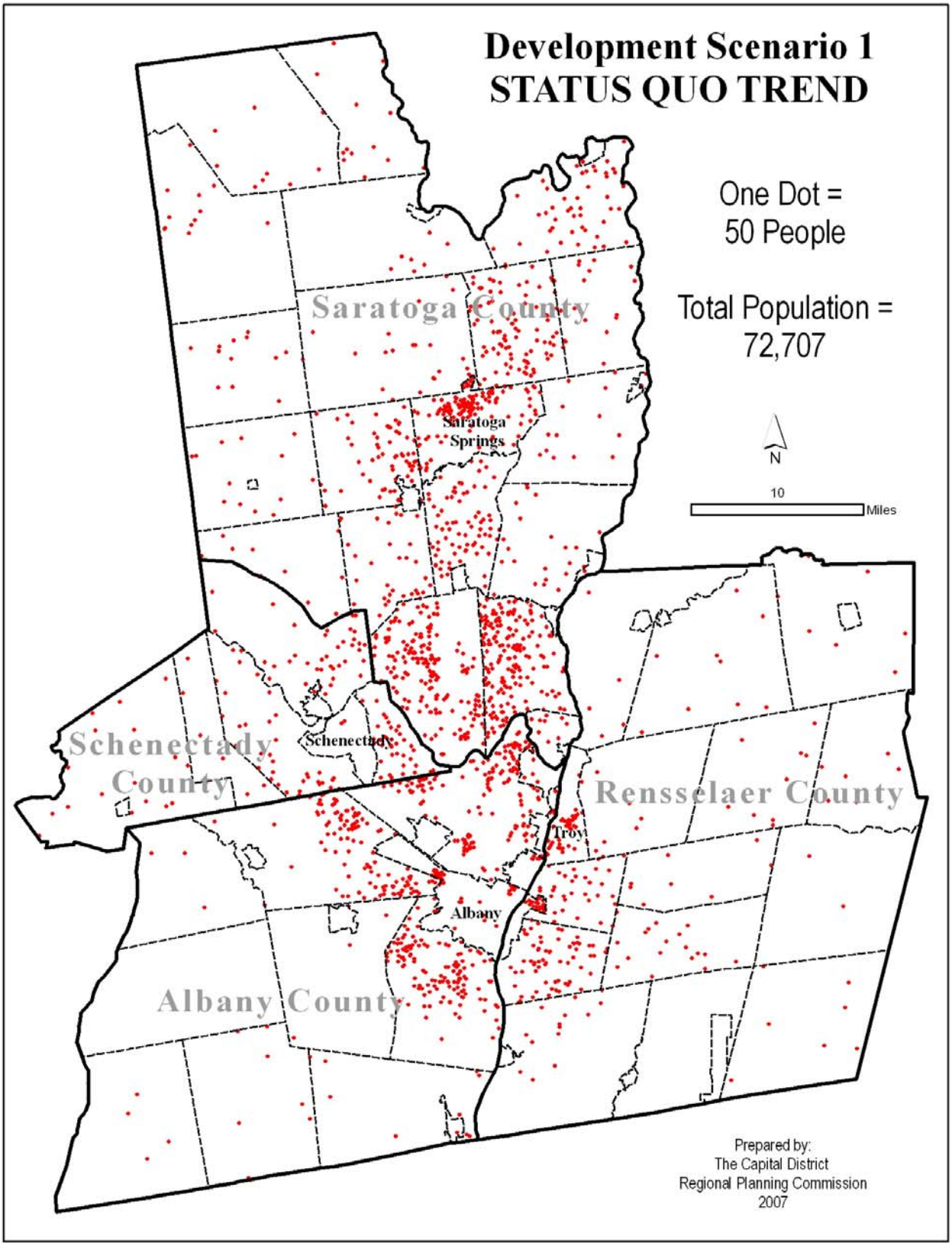
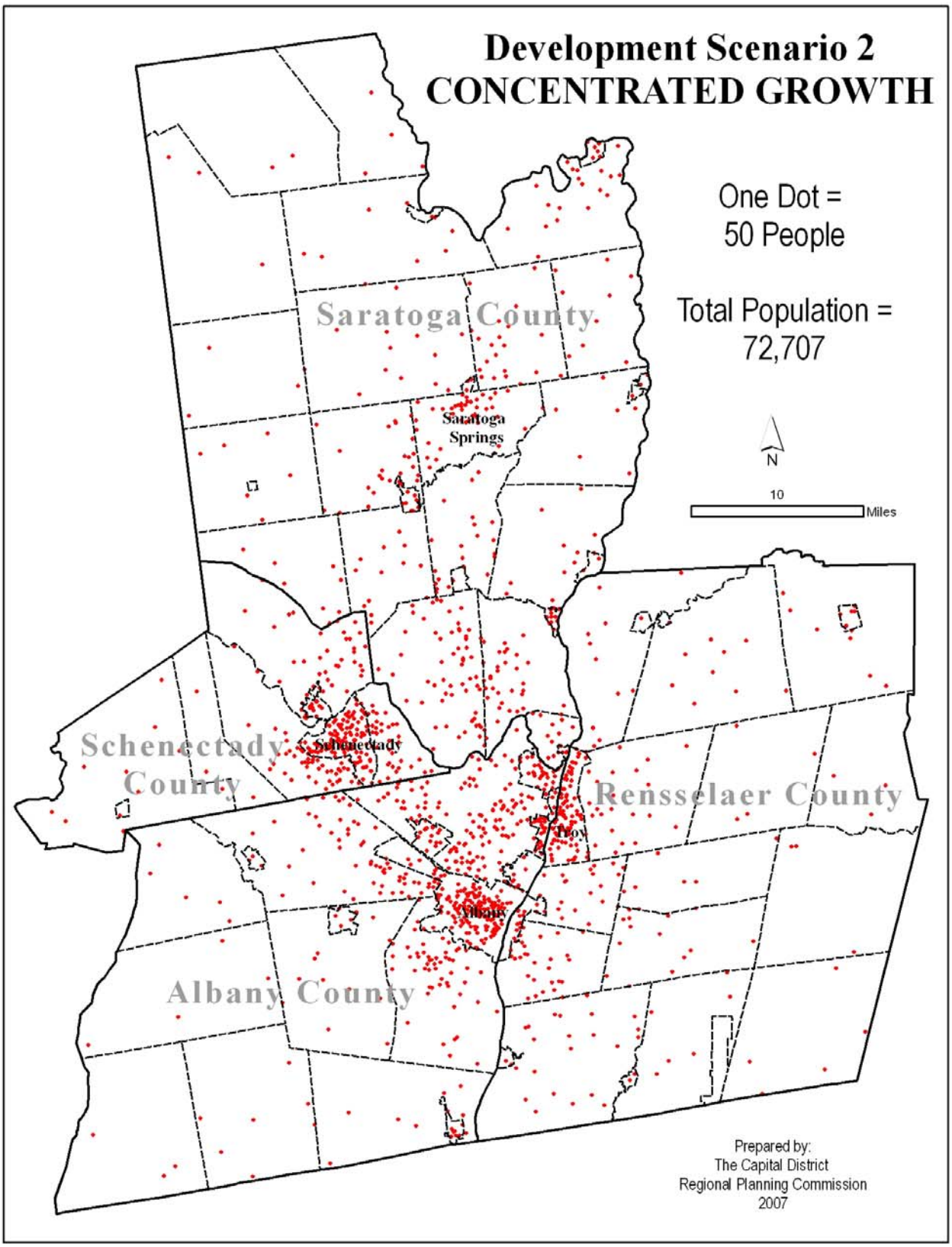
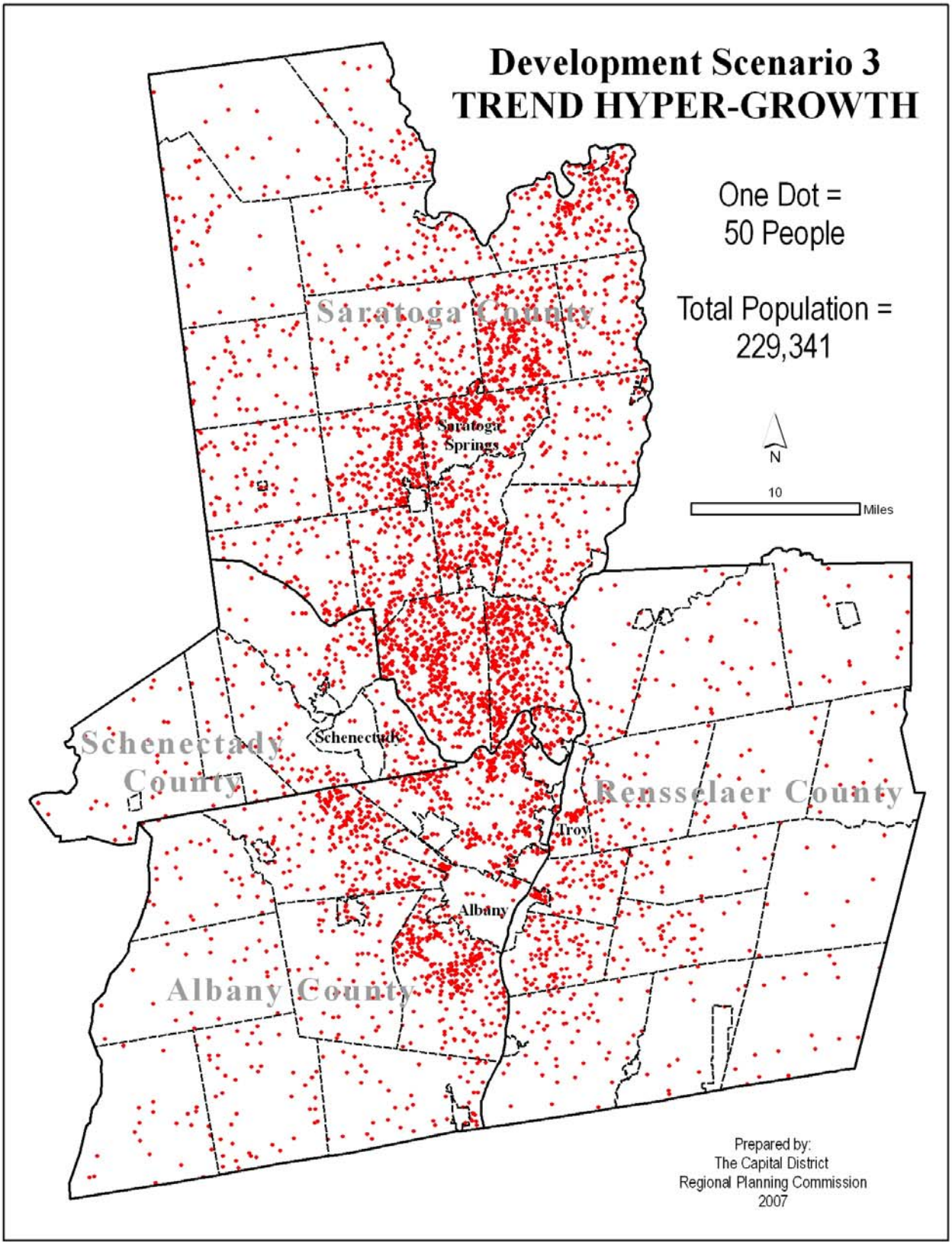


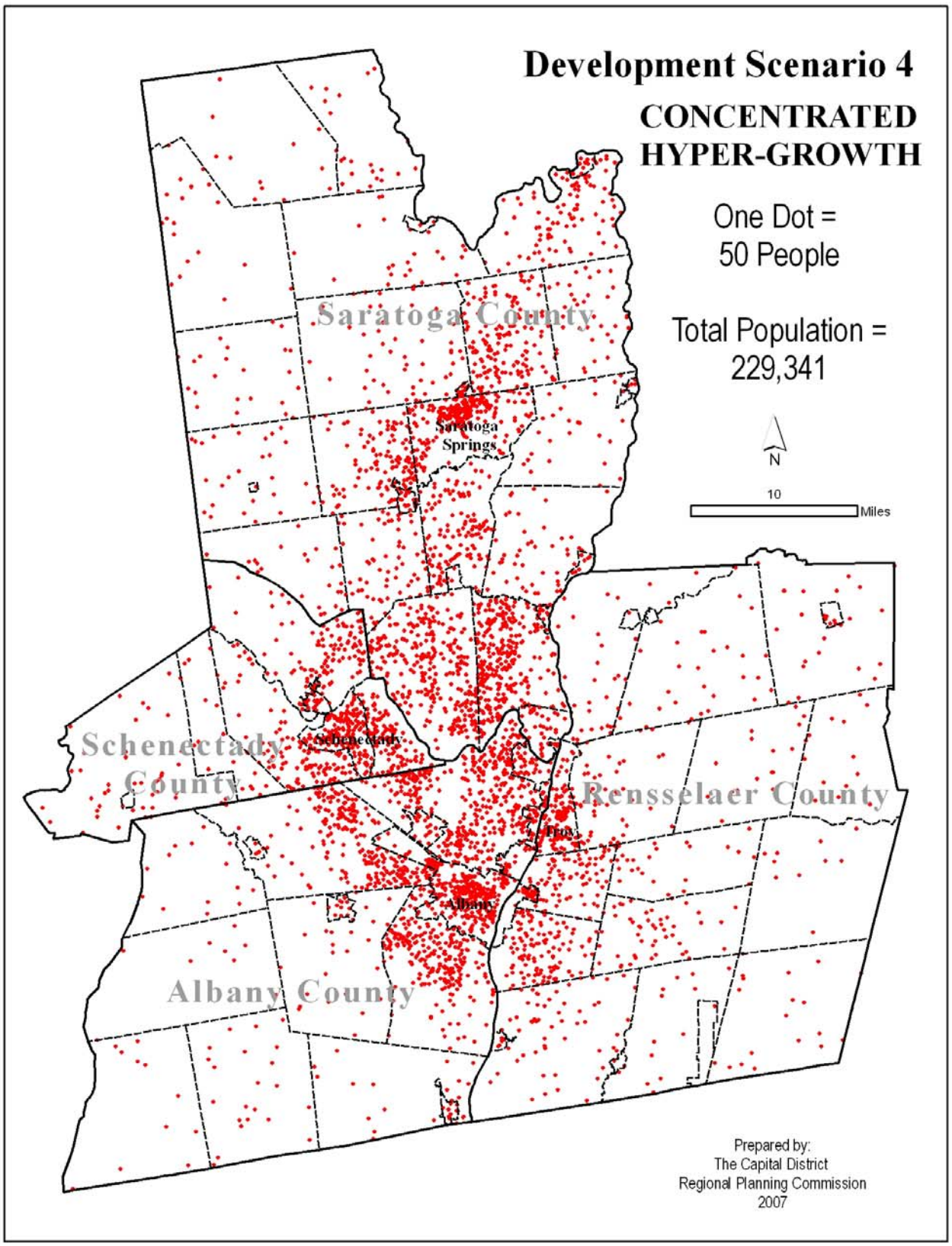
CDRPC Projections
Current Policies



CDRPC Projections
Higher Density & Urban Policy Initiatives



Average U.S. Growth Rate (1%/year)
Current Policies



Average U.S. Growth Rate (1%/year)
Higher Density & Urban Policy Initiatives

Fiscal Impacts of Development

Numerous studies have been conducted that have identified and quantified the factors that have an effect on the public costs of supporting development. Among the factors that have been found to have a measurable effect on the costs of public facilities and services are:

1. Type of land use
2. Housing type and size
3. Development pattern and density
4. Location and distance from central facilities
5. Population size and rate of growth

The following highlights some of the major findings of this research.

2.1 Type of Land Use

Researchers have generally concluded that *non-residential* development tends to be more fiscally beneficial to local governments than *residential* development, primarily because funding public education is a major cost of local governments and additional residential development brings with it added numbers of school-aged children. Among non-residential land uses, business parks, office parks and high-tech research parks, have been generally found to be more fiscally beneficial than ordinary industrial land uses.

Based on this conventional wisdom, citizens and local elected officials have often encouraged the development of business, office, and research parks in the hope that such development will lower local taxes. However, studies have found that attracting such development is no guarantee that local tax levies will go down. For example, a study of DuPage County Illinois, a county which had attracted a large amount of business and office park development because of its proximity to O'Hare Airport, found that tax levies in the county continued to rise (DuPage County Planning Department, 1992). One factor which contributed to this finding is that attracting new non-residential development (i.e. new jobs) inevitably brings with it an increased demand for new housing.

In recent years a number of studies have produced interesting findings concluding that leaving land in agricultural use or as open space may actually be more economically beneficial to a community than having the land be developed. Cost of Community Services (COCS) studies conducted by the American Farmland Trust have found that although agricultural land pays relatively little in taxes, it routinely pays *more* in taxes than it costs in terms of public services received , whereas developed land often costs more in public services received than it generates in tax revenue (American Farmland Trust, 2002).

Additional studies have found that keeping land undeveloped and permanently preserving it as open space can be fiscally beneficial because publicly owned lands can significantly increase the value of adjoining private properties. Brabec (1994) reports that:

- Analysis of property sales in the vicinity of the 1294 acre Pennypack Park in Philadelphia revealed that properties located close to the park were valued more highly than properties located further away from the park.

- A study in Dayton, Ohio found that the proximity of an arboretum added 5 percent to the average selling prices of homes, and proximity to the park and river added 7.35 percent.

- In Boulder, Colorado the value of homes adjacent to a greenbelt of preserved open space were 32 percent higher than those of similar residences 3000 feet away.

- In Seattle, homes near the 112 mile Burke-Gilman trail sold for 6 percent more than other houses of like size.

Thus, although public parks and lands set aside for conservation purposes pay nothing in property taxes, such a use of land can be fiscally beneficial because when local property values increase local governments collect more in taxes.

2.2 Housing Type and Size, and Lot Size

Years of fiscal impact studies have produced almost uniform agreement that the type and size of housing can have a significant effect on the fiscal impact of residential development because of the correlation between housing type and size and the number of school aged children. Age restricted housing limited to persons sixty years of age or older has generally been found to be fiscally beneficial, because such housing has no impact on local education costs. Since studio and one-bedroom housing units have few school-aged children living in them such units have also generally been found to be fiscally beneficial. Conversely, as the number of bedrooms (and numbers of school-aged children) increase, residential development becomes less fiscally beneficial. (Burchell et al., 1993).

Public costs have also been found to increase as lot size and lot frontages increase. The larger the lot and the longer the street frontage, the greater the public cost of water and sewer service, road repair and snow plowing, school bus routes, etc. For example, Speir and Stephenson studied how public water and sewer costs varied with changes in lot size, and found that smaller lots cost significantly less to serve than larger lots. "[W]hen lot size increases from 0.25 acre to 1 acre, costs nearly double…. Annual costs per household increase from $204 to $392… The higher costs are due to the longer distribution mains required for larger lots. Friction head losses are also higher with longer lengths of pipe, which increase pumping costs (Speir and Stephenson 2002, 60)."

In sum, although subdivisions composed of large, single-family, detached homes on large lots are often favored and encouraged by suburban communities, fiscal impact studies have found that such developments can often cost local governments more than they produce in tax revenue.

2.3 Development Pattern and Density

Fiscal impact studies have consistently found that per unit public costs decrease as the density of development increases and development becomes more compact. The first, and to this day, the most influential study comparing the costs of alternative development patterns was completed by the Real Estate Research Corporation (RERC) in 1974. RERC's report, titled *The Costs of Sprawl*, compared the economic costs associated with six representative development patterns on 100 acres of land. The six different development patterns were: low-density, single family detached homes in a standard subdivision—3 units per acre (termed the "sprawl" option); clustered single-family development—5 units per acre; clustered townhouse development—10 units per acre; clustered walk-up apartments—15 units per acre; and mixed residential development—20% of each. The conclusion of the *Cost of Sprawl* study was unequivocal:

> [T]he major conclusion of this study is that, for a fixed number of households, "sprawl" is the most expensive form of residential development in terms of economic costs, environmental costs, natural resource consumption, and many types of personal costs… This cost difference is particularly significant for that proportion of total costs which is likely to be borne by local governments (RERC 1974).

One year after RERC released the report, the State Planning Office in Wisconsin compared the fiscal impacts of different mixtures of development and the effects of accommodating development at different densities. Six forms of development were identified and evaluated: conventional exurban development—single-family detached homes on 2 acre lots; clustered exurban development—1 acre lots; conventional suburban development—5 dwelling units (d.u.) per acre; clustered suburban development—6 d.u. per acre; conventional urban development—8 d.u. per acre; clustered urban development—10 d.u. per acre. The Wisconsin study found that exurban development of houses on two acre lots cost 28% more per dwelling unit than suburban single-family homes and townhouses at six dwellings per acre; exurban development of homes on two acre lots was 172% more costly per unit than for 10 units per acre urban development. The Wisconsin study found that "… increases in density and decreases in leapfrogging reduce the costs of public facilities needed to support new development… (Wisconsin State Planning Office, 1975)." Virtually all of the savings occurred in the areas of Transportation and Public Facilities. The Wisconsin study concluded that "[i]f saving money on community facilities is important to citizens and local government officials, an increase in density and a reduction in leapfrogging will save significant sums (Wisconsin State Planning Office 1975)."

Another study conducted by James Nicholas and Arthur Nelson analyzed the annual capital facility and service delivery costs for 1000 new housing units constructed at different densities in Loudoun County, Virginia (1991). Four development scenarios were examined: rural sprawl (1 unit per 5 acres); rural cluster (1 unit per acre); medium density (2.67 units per acre); high density (4.5 units per acre). Nicholas et al. (1994) found that rural sprawl cost 10% more per unit than rural cluster, and 40% more per unit than medium-density residential development. Costs that varied with density, and that

increased on a per unit basis as density decreased, were principally school transportation costs; road maintenance costs; and water and sewer operating costs. Costs that did not vary significantly with density were public school capital costs; law enforcement; fire and rescue services; health and welfare services, and costs of general government.

2.4 Location and Distance from Central Facilities

A study by the Center for Urban Policy Research (CUPR) at Rutgers University demonstrated how public costs related to development can vary depending on *where* that development is occurring. This study analyzed the costs of providing roads to support *similar types and densities* of development in four different locations in Naperville, Illinois. It found that the cost of providing roads for these *same* types of development could be as much as 2 ½ times greater in one location than in another (CUPR, 1988).

Another study conducted by Professor James Frank of Florida State University found that the total public cost of providing public infrastructure to a 3 unit per acre residential development located ten miles from central facilities was $48,000 per house—whereas the per unit costs in a 12 unit per acre development located closer in was 50% lower (Frank, 1989).

A study conducted by the Center for Urban Policy Research in 1992 estimated the public costs that would result if development in New Jersey took place according to the "managed growth" scenario called for in the State of New Jersey's *Interim Development and Redevelopment Plan*, and compared those costs against those of allowing past trends to continue. In terms of road costs, the study found that fewer miles of local roads would have to be built under the managed growth scenario, thereby "saving municipal public works departments $112 million annually in construction, maintenance and debt service costs (CUPR, 1992)." Likewise, "public school districts [would] realize a $286 million annual financial advantage…due to being able to make use of usable excess public school operating capacity." In terms of water utility costs, the study found that managed growth would produce savings of $61 million over a twenty year period—a 10 percent savings as compared against the total water infrastructure costs likely to result from following past trends. Similarly, managed growth would result in sewer infrastructure cost savings of $379 million—5.6% of the total sewer cost for new development.

In their study of the effects of housing patterns on public water and sewer costs, Speir and Stephenson measured the effect of tract dispersion and distance on public costs. They found that water and sewer infrastructure costs increased between 6% and 14% as tract dispersion increased (Speir and Stephenson, 2002). Costs also increased with distance from existing service centers. A development 0.25 mile from the service center cost 30% less per unit than one 4 miles from the service center. "Cost differences among scenarios are attributed to changes in the length of pipes, the diameter of water transmission and sewer interceptor pipes, the number and size of water pump stations, and energy costs" (Speir and Stephenson 2002, 60).

2.5 Population Size and Rate of Growth

Fiscal impact research has documented that the number of full-time employees per 1,000 population, and employees per 1000 pupils in public schools, tends to vary among communities of different population sizes. Likewise, researchers have found that *economies of scale* (in terms of operating and capital costs per 1000 population) can be achieved in delivering certain public services as community size increases; with other public services there are no such economies of scale. Fiscal impact research has furthermore shown that public costs per 1,000 population vary depending on the *rate of growth* and the *direction* of population change (i.e. whether a community is growing in population, or losing population).

The accrued evidence of such research over the years is reflected in tables that show the Operating Expenditure Multiplies of communities with different population sizes and different growth rates. A typical table contained in *The New Practitioner's Guide to Fiscal Impact Analysis* (Burchell, Listokin, Dolphin, 1993) establishes seven categories of population size (1,000-10,000; 10,001-25,000; 25,001-50,000; 50,001-100,000; 100,001-500,000; 500,001-1,000,000; and over 1,000,000), and three different categories of population change (1.5%-2.0% increase/year; Over 2.0% increase/year; 0% to 0.5% decrease/year). The table lists six types of municipal government functions (General Government, Public Safety, Public Works, Health/Welfare, Recreation/Culture, and Education) and gives the appropriate Operating Expenditure Multiplier for each combination of Population Size and Growth Rate.

The data suggests that economies of scale are achieved in the area of Public Works (highway maintenance, snow plowing, water and sewer infrastructure, etc.) For example, costs are greater for communities with populations less than 25,000 than for those with populations between 50,001-100,000. No such economies of scale appear to be achieved, however, in the areas of Public Safety (Police and Fire) and Education as population increases. Interestingly, the data suggests that as population size passes a certain threshold (i.e. 100,001-500,000 and 500,001-1,000,000), Operating Expenditure Multipliers for these services can actually increase.

Another important finding of this type of research is that a rapid rate of development can prove more costly to a community than if growth occurs at a more moderate rate. A study by Helen Ladd (1990) analyzed data from 248 large counties over a 12 year period, and found that counties with high rates of growth and large amounts of tax-paying new development had *higher* levels of public expenditure, and higher tax rates, than slower growing communities. The worst fiscal situation however, is undoubtedly that confronted by communities whose populations are declining, because a great deal of the cost of providing public services is associated with capital facilities that are fixed investments. Such fixed facility costs do not decrease as population decreases. As a result, they must be recovered from an ever-dwindling tax base, resulting in the imposition of an increased tax burden on those who remain.

2.6 Comparing Fiscal Impact Models

Fiscal Impact studies measure the potential impacts of development, and vary widely in scope. Contemporary models range in their complexity from those which analyze secondary economic impacts as well as the fiscal impacts of growth to more limited approaches that just calculate the additional costs to provide new infrastructure based on average per capita costs. Nonetheless, they rarely if ever analyze the private cost for wells or septic systems, the externalities of development, or measure what actually is occurring in a community. They also may or may not account for current service capacity and whether new growth patterns will optimize the use and complement the investment across various infrastructures or the growth will simply exceed current capacities.

Bunnell (1998) suggests that regardless of the degree of sophistication, fiscal impacts can be categorized into two groups: 1) marginal cost and 2) average costs. Marginal cost approaches to fiscal impact modeling, in some situations, can better account for the "lumpy" nature of providing the physical infrastructure such as roads, water, sewer, new school facilities, etc. In other words, the costs are not evenly distributed over time; furthermore the uneven cost allocation is compounded by the mismatch between demand and the long life-cycle of the facilities. In very general terms, marginal cost approaches are relatively more suited for short run analyses.

The advantages of the average costs approach include the reality that due to "lumpiness" of infrastructure there is often some excess capacity present in most communities; suggesting an average cost approach is better suited. Over the long run (20 years plus) the cost of providing the infrastructure will approach the present average with some accounting for inflation. Despite its advantages, average costs models do not adequately capture the nature of dis-economies of scale present in most infrastructure investments.

Given the nature of our study over vastly different terrain; varying community capacities; and the long time horizon, the marginal cost approaches would require a degree of detail regarding incremental changes that is not possible. Moreover, given the scope of the project and the very fragmented infrastructure delivery system in the Capital Region, an average cost approach is better suited for evaluating the long run change and evens out the differences across the different communities. This allows the research team and the community to better assess the trends presented by the alterative development scenarios.

Methodology of the Report

This chapter articulates the methodological approach to this study. The process of fiscal impact analysis begins with defining the study area and horizon year. Projecting the future population of the study region at the predetermined horizon year is the next critical step. With a valid population projection, the most appropriate means to estimate the future costs of the infrastructure to accommodate the growth need to be determined. This chapter is subdivided into four major sections beginning with the population projections and proceding though the selection of a fiscal impact model, calibrating the model, and the case study selection.

3.1 Population Forecasting Approach

The research team made a conscious decision to build on the work conducted by the Capital District Regional Planning Commission in the *Alternative Development* report published in 2005. There were a number of considerations discussed regarding this decision. Central to these deliberations were the following three questions: 1) Was the four county study region the appropriate scale of analysis? 2) Was the 35 year time horizon desirable? and 3) What were the validity and public receptiveness to the population forecasts presented in the report.

Selecting the *Alternative Development* report as the baseline regional population change for this study was the most important decision regarding the structure and results of the study. The *Alternative Development* report uses the Albany, Rensselaer, Saratoga, and Schenectady four county area to define the Capital Region. This definition of the region captures the vast majority of the population and accompanying commercial activities. However, there are two noteworthy concerns using the population projections in this report. Given the national and similar local trends regarding land use and commuting patterns, we anticipate some growth spillovers into adjacent counties. Given the study area definition, this growth is unaccounted for in our estimates. Furthermore, there is the potential for the Luther Forest Advanced Micro Devices (AMD) project to skew development patterns into areas that currently lack the infrastructure to support growth, increasing the spillover into counties adjacent to the four core Capital Region counties. Both of these scenarios will result in our model underestimating population changes and infrastructure demands, resulting in an undervaluation of the fiscal impacts.

The degree to which this varies depends on the ability of policy to shape development and ameliorate its externalities. By interviewing key stakeholders in the six counties that have the most economic interaction with the four core counties, the research should be able to assess, in qualitative terms, the extent of the affects of increased growth in the adjacent areas of Columbia, Greene, Montgomery, Schoharie, Warren and Washington Counties. However, we can not account for any differences in the forecasted population distribution in our four county study, nor the deviation that the Luther Forest development may cause.

The complexities of population modeling, compounded with the complication associated with forecasting the value of money over the long run, makes fiscal impact modeling a

daunting challenge. To reduce the errors introduced by the longer horizon year, the research team decided to truncate the forecast to 2030.

The *Alternative Development* report presents two different population forecasts under two different distribution scenarios. A third population forecast, though not considered in the report, were projections prepared by the Cornell Institute for Social and Economic Research (CISER) which, after a slight increase, projects a decline in the region's population by 2030. Though possible, estimating the fiscal impacts of all six alternatives would have diluted our resources and ultimately diminished the value of this report. The research team, in consultation with the Center for Economic Growth, decided to focus its efforts on the two most probable population forecasts presented in the report. The first forecast suggests the region will grow by slightly under 73,000 people over the next 25 years. This is referred to as the Status Quo trend forecast and assumes that the region will experience some economic growth and continue to grow moderately by attracting new residents for job opportunities to offset losses due to declines as a result of an aging population of baby boomers. The second alternative selected for analysis was the hyper-growth forecast, which assumes that the region will grow at the national average rate of approximately 1% annually, adding just over 229,000 new people by 2030 (CDRPC, 2005). This assumes a much greater rate of economic growth in the region thereby attracting new residents to the region. The third alternative, prepared by CISER, which forecasts a net loss in the region's population by 2030 based on historical and current trends of the components of population growth (natural rate of change and migration) was not selected for further analysis.

The final decision made by the research team about the population forecast addressed assumptions regarding the distribution of the new residents across the region. The benefit of previous public scrutiny was an important factor in choosing the two possibilities outlined in the *Alternative Development* report. The first alternative assumes the trend of decentralization of the population will continue, resulting in lower population density and more urbanization of land across the region as demonstrated by Pendall (2003). The second alternative assumes a denser settlement pattern would emerge due to a combination of policy and evolving consumer preferences shaped by changing demographics, public policy, energy prices and improving quality of life in urban places, among other stimuli.

It is important to note that the assumptions about the growth and distribution of the population for the trend or redevelopment scenarios do not fully account for changes that some have forecast may result from the region's investment in Nanotechnology, including the Luther Forest project. If those more optimistic forecasts than already accounted for prove accurate, it would be a major shock relative to any forecast in the *Alternative Development* report.

In the end, the fiscal impact of four potential population size and distribution outcomes are compared. They are: 1) the baseline growth rate combined with the trend distribution (Status Quo Trend); 2) the baseline growth rate combined with denser settlement pattern (Concentrated Development); 3) the hyper-growth rate combined with trend distribution (Trend Hyper-Growth); and 4) the hyper-growth rate combined with denser settlement in existing and undeveloped areas (Concentrated Hyper-Growth).

3.2 Selecting a Fiscal Impact Model

The art and practice of fiscal impact modeling has evolved considerably with advances in computing technology, increases in data collection, and improved information regarding the relationship between population expansion and increased demand for supporting infrastructure. However, evolving consumer preferences and shifts in lifestyles over the past two decades have created new challenges. The practice of fiscal impact analysis ranges from analyzing the impacts from the development of a single site to the use of econometric analysis using models, such as REMI, or input/output models such as IMPLAN, to estimate impacts on larger geographic scale over much longer time. By and large the choice comes down to either using average cost approaches or marginal cost approaches previously discussed (Bunnell, 1998). Most analysts concur that average cost approaches are best suited for long run estimates. The average cost methods approach was selected for this study for three primary reasons: 1) the long time horizon; 2) data availability; and 3) average costs approach best account for the variations across the varied landscape of providers in the Capital Region.

Tipping the scale in favor of selecting the fiscal impact model developed by Arthur Nelson were issues regarding cost, data availability, the national recognition of the model, and its ability to be readily adapted to various geographic scales. The American Planning Association publication, *Planner's Estimating Guide: Projecting Land-Use and Facility Needs*, provides a detailed guide to the construction of the model and its application (Nelson,2004). This model's strengths include its reliance on available data, the ease to which an analyst can calibrate the model to adjust for regional specificity, the capacity to apply the model to various geographic scales, the detailed development of the model through its application over a few decades in a variety of regions, and its wide acceptance in the professional planning community. The model estimates the fiscal impacts of population growth for a defined study region for an array of publicly provided infrastructure that includes but is not limited to: 1) water supply and distribution; 2) wastewater collection and treatment; 3) fire protection and EMS; 4) primary and secondary education; and 5) transportation infrastructure.

While the selected model offers many advantages, one disadvantage is that it uses national averages to calculate the demand for and cost of infrastructure. Thus the analyst must calibrate the model for regional specificities. While the model does provide an estimate for the provision of transport infrastructure, the research team opted to use the Capital District Transportation Committee's (CDTC) Systematic Traffic Evaluation and Planning model to estimate the regional cost of transportation infrastructure provision. This decision was based on CDTC's expertise and their model's higher degree of specificity with regards to transportation needs relative to the existing network, as well as its inclusion of regional contingencies and price differentials. To calibrate the model for the other components of publicly provided infrastructure, the research team combined data from public sources and interviews with providers of the infrastructure. Section 3.3 articulates the process used to calibrate the fiscal impact model.

3.2.1 CDTC's Transportation Process

CDTC evaluated the impacts of the different growth scenarios using the CDTC Systematic Traffic Evaluation and Planning (STEP) Model. The CDTC STEP Model is a travel demand model which utilizes VISUM software. The simulation of travel is based on the premise that the magnitude and pattern of travel is a stable function of the characteristics of the land use pattern and the transportation system. In travel simulation modeling, those aspects of land use development and of the regional transportation system demand are identified, quantified, and correlated with travel through the analysis of origin-and-destination, land use, and transportation system data. It has been demonstrated that the relationships between land use and the transportation system and attendant travel remain reasonably stable over time, thus enabling the forecast of future travel patterns based upon a future land use development pattern. By considering the future distribution and intensity of land use activity in a corridor and in the surrounding communities as the major factor influencing future traffic patterns, a transportation plan could be developed which would not only serve the existing traffic patterns in the area, but which would also serve the new pattern that will evolve with changing development.

Transportation models are generally structured to analyze the flow of vehicles over highways throughout a specified geographic area. The geographic area is divided into smaller sub-areas, called traffic analysis zones (TAZ). The street networks are identified by points of intersection, termed "nodes" and segments between nodes, termed "links". Given the necessary transportation system characteristics and knowledge of population and employment location, the sequence of travel simulation occurs in three steps:

1. Trip Generation: The total number of vehicle trips generated in each zone of a study area is determined using existing relationships between land use and travel. The output from this step is the total number of vehicle trip ends --- that is, trips entering and leaving each zone of the study area. The total number of trips is dependent upon the trip generation rate used.

2. Trip Distribution: Given a street system and knowledge of the location of trips, a model will distribute trips, that is, calculate how many trips are produced in one location and attracted to another. Like Newton's Law of Gravity, from which the technique is derived, the number of trips between each origin and destination pair is inversely proportional to the travel time between each origin and destination and proportional to the attractiveness of one destination relative to all other destinations. This process results in an estimated trip table for all the zones in the region. For a given zone, the trip table estimates where each trip will come from or go to.

3. Traffic Assignment: The inter-zonal trips are assigned to existing and proposed highway facilities. The output of this step is the number of vehicles utilizing each link of the arterial street and highway system. The decision of which route a vehicle takes is based on a process that seeks to minimize delay or travel time, including considerations of link capacity and congestion effects.

A recursive process was used to provide feedback to the trip distribution based on travel times. First, a trip distribution was run using free flow conditions to calculate travel times for the gravity model. The resulting trip table was used in the assignment process. Next, the resulting congested travel times were fed into the trip distribution process. This recursive process was repeated 12 times in the calibration year, 2000, until convergence in travel times was achieved. The resulting link volumes were found to have close correspondence to year 2000 traffic counts, and the resulting trip times by trip type were found to have close correspondence to the travel times found in the *2001 National Household Travel Survey* for the Capital Region.

For the each of the future growth alternatives, CDRPC forecasts of households at the TAZ level were used to calculate future trip generation by TAZ. The resulting trips by zone were input into the trip distribution process. The recursive process was used until travel times converged. In the future simulations, 15 iterations of the recursive process were used to achieve travel time convergence.

Based on traffic volumes assigned to each link, VISUM software was used to calculate resulting travel times, excess vehicle hours of delay, and vehicle operating costs for each link on the network. The results by link were aggregated to the regional level.

Based on the work done so far for the *New Visions for a Quality Region Plan*, the impacts of proposed big initiatives were considered for each scenario. Costs for the big initiatives were developed, and each scenario was examined in the context of the opportunities it would provide for the big initiatives.

3.3 Calibrating the Model

To calibrate the selected fiscal impact model, it was necessary to determine the cost difference for infrastructure provision in the study region relative to the nation. For example, in general, labor costs in the New York are higher than the national average (BEA, 2006). With 45 school districts, 25 sewer districts, 57 water districts, and an even larger number of fire districts (over 250), the research team needed to prioritize which types of providers to interview and determine a sample selection process that would provide the most representative data. Each infrastructure type was considered separately for selecting the sampling frame. The geographic distribution across the four counties, varying degrees of urbanization, as well as the size of population change were central to the study team's consideration in the selection of all of the samples. To calibrate the model, the average acreage by land use and employment at the two digit level of the North American Industrial Classification System[1] of industrial sectors needed to be forecast to the horizon year 2030. Each of these steps are discussed in more detail below.

[1] The initial time period employment data was in Standard Industrial Classification code (SIC) while the 2005 property data was in the North American Industrial Classification System (NAICS). To calculate changes and forecast future employment trends, all employment data was converted to SIC codes. Given the highly aggregated nature of the employment component of the Nelson model, either NAICS or SIC industry sectors are usable.

3.3.1 Sample Selection of Water and Wastewater Treatment Providers

In the case of the sewer and water infrastructure providers, the team employed a snowball method for selecting the sample. The snowball technique begins by identifying key stakeholders and then asking them to recommend participants based on their knowledge of the sample population. Contingent on the goals of the research, the sample selection may be based on the representative set or seek to balance unique cases with those that represent the norm. Given the potential consequences of accelerated growth on these critical infrastructure providers, our team sought to interview a balance of unique cases with more representative examples to better understand the average cost to increase the supply and distribution capacity of potable water in the region. A similar approach was used to select the sample for operators of wastewater treatment systems in the Capital Region.

Detailed interviews were conducted with the heads of the largest water and sewer infrastructure providers in the Capital Region (9 water infrastructure agencies and 4 sewer districts) to obtain current information regarding infrastructure demands and capacity, as well as possible plans for expansion. The water districts surveyed provided water to 448,419 people or 56% of the total population of the four-county Capital District region in 2000. Seventy-seven percent (77%) of all Capital Region residents served by public water supplies received their water from these 10 water service providers. The four largest wastewater treatment agencies surveyed provided wastewater treatment for roughly 385,000 people or approximately 50% of the total population in the Capital Region. Seventy-six percent (76%) of all people living in housing connected to public sewer systems had their wastewater treated by these four sewer districts.

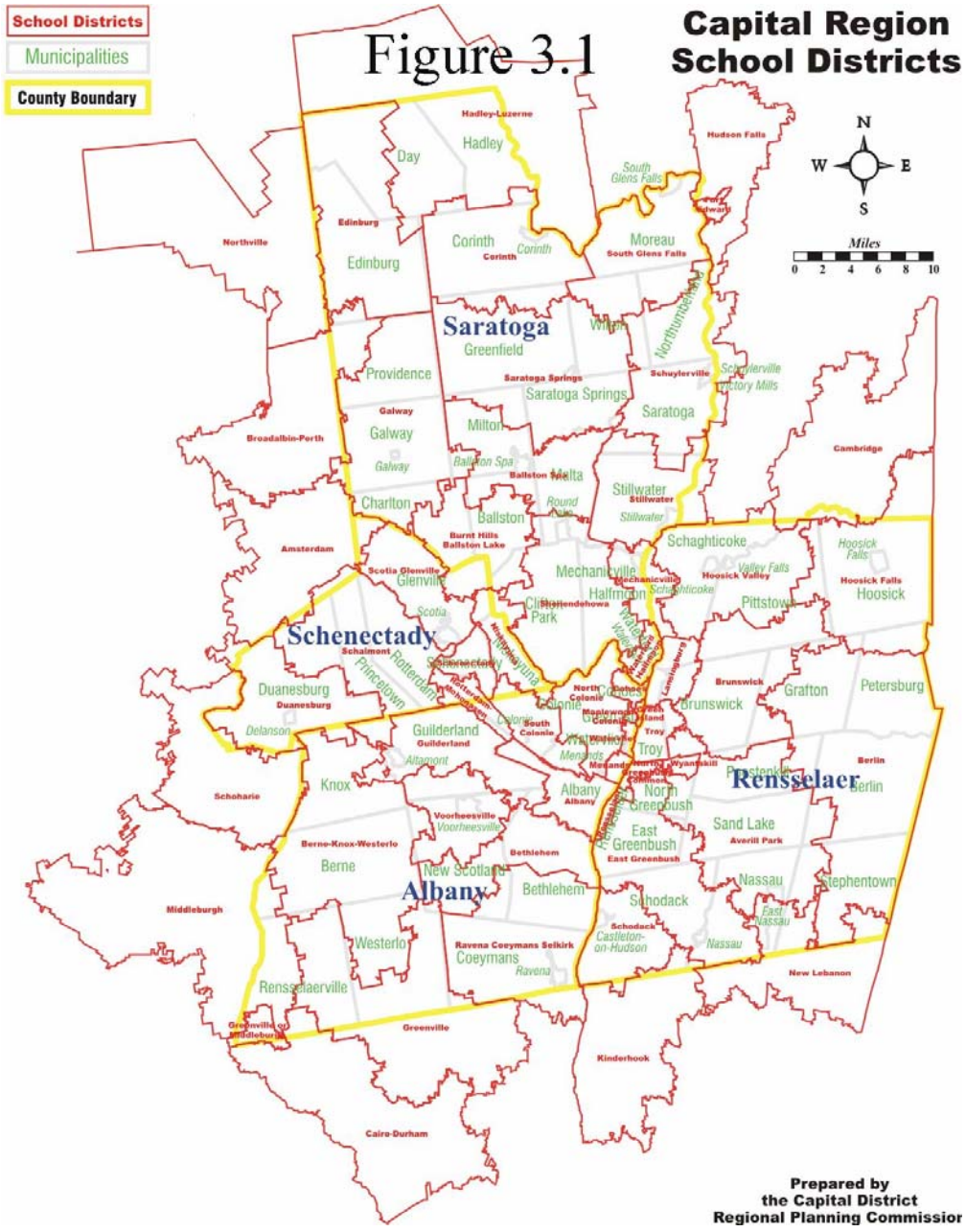
In addition, data compiled in the Capital District Regional Planning Commission's report on water systems (CDRPC 1999) and in the NYS Department of Environmental Conservation's report on municipal wastewater treatment plants (NYSDEC 2004) was analyzed to determine current infrastructure capacities, service levels, intra-regional disparities and trends. Lastly, a literature search was conducted to identify and incorporate the findings of studies elsewhere in the county which have documented costs associated with water and sewer infrastructure provision, and attempted to isolate and quantify factors affecting the costs of water infrastructure provision.

3.3.2 Sample Selection of School Districts

The variation in the size of the various school districts, their sheer number, and the unique challenges faced by each district shaped the sample selection process. In an effort to build a representative sample that would accurately reflect the average cost to provide quality education in the Capital Region, the sample selection process began with determining the degree of change in each of the 45 school districts. In the *Alternative Development* report, the population projections were calculated at the Traffic Analysis Zone (TAZ) area scale and then aggregated into minor civil division, then by county, and summing the four counties to estimate the regional change. Unfortunately, school district service area boundaries often cross municipal and, in some cases, county boundaries (see figure 3.1).

To allocate changes in school age population growth by school districts, ArcGIS geographic information system software was used. Assuming an even distribution of population in each

TAZ, the relative proportion of the area of each TAZ in a school district was calculated and multiplied times the size of population in the TAZ and the percent of the population of school age children for the school district. Each of these products was then aggregated to calculate the school age population in both 2000 and the estimated school age population in 2030 in all school districts. These estimates were then used to calculate the aggregate and relative change in population. This process enabled the research team to identify the school districts that would be most impacted by the hyper-growth trend scenario.



The second step in the process was to ensure that differences across the four counties and the different types of districts were captured in the sample selection. This was an iterative process, in which professional judgment was combined with data from the New York State Department of Education and the estimated changes in school age children in each of the districts. This resulted in a sample of 16 school districts to be interviewed.

In all but one case, the district superintendent or the assistant superintendent of business was interviewed. The interviews focused on understanding the cost of delivery of the education, understanding how changes in population would affect the costs, as well as facilities needs. Data was also collected on the current facility size and available expansion area. Depending on the characteristics of each provider, the interview questions were tailored to optimize the data collection.

3.3.3 Sampling Fire Districts

The sampling of the nearly 260 fire districts followed a similar process to that of the school districts. Unfortunately, the response rate was significantly lower than optimal despite multiple efforts to contact the districts. The initial contact was made via informational letter and request for an interview to the 12 district chiefs in June of 2006. This was followed up with at least three telephone calls to schedule an interview over the course of June, July, and August of 2006. During the telephone contact phase the sampling frame was expanded to 20 districts. In the end, only one district granted an interview.

Some alternative approaches were then considered. After the initial efforts to contact district chiefs fell short, the research team contacted the county coordinators. This resulted in one in-person interview which, clearly indicated that the information regarding budgets, space, and resources needs were not collected at any central point. Though the research team submitted a Freedom of Information request with the State of New York Department of State regarding data on fire response by district in the four county study area, the data did not provide insight into the cost of the provision of fire services. Thus, the estimates regarding the fiscal impact of fire and emergency medical services are based on the national average, using data from two reports by the National Fire Protection Association (Hall et al., 2002; Karter, 2006). This assumption most likely under-estimates cost for a variety of reasons. The regional price differential between the national average and the Capital Region suggests that labor, land, and energy costs are higher in the study region than the nation as a whole. Furthermore, there is a precipitous decline in volunteers to staff the over 200 districts that rely on volunteer fire fighters. Much of the literature on social capital suggests that this trend in membership will continue its decline (Putnam, 2000). Without volunteers, the need to hire professional paid staff increases the labor costs. While the research team was not able to collect data on the average cost per fire or emergency medical response, one county coordinator suggested that the number of calls will tend to increase as the population ages with the maturation of the baby boomers. The population of Upstate New York, including the Capital Region, is relatively older than the U.S. as a whole and is forecast to have a greater proportion of its population over 65 relative to the nation for the foreseeable future (Deitz, 2006). The aging population will lead to an increased number of calls and will swell the cost for providers.

3.3.4 Calibrating Average Land Use in the Region

Determining the average amount of acreage used by different types of land use was a multi-step process that combined multi-data sources. The data sources included the real property data and parcel data, both in GIS shapefile format, available from CDRPC. Combining these data sources, the research team was able to calculate the average acreage by different land use for each of the four counties and the collective regional average.[2]

3.3.5 Forecasting Future Employment

Estimating fiscal impacts requires the analyst to project both the future population and requisite employment base to support the population to determine future land use as well as infrastructure demands from commercial and industrial properties. To estimate the future employment base for the region, the research team relied on the New York State Department of Labor's current employment estimates by industry, which was extrapolated to 2030 by the model as a function of projected population change. Thus, the employment forecast assumes a stable workforce participation rate and industrial structure. Based on the average building area needed and average acreage per employee in each industry, the study team was able to forecast future land use need by industry in each of the four counties and the region as a whole.

3.3.6 Monetary Units

Unless otherwise specified all monetary reporting is in chained 2005 U.S. dollars. Predicting the future value of money is fraught with potential errors. No model can predict events, such as 9/11 or new economic opportunities such as the invention and adoption of the micro chip. The failure to accurately discount the future value of money can jeopardize the validity of any policy conclusions. This highlights one of the most important aspects of using long-term modeling to guide policy development. Most analysts recommend that interpretation of results should focus on the trends a model suggests and assert that policy should be developed from evaluating differences in the trends for the various runs of a model.

To estimate the net present value of future expenditures, the discount rates from the *President's Economic Report 2006* were used. This report provides specific rates from 2000-2011. The research then flat lines the discount rate for 2011 for all future years. This assumption follows best practices in federal budget accounting, long-term forecasting of GDP, the bond market, and other economic forecast models such as REMI and IMPLAN.

3.4 Case Study Selection Rational

To facilitate policy formation the research team examined urban design and infrastructure investment best practices by conducting case studies of four regions that have, to varying degrees, implemented best practices to guide the development process, including infrastructure investments. The four case study locations: Portland, OR; Twin Cities, MN; Albuquerque, NM; and Denver, CO, were selected based on their reputation within the planning community for effectively optimizing the benefits of growth while mitigating the negative externalities and/or their similarities to the Capital Region's population size. Both

[2] For some land uses, the national average was used to forecast future costs. When necessary, national averages were used in calculating capital costs for specific land uses (costs per unit) and change impact (national multipliers).

Portland and the Twin Cities have long-established planning practices that coordinate land use planning and infrastructure development at the regional scale in order to achieve a high quality of life in their respective regions. More recently, Albuquerque adopted a Planned Growth Strategy intended to refocus development to conserve precious resources, improve quality of life, protect the natural environment, and reduce the costs of infrastructure provision.

The case studies focused on two aspects: process and design. In the cases of the Twin Cities and Albuquerque, the main emphasis was on the preconditions and process of successfully developing a more regional strategy linking land use planning with infrastructure development and funding. Portland represents a regional approach complemented by design standards implemented at the local level. In Denver, the focus was on design standards at a variety of scales, from the large Stapleton Airport project, to the much smaller neighborhood scale.

3.5 Conclusion

The analysis was conducted at the county level for the four core counties. By disaggregating the data to the county level, the differences across the four counties can illuminate policy choices and the affects of different development patterns. The results from the four counties are then aggregated to estimate the total regional impact.

The results presented in this report most likely underestimate the fiscal impacts for all four scenarios for three reasons. As previously mentioned, the choice to use the *Alternative Development* report for population growth and distribution forecasts may underestimate the potential total population change and distributional effects if the most optimistic forecasts of Regional growth suggested by some are realized. Second, in some cases it was necessary to use national averages, which relative to regional prices for land and labor, will result in lower aggregate impact. Finally, when professional judgment was necessary to estimate the value of money in the future, demand for land, etc; the research team consciously chose to use conservative estimates. While the same assumptions are applied in all four scenarios, the affect on the fiscal impacts are greatest in the hyper-growth trend scenario. The underestimation of fiscal impacts will be magnified if the Luther Forest project further exacerbates the trend towards development in areas that lack the requisite infrastructure and to counties not in our primary study area.

The interpretation of the results of the fiscal impact model, should focus on the trends, not the specific dollar estimates, to understand the implication of the different growth rates and land use patterns in the *Alternative Development* report. Focusing on the trends mitigates the errors in the estimation and shapes the discussion regarding the aggregate changes. Most analysts of long-run models assert that focusing on trends is appropriate due to the various contingencies and “noise” in long-run models. The trends presented also provide a relatively more solid foundation from which to make policy recommendations.

Qualitative and Quantitative Findings

This chapter presents the findings of the fiscal impact modeling for each of the four Alternative Futures. The findings are contextualized by a qualitative analysis that addresses the issues raised by providers of public infrastructure as well as factors that may skew the results. The discussion of the results focuses on the trends revealed by the models.

The implications of the fiscal impact of growth are far outweighed by the costs associated with the continual provision of public infrastructure and services, regardless of any changes to the size or distribution of the population. In the case of fixed, in-place infrastructure that shape development trends, such as transportation, the ability to keep pace with ongoing infrastructure repairs and upgrades to maintain existing levels of services in the face of stagnant or declining budgets, restricts future options. Present estimates suggest that it will cost upwards of $80 million annually over the next 25 years for just road system preservation, which does not include transit service or any system upgrades (see table 4.1). CDTC estimates that system preservation for the entire transportation network, including necessary upgrades to meet the goals of the *New Vision Plan*, will cost approximately $600 million annually for the regional programs.

Regional water supplies are a regional asset; however, there is a mismatch between the location of the existing distribution system and current patterns of growth. Significant public expenditures will be necessary to expand water infrastructure capacity in Saratoga County under all four scenarios. These costs will be greatest under the Trend Hyper-Growth Scenario ($200.3 million), but comparably less ($151.5 million) under the Concentrated Hyper-Growth Scenario. If the region grows at a more moderate rate, water infrastructure costs in Saratoga County could be $106.8 million under the Status Quo Trend Scenario, but only 74% of that amount ($78.9 million) under the Concentrated Scenario. No major capital expenditures are expected to be necessary in Albany and Schenectady counties related to expanding water infrastructure capacities to meet demands generated by new development in those counties under all but the Concentrated Hyper-Growth scenario in Albany County. A more concentrated development pattern in Rensselaer County will result in slightly higher costs ($12.0 million for the Status Quo Trend growth versus $24.4 million for the Concentrated Growth). Region-wide there is a slightly higher cost for the Status Quo Trend versus Concentrated Growth scenarios and virtually no difference between the Trend Hyper-Growth and Concentrated Hyper-Growth scenarios. When private well costs are taken into account, the difference is magnified between the two types of growth patterns with greater costs associated with the Trend versus the Concentrated scenarios. Also not taken into account are system maintenance and replacement costs that will be required regardless of the population served.

Major public expenditures will be necessary to upgrade and expand the region's wastewater treatment plants and associated facilities to meet increased wastewater demands under all four of CDRPC's growth scenarios. In Albany County, the required expenditures will be greater under the Concentrated scenarios than under the Trend scenarios. Assuming the percentage of households connected to public sewers will increase to 92% from the current 87%, expansion of wastewater facilities in Albany County under the Concentrated Scenario

is projected to cost $35.6 million, compared to no major expenditures under the Status Quo Trend Scenario. However, private costs are triple in a Status Quo Trend versus Concentrated growth scenario. Using the same assumption regarding households on public sewers, the Concentrated Hyper-Growth Scenario is projected to require wastewater facility upgrades costing $176.7 million, versus $60.6 million under the Trend Hyper-Growth Scenario. The higher costs associated with the Concentrated scenarios is primarily attributable to the fact that under these scenarios the regional share of population in Albany County will be higher compared to the Status Quo Trend and Trend Hyper-Growth scenarios. Saratoga County exhibits the opposite trend where a less dense development pattern leads to significantly higher costs. For the region as a whole, concentrated development will result in higher public costs for wastewater treatment and collection, but this does not capture the costs of providing private septic systems, their maintenance or the potential environmental threat they could pose. It also does not take into account the costs for system expansion that may be required to address future health and environmental concerns due to failing septic systems. Once again, also not taken into account are system maintenance and replacement costs that will be required regardless of the population served.

Without any changes in the number of students, their distribution within or across the 45 different school districts, or the size of the special needs population, the estimated facility costs will be upwards of $58.3 billion for the period from 2006 to 2030 to provide primary and secondary education. The estimated $58.3 billion is merely for system preservation and does not include additional costs that would be incurred by any of the four Alternative Futures. System preservation expenditures, which do not account for any unfunded mandates that may carry hefty price tags for local school districts, such as the Americans with Disabilities Act or No Child Left Behind Act, dwarf the modeled fiscal impacts of the four Alternative Futures. Furthermore, the fiscal impact of adding additional population is a bigger driver of the long run costs depending upon where the population locates. In the case of primary and secondary education, population growth induced impacts are approximately $1.015 billion under a Concentrated growth pattern and $1.088 billion in a Status Quo Trend development pattern. This difference escalates significantly under the hyper growth scenarios. Continued low density development with hyper-growth will cost the region approximately $3.330 billion over the next 25 years or $1.126 billion more than the Concentrated Hyper-Growth scenario to provide primary and secondary public education facilities. Savings from a more concentrated development pattern could be used to make other critical investments and/or reduce the overall tax burden.

Modeling the fiscal impacts on Fire and Emergency Medical Services was hampered by the lack of regionally specific data. Furthermore, it is limited by the model, which does not incorporate the potential significant increase in labor related costs that would be associated with a currently all or predominately volunteer staffed fire district's transition to a career firefighter staffing structure. National data indicates that fire districts have a service population tipping point at about 25,000 residents. An analysis of the fire districts that will have the highest increase in population over the next 25 years if the region experiences a Hyper-Growth Trend suggests that six, perhaps more, fire districts will reach this tipping point. Using average regional wage data from the NYS Department of Labor, we estimate that each fire district that transitions to a career firefighter staff will occur about a million

dollars per annum wage bill.

The total facility impacts on Fire & Emergency Medial Services under a Trend Hyper-Growth scenario are approximately $868.6 million versus $881.7 million under a Concentrated Hyper-Growth scenario. This is significantly higher than the Status Quo Trend growth rate impacts estimated to be $341.0 million, or the Concentrated Growth scenario, with an estimated impact of $346.9 million. The marginal differences due to the population distribution are the result of land costs and average acreage per facility across the counties. However, it is important to note that impacts are only for facilities and do not include any potential wages or equipment that will be needed to outfit the new facilities. While the cost to equip new stations will not change relative to where they are built, the wage component is subject to high variability depending on the location. If the capacity is needed in an area currently dependent on volunteers, the wage bill will be significantly higher than if the new residents are absorbed into fire districts currently served by career firefighters.

Generally speaking, transportation, sewer, and water infrastructure drive or shape the locational choices of households and firms, while schools and fire/EMS services respond to where development occurs. Some communities, such as Minneapolis, use transportation and sewer investments to guide the location of development which will be explored in Chapter 5.

The following sections provide the detailed cost analysis for each of the major infrastructure investments in the four core counties of the Capital Region. However, growth in the four core Capital Region counties will inevitably spill over into the adjacent counties. These impacts are analyzed in qualitative terms in Section 4.6 of this chapter.

4.1 Transportation

This section analyzes the fiscal impact of the four development scenarios articulated in the *Alternative Development* report. The methodology for this section utilizes CDTC's Systematic Traffic Evaluation and Planning (STEP) Model which utilizes the VISUM software model. The inputs for the forecasted changes are guided by the New Visions' planning goals and objectives.

4.1.1 Basic infrastructure reinvestment expenses

Cost is currently a critical transportation issue. Projected costs for maintenance, operations, and reconstruction are staggering. Preliminary budget estimates for system rehabilitation indicate that the cost to maintain the region's highways has increased 40% in the past six years. Funding support is not keeping pace.

As part of the development of the *New Visions 2030 Plan*, CDTC convened the Finance Task Force to assess transportation costs and potential revenue sources in the region for the next thirty years. Costs for highway rehabilitation and reconstruction were updated from the original *New Visions Plan* using the following steps:

1. Identifying appropriate unit cost adjustments to reflect inflation through 2006.
2. Incorporating the latest pavement condition information into the CDTC model.
3. Running the model for various classes of highways.
4. Integrating the results with those from the New Visions Working Group B (the Expressway System Option Working Group) or otherwise reconciling the differences.

The results of this process are shown in table 4.1. System preservation numbers indicate the annual cost to maintain the system in its present condition while full implementation refers to the costs necessary to achieve *New Visions* goals for pavement condition. The range in costs for full implementation is based on the strategies used to maintain the expressway system. The higher number in the range is based on a more extensive use of reconstruction assumed in the Working Group B report. Expanding these costs for the period 2005 to 2030 results in total costs of $2.3 billion for system preservation, and between $3.9 billion and $4.6 billion for full implementation of pavement condition goals. The CDTC Infrastructure task force found that pavement rehabilitation costs are affected by the traffic levels; that is, higher vehicles miles of travel will result in more rapid deterioration of pavements and higher costs to maintain pavement quality.

The *New Visions Plan* highlighted a concern that funding available for maintenance, operation and capital improvements varies widely by community and level of government. One important example of this is that many urban arterials outside the cities (such as Route 5, Route 20 and Route 146) are owned and maintained by the state, while the same facilities in the cities are owned by the cities, who have full responsibility for maintaining these roads. This has resulted in higher percentages of pavement in poor condition within the region's cities and higher financial burdens on the cities than the suburban towns. CDTC has identified the need for investment in city arterials. Increased federal funding, or funding from other sources, for city arterials would represent a significant tool for urban reinvestment that would benefit all travelers in the region.

Table 4.1: New Visions 2030 Pavement Annual Rehabilitation Costs

	System Preservation	Full Implementation Range		
State and Local	$56.00	$108.20	to	$131.60
Thruway	$9.30	$14.80	to	$14.80
Total Priority Network	**$65.30**	**$123.00**	**to**	**$146.40**
Non-Priority Network	$15.30	$18.40	to	$18.40
Total Priority & Non-Priority Network	**$80.60**	**$141.40**	**to**	**$164.80**

Annual Costs in Millions of 2005 Dollars.

The numbers will be presented in the New Visions Plan in year 2006 dollars. An annual inflation rate of 12.6% was used to convert year 2006 dollars to 2005 dollars for this table. The 12.6% inflation rate was derived from FHWA's moving price index, published in a quarterly document, "Price Trends for Federal-Aid Highway Construction".

Table 4.2 presents estimates of annual budgets for 17 project categories based on commitments in the CDTC *New Vision's Plan*. These have been updated from previous plan estimates based on inflation and implementation experience. These costs include programs that are funded by federal, state and local fund sources.

4.1.2 Big Initiatives

As part of the development of the *New Visions 2030 Plan*, a list of candidate "big ticket" and "big idea" initiatives was developed. These initiatives are ambitious in scope and are not funded in the current plan. Rather they are being presented for public review and consideration as "big idea" initiatives that could be undertaken if future funding is available and other conditions are met. They would be a stretch for the Capital Region, and public support, in addition to funding, would have to be established as a prerequisite. Yet they also represent a significant opportunity for the Capital Region to invest in high quality transportation and communities. The big initiatives generally would be more feasible under higher growth scenarios, and in many cases would provide the opportunity to manage the growth in a way that protects and enhances the region's quality of life.

Table 4.2: New Visions 2030 Regional Transportation Plan Budget By Element

Regional Programs	2030 Full Implementation Annual Cost
Intermodal Facilities	*$44.40*
Transit Infrastructure	$14.00
Transit Service	$56.00
ITS (Technology) and Traffic Infrastructure	$9.10
ITS (Technology) and Traffic Operations	$4.40
Highway Rehab, Reconstruction and Redesign -- Priority Network	$146.40
Highway Rehabilitation & Reconstruction – Other	*$18.40*
Bridge Rehab & Reconstruction	$72.90
Highway and Bridge Maintenance	$193.50
Strategic Highway and Bridge Actions -- CMS-based (capacity)	*$10.70*
Strategic Highway and Bridge Actions – Economic Development /Community Compatibility	*$8.90*
Supplemental Goods Movement Accommodations	$4.60
Supplemental Bike & Pedestrian Accommodations	$3.30
Supplemental Access Management Actions	$0.60
Supplemental Safety Actions	$4.70
Demand Management	$1.80
Integrated Planning & Outreach	$4.00
Total	$597.70

Annual Costs in Millions of 2005 Dollars.

Values in italics are being further refined and updated in the development of the New Visions 2030 Plan. The numbers will be presented in the New Visions Plan in year 2006 dollars. An annual inflation rate of 12.6% was used to convert year 2006 dollars to 2005 dollars for this table. The 12.6% inflation rate was derived from FHWA's moving price index, published in a quarterly document, "Price Trends for Federal-Aid Highway Construction".

CDTC's *New Visions 2025 Plan* puts 92% of available resources into system operations; maintenance; preservation; facility and service improvement; and into intermodal facilities. The existing plan is cautious regarding major highway expansion, and commits to progressive bus oriented transit projects (Bus Rapid Transit) while reserving rail for further consideration. Through this approach, the plan expects to achieve steady improvements in pavement and bridge conditions, bike and pedestrian accommodations and street/ streetscape design while enhancing traffic operations, traveler information and redesigning transit service delivery. This plan appears reasonable given the generally effective regional transportation system and the pace of population growth. Urgency for system expansion is not present and past events, such as lack of local support leading to the defeat of the 2000 and 2005 State Transportation Bond referenda, indicate that locally there is no clear willingness to pay for major highway or transit expansions.

However, a shift in the pace of growth from the current 2,500 – 3,000 new residents per year to a 10,000 person per year or higher rate, as envisioned under the Hyper-Growth scenarios, would create pressure for transportation system enhancements and expansions. In this context, it makes sense to evaluate the big initiatives to determine under what conditions they will be feasible and how they can help to manage the region's growth in order for the region to maintain quality of life and quality transportation.

CDTC conducted studies of a number of metropolitan areas and their regional transportation plans. Funding supports the levels of spending on big initiatives in other areas, and based on

the study's findings, a number of metro areas are planning higher levels of spending for expansion and enhancement than the Albany area. Table 4.3 shows annual long-term per capita budget for expansion and enhancement such as: highway widenings; new highways; intelligent transportation systems deployment; innovative land use – transportation initiatives; demand management; additional buses; rail transit construction or expansion. CDTC's fiscal reach is comparable to Buffalo's; together they are the two New York State areas that are most restrained in committing to system expansion.

Table 4.3: Regional Transportation Plan Expansion / Enhancement Budgets "Fiscal Reach"

	Future Population (thousands)	Cost per year per capita for expansion and enhancement
Albany	832	$50
Atlanta	4,814	$217
Austin	2,071	$158
Baltimore	2,741	$79
Buffalo	1,252	$51
Columbus	1,645	$81
Nashville	1,471	$100
Phoenix	6,140	$76
Pittsburgh	2,687	$156
Portland	1,667	$128
Raleigh-Durham	1,534	$117
San Diego	3,855	$226
Seattle	4,536	$364
Tucson	1,400	$85

These studies of regional transportation plans in selected metropolitan areas have revealed common themes about what is required to implement big initiatives. These themes or conditions are listed below.

1. **A sense of *urgency* is typically present.** This sense of urgency may be related to long-standing issues of great magnitude, such as the congestion present in London prior to areawide pricing, or to an experience and atmosphere of rapid growth. Congestion pricing on SR91 in California is justified on the basis of rapid declines in service quality and projections of gridlock. Raleigh's rail initiative is justified not on the basis of current development but on the basis of the region's #6 rank in population growth in the nation. *This sense of urgency may not be present in the Capital Region for many of the initiatives under current growth trends, but it could emerge strongly under the higher growth scenarios discussed in this report.*

2. **A *champion* is typically a critical catalyst and sustainer of the initiative**. Elected officials or, occasionally, planning professionals are often directly associated with marshalling the support and forging the necessary partnerships to make an initiative a reality. The champion is often essential to shepherding the initiative through difficult implementation phases of environmental analysis, NIMBY opposition and cost increases. Without a visible champion, an initiative could die easily in the face of such obstacles. *The big initiatives for the Capital Region will require champions.*

3. **The initiative reflects the sensibilities and community values of the region, producing a strong community *consensus***. For example, the Portland and Minneapolis initiatives in the areas of growth management, environmental stewardship and livability both draw from, and reflect, the personal priorities of the local residents and business leaders. Big initiatives today are not likely to succeed simply because they fall within the purview of a powerful government agency; they require broad public support. *The feasible big initiatives presented in this paper have been selected because they are consistent with New Visions planning principles, which have enjoyed strong and growing support among Capital Region communities.*

4. **Commitment to a major initiative is as much related to a *subjective rationale* as to objective analysis**. This does not mean that a decision to reconstruct the Central Artery in Boston or a regional rail system in Raleigh-Durban is unfounded. Rather, it means that regions pursue major initiatives as much because they want to as because they believe the initiative is economically efficient in achieving results. The "look and feel" of the completed project; the desire to make a public statement of the region's priorities; the hope of lasting positive benefits are at least equal to calculations of user savings, transit ridership, emissions reductions or cost effectiveness in the decision process. *The subjective rationale for the big ticket items in the Capital Region is compelling.*

5. **Funding is achieved through a combination of local sources and state or federal funds – reflecting a *willingness to pay*.** The funding paradox: "We can't plan something big because we don't have money and we can't get money because we haven't planned anything big" is resolved in successful initiatives by (1) securing local financial support for a popular initiative with public support by promising external funds to vastly subsidize the local cost; and (2) leveraging the local enthusiasm and local funding commitment to obtain external, state or federal, funds from discretionary pots.

The question of the willingness to pay for big ticket items has an uncertain answer in the Capital Region under existing conditions. Growth pressures brought about by the high growth scenarios may influence the public on this, especially if investments are viewed as tools to manage the growth and protect and enhance community quality. Furthermore, higher growth scenarios may lead to increases in regional transportation revenues, for example, an increase in mortgages related to higher population growth will create more revenue for funding public transit; and higher population growth will result in increasing shares of federal funds. This type of funding increase would present opportunities that could influence the public's thinking. More concentrated development patterns with urban reinvestment would support premium transit service and reduce costs per vehicle mile traveled, creating opportunities for public support of increasing revenue.

Finally, forecasts of future levels of State and federal funding are uncertain, but if those funding levels were to increase, the region would be well positioned to take advantage of those funds if a consensus has been developed about the types of big initiatives that

should be pursued. The recent state investments and incentives for NanoTech and chip fab industries in Upstate communities raises the possibility that the external funding needed to help support big transportation initiatives in the Capital Region may be from the State budget as much or more than from the federal budget.

6. **In the absence of the conditions to support big initiatives, it is difficult to attain comparable impact through incremental changes.** Incremental actions, such as those contained in CDTC's existing *New Visions Plan* and funded in the 2005-10 Transportation Improvement Program, are different in kind as well as in scale from big initiatives that derive from a sense of urgency. For example, in the absence of expectations of rapid growth in the region, in 2000 CDTC chose a Bus Rapid Transit (BRT) option for the NY 5 corridor and full implementation will not be completed until 2015. Over that same timeframe, other metropolitan areas will have built substantial regional rail systems; undertaking these difficult and expensive actions because of urgency caused by growth. The substantial commitment to rail transit in those metropolitan areas will produce a land use impact (with development more oriented to station locations) that the slow rollout of BRT in the Capital Region cannot. *Forty years from now Capital Region residents may wonder why their region lacks the transportation infrastructure evident in other areas and conclude that planners and elected officials at the beginning of the 21st century lacked foresight. For that reason, it is important to at least consider big initiatives for the Capital Region.*

The big initiatives identified for the Capital Region are listed on the following pages, along with cost estimates and an assessment of how good a fit each initiative is with each of the four growth scenarios. The capital costs of the big initiatives range from the hundreds of millions to the billions of dollars. In addition to capital costs, annual operating costs are identified for several projects.

Finally, the implementation feasibility of each initiative is indicated, using the following scale:

* plausible but unlikely. A "heavy lift" relative to rate and location of growth.

** plausible, with a good chance of implementation if transportation policy remains progressive.

*** the growth and development scenario will create a strong interest and demand for the initiative and provide the political and financial clout to make implementation quite possible, even probable.

**** implementation very likely because the initiative is part of the package of actions that would be necessary to achieve the growth scenario.

Two of the initiatives presented have been determined to be inconsistent with community values and public policy, and they will not be recommended in the *New Visions 2030 Plan*: major highway system construction and the "take a lane" program. Any of the other initiatives are plausible under the base scenario, since they are consistent with

community values and with the *New Visions Plan*. It is possible that after further public discussion, one or more champions could emerge and public willingness to pay for a given initiative could secure additional funding. However, under the Status Quo Trend scenario, funding levels are expected to remain limited, and in many cases, demand for the new services would be marginal with existing growth levels and patterns.

Under the Concentrated scenario, with existing trends of growth, increased urban investment and more concentrated patterns of development, all of the feasible alternatives would become more plausible, with a better chance of implementation, because more concentrated development patterns would provide increased efficiencies and greater levels of demand in corridors that can better support transit and other modes. One initiative, Bus Rapid Transit, could be expected to have strong interest and demand and feasibility.

The third scenario, Trend Hyper-Growth occurring in highly dispersed patterns, would in some cases increase the feasibility of big initiatives compared to the Concentrated scenario, primarily because of increased levels of demand and potentially higher levels of revenue resulting from that demand. However, in other cases, even with increased demand, the feasibility would be no greater than the second growth scenario because of reduced efficiencies.

In most cases, the fourth growth scenario, Concentrated Hyper-Growth with increased urban investment and more concentrated development patterns, provides the best opportunity to support the big initiatives. This is because this scenario would provide higher levels of demand and correspondingly higher revenues; and smarter growth patterns would also result in increased efficiencies for service, increased transit usage, increased walking and bicycling, shorter auto trips, and more opportunities for travel.

Table 4.4: Maximum Twenty-Year Scale of Hypothetical "Big Initiatives" in the Capital District (Implementation between 2010 and 2030) and Implementation Feasibility in Alternative Growth Scenarios

	Hypothetical "Big Initiative"	Approximate *Maximum* Twenty-Year Scale in the Capital Region	Twenty-Year Cost Estimate Comments	Status Quo Trend	Concen-trated Growth	Trend Hyper-Growth	Concen-trated Hyper-Growth
	**Regional Greenway Program**	10 miles per year; 280 miles total including existing	**$150 M** Scale reference is Seattle's plan for 800 miles of paths. Cost at approximately $500 K/mile based on local experience.	*	**	**	***
	**Riverfront Access & Urban Development Program**	Implementation of a majority of existing plans	**$1,000 M** Could draw from multiple fund sources, not just transportation. If significant Interstate redesign is included, could approach $3 B - $4 B based on Boston's Central Artery precedent.	*	**	**	****
	**Street Reconstruction and Reconfiguration**	40 lane miles per year; 800 lane miles total	**$2,400 M** *New Visions* intended to address 25 lane miles per year; this is 50% more aggressive. Cost at approximately $3 M per lane mile.	*	**	**	***
	**Roadway Widening & Connections Program**	10-15 lane miles per year; 200 lane miles total	**$1,000 M** Scale comparable to double the intended ten-year implementation in *New Visions 2021 plan* . Mix of modest ($2.5 M per lane mile) and costly ($7 M per lane mile) projects.	*	**	****	***

* plausible but unlikely. A "heavy lift" relative to rate and location of growth.

** plausible, with a good chance of implementation if transportation policy remains progressive.

*** the growth and development scenario will create a strong interest and demand for the initiative and provide the political and financial clout to make implementation quite possible, even probable.

**** implementation very likely because the initiative is part of the package of actions that would be necessary to achieve the growth scenario.

Table 4.4 cont.: Maximum Twenty-Year Scale of Hypothetical "Big Initiatives" in the Capital District (Implementation between 2010 and 2030) and Implementation Feasibility in Alternative Growth Scenarios

	Hypothetical "Big Initiative"	Approximate *Maximum* Twenty-Year Scale in the Capital Region	Twenty-Year Cost Estimate Comments	Status Quo Trend	Concen-trated Growth	Trend Hyper-Growth	Concen-trated Hyper-Growth
	**Major Highway System Construction**	Approx. 20-25 arterial and 5-10 lane miles of expressway annual	**$3,000 M to $5,000 M** Not consistent with community values or public policy (such as the State Energy Plan, State Transportation Plan and the New Visions Plan).				
	**Suburban Town Center Development**	5-10 lane miles per year; 150 lane miles total	**$175 M** Cost at approx. $1 M+ per lane mile as mix of access and collector roads. Developer-built or financed connections not included in the total.	*	**	**	***
	**Bus Service Expansion, BRT Program with Transit-Oriented Development**	100 route miles total including NY 5	**$200 M capital** **$400 M add'l oper.** Scale and cost estimated at 5-10 times that for NY 5 BRT.	*	***	**	****
	**Guideway Transit System with Transit-Oriented Development**	50 route miles guideway with 50 route miles of non-guideway BRT.	**$2,100 M capital** **$1,450 M add'l oper.** Scale comparable to planned expansion in Portland over 20 years; capital cost of $40 M/mile derived from Portland, Phoenix, and Columbus plans. Operating cost estimated at $1.25 M/year per linear mile. Includes ½ of BRT non-guideway plan also.	*	**	**	***

* plausible but unlikely. A "heavy lift" relative to rate and location of growth.

** plausible, with a good chance of implementation if transportation policy remains progressive.

*** the growth and development scenario will create a strong interest and demand for the initiative and provide the political and financial clout to make implementation quite possible, even probable.

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Table 4.4 cont.: Maximum Twenty-Year Scale of Hypothetical "Big Initiatives" in the Capital District (Implementation between 2010 and 2030) and Implementation Feasibility in Alternative Growth Scenarios

	Hypothetical "Big Initiative"	Approximate *Maximum* Twenty-Year Scale in the Capital Region	Twenty-Year Cost Estimate Comments	Status Quo Trend	Concen-trated Growth	Trend Hyper-Growth	Concen-trated Hyper-Growth
	**Managed Lane Program**	50 route miles total with approx. 75 lane miles	**$750 M** **$10 M operating** Scale at one or two lanes per center-line mile where physically feasible in Interstate system in Albany County, extensions north, east, west. Cost at $10 M per lane mile	*	**	****	***
	**Take-a-Lane Program**	No feasible implementation for contra-flow lanes. Tolling existing toll-free facilities in theory could reach 100 route miles	**more than supported with toll revenue-** Not supported by traffic dynamics; no excess capacity in off-peak to yield a lane. Tolling existing toll-free facilities not yet politically plausible.				
	**Highway Noise Program**	40 locations on expressway system	**$40 M** Scale addresses all existing warrants; noise mitigation costs for widenings are included in guideway and managed lane budgets above.	*	**	***	***
	**Demand Management Program**	40,000 participants	**$50 M (public)** Scale at 10% of regional workforce; Cost estimated at $20/month for ¼ of participants, self-financed by employers for remaining participants. $20/month is derived from CDTC experience.	*	**	**	***

* plausible but unlikely. A "heavy lift" relative to rate and location of growth.

** plausible, with a good chance of implementation if transportation policy remains progressive.

*** the growth and development scenario will create a strong interest and demand for the initiative and provide the political and financial clout to make implementation quite possible, even probable.

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Table 4.4 cont.: Maximum Twenty-Year Scale of Hypothetical "Big Initiatives" in the Capital District (Implementation between 2010 and 2030) and Implementation Feasibility in Alternative Growth Scenarios

	Hypothetical "Big Initiative"	Approximate *Maximum* Twenty-Year Scale in the Capital Region	Twenty-Year Cost Estimate Comments	Status Quo Trend	Concen-trated Growth	Trend Hyper-Growth	Concen-trated Hyper-Growth
	**Clean, Efficient Vehicle Program**	Public transit fleets, private vehicle incentive to double hybrid sales (2010), declining incentive to 2030	**$550 M** Scale at 30% purchase price incentive in 2010 to double hybrid sales to 2,800; incentive declines as hybrid market expands. Estimated $100,000 price increase for 300 transit vehicles of varied sizes	*	**	**	***
	**Intelligent Traffic Management Program**	Full ITS deployment on priority network; including real-time traffic info on entire system	**$135 M** Working Group B estimates as continuation of current $6.7 M/yr; purchases more as costs decrease. Cost does not include rapidly-expanding private investment (vehicles, services)	*	**	***	***
	**Video Surveillance & Enforcement Program**	Full deployment on priority ITS network	**Supported by fines** Red light running cameras and possibly, speed enforcement cameras	*	**	**	**
	**Comprehensive Traffic Safety Program**	Capital investment at several times the set aside in SAFETEA-LU, plus other features	**$200 M** Capital improvements, driver education, traffic enforcement, improved community and site design.	*	**	**	**

* plausible but unlikely. A "heavy lift" relative to rate and location of growth.

** plausible, with a good chance of implementation if transportation policy remains progressive.

*** the growth and development scenario will create a strong interest and demand for the initiative and provide the political and financial clout to make implementation quite possible, even probable.

**** implementation very likely because the initiative is part of the package of actions that would be necessary to achieve the growth scenario.

4.1.3 System Performance

Each of the four growth scenarios will have different impacts on the Capital Region's transportation system. The CDTC *New Visions Plan* evaluates the impacts of transportation investments using multiple performance measures including congestion; accessibility; transit, pedestrian, and bicycle access; arterial function; environmental impacts; travel flexibility and reliability; quality of life; economic impacts; and others. This section will assess the performance of the transportation system under the different growth scenarios. Quantitative measures have been developed, but in many cases where more detailed analysis is beyond the scope of this study, qualitative descriptions are useful for describing the real impacts of the scenarios.

The CDTC STEP Model was run in the year 2030 for each of the four scenarios. Trip generation was calculated for each scenario using the estimates of household growth by 950 traffic analysis zones developed by CDRPC. Higher transit ridership and a higher number of trips by walking were assumed under the two concentrated scenarios. The CDTC gravity model is used to predict origins and destinations for all vehicle trips in the PM peak hour, including work trips, shopping trips, and other trips. The model calculates the best path for each trip along the network, after considering the impacts of traffic congestion and delay, and then estimates traffic volumes for each link of the network. The results are summarized in Table 4.5.

Status Quo Trend—This scenario assumes continued steady but moderate growth in the economy and employment, and with employment growth in some sectors outpacing employment losses in other sectors. Compared with year 2000, by 2030, population will grow by 9%, and households will grow by 15%. Development patterns will continue to be dispersed, and travel modeling indicates vehicle miles traveled (VMT) will increase by 13%. Although travel growth will be modest, travel time will increase by 22% and hours of congested travel (excess vehicle hours of delay) will increase by 65%. Congestion in existing critical corridors such as the Northway corridor will worsen significantly. At the same time, travel on rural roads and outer suburban roads will increase at a faster pace than in congested corridors, and travel times will increase for residents in outlying areas.

Transit service will continue at comparable levels as today, while a larger proportion of the region's residents will not have reasonable access to transit. This is because there will be continued development beyond walking distance to arterials with transit service. The difficulty for those without cars having access to jobs will increase. An increasing population of the elderly will have difficulty traveling to daily activities. Steady continued progress is expected in building sidewalks and multi-use trails and improving street crossings for pedestrians, yet opportunities for walking instead of driving for work and shopping will remain limited. Maintaining quality of life, walkable streets, and livable communities will be a challenge as urban areas decline and traffic congestion increases.

Table 4.5: Population, Households, Vehicle Miles of Travel, Vehicle Hours of Travel Time, Vehicle Operating Costs, Excess Vehicle Hours of Delay and Average Speed, PM Peak Hour For Alternative Future Growth Scenarios

		Population	Households	Vehicle Miles Traveled	Vehicle Hours of Travel	Excess Vehicle Hours of Delay	Excess Vehicle Hours of Delay per Person X 1000	Vehicle Operating Cost	Average Speed (mph)
Year 2000		794,293	318,255	1,791,978	53,655	5,504	6.9	$659,723	33.4
Status Quo Trend	**Base 2030**	867,000	366,081	2,029,573	65,195	9,065	10.5	$749,580	31.1
	Growth 2000-30	9%	15%	13%	22%	65%	52%	14%	-7%
Concentrated Growth	**2030 Value**	867,000	368,537	1,888,404	57,958	6,531	7.5	$695,175	32.6
	Growth 2000-30	9%	16%	5%	8%	19%	9%	5%	-2%
	From Base	0%	1%	-7%	-11%	-28%	-29%	-7%	5%
Trend Hyper-Growth	**2030 Value**	1,023,634	430,008	2,390,310	85,303	16,722	16.3	$892,284	28
	Growth 2000-30	29%	35%	33%	59%	204%	136%	35%	-16%
	From Base	18%	17%	18%	31%	84%	55%	19%	-10%
Concentrated Hyper-Growth	**2030 Value**	1,023,633	433,385	2,164,419	74,954	13,649	13.3	$803,045	28.9
	Growth 2000-30	29%	36%	21%	40%	148%	93%	22%	-13%
	From Base	18%	18%	7%	15%	51%	27%	7%	-7%

Travel Results From the CDTC STEP Model.

1. "Excess vehicle hours of delay" represents hours of congested travel time, specifically travel time beyond the travel time that would be needed at level of service "D".

2. Operating costs are calculated in 2006 dollars assuming current fleet fuel economies and are based on congested driving conditions represented in the model. The future cost of gasoline and future levels of fuel economy are highly speculative, yet the operating costs shown here provide a comparison between growth scenarios. Higher operating costs would correspond to higher fuel consumption and higher greenhouse gas emissions.

Concentrated Growth—This scenario, with more urban reinvestment and suburban containment, will result in the same growth in population and households as the baseline scenario, but with 7% less vehicle miles of travel than the baseline scenario. Hours of travel would be 11% less than the baseline, while hours of congested travel would be 28% less than the baseline. Transit service will be more frequent, and ridership would be higher, given the higher number of riders within walking distance to arterials with transit, and the higher number of activities along transit corridors. It is likely that additional corridors beyond the Route 5 corridor will have Bus Rapid Transit service, increasing the number of residents and communities benefiting from this premium service. Segments of a regional greenway

program could be built, with increased opportunities for walking and bicycling. The higher number of people living near existing sidewalks and paths will significantly increase walking access and the ability to make more work and shopping trips by transit, walking, or bicycling. The feasibility for a managed lane on the Northway or other corridors would be higher than in the baseline, and therefore the potential for better commuting options to avoid high congestion levels that will continue to exist in critical corridors.

Further progress can be expected in implementing suburban town centers, riverfront access and urban development, resulting in tangible improvements in quality of life and attractiveness of the region. Because of lower VMT levels, less investment will be necessary for work to maintain pavement conditions, freeing funds for greater investment in street reconfiguration, enhancement and streetscaping. At the local level, due to smarter growth patterns, there will be less mileage of new residential streets (compared with the base scenario) and therefore lower maintenance costs for local municipalities. Greater protection of open space and environmentally valuable lands will result from this growth scenario.

Trend Hyper-Growth—This scenario represents high growth occurring in current trend dispersed patterns with low density development occurring in currently undeveloped lands. Compared with year 2000, by 2030 population would grow by 29% and households would grow by 35%. While vehicle miles traveled would increase by 33%, congested travel time ("excess delay") would more than triple in the Capital Region.

On a per capita basis, congestion would increase by 136% under this scenario. Based on analysis of the 85 largest urban areas by the Texas Transportation Institute, the Capital Region was ranked 66th out of 85 urban areas for delay per traveler (in 2003; #1 being the worst). If delay per traveler increased by 136%, compared with the 2003 levels of delay in urban areas, the Capital Region rank would increase to 30th out of 85 urban areas. Based on the TTI numbers, future congestion under this scenario could be comparable to current congestion in Cincinnati, Ohio; Las Vegas, Nevada; Albuquerque, New Mexico; Salt Lake City, Utah and Columbus, Ohio.

Travel on roads that are currently rural collectors would increase by 65% to 95% under this scenario. Of the scenarios tested, this scenario represents the highest vehicle operating costs, highest fuel consumption and the highest greenhouse gas emissions.

Transit service frequency and ridership would be comparable to the base scenario, and since much of the new housing would be inaccessible to transit, a smaller percentage of the residents of the region would have transit access. Problems related to the lack of transit and walking access to activities for those without automobiles, including the elderly, will be significantly more pervasive than the baseline scenario. Loss of open space, lack of investment in urban areas, and levels of congestion would be worse under this scenario than any of the other scenarios; significantly reducing quality of life. Expansion of existing suburban towns, as well as towns that are presently rural, with low density suburban development will increase local highway maintenance costs, in addition to other service and infrastructure costs described elsewhere in this paper.

The sharp increase in population and households could present opportunities for increased funding levels from greater generation of user fees (for example, gas taxes) and other revenues such as mortgage recording fees. The severe levels of congestion could create a sense of crisis that would provide public support for other local revenues. For these reasons, there would likely be opportunities to fund some of the big ticket initiatives. Bus Rapid Transit investments would be possible, although reduced densities and higher congestion levels would reduce the efficiencies and benefits of such service. Roadway widenings might be supported in some suburban corridors that would not be needed in the other scenarios, trading off walkability and attractiveness for arterial development and higher traffic conflicts in a number of communities.

While investments in big ticket transportation investments could encourage concentrated development, lack of investment and planning would encourage the dispersed settlement patterns. Once high growth occurs in dispersed patterns, a significant opportunity will have been lost. Lower density development, in turn, will make transit investments much more difficult.

Concentrated Hyper-Growth—This scenario represents high growth occurring in concentrated patterns corresponding to urban investment and high quality suburban planning. Population and household growth would be roughly the same as in the Trend Hyper-Growth Scenario. But while households would grow 18% more than the base scenario, VMT growth would only be 7% higher than the base. While congested hours of travel ("excess delay") would still be 51% higher than the base, this measure would be 18% less than the Trend Hyper-Growth scenario.

On a per capita basis, congestion would increase by 92% under this scenario. Based on analysis of the 85 largest urban areas by the Texas Transportation Institute (TTI), the Capital Region was ranked 66th out of 85 urban areas for delay per traveler (in 2003). If delay per traveler increased by 92%, compared with the 2003 levels of delay in urban areas, the Capital Region rank would increase to 48th out of 85 urban areas. Based on the TTI numbers, future congestion under this scenario could be compared to current congestion in Raleigh-Durham, NC; Birmingham, AL; Charleston, SC; and Colorado Springs, CO.

Transit service frequency and ridership would be highest under this scenario. Because of the potential funding increases related to higher growth, as well as the opportunities for greater efficiencies, this scenario has the strongest potential for Bus Rapid Transit and fixed guideway transit. Smart development patterns will increase the number of residents within walking distance of high quality transit corridors. A significant percentage of residents would have access to transit and walking for work, shopping and other activities. This would provide a great benefit for those without cars, including the elderly, but also will provide opportunities for those with cars to use transit when convenient as an alternative to driving under congested conditions or when parking is limited.

Most of the big ticket initiatives would have the highest feasibility under this scenario, as well as the highest level of success. The opportunity would be provided to make this region famous for its system of greenways and urban riverfront development; a region known for its

high quality transit service and walkable, attractive cities and suburbs. Managed lanes would have the highest potential for success under this scenario and would provide options for commuters to avoid congestion and provide for better conditions for goods movement and vacation travel. The largest budget for street reconfiguration and streetscaping would be available under this scenario, while minimizing the need to widen suburban arterials.

Under a high growth scenario, a concentrated pattern of development is not likely to evolve unless strong regional policies and investments are implemented in advance of growth. Many of the big ticket transportation initiatives discussed in this paper would encourage urban reinvestment and concentrated development, but strategic investments and policies related to water, sewer, schools, and other infrastructure and services would also be necessary to encourage a concentrated development pattern. Strong community and regional planning will be required to encourage smart growth development. Early and continuing investments in transit, greenways, urban development, and other initiatives can support and protect future quality of life for the entire region.

4.1.4 Summary of Transportation Related Impacts

The big ticket initiatives represent an investment tool that will help manage growth in a way that will sustain the Capital Region as a quality region. Investments in the big ticket initiatives can catalyze a more concentrated development pattern under any growth scenario. The caveat is that the big ticket initiatives are currently unfunded, and by themselves will not induce high growth. However, if the region does experience high growth, these investments provide an opportunity to protect the quality of the region's transportation system while at the same time encouraging urban investment and concentrated growth. In the event that higher growth does not materialize, partial implementation of the big ticket items, to the extent feasible, can be pursued.

Failure to invest in transportation initiatives will result in lost opportunities to provide mobility and quality of life, and to shape the future of the region.

The *New Visions Plan* already calls for transportation investments that support urban reinvestment and high quality suburban planning. The public dialogue that has occurred in the development of the 2030 Plan—*New Visions for a Quality Region* has reaffirmed and broadened the support for policies that lead to healthy economic growth while sustaining quality walkable communities. Groups such as the Center for Economic Growth (CEG), the Business – Higher Education Roundtable and ARISE have also engaged extensively in the subject of regional transportation system needs and wants, with CEG producing a collaborative "regional development strategy" and the roundtable authoring a white paper on transportation. The regional urban empowerment group ARISE has also engaged extensively in the regional development agenda discussion. These groups are both supportive of and engaged in CDTC's processes. The result is a consensus that seeks to use transportation policy (and other public policy) in the region to:

1. Encourage sustainable economic growth with good paying jobs,
2. Revitalize urban areas,
3. Help build community structure in growing suburbs,

4. Preserve open space and agricultural land,
5. Make communities more walkable and livable,
6. Provided meaningful; transit options,
7. Connect all residents with job opportunities, and
8. Mitigate growing congestion and maintain reasonable mobility on the highway system.

Such a community consensus provides a powerful "subjective rationale" regarding the vision of the region, its urban and environmental sensibilities in support of big initiatives that help achieve the stated consensus goals. The plausibility of big initiatives is certainly increased by the recent Luther Forest Technology Campus actions, the catalytic effect of ongoing investment by Metroplex in Schenectady and the commitment of state funding for a convention center in Albany. If over one billion dollars of public incentives in Malta alone is able to leverage many times that amount in private investment, the public is able to see the potential gain from major public investments – such as transit systems or riverfront development, technology or urban revitalization.

Community values and broad consensus are evident not only through the discussions of community leaders but also through public surveys. In a recent Siena College survey, 83% of Capital Region respondents favored the use of public funds to create parkland and protect farmland; 64% supported greater funding for sidewalks, bike lanes, paths and crosswalks over building new highways; and 68% supported greater funding for trains, buses and light rail over building new highways. Such a community consensus is also evident through the products of recent linkage planning studies and through the local response to transportation project solicitation. In short, the temperament of the Capital Region is one that is receptive to "green" concepts; more interested in preservation and restoration than large-scale new development; and quite appreciative of local heritage and quality of the environment.

Yet, there is much uncertainty in forecasting and there are market forces that continue to encourage low density sprawl development patterns, and in many cases a planning framework that is not empowered to achieve the kinds of quality communities and urban reinvestment called for in the *New Visions Plan*. The urgency for coordinated, high quality planning is even greater under a scenario of high growth. This urgency will be necessary because the impacts of a high growth scenario with dispersed development patterns would threaten to make the region's quality of life unsustainable.

The opportunities for big ticket initiatives and for the Capital Region to achieve the many attractive attributes of a quality region are greater under the high growth scenarios. Achieving the benefits of the concentrated development scenarios will require continued strong public support and much concerted regional and community leadership. The opportunities presented by the big ticket initiatives will also require proactive leadership and determination, as well as development of the prerequisite conditions discussed in this paper.

Additional public dialogue is warranted and will be pursued to review and confirm or modify the findings of CDTC's review of "big idea" and "big ticket" transportation initiatives and the vision for a quality region.

4.2 Water Supply and Distribution Infrastructure

Growth and development can place considerable strains on public water supplies and distribution systems. Similarly, limitations in the region's water supply and distribution system could exert a major constraint on its ability to accommodate new development. Indeed, a number of fast growing metropolitan areas elsewhere in this country, including the high-tech centers in San Jose, CA and Austin, TX are facing serious water provision challenges.

Compared to fast-growing metropolitan areas in other parts of the country, the Capital Region is fairly well endowed in terms of its regional supply of water. However, there is a growing spatial mismatch between where growth is occurring and the capacities of public water systems to deliver increased supplies of potable water. Areas where the bulk of future growth is forecasted to occur tend *not* to be the areas of the region that possess the most ample supplies of water and the most fully developed water distribution systems.

For both geographic as well as historical reasons, the largest and best developed water systems in the Capital Region serve older urban areas and inner ring suburbs. Among the important water sources are: the Alcove Reservoir (Albany's main water supply, which also serves portions of Bethlehem and Guilderland); the Tomahannock Reservoir (water supply of the City of Troy, the City of Rensselaer, North Greenbush, portions of Brunswick and Schaghticoke); Watervliet's Normanskill Reservoir in Guilderland (water supply for Watervliet and approximately 25,000 residents in Guilderland); the Mohawk River (the water source of the Latham Water District, which serves two-thirds of the Town of Colonie as well as portions of Niskayuna and Guilderland); and the Great Flats Aquifer (water supply for the City of Schenectady, as well as much of Schenectady County.

Overall, 77% of the Capital Region's population is served by public water supplies. However, the percentage of population served by public water supplies varies considerably by location throughout the Capital Region. Over 90% of the population in Albany and Schenectady counties is served by public water systems. Meanwhile, only 60% of those living in Rensselaer County, and only 58% of the population of Saratoga County are connected to public water systems.

4.2.1 Capacity Issues and Planned Infrastructure Investments

The development and operation of public water systems capable of delivering adequate supplies of potable water to residential, commercial, industrial and institutional land uses is extremely capital intensive. Nelson (2004) estimates that the average capital cost of expanding the capacity of a public water system, including additional water treatment plant capacity and distribution lines, is $9.42 per gallon. In other words, the capital cost of expanding the capacity of a public water system by 1 million gallons per day (MGD) is $9.42 million.

The need to make major capital investments in water infrastructure are also *"lumpy."* That is, public water systems, because they have a long useful life, are built and expanded relatively infrequently since when they are built and expanded, excess capacity is built into the systems to meet the needs of not only current but also future residents. For all these

reasons, the capital costs of developing and expanding public water systems are typically financed through long-term borrowing. For example, 57.7% ($2.6 million) of the current $4.5 million budget of Halfmoon's Water Department is devoted to paying off debt related to capital expenditures.

One of the major growth-related issues confronting the Capital Region is how to meet the water needs of areas experiencing increases in population and jobs. The challenge of meeting these needs is made greater by the fact that the parts of the region experiencing the greatest amount of development tend to be areas less extensively served by public water systems. Two of the nine water systems surveyed are already facing current capacity constraints (see Table 4.6). In Saratoga Springs, 95% of the Maximum Safe Yield of the City's water system is routinely required simply to meet the average levels of water use throughout the year. During peak periods of water use during the summer, water drawn from Saratoga Springs water system (Loughberry Lake being the principle source) exceeds the Maximum Safe Yield of the system by a considerable extent; 145% of Maximum Safe Yield. To help ease this water deficiency, the Saratoga Springs Water District has developed plans to double the water yield from its principle water source (from 5.5 MGD to 11 MGD) by expanding its water treatment plant and building an expanded transmission line from Saratoga Lake. The cost of this project is estimated at $18 million (2006 dollars).

Table 4.6: Water Consumption, by Water District

Water District	Service Population	2006 Avg. Use (GPD)	2006 Peak Use (GPD)	Avg. Water Use/Capita	Total Capacity MGD	% Capacity (Average)	% Capacity (Peak)
Latham	64,932	15,300,000	19,900,000	219	31.5	48.6%	63.2%
Albany	101,727	20,000,000	22,000,000	197	29.0	69.0%	75.9%
Watervliet*	35,830	7,000,000	8,000,000	195	12.0	58.3%	66.7%
Troy**	72,777	20,250,000	23,000,000	278	32.0	63.3%	71.9%
Saratoga Springs	26,153	5,250,000	8,000,000	201	5.5	95.5%	145.5%
Clifton Park	28,500	3,300,000	4,000,000	116	6.5	50.8%	61.5%
Halfmoon	7,690	2,320,000	2,850,000	182	3.0	77.3%	95.0%
Rotterdam	25,210	5,100,000	7,000,000	202	10.5	48.6%	66.7%
Schenectady	85,600	17,370,000	22,000,000	203	35.0	49.6%	62.9%
Total	**448,419**	**95,890,000**	**116,750,000**	**209**	**165.0**		

* Includes 25,000 water users in Guilderland.

** Includes 19,266 water users in Rensselaer (City), Brunswick, N. Greenbush, and Schaghticoke.

Sources: NYSDEC 2004
CDRPC 1999
Interviews with Water Infrastructure Providers

Saratoga Springs is not the only water system contemplating major capital investments to expand and improve their water systems. In five of the nine water districts surveyed, plans have been developed to expand water supply and distribution capacity. If completed as planned, these infrastructure projects taken together should add 24.5 – 31 MGD of capacity to the Capital Region's water system. The total cost of these water infrastructure projects, according to those water districts, could be approximately $131.3 million.

The Towns of Halfmoon and Clifton Park in Saratoga County, both of which have been experiencing considerable growth, are also likely to face major challenges in terms of

meeting future water demands associated with continued growth. In 1996, Halfmoon's system was providing 700,000-800,000 gallons per day; by 2006, the amount of water pumped daily through Halfmoon's water system was averaging 2.32 MGD. The Town used to draw water from a number of wells, however all but one, the Hoffman Pumping Station, have been closed down. Most of the Town's water comes from the Hudson River, but it also purchases 300,000 gallons/day from Waterford under a long term contract. Another 30-40,000 gallons/day are purchased from Mechanicville to serve a small section in the northeast corner of the Town. While only approximately 77% of Halfmoon's current total water supply is required to meet average levels of water use, water use in the town increases sharply during the summer months to the point where it regularly consumes 95% of the system's Maximum Safe Yield (Table 4.6). To meet its growing water needs in the future, the Halfmoon Water Department is completing an expansion of its water intake/treatment facility from 3 MGD to 7 MGD. The cost of the project is estimated at $14.5 million.

The need to increase water supplies and distribution systems is occurring throughout Saratoga County which has led the County to develop plans to build a county-wide water system capable of providing water to rapidly growing communities throughout the County, as well as to the anticipated AMD Computer Chip Plant at the planned Luther Forest Technology Park. Indeed, if a major new chip fabrication plant is built in Malta it will place an extraordinarily high demand on water supplies in Saratoga County. The following statistic may help to place these water demands in perspective: to manufacture a single 3 ounce microchip requires 2,800 gallons of water (Dreiser 2002, 123).

Initial plans developed by Saratoga County call for building a water system capable of supplying 7 MGD. Under the plan, water would be drawn from the Upper Hudson River and a water treatment facility would be built in the Town of Moreau, at Potter and Butler Roads. The cost of the project is currently estimated at between $76 and $100 million. The Saratoga County water system is being planned and designed to be expanded to provide an average daily water supply of 14 MGD, and to meet peak demands of up to 26 MGD.

At the time of this writing, the Towns of Ballston and Wilton, in order to meet their growing water needs, have committed to purchase water by joining a new Saratoga County water system. The Mount McGregor Correctional facility has also signed on as a customer.

In Albany County, the City of Watervliet has developed an ambitious plan to expand its water supply and distribution system to not only meet the future water needs of developing areas of Guilderland, whose water use has increased 25% during the past ten years, but also meet the water needs of a number of other Albany and Schenectady County communities.

Watervliet's water infrastructure plan calls for expanding the capacity of its Normanskill Reservoir, located in Guilderland, and increasing the maximum safe yield of the reservoir from 12 MGD to 24 MGD. At present, untreated water is delivered to the Town of Guilderland, which operates its own separate treatment plant; meanwhile, water consumed in Watervliet is treated in a treatment plant in Watervliet. Under the proposed plan, a new treatment plant would also be built near the reservoir, thus enabling Watervliet to provide treated water to Guilderland. The total cost of this project is expected to be between $6.5

million and $9.5 million; $1-1.5 million to expand the reservoir and $5-8 million to build a new, expanded water treatment plant. However, this is only the first phase of a much bigger water infrastructure project which could have a major impact on growth in the region.

Phase 2 of the Watervliet water system expansion plan calls for constructing a 7 mile long water transmission line, capable of providing 15 MGD of water, to areas in Vorheesville, New Scotland and Bethlehem. A second water transmission line, also 7 miles long, would be built to provide water to areas in Duanesburg and Rotterdam. Both proposed phases are still under discussion with no firm commitment from any of the affected parties, and estimates of the capital cost of constructing these transmission lines are not currently available.

4.2.2 Water Charges

Historically, water in the Capital Region has been relatively abundant and remarkably inexpensive. Indeed, until fairly recently many districts made no attempt whatsoever to meter water usage and instead charged an annual flat rate for water service. Troy's Water District, for example, did not install water meters until the mid-1970s. Residents in Rotterdam still pay a flat rate fee of $35/year for their water, regardless of how much they consume. Water service to residential customers in Schenectady is also unmetered. Residents of Schenectady pay a flat fee which varies based on the number of fixtures in the home. Residents of Watervliet pay a flat annual fee of $262, which covers *both* their water and sewer service. Sewerage collection and treatment for Watervliet is handled through the Albany Sewer District.

Among communities metering water usage, there is considerable variability both in the level of water charges and in the methods used in charging for water. Among the nine water districts surveyed, charges levied for water in 2006 were highest in Clifton Park and Halfmoon (See Table 4.7). Residents of Clifton Park paid $3.53/1000 gallons for the first 40,000 gallons; between 40,001 gallons and 80,000 gallons, they paid $7.06/1000 gallons; above 80,001 gallons the charge was $14.12/1000 gallons. Residents served by Halfmoon's water system paid $2.95/1000 gallons up to 30,000 gallons used; between 30,001 and 50,000 gallons they paid $4.43/1000 gallons and above 50,000 gallons, they paid $5.90/1000 gallons. Residents of Troy paid a fixed rate of $3.12/1000 gallons. The Latham Water District charged its customers a straight $2/1000 gallons charge, with a minimum charge of $40.00.

Among the water districts surveyed, the City of Saratoga charged the lowest amount for water. In areas served by the City of Saratoga Springs water district, residents paid $1.17/1000 gallons for the first 15,000 gallons used, and $1.39/1000 gallons for water use between 15,001 and 75,000 gallons. Water consumption above 75,000 gallons was charged at a rate of $1.42. The idea behind this increasing rate structure is to encourage water conservation. However, the charge for water use in Saratoga Springs is so modest, and the increase in water charges associated with increased water use is so slight, that it is doubtful that this increasing rate structure discourages much water use.

Table 4.7: Water Charges by District, 2006

District	Residential Water Charge
Latham	$2.00/1,000 gallons — Minimum Charge of $40
Albany	$2.62/1,000 gallons
Watervliet	$262/year flat rate charge for water + sewer
Troy	$3.12/1,000 gallons
City of Saratoga Springs	$1.17/1,000 gallons < 15,000 gallons $1.39/1,000 gallons 15,000 to 74,999 gallons $1.42/1,000 gallons > 75,000 gallons
Clifton Park	$3.53/1,000 gallons < 40,000 gallons $7.06/1,000 gallons 40,000 to 79,999 gallons $14.12/1,000 gallons > 80,000 gallons
Halfmoon	$2.95/1,000 gallons < 30,000 gallons $4.43/1,000 gallons 30,000 to 49,999 gallons $5.90/1,000 gallons > 50,000 gallons
Rotterdam	Residents pay a flat fee of $35/year For commercial properties, a flat fee of $35 for up to 75,000 gallons Meter starts running at 75,000 gallons 75,000 to 174,999 gallons, $25/year; > 175,000 gallons, $60/year
City of Schenectady	Residents pay a flat fee based on the number of fixtures Commercial water use is metered

4.2.3 Rates of Water Consumption

Previous research and case studies have identified various factors that affect levels of water use, such as the type, size and density of residential development. Nelson (2004) reports that households in single family homes consume an average of 280 GPD, while households in apartments with two or fewer bedrooms consume an average of 180 GPD. Levels of water use also tend to increase with increased lot size, lawn watering and car washing being major contributors; and as home sizes increase, more bathrooms and fixtures, jacuzzis, swimming pools, etc. According to Speir and Stephenson, "households on larger lots will consume more water, primarily for landscaping" (2002, 63). Thus, while Speir and Stephenson estimate that average per capita water consumption nationally is roughly 100 GPD, they estimate that persons living in single family homes on 1 acre lots consume at least 125 GPD per capita—an estimate they regard as conservative.

In five of the nine water districts surveyed, average per capita water consumption ranged between 195 GPD and 203 GPD (See again Table 4.6). On a per capita basis, water consumption was highest in areas of Rensselaer County served by Troy's water system (278 GPD) and lowest in Clifton Park (116 GPD). Per capita water consumption in the Capital Region as a whole averaged 209 gallons per day (GPD).

Table 4.8: Differences in Core and Suburban Water Use in Capital District

Place	Residents Served	MGD	Percent of Capital District Water Use	Gallons Per Resident Per Day
Albany County	272,583	49.03	42.9%	180
City of Albany	101,000	16.51	14.4%	163
Balance of Albany County	171,583	32.52	28.4%	190
Rensselaer County	92,071	26.82	23.5%	291
City of Troy*	72,777	20.25	17.7%	278
Balance of Rensselaer County	19,294	6.57	5.7%	341
Saratoga County	115,715	11.56	10.1%	100
City of Saratoga Springs	26,153	2.81	2.5%	107
Balance of Saratoga County	89,562	8.75	7.7%	98
Schenectady County	133,242	26.94	23.6%	202
City of Schenectady**	85,600	17.37	15.2%	203
Balance of Schenectady County	47,642	9.57	8.4%	201
Total	**613,611**	**114.35**		**186**

* Includes 19,266 additional water users in Rensselaer (City), Brunswick, N. Greenbush and Schaghticoke.

** Includes 20,600 additional water users in Niskayuna and small portion of Guilderland.

Sources: Water Use Data from City and County Data Book 1997
Population from (CDRPC 1999)
Interviews with Water Infrastructure Providers

Data presented in Table 4.8 provides some evidence that areas of low density residential development consume more water on a per unit basis than densely developed urban areas. The table, based on 1997 data, shows per capita rates of water consumption within the Cities of Albany, Troy, Saratoga Springs and Schenectady water districts, and compares them against the rates of water consumption in their respective counties as a whole, and areas in those counties served by other water systems. For example, average per capita consumption of water within areas served the Albany Water District in 1997 was 163 GPD, while in the balance of the County water was consumed at a rate of 190 GPD. Likewise, average per capita water consumption within areas served by the Troy Water District in 1997 was 278 GPD, while water consumption in the balance of Rensselaer County was 341 MGD. However, the rate at which water is consumed in the City of Saratoga Springs (107 GPD/capita) is marginally higher than the rate of water consumption in other portions of Saratoga County (100 GPD). It is also virtually the same when comparing the City of Schenectady with the remainder of Schenectady County.

4.2.4 Water Infrastructure Capacities and Deficiencies Under Alternative Scenarios

Using the impact analysis model developed by Arthur C. Nelson (2004), we have analyzed the additional water facilities required to serve the additional development forecasted under CDRPC's four development scenarios to arrive at an estimate of the facility costs incurred in each county under each scenario.

Nelson forecasts future water usage based on estimates of ***per household and per parcel*** water use. To adapt this model to the Capital Region we have utilized CDRPC's forecasted household sizes for 2030. We have also adjusted the model to reflect existing levels and patterns of water usage in the Capital Region. Nelson's default assumption is that single-

family detached homes on lots 1 acre or more in size will consume 450 GPD, that single-family detached homes on lots less than 1 acre in size will consume 400 GPD, and that attached residential units will consume 250 GPD. However, rates of water usage in the Capital Region vary from these national measures. We have therefore adjusted the water usage figures to reflect *actual* rates of water consumption in 2005 in the Capital Region, and also to reflect variations in average household sizes among the four counties. For purposes of this analysis we therefore assume the following: households in single-family detached residents on lots 1 acre or larger will consume 593 GPD in Albany County, 770 GPD in Rensselaer County, 588 GPD in Schenectady County, and 413 GPD in Saratoga County; households in detached homes on lots *less* than 1 acre will consume on average 527 GPD in Albany County, 684 GPD in Rensselaer County, 523 GPD in Schenectady County, and 367 GPD in Saratoga County; and households in attached residential units will consume 329 GPD in Albany County, 428 GPD in Rensselaer County, 327 GPD in Schenectady County, and 230 GPD in Saratoga County.

As shown in Table 4.9, no additional water facility costs are forecast to be necessary in Schenectady County under any of the four CDRPC development scenarios, and no costs would be incurred in Albany County under three of the four scenarios. Only under the Concentrated Hyper-Growth Scenario would public water infrastructure costs be incurred in Albany County, and that cost ($23.9 million) would be relatively modest. Projected water infrastructure costs in Rensselaer County are expected to range from nearly $12 million over the next 25 years under the Status Quo Trend Scenario to $65.8 million under the Concentrated Hyper-Growth Scenario. The picture is entirely different in Saratoga County, where additional water facility capacity will be needed under all four development scenarios. The amount of additional water that will need to be provided through public water systems in Saratoga County ranges from 15.95 MGD under the Concentrated Scenario to 31.44 MGD under the Trend Hyper-Growth Scenario. The water infrastructure demands of all four development scenarios greatly exceed the current infrastructure capacity of the County. The water infrastructure cost of the Status Quo Trend Scenario is approximately $28.0 million greater than the Concentrated Scenario; the cost of the Trend Hyper-Growth is roughly $48.8 million greater than under the Concentrated Hyper-Growth Scenario.

While public water infrastructure costs in Saratoga County will be greater under the Trend Scenarios than under the Concentrated Scenarios, water infrastructure costs in Rensselaer County will be greater under the Concentrated Scenarios than under the Trend Scenarios. This is primarily due to the fact that under the Concentrated Scenarios, there will be more growth in the existing service areas which will require capital investments for expansion to accommodate the larger number of persons being served. In part because of these off-setting cost differences, total public water infrastructure costs for the Capital Region as a whole are fairly similar under the Trend Hyper-Growth and Concentrated Hyper-Growth Scenarios. Some public cost savings are forecast under the slower growth scenario by pursuing Concentrated as opposed to Status Quo Trend development.

Table 4.9: Public Water Infrastructure Capacities and Costs Under Alternative Development Scenarios, by County

Alternative Development Scenarios	2005 Excess Capacity (MGD)	Additional Water Needed 2030	% Existing Capacity Used 2030	Estimated Facility Cost
Albany County				
Status Quo Trend	22.60	13.47	87%	$0
Concentrated Growth	22.60	15.50	90%	$0
Trend Hyper-Growth	22.60	21.07	98%	$0
Concentrated Hyper-Growth	22.60	25.13	104%	$23,860,914
Rensselaer County				
Status Quo Trend	9.00	10.27	104%	$11,976,901
Concentrated Growth	9.00	11.59	108%	$24,393,739
Trend Hyper-Growth	9.00	13.33	114%	$40,807,951
Concentrated Hyper-Growth	9.00	15.99	122%	$65,814,644
Saratoga County *				
Status Quo Trend	-2.85	19.51	211%	$106,778,309
Concentrated Growth	-2.85	15.95	187%	$78,897,748
Trend Hyper-Growth	-2.85	31.44	291%	$200,334,408
Concentrated Hyper-Growth	-2.85	25.21	249%	$151,500,345
Schenectady County				
Status Quo Trend	16.50	0.55	65%	$0
Concentrated Growth	16.50	2.67	70%	$0
Trend Hyper-Growth	16.50	1.27	67%	$0
Concentrated Hyper-Growth	16.50	5.66	76%	$0
Capital Region				
Status Quo Trend				$118,755,209
Concentrated Growth				$103,291,487
Trend Hyper-Growth				$241,142,359
Concentrated Hyper-Growth				$241,175,903

* Saratoga Co. figures include 3 MGD committed to planned AMD chip plant in Malta.
Note: All figures in 2005 Current Dollars.

4.2.5 Private Water Infrastructure Costs

The percentage of future residents served by public water systems has a considerable impact on the *public costs* of accommodating future development.[1] The higher the proportion of residents connected to a public water system the higher the *public* cost of operating that water system. Likewise, when a relatively low proportion of residents are connected public water systems the public costs are lower. However, homes served by private wells are not free of water-related costs. The cost of drilling a well can range between $5,000 and $13,000; R.S. Means estimates the cost of drilling a 6 inch 500 ft. deep well at a little over $9,000. Homes connected to private wells are also at risk that their well water could become contaminated or run dry during several months of the year. Thus, the private water infrastructure costs associated with alternative development scenarios also need to be considered.

[1] Public systems include those systems operated and management by for-profit firms. When we refer to private cost, this only includes wells that are designed to serve only the household on which the well is drilled.

The percentage of future new development served by public water systems varies considerably under the four alternative development scenarios, thereby having a considerable impact on *private* as well as *public* water infrastructure costs. As shown in Table 4.10, aggregate *private* water infrastructure costs are expected to exceed total *public* water infrastructure costs in several of the scenarios.

In Saratoga County, private water infrastructure costs could exceed $152 million under the Trend Hyper-Growth Scenario. Total public *and* private water infrastructure costs in Saratoga County under the Trend Hyper-Growth Scenario will likely reach $352 million nearly 75% of the total public and private water infrastructure cost in the entire four county Capital Region.

Table 4.10: Private Water Infrastructure Costs Associated with Alternative Development Scenarios, by County

Alternative Development Scenarios	Households on Private Wells 2030	Change in Households on Private Wells 2005-2030	Added Private Cost** 2005-2030	Added Public Cost 2005-2030	Public + Private Cost 2005-2030
Albany County					
Status Quo Trend	13,314	3,372	$30,348,000	$0	$30,348,000
Concentrated Growth	13,872	3,819	$34,371,000	$0	$34,371,000
Trend Hyper-Growth	14,821	5,043	$45,387,000	$0	$45,387,000
Concentrated Hyper-Growth	15,803	5,923	$53,307,000	$23,860,914	$77,167,914
Rensselaer County					
Status Quo Trend	15,231	2,231	$20,079,000	$11,976,901	$32,055,901
Concentrated Growth	15,964	2,889	$26,001,000	$24,393,739	$50,394,739
Trend Hyper-Growth	16,611	3,661	$32,949,000	$40,807,951	$73,756,951
Concentrated Hyper-Growth	18,058	5,008	$45,072,000	$65,814,644	$110,886,644
Saratoga County *					
Status Quo Trend	24,144	7,252	$65,268,000	$106,778,309	$172,046,309
Concentrated Growth	21,405	4,513	$40,617,000	$78,897,748	$119,514,748
Trend Hyper-Growth	33,227	16,947	$152,523,000	$200,334,408	$352,857,408
Concentrated Hyper-Growth	28,463	10,947	$98,523,000	$151,550,345	$250,073,345
Schenectady County					
Status Quo Trend	5,775	349	$3,141,000	$0	$3,141,000
Concentrated Growth	6,203	777	$6,993,000	$0	$6,993,000
Trend Hyper-Growth	5,918	492	$4,428,000	$0	$4,428,000
Concentrated Hyper-Growth	6,810	1,384	$12,456,000	$0	$12,456,000
Capital District					
Status Quo Trend	58,464	13,204	$118,836,000	$118,755,210	$237,591,210
Concentrated Growth	57,444	11,998	$107,982,000	$103,291,487	$211,273,487
Trend Hyper-Growth	70,577	26,143	$235,287,000	$241,142,359	$476,429,359
Concentrated Hyper-Growth	69,134	23,262	$209,358,000	$241,175,903	$450,583,903

* Saratoga Co. figures include 3 MGD committed to planned AMD chip plant in Malta.

** Average cost per private well estimated as $9,000.

Note: All figures in 2005 Current Dollars.

4.2.6 How We Pay for Water Infrastructure

Residents in the Capital Region, as in other parts of the country, typically pay for water

infrastructure and service differently than for other public facilities and services such as schools, police, fire protection, roads, etc. Most public facilities and services are paid for through property taxes. The amount paid is based on the value of one's property, rather than the amount of services consumed. For example, property owners pay for public school costs whether or not they have school-aged children in the public schools. In contrast, households that use municipal water services pay a user charge, and the amount that any given property owner pays typically varies according to the amount of water consumed. Thus there is generally a proportional relationship between the amount people pay and the amount of benefit they receive (the benefit principle). For that reason, many regard user charges as a more equitable way of paying for public facilities and services. User charges also have the advantage of enabling a municipality to collect revenue from institutional uses (federal and state buildings churches and religion-affiliated institutions, public colleges and universities, hospitals, etc.) that are exempt from property taxes.

Nevertheless, user charges are not always entirely equitable. For reasons of administrative convenience, municipalities and water and sewer districts typically apply a *uniform* charge for sewer and water service, so that one pays the same price per 1000 gallons of water regardless of *where* in the municipality they live. However, costs of providing water and sewer service can vary significantly depending on where properties are located. As discussed in Chapter 2 the cost of building and maintaining water and sewer lines, as well as roads, increases with distance. The farther a property is from a municipality's water supply or water treatment facility the greater the public cost of providing service to that property. Thus, uniform charges for water and sewer are not completely equitable, because properties farther from central facilities end up paying *less* than the cost of actual service and properties close to central facilities will pay *more.*

When water districts expand their service areas, and extend water lines into another municipality, they often negotiate a legal agreement that enables them to impose higher water and sewer charges than in previously served areas. Such water charges can be as much as 2½ times higher than what is charged within a municipality's boundaries. In this way, owners of properties that benefit from water extensions can be made to bear the additional costs associated with those extensions.

4.2.7 Summary of the Potable Water Supply and Distribution Fiscal Impacts

Freshwater resources, be they for recreational or potable water supply purposes, are a regional asset. The growing spatial mismatch between the historic location of potable supply and distribution infrastructure and development are resulting in higher combined public and private opportunity cost to provide this critical infrastructure that shapes and supports development. Though the fiscal impact of providing public potable water infrastructure under a Concentrated Hyper-Growth scenario is comparable to the Trend Hyper-Growth, the private costs are higher. In a low growth future, both the public and the private costs of providing potable water infrastructure are more if the region continues to disperse from its historic cores. Furthermore, the experience of other regions indicates that our current Trend development pattern may threaten the quality and quantity of our water resources in rural and semi-rural areas, further increasing the costs of providing public potable water to serve those areas in the future.

4.3 Wastewater Treatment

Similar to potable water infrastructure, growth and development can place considerable strains on public wastewater collection and treatment systems. Failure to provide adequate facilities to treat wastewater in the region could be a major constraint on the region's ability to prosper economically, and place the region's water and overall environmental quality in jeopardy.

There are currently 25 separate sewer districts, and 29 different wastewater treatment plants in the Capital Region (NYSDEC 2004). Nearly sixty percent (17 of 29) of the treatment plants in the region are relatively small, with treatment capacities of 1 million gallons per day (MGD) or less. At least four districts serve fewer than 1000 persons. Table 4.11 shows how wastewater facilities are distributed among the four counties in the Capital Region. As shown in the table, 51% of the region's total wastewater treatment capacity is located in Albany County. The balance of the Capital District's wastewater treatment capacity is distributed among Rensselaer County (18%), Saratoga County (15%) and Schenectady County (15%). Approximately fifty percent (50%) of all Capital District residents who are connected to municipal sewers live in Albany County. Eighty-seven percent (87%) of Albany County residents and 65% of Schenectady County residents live in homes connected to municipal sewers, whereas 43% of Rensselaer County's population and 45% of Saratoga County's population are connected to municipal sewers. Overall, almost two thirds or 64% of the total population of the Capital Region is currently served by municipal sewers.

The four largest sewer districts in the region by far are the Albany County Sewer District, the Rensselaer County Sewer District, the Saratoga County Sewer District and the Schenectady Sewer District. Together, these four sewer districts in 2006 provided wastewater collection and treatment to approximately 385,000 people— roughly 50% of the total population of the Capital Region.

4.3.1 Capacity Issues and Factors Affecting the Need for Capital Investments

Table 4.12 shows the populations served by the various treatment facilities operated by the four largest sewer districts in the region, the average volumes of wastewater processed through the plants, and the average percent of capacity those plants are currently operating at on a daily basis. It should be noted that, unlike the other sewer districts which operate only one central treatment facility, the Albany County Sewer District operates two treatment facilities—a North Plant and a South Plant.

The Saratoga County Sewer District is essentially operating at 96% of capacity, having committed 3 MGD of treatment capacity to serve the AMD chip fabrication plant at the Luther Forest Technology Park; therefore, less than 4% of its current treatment capacity remains available to serve other new development. Meanwhile, wastewater treatment plants in Albany are generally operating at 75% of capacity. Treatment plants in Schenectady and Rensselaer Counties are operating at 78% and 71% of capacity respectively.

Table 4.11: Wastewater Districts in the Capital District

	2006 Capacity (MGD)	Percent of Capital District Capacity*	Population Served	% of County Population on Public Sewer	% of Regional Population on Public Sewer
Albany County					
Albany County Sewer, N& S Plants	64.000		165,000		
Altamont	0.750		1,800		
Bethlehem	4.900		28,000		
Coeymans	0.820		4,300		
Colonie (Pure Waters)	4.900		38,000		
Guilderland	2.600		15,000		
Guilderland 2	0.360		NA		
Ravena	0.008		3,500		
Rensselaerville	0.023		NA		
Voorheesville	0.110		930		
Voorheesville 2	0.004		46		
Albany County Total	**78.475**	**51%**	**256,576**	**87%**	**50%**
Rensselaer County					
Rensselaer County Sewer District	24.000		60,000		
Castleton-on-Hudson	0.190		2,000		
Greenbush	2.500		NA		
Hoosick Falls	1.040		3,800		
Schodack	0.010		NA		
Rensselaer County Total	**27.740**	**18%**	**65,800**	**43%**	**13%**
Saratoga County					
Saratoga County Sewer District	21.300		80,000		
Clifton Park	0.035		NA		
Hadley	0.050		NA		
Schuylerville	0.260		2,000		
Stillwater	0.120		NA		
Waterford	1.500		8,000		
Saratoga County Total	**23.265**	**15%**	**90,000**	**45%**	**18%**
Schenectady County					
Schenectady County District	18.500		80,000		
Duanesburg	0.100		900		
Glenville 1	0.050		300		
Glenville 2	0.077		650		
Rotterdam	1.500		NA		
Niskayuna	3.000		14,000		
Schenectady County Total	**23.227**	**15%**	**95,850**	**65%**	**19%**
Capital District Total	**152.707**	**100%**	**508,226**	**64%**	**100%**
Regional Population in 2000			794,293		
Percent of Total Cap. District Population on Public Sewer					**64%**

* Does not sum to 100% due to rounding errors.

Table 4.12: Wastewater Demand and Capacities, Four Largest Sewer Districts in Capital District, 2005

Sewer Districts	Total Population	Service Area Population	Average Wastewater (MGD)	Average Capacity Utilization	Wastewater Per Capita (GPD)*
Albany Co.	294,565	165,000	51.4	75%	268
Rensselaer Co.	152,538	60,000	17.0	71%	255
Saratoga Co.	200,635	80,000	20.4 **	96% **	109
Schenectady Co.	146,555	80,000	14.5	78%	163
Total	**794,293**	**385,000**	**82.9**	**81%**	**198.75**

* The per capita calculation does not include commercial and industrial use.

** Data include 3 MGD of wastewater treatment capacity committed to planned AMD chip plant in Malta.

Sources: NYSDEC 2004
CDRPC 1999
Interviews with Sewer Districts

Table 4.12 also shows how much wastewater was generated in 2005 on a per capita basis within the Capital Region's four major water districts. Per capita wastewater generation throughout the four county Capital Region in 2005 averaged 199 GPD. Per capita wastewater generation was highest in the Albany Sewer District (268 GPD), and was second highest in Rensselaer County (255 GPD). The lowest per capita amount of wastewater generated was in Saratoga County (109 GPD).

While Saratoga County faces an immediate need to expand wastewater capacity, interviews with the heads of Albany and Rensselaer Sewer Districts indicate that wastewater flows to the plants in those counties are almost at the same as levels as during the 1970s and 1980s. "The City of Albany has lost roughly 26% of its population since 1968 when the Albany Sewer District was formed; the Schaefer Brewery that used to generate a lot of wastewater and heavy Biological Oxygen Demand (BOD) and the Ford Plant on Green Island have closed," reports Richard J. Lyons (Lyons interview). Likewise, Gerard Moscinski, head of the Rensselaer County Sewer District reports that "Wastewater flow has not really increased much over the past ten years. Actually, wastewater flows have varied considerably over the years, but the variations are more related to the weather [and varying amounts of rainfall and stormwater runoff] than to changes in urban development and population" (Moscinski interview).

Another important factor that will increase the need for major capital investments in wastewater treatment facilities is that many of the region's existing facilities were built many years ago and are becoming obsolete and in need of replacement and/or significant modernization. Albany's North and South Plants were built in 1974; Schenectady County's plant was built in 1954 and updated in 1975; Rensselaer County's treatment plant was built in 1976. While such facilities are still doing what they were built to do in terms of treating wastewater, they are relatively inefficient in terms of energy use, and therefore more costly to operate than modern facilities. As facilities become older they also become less reliable and prone to break down. The cost of replacing old facilities is an expenditure which is independent of new growth, and therefore not directly attributed to new development. However, it does need to be taken into account when considering future capital investment needs related to wastewater facilities.

4.3.2 Charges for Wastewater Collection and Treatment

Many sewer districts charge residential customers for sewerage collection and treatment based on the amount of water they consume. City of Troy residents are charged $1.20 per 1000 gallons of water they use, with a minimum charge of $33.60 per six month period ($67.20/year). This sewer charge is on top of the $3.12/1000 gallons they pay for water, producing a combined water and sewer rate in 2006 of $4.32/1000 gallons. Residential properties outside Troy served by the Rensselaer Sewer District pay a different, somewhat higher sewer rate, which again varies depending on the amount of water used. However, some properties that are connected to municipal sewers obtain their water from private wells. Properties outside Troy which obtain water from private wells pay a flat rate sewerage charge of $42.50 every six months ($95/year).

Some sewer districts impose separate charges for operating and maintaining costs and for debt service related to long-term borrowing for capital improvements. For example, the Town of Colonie's Pure Waters Sewer District charges the average Colonie homeowner $122.79/year to cover operating and maintenance costs, based on an estimate that the average home generates approximately 81,000 of wastewater. It also imposes a separate charge for debt service and capital financing, which in 2006 was $47.40. The average homeowner connected to Colonie's Pure Waters Sewer District paid a total of $170.19 for sewer service in 2006.

4.3.3 External Factors Affecting Needed Future Wastewater Investments

Determining the exact amount of wastewater treatment capacity that will be needed to meet future demands is complicated by the fact that the amount of wastewater that passes through treatment plants can increase significantly when it rains. Wastewater lines built today are separated for storm and sanitary sewers. However, a high proportion of older, developed urban areas in the region have combined storm and sanitary sewers. When huge volumes of stormwater surge into these combined collection systems, treatment plants are unable to keep up with the demand. According to officials at the Rensselaer County Treatment Plant, the average flow last year through the treatment plant was about 17 million gallons per day, and the treatment plant is rated for a capacity of 24 MGD. However, the flow rate during heavy storms can increase to 36-45 MGD (150%-187% of capacity), causing untreated sewage to go into the Hudson River. Similarly, in Albany County, in June 2006, a period of unusually intense rainfall, the average flow to North Plant was 31.2 MGD (89% of the plant's rated capacity) and 28.5 MGD at the South Plant (98% of its rated capacity).

The capacity of combined sewer systems needed to handle surges of wastewater during major rain events is not simply determined by the limits of the water treatment facilities themselves. Richard Lyons of the Albany Sewer District reports that both its North and South Treatment Plants could handle more wastewater and still meet the permit requirements. The constraint, according to Richard Lyons, isn't biological (i.e. how much the plant can treat), but rather hydrological (i.e. the volume of water that can flow into and through the system's pipes.

As the above discussion suggests, the amount of wastewater treatment capacity needed to

meet future needs will be heavily affected by efforts aimed at controlling stormwater runoff and reducing combined sewer overflows (CSOs), which will also be extremely costly to mitigate. Currently, the Albany Pool communities - Troy, Watervliet, Green Island, Albany, Cohoes and Rensselaer are preparing a Long Term Control Plan to address this issue. The Plan is expected to be completed by the end of 2009. At this time, there are no cost estimates available associated with proposed solutions that may be forthcoming. However, recently completed Long Term Control Plans prepared for cities across the country indicate that the financial implications can be significant with solutions costing hundreds of millions of dollars.

Another issue affecting future investment in wastewater facility improvements and upgrades are regulatory changes. The amount of capital investment needed to upgrade and expand sewage treatment plants and extend sewer lines to currently unserved areas could be greatly affected by changes in state and federal regulations and water quality standards. If, for example, New York State were to enforce a mandate that the Hudson River be swimmable, a significant increase in public investment in wastewater facilities would be needed to achieve that level of water quality.

4.3.4 Capital Costs of Improving and Expanding Wastewater Collection and Treatment
Building new sewage collection and treatment facilities, and expanding the capacity of existing facilities is extremely capital intensive. According to national statistics compiled by Arthur Nelson (2004), the capital cost of constructing wastewater collection and treatment facilities is $14.68 per gallon of wastewater. In other words, to construct a facility capable to collecting and treating 1 million gallons of wastewater daily will cost approximately $14,680,000.

Thirty-five years ago, following passage of the Clean Water Act, wastewater treatment facility projects generally received 70% to 85% federal funding support. Presently, federal funding for such projects is much more limited with most of the capital costs being borne by the users served by the system.

4.3.5 Planned Near-Term Capital Investments in Wastewater Infrastructure
Among improvements to be completed within the next 5 years, the Saratoga County Sewer District is planning to double the capacity of its current wastewater treatment plant, from 21.3 MGD to approximately 42 MGD. Meanwhile, major capital expenditures to upgrade and improve wastewater treatment facilities are planned in Rensselaer County.

Rensselaer County's Sewer District is planning to construct a new solids handling facility at a cost of $4-5 million, as well as new aeration system that will cost another $4-5 million. Improvements to five pump stations are planned at a cost of $6.2 million, which will allow the system to pump more sewerage. Repairs to a substation are expected to cost another $400,000. In all, it is expected that the Rensselaer County Sewer District will spend at least $15 million on capital improvements in the next five years—a necessary expenditure whether or not there is additional growth in Rensselaer County.

In addition to these near-term capital investments, discussions are underway with the

Rensselaer County Legislature to replace the entire current wastewater treatment facility with a more reliable, more efficient system. If implemented, the project is estimated to cost $20-25 million.

No similar major near-term capital investments to replace or modernize wastewater treatment facilities are planned in Albany County. However, the District expects to spend roughly $1.5 million/year on capital improvements during the next five years.

The Schenectady Sewer District expects to spend approximately $2 million annually on capital improvements during the next five years. The capital improvements in Albany and Schenectady counties are necessary to maintain current levels of service to existing users, regardless of whether or not additional growth occurs in these two counties.

4.3.6 Required Treatment Plant Capacities and Costs Under Alternative Scenarios

Total current wastewater treatment capacity in the Capital Region in 2006 (shown previously in Table 4.11) was 152.7 MGD. However, much of that capacity is taken up treating wastewater from existing development. The four major sewer districts in the region are currently operating at an average capacity of approximately 80%. Assuming that all sewer districts in the region are operating at 80% of capacity, 20% of the total capacity of the region's wastewater treatment plants (30.54 MGD) presumably remains available to meet the demands of future development. In other words, if development were ideally geographically distributed it would be theoretically possible to first use up all the region's excess wastewater treatment capacity before having to build more treatment plant capacity.

However, wastewater treatment facilities and excess capacity are *not* ideally geographically distributed throughout the region in relation to where new development is occurring. Fifty-one percent (51%) of the current District's wastewater treatment capacity is in Albany County, whereas only 15% of wastewater treatment capacity is in Saratoga County, where the bulk of new development under the Trend Status Quo and Trend Hyper-Growth Scenarios is projected to occur.

Furthermore, it is neither realistic nor desirable to expect that all existing excess facility capacity can be utilized to meet the demands of new development. As previously discussed, the effectiveness of wastewater treatment tends to decline as treatment plant capacity increases above 80%. Also, until sanitary and storm sewers are completely separated, wastewater treatment plants need to have a margin of excess capacity to enable them to handle surges in wastewater through the system during periods of heavy rainfall. Otherwise, the region's water quality could be seriously compromised. Thus, it would seem prudent to try to minimize situations where treatment plants have to operate at more than 80% of capacity when handling average daily wastewater loads.

Using the impact analysis model developed by Arthur C. Nelson (2004), we have estimated the additional wastewater facilities necessary and their respective costs to meet the wastewater demands of new development under each of CDRPC's four alternative development scenarios. Two sets of estimates have been prepared: one assumes that all existing excess facility capacity can be utilized in meeting the needs of new development

before new investments are necessary and the other assumes the treatment plants do not operate above 80% of capacity.

Table 4.13 presents the results of this county by county analysis for each of the two sets of estimates. As shown in the table, wastewater facility expansion costs will be greatest in Saratoga County, and will be significantly greater under the Trend development scenarios than under Concentrated development scenarios. Albany County's current excess wastewater treatment capacity should enable it to absorb growth under the Trend Scenario at no additional capital cost assuming the existing 20% excess facility capacity can be utilized to accommodate the additional growth. However, the Albany Sewer District will have to invest roughly $35.6 million to expand its wastewater treatment capacity to handle growth projected under the Concentrated Scenario, and will need to invest over $176.6 million to handle the wastewater demand generated under the Concentrated Hyper-Growth Scenario.

Table 4.13: Public Wastewater Infrastructure Capacity, Demand and Costs Under Alternative Development Scenarios, by County

Alternative Development Scenarios	2005 Excess (Deficient) Capacity (MGD)	Change in Wastewater Demand 2030	Additional Capacity Needed 2030	Facility Expansion Cost	Maintain 80% Capacity Added Capacity Needed 2030	Maintain 80% Capacity Facility Expansion Cost
Albany County						
Status Quo Trend	19.62	15.75	0.00	$0	14.78	$174,234,193
Concentrated Growth	19.62	22.68	3.06	$35,624,108	23.44	$272,906,935
Trend Hyper-Growth	19.62	24.68	5.06	$60,566,426	25.94	$310,363,232
Con. Hyper-Growth	19.62	34.60	14.98	$176,656,472	38.34	$452,140,389
Rensselaer County						
Status Quo Trend	8.10	8.87	0.77	$9,205,668	7.90	$93,964,235
Concentrated Growth	8.10	11.15	3.05	$36,003,349	10.75	$126,767,836
Trend Hyper-Growth	8.10	11.13	3.03	$36,446,549	10.72	$128,847,536
Con. Hyper-Growth	8.10	13.71	5.61	$66,749,789	13.95	$165,890,636
Saratoga County *						
Status Quo Trend	-0.25	17.35	17.60	$141,778,308	27.82	$250,653,509
Concentrated Growth	-0.25	11.76	12.01	$83,772,227	20.83	$179,310,106
Trend Hyper-Growth	-0.25	28.36	28.61	$259,549,065	41.58	$399,978,681
Con. Hyper-Growth	-0.25	24.93	25.18	$219,565,750	37.29	$348,673,125
Schenectady County						
Status Quo Trend	5.01	-0.38	0.00	$0	0.00	$0
Concentrated Growth	5.01	1.60	0.00	$0	1.54	$17,598,664
Trend Hyper-Growth	5.01	-0.40	0.00	$0	0.00	$0
Con. Hyper-Growth	5.01	2.63	0.00	$0	2.83	$32,602,033
Capital District						
Status Quo Trend	32.48	41.59	18.37	$150,983,976	50.50	$518,851,937
Concentrated Growth	32.48	47.19	18.12	$155,399,684	56.57	$596,583,541
Trend Hyper-Growth	32.48	63.77	36.70	$356,562,040	78.25	$839,189,449
Con. Hyper-Growth	32.48	75.87	45.77	$462,972,011	92.42	$999,306,183

* Saratoga County figures include 3 MGD wastewater generation by AMD computer chip plant in Malta.
Note: All figures in 2005 Current Dollars.

It should be noted that in both cases, the total public wastewater facility costs in the Capital

Region as a whole will be *greater* under the Concentrated development scenarios than under the Trend Scenarios. Assuming that all the existing excess capacity is utilized to accommodate future growth before investment is made to expand wastewater treatment capacity, the cost is estimated to be $155.4 million under the Concentrated Scenario, compared to $151.0 million under the Status Quo Trend Scenario. Likewise, total wastewater infrastructure costs under the Concentrated Hyper-Growth Scenario will be $463.0 million compared to $356.6 million under the Trend Hyper-Growth Scenario.

To preserve the 20% excess capacity to maximize plant operation will require significantly larger public investments. As shown in the last column of Table 4.13, to maintain 80% capacity in the region's wastewater treatment facilities could cost from $518.9 million under the moderate growth Status Quo Trend Scenario to nearly $1 billion under the Concentrated Hyper-Growth Scenario.

4.3.7 Costs of Private On-Site Wastewater Treatment Facilities

Owners of homes not connected to municipal sewers are responsible for a wide range of costs, such as installing a septic tank; paying to have their septic tanks pumped out on a regular basis to keep them operating properly; and replacing a worn-out, poorly functioning septic tanks. Since the proportion of future residents on public sewer systems will vary considerably for each of the four development scenarios, it is important to estimate and compare those private costs.

Table 4.14: Private Wastewater Treatment Costs Under Alternative Development Scenarios, by County

Alternative Development Scenarios	2030 Households Not Connected to Public Sewers	Change in Added Households Not on Public Sewers 2005-2030	Private Cost per Household Not on Public Sewers	Added Private Cost 2005-2030	Increased Public Wastewater Treatment Costs 2005-2030	Total Private + Public Costs 2005-2030
Albany County						
Status Quo Trend	17,308	3,820	$5,000	$19,100,000	$0	$19,100,000
Concentrated Growth	11,098	1,214	$5,000	$6,070,000	$35,624,108	$41,694,108
Trend Hyper-Growth	19,267	5,503	$5,000	$27,515,000	$60,566,426	$88,081,426
Con. Hyper-Growth	12,642	2,501	$5,000	$12,505,000	$176,656,472	$189,161,472
Rensselaer County						
Status Quo Trend	29,138	1,711	$5,000	$8,555,000	$9,205,668	$17,760,668
Concentrated Growth	29,151	1,485	$5,000	$7,425,000	$36,003,349	$43,428,349
Trend Hyper-Growth	33,943	6,067	$5,000	$30,335,000	$36,446,549	$66,781,549
Con. Hyper-Growth	34,546	6,197	$5,000	$30,985,000	$66,749,789	$97,734,789
Saratoga County *						
Status Quo Trend	42,325	3,624	$5,000	$18,120,000	$141,778,308	$159,898,308
Concentrated Growth	38,611	661	$5,000	$3,305,000	$83,772,227	$87,077,227
Trend Hyper-Growth	66,453	24,522	$5,000	$122,610,000	$259,549,065	$382,159,065
Con. Hyper-Growth	49,970	9,808	$5,000	$49,040,000	$219,565,750	$268,605,750
Schenectady County						
Status Quo Trend	23,682	761	$5,000	$3,805,000	$0	$3,805,000
Concentrated Growth	23,897	661	$5,000	$3,305,000	$0	$3,305,000
Trend Hyper-Growth	25,266	2,242	$5,000	$11,210,000	$0	$11,210,000
Con. Hyper-Growth	27,962	4,315	$5,000	$21,575,000	$0	$21,575,000
Capital District						
Status Quo Trend	112,453	9,916	$5,000	$49,580,000	$150,983,976	$200,563,976
Concentrated Growth	102,757	4,021	$5,000	$20,105,000	$155,399,684	$175,504,684
Trend Hyper-Growth	144,929	38,334	$5,000	$191,670,000	$356,562,040	$548,232,040
Con. Hyper-Growth	125,120	22,821	$5,000	$114,105,000	$462,972,011	$577,077,011

* Saratoga Co. figures include 3 MGD wastewater treatment capacity committed to planned AMD chip plant in Malta.
Note: All figures in 2005 Current Dollars.

As shown in Table 4.14, total aggregate private costs associated with constructing new on-site wastewater treatment facilities will be significant under any of the four development scenarios, but as expected will be greatest under the Trend scenarios when compared to the Concentrated Growth scenarios . For the Region, the total private cost of wastewater treatment facilities will be $49.6 million under the Status Quo Trend Scenario versus $20.1 million under Concentrated Growth. The cost to install private systems under the Trend Hyper-Growth is projected to be $191.7 million and under the Concentrated Hyper-Growth the private costs is projected at $114.1 million.[2]

[2] Public wastewater systems include those systems operated and management by for-profit firms. When we refer to private cost, this only includes wastewater systems that are designed to serve only the household on which the system is installed.

4.3.8 Summary of Wastewater Fiscal Impacts

The Capital Region has underutilized wastewater collection and treatment infrastructure in its historic cores. However, much of the growth over the past five decades has decentralized development. Furthermore, the fiscal impacts of the alternative development scenarios are uneven across the different counties. In Saratoga County and Rensselaer Counties the trend development pattern has resulted in a significant percentage of households that are not on a public wastewater collection and treatment system. If the region continues to disperse across the landscape, there will be higher private cost as much of the new construction will need to provide private systems onsite. Also, if public wastewater systems needed to be expanded to include households in these outlying areas for health or environmental reasons, the total public costs of services under the trend scenarios would be much greater than presented. Finally, while the fiscal costs of public wastewater and collection systems are higher under the Concentrated Growth scenarios, the environmental cost and ecological threat of many dispersed private on-site wastewater treatment systems are also not captured. As the case study in the Twin Cities region reveals, the harm presented by these systems can result in major ecological damage that threatens potential water supplies and cherished recreational waterways. The cost of mitigating the environmental damage once it has been caused are almost certain to be substantially higher than the difference in public wastewater infrastructure costs between the Trend Scenarios and the Concentrated Growth Scenarios.

4.4 The Cost of Public Education

In general, schools are built in response to increases in, or the redistribution of, school age populations within and/or across district boundaries. In geographically large districts, the failure to coordinate development with school district capital planning can result in inefficient facility utilization and significantly higher transportation spending. From a regional perspective, intra-regional migration can have the same effect on facility utilization as people leave an area with existing capacity to relocate either to suburban and/or rural locales challenged to keep pace with the influx of new residents with school aged children.

Modeling the fiscal impacts of population change on the capital expenditures of school districts is driven, first and foremost, by the size of the population change and the district's existing capacity to meet the forecasted demand. A fiscal impact analysis of facility demand does not capture the cost of future staffing, which accounts for approximately 80% or more of a local district budget. Fiscal impact models generally also do not account for who pays for facility expansion-- be it local, state, federal government and/or private sources. In New York, state government contributions to local school operational budgets have declined precipitously during the last 30 years, from over 50% to approximately, on average, about a third. Finally, fiscal impact models fail to adequately account for one of the fastest rising budget line items, transportation. As uncertainty in fuel prices increases, the geographic relationship between school age populations and school facilities is fast becoming a major driver in school districts' budgets. An analysis of a sample of recent school budget expenditures over the past five years reveals that transportation costs have risen significantly. In part, this cost is related to rising fuel costs which is intensified by increased vehicle miles traveled as population density decreases and alternative means, such as walking to school, are eliminated as a result of the increased distance between school facilities and households.

4.4.1 Estimated Fiscal Impacts by Growth Scenario

The clear trend for the Capital District is that school age children are becoming increasingly dispersed over broader geographic space creating larger gaps in school facilities' capacity which will result in large fiscal impacts. The difference between the dispersed growth pattern and a more concentrated development scenario is most apparent in Saratoga County. Over 42% of the additional impact resulting from decreasing population density will be in Saratoga County indicating that the impacts are unevenly distributed. In part, this result reflects the existing pressure on school districts which are in a constant struggle to meet rising demand. It also reflects that there is some excess capacity in other counties. For example, the Albany City School District is near completion of a major $189 million capital plan that has replaced or completely refurbished all of its elementary and middle schools creating new facility capacity.

The prevailing trend for the region as a whole is that more compact development results in lower fiscal impacts for educational facilities (see table 4.15). The fiscal impact of the Status Quo Trend development pattern, relative to the Concentrated Growth pattern, is $72.5 million more over the next 25 years. However, if the region experiences Hyper-Growth, in a more concentrated development pattern the region could recognize a savings of over $1.1 billion on primary and secondary education facilities during the next two and half decades. If the region develops in a more concentrated settlement pattern, relative to the continuing

trend of an outward, decentralized population pattern, these savings could be used for other educational investments or to reduce the overall tax burden.

Table 4.15: Educational Facilities Fiscal Impacts for the Capital District

Educational Facility	Estimated Facilities Costs			
	Status Quo Trend	Concentrated Growth	Trend Hyper-Growth	Concentrated Hyper-Growth
Grades K-5 (elementary)	$121,049,831	$71,420,665	$971,873,774	$480,322,973
Grades 6-8 (middle)	$357,454,394	$300,574,564	$918,595,470	$594,204,623
Grades 9-12 (high)	$609,112,719	$643,115,764	$1,439,162,884	$1,129,291,010
Total Impact Capital District	$1,087,616,943	$1,015,110,993	$3,329,632,127	$2,203,818,606

Albany County: Educational Facilities Fiscal Impacts

Educational Facilities	Estimated Facilities Costs			
	Status Quo Trend	Concentrated Growth	Trend Hyper-Growth	Concentrated Hyper-Growth
Grades K-5 (elementary)	$0	$0	$40,271,894	$71,523,838
Grades 6-8 (middle)	$56,711,876	$23,555,515	$108,125,837	$81,631,725
Grades 9-12 (high)	$127,895,268	$181,073,623	$234,880,231	$319,588,649
Total Impact Albany County	$184,607,144	$204,629,138	$383,277,961	$472,744,212

Rensselaer County: Educational Facilities Fiscal Impacts

Educational Facility	Estimated Facilities Costs			
	Status Quo Trend	Concentrated Growth	Trend Hyper-Growth	Concentrated Hyper-Growth
Grades K-5 (elementary)	$0	$0	$492,437,709	$52,024,577
Grades 6-8 (middle)	$46,714,481	$48,066,987	$335,872,648	$89,425,923
Grades 9-12 (high)	$74,298,773	$95,776,344	$466,912,706	$155,891,505
Total Impact Rensselaer County	$121,013,254	$143,843,332	$1,295,223,063	$297,342,004

Saratoga County: Educational Facilities Fiscal Impacts

Educational Facility	Estimated Facilities Costs			
	Status Quo Trend	Concentrated Growth	Trend Hyper-Growth	Concentrated Hyper-Growth
Grades K-5 (elementary)	$119,593,765	$34,440,182	$431,679,830	$256,851,016
Grades 6-8 (middle)	$160,860,491	$103,694,449	$370,372,814	$253,005,219
Grades 9-12 (high)	$274,096,933	$188,198,317	$588,913,530	$412,555,088
Total Impact Saratoga County	$554,551,189	$326,332,947	$1,390,966,174	$922,411,323

Schenectady County: Educational Facilities Fiscal Impacts

Educational Facility	Estimated Facilities Costs			
	Status Quo Trend	Concentrated Growth	Trend Hyper-Growth	Concentrated Hyper-Growth
Grades K-5 (elementary)	$1,456,066	$36,980,484	$7,484,340	$99,923,542
Grades 6-8 (middle)	$93,167,546	$125,257,613	$104,224,171	$170,141,757
Grades 9-12 (high)	$132,821,744	$178,067,480	$148,456,418	$241,255,768
Total Impact Schenectady County	$227,445,357	$340,305,577	$260,164,929	$511,321,067

Note: Figure may not sum due to rounding and incidental cost of auxiliary building impacts not shown.
All figures in 2005 current dollars.

The impact of adding additional school age population is considerably larger relative to how the population is distributed across the region. The impacts resulting from population increases in the Status Quo Trend is just under $1.1 billion versus a little over $1 billion under the Concentrated Growth scenario. If the region experiences hyper-growth, the Trend

Hyper-Growth scenario is over $1.1 billion more than the Concentrated Hyper-Growth scenario. There are very limited policy actions that can mitigate the fiscal impact of additional school age children through either migration or new births. Furthermore, unfunded mandates and general educational policy, such as reducing student teacher ratios or a decisive shift in charter school policy, conceivably could significantly increase the cost of public education.

Growth management policy can reduce the fiscal impact of providing education across the region. By directing growth into existing centers, the overall fiscal impact of education for Capital Region communities could result in over $1.1 billion savings under a hyper-growth scenario. Even if the region does not experience hyper-growth, the regional savings over the next 25 years would be considerable -- approximately $72.5 million dollars in capital costs-- if the region's development occurred within existing centers. These savings could potentially be magnified if site selection for new facilities enabled a reduction in busing, which would save on rising, and increasingly volatile, transportation costs.

4.4.2 County by County Analysis of the Fiscal Impacts on Education

Fiscal implications of a more dispersed development are best illustrated in Saratoga and Rensselaer Counties. Comparing the Trend Hyper-Growth and the Concentrated Hyper-Growth development scenarios illuminates the additional capital cost of continued population expansion into less developed locations. Rensselaer County would experience dramatically higher capital costs under a Trend Hyper-Growth scenario relative to a more concentrated settlement pattern. The Concentrated Hyper-Growth Concentrated development alternative would save the taxpayers of Rensselaer County nearly a billion dollars over the next 25 years compared to the Trend Hyper-Growth development pattern. Though the capital costs for educational facilities under a low growth forecast would be slightly higher for a concentrated development scenario ($22.8 million over 25 years), this finding does not consider the potential savings in transportation costs that could be realized under a concentrated development pattern. In Saratoga County, the estimated facility costs under the Trend Hyper-Growth are almost a half a billion dollars more than under the Concentrated Hyper-Growth. Under the low growth forecast, capital costs would be a little more than a quarter billion dollars more under the Trend versus Concentrated scenario.

In Albany County, the differences in fiscal impacts due to the alternative distribution patterns are considerably smaller relative to the other three counties. However, the fiscal impacts are also higher under the Concentrated Growth development scenario. This reflects the reality that the impacts are driven by the number of new students and reveals that Albany County has considerable capacity at the elementary and middle schools levels, though expansion at the high school level will be necessary. In the Concentrated Growth development scenario, Albany County schools would need to absorb nearly 2,000 additional school age children relative to the Status Quo Trend. Given existing capacity, no additional facilities are needed at the elementary school level and only modest additional facilities are necessary at the middle school level. This result is primary due the recent capital expansions in Albany, Guilderland, Cohoes, and North Colonie. However, there would need to be considerable new capacity developed to meet the demand at the high school level.

The Trend Hyper-Growth scenario would result in an over $383 million fiscal impact due to school facility needs in Albany County relative to the moderately higher impact for a Concentrated Hyper-Growth development scenario ($472.7 million). The $89.5 million difference is primarily the result of the addition of over 19,000 new students and the capacity deficiencies at the high school level, and to a lesser degree, new facility needs at the elementary level. Again, these estimates do not include any potential transportation cost or other spillover benefits of a more compact urban form.

Schenectady County faces capacity issues at both the primary and secondary education levels which would be exacerbated in a Concentrated Growth scenario. This is, in part, due to disinvestment in the City of Schenectady resulting from decades of declining enrollment that has only recently begun to turn around. The needs of the first ring suburban communities are also highlighted by this finding. In addition, the relatively recent closing of some private schools and charter schools has placed Schenectady at a disadvantage. The additional 11,000 or so new students in Schenectady County under a low growth Concentrated Growth scenario, relative to the Status Quo Trend alternative, would result in approximately $112 million of additional fiscal impacts over the next 25 years. The Hyper-Growth scenario would add over 23,000 new students in Schenectady County in a Concentrated Hyper-Growth development scenario relative to the Trend Hyper-Growth. These additional students, coupled with the limited existing excess capacity, would result in $251 million of additional fiscal impacts.

4.4.3 Summary of Educational Fiscal Impacts

From a regional perspective a more concentrated development pattern would save the taxpayers over $1.1 billion during the next 25 years if the region experiences Hyper-Growth. By coupling land use planning with school facility capital planning there can be greater savings by increasing the opportunity to walk to school and cutting rapidly rising transportation costs. On a county-by-county basis the impacts are unevenly distributed and reveal that Albany County has the largest existing capacity to absorb new students at the elementary and middle school levels. All counties lack additional capacity at the high school level.

The analysis also reveals opportunities to leverage school facilities investments to invigorate urban redevelopment. Much of the recent literature on residential location asserts that quality of life issues rank among the top factors when considering where to live (Gottlieb 1994; Granger and Blomquist 1999). Superior primary and secondary schools, environmental quality, and reduced commuting times all consistently rank among the top factors, often above the cost of living (Gottlieb 1994). Thus, new investments in school facilities in urban areas would complement the urban redevelopment strategy and create opportunities to build neighborhood schools that children can walk to.

4.5 Fiscal Impacts on Fire and EMS Services

There are over 200 fire districts within the primary study area, the majority of which provide some level of Emergency Medical Services (EMS). Nearly all of these fire districts, outside the core cities, are solely or heavily reliant on volunteers to respond to emergency calls. Of the 124 fire districts that serve the primary study area and reported to the U.S. Fire Administration fire department census, only nine are staffed entirely by career firefighters and just one is mostly staffed by career firefighters.

The overwhelming majority (107) fire districts reported being staffed solely by volunteers and seven reported being majority volunteer departments. This is problematic for two reasons. First, over the past three decades there has been a severe decline in volunteer membership (Hall et al. 2006). Second, with population expansion comes an inevitable transition from volunteer staffing to professional staffing. U.S. Fire Administration data indicates that there is a population size tipping point when communities transition from volunteer to career firefighter staffed departments. Based on national averages, fire districts that serve populations between 25,000 and 49,999 are two thirds staffed by career firefighters (see table 4.16). When districts grow beyond 50,000, more than 89% are of the national staffing is by career firefighters. For many Capital Region suburban districts this tipping point is fast approaching; Hyper-growth will accelerate this process.

Table 4.16: Career Versus Volunteer Firefighters, 2005

Size of the Population Protected	Number of Career Firefighters	Number of Volunteer Firefighters	Percent Career Firefighters	Percent Volunteer Firefighters
More than 1,000,000	36,100	100	99.7%	0.3%
500,000-999,999	35,900	4,150	89.6%	10.4%
250,000-499,999	24,750	2,800	89.8%	10.2%
100,000-249,999	47,100	3,000	94.0%	6.0%
50,000-99,999	47,050	5,650	89.3%	10.7%
25,000-49,999	46,650	23,950	66.1%	33.9%
10,000-24,999	45,200	79,200	36.3%	63.7%
5,000-9,999	17,000	109,000	13.5%	86.5%
2,500-4,999	5,500	165,950	3.2%	96.8%
Less than 2,500	8,050	429,550	1.8%	98.2%
Total	313,300	823,350	27.6%	72.4%

Source: Karter 2006

Currently, mutual aid and assistance agreements have been used to help cover staff shortages in the outlying areas as well as the core communities. However, if the region continues its outward expansion, these agreements may be less than adequate to ensure sufficient personnel and property protection in fast growing suburban and rural areas dependent on volunteer staffing for their fire and EMS services. A Trend Hyper-Growth development scenario would stress the mutual aid agreements, heighten the risk in underserved areas, and accelerate the need to professionalize some currently volunteer districts. This change would bring significant new costs to cover the construction of new facilities, the purchase of necessary equipment, and most importantly, to cover the costs of professionalizing the staff of many of the districts.

Rapidly rising costs for fire and EMS services affects all communities and issues regarding the primary sources of revenues for volunteer-based departments in smaller communities exacerbate the problem. Nationally, from 1980 to 2004, inflation-adjusted expenditures for fire and EMS services increased 110% (Karter 2006). From the local perspective, the rapidly increasing costs are compounded by the reality that fire districts with all or majority volunteer staff are overwhelming dependent on local sources of revenue, primarily a fire district or other tax (see table 4.17). This highlights potentially skewed impacts on smaller communities with limited capacity to fund additional fire and EMS services.

Table 4.17: Revenue Streams for All or Mostly Volunteer Fire Districts

Community Population	Fire District or other Tax	Payment per Call	Other Local Payment	State Government	Fund Raising	Other
25,000-49,999	78.2	2.0	4.9	1.7	9.9	3.3
10,000-14,999	76.3	1.8	5.1	3.8	9.4	3.6
5,000-9,999	72.3	1.6	4.4	4.6	13.4	3.7
2,500-4,999	66.7	1.8	5.4	5.4	16.9	3.8
<2,500	62.6	1.9	4.8	6.6	19.1	5.0

Note: All figures in percentage of total revenue stream.
Source: Hall et al. 2003.

It is important to note that when forecasting the fiscal impacts of alternative growth patterns on fire and EMS services, our assumptions are based almost exclusively on national averages. Using real property data, the study team was able to calculate the average acreage per fire station by county, providing a limited degree of regional specificity. However, we were unable to identify the fire districts with excess capacity or those that are stretched thin and/or at the tipping point for converting to career firefighter staffing. By using national data to estimate future needs based solely on the number of new residents, the model simply distributes the location of the new fire stations (thus fiscal impacts) correlated to the size of populations increases in each of the counties. Hence, in either of the trend distribution development scenarios, the costs are higher for Saratoga County relative to the concentrated development scenarios, while the reverse is true for the Albany, Rensselaer, and Schenectady (see table 4.18). These marginal differences in the concentrated versus trend development form are the results of two factors: 1) the average cost per acre of land across the counties; and 2) the average acreage per fire/EMS facility across the counties. When aggregated to the Capital Region level, the differences in the fiscal impacts that result from concentrated versus trend population distributions are very small, though a sizeable difference emerges from the additional population between the Trend versus the Hyper-Growth population growth assumptions, regardless of the distribution of the population across the region.

A Trend Hyper-Growth development scenario would result in a facilities fiscal impact of approximately $869 million. However, this does not include any additional costs that will result from volunteer departments needing to transition to hiring career firefighters. The NYS Department of Labor statistics indicates that the annual average wage for a career firefighter in the Capital Region is $41,390 and a first-line supervisor/manager of firefighting and prevention workers earns, on average, $64,700 annually. The result of a volunteer department of 25 transitioning to a career firefighter staff would be a million dollars in wage obligations annually, not counting overtime or benefits. Furthermore, the national average is

that for roughly every 900 people there is one career firefighter on the job. However, the Capital Region is significantly above this ratio, at about 1,500 people per career firefighter in the region, suggesting that some districts may already be at their tipping point.

Table 4.18: Fire/EMS Facilities Fiscal Impacts for the Capital District

Capital District Fire and EMS Facilities	Estimated Facilities Costs			
	Status Quo Trend	Concentrated Growth	Trend Hyper-Growth	Concentrated Hyper-Growth
Building	$338,323,295	$344,674,609	$861,425,539	$875,355,271
Acre	$2,607,747	$2,202,239	$7,219,490	$6,378,976
Auxiliary Building Sq. Ft.	$290	$271	$352	$312
Auxiliary Net Acres	$5	$5	$7	$6
Total Impact Capital District	$340,931,337	$346,877,124	$868,645,388	$881,734,566

Albany County: Fire and EMS Facilities Fiscal Impacts

Fire and EMS Facilities	Estimated Facilities Costs			
	Status Quo Trend	Concentrated Growth	Trend Hyper-Growth	Concentrated Hyper-Growth
Building	$58,415,008	$89,858,651	$176,449,380	$238,743,964
Acre	$477,308	$734,233	$1,441,764	$1,950,772
Auxiliary Building Sq. Ft.	$79	$77	$90	$86
Auxiliary Net Acres	$1	$1	$2	$2
Total Impact Albany County	$58,892,396	$90,592,962	$177,891,236	$240,694,823

Rensselaer County: Fire and EMS Facilities Fiscal Impacts

Fire and EMS Facilities	Estimated Facilities Costs			
	Status Quo Trend	Concentrated Growth	Trend Hyper-Growth	Concentrated Hyper-Growth
Building	$74,379,627	$103,223,967	$137,760,187	$200,351,707
Acre	$253,682	$352,059	$469,850	$683,326
Auxiliary Building Sq. Ft.	$51	$49	$58	$54
Auxiliary Net Acres	$1	$1	$1	$1
Total Impact Rensselaer County	$74,633,361	$103,576,076	$138,230,095	$201,035,088

Saratoga County: Fire and EMS Facilities Fiscal Impacts

Fire and EMS Facilities	Estimated Facilities Costs			
	Status Quo Trend	Concentrated Growth	Trend Hyper-Growth	Concentrated Hyper-Growth
Building	$165,676,984	$75,868,083	$494,824,690	$310,438,044
Acre	$1,698,887	$777,967	$5,074,037	$3,183,298
Auxiliary Building Sq. Ft.	$89	$79	$126	$106
Auxiliary Net Acres	$2	$2	$3	$2
Total Impact Saratoga County	$167,375,963	$76,646,132	$499,898,856	$313,621,449

Schenectady County: Fire and EMS Facilities Fiscal Impacts

Fire and EMS Facilities	Estimated Facilities Costs			
	Status Quo Trend	Concentrated Growth	Trend Hyper-Growth	Concentrated Hyper-Growth
Building	$39,851,675	$75,723,908	$52,391,282	$125,821,557
Acre	$177,870	$337,979	$233,839	$561,581
Auxiliary Building Sq. Ft.	$70	$65	$77	$67
Auxiliary Net Acres	$1	$2	$2	$2
Total Impact Schenectady	$40,029,617	$76,061,954	$52,625,200	$126,383,206

Note: Forecsted impacts are based on national averages and do not include equiping new fire/ems station or labor costs. All figures in 2005 current dollars.

An analysis of the fire districts for which the study team has service area boundaries in an electronic format, suggests that within Albany, Rensselaer, and Schenectady Counties, the Trend Hyper-Growth scenario could push three or four districts to the population tipping point. The study team's professional judgment is that an equal or higher number of districts in Saratoga County would reach the 25,000 service population tipping point. Fire districts in Ballston Spa, Halfmoon, and Clifton Park all are located in the forecasted areas with the largest population increases, suggesting that these departments will face significant pressure to transition to career firefighters.

In summary, the analysis of the fiscal impacts on fire and EMS service is hampered by the lack of regional specificity of the data regarding excess capacity and the lack of knowledge regarding districts with service capacity needs. Thus, the forecasted impact on facilities is driven only by the number of new residents in the four core counties. In addition, national data suggests that some Capital Region fire districts will soon face the population tipping point that will pressure the communities to consider transitioning all or majority volunteer staffed departments to all or majority career firefighters to meet their staffing needs. This transition will bring significant additional costs not captured in a facilities based fiscal impact model.

4.6 Qualifying the Spillover Impacts

Historical growth patterns in Upstate New York, including the Capital Region, indicate that any growth in the four core counties spills over into adjacent counties. As previously mentioned, it is the authors' professional judgment the location of the AMD facility will increase the propensity of in-migrants to settle outside the core region. Nevertheless, the quantitative analysis does not include these communities. However we interviewed key stakeholders with knowledge of the infrastructure capacity in the six adjacent counties of Columbia, Greene, Montgomery, Schoharie, Warren, and Washington in order to gauge the capacity of these communities to absorb additional development. By and large, the communities in these counties are not well prepared to absorb more than about a 1000 additional households in an "ideal" distribution within the respective counties before significant investments in new infrastructure will be necessary. A perfect storm of high growth in underserved areas would overwhelm existing infrastructure, particularly water and sewer, while stressing the environment due to the insufficient water resources and wastewater management capacity.

The one exception was Montgomery County where it was suggested that the City of Amsterdam could absorb 10,000 to 12,000 additional persons. However, it was also noted that current growth in the county is occurring outside the city limits where services are more limited. This is reflective of what "ideal distribution" would be: i.e. located in areas were there is existing capacity. Of course, this rate and scale of growth would severely impact other public infrastructures besides water and sewer. For example, none of the school systems interviewed in any of these counties stated they would be able to absorb more than a few hundred students, ideally distributed across the different age cohorts, before additional school facilities would be needed.

Overall the planning infrastructure of the adjacent counties is less than optimal for mitigating the negative impacts associated with a hyper-growth scenario. Still, the stakeholders we interviewed suggested that the counties have good working relationships with most state-level agencies. The overwhelming majority indicated that the New York Department of State's training programs have been a terrific service for their communities and often catalyzed joint programs between the adjacent counties outside the four core counties of the Capital Region.

Many suggested that the towns and villages in these counties often depend upon county-level planning due to limited or non-existent planning capacity at the local-level. While towns and villages utilize county-level planning support systems, there is limited coordination of land use and infrastructure planning between different sub-county jurisdictions. Furthermore, in some instances, the relationships are contentious between local jurisdictions regarding planning issues. The conflict is most often associated with the limited nexus between the tax benefits of development and the fiscal burden to provide infrastructure to support development. This is further exasperated by the home-rule framework for land use planning.

The ability of adjacent counties to assuage the negative impacts of growth is further diminished by the general lack of coordination of planning activities with the four core counties. Only one of the counties interviewed has developed a population forecast that

incorporated the four core counties of the Capital Region's growth as one of the driving factors. The relative rural nature of these counties and their historically slow growth were two primary reasons the stakeholders mentioned as contributing to the lack coordination of planning with the core counties. Another explanatory factor is that the ring counties have multiple centers of influences. For example, Columbia County stakeholders indicated the residents are pulled in three directions, NYC and Poughkeepsie to the south, Pittsfield, MA to the east, and the Capital Region to the north. Schoharie county stakeholders mentioned that the population growth factors include New York City in the southeastern towns while the Capital Region's growth pressure is along the Route 20 and I-88 corridors. In the case of Schoharie, it remains part of the Southern Tier East Region, further fracturing its relationship to the Capital Region. The cores' northern neighbors face similar circumstances. Finally, though deemed to be less critical to their capacity to address growth pressures, adjacent county stakeholders suggested that collaboration with the four core Capital Region counties' planning organizations was ad hoc at best. They also articulated that in some cases the communication was one-directional, from the four core Capital Region counties to the adjacent counties, and that their concerns were frequently not addressed.

For context, the eight adjacent counties' total population in 2000 was 377,376, about one third the four core counties' population (see table 4.19). Individually, the largest county populations were Columbia (63,094), Warren (63,303) and Washington (61,042). These relatively small base populations appear to exaggerate the rate of change for population growth. For example, between 1990 and 2000, Greene County grew by 7.72%, or roughly 3,500 new residents. If Albany County had grown at the rate it would have added nearly 22,500 residents. An analysis of each of the adjacent counties growth from 1990-2000 indicates that two counties lost population (Montgomery and Schoharie), Columbia essentially had zero growth, and Fulton and Hamilton grew by less than 2%. Collectively, the adjacent counties added a total 7,806 new residents, led by Warren at 4,094 and Greene with 3,456. Of the other six counties, only Washington added more the 1,000 new residents.

Table 4.19: Historic and Projected Adjacent County Population Growth

						Percent Change		Total Change	
County	1990	2000	2010	2020	2030	1990 to 2000	2000 to 2030	1990 to 2000	2000 to 2030
Columbia County	62,982	63,094	64,793	67,922	72,133	0.18%	14.33%	112	9,039
Greene County	44,739	48,195	51,095	53,684	55,966	7.72%	16.12%	3,456	7,771
Fulton County	54,191	55,073	55,490	55,281	55,022	1.63%	-0.09%	882	-51
Hamilton County	5,279	5,379	5,342	5,404	5,466	1.89%	1.62%	100	87
Montgomery County	51,981	49,708	49,845	50,526	51,143	-4.37%	2.89%	-2,273	1,435
Schoharie County	31,859	31,582	33,058	35,690	38,269	-0.87%	21.17%	-277	6,687
Warren County	59,209	63,303	67,179	69,670	71,098	6.91%	12.31%	4,094	7,795
Washington County	59,330	61,042	63,209	62,926	61,392	2.89%	0.57%	1,712	350

Source: Global Insight, Inc., NYS Department of Transportation (2006)

The population forecast suggest that some of the adjacent counties will face steep challenges to accommodate new residents. Columbia County is forecasted to add slightly more than 9,000 new residents from 2000 to 2030, based on the Global Insight projections. Schoharie and Montgomery counties are forecasted to reverse the population losses in 1990, adding 6,687 and 1,445 new residents, respectively, over the next 25 years. Warren and Greene

County are also forecasted to have significant population increases of nearly 8,000 a piece. Only Fulton, Hamilton, and Washington counties are not anticipated to have any significant growth. In fact Fulton is projected to lose 51 residents during the next 25 years.

From the adjacent counties perspective, their planning capacity and existing infrastructure are less than adequate, leaving them vulnerable if they are faced with the significant growth pressures forecast by Global Insight, never mind the additional spillover growth from the core under a hyper-growth trend scenario. Compounding the problem, if adjacent counties need to react to a large influx of population is the reality that few of the communities in these counties have zoning and/or contemporary comprehensive plans. Finally, as the Capital Region grows it is clear that coordination of planning and development activities must improve among the communities.

4.7 Summary of the Fiscal Impacts

The Capital Region faces a potentially steep fiscal impact under either of the hyper-growth scenarios, though these impacts are uneven across the different communities and could be partially mitigated by a more concentrated growth scenario. If the region continues to grow at its current pace the fiscal impacts for producing and distributing potable water, wastewater collection and treatment, K through 12 public education, and Fire/EMS services will be roughly the same, though fiscal impacts of a more low density urban form is slightly higher ($77.1 million over the next 25 years) than a more compact development pattern under a low growth scenario (see Table 4.20). However, it should be noted that this cost comparison does not capture many of the negative externalities of low density growth or the opportunity costs of some benefits of more compact development. Among the costs not captured are the loss of critical habitat and open space, increased pollution levels, increased energy use, longer commuting times, more vehicle miles traveled, and potential threats to the water supplies. More compact development allows government to leverage resources, optimize its infrastructure investments as well as reduce overall operating maintenance costs of the facilities. Also not captured is the cost to maintain existing infrastructure regardless of the numbers served. The maintenance and replacement costs in the underutilized areas will be borne by a smaller and, in all likelihood, a less wealthy population based on the continuation of current trends.

If growth is accelerated to that of the national average, the savings achieved by pursuing a less sprawling, more concentrated development pattern could amount to over a billion dollars over the next 25 years. A more concentrated growth pattern would also complement CDTC's *New Visions Plan* by focusing the needed infrastructure investment to support urban redevelopment. The benefits of a more compact development pattern extend to protecting crucial water supplies and other natural resources, saving open space, reducing commuting times, enhancing transit opportunities, decreasing pollution, and promoting energy savings; all of which improve the quality of life in the region. Collectively, these benefits would reduce the overall tax burden, catalyze a more coordinated development framework, and make the region more economically competitive, while substantively improving the overall quality of life of the region's residents.

It should be noted that the fiscal impacts and cost savings associated with alternative development scenarios vary considerably among the four counties. Saratoga County exemplifies the higher infrastructure costs associated with low density development. Regardless of the type of infrastructure or the growth rate, a compact development pattern would result in significantly lower costs in Saratoga County. If the region grows at its current pace for the next 25 years, a more concentrated region-wide development pattern would result in approximately $405.0 million of savings in infrastructure cost in Saratoga County. In Saratoga County, as well as the region as a whole, the largest savings would be in education facilities. For a high growth scenario, residents of the County could save approximately $468.6 million over the next 25 years for education infrastructure alone. Significant public cost savings can be incurred for other infrastructure as well. It is also important to note that the Trend Hyper-Growth scenario will accelerate the need to transition some currently volunteer fire districts to professional staff, which would carry significant additional wage costs not included in the estimated facilities cost.

Overall, Albany County is relatively well positioned to absorb new residents, particularly in terms of its potable water resources and distribution network and wastewater treatment systems. The fiscal impact of providing additional fire and EMS services facilities in Albany County is relatively modest if the region continues to grow at its current rate. This cost would escalate relatively rapidly, however, if the region experiences hyper-growth. A more concentrated development pattern will result in higher cost, because the cost is correlated to the number of new residents. Under a Concentrated Growth pattern, the majority of the population increases will be absorbed into fire districts which already have an all, or partial, professional staff, which would reduce the pressure to professionalize other all volunteer districts.

The near complete departure of GE from Schenectady and commensurate population decline has left in its wake considerable excess potable water treatment and distribution as well as wastewater collection and treatment capacity in Schenectady County. Thus, Schenectady County would probably experience very limited additional costs to provide additional new residents and business public water and sewers under any growth scenario. However, the steep decline and redistribution in population has resulted in minimal available excess capacity in primary and secondary education facilities. Thus the cost to absorb new school age children is higher under a concentrated development scenario relative to the current trends. Still, the cost increase is relatively modest between the trend and the concentrated growth and the concentrated growth scenario creates opportunities to reduce the need for busing, which could generate additional savings for the school districts. The situation for fire and EMS services is similar to Albany with one additional caveat that reduces the pressure to transition volunteer staffed district. As home to the Stratton Air National Guard Base, the DOE facility in Niskayuna and the City of Schenectady Fire Department, the county is endowed with more professional firefighters per capita than Albany County. This large career firefighting capacity is able to provide considerably mutual aid to nearby communities. In addition, Niskayuna F.D. #1 and Scotia have some professional firefighters on staff. This will reduce the pressure to professionalize some currently all volunteer fire departments near these locations as they experience growth in the future.

The fiscal impacts in Rensselaer County exhibit the most variation between the trend and compact development forms under the accelerated growth scenario. While the fiscal impacts of the Status Quo Trend are $91.0 million lower than under Concentrated Growth, in a hyper-growth scenario more compact development could save the county approximately $879.8 million over the next 25 years. The majority of this variation is due to the need for education facilities in the Trend Hyper-Growth scenario. Fire and EMS services also carry a large fiscal burden for the Rensselaer County if the region has accelerated growth with continued disbursement of its population. The Fire and EMS costs would be compounded by some districts needing to transition from volunteer staffing to professional firefighters as the demand for these services move further from the existing professional districts. On the plus side, the county has sufficient water resources and distribution network to absorb new residents; though under our assumption a significant portion of new households will need to pay the private cost of a well and septic system which obscures the total costs for these infrastructures. In addition, as in the case of Saratoga County, the proliferation of private septic systems causes hidden risks to water supplies. Similar concerns over water supply

contamination caused by septic systems catalyzed change in the Twin Cities, Minnesota. This is discussed in more detail in chapter 5.

Table 4.20: Combined Fiscal Impacts in the Capital District

Capital District Infrastructure	Estimated Facilities Costs			
	Status Quo Trend	Concentrated Growth	Trend Hyper-Growth	Concentrated Hyper-Growth
Water	$118,755,210	$103,291,487	$241,142,359	$241,175,903
Wastewater	$150,983,976	$155,399,684	$356,562,040	$462,972,011
Education	$1,087,617,229	$1,015,111,279	$3,329,632,467	$2,203,818,944
Fire/EMS	$340,931,042	$346,876,848	$868,645,028	$881,734,248
Total Impact Capital District	$1,698,287,457	$1,620,679,298	$4,795,981,895	$3,789,701,106

Albany County: Combined Facilities Fiscal Impacts

Infrastructure	Estimated Facilities Costs			
	Status Quo Trend	Concentrated Growth	Trend Hyper-Growth	Concentrated Hyper-Growth
Water	$0	$0	$0	$23,860,914
Wastewater	$0	$35,624,108	$60,566,426	$176,656,472
Education	$184,607,222	$204,629,218	$383,278,049	$472,744,304
Fire/EMS	$58,892,316	$90,592,884	$177,891,144	$240,694,736
Total Impact Albany County	$243,499,538	$330,846,210	$621,735,619	$913,956,426

Rensselaer County: Combined Facilities Fiscal Impacts

Infrastructure	Estimated Facilities Costs			
	Status Quo Trend	Concentrated Growth	Trend Hyper-Growth	Concentrated Hyper-Growth
Water	$11,976,901	$24,393,739	$40,807,951	$65,814,644
Wastewater	$9,205,668	$36,003,349	$36,446,549	$66,749,789
Education	$121,013,304	$143,843,384	$1,295,223,118	$297,342,064
Fire/EMS	$74,633,309	$103,576,026	$138,230,036	$201,035,033
Total Impact Rensselaer County	$216,829,182	$307,816,498	$1,510,707,654	$630,941,530

Saratoga County: Combined Facilities Fiscal Impacts

Infrastructure	Estimated Facilities Costs			
	Status Quo Trend	Concentrated Growth	Trend Hyper-Growth	Concentrated Hyper-Growth
Water	$106,778,309	$78,897,748	$200,334,408	$151,500,345
Wastewater	$141,778,308	$83,772,227	$259,549,065	$219,565,750
Education	$554,551,280	$326,333,028	$1,390,966,303	$922,411,431
Fire/EMS	$167,375,871	$76,646,051	$499,898,727	$313,621,341
Total Impact Saratoga County	$970,483,768	$565,649,054	$2,350,748,503	$1,607,098,868

Schenectady County: Combined Facilities Fiscal Impacts

Infrastructure	Estimated Facilities Costs			
	Status Quo Trend	Concentrated Growth	Trend Hyper-Growth	Concentrated Hyper-Growth
Water	$0	$0	$0	$0
Wastewater	$0	$0	$0	$0
Education	$227,445,423	$340,305,648	$260,164,998	$511,321,145
Fire/EMS	$40,029,546	$76,061,887	$52,625,121	$126,383,137
Total Impact Schenectady County	$267,474,969	$416,367,536	$312,790,118	$637,704,283

Note: Figure may not sum due to rounding.
All figures in 2005 current dollars.

The qualitative analysis of adjacent counties reveals that there are substantial risks under a Trend Hyper-Growth Development scenario. In all but one case, these counties lack both the physical infrastructure and the planning resources to respond to accelerated growth. From our interviews, only Amsterdam had excess water and wastewater facilities capacity, however if all the growth in Montgomery County was concentrated in the City of Amsterdam there would be the need for significant investment to expand the educational facilities. In addition, the lack of planning coordination with the four core counties (Albany, Saratoga, Rensselaer, and Schenectady) and poor inter-municipal cooperation could magnify the negative impacts.

These results clearly demonstrate the need for a more coordinated and rational approach to development in the Capital Region. The region faces some difficult policy choices that will have fiscal, environmental and social impacts. More concentrated development could reduce the tax burden; provide increased transportation efficiencies and greater levels of demand in corridors that can better support transit thereby reducing auto dependency - saving time, money, and energy; reduce pollution; and preserve scarce natural resources, including one of the region's greatest asset, its freshwater resources. These benefits would improve the region's quality of life and make it more economically competitive.

Lessons from Successful Places

Managing the fiscal impact of growth presents opportunities and challenges for local governments. Recent research has improved our understanding of the relationship between urban form and fiscal impacts, linking sprawl to higher costs for municipal services (Speir and Stephenson, 2002; Burchell et al., 2002; Katz, 2006). The built environment also can promote or discourage multimodal transport options and physical activity, protect valuable environmental resources, and enhance community aesthetics (Nelesson, 1993; Mumford, 1938; Jacobs, 1961; Mitchell et al., 2006; Camagni and Gibelli, 2002; Grant, 2002). Recent research also demonstrates that declining urban densities increase energy use as well as air and water pollution, which have both personal and public costs (Dincer, 2001; Tregoning, 2002; Portney and Kent, 2002; Newman and Kenworthy, 1989; Naess et al., 2001; van de Couvering and Schwanen, 2006).

The evidence is mounting that public policy has shaped residential and commercial locational choices. Our tax policies in conjunction with public investments for highway construction and other key infrastructure such as water and sewer lines have significantly shaped our current urban form. This has contributed to the loss of population in existing urban centers resulting in underutilized infrastructure in our cities, increased congestion on the highways and major arterials, loss of critical farmland and open space, and increased levels of pollution (Hanson, 1992; Hart, 1992; Newman and Kenworthy, 1989). In Upstate New York, including the Capital Region, this outward expansion has occurred with little increase in population (Pendall, 2003; CDRPC, 2003, 2005). While some assert that the decline in population and business activity in our current built environment is inevitable and/or the result of individual consumer preferences regarding residential choices, in many respects public policy has shaped land markets making suburbanization more desirable relative to other urban forms (Hanson, 1992; Speir and Stephenson, 2002; Burchell et al., 2002). Despite the unintended consequences of how government at all levels fund and provide infrastructure, the past decade has seen a revival of consumer support for more compact development with mixed-use centers as people seek an alternative to the traditional suburban development patterns (Nelson, 2004; Scheiner and Kasper, 2003; Camagni and Gibelli, 2002).

Some communities and regions have pioneered policy responses designed to capitalize on the opportunity to use infrastructure planning to enhance community attributes, protect environmental resources, and reduce the fiscal impacts of growth. The case studies of Twin Cities, MN; Albuquerque, NM; Portland, OR; and Denver, CO are designed to elicit lessons from these communities. They have employed a variety of policies, ranging in geographical scale from multi-county regional policies to single site design standards to enhance the community's quality life. Each of these case studies represents a different approach to optimizing the benefits of growth while mitigating its negative externalities. In each case the community's unique political-economy, geography, catalyst behind the policy choices, and the chronology of events shaped the policy outcomes.

This section begins with examining the cases of the Minneapolis/Saint Paul and Albuquerque to better understand the mechanisms that motivated the regional actors to develop shared infrastructure policies. The Twin Cities region was an early pioneer of shared infrastructure across multiple jurisdictions, now encompassing seven counties and approximately 200 local government units. Their early success with a regional approach to wastewater management has since expanded to a more comprehensive regional strategy that is considered a success by most observers and residents. This is followed by the case study of the development and passage of the *Planned Growth Strategy* (PGS) in Albuquerque. Albuquerque is an elastic city (Rusk, 1993) that has rapidly expanded both in area and population for the past four plus decades. This hyper-growth has resulted in the majority of Albuquerque's residents having a negative attitude to both the pattern of development and the planning approach to managing it (PGS, 2003). The consequences of the sky-rocketing growth rate in the 1990s were unmet demands for infrastructure, severe traffic congestion, and undesirable environmental impacts. Through seven years of community discussion and dialogue, a unique strategy emerged that endeavors to use a market-based approach directing growth into areas that are better suited to absorb development (Colombo, 2003). The other case studies examine how three different cities within the Denver region have utilized neo-traditional community design standards to shape development around planned centers in both urban and suburban settings ranging in size from 100 acres to 4,700 acres. The section closes with an examination of Portland, which has used a combination of regional techniques complemented by urban design standards at the neighborhood and site scales. The interplay of these policies and their influence on neighborhoods is discussed as the analysis steps down from the regional scale to the design standard policies, which can be employed by local governments in a home-rule environment such as the Capital Region.

5.1 Shared Infrastructure Catalyzes Regional Success in the Twin Cities

In the wake of WWII, the Twin Cities region resembled many metropolitan areas with competing cores cities (Saint Paul and Minneapolis) and rapidly expanding suburbs, eroding rural landscapes, and degrading environmental assets. Though the two core cities are separated by the Mississippi River, the region's geography makes it conducive to continual outward expansion onto the wide open plain with a maximum elevation change of a mere 200 feet. This trajectory was partially arrested through collective action due to a heightened concern about the negative impacts to the surrounding lakes, a cherished environmental asset of the region. While there are many factors, most stakeholders interviewed suggested that the roots of the regional strategy can be traced to shared responsibility for wastewater treatment, beginning initially in 1936 with the two core cities, before expanding to the current seven county service area.

To better understand the evolution of planning in the Twin Cities region and the benefits derived though shared services and regional infrastructure planning, we interviewed 18 key stakeholders representing a range of perspectives including: elected officials at the local level; former and current commissioners, as well as staff of the Metropolitan Council; directors of various non-profit community-based organizations; and faculty at the Humbert H. Humphrey Institute of Public Affairs of the University of Minnesota. The interviews focused on the factors that catalyzed the formation of the regional strategy, contemporary attitudes regarding the success of the regional strategy, and approaches that might improve

the effectiveness of the Metropolitan Council. Information from these interviews was combined with secondary sources to develop lessons for effective infrastructure planning.

5.1.1 Overview of the Twin Cities Region

For the past decade, the Twin Cities region, centered on Minneapolis and Saint Paul, MN, has consistently been rated among the best places to live in the United States (City Rating, 2006). During the 1990s, the region gained over 350,000 people (15.4%) while adding roughly 300,000 (25.8%) jobs from 1986 to 2000. In 2000 the region's MSA population reached nearly 3 million residents living in 13 counties (see figure 5.1). Of these 3 million people in the region, roughly 89% live in the seven core counties that define the service area of the Metropolitan Council. Over 60% of the State of Minnesota residents call the Twin Cites area home. Since 2000, the region has added nearly 130,000 more residents in the seven core counties. The expanding economic opportunities for its residents raised the median household income by $6,550 (13.7%) in the 1990s. This is quite remarkable given the snowbelt-sunbelt trends in the U.S. over the past 30 plus years.

At the time of inception of the Twin Cities' regional strategy in the mid 1950s, there was a diverse industrial base, with 26 Fortune 500 companies, many of which were home-grown. Similar to today, the region constituted over 50% of the state's population, making the State relatively more responsive to metropolitan concerns. The region has remained remarkably cohesive and a dynamic economic engine. Its primary economic drivers are the highly skilled workforce employed in technology-related industries most notably: medical instruments; professional, scientific, and technical services; and information, among others. During the 1990's, the region's private sector employment expanded at approximately 2.5% annually. With the bursting of the tech bubble in 2001, the region suffered employment

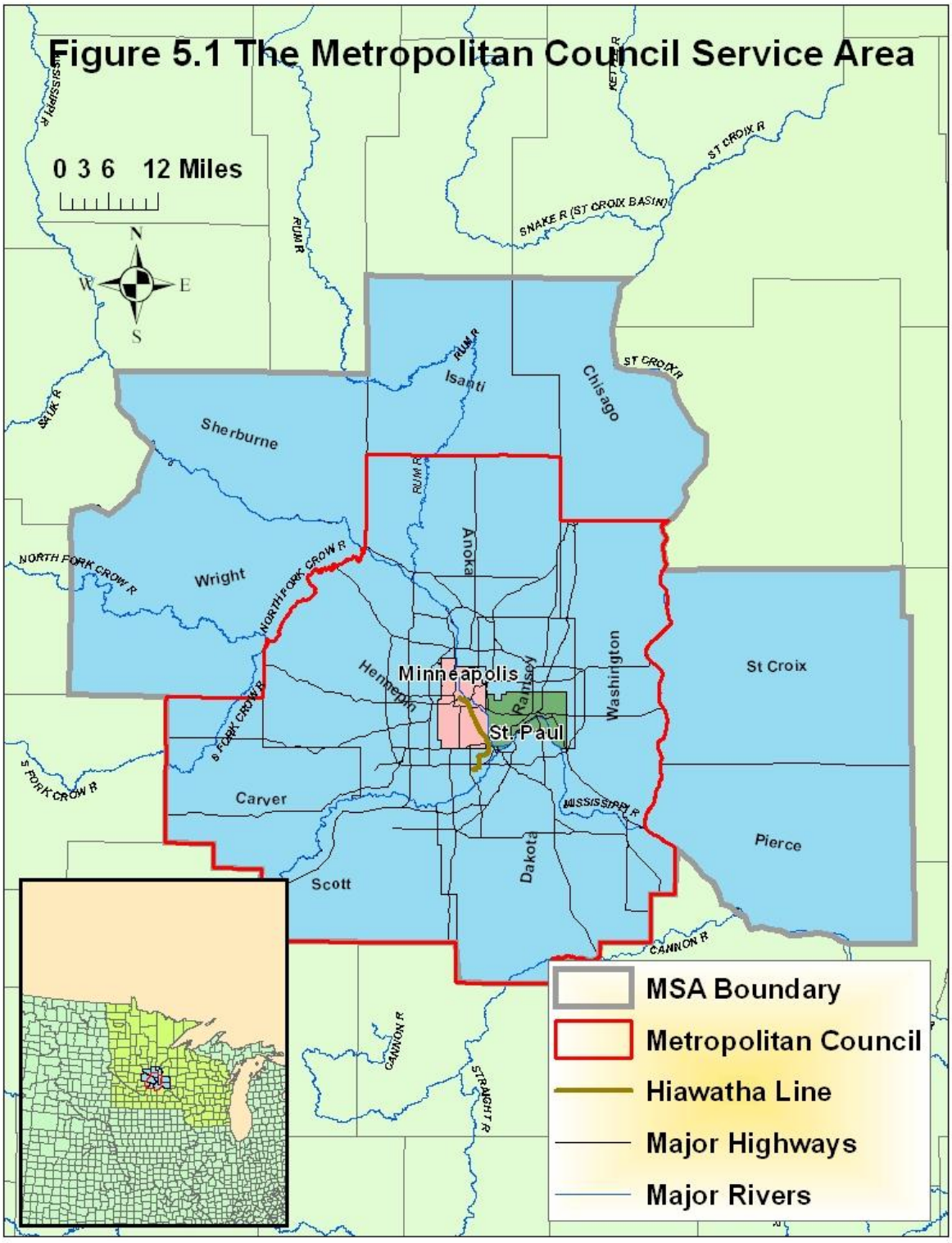


Figure 5.1 The Metropolitan Council Service Area
0 3 6 12 Miles
N
W
E
S
Isanti
Chisago
Sherburne
Wright
Anoka
Hennepin
Minneapolis
Ramsey
St Paul
Washington
St Croix
Carver
Scott
Dakota
Pierce
MISSISSIPPI R
CANNON R
ST CROIX R
SNAKE R (ST CROIX BASIN)
RUM R
NORTH FORK CROW R
S FORK CROW R
MSA Boundary
Metropolitan Council
Hiawatha Line
Major Highways
Major Rivers

contraction in 2001 and 2002 before rebounding in 2003 (Met Council, 2005; Uphoff, 2004). Chappel et al. (2004) found that the region hosts one of the largest concentrations of high-tech jobs (ranking 11th) among all U.S. MSAs, while ranking seventh among what the authors refer to as the I-Tech sector. Furthermore, Florida (2002) ranks the region among the top ten "creative" large metropolitan regions in the U.S.

5.1.2 Brief History of the Metropolitan Council

The Metropolitan Council is a seven county regional agency, established by the Minnesota State Legislature in 1967, vested with the authority to plan and coordinate certain public services that had grown beyond effective local control (Naftalin and Brandl, 1980). At the time of its passage, both of the Minnesota legislative bodies were controlled by Republicans and were considered relatively conservative. Furthermore, the bill was signed into law by a Republican governor (Met Council, 2006c).

The Met Council roots can be traced to the Metropolitan Drainage Commission of Minneapolis and St. Paul created in 1928 and, to a lesser a degree, the voluntary Council of Governments. With the passage of the 1967 Act, the State was, in essence, rejecting the voluntary and advisory nature of the Council of Governments, mandating authority to the Met Council to direct the development of the region. There are 17 council members, 16 that represent specific areas and the council chair. All appointed by the Governor, they serve at the Chief Executive's pleasure. The legislative intent was to create "a body that would adopt regional development policies and coordinate the implementing activities of other regional agencies and local government" (Naftalin and Brandl, 1980, v).

Since its inception, primarily due to its effectiveness, the Met Council's mandate has expanded to a wide-range of planning as well as administrative functions including: sewer; infrastructure for highways and transit; land use planning; park planning and management; housing; and eliminating fiscal disparities across the approximately 200 local jurisdictions. Under the fiscal disparities system, which was mandated by the State legislature in 1974, each community contributes 40% of the growth of its non-residential tax base to a regional pool, which after 31 years of operation now constitutes about 20 percent of the region's total tax base. Money in this shared pool of revenue is distributed back to communities in inverse proportion to a community's commercial tax base. As a result of this tax base sharing program, fiscal disparities at the regional level have been reduced from 50:1 to 12:1; improving the quality of life across all communities while sustaining vibrant community centers, which may not have been achievable otherwise.

The Met Council is currently charged to collaborate with local communities to provide the region's critical infrastructure and services including:

- Operation of the region's largest bus system;
- Collection and treatment of wastewater;
- Engaging communities and the public in planning for future growth;
- Providing forecasts of the region's population and household growth;
- Providing affordable housing opportunities for low- and moderate-income individuals and families;

- Planning, acquisitions, and funding for a regional system of parks and trails; and
- Developing a framework for decisions and implementation for regional systems including aviation, transportation, parks and open space, water quality and water management.

The Met Council fiscal year 2005 budget was slightly over $627 million (see Table 5.1). User fees for wastewater treatment services (28.8%) and bus fares (12.3%) accounted for over 41% of its revenues, while State and federal funds accounted for 32.2% and 13.5% respectively. Another significant revenue stream was property taxes (10.5%). Nearly half of the Met Council expenditures are used to provide transportation services in the region including road and mass transit infrastructure.

Table 5.1: Metropolitan Council Budget

Revenues	Amount	Distribution	Expenditures	Amount	Distribution
Wastewater Treatment Fees	$180,309,500	28.75%	Transportation	$306,222,838	48.67%
Bus Fares	$76,870,672	12.26%	Environmental Services	$107,161,987	17.03%
State Funds	$202,077,348	32.22%	Debt Service	$121,918,712	19.38%
Federal Funds	$84,908,667	13.54%	Pass-Through	$78,339,705	12.45%
Property Taxes	$66,258,100	10.57%	Planning & Administration	$15,484,068	2.46%
Other	$16,721,954	2.67%			
Total	$627,146,241	100.00%	**Total**	$629,127,310	100.00%

Notes: Environmental Services are wastewater collections and treatment.
Revenue & pass-through expenditures rarely match on an annual basis and in 2005 the Met Council used reserves to cover the difference.

Source: Met Council 2006b

The demonstrated success of this regional strategy has prompted the State Legislature to consider potentially extending the mission of the Met Council yet again. In 2006, the Met Council was directed to investigate potential policy interventions to protect the region's water supply in order to increase accessibility and improve the management of a relatively fragmented water supply and distribution network.

5.1.3 The Regional Consensus

The unanimous opinion among individuals interviewed and informal conversations with residents of the Twin Cities was that the Met Council has been an effective organization. Their view was that it helps maintain the positive attributes of the metropolitan region, including economic prosperity. In particular, people praised the park planning and the Met Council's contributions to the overall quality of life. The anecdotal evidence presented here is supported by a Met Council survey which indicated that 37% of surveyed adults think the Met Council is doing a good to very good job addressing regional concerns; more than double the 18% that believe it is doing a poor to very poor job (Met Council, 2006d). The overwhelmingly positive assessment of the Met Council was counterbalanced by criticisms of specific programs (notably the ongoing effort to determine a fair distribution of affordable housing); the decision making process; and the lack of accountability to the electorate. Some local elected officials suggested that the Met Council's responsiveness to local community needs was not optimal. Similar to most American cities, traffic congestion was also considered to be major problem and the Met Council has been criticized for this intractable problem. Traffic congestion has been, and remains, the number one area of concern for the region's residents (Met Council, 2006d).

5.1.4 The Emergence of the Regional Strategy

When questioned about the emergence of the regional strategy and the formation of the Met Council, most of the key stakeholders interviewed agreed that the primary stimulus was the degrading quality of the region's lakes due to poor wastewater management and encroaching development. Another prominent explanation was the community's desire to retain its status as a regional center with the ability to compete with larger metropolitan areas. Advocates of this account concede that the wastewater management issue provided the opening for the dialogue and catalyzed momentum among the general population, but insisted that the major decision-makers had broader aims. To a lesser extent, some suggested that the high ideals for community building and envisioning the region as major player on the national, even international, scales were significant factors.

There was a consensus regarding the important role of the University of Minnesota as well as the media in the region. Faculty at the University provided objective analysis, technical advice, and valued insights that helped shaped the public debate. Local media provided the space for public dialogue regarding how the region should develop. For over a decade, there were numerous articles and op-ed pieces in the local papers as well as TV and radio coverage.

Political leadership and private sector support were cited by all stakeholders interviewed as critical to the passage of the 1967 legislation creating the Metropolitan Council. The support was bipartisan and created strong public-private partnerships. Business support was motivated by a desire to reduce taxes through savings generated by shared services; rationalizing the delivery of critical infrastructure; workforce benefits gained through improved quality of life; and making the region more competitive in national and international markets. Alliances were also built with residents and environmentalists whose interests were tied to protecting the lakes and providing a world class park system. This broad political support across diverse constituents galvanized political leaders.

5.1.5 Documenting the Success of the Met Council

Providing a counterfactual to the region's contemporary situation is not possible. Myron Orfield (2002) argues that the regional strategy has failed at many of its broader social aims and has essentially delayed the negative trends apparent in other urban centers. Though he presents compelling statistical evidence, one can not argue with certainty that the negative effects of the hollowing out of the urban cores and the concentration of low income households has not been significantly muted by the Met Council's policies. The evidence on fiscal disparities suggests that these negative trends have been at least partially mitigated.

The efficiency in the provision and operation of public infrastructure in the region is a compelling indication of the success of the Met Council's primary responsibility as the region's coordinator and operator of the critical infrastructure to support development. The wastewater management system received the National Peak Performance Award in 2005 from the National Association of Clean Water Agencies. It provides this service at substantially lower costs than other comparable metropolitan areas. The efficiencies are attributable to a number of factors that include: 1) the economies of scale; 2) coordination of land use planning with service provision; 3) lower overhead costs; and 4) the availability of

resources that ensure consistent system upgrades and maintenance. The linking of density to service area (minimum of 3 housing units per acre) ensures optimal and efficient use of the trunk lines and was cited by long time staffers as one of more critical factor for its success. Topography allowing for a majority gravity fed system also contributes to the low cost of operation. The wastewater treatment system has been nationally recognized for its efficient operations. From 2003 to 2005, the system reduced phosphorous by 49%. The installation of new pollution control equipment at the largest treatment plant has reduced air pollution and mercury emission by 98% and 96% respectively between 2004 and 2005. The system operators are currently engaged in reducing the growing infiltration and inflow, thereby increasing its current operating efficiencies.

The high public satisfaction with the regional park system provides another clear indication of the effectiveness of the regional strategy. In 2005, 96% of residents believed that the Twin Cities region was a better place to live relative to other U.S. metropolitan areas (Met Council, 2006d), in part due to the regional park system. The success is predicated on the regional vision that coordinates park development across multiple municipalities, allows for trail linkages between facilities, and the purchase of land to develop into parks and trails in advance of development. This "pre purchasing" has significantly reduced land acquisition costs related to park development and ensured that prime lake front and other unique areas are preserved for public enjoyment and access.

In the transportation arena, the Met Council successfully developed the Hiawatha Light Rail project to reduce traffic congestion in the region. In its first full year of operation, beginning in December 2004, ridership exceeded preconstruction estimates by 58.2% (Met Council, 2006b). The success of this line has generated increased enthusiasm for expansion of the system. In 2004, the region also added 36 new miles of bus only shoulders on the region's highways; the largest single year expansion. Still, traffic congestion remains a major concern for the region.

5.1.6 Improving the Performance of the Metropolitan Council

The one area of significant divergence of opinion among the people interviewed is how to improve the effectiveness of the Met Council. Interestingly, the solutions did not appear to be correlated with the individual's relationship to the Met Council. In other words, local government officials did not share a common view, nor did current council staff or appointed members. The proposed interventions covered a range of potential solutions. If there was one common theme, the majority of respondents agreed that growth beyond the original service area was eroding the effectiveness on the Met Council. Thus, many suggested an expansion of the service area. All acknowledged that there are steep political challenges to this proposal; the adjacent counties and their constituent communities do not necessarily desire to be part of the Met Council. Furthermore, given that the region already encompasses the majority of the state's population, expanding its reach might meet strong opposition in the state legislature to prevent a perceived potential for the Met Council region to become privileged in State decision-making. Another issue is that some of this growth has expanded the labor market into Wisconsin, thus outside Minnesota's control.

Another politically challenging proposal was to move to an elected Met Council. Presently, the Council is appointed by the Governor and serves at the pleasure of the Chief Executive. Those who favored this solution asserted that the Met Council would be more responsive to local issues under this structure. Opponents counter that this structure would result in more parochial politics within the Met Council, diminishing its ability to serve the region. The potential loss of the regional focus was also acknowledged by some of the proponents of the elected Met Council strategy. Both proponents and opponents of an elected Met Council asserted that an elected Met Council was unlikely because the size of the territories and number of constituents within each territory would concentrate too much power. As currently demarked, each of the Met Council's sub-regions has more residents than any state senatorial district or U.S. congressional district. Increasing the number of representatives on the Council to reduce the constituent base of each Councilor would heighten the potential for parochial politics, potentially paralyzing the Council's ability to serve the region.

Some of the key stakeholders interviewed suggested that the Met Council return to its roots, shedding the administrative and operational functions; acting solely as a policy-setting body. Shedding the operational functions would free the Met Council from expending resources on day-to-day operations, budget management, and customer relations. Proponents assert that by focusing on the policy agenda, the Met Council could employ innovative strategies that, in its current form as the operating entity, might meet both internal and external resistance. However, this may also result in a decline of the perceived value of the Met Council and its effectiveness. The area residents and local officials rate the park system, the new light rail line, and the wastewater treatment services as major accomplishments of the Met Council. If the Met Council sheds the management of these activities, constituents might not connect the Met Council with these valued services.

Perhaps the most feasible suggestion was to stagger the terms for the appointed Council leadership. Though it has not happened in the past, the potential exists that all 17 members, including the Chair, can be replaced at the same time when a new governor is elected. Membership turnover creates the loss of institutional memory among the leadership. This make the organization heavily staff-driven as the new Council members familiarize themselves with operational procedures, on-going activities, policy goals, and build relationships with local elected officials. Furthermore, new gubernatorial leadership and complete turnover in council leadership may be accompanied with a radical shift in Council philosophy and goals, stimulating staff uncertainty with regards to organizational priorities. Finally, high turnover at the leadership level of the Met Council may lead to the loss of social capital with local elected officials and loss of cohesion in the policy-making process.

5.1.7 Lessons Learned in the Twin Cities

The Twin Cities' regional strategy has created a competitive advantage for the area as evidenced by the expanding economy, cutting-edge industries, a high-skilled workforce, and the high quality of life. The regional strategy was catalyzed by a threat to a cherished environmental treasure and an understanding that the region's competitive advantage would be enhanced through cooperation. Its passage was shepherded by visionary political leadership that was able to set aside their differences in the interest of the collective benefits to the region. Orchestrating the development of infrastructure and land use at the regional

scale has cut the cost to provide critical public services and enhanced the quality of life, attracting and retaining a skilled workforce. While not directly addressed in this research, higher education and excellent primary and secondary schools were cited as fundamental to the success of the region. The vision to invest in the park system and light rail service has helped to preserve and reinvigorate older neighborhoods and vibrant cores.

5.2 Albuquerque's New Direction

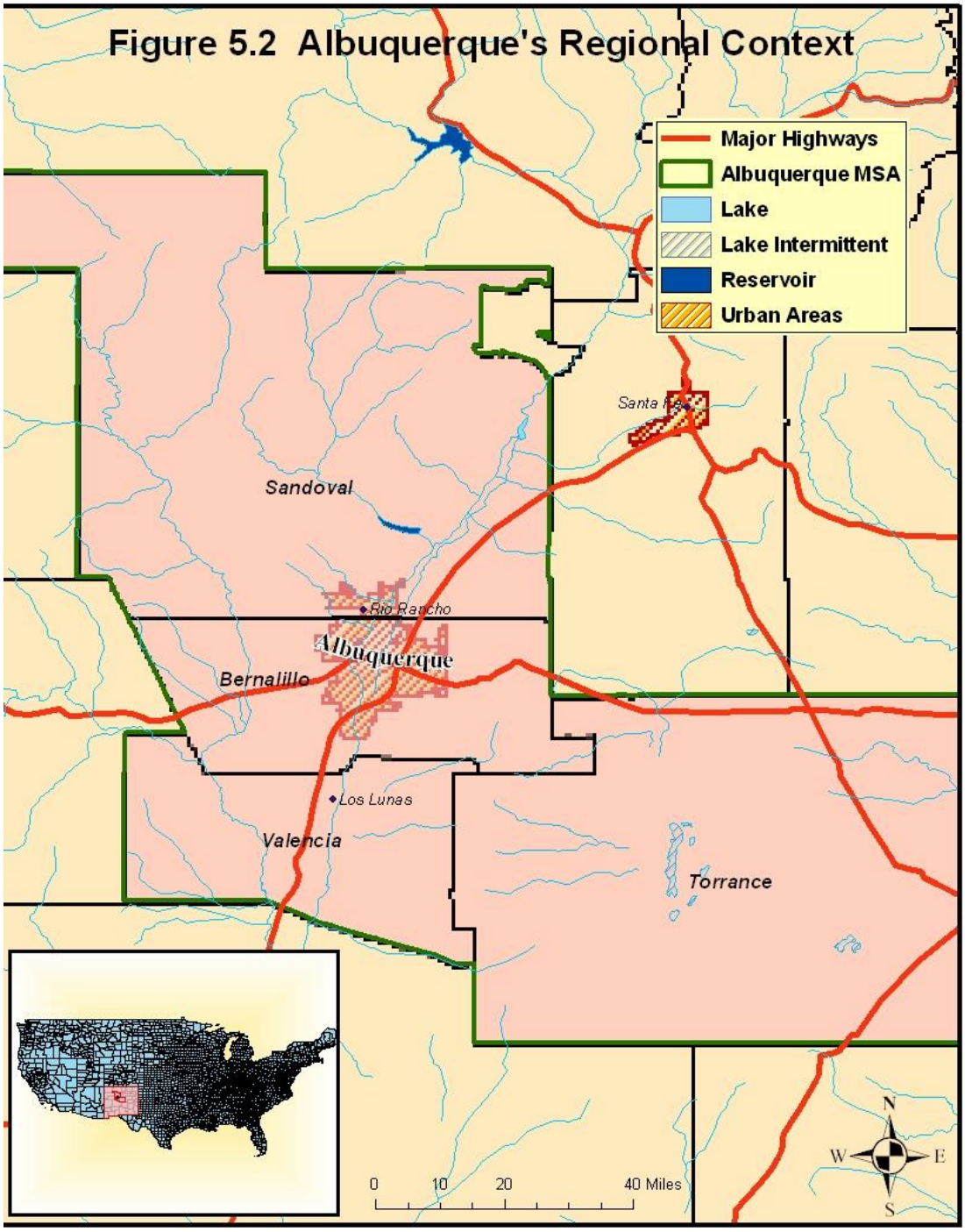
The Southwest has been experiencing accelerating change for the past four decades. The mushrooming population threatens the natural resources, and in many respects, the historic fabric of many communities. The challenges of hyper-growth are exemplified in the case of the City of Albuquerque. Since 1970, the population has doubled from 225,000 to nearly a half million residents. The population growth has been primarily accommodated in single family homes built on the edge and rapidly expanding out from the traditional core. The stress on the desert landscape, water resources, public infrastructure, and quality of life fermented new ideas and leadership that has successfully galvanized a diverse coalition, which has embarked on an uncharted path. This new direction is codified in the *Planned Growth Strategy* and subsequent supporting local ordinances, such as the Development Impact Fees. The local ordinances are intended to produce a more vibrant downtown, reinvigorate older neighborhoods, improve quality of life, mitigate the fiscal burden of growth, optimize capital investments, rationalize the delivery of critical infrastructure, and protect scarce water resources.

The recent policy initiatives in Albuquerque endeavor to use market forces, in conjunction with capital planning, zoning, and land use planning, to direct development into areas that have existing infrastructure to absorb development. This change in course is, in part, a response to explosive growth (Colombo, 2003). To grasp the context of this change in development policy, the research team interviewed 13 stakeholders from differing vantage points including: 1) past and present Albuquerque City Council; 2) Bernalillo County Commissioners; 3) residential and commercial developers; 4) neighborhood association leaders; and 5) other non-for-profit stakeholders. In addition, we attended a City Council meeting with two controversial elements of the Planned Growth Strategy (PGS) on the agenda: 1) affordable housing policy; and 2) the revised Volcano Heights zoning ordinance which embraced the mixed use dense cores and corridor strategy articulated in the Planned Growth Strategy. This primary data was combined with a review of the Planned Growth Strategy and other secondary materials.

5.2.1 Albuquerque in Transition

Prior to 1950, Albuquerque was a moderately sized, sleepy community. Due to a combination of many factors, but driven primarily by the nuclear weapons development at Sandia National Lab and Los Alamos National Lab, the region experienced a boom propelling a five-fold increase in the City of Albuquerque's population since 1950. The growth has shown no signs of waning and current projections suggest that the four county MSA will top a million persons before the end of the decade (see figure 5.2). The Albuquerque MSA is roughly 40% of the State's population and the City's ability to annex adjacent territory has resulted in the majority (63%) of these people living within the city limits. David Rusk (1993) asserts that the "elastic" nature of the city has enabled the city to

capture the benefits of growth and prevent serious decline in its core. Thus the City's per capita income of $20,884 is significantly higher than the State's ($17,261) and slightly higher than Bernalillo County ($20,790) and the MSA ($20,025) as a whole.[1] However, recent trends and the geography of the region suggest that annexation can not mitigate rising challenges.



[1] Median household as well as median family income have the same distributional pattern as per capita income.

Situated in an arid mountain valley, Albuquerque is bisected by the Rio Grande River, with the significant majority of new development to the north and west of the River, away from the traditional core and job centers. It is important to note that within the State of New Mexico, the entire length of the Rio Grande River and most of its riparian zone are owned by the federal government as part of the Parks Services and within the city limits two State Parks (Rio Grande and San Gabriel State Parks) also line its banks. This creates a remarkable downtown amenity, but also limits the option to build major roads and bridges to connect residents on the west side to jobs on the east. In addition, steep mountain terrain to the east, and to a lesser degree, the north, combined with the Kirkland Air Force base to the southeast, seven Native American Nations' territories (to the North: Jemez, Zia, San Felipe, and Cochiti; to the west: Canoncito and Laguna; and to the south: Isleta) and the Petroglyph National Monument to the west, creates what many stakeholders referred to as a defacto growth boundary for the City.

Over the past decade, the MSA region grew by 48% adding 232,161 people between 1990 and 2000 and nearly 100,000 non-agricultural jobs from 1990-1998. A significant portion of the development has leapfrogged beyond the City's edge and outside Bernalillo County. The Albuquerque MSA is now home to 712,738 people and approximately 350,000 jobs in the labor market. The tremendous growth has been accompanied by increasing citizen dissatisfaction, pollution problems, and an accelerating jobs-housing spatial mismatch. A 1999 survey of residents revealed that 62% felt that Albuquerque was growing too fast compared to just 36% five years earlier. Furthermore, in 1999, only 26% believed Albuquerque was well-planned and research in 2001 found that many residents had lost faith in the local leadership's capacity to implement plans (Colombo, 2003).

The region's limited water resources are stretched thin. Our interviews suggest that some water districts surrounding Albuquerque have exceeded their state and federally permitted water rights.[2] The arid, steep terrain also creates significant stormwater runoff issues that result in frequent flooding of the low lying areas in the traditional core. Some argue that the stormwater management issue is compounded by the increasing quantity of impermeable surfaces in the surrounding higher terrain areas.

The rapid and unpredictable growth also significantly stressed the Albuquerque Public Schools, with overcrowding in some schools, while others were operating well below facility capacity. The unpredictable nature of the development, combined with limited bonding capacity, prevented the school system from developing a capital plan that could keep pace with the population growth and its redistribution. These factors, in conjunction with significant citizen dissatisfaction and other environmental concerns, stimulated a public dialogue regarding the future of the region.

[2] The City of Albuquerque and Bernalillo County have recently merged their once independent water and sewer authorities. Staff at both the City Council and County Commission stated that they are currently using 75% of their permitted water rights. Furthermore, County and City officials indicated in interviews that rapidly growing districts to the north (Rio Rancho) and south (Los Lunas), have over-sold building lots relative to their permitted water rights. This most likely will be settled in the courts and has tremendous significance for the regional development pattern.

5.2.2 The Fork in the Road and a New Direction

Rising transportation issues were the first indication of the need for an alternative approach to accommodate new growth. In 1995, the Albuquerque City Planning Office, under the direction of the Director of Planning, hired Parsons Brinckerhoff to conduct a study to investigate solutions for the over-burdened transport network. The findings were issued in 1997 in the *Transportation Evaluation Study* (TES) which, among other things, recommended an Urban Growth Boundary (UGB) with a 20 year supply of developable land. The report ignited the nearly decade long debate regarding direction of development in the region. The entrenched development community, including a Councilperson who owned a real estate brokerage/developer firm, and some business leaders, opposed the TES. The opposition focused their objections on the UGB section of the report and successfully defeated the City Council from legislatively "accepting" the report. Soon after the TES was released, a new Mayor was elected. The new Mayor, Martin Chavez, replaced the Director of Planning and a compromise solution to development problems was sought (Colombo, 2005).

The TES process stimulated the mobilization of non-profit groups with interests in shaping the future of Albuquerque. These groups included: Albuquerque Shared Vision, 1000s Friends of New Mexico, Albuquerque Interfaith, and the newly formed Supporters of the Planned Growth Strategy. While the TES was merely "received" by the Council and not "accepted," the process resulted in the adoption of a few critical ordinances, including R-91-1998 (§ 3-8-6 Code of Resolutions), which articulated the "growth policy framework" that shaped the Planned Growth Strategy (PGS). The Resolution established a framework for future growth that would include the following components:

1) Capital improvement programs and plans should support the emergence of cores and corridors;
2) Develop impact fees consistent with the actual cost to deliver the service;
3) Time road and utility construction to ensure orderly growth;
4) Encourage higher densities with mixed use cores and corridors; and
5) Consider if, on balance and within the context of an amended comprehensive plan, the concept of an Urban Service Area is beneficial to the quality of life for Albuquerque residents. If yes, then determine where Urban Service Areas should be made (PGS 2003a: p2).

Staff of the City Council Department, working with the Council member who initially opposed the TES, and others, refocused the efforts to emphasize zoning, sector plan requirements, and revamping the development approval process to link development with the Capital Improvement Program (CIP). The CIP addressed streets, hydrology (stormwater management), potable water, and wastewater provisions (Colombo, 2005). The process over the next six years included multiple public meetings, door-to-door citizen engagement, surveys, and many other forums for public comment on draft plans and revisions. Ultimately, what emerged was the *Planned Growth Strategy*, a development guidance document, which was adopted by the Albuquerque City Council on September 23, 2002. Though Mayor Chavez was opposed to the plan, it was adopted with a veto proof majority (7

yeah, 2 nay) on the City Council, and was subsequently signed by the Mayor in October 2002.[3] This marked a clear departure from the past, moving away from growth accommodation to growth management (Colombo, 2003).

The *Planned Growth Strategy* is a development guidance document that articulates principles for additional growth in the City of Albuquerque. It consists of two volumes with over 750 pages, which cost over $400,000 to prepare. The first volume details the findings while the second articulates the Preferred Alternative and policies to achieve the shared vision, including the promotion of development to achieve that vision. It builds from the TES, which articulated the need for a shared vision from which to craft development policy.

While many in the development community acknowledged publicly at the time and in our interviews that a more rational approach to development was needed, all but one of the members of the development community we interviewed remains disappointed with the PGS. Support was also mixed within both older and newer neighborhoods. Some newer communities west of the Rio Grande welcomed the plan, though the Volcano Heights area land-owners strongly resisted the adoption of the new zoning regulations based on the principles of the PGS.[4] The process is still evolving; many contentious issues remain to be resolved and alliances continue to shift. In this early stage, the trend appears to be in the direction of stronger support of the core principles of the PGS, though there is friction from those with entrenched development interests.

5.2.3 A Brief Description of the Planned Growth Strategy and Impact Fees

Prior to the PGS, planning in Albuquerque/Bernalillo County was organized at three levels, which have not changed in form or function. The first level is Albuquerque/Bernalillo County Comprehensive Plan, which informs the Area Plans (level two) and Neighborhood and Sector Plans (level three). This approach recognizes the complex interrelated nature of multiple planning and development issues which demand flexible programs designed to respond to issues at different scales simultaneously. The PGS is a Citywide planning guidance document intended to shape area and neighborhood/sector plans within the city limits, and, one hopes, beyond. As such, it is positioned between the Albuquerque/Bernalillo County Comprehensive Plan and the Area plans, however as a guidance document, it is has no legally binding mandate.

The PGS begins with an analysis of three growth trend scenarios. All the scenarios assume the same rate of growth, but each have a different geographic distribution for the ensuing development. The three scenarios are: 1) the Trend, which continues unimpeded outward expansion of low-density development; 2) the Downtown, which focuses the development on "selected cores and corridors with major concentration in the Downtown, University of New Mexico and Uptown areas (p4);" and 3) the Balanced, which is more compact than the trend

[3] The compromised PGS was adopted in two separate bills F/S O-02-39 and F/S R-02-111.

[4] The Volcano Heights area is an undeveloped area west of the Rio Grande that had been platted and sold as 1,000 one acre, single family home residential lots, nearly 40 years ago. This constituent group was very vocal at the City Council Meeting on August 21, 2006, when the new Volcano Heights Plan was to be voted on. The plan was ultimately tabled at this meeting, however it has since been adopted. The Volcano Heights Plan can be reviewed at: http://www.cabq.gov/council/VolcanoHeights.html.

while allowing for more flexibility than the Downtown scenario (PGS 2003). The fiscal impacts to provide the infrastructure to support each of these scenarios was then forecast and a macro-economic model was used to forecast the economic impacts of each scenario. The social implications of each growth scenario were also investigated. From this emerged the Preferred Alternative phase of the project based on community input to the three alternative directions.

Through town hall meetings, citizen surveys, and other means of public participation, it was determined that the Balanced scenario was the community's preferred alternative. Within the three levels of planning in Albuquerque/Bernalillo County, the recommendations endeavor to assist areas and neighborhoods to revise their plans to achieve a common vision. Since the passage of the PGS, the County has also revised some plans to meet the goals of the PGS, most notably *The Vision for the Hiland Theater and Highland Neighborhood* document (Bernalillo County, 2006), submitted by the County for inclusion in the *Nob Hill/ Highland Sector Development Plan*, indicating the influence of the plan beyond the City.

To support the vision articulated in the PGS Preferred Alternatives, the City Council adopted the City of Albuquerque Development Impact Fee Ordinance, Enactment Nos. 0 200451, 0-200452, 0200453, and 0200454 (hereinafter referred to as the Impact Fee Ordinances, and Resolution 04159) which became effective July 1, 2005. The Impact Fee Ordinances and Resolution 04159 were adopted at the November 15, 2004 City Council meeting; creating a significant tool to execute the vision. The implementation, to be phased in over three years, will reach 100% of the intended cost structure in 2007. It defined three primary types of service areas: Fully Served, Partially Served, and Unserved, based on the existing array of public infrastructure including: 1) drainage facilities; 2) street facilities; 3) parks, trails, recreation, and open space facilities; and 4) public safety facilities. The amount of each Impact Fee is linked to the availability of the infrastructure with highest fees reserved for Unserved Areas and lowest in Fully Served Areas.[5] While the need to development additional park facilities is used to categorize the development area as fully served, partially served, or unserved, the assessed impact fees calculation does not include funds for parks since there is separate financing mechanism.

Though the expense of expanding water and sewer infrastructure, as well as park expansion and development, are not part of the Impact Fees, Albuquerque does assess a Utility Expansion Charge (UEC) for water and sewer and has a separate fee for park expansion and development. These fees are calculated on an average basis and for UEC are then reduced by 50%, regardless of location. This fee structure treats all areas the same, regardless of their classification as a fully served or unserved. Thus, it can be argued that this method of calculating the water and sewer infrastructure fees subsidizes growth in currently unserved areas, undercutting the goal of the Impact fees of the PGS (Colombo, 2003).

As per New Mexico State law, the City can not charge a school impact fee. However, developers, City officials, and Albuquerque Public Schools (APS) have entered into a "voluntary" agreement regarding additional fees for housing units in underserved areas. This

[5] For more details on the Development Impacts see: Colombo 2003 and Albuquerque City Council web site http://www.cabq.gov/council/pdf/ImpactFeesRegulationswithApprovedAff.Housng.pdf.

agreement attempts to walk a legal and political tight rope. Who initiated the dialogue and framework for the agreement is open to debate. Both the development community and political leadership understood the needs of the APS, which motivated everyone to seek a solution to the facilities problems created by the rampant growth in underserved areas. What can be stated with certainty is that the APS supports linking the pace and distribution of growth to infrastructure development, including schools, and the APS's facilities as well as capital needs were not being met in the "growth accommodation era." Only time will tell if the agreement will withstand potential legal challenges and if the political alliances forged in its creation will endure.

5.2.4 New Optimism

It is too early to measure the success of the PGS with any degree of certainty, though the optimism of the majority of stakeholders we interviewed and some anecdotal evidence suggest a change of course. Some promising markers indicating success include: 1) the Mesa del Sol project, a new urbanist development near the Kirkland Air Force Base ; 2) redevelopment along the Historic Route 66, one of Albuquerque's traditional commercial corridors; 3) the adaptive reuse of the Albuquerque High School and the redevelopment of adjacent properties in accordance with principles of the PGS; 4) the recent adoption of the Volcano Heights Plan; and 5) the emerging new mixed use center in the Nob Hill neighborhood, among others.

Beyond these projects, other trends imply increasing support. Since the original passage of the PGS and supporting ordinances, City Council and County Commission elections suggest increasing support among the electorate. Despite the financing and backing of anti-PGS candidates from the development community (Home Builders Association and National Association and Office and Industrial Properties), pro-PGS candidates continue to win elections. One pro-PGS City Councilor won a seat on the County Commission and his open City Council seat was won by a strong proponent of the PGS, who ran on a PGS platform. In addition, other advocates of the PGS have been reelected. The electoral successes have also resulted in legislative victories, such as the development impact fees.

Stakeholders we interviewed also suggested that the PGS has attracted the attention of the national building community interested in Smart Growth and New Urbanism. Some of these builders have entered discussions regarding new projects. This is in sharp contrast to the majority of area developers who stated in interviews that the PGS has significantly diminished their desire to develop in the City. This disparity may reveal a difference in business models, rather than the dampening of developer's profit potential. It may also reflect an adjustment period for local developers, who are still disenchanted with the process and subsequent electoral defeats, as well as a need to adapt to an innovative development model.

These early positive trends may be reversed, though only time will tell. If the supporters of the PGS can maintain their electoral support among the constituents and are able to have a few successful developments by builders who desire to utilize the advantages of the PGS Impact Fees, then Albuquerque may emerge as a new pioneer in successful urban land management. Regardless of the long-run outcomes, the case provides insights into

innovative urban growth policies that endeavor to achieve goals through a heavy reliance on market-based forces.

5.2.5 Learning from the Albuquerque Experience

Albuquerque's Planned Growth Strategy represents an alternative approach to regulatory means to managing urban growth. The ongoing political and planning processes will take time to yield measurable outcomes, though early indications are that the community endorses the shift from "growth accommodation" that fostered sprawl, to a dense development pattern centered on areas that have existing infrastructure. This change has been catalyzed by environmental degradation, including the deterioration of the quality of life. Hyper-growth also negatively impacted the capacity for the community to provide key infrastructure, such as schools, stormwater management, potable water, and sewer services. In response, the community's faith in planning institutions declined. Intensifying dissatisfaction with traffic congestion tipped the balance, generating the nearly decade long community dialogue that resulted in the Planned Growth Strategy and supporting local ordinances.

Passage of the PGS was predicated on the successful marshalling of community discontent. To galvanize support, elected official with assistance from the planning community and community based organizations, launched a massive campaign to garner public participation in the process. The Preferred Alternative strategy that emerged was the result of a consensus building process along two parallel interdependent tracks: electoral and planning policy.

5.3 Design-Oriented Case Studies

In addition to the case studies above, which have focused on regional development policies, the study team also visited a number of new developments that have utilized traditional urban design techniques to help implement regional development goals. In the first three examples from the Denver Colorado area, the specific developments were carried out within a single municipality, which corresponds with the Capital Region's tradition of regulating and developing land through independent home rule authority. The final examples, from the Portland, Oregon region, represent a combination of both local and regional design strategies working in concert to shape an entire region.

The three case studies from the Denver, Colorado region are: "Bradburn Village," which is located in the city of Westminster; "Stapleton," which is located in the city of Denver; and "Belmar," which is located in the city of Lakewood. The fourth case study involves a broader discussion of the Portland, Oregon region, including regional growth policies, a summary of initiatives specific to the city of Portland, and concluding with a summary of "Orenco Station," a transit oriented development within the Portland Region, located in the city of Hillsboro.

There are a number of design characteristics that each of these case studies have in common: a) master planning; b) large-scale construction; c) mixed-use; d) compact development at village to city-scale densities; e) pedestrian and transit orientation; f) focus on the public realm; and g) incorporation of parks, greenways, open space and/or other environmentally friendly designs and practices.

5.3.1 Bradburn

Bradburn Village is a $220 million, 120-acre development in the city of Westminster, Colorado (population ~105,000). Westminster is located halfway between Denver and Boulder. Bradburn features four distinct, connected neighborhoods, nine parks, a commercial core, two recreational centers with swimming pools, and access to 45 miles of open space and regional trails.

At full build-out, Bradburn will include approximately 270 single-family homes, 140 single-family attached townhouses, 310 rental row houses, 33 live/work units and 108 rental apartments located above Main Street retail; there will also be 166,000 sq. ft. of retail/restaurant space, 29,000 sq. ft. of office space and 9,000 sq. ft. of restaurant space in outlying parcels. Construction began in 2002 and there is a five-year timeline for completion. There are 10 different custom builders participating in the construction.

The developer of Bradburn is Continuum Partners, based in Denver, Colorado. CEO Mark Falcone, from Syracuse, New York, founded the company in 1997. Continuum is dedicated to creating developments that demonstrate the principles of smart growth and New Urbanism. The company's philosophy is that there is a connection between long-term, sustained property value and high-quality urban design.

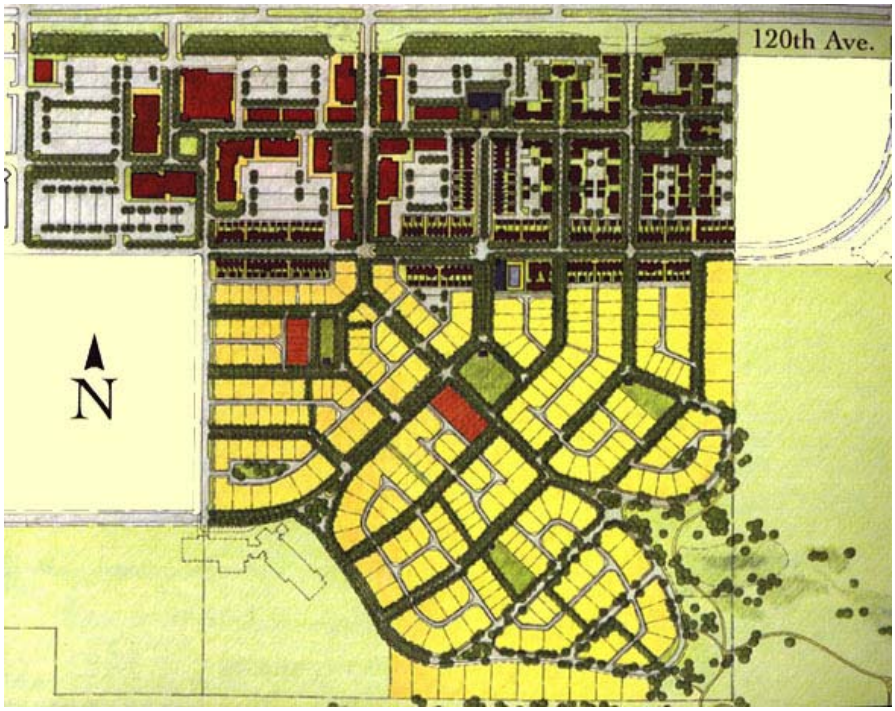
In 1999, Continuum Partners approached the City of Westminster about developing Bradburn Village, in part because Westminster had gained a reputation for farsighted planning. The

city had already identified in its comprehensive plan the desire for mixed-used, pedestrian oriented development. Staff planners and city officials enthusiastically embraced the Bradburn concept. A group of city officials flew to Gaithersburg, Maryland to study the highly regarded Kentlands New Urbanist development. They met with Gaithersburg officials and representatives of the nationally recognized urban design firm DPZ, which designed Kentlands, and ultimately hired the same firm to create the concept plan for Bradburn.

City planning staff hired a design consultant, Van Meter-Williams-Pollack, and worked with Continuum to develop design guidelines that would be applied to this project, and potentially others in the future. The design guidelines were drafted to ensure that this development would be an authentic New Urbanist project that met the specific mixed use, public space, density and pedestrian orientation design goals shared by both the city and the developer. The guidelines were based on Urban Transect theory (a gradient of urban intensity), and include a mix of prescriptive and suggestive principles for overall community design, with numerous illustrations to clarify the guideline's objectives.

Within three months, city officials adopted the new design guidelines and revised their Comprehensive Land Use Plan to accommodate this development. With the new design guidelines, DPZ began the site planning process for the development (See Figure 5.3). The final plan consisted of 113 pages of blue line prints plus a manual of self-imposed Urban Regulations that control building setbacks, the size of porches, the location of fences, building heights, and garages. These documents did not dictate how buildings were to be designed, but set out the framework and criteria for their design.

Figure 5.3 Bradburn Concept Plan by DPZ



Parking requirements for the site are as follows: for single family detached homes, two spaces per unit on-site, plus one on-street space; for rental row houses, one space per unit, plus one on-street; for single family attached dwellings, two spaces for two and three bedroom homes, one space for one bedroom homes, plus one on-street or parking lot space

per three units; commercial and mixed use areas based on a site- and use-specific parking study.

The City of Westminster, as part of its adopted Growth Management Plan, regulates the pace of residential construction within the city. This is done by allocating new water resource connections for various categories of residential development on a competitive basis, which enable developers to earn additional points by producing developments that include desired amenities such as landscaping, recreational facilities, pedestrian/bicycle circulations, public open space or parkland dedications (over and above those required for parks, schools, or other public purposes), view preservation, enhanced building appearance, variety of building and housing types, and dedication of rights of way. The Bradburn project was submitted under this process and ultimately approved (May, 2001) as a planned unit development (PUD) using the City's new design guidelines. Under the PUD process, the City-planning staff work closely with the developer to ensure high quality projects that satisfy City planning goals (See Figures 5.4 and 5.5 for examples). According to City planning staff, the City's elected officials, who ultimately approve projects submitted as PUDs, trust their expertise and almost always endorse and back their recommendations. Throughout the process of developing the design guidelines project application, participation by the general public, regional developers, and the local homebuilders associations was encouraged.

According to planning officials from the City of Westminster, developments like Bradburn are becoming popular alternatives to sprawling large lot subdivisions in suburban markets. Mixed-used, higher-density, pedestrian oriented developments such as Bradburn also offer a way for the Denver region to combat the impacts of sprawl and preserve open space. Bus service is planned to the site and a planned commuter rail station is within three miles of the site. And at the same time as the City of Westminster is encouraging compact development at Bradburn it has also undertaken, with the strong public support of Westminster voters, an aggressive program of open space acquisition financed by a dedicated local sales tax increase. As of 2006, in addition to 3000 acres of City parkland, more than 2,700 acres of open space had been acquired and permanently preserved.

However, this kind of project didn't happen without a significant effort on the part of the City. The City of Westminster needed to adapt its "culture" to permit a project with narrower street sections and a mixture of uses and densities, as well as non-traditional infrastructure mechanisms. The developer had to commit to very high quality development standards, and to make an investment in, and commitment to, building an actual "community;" not simply a "subdivision."

Figure 5.4 Bradburn "Main Street"

Figure 5.5 Bradburn Apartments and Village Green

5.3.2 Stapleton

Stapleton, like Bradburn, epitomizes time-honored urban design techniques – walkable, integrated streets connecting a mix of housing types to nearby offices, shops, schools, and parks. The result is a true urban center on land that once was occupied by the Stapleton International Airport.

In 1998, voters in the city of Denver endorsed the development of a new Denver International Airport. A year later, a group of civic and business leaders created the Stapleton Redevelopment Foundation, which was charged with the task of coordinating the redevelopment of the airport site. There were a variety of opinions offered about how the site should be redeveloped. Though some argued that the site should be developed as a large office park, the community ultimately came to a consensus that the most sustainable way to utilize the site was to develop an integrated new community with the "feel" and function of an old Denver neighborhood. After an extensive community outreach effort, the Foundation produced the "Stapleton Development Plan," popularly know as the "Green Book," which established the framework for the Stapleton project: a balance of homes and businesses, shopping and dining, industry and greenways, and a mixing of people of different races, professions, interests, and socio-economic levels.

Figure 5.6 Stapleton Site at the Start of Construction

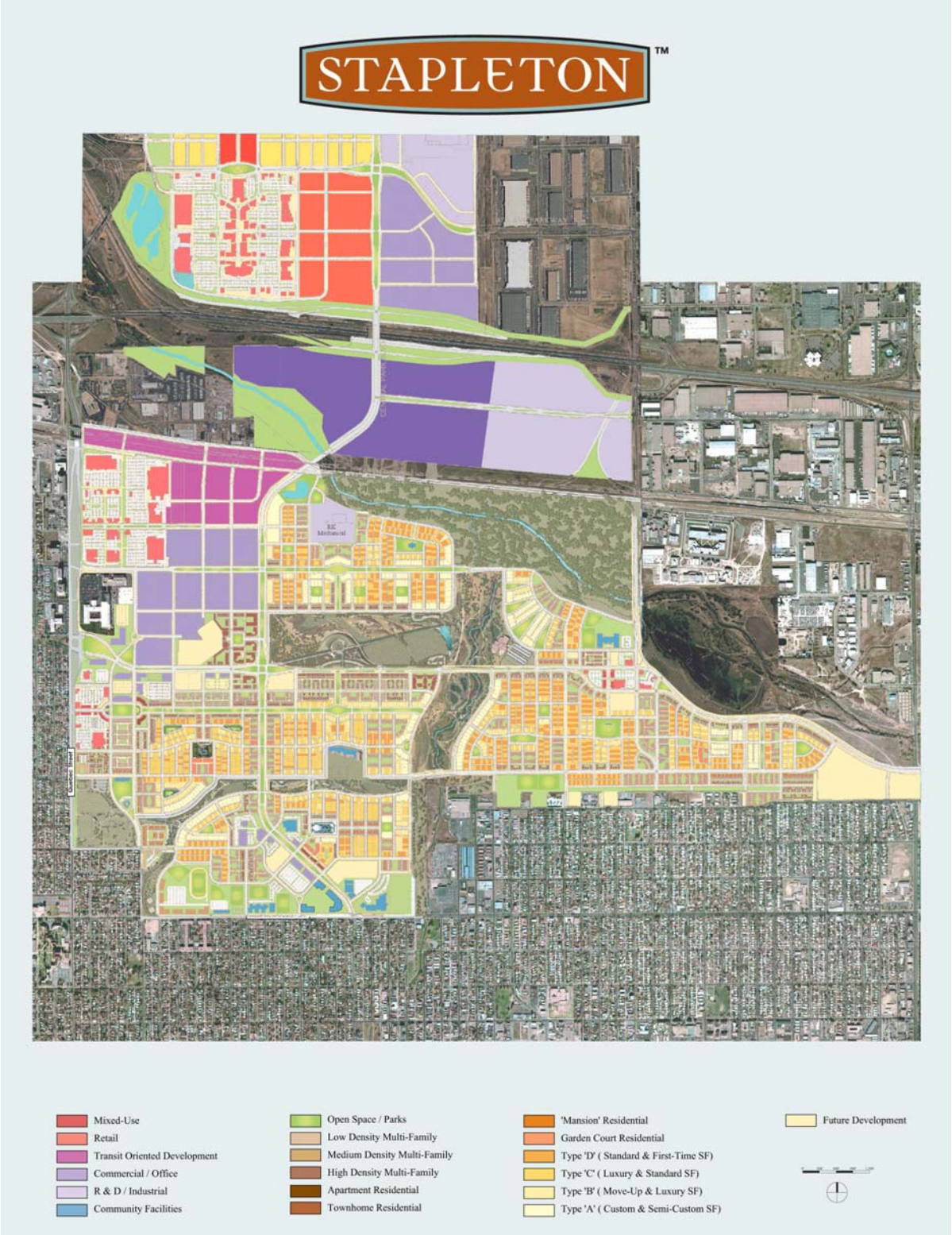
Located at the Eastern edge of Denver, approximately 10 minutes from downtown, the 4,700-acre site is one of the largest urban redevelopment projects in the nation (See Figure 5.6).

Construction on the site began in 2001. As of the summer of 2006, Stapleton's population had grown to approximately 7,000 residents. There are 12,000 homes and apartments planned for full build-out (including affordable "workforce" housing), as well as 3 million square feet of retail space, 10 million square feet of office space, six schools, and 1,100 acres of parks and open space. Ultimately, approximately 30,000 residents and 35,000 workers will be accommodated at full build out (which will take approximately 15 years for residential and 20 years for office and retail).

In 1998, Forest City Enterprises was selected as the master developer. Working with the nationally renowned planner Peter Calthorpe, a master plan was developed for the site layout (See Figure 5.8). The plan was driven by the need to create integrated, mixed use, walkable neighborhoods with easy access to both retail activity centers and open space. The site is not only internally integrated, but is also integrated into the existing urban fabric of the City of Denver. The site design was conceived as an extension of the city grid, so that many existing city streets were extended through the site and the names were retained. Moreover, the site will be serviced by the region's future light rail network.

Figure 5.7 Stapleton Residential Neighborhoods

Figure 5.8 Stapleton Site Plan (by Forest City Enterprises/Peter Calthorpe)



The City of Denver approved the plan as a Planned Unit Development and adopted the necessary zoning changes along with the design guidelines called for in the "Green Book."

(Chapter 59 of the Denver City Code). The City also entered into a partnership agreement with Forest City to help finance infrastructure costs related to the development. Over $600 million in regional and local infrastructure improvements are required; costs which will be repaid with revenues provided through tax increment financing. In order to lessen the burden on City planning staff for implementing and overseeing the design, the City made Forest City responsible for plan implementation and the design and layout of roads, utilities and public spaces, and the coordination of over twenty different custom builders (Figures 5.7 and 5.9 through 5.13 illustrate the emerging built environment).

Figure 5.9 Stapleton Residential Neighborhood

Figure 5.10 Mixed-Use in Downtown Stapleton

Figures 5.11 & 5.12 Stapleton Condos

Figure 5.13 Residential Alley

Figure 5.14 Stapleton Greenway and Trail Network

5.3.3 Belmar

While the Stapleton project has utilized traditional urban design techniques to redevelop a former airport, the Belmar project, in Lakewood, Colorado, has utilized these same techniques to redevelop a large shopping mall into a traditional Main Street downtown.

Located twenty miles southwest of Denver in the City of Lakewood (population ~141,000) Belmar occupies the site of the former Villa Italia shopping mall. When the Villa Italia Mall opened in 1966 it was said to be the largest indoor, air-conditioned shopping mall between Chicago and California. The mall began to decline in the early 1990s, which led the City of Lakewood to initiate an urban renewal program and begin planning for the redevelopment of the site (See Figure 5.15).

Figure 5.15 Belmar Site after Mall Demolition (from Google Maps)

The City had previously created a small city center cluster of civic buildings, a park, a museum and an arts complex across the street from the mall site and was looking to reinforce this initiative by creating a full-fledged town center by redeveloping the nearly defunct mall. A citizen advisory committee was appointed by Mayor Steve Burkholder to help create the redevelopment vision. The committee sent members out with cameras to take pictures of the kinds of places they enjoyed shopping. Many of the members came back with photos of traditional downtown areas such as “LoDo” in Denver and downtown Boulder. The

committee believed that building more big-box stores would not help create a true center of civic life for the City. They ultimately decided that the way to pump new life into Lakewood would be to create a vibrant downtown center based on traditional urban design principles.

In 1998, the city approached Continuum Partners (the same developer that developed Bradburn) about redeveloping the site into a traditional mixed-use downtown. In 1999 Continuum began land purchase negotiations, which involved navigating the complicated ownership structure of the mall site (the Stanton Foundation owned the underlying ground and Equitable Life Insurance owned the ground lease and buildings, and a number of tenants remained). It took Continuum several years to complete the necessary transactions to secure the site and to terminate existing leases. Several on-site tenants resisted the redevelopment plan, leading the City of Lakewood to initiate eminent domain proceedings, resulting in court proceedings that ultimately upheld the action. Continuum stayed with the project because they believed that quality design, based on traditional urban form, would prove more sustainable and more profitable in the long run than an auto-oriented strip development.

Continuum designed a plan for the 105-acre site that included a gridded 22-block traditional downtown with a mix of offices, retail shops, restaurants, loft apartments, condominiums, and public spaces (See Figure 5.16). The $850 million project is expected to take seven years to complete. The City of Lakewood utilized its urban renewal district powers to create a metropolitan district, which allowed $120 million of the infrastructure improvements to be financed through district-issued bonds that will be paid off over two decades using a public improvements fee on future retail sales. Another $40 million in infrastructure and site improvements were financed directly by Continuum. Lakewood also assisted by waiving one-half of the City's two percent sales tax within the project area and by providing a $110,000 grant. The city also helped secure a $1.9 million federal loan to remediate

Figure 5.16 Belmar Three-dimensional Site Plan

contamination caused by former dry cleaning and automotive businesses on the site. The City of Lakewood also had to rezone the entire site to conform to the development plan.

Site construction began in the fall of 2002. The first phase opened in May 2004. At full build-out the site will include over 1.1 million square feet of retail, restaurants, and entertainment venues; 800,000 square feet of office space; 1,300 residences; an event center, a central plaza, and a park. Belmar includes over 9,000 parking spaces in public parking garages, surface lots, and on-street parking.

Belmar's streets, parks, and cultural amenities are designed to encourage walking and promote community interaction by emphasizing the importance of urban public spaces (See Figures 5.17 through 5.19 below). Numerous public events are held at Belmar, including an art-based lecture series, a craft series and workshop, a year-round public art program, a Paris-style street market, a farmers market, an Italian festival, and a holiday tree-lighting event. In a few short years, Belmar, whose mantra is "Enrich your life not your lawn," has been transformed from a mall to a downtown and become the center of Lakewood's civic and cultural life.

Figure 5.17 Shopping at Belmar

Figure 5.18 Mixed Uses at Belmar

Figure 5.19 Public Plaza at Belmar

5.3.4 The Portland, Oregon Region, including the City of Portland and Orenco Station

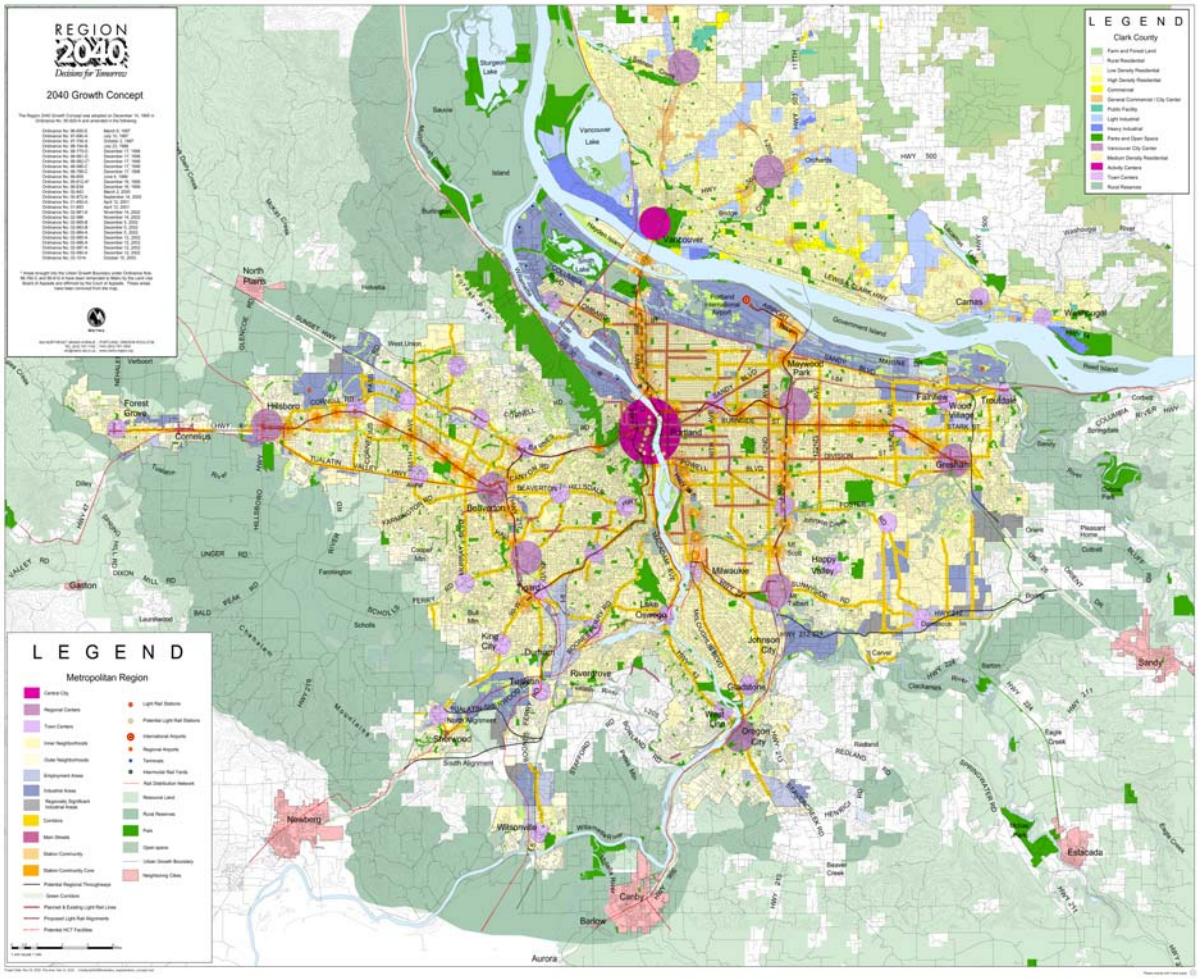
The City of Portland and the Portland region are considered by many planning experts to represent the best examples of city and regional planning in the United States. The following is an overview of state and regional planning initiatives being utilized in the Portland region, followed by a discussion of some important planning initiatives within the City of Portland, particularly within its "Pearl District," and a discussion of the Orenco Station development.

In 1973, the Oregon State Legislature adopted the nation's first statewide land-use planning laws, which required every city and county in Oregon to create a long-range plan addressing future growth and meet statewide goals. The statewide goals are primarily concerned with ensuring the wise use of land and the protection of natural resources. One of the most important aspects of Oregon's state land use law is that it requires the setting of urban growth boundaries. Urban growth boundaries mark the separation between rural and urban land. The growth boundaries are drawn so as to contain an adequate supply of land to accommodate the expected population growth during a 20-year period.

In 1978, voters within the Portland metropolitan area of Clackamas, Multnomah, and Washington Counties approved a ballot measure that established Metro, the nation's first publicly elected regional government. Among other tasks, Metro was given responsibility for coordinating the land-use plans of the region's 27 jurisdictions. Metro, as required by state law, established a regional urban growth boundary. The Metro Council is empowered to make binding policy decisions regarding development within the growth boundary. This role was strengthened in 1992 when the region's voters approved a home rule charter that directed Metro to make regional growth management its primary mission. The charter also required the adoption of a regional vision statement and the adoption of a "Regional Framework Plan," which is a comprehensive set of regional policies on land use, transportation, water quality, natural areas, and other issues of "regional significance." In 1995, Metro adopted the 2040 Growth Concept, and in 1996 Metro approved the Urban Growth Management Functional Plan.

One of the most important aspects of the 2040 Growth Concept is the promotion of "centers," which are compact mixed-use areas of high-density housing, employment, and retail that are pedestrian oriented and well served by both roads and public transit. The advantage of high-density centers is that they use less land per capita; allow easier access between homes, jobs, services and shopping; and promote walking and social interaction as well as facilitate transit use. The 2040 Growth Concept identifies a hierarchy of centers: central Portland (top priority) and numerous regional centers, town centers, station communities and main streets (See Figure 5.20). The Orenco Station site, which will be discussed shortly, is identified in the Growth Concept as a "town center."

Figure 5.20 Metro Portland 2040 Growth Concept



Another important aspect of Portland's regional planning is Metro's Regional Transportation Plan (RTP). As the Metropolitan Planning Organization for the Portland region (similar to CDTC in the Capital Region), Metro is required under federal law to plan for future regional transportation needs and expenditures. Metro's RTP is focused on the integration of land use and transportation, with the primary goal of encouraging less reliance on automobiles through the use of mass transit.

The foundation of Metro's 2040 Growth Concept, "Centers" initiative, and RTP is the MAX regional light rail system, which forms the spine that supports and connects the centers of development within the region. The MAX system, which is owned and operated by TriMet, the region's transit agency, was established in the mid 1980's when the 15-mile Eastside line opened using funds originally earmarked for new highway construction. The 18-mile Westside line, which connected downtown Portland with the city of Hillsboro (and points in between) opened in 1998. Additional spokes were added connecting the city to the airport (2001) and the Exposition Center (2004). The city of Portland has also developed a modern

streetcar system, which loops through the central city connecting Downtown, Portland State University and Northwest Portland (See Figure 5.21).

Metro's 2040 Growth Concept promotes the development of high-density, mixed-use centers, around transit stations (Transit Oriented Development) because the region has come to agree that this is the most viable way of accommodating the approximately one million new residents projected to be added to the Portland region by 2040. However, Metro has found that short-term market demand is often inadequate (from a developers point of view) to support high enough densities in most planned transit nodes outside the city center. Therefore, in order to increase the intensity of development around transit nodes, Metro has underwritten certain costs associated with higher density development – parking garages, firewalls for mixed use buildings and overall land carrying costs – using a combination of local money and federal aid (Federal Transit Administration grants and FLEX STP funds). Metro has also purchased land around transit sites and then resold it to selected developers through joint development agreements in which certain design and density requirements are satisfied.

Figure 5.21 Portland Streetcar

The most important and tangible result of the state, regional and local land use and transportation policies in the Portland region is the ongoing growth and vitality of the City of Portland, proper. The central city is the top priority for development within the Portland region. It is the most important "center" of Metro's regional centers policy. This has been a long-standing goal for development in the region, and it shows. Unlike most of the cities in the Capital District, Portland has been growing steadily, not declining. There is little visual

evidence of abandonment or vacancies. Portland is an active city with round-the-clock street life. There is a strong middle-class presence and a robust demand for housing within the full spectrum of price ranges.

The vibrancy of Portland is no accident. It is the result of long standing (since the early 1970s) state policies, regional policies, and local policies that have worked in concert to limit sprawl and promote urban growth and vitality. In addition to strong state and regional planning, regional growth boundaries, and the promotion of light rail, there has been a local focus on urban design techniques that give priority to preservation, pedestrians, public parks, public art and public places. Moreover, in order to reduce regional sprawl, Portland has sought to grow up, not out.

Figure 5.22 Pioneer Square

Purposeful planning has had a long legacy in the City of Portland. The 1972 Downtown Plan was decades ahead of its time. In an era when many cities were either bulldozing or abandoning downtown, Portland's focus was on keeping downtown the principal employment and cultural hub of the region. The 1972 Plan envisioned high-density office and retail corridors crossing in the center of downtown; it sought to create a vibrant pedestrian environment by suggesting that new buildings be built out to the sidewalks, preferably with street level retail, to reproduce a sense of enclosure and generate high levels of sidewalk activity. The plan envisioned a gradient of intensity, similar to what is now called transect zoning, with a high density core that transitions into less dense residential neighborhoods. The plan recommended the creation of several auto-free zones, including a tree-lined transit mall; new urban parks, plazas and recreational open spaces, including riverfront access (See Figure 5.22 & 5.23); two new strategically located downtown parking garages; and new downtown housing. Moreover, the plan sought to revitalize and protect existing residential neighborhoods and preserve historic structures through the creation of historic districts.

The 1972 Plan was developed locally with a great deal of public input, which helped forge public ownership and consensus, and led not only to the Plan's eventual adoption, but also to its near full implementation. A high level of civic engagement in Portland is another one of its signature characteristics. In 1974, at the time when the Downtown Plan was being created and adopted, the City government gave on-going public participation official status by

creating the Office of Neighborhood Associations (ONA). Through the creation of ONA, the relationship between citizens and City Hall (especially the City's Bureau of Planning) was both formalized and financially subsidized by providing a direct liaison between the City and the neighborhood associations, and by providing direct financial support and technical guidance. Although the City provides this support, it does not dictate issues or positions to the associations.

Portland planning was also ahead of its time in its focus on the integration of transportation and land use. Indeed, Portland was looking at the integration of land use and transportation in the early 1970's, with the goal of creating a high-density city that was both walkable and commercially viable, whereas it wasn't until the early 1990's that federal transportation policy officially recognized this relationship. Portland achieved its goal by focusing less on highway building (unlike most other regions at the time) and instead sought to develop a viable light rail/street car/bus network throughout the city and region. A signature event that illustrates Portland's unique approach was its choice to abandon the East-West Mt. Hood Freeway proposal, which had been approved by the state highway commission, and divert the funds earmarked for the highway proposal toward improving an existing highway and developing a mass transit system. In a somewhat related event, the City decided that same year to tear up the existing Harbor Drive Highway, which separated the downtown from the waterfront, and in its place to create a major waterfront greenway/park (the Tom McCall Park) that instantly became one of Portland's most cherished places (See Figure 5.23).

Figure 5.23 Governor Tom McCall Waterfront Park

5.3.4.1 Portland's Pearl District

Although successful urban planning is evident throughout the City, it is perhaps most obvious in the redevelopment of a mixed warehouse/industrial/rail district adjacent to, and north of, downtown, called the Pearl District. This area is now filled with high-density apartments and condos (3 to 15 stories), most with ground floor retail. Throughout the district there are many restaurants, art galleries, antique shops, and assorted services; all within easy walking distance, and the area is fully serviced by the MAX street trolley system. There are also several beautifully designed parks integrated into the district.

Figure 5.24 Pearl District Condos

The Pearl District first became the focus of City planning efforts in the early-1980s. As the rail and manufacturing activities prominent in this area had declined over the previous twenty-five years, the under-utilized buildings and low rents became attractive to artists, antique dealers, and other urban homesteaders looking for inexpensive space conveniently located near downtown. Older warehouses and factories also became attractive for conversion to housing – lower income, at first – and as business incubator startup space. An urban design study in the early-1980s, followed by the 1988 Central City Plan, sought to revitalize this area as a mixed-use neighborhood. Further plans followed, including the 1992 River District Vision Plan and the 1994 River District Development Plan. These planning efforts eventually led to adoption of the River District Urban Renewal Plan, developed by the Portland Development Commission (PDC), and adopted by the City Council in 1998.

Figure 5.25 Public Park and New Condo Construction in the Pearl District

An important aspect of the River District Urban Renewal Plan was that it allowed tax increment financing (TIF) to be utilized to pay for street and other infrastructure improvements, trolley lines, and parks within the district over a twenty-year period (See Figure 5.25). The "Lovejoy Ramp" that led to the Broadway Bridge and was considered a barrier to downtown connectivity was also torn down as part of the project. Tax increment financing became especially important after several statewide property tax limitation measures were passed in the 1990s. The PDC has also utilized property tax and other incentives to preserve historic buildings and to mandate construction of affordable housing.

The urban renewal district created for the River District/Pearl District covers an 85-block area of over 300 acres, which is expected to accommodate over five thousand new housing units, four new parks, urban trolley access and new commercial and retail development (See Figures 5.24 and 5.25 above).

Most of the goals for the redevelopment of the Pearl District have been met or exceeded. According to the PDC, as of 2000 there were approximated 1,300 residents and 9,000 jobs in the Pearl District. The Commission projects that full build-out will result in about 12,500 residents and 21,000 jobs. As of 2006 approximately 3,500 lofts, condos and apartments had been developed, along with numerous new office and retail establishments. Demand has been so great within this area that price increases are now making it unaffordable for many of the

early pioneering artists to remain. Rising property values have also displaced some long-standing industrial uses with high-end housing.

One of the early developments in the Pearl District that set the stage for the how the district would be developed involved a public-private partnership between the PDC and a development company called Hoyt Street Properties (HSP). In exchange for HSP's promise to build residential units at 130+ units per acre to include a substantial portion of low-income housing, the PDC agreed to make several important civic improvements: street grid extensions on developer donated land, the Lovejoy ramp realignment, financial support toward the street trolley development, and park development on developer donated land. HSP has since built over 1000 residential units, both rental and owner occupied, in the district. A number of other developers have also been actively building in partnership with the PDC.

While the early phase of residential development in the Pearl District was in three to five story structures, more recent developments have tended to be in the fifteen-story range. Moreover, the price for market rate units has increased dramatically. Nonetheless, developers utilizing PDC incentives have built nearly 25 percent of the units in the district as mandated "affordable" units.

Although the results of these planning efforts have been extremely successful by most measures, the City continues to refine its planning for the Pearl District. Another plan for the district was adopted in 2001. This plan seeks further progress toward creating a first-class urban setting based around fostering the key attributes of vibrant urbanism: high-density; a broad mix of land uses and activities; interesting, connected, walkable streets; accessible mass transit; a mix of old and new buildings; environmentally sustainable design and green buildings; and inviting, accessible parks and public spaces.

5.3.4.2 Orenco Station

Orenco Station is an approximately 200-acre Transit Oriented Development (TOD) located in City of Hillboro, 11 miles west of the City Portland, Oregon (1/2 hour by light rail). The site of Orenco Station is designated a "town center" under the Portland's 2040 regional plan. Orenco Station represents the most fully developed "new center" along the MAX line in outer Portland region.

Orenco Station was developed by PacTrust, a Portland real estate company, in partnership with homebuilder Costa Pacific Homes. A team of development experts was formed to work with City of Hillsboro officials and the public to create a vision for the site. A number of design charrettes were held. The vision for Orenco Station was informed by a desire to create both a strong sense of place and an environment conducive to pedestrian activity and public interaction. This vision was initially formulated in the mid 1990's with the knowledge that the site would soon become a node along the Westside line of the MAX network, which opened in 1998. Part of the reason Metro identified the Orenco Station site as a "town center" in the 2040 plan was to encourage development along rail stops and to achieve a better regional balance of jobs to housing. The area around Orenco is surrounded by thousands of high-tech jobs, including a large Intel "chip-fab" site a mile away.

Once the vision was agreed upon, the developers and design team worked with the City of Hillsboro planners to create new, innovative land use regulations for the site, which included standards for mixed-use buildings, narrow streets (20 feet across, with sidewalks throughout), shallow street setbacks (19 feet), accessory units ("granny flats"), live/work homes, and alley-loaded garages. The final site design was created by Fletcher Farr Ayotte and Iverson Associates.

Figure 5.26 Downtown Orenco Station

Ground was broken in 1996 for the initial Orenco Station development. The development includes a mixed-use "downtown" center, a large park and connected residential neighborhoods. In the town center, a combination of retail, offices, apartments and live/work units abut the sidewalk, with on-street parking and additional parking behind the buildings (See Figure 5.26). All told, there are 428 single-family units, 716 townhouses and live/work units (See Figure 5.27), 203 condos and 503 apartments in Orenco Station; there are also approximately 218,000 square feet of retail and 30,000 square feet of office space.

The town center of Orenco Station is roughly a quarter mile north of the MAX station. Until recently, most of the land between the development site and the train station was vacant, which limited the pedestrian experience and perhaps inhibited some transit use. More recently, however, this has begun to change as several additional residential developments have been built on this vacant land.

Figure 5.27 Combination Townhouse and Live/Work Units

The first residential project in this area, called the Club 1201 condominium complex, is an assembly of ten 21-unit buildings located directly north of the MAX station. This project has a density of approximately 17 units per acre. The design is the least "urban" of those included in Orenco Station, in as much as the units are inward-looking and the street grid is broken in several areas. Adjacent to this development is the "Q Condos" development – 78 urban-style row houses. Across the street from the Q Condos is a luxury apartment complex called Nexus, which was under construction in the summer 2006 and is expected to be completed in early 2007. This project will include 422 up-scale units on about 13 acres, creating a density of about 32 units per acre. The Nexus apartments and the Q Condos together will form an urban streetscape between the Orenco Station Town Center and the MAX station, which should strengthen both the pedestrian and mass transit elements of the overall Orenco Station project (See Figure 5.28 below).

In addition to the original Orenco Station development, and the infill housing leading from this development to the MAX station, there is an additional group of projects immediately south of the MAX station referred to as Orenco Station South. Included in Orenco Station South are 264 garden apartment units arranged in three-story structures of between 12 and 24 units (See Figure 5.29 below). Also adjacent to the garden apartments is a project called Arbor Gardens, which includes 140 three-story urban row homes on narrow lots (20 feet) with alley parking behind, and 400 single-family homes on relatively narrow lots (between 36 and 46 feet). The houses include front porches, the streets include sidewalks, and there are several parks and play areas integrated into the design.

Figure 5.28 New Construction between the MAX and Downtown Orenco

Figure 5.29 Garden Apartments at Orenco Station South

5.4 Case Studies Summary

Collectively the four case studies document a range of policy options available to decision makers at various scales. Portland clearly demonstrates that when local, regional, and state policy work in unison, the synergy of the policy outcomes can produce demonstrable positive effects. A regional strategy for infrastructure development coupled with land use planning has helped the Twin Cities region remain a dynamic, economically competitive place with a high quality of life. Denver, while having a less pronounced regional strategy than either Portland or the Twin Cities, has effectively used a mix of regional infrastructure planning in combination with design strategies to catalyze a more compact development pattern focused on creating vibrant centers. In Albuquerque, the community has embraced a change in policy orientation, moving from "growth accommodation" to "growth management." The strategy endeavors to utilize market forces in conjunction with zoning and capital infrastructure planning to direct development into areas with existing infrastructure. Each of these communities recognizes that the quality of life and their economic competitiveness is dependent on reducing the cost of infrastructure to support development, protecting natural assets and maintaining a high quality of life for their residents. Furthermore, in the case of the Twin Cities, there is evidence that not only does the regional infrastructure reduce costs, but the region's residents and elected officials give the Metropolitan Council credit for its success and high approval ratings.

Conclusion and Policy Options

The experiences of other regions as well as this analysis of the fiscal impacts of growth in the Capital District indicate that compact development patterns result in lower cost to provide the critical infrastructure necessary to support it. Compact settlement patterns have additional benefits beyond the fiscal savings including: 1. increased opportunities for alternative modes of transportation; 2. reduced congestion and travel time; 3. enhanced quality of life; 4. economic competitiveness; 5. preservation of open space and other scarce natural resources; 6. pollution reduction; and 7. a healthier living environment for residents. To achieve these benefits requires an examination of how past and present policies encourage sprawl through the provision of services and what alternative policy strategies should be pursued to encourage a more compact development pattern.

The analysis of the fiscal impact study demonstrates that unless the Capital Region does a better job in managing growth, the fiscal impacts will increase the already high tax burden on businesses and homeowners, in particular in existing urban areas. We estimate that if the region continues its slow growth, the cost to provide potable water, wastewater collection and treatment, primary and secondary education, and fire/EMS services over the next 25 years will be slightly higher for the Status Quo Trend versus the Concentrated development pattern. However, the cost will vary by county. For example, continued low density development in Saratoga County will cost an additional $405 million relative to a more compact form. This is partially offset by Albany County, which would receive nearly 40% of the 72,700 new residents under the Concentrated development pattern, driving up the cost of public infrastructure by $87.3 million more than under the Status-Quo Trend scenario where Albany would receive a 23% share of the population increase. If the region experiences high growth due to enhanced economic development initiatives or other stimuli, the additional cost to the region, not taking into account transportation investments, will be approximately $1 billion under the current distribution trend relative to a more compact growth scenario.

Even if the region does not grow, the public infrastructure system preservation costs are staggering. Costs will continue to increase, with an even smaller economic base and an older, less wealthy population responsible to pay for the improvements. Without an expanding economic base to cover these costs, the region's economic competitiveness will deteriorate. Consequences of economic stagnation are evident in other upstate cities such as Utica, Binghamton, and Buffalo.

Our cost estimates understate the true cost of more dispersed development, because they do not incorporate some of the negative externalities of growth. In the transportation arena, for example, the externalities include increased congestion, lost opportunities for alternative transportation options as well increase vehicle miles traveled. Increased vehicle miles traveled also increase energy consumption, air pollution, roadway runoff that fouls the water supplies, and leads to more rapid roadway deterioration.

Nationally, some communities have successfully assuaged many of the negative externalities of growth through innovative policy at the local, regional and state level. The Twin Cities,

Portland and to a lesser degree Denver, all illuminate how these three levels of policy can complement each other. In all three cases, local governments were proactive in advancing design standards which emphasized vibrant centers at transportation nodes, with importance placed upon light rail and dedicated rapid transit bus routes to encourage higher density and alternative modes to the automobile. Albuquerque is currently endeavoring to follow in the wake of these pioneering communities, having selected a set of policies which have emerged though a dialogue reflecting regional values and legal constraints. Though taking a different approach, Albuquerque also endeavors to focus development on historic cores and corridors with mixed uses at higher densities.

The cases of the Twin Cities and Albuquerque as well as Portland (though not presented in this report),[1] illustrate that to achieve a regional consensus requires a significant catalyst or driver for change, bold political leadership at all levels, and a broad coalition of constituent support that transcends traditional political boundaries. In the Twin Cities, the environmental threats to a cherished regional resource initiated the dialogue that united environmentalists, business groups, and political leaders from urban, suburban, and rural communities. Albuquerque's rampant unrestrained development was eroding its natural resources and tore at the community's historic fabric resulting in widespread resident dissatisfaction. Led by new political leadership, the end result is a Planned Growth Strategy to guide the region's future development. The EPA's labeling of Portland as the city with the worst air quality in 1970, coupled with the threatened loss of billions of dollars in federal highway funds and new political leadership stimulated its regional strategy. In all three cases, broad support across many different constituencies was critical to their success. Business leaders, environmental coalitions, ordinary citizens, as well as faith based organizations and other not-for-profit entities rallied around the promise of a new direction, with the belief that regional cooperation could assuage the negative impacts of growth. Each of these cases had varying degrees of support from State government in their efforts to meet their challenges. In both Oregon and Minnesota, State government played a pivotal role in establishing their regional strategy.

The primary objective of this study is to provide the basis for a constructive regional and community dialogue about policy options that may be worth pursuing to manage the direction of future growth in the Capital Region. The policy options outlined below are categorized at the Regional, State, and Local level representing the three levels of complimentary policy makers that can advance an agenda of change to improve the fiscal, environmental, and social climate of the Capital Region. Before articulating the Region's Policy Options, the principles of Smart Growth, endorsed and part of *New Visions* report for the region, are presented as reference points for the discussion that follows.

6.1 Components of Smart Growth

The evidence from multiple studies across the U.S. and from the analysis of the Capital Region indicates that more compact development incorporating the principles of Smart Growth reduces the fiscal impacts of providing the critical infrastructure to support development. Many of these principles are critical elements of the policy recommendations in the *New Visions* report for our region. One of the key enabling factors to achieve Smart

[1] See Bianco 2001 for more details of the catalyst to Portland regional strategy.

Growth is inter-community cooperation, which has been strongly endorsed by Governor Spitzer in his inaugural speech and in other forums. Research on Smart Growth indicates that the following planning principles result in lower fiscal impacts, improved quality of life, and healthier life styles while mitigating the impacts of land development. Based on the experience of communities around the nation that have used smart growth approaches to create and maintain great neighborhoods, the Smart Growth Network and others have developed a set of ten basic principles:

1. Mix land uses
2. Take advantage of compact building design
3. Create a range of housing opportunities and choices
4. Create walkable neighborhoods
5. Foster distinctive, attractive communities with a strong sense of place
6. Preserve open space, farmland, natural beauty, and critical environmental areas
7. Strengthen and direct development towards existing communities
8. Provide a variety of transportation choices
9. Make development decisions predictable, fair, and cost effective
10. Encourage community and stakeholder collaboration in development decisions.

6.2 Regional Level Policy Options

Regional planning in the U.S. is often undervalued and not readily visible to many citizens. While many Americans may identify the Tennessee Valley Authority as a regional planning agency, the work of Metropolitan Planning Organizations such as the CDTC, watershed commissions, Local Council of Governments, etc. rarely receive the attention and accolades they deserve. This is particularly apparent in Home Rule states such as New York where most land use decisions are made at the local government level. Though yielding no regulatory power, regional councils provide important data and serve as a critical resource in the overview of issues that transcend municipal boundaries. In the Capital Region, CDRPC is recognized as serving an important role as a technical resource, providing and sharing information and promoting intergovernmental cooperation and collaboration on regional initiatives.

Without a regional perspective and planning, the ability to coordinate development in a manner that reaps the greatest rewards while assuaging the negative externalities is significantly diminished. To foster the development of a more economically competitive region with an enhanced quality of life, regional planning and cooperation need to be strengthened. We recommend the following regional level policies for further discussion among the many stakeholders in the region:

- CEG, in conjunction with the Chambers of Commerce, should continue to aggressively promote a regional strategy within the business community.

- CDTC should continue its efforts to implement the *New Visions* plan that encourages more compact development, transit friendly corridors, and urban revitalization through its infrastructure investments in conjunction with land use planning. Managing mobility is a major theme of the *New Visions Plan*. Major new highway

construction is not consistent with the *New Visions Plan*, and would not be consistent with urban reinvestment and regional and community quality of life.

- CDTC should pursue the big ticket initiatives described in this report, and elicit the level of public support for these initiatives. These initiatives would encourage more concentrated and sustainable regional economic growth, dramatically improve the quality of transportation in the Capital District, and increase the attractiveness of the region. Securing funding for these initiatives is a significant hurdle that will need to be explored.

- Regional stakeholders must strengthen their partnerships and reach out to other constituents to broaden the coalition that supports a more rationalized approach to the delivery of critical public infrastructure.

- There is a need for the emergence of political and business leadership to champion for regional solutions to address issues of regional interest and concern.

- The region should build upon initial regional efforts such as the Schenectady Intermunicipal Watershed Rules and Regulations Board, Juvenile Secure Detention Center, and the Combined Sewer overflow study and identify other opportunities to coordinate certain critical infrastructure and service delivery functions.

- Expanding upon CDTC's *New Visions 2030* efforts, a broad range of stakeholders representing the public, private and non-profit sectors and the media should be engaged to identify a Regional Vision including defining and advocating the adoption of policies and strategies to achieve the objectives of the Vision.

6.3 State Level Policy Options

A few State governments have been instrumental in helping communities capture the benefits of growth while assuaging many of the negative externalities associated with increased development. The actions of these pioneering States have used a variety of tools to foster increased regional coordination, encouraging communities to collaborate through the use of incentives as well as disincentives. They have also used regulations and infrastructure funding mechanisms to achieve their policy objectives.

- New York should adopt a statewide Smart Growth strategy that designates different levels of desired development based on factors such as the historic development patterns of the community, fiscal constraints, availability of infrastructure, and environmental factors. Centers and corridors most appropriate to accommodate development should be identified along with a clear, comprehensive set of principles and guidelines to achieve the stated objectives in line with smart growth principles.

- There should be enhanced collaboration and communication among the various State Departments to assure consistency with the policy initiatives pursued by each Department.

- The State should target its infrastructure investment and economic development assistance programs to advance the goals of a State Smart Growth strategy with funding priority given to projects and programs that incorporate the Smart Growth principles.

- New urban policy initiatives should be advanced that build upon a community's assets taking into account the demographic trends favoring existing urban centers.

- The NYS Department of State should increase planning related training for local communities, incorporating curriculum that helps to promote the goals of a State Smart Growth strategy and its implementation.

- The State should make grants available to county and regional organizations to undertake regional visioning and coordination initiatives in order to engage a broad range of stakeholders to create regional smart growth strategies.

- The State should create a planning grant program that helps fund the preparation of smart growth comprehensive plans and implementation strategies such as Transfer of Development Rights programs and form based zoning codes.

- The Shared Municipal Services grant program should be expanded to include opportunities to investigate the consolidation of services and the elimination of taxing districts, including rewarding government entities that consolidate service delivery functions.

- Powerful incentives should be provided to communities to adopt plans and implementation strategies consistent with a compact, mixed-use, pedestrian-oriented design.

- Tax incentives such as the Historic Rehabilitation Tax Credit program should be expanded to include additional areas and properties eligible for participation in the program.

- The State should streamline its brownfield programs and expand funding for the Brownfields Opportunity Areas component as well as clean-up assistance for non-responsible parties. Priority should be given to projects that complement the Smart Growth Strategy.

6.4 Local Level Policy Options

In a home rule planning environment, local level policy-makers are empowered to determine the development pattern within their jurisdiction. This enables local communities to play a significant role in shaping the future development of the region. Their bold leadership is necessary to achieve the benefits of a more compact development pattern. Policies that local communities can take to complement state and regional policies include:

- Municipalities in the Capital Region should be encouraged to develop comprehensive plans that deal with the growth inducing impacts of infrastructure investments in order to present a local vision for how the community would like to develop.

- In order to preserve rural character and working landscapes, local governments in rural and suburban towns should identify hamlet and village locations to target future town growth.

- Existing land use regulations should be evaluated to determine if they accommodate compact, connected, mixed-use, pedestrian-oriented design.

- Communities should continue to be encouraged to participate in the CDTC Linkage Program and other financial incentive programs available from public and foundation sources for the development of plans and implementation strategies encouraging smart growth.

- Potable water providers should coordinate with planning entities to more effectively link density requirements and system expansion. Decisions on system expansion should prioritize projects that support a State Smart Growth Strategy.

- Similarly, wastewater providers should coordinate system capital planning with land use, prioritizing system expansion and upgrades to complement compact, mixed-use, pedestrian-oriented design.

- Local communities should purchase, or work with property owners of selected strategic parcels, with the intent to solicit design competitions for their development in line with locally adopted design guidelines and strategies.

- Local planning boards should increase the consideration of regional impacts of local development decisions during their review process.

- Local school districts should seek to locate new facilities in locations that can minimize the dependence on bussing as the means to transport students, and explore opportunities to coordinate services across districts where appropriate.

- Local school districts should work with the local planning board to coordinate growth in the district with the school districts' capital planning efforts.

- Taxing entities should investigate opportunities to consolidate service areas and operations to achieve cost reductions through economies of scale.

- Local communities should focus more of their efforts on utilizing DEC Brownfield Opportunities Area Planning grants and other incentives for redeveloping brownfields.

6.5 Conclusion

The Capital Region currently exhibits many of the potential stimuli that could initiate a new development paradigm. The *New Visions* process has been instrumental in fostering the beginnings of a regional discussion regarding a shared vision for the Capital Region. Recent announcements and initiatives such as the location of a chip plant at the Luther Forest Technology Park and International Sematech to the Albany NanoTech research complex at UAlbany suggest the opportunity for more rapid growth further stimulating the need for dialogue.

Many in the business community have expressed the need for more regional cooperation to nurture the emerging new industries in nano-scale technology, renewable energy and other high tech sectors. The business community recognizes the need for a more rational approach to enhance the region's competitiveness for attracting both firms and workforce talent. The Center for Economic Growth, a regional economic and business development organization, dedicated to developing and promoting efforts to attract high-tech talent and companies to the Capital Region, has been in the forefront to facilitate a regional dialogue to better manage growth in a regional context, including providing financial and technical support to undertake this study. There are a number of other quasi-public and non-for-profit entities that have provided a forum for this discussion and are fostering support for more regional cooperation including the Business and Higher Education Round Table, the Environmental Clearinghouse of Schenectady, ARISE, The Capital Region Local Government Council, Tech Valley Chamber Coalition, and the Albany Round Table, to name a few.

The successful regional collaboration leading to the construction of the Capital District Secure Juvenile Detention Center along with the combined sewer overflow study, being prepared as a joint initiative among the Albany Pool communities, reinforces the desire to support "regional" solutions to common problems. Given the potential for a more concentrated development pattern and the opportunity for regional solutions to reduce the cost to provide public infrastructure, there is the potential to reduce the tax burden often cited as a cause of slow growth in Upstate New York.

At the local level, some communities have endeavored to use their power of zoning to create new centers in existing suburbs or restrict undesirable development. A number of communities are questioning the wisdom of unrestrained development that does not fit the character of their communities, erodes the remaining open spaces or otherwise infringes on the vision their residents have for the future. Several suburban communities have recently revamped their master plans to protect their remaining open space, promote mixed use centers as well as to encourage more compact development. There are several development proposals currently under review that incorporate the elements of a mixed use neo-traditional design. The existing urban centers are also beginning to attract investor interest. While Saratoga Springs has experienced significant revitalization during the last ten years, Schenectady, Albany, and Troy have also witnessed recent investor interest to build in-fill mixed use developments on vacant or underutilized parcels or convert existing nonresidential (primarily vacant) uses to residential. The City of Cohoes has also attracted investor interest with the recent conversion of one of its long abandoned mills into residential condominiums.

At the regional scale, the Capital District Transportation Committee and the Capital District Regional Planning Commission's efforts on a number of projects, including but not limited to the *New Visions* reports, *Alternative Development Report*, combined sewer overflow dialogue, and the nationally recognized Linkage Program have fostered greater regional cooperation among the region's local governments and improved coordination of planning activities. The creation of the Hudson Valley Greenway and Erie Canal Heritage Area are two more institutional developments that can expand the coalition and deepen the community's regional dialogue. The recent efforts of the Center for Economic Growth, including financial support for the preparation of this study, suggest increased buy in from the business community for a more regional strategy to coordinate development in the Capital District. The collaborative efforts of these organizations are manifested in this report which endeavors to estimate the fiscal impacts of alternative development patterns in the region and extend the regional dialogue.

From the state level perspective, the stated agendas of both the Legislature and Governor's office include a focus on upstate development and urban redevelopment. Governor Spitzer's inaugural speech and discussions by his transition team advocating the promotion and establishment of a smart growth focus toward development in New York State parallel and strengthen the policy options identified in this report. The Legislature's support of urban initiatives including Brownfield legislation also reinforces a more concentrated development scenario. Furthermore, there is a recognition of the challenges faced by the fragmented service delivery system in New York and the need to seek out and implement best practices to coordinate and consolidate efforts to achieve cost savings.

The Capital District is presented with an extraordinary opportunity to reshape its future. The region has a multitude of assets along with a combination of favorable circumstances to embrace change. What is needed is bold local leadership to take the innovative steps that are critical to forging a new future. By promoting regional solutions to common problems and encouraging more compact development, our communities could reap fiscal rewards and the spillover benefits that will enhance our quality of life as well as ensure a more economically sustainable future.

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