Southern Nevada Regional Economic Study

Southern Nevada Regional Planning Coalition

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ACKNOWLEDGEMENTS

The authors of this study would like to express their appreciation for the considerable assistance received from SNRPC member organizations. Special thanks are due the municipal and county directors of business development [Scott Adams, Lesa Coder, Bob Cooper, and Michael Majewski] for their critical input over the course of this research. The demographers and planners of SNRPC members were an invaluable source of data and review of our demographic research. Finally, we wish to acknowledge helpful feedback from the SNRPC Technical Committee and its members, as well as individuals throughout the SNRPC for feedback on draft documents.

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INTRODUCTION

Across the country, cities and states are abandoning economic development policies focused on individual industries. It is now widely recognized that business success depends on the competitiveness of its key suppliers, service providers, sources of capital equipment, and even direct competitors. Best practice economic development aims to nurture clusters of linked industries and to exploit synergies between clusters and related institutions (higher education, non-profit research and development and labs, and business development agencies).

Current forecasts of growth in Nevada [and Southern Nevada] suggest employment patterns dominated by our current [world-class] hospitality, recreation and entertainment cluster. Historically, Southern Nevada has seen significant growth in this cluster and most forecasts suggest that it will remain a dominant cluster.

As barriers to business location fall, it is clear that Southern Nevada has an opportunity to both develop and attract a more diverse set of clusters. Central to long term prosperity and economic diversification is the development of leading industry clusters that seek competitive advantage through continued innovation, highly skilled and productive workers, and the utilization of advanced infrastructure and technology.

The purpose of this study is to inform the design and implementation of cluster-based economic development strategies for Southern Nevada which can both diversify the economy and positively impact the growth trajectory.

The study uses a new and systematic value-chain cluster methodology to identify major target clusters in Southern Nevada. The three most salient points of this approach are:

- Such an approach reveals differences in clustering based on commodity use and production patterns and, most importantly, *jointly evaluates* industry linkages.
- It uses evidence of *indirect* linkages (e.g. relationships between sectors based on links between second and third tier buyers and suppliers) which is noticeably absent from other approaches.
- It permits the assessment of linkages between pairs of industries based on their total patterns of sales and purchases across multiple industries.

An overview of the value-chain cluster approach is shown the figure below.

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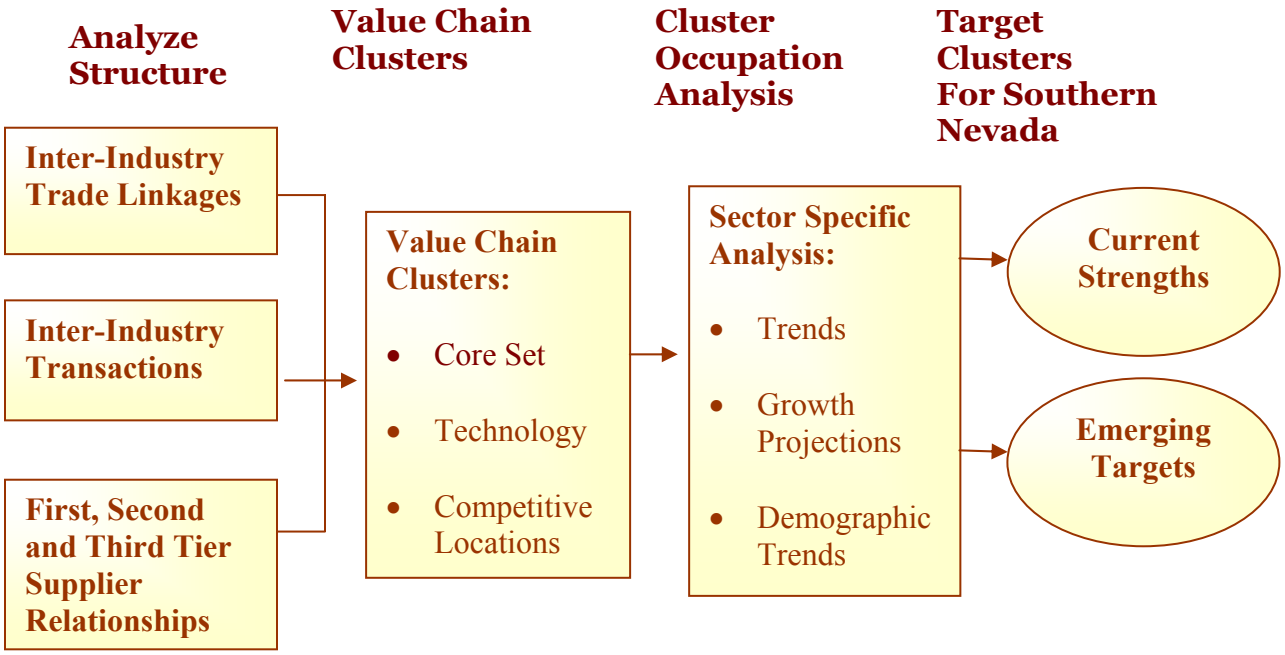
Value Chain Cluster Approach



In addition, the study both reviews related issues and provides a detailed working set of ancillary materials for local planners and development professionals to utilize in future work. These materials cover demographics, detailed industry and cluster trends, highly detailed occupation information, and information on land availability.

Demographics

Our demographic analysis suggests that Nevada will continue to experience strong population growth. To summarize, the underlying demographic assumptions in our research suggest future population estimates consistent with regional and national population growth to 2030 as follows:

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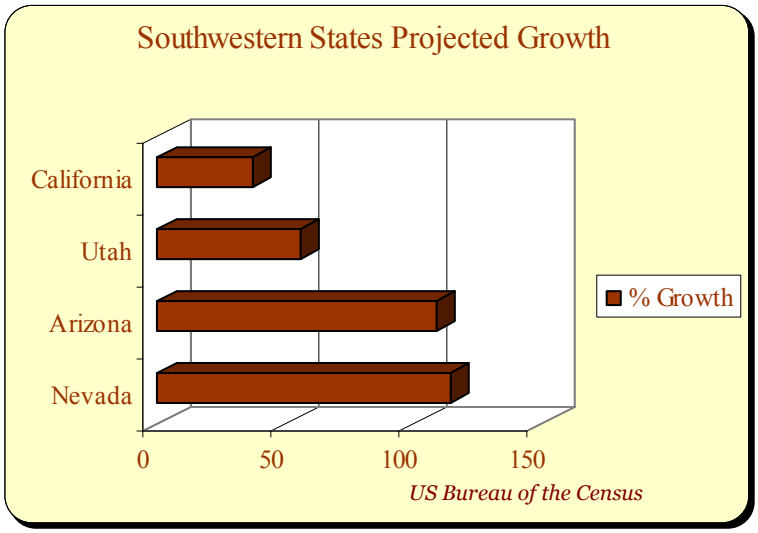
Table ES-1
Southwestern Growth to 2030

State	Percent Growth
Nevada	114.3
Arizona	108.8
Utah	56.1
California	37.1
United States	29.2

Source: US Bureau of the Census



It is important to note that the significant population growth forecast for Southern Nevada has three critical interactions with future service provision and principles of business location.

Specifically, the demographic trends for Nevada (and our region) have several important implications for business recruitment:

- Nevada's doubling of population will result in a "law of large numbers" where local location will be desirable compared to shipping to Nevada from elsewhere [such as with a bottling plant]. This reflects the economies of scale inherent in prepared food and beverage manufacturing.

- The growth of Nevada's senior population needs to be recognized as it relates to growth in the provision of hospital and health relates services.

- It is important to note that firms committed to serving the Southwest [Southern California, Nevada, Arizona, and Utah] will increasingly have transportation incentives to locate in Southern Nevada. This is due to the role of Southern Nevada as a "transportation network focus" given road networks, differential population growth noted above, and accepted transportation modeling as used by location consultants. As Southern Nevada's population grows relative to its neighbors, there is an explicit economic incentive for business location in Southern Nevada for servicing the multi-state area.

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Target Clusters

Our analysis identifies a set of target industry clusters for Southern Nevada that build upon existing strengths and suggests new opportunities and emerging technologies. In a restructuring economy such as Southern Nevada–one in which traditional industries remain dominant and knowledge-intensive sectors dependent on strong local linkages are only beginning to attain critical mass, a value-chain cluster analysis can contribute insights the typical approach cannot.

While the usual analytical approach focuses mainly on what a region *does have* at the current time, the value-chain cluster approach identifies what is emerging and what an economy *could have*, perhaps with properly focused technology policy. It is well-known that hospitality, entertainment and recreation form a key cluster in Southern Nevada. The more important question is whether higher technology and higher wage industry segments can be developed within this cluster.

First, our research reconfirms the basic attractiveness of Southern Nevada for current industry targets as:

- Administrative and Back Office Services
- Distribution Centers
- Furniture Mart Supplier and Related Services
- [Potential] Public Higher Education Research Park Expansion

Second, our population forecasts, demographic changes and spatial networking both reinforce and suggest inclusion of:

- Education Services [Public and Private]
- Hospital and Health Related
- Research and Development
- Regional Offices
- Senior Services

Finally, we identify industry targets in a detailed manner for several target clusters. It is quite important to note that these clusters often comprise complimentary linkages and direct linkages. These target clusters are:

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- Hospital and Health Related Cluster: Service Provision and Manufacturing

  Includes: Medical Niche to include wellness centers for targeted populations [women, seniors] as well as specialty clinics

- Regional Offices Cluster: Southwestern and Other Headquarter Functions

  Includes: Specialized sub-sector of financial services

- Homeland Security Cluster: Complementary Services and Manufacturing

  Direct synergies with *Regional Offices* cluster and *Information and Communications Technology* cluster

- Research and Development Cluster: Synergistic and Complementary to Other Target Clusters

- Education and Training Institutions Cluster

- Information and Communications Technology Cluster

  Includes tantalizing possibility to bundle new technologies within ICT to create a technological [virtual] meeting sub-cluster

- Life Sciences Cluster

- Selected Sustainability Technologies: Future Cluster Potential

Development Factors and Recommendations

Based upon the target clusters, we present information on three factors impacting economic development and targeted cluster success. These three factors are key occupations required to support targeted cluster development, the controversial issue of land availability in Southern Nevada, and an emerging issue among firms requesting information on Southern Nevada, namely workforce housing.

It is important to address any limitations implied by these factors in order to both fully attain current SNRPC employment forecasts and to realize full potential of targeted cluster development.

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Occupational Requirements

First, successful economic development efforts and recruitment often stress the importance of high quality educational resources and workforce. Thus, we provide information on the necessary occupational requirements of potential target clusters. Specifically, we identify key occupations within each cluster.

Recommendation*:* Education and economic development are not independent topics but are integrated. Vocational education reform and general education restructuring are an integrated element of the SNRPC goals for targeted cluster development. Future planning in these areas needs to be done within an integrated framework.

Land Availability: Industrial

Second, we discuss the controversial issue of "adequate" land for future development. In our view, there is much less disagreement among the various analyses than popularly believed. This is due to the simple dichotomy, or alternative perspectives, of viewing land in terms of its physical availability as contrasted to viewing land as an economic and business concept.

From the first perspective of availability, subject to physical constraints that may inhibit development, is there enough total acreage available to support development? From the second perspective of land as a business and economic concept, are there minimum size acreage constraints, deed restrictions or the lack thereof, possibilities for land speculation, infrastructure issues, and price points relative to possible competitive locations to Southern Nevada that make land scarce?

***Recommendation*:** The total amount of available land for development in Southern Nevada is significant. However, constraints such as minimum size requirements, speculative behavior, and the competitive price position of other potential locations limits the total available land for targeted cluster development and general industrial use. Therefore, serious discussion should take place for a designated set aside for industrial usage throughout Southern Nevada of a potential 5,000 acres.

If such a proposal for additional industrial land is to be considered, such land should have either some type of deed restriction or minimum parcel size sales [25 acres-100 acres] to minimize general speculation, individual gaming behavior to purchase small critical parcels within larger acreage, etc. SNRPC would have to consider the specific spatial locations of any such industrial zones and associated governance.

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Workforce Housing: Emerging Issue

Finally, we address what appears to be an emerging issue among firms requesting information about Southern Nevada, the cost of workforce housing. For the issue of economic development and targeted clusters, the problem occurs with respect to potential firms transferring from other areas to Southern Nevada and the potential impact of housing prices on new technological startups. With relocating firms considering more locations than only Southern Nevada, the relative price of housing does matter.

Recommendation: The issue of workforce housing has increasingly become a focused community issue, particularly in light of recent SNRPC research. Workforce housing needs to be reexamined with respect to innovative architectural designs, etc. designed to provide future workforce housing at specific price points. Such a renewed focus will allow the maximum potential of targeted cluster development to be realized.

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I. INTRODUCTION

Across the country, cities and states are abandoning economic development policies focused on individual industries. It is now widely recognized that business success depends on the competitiveness of its key suppliers, service providers, sources of capital equipment, and even direct competitors. Best practice economic development aims to nurture clusters of linked industries and to exploit synergies between clusters and related institutions (higher education, non-profit research and development and labs, and business development agencies).

Industry clusters are groups of businesses and industries that are related through their presence in a common product chain, dependence on similar labor skills, or utilization of similar or complementary technologies. Whereas an *industry* is a group of businesses that produce a similar product, a *cluster* includes final market producers, suppliers, related producer services, and other enterprises linked through formal and informal channels. A well-known regional example is information and software in Silicon Valley.

Current forecasts of growth in Nevada [and Southern Nevada] suggest employment patterns dominated by our current [world-class] hospitality, recreation, and entertainment cluster. This is seen below in Nevada occupations forecasted to have the highest future growth. Historically, Southern Nevada has seen significant growth in this cluster and most forecasts suggest that it will remain a dominant cluster.

Table 1
Employment Change by Occupation to 2012: Nevada Forecasts

Title	2002 Employment	2012 Employment	% Change 2002-2012	Average Annual Openings
Total, All Occupations	1,174,840	1,654,460	41	77,680
Cashiers	35,760	50,760	42	3,240
Retail Salespersons	34,060	49,430	45	2,780
Waiters and Waitresses	33,510	47,570	42	3,130
Janitors and Cleaners, (Excluding Maids and Housekeeping Cleaner)	26,650	37,430	40	1,580
Gaming Dealers	22,650	35,170	55	1,970

Source: Nevada Employment Projections; Long Term Forecasts; U. S. Bureau of Labor Statistics, U.S. Department of Labor, Nevada Employment Security.

However, as barriers to business location fall, it is clear that Southern Nevada has an opportunity to both develop and attract a more diverse set of clusters. Central to the

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long term prosperity and economic diversification is the development of leading industry clusters that seek competitive advantage through continued innovation, highly skilled and productive workers, and the utilization of advanced infrastructure and technology.

The purpose of this study is to inform the design and implementation of cluster-based economic development strategies for Southern Nevada which can both diversify the economy and impact the growth trajectory depicted in Table 1.

The study uses a new and systematic methodology to identify major target clusters in Southern Nevada.

In addition, the study provides a detailed working set of ancillary materials for local planners and development professionals to utilize in future work. These materials cover demographics, detailed industry and cluster trends, highly detailed occupation information, and information on land availability.

Implicit in our approach is the concept, endorsed by a growing body of empirical research, that a strong base of science and technology is a necessary foundation for sustained diversity. The view rests on three major arguments. First is the notion that with increasingly open national and international markets, local areas must seek competitive advantage in America's knowledge infrastructure, including its private and public R&D institutions, educated workforce, tradition of risk-taking and entrepreneurship, advanced physical infrastructure, and stable and transparent social and political institutions.

The second argument for a close link between technology and regional economic performance is based on studies of recent sector growth trends. For example, a series of studies have documented higher growth in high- tech and related employment compared to employment in the rest of the economy over the last decade. In this regard, Southern Nevada has been atypical due to significant growth in its hospitality, recreation, and entertainment cluster. Certainly not all industries cited by various studies as "technology-intensive" are posting significant employment or output gains. Indeed, some tech sectors faced significant declines during the 1990s. But even with uncertainty over the recent recession as well as how best to define the technology sector most studies show gains in technology-related employment have been strong relative to other industries over the last decade.

The third argument for technology as a key to regional economic development is that technology-related activity must necessarily cluster in specific regions because knowledge spillovers are *localized*. Innovations initially occur in companies, universities, and laboratories located in specific places. The subsequent spread (or diffusion) of such innovations, as well as the spillovers they generate, may occur more readily among economic actors located in close proximity, either because the innovation is tacit in nature or because its successful utilization requires an element of hands-on

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learning-by-doing. Technology businesses locate near other high tech companies and R&D performers in order to share in the spillovers, further enhancing the attractiveness of the growing cluster for still more high tech enterprises. The cluster expands through a process of cumulative advance.

This report is organized as follows. In Section II, a summary of demographic forecasts for Southern Nevada are presented. Demographic growth forms the fundamental element of future growth. Target clusters are presented in Section III. Also included in this section is an overview of the cluster methodology. Section IV discussed labor force forecasts and occupational projections of key occupations required to support target clusters. Land issues are addressed in Section V. The emerging constraint of workforce housing is discussed in Section VI. The final section, Section VII, presents policy recommendations.

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II. DEMOGRAPHICS: FUNDAMENTALS OF GROWTH

The purpose of this section is to summarize the basic demographic outlook utilized in our value-chain cluster methodology. At a highly detailed small area basis (Census tracts and blocks) we have developed a small area population forecasting model for Southern Nevada and associated small area population forecasts.

Our modeling approach explicitly recognizes that much of the traditional (and detailed) population data, for example, is associated with Census data that is five years old. This point is particularly critical for the Western Region and Nevada, with significant growth and socioeconomic change.

Our detailed set of population projections is part of Appendix B: Model Elements and Data: A Working Guide. We have developed two scenarios, a high growth forecast and lower growth forecast.

In order to provide a basis for interpretation of the target clusters in Section III, this section provides both a summary of population projections and the implications of Southern Nevada's population growth.

Population Trend: Summary

Our demographic analysis suggests that Nevada will continue to experience strong population growth. Specifically, several points to note are:

- Nevada is forecasted to remain the fastest growing Western state in (percentage) population growth to 2030 [114%].
- Neighboring states as Arizona and Utah will also grow significantly, particularly Arizona [Arizona at 109% with Utah at 56% both compared to a US average rate of population growth of 29%].
- California will grow above the US rate but less than Nevada's other neighbors [37%]. However, the large population base of California implies the largest overall change in the total number of persons.

To summarize, the underlying demographic assumptions in our research suggest future population estimates consistent with regional and national population growth to 2030 as follows:

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Table 2
Southwestern Growth

State	% Growth
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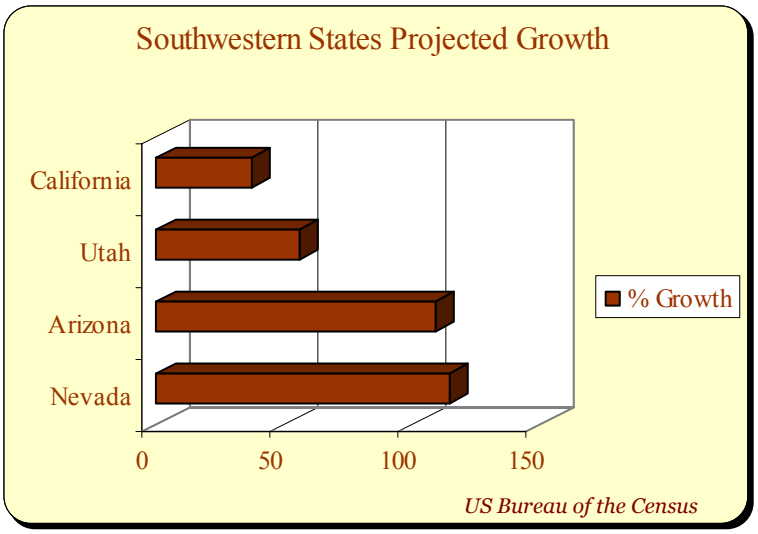
California	37.1
United States	29.2

Source: US Bureau of the Census

Figure 1



Implications

It is important to note that the significant population growth forecast for Southern Nevada has three critical interactions with future service provision and principles of business location.

Specifically, the demographic trends for Nevada (and our region) have several important implications for business recruitment:

- Nevada's doubling of population will result in a "law of large numbers" where local location will be desirable compared to shipping to Nevada from elsewhere [such as with a bottling plant]. This reflects the economies of scale inherent in prepared food and beverage manufacturing.

- The growth of Nevada's senior population needs to be recognized as it relates to growth in the provision of hospital and health relates services.

- It is important to note that firms committed to serving the Southwest [Southern California, Nevada, Arizona, and Utah] will increasingly have transportation incentives to locate in Southern Nevada. This is due to the role of Southern Nevada as a conceptual "transportation network focus" given road networks, differential population growth noted above, and accepted transportation modeling as used by location consultants.[1] As Southern Nevada's population grows relative to its neighbors, there is an explicit economic incentive for business location in Southern Nevada for servicing the multi-state area.

[1] TRI has used these modeling concepts for major supermarket chain location, Research Triangle Park [NC], City of Los Angeles, etc.

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III. TARGET CLUSTERS

The principal objective of the study is to identify major clusters for targeted future development in Southern Nevada. We investigate this question with a new methodological approach to identify both general value-chain clusters and those value-chain clusters comprised of high tech sectors.

A detailed discussion of our methodology is contained in Appendix A: Cluster Methodology: An Exposition. A summary of our approach is presented below followed by a presentation of cluster targets.

Value-Chain Clusters for Targeted Development: A Summary of Approach

The most common approach to industry cluster analysis involves two steps. First, measures of size, concentration, and growth are used to identify large and/or high performing sectors. Second, those sectors are grouped into clusters based on judgment or secondary information about their interdependence.[2] The result is a set of key industry clusters as they exist at the time of the study.

In many areas, such an approach has severe limitations. First, it often reveals little about technology-intensive industries of interest (e.g., information technology, health sciences, etc.) simply because such sectors are not yet as large–in relative or absolute terms–as other industries. Second, it ignores the fact that in many industries, local ties are not a significant determinant of competitiveness. The branch plant manufacturer producing a standardized good is an example. Its principal linkages are with its headquarters, suppliers, and equipment vendors, all of which may be located in another region or state.

- Identify value-chain industry clusters based upon industry trade flows and supply linkages
- Identify emerging industry clusters
- Analyze demographic trends and projections

As noted, our basis for cluster analysis is derived from a value-chain cluster analysis. The methodology of identifying value-chain clusters is derived from detailed data on business trade flows and supply relationships.

The three most salient points of this approach are:

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[2] The information sources may be quantitative or qualitative in nature (e.g. in the case of the latter, obtained via interviews).

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- Such an approach reveals differences in clustering based on commodity use and production patterns and, most importantly, *jointly evaluates* industry linkages.

- It uses evidence of *indirect* linkages (e.g. relationships between sectors based on links between second and third tier buyers and suppliers) which is noticeably absent from other approaches.

- It permits the assessment of linkages between pairs of industries based on their total patterns of sales and purchases across multiple industries.

A summary of the differences between commonly accepted terms and our value-chain cluster methodology is shown in the table below.

Table 3
Cluster Methodology

Sector (or Industry)	A sector or industry is a group of enterprises that manufacture similar products, as typically defined, for example, under the North American Industry Classification System (NAICS) codes.
Industry cluster	A group of business enterprises and non-business organizations for whom membership within the group is an important element of each member firm's individual competitiveness. Binding the cluster together are buyer or supplier relationships or perhaps common technologies.
Value-chain industry cluster	A value chain cluster is an industry cluster identified as an extended buyer-supplier chain. It includes final market producers, and first, second and third tier suppliers that directly and indirectly engage in trade. It is comprised of multiple sectors or industries connected by flows of goods and services stronger than those linking them to the other sectors of the national economy. It also suggests potentials, where enterprises may or may not presently trade with each other, although such trade could possibly occur in the future.

In a restructuring economy such as Southern Nevada–one in which traditional industries remain dominant and knowledge-intensive sectors dependent on strong local linkages are only beginning to attain critical mass, a value-chain cluster analysis can contribute insights the typical approach cannot.

While the usual analytical approach focuses mainly on what a region *does have* at the current time, the value-chain cluster approach identifies what is emerging and what an economy *could have*, perhaps with properly focused technology policy. It is well-known

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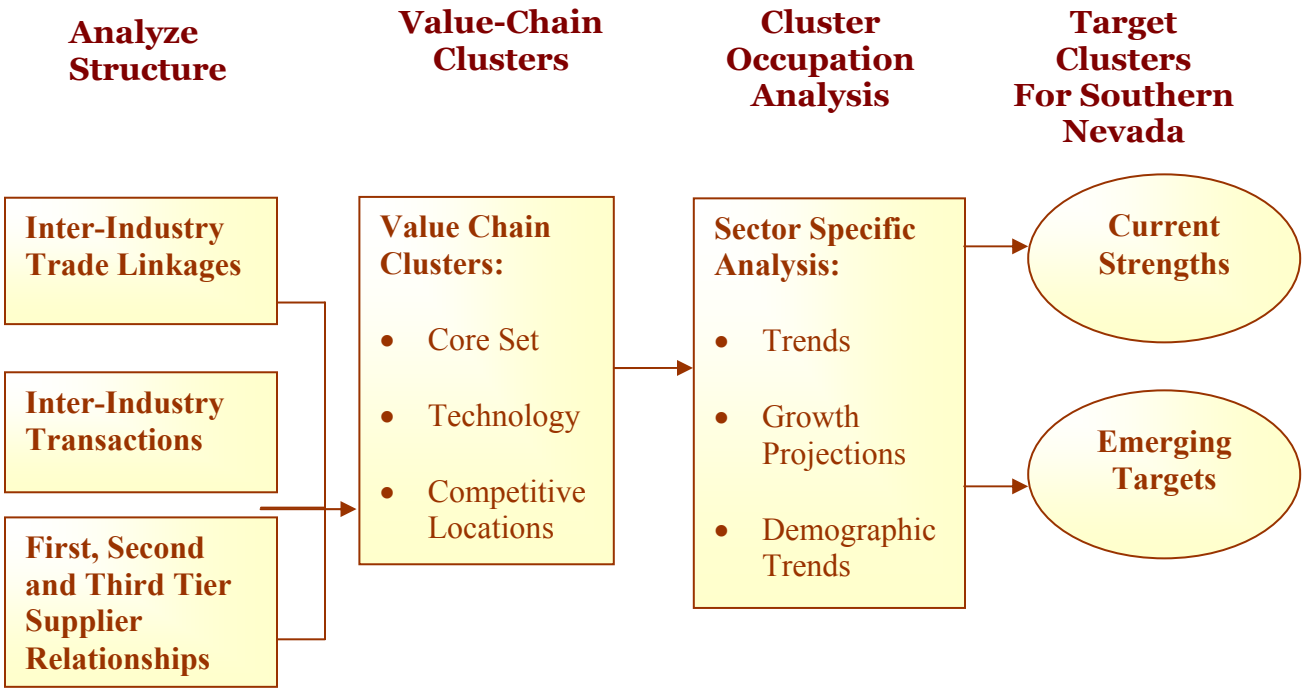
that hospitality, entertainment and recreation form key clusters in Southern Nevada. The more important question is whether higher technology and higher wage industry segments can be developed within those clusters. But to find the answer one has to know what those segments are. They simply cannot be found by looking in a place where they have not yet developed.

An overview of the value-chain cluster approach is shown in Figure 2 below.

Figure 2 Value Chain Cluster Approach



Target Clusters

The methodology above results in a set of eight detailed clusters which, as shown below, in several instances complement each other. For exposition purposes, it is conducive to disaggregate our results into an initial set comprised of current industry targets that are well-known within the economic development community of Southern Nevada. Then, a second set of clusters is provided in detail that is based upon a more extensive set of supplier relationships and strengths of Southern Nevada that provide an expanded set of target clusters.

In general, Southern Nevada has unique cluster opportunities due to its spatial location, forecasted population growth, tax climate relative to major competitive locations in adjoining states, and current world-class hospitality cluster. This allows favorable

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cluster development for Southern Nevada that does not appear as "emerging" within national or Western data.

Current Strengths: General Categories

First, our research reconfirms the basic attractiveness of Southern Nevada for current industry targets as:

- Administrative and Back Office Services
- Distribution Centers
- Furniture Mart Supplier and Related Services
- Potential Public Higher Education Research Park Expansion

Impact of Demographic Changes: General Categories

Our population forecasts and other demographic changes and spatial networking both reinforce and suggest including:

- Education Services [Public and Private]
- Hospital and Health Related
- Research and Development
- Regional Offices
- Senior Services

Detailed Clusters

Our analysis of emerging clusters relative to our community **and** both of the criteria above suggests selected opportunities within eight detailed clusters.

These target clusters are:

- Hospital and Health Related Cluster: Service Provision and Manufacturing
- Regional Offices Cluster: Southwestern and Other Headquarter Functions
- Homeland Security Cluster: Complementary Services and Manufacturing
- Research and Development Cluster: Synergistic and Complementary to Other Target Clusters
- Education and Training Institutions Cluster
- Information and Communications Technology Cluster
- Life Sciences Cluster

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Each of the target clusters above will be presented in turn.

Hospital and Health Related Cluster: Service Provision and Manufacturing

The hospital and health related cluster significantly expands the traditional concepts of health services. This cluster explicitly contains several sub-clusters within the targeted sectors. Three important implications of this cluster to note are the development of:

- Medical Niche to include wellness centers for targeted populations [women, seniors] as well as specialty clinics.
- A substitution of medical services within Southern Nevada from the current Southern California market.
- A significant higher technology manufacturing component.

It is also of interest to note the joint linkages with three other target clusters discussed below:

- The complimentary cluster below [*Life Sciences*] directly supports this cluster with mutually beneficial linkages.
- The development of a R*esearch and Development* cluster contains individual sectors integrated with this cluster.
- Regional professional development is, of course, implied as part of the *Education and Training Institutions* cluster.

The growth of general hospital and medical services tends, of course, to mirror changes in population growth and changes in cohort composition [for example, seniors in the community].

However, the success to date of the Nevada Cancer Institute suggests that similar niche medical opportunities can be developed. This opportunity can be identified along three separate lines. Each will be discussed in turn.

First, the need for specialized treatment centers for the current local [and forecasted] population suggests that such facility re-location or development can be encouraged. Senior services could also be addressed.

Second, a significant amount of current elective surgery is often undertaken in Southern California. With the specialized entertainment and related amenities associated with

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Southern Nevada's hospitality cluster, development of such facilities in Southern Nevada would be attractive to both patients and their families.[3]

Third, and related to both points made immediately above, the trend to wellness centers [such as Senior's and Women's] appears to be a significant opportunity for local development efforts. This is particularly true given forecasted population growth in these two cohorts.

All of these factors also suggest that as this cluster is developed that Southern Nevada has the significant likelihood of developing a reputation as site for associated medical trials and testing. However, such a reputation is predicated, of course, on the development of facility infrastructure.

Table 4
Hospital and Health Related Cluster

Cluster	NAICS
Specialty (except Psychiatric & Substance Abuse) Hospitals/Clinics	6223
Outpatient Care Centers	6214
General Medical & Surgical Hospitals	6221
Offices of Physical, Occupational & Speech Therapists, & Audiologists	62134
Offices of physicians, dentists, & other health practitioners	6211-3
Other ambulatory health care services	6214-5 6219
Electromedical apparatus manufacturing	334510
Pharmaceutical & medicine manufacturing	3254
Surgical & medical instrument mfg	339112
Surgical appliance & supplies mfg	339113
Facilities support services	5612
Services to buildings & dwellings	5617
Environmental & other technical consulting services	54162-9
Business support services	5614
Testing Laboratories	541380

[3] In addition, comparably more attractive environmental conditions such as air quality provide further impetus to the comments above. The best source for air quality and related environmental data within Clark County is available at the Clark County Department of Air Quality and Environmental Management [www.accessclarkcounty.com/air_quality/index.htm].

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Regional Offices Cluster: Southwestern and Other Headquarter Functions

The regional office cluster supports a much more expanded concept of "office" than current market conditions in that it targets regional headquarter functions.

There are four reasons that our research suggests that a regional office cluster is a strong candidate for development in Southern Nevada. Each of these reasons will be discussed in turn.

As previously noted above, our estimates of population growth for Southern Nevada show us as still continuing very strong growth. This population growth will act as a type of demographic "law of large numbers" that reinforces the location of such regional offices, particularly as related industrial growth related to "numbers" occurs. For example, bottling plants, food manufacture [such as Frito-Lay] will reach a tipping point for facility location in Southern Nevada as we approach 2010.

Second, as noted, the relative growth of population in California, Utah, Arizona, and Nevada shifts the "centroid" of network distribution towards Southern Nevada both for goods movements and potential services location [relative to Southern California].

Third, existing tax advantages suggest a strong push to site such facilities in our community. This point takes on more importance over time as regional population growth favors location in Southern Nevada.

Finally, a regional office cluster uses significant inter-sector trade flows from an existing dominant local cluster [hospitality and related services]. This further reinforces regional office.

It is interesting to note that a specialized sub-sector in this area could be represented by financial services. With a growing presence of specialized services to support the financial sector from an *education and training institutions cluster [see below]*, the attractiveness of Southern Nevada is enhanced. The average income in financial services exceeds national averages, and the [income] tax advantages of our community are significant.

Counterbalancing factors that need to be considered are, of course, home prices relative to alternative locations and the less definable concept of community reputation. However as we approach 2030, the implied population growth [and tax advantages] to push such development from Southern California appears dominant. Similarly, in order to easily service Southern California as well as Southern Nevada [and Utah], fundamental network location suggests that Southern Nevada will be able to dominate the Phoenix area.

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Table 5
Regional Offices Cluster

Cluster	NAICS
Credit Intermediation and Related Activities	522
Securities, Commodity Contracts, and Other Financial Investments and Related Activities	523
Insurance Carriers and Related Activities	524
Corporate Offices	551114
Corporate, Subsidiary, and Regional Managing Offices	551114
Direct Health and Medical Insurance Carriers	524114

Homeland Security Cluster: Complementary Services and Manufacturing

By their very nature, emerging clusters are those without a long established pattern of historical data to identify past performance and trends. However, based upon inter-sector trade flows and linkages, emerging technologies, and demographic trends, a set of emerging industry clusters can be identified that are appropriate for potential development targets. As a specific example, even as late as 1998, few studies identified emerging clusters at the national level such as homeland security or related sub-clusters such as data security. Both of these potential clusters have not only developed but, in addition, appear highly appropriate for Southern Nevada based upon our methodology.

The concerns over identify theft, national security, and human and natural disasters has raised increasing concern over fundamental questions of data and information security. The issues of facility location with secure data warehousing, particularly for financial records and personnel records, has become increasingly important.[4]

As is well appreciated, Southern Nevada has limited exposure to traditional natural disasters. In addition, our community has high quality communications capabilities.

It is important to note that an effort to develop this sub-cluster ties directly into efforts to develop the two clusters of *Regional Offices [above]* and *ICT [below]*. It is important to note these synergies within economic development.

[4] The OECD [in Europe] has recently begun study of not only common security protocols but also ways in which inter-country data can be safely stored.

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Table 6
Homeland Security Cluster

Cluster	NAICS
Optical Instrument and Lens Manufacturing	333314
Navigational, Measuring, Electromedical, and Control Instruments Manufacturing***	33451
Professional Scientific and Technical Services****	541
Software Publishers	511210
Custom Computer Programming Services	541511
Computer Systems Design Services	541512
Computer Facilities Management Services	541513
Other Computer Related Services	541519

The manufacturing targets include the two specific elements below:

Table 6b
Homeland Security Cluster Manufacturing Targets

*** Includes:	
Instrument Manufacturing for Measuring and Testing Electricity and Electrical Signals	334515
Analytical Laboratory Instrument Manufacturing	334516
Other Measuring and Controlling Device Manufacturing	334519
Search, Detection, Navigation, Guidance, Aeronautical, and Nautical System and Instrument Manufacturing	334511

**** Includes:	
Testing Laboratories	541380
Environmental Consulting Services	54162
Other Technical Consulting Services	541690
Research and Development in the Physical, Engineering, and Life Sciences	54171

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Research and Development Cluster: Synergistic and Complementary to Above Target Clusters

NOTE: Industry targets are included in clusters above under "Hospitals and Health Related" and "Homeland Security".

Testing laboratories appears under both clusters as do selected professional consulting services and basic research and development in the sciences.

Education and Training Institutions Cluster

Initially, the identification of an education services cluster follows a similar logic to that for regional office as discussed above. For example, expanding population suggests an increased demand for such services related to both formal programs in public education and for programs in private facilities. However, there are additional issues that suggest development of such a cluster.

First, historically, the higher education system has not developed a range of competing institutions in the Valley [as contrasted to Southern California]. This leaves much more of a competitive environment for niche opportunities in Southern Nevada than elsewhere both for exiting programs and potential expansion.

Second, the current review of vocational technology programs at the secondary education level in the Clark County School District (CCSD) suggest possibilities for both private education services on their own and as potential future partners with CCSD. Vocational education to support targeted cluster development should result in public-private opportunities within this cluster.

Third, the *regional offices cluster* in general and activities related specifically to financial services require ongoing training in management and marketing services and financial education. These activities not only require continuing educational services but, in addition, specialized staff training. This again appears to be an instance where a set of individual clusters has synergistic interactive effects.

Fourth, the high technology component in both the *hospital and health related* cluster and the *homeland security* cluster imply a complimentary research function to potential educational research.

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Table 7
Education and Training Institutions Cluster

Cluster	NAICS
Junior Colleges	6112
Colleges, Universities, & Professional Schools	6113
Technical & Trade Schools	6115
Other Schools & Instruction	6116
Business Schools & Computer & Management Training	6114
Educational Support Services	6117

Information and Communications Technology Cluster

The growth and development of the cluster in information and communication technologies (ICT) has in itself become a major new industrial complex. This cluster is the underpinning of what is loosely termed both "knowledge-based societies" and the concept of a "creative class."

The fundamental research of these new technologies is often based at major United States and European research facilities and at both private companies and major research universities in computing technology and specialized engineering.

The suggested value-chain cluster for Southern Nevada is as follows:

Table 8
Information and Communications Technology Cluster

Cluster	NAICS
Data processing services	5182
Other computer related services, including facilities management	541513-9
Computer systems design services	541512
Software publishers	5112
Custom computer programming services	541511
Information services	516 519 5181
Telecommunications	517
Cable networks & program distribution	5152

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Emerging ICT Sub-Cluster: Virtual Meeting Technology and the Case for Southern Nevada

The ICT cluster contains elements of an emerging new sub-cluster that is highly appropriate for discussion in Southern Nevada.

There is a tantalizing possibility to wrap the new technologies as they become available within ICT to create a technological [virtual] meeting sub-cluster. With an unparalleled physical location for entertainment and similar attributes when meetings are necessary combined with quality air access for potential participants, this new meeting technology niche is possible. First-time entrants will have a prime mover advantage, but the investment may be seen as risky given that the exact configuration and cost of new technologies remains uncertain.

It is very interesting to note that the total number of jobs by high tech occupation associated with major complexes of ICT is relatively small. Thus, development of this cluster is certainly feasible for Southern Nevada. Several examples illustrate this point:

- Systems analysts who analyze science, engineering, and business issues are concentrated in the two top areas of the Boston-Cambridge Mass. area and the San Jose-Sunnyvale- Santa Clara Ca. area. Yet the total occupational employment in each of these two areas is both less than 9,600 jobs.

- Systems software engineers who engage in research, design, and development are concentrated in the San Jose-Sunnyvale- Santa Clara Ca. area and New Jersey-Pennsylvania market and yet total employment in each area is less than 3,600 jobs.

- Finally, except for the San Jose-Sunnyvale- Santa Clara Ca. area, application software engineers at major ICT centers represent individual area employment levels of less than 500 jobs.

With the location advantages of Southern Nevada, initial success with this target cluster has the potential to lead to a broader recognition of the SNRPC area for location.

Life Sciences Cluster:

Within the quite broad concept of Life Sciences, five *feasible* opportunities for Southern Nevada appear to be:

- Pharmaceuticals
- Medical devices [to include Optics]
- Instrumentation

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- Diagnostics
- Biotechnology research and ancillary services

The **first four** of these potential targets are included in the clusters identified above, namely:

Table 9
Life Sciences Clusters

Pharmaceuticals	**NAICS**
Pharmaceutical & medicine manufacturing	3254
Medical Devices	
Electromedical apparatus manufacturing	334510
Surgical & medical instrument manufacturing	339112
Surgical appliance & supplies manufacturing	339113
Including	
Optical Instrument and Lens Manufacturing	333314
Instrumentation	
Navigational, Measuring, Electromedical, and Control Instruments Manufacturing	33451
Specific Instrumentation Targets	With Emphasis On
Instrument Manufacturing, Measuring and Testing Electricity and Electrical Signals	334515
Analytical Laboratory Instrument Manufacturing	334516
Other Measuring and Controlling Device Manufacturing	334519
Search, Detection, Navigation, Guidance, Aeronautical, and Nautical System and Instrument Manufacturing	334511

The **fifth target** [Biotechnology research and ancillary services], although feasible, may require public investment that is beyond the capability of individual governments within our community. The primary business environment of Southern Nevada is a very positive location advantage compared, for example, to California. However, the nature of research linkages in this sector needs to be recognized and discussed within the community.

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Specifically, based upon major dominant firms located in California and elsewhere, this industry target has a close relationship with the broad industry definition of "Research and Development in the Physical, Engineering, and Life Sciences [NAICS 541710]". It is important to note that the research and development industry associated with biotechnology research includes a set of specialized research facilities dominated by a set of five research services. These five services are:

- *Bacteriological research and development laboratories or services*
- *Biology research and development laboratories or services*
- *Biotechnology research and development laboratories or services*
- *Plant biology/biotechnology research and development laboratories or services*
- *Cancer research laboratories or services [utilizing the above]*

The Nevada Cancer Institute and related community initiatives are an important step towards the above. Yet the commitment and struggle to see a successful Nevada Cancer Institute illustrates the level of commitment required to expect local economic development to attract a true biotechnology cluster.

Selected Sustainability Technologies: Future Cluster Potential

The events of 9/11 terrorist bombings as well as the natural disasters and resultant economic impacts of Hurricane Katrina have increased the demand for sustainability technologies throughout the United States. Nevada is uniquely positioned to capture this market due its unique climatology and geology.

Two identifiable sectors include:

- Selected solar industry components such as cells and panels [within 334413, 333414].

- Electric Power Generation, Transmission and Distribution [2211].

However, there is significant amount of activity in Southern Nevada in this sector that does not easily fit into easily definable categories. This represents a unique opportunity for Southern Nevada to create meaningful public partnerships with the federal government to exploit these advantages. A summary follows.

Nevada is progressing on innovative applications for three unique areas:

Renewable and Alternative Energy - Nevada has all the desirable renewable energy sources and facilities to become a significant player in the renewable and

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alternative energy market. The state's prominence as an ideal "living laboratory" for validation of alternate energy technologies is attracting companies into the state.

***Environmental Technologies* -** Nevada is at the forefront of innovation and commercialization in environmental technologies. The federal R&D funds flowing into Nevada have shaped the competitive base of companies and facilities operating in this sector. Companies operating in the sector have demonstrated capabilities in environmental bioremediation (bio/phyto remediation), waste management (solid waste management and wastewater treatment), and bio-security.

***Disaster Mitigation and Management* -** Nevada is a prominent location in the region for expertise in disaster mitigation and management. Prevalence of world-class infrastructural facilities drives this growing prominence. Many of Nevada's technology businesses are collaborating with the infrastructure and the U.S. Departments of Defense and Energy to develop innovative products and services.

To develop these as diversifiable clusters may well take true community planning and coordination among local governments and the federal government. These opportunities for Southern Nevada are important; the catalyst to bring them into fruition may require community coordination.

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IV. *LABOR FORCE: EMPLOYMENT FORECASTS AND KEY CLUSTER OCCUPATIONS*

Employment growth and occupational implications of that growth are critical variables for community planning. This section of the report summarizes two sets of information.

First, a summary of overall employment forecasts for Southern Nevada is presented. These forecasts are shown for selected industries as well as by jurisdiction. In addition, employment levels associated with potential cluster development are shown.

Key occupations associated with each of the detailed clusters discussed above are then presented.

Employment forecasts

Clark County Employment Forecasts: By Industry and Jurisdiction

The SNRPC utilizes the economic forecasting system maintained by UNLV Center for Business and Economic Research to provide forecasts (popularly referred to as REMI).[5]

Based upon these forecasts, and supplementary data of the Nevada Department of Employment, Training, and Rehabilitation, Southern Nevada is forecast to have strong employment growth over the period. Specifically, total employment increases by approximately 51% over the period 2005-2035.

This result is not surprising given the strong population growth forecasted over the same period.[6] All areas of Southern Nevada should also experience significant employment growth over the forecast period.[7]

[5] REMI is a regional economic forecasting model (or, more precisely Regional Economic Model Inc. [REMI]) developed by the company of the same name. For more information, see CBER or the parent company (http://www.remi.com/).
[6] There is a famous "chicken or egg" debate in regional economics over which comes first, employment growth or population growth but there is no disagreement that the two are powerfully correlated.
[7] The area forecasts assume that current patterns of employment in the industry specific DETR data base remain constant over the period.

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Table 10
Clark County Employment Projections By Industry, 2005-2035

Industry	2005	2010	2015	2020	2025	2030	2035
Natural Resources, Mining, Utilities and Construction	121,702	139,728	155,135	162,159	167,404	174,868	185,090
Manufacturing	27,428	29,912	32,435	34,830	37,040	39,653	42,663
Trade, Wholesale and Retail	137,770	156,092	164,124	161,302	156,908	154,466	153,715
Transportation, Information, Finance, and Accounting	147,962	166,236	180,910	188,719	194,909	202,444	211,108
Services	533,702	664,427	725,520	756,871	786,124	824,501	870,394
Public Administration	101,590	123,232	139,276	147,770	152,855	156,224	159,091
Agriculture	272	257	235	211	189	169	152
Total Employment	1,070,426	1,279,884	1,397,635	1,451,862	1,495,429	1,552,325	1,622,213

Source: UNLV Center for Business and Economic Research

Table 11
Clark County Employment Projections By Entity, 2005-2035

Industry	2005	2010	2015	2020	2025	2030	2035
Total Employment	1,070,426	1,279,884	1,397,635	1,451,862	1,495,429	1,552,325	1,622,213
Unincorporated Clark County	574,819	687,298	750,530	779,650	803,045	833,599	871,128
City of Las Vegas	299,719	358,368	391,338	406,521	418,720	434,651	454,220
City of Henderson	78,141	93,432	102,027	105,986	109,166	113,320	118,422
City of North Las Vegas	77,071	92,152	100,630	104,534	107,671	111,767	116,799
Boulder City	40,676	48,636	53,110	55,171	56,826	58,988	61,644

Sources: UNLV Center for Business and Economic Research, Nevada Dept. of Employment, Training, and Rehabilitation

Cluster Employment Projections: Potentials

The interrelationships among the target clusters presented above suggest six separate occupational profiles (with the *research and development* cluster as an integral part of the others). Presented below are two estimates of potential employment for these six distinct clusters.

The first set of employment estimates assumes a passive effort to cluster recruitment and development. In this case, current industry linkages are assumed to hold and the only key "new" driver is employment change in other industries and population growth. For example, although the hospital and health services cluster grows at a faster rate than general employment over the period, this is due to underlying demographic factors.

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By contrast, the second set of estimates is based upon an active attempt by Southern Nevada to engage in targeted cluster development. It is based upon successful growth rates in related clusters elsewhere in the country.[8] These estimates suggest a significant potential for cluster employment if a significant targeting strategy is formulated.[9]

Table 12
Target cluster employment projections, 2005-2035
REMI Controlled

Target Clusters, Clark County	*Controlled to REMI projections:*						
	2005	2010	2015	2020	2025	2030	2035
Hospitals & health related	64,292	77,305	84,890	88,674	91,841	95,860	100,724
Educational services	50,703	60,225	65,331	67,413	68,970	71,110	73,807
Information technology	4,291	5,146	5,635	5,871	6,064	6,313	6,616
Life sciences	1,344	1,539	1,606	1,591	1,559	1,536	1,519
Regional offices	40,012	48,895	54,544	57,855	60,822	64,414	68,649
Security	3,855	4,649	5,119	5,362	5,569	5,828	6,140

Note: Target clusters are comprised of the following sectors: hospitals and health related (3254, 3345, 3391, 5413, 5416, 5614, 6211, 6212, 6214, 6215, 6221, 6222 and 6223); educational services (6112, 6113, 6115 and 6116); information technology (5112, 5161, 5182 and 5415); life sciences (3254, 3345 and 3391); regional offices (5221, 5222, 5223, 5231, 5239, 5241, 52421, 52429 and 5511); and security (3333, 3345, 5112 and 5415). *Target clusters are not mutually exclusive.*

[8] As a rough indicator of private sector innovation activity, data is available from the U.S. Patent and Trademark Office (USPTO) to measure patenting in ten technology sectors that roughly corresponded to the six value chain categories. This allows identification of rates of clustering. In addition, federal innovation funding program winners in all technology areas can be matched to the value chains, mapping the winners by geography.

[9] Relevant references here would include Alan Schlottmann and Henry W. Herzog Jr., *Industry Location and Public Policy,* University of Tennessee Press; D. R. Sule, *Manufacturing Facilities: Location, Planning, and Design,* PWS Publishing; Allen J. Scott, *Technopolis: High-Technology Industry and Regional Development in Southern California,* University of California Press; Vittorio Chiesa and Davide Chiaroni, *Industrial Clusters In Biotechnology: Driving Forces, Development Processes And Management Practices,* and Mario A. Maggiano *Clustering Dynamics and the Location of High-Tech-Firms,* Physica-Verlag Heidelberg Press.

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Table 13
Target cluster employment projections, 2005-2035 - Potentials

Target Clusters, Clark County Active Cluster Development	2005	2010	2015	2020	2025	2030	2035
Hospitals & health related	64,292	85,035	97,623	101,975	108,372	113,114	120,869
Educational services	50,703	66,248	75,130	77,525	81,385	83,910	88,568
Information technology	4,291	5,791	6,780	7,151	7,656	8,549	10,040
Life sciences	1,344	1,947	2,585	3,355	4,100	4,644	5,053
Regional offices	40,012	53,785	62,726	66,905	72,770	78,008	86,751
Security	3,855	5,114	5,887	6,166	6,671	7,377	8,367

Key Cluster Occupations

Successful economic development efforts and recruitment often stress the importance of high quality educational resources and workforce. It is therefore crucial for SNRPC to have access to information on the necessary occupational requirements of potential target clusters. Unfortunately, such information to date has been very limited.

As discussed in Appendix B, our modeling elements provide to SNRPC a new highly disaggregated informational data base on occupational requirements by industry.[10] This includes:

- New full industry-occupation structural matrix [complete occupational system and industry codes]
- Earnings data
- Educational requirements by occupation[11]

The current employment patterns of higher education are fairly well understood. However, for other targeted clusters, there has been little information to date on critical occupation skills. Based upon our occupational system, provided below are key occupations necessary to support each of the five newer clusters identified above.

[10] The authors acknowledge the financial support of the National Science Foundation in supporting development of this occupation matrix.
[11] Education cluster codes from the US Bureau of Labor Statistics are as follows: HS (high school occupations); SC (some college occupations); C (college occupations).

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Table 14
U.S. Average Educational Characteristics of Key Occupations: Health Cluster [Includes manufacturing and service component]

SOC Code	SOC Title	Estimated Share of Cluster Workforce %	Median Annual Earnings	Principal Education and/or Training Requirement	Education Cluster
29-1020	Dentists	0.95		First professional degree	
29-1021	Dentists, general		$123,060	First professional degree	C
29-1022	Oral & maxillofacial surgeons		$145,600	First professional degree	C
29-1023	Orthodontists		$145,600	First professional degree	C
29-1024	Prosthodontists		$145,600	First professional degree	C
29-1029	Dentists, all other specialists		$126,130	First professional degree	C
19-1042	Medical Scientists, Except Epidemiologists	0.52	$61,320	Doctoral degree	C
29-1060	Physicians & surgeons		$145,600	First professional degree	C
29-1062	Family & General Practitioners	0.61		First professional degree	
29-1063	Internists, General	0.40		First professional degree	
29-1067	Surgeons	0.38		First professional degree	
29-1051	Pharmacists	0.20	$84,900	First professional degree	C
29-2011	Medical Technologists	1.18	$45,730	Bachelor's degree [Some Associates Degree]	C/SC
17-2012	Medical Technicians	1.19	$30,840	Associates degree	SC/ some C
29-1111	Registered Nurses	5.70	$52,330	Bachelor's degree-Associates degree	C/SC
17-1011	Architects, Except Landscape & Naval	0.48	$60,300	Bachelor's degree	C
11-9041	Engineering Managers	0.52	$97,630	Bachelor's or higher, + work experience	C
15-1031	Computer Software Engineers, Applications	0.47	$74,980	Bachelor's degree	C
15-1032	Computer Software Engineers, Systems Software	0.37	$79,740	Bachelor's degree	C
17-2071	Electrical Engineers	0.54	$71,610	Bachelor's degree	C
17-2072	Electronics Engineers, Except Computer	0.35	$75,770	Bachelor's degree	C
17-2141	Mechanical Engineers	0.58	$66,320	Bachelor's degree	C

Note: In all of the occupation tables presented the education cluster codes from the US Bureau of Labor Statistics are as follows: HS (high school occupations); SC (some college occupations); C (college occupations).

Table 15

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Table 15
U.S. Average Educational Characteristics of Key Occupations: Information Technology Cluster

SOC Code	SOC Title	Estimated Share of Cluster Workforce %	Median Annual Earnings	Principal Education and/or Training Requirement	Education Cluster
11-9041	Engineering Managers	0.40	$97,630	Bachelor's or higher, + work experience	C
15-1031	Computer Software Engineers, Applications	9.92	$74,980	Bachelor's degree	C
15-1032	Computer Software Engineers, Systems Software	5.40	$79,740	Bachelor's degree	C
17-2071	Electrical Engineers	0.11	$71,610	Bachelor's degree	C
19-3021	Market Research Analysts	0.84	$56,140	Bachelor's degree	C
13-1111	Management Analysts	1.66	$63,450	Bachelor's or higher, + work experience	C
13-2011	Accountants & Auditors	1.21	$50,770	Bachelor's degree	C
15-1021	Computer Programmers	7.45	$62,890	Bachelor's degree	SC/C
11-3021	Computer & Information Systems Managers	2.98	$92,570	Bachelor's or higher, + work experience	SC/C
17-2112	Industrial Engineers	0.14	$65,020	Bachelor's degree	SC/C
17-2061	Computer Hardware Engineers	0.43	$81,150	Bachelor's degree	SC/C
11-1011	Chief Executives	0.63	$140,350	Bachelor's or higher, + work experience	SC/C
15-1051	Computer Systems Analysts	4.85	$66,460	Bachelor's degree	SC/C
15-1081	Network Systems & Data Communications Analysts	2.45	$60,600	Bachelor's degree	SC/C
11-3031	Financial Managers	0.94	$81,880	Bachelor's or higher, + work experience	SC/C
11-1021	General & Operations Managers	2.45	$77,420	Bachelor's or higher, + work experience	HS/SC/C
43-1011	First-Line Supervisors/Managers of Office/Admin Support Workers	1.32	$41,030	Work experience in a related occupation	HS/SC/C

Education cluster codes from the US Bureau of Labor Statistics are as follows: HS (high school occupations); SC (some college occupations); C (college occupations).

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Table 16
U.S. Average Educational Characteristics of Key Occupations: Life Sciences Cluster

SOC Code	SOC Title	Estimated Share of Cluster Workforce %	Median Annual Earnings	Principal Education and/or Training Requirement	Education Cluster
19-1042	Medical Scientists, Except Epidemiologists	0.85	$61,320	Doctoral degree	C
19-2031	Chemists	1.32	$56,060	Bachelor's degree	C
17-2041	Chemical Engineers	0.21	$76,770	Bachelor's degree	C
11-9121	Natural Sciences Managers	0.43	$88,660	Bachelor's or higher, + work experience	C
11-9041	Engineering Managers	1.12	$97,630	Bachelor's or higher, + work experience	C
17-2011	Aerospace Engineers	0.21	$79,100	Bachelor's degree	C
15-1031	Computer Software Engineers, Applications	1.42	$74,980	Bachelor's degree	C
15-1032	Computer Software Engineers, Systems Software	0.93	$79,740	Bachelor's degree	C
17-2071	Electrical Engineers	1.22	$71,610	Bachelor's degree	C
17-2072	Electronics Engineers, Except Computer	0.93	$75,770	Bachelor's degree	C
17-2141	Mechanical Engineers	1.46	$66,320	Bachelor's degree	C
13-2011	Accountants & Auditors	0.84	$50,770	Bachelor's degree	C
15-1021	Computer Programmers	0.29	$62,890	Bachelor's degree	SC/C
11-3021	Computer & Information Systems Managers	0.62	$92,570	Bachelor's or higher, + work experience	SC/C
17-2112	Industrial Engineers	1.30	$65,020	Bachelor's degree	SC/C
17-2061	Computer Hardware Engineers	0.26	$81,150	Bachelor's degree	SC/C
17-2131	Materials Engineers	0.13	$67,110	Bachelor's degree	SC/C
15-1051	Computer Systems Analysts	0.66	$66,460	Bachelor's degree	SC/C
15-1081	Network Systems & Data Communications Analysts	0.14	$60,600	Bachelor's degree	SC/C
17-2031	Biomedical Engineers	0.12	$67,690	Bachelor's degree	SC/C
19-4021	Biological Technicians	0.60	$33,210	Associate degree	HS/SC/C
11-3031	Financial Managers	0.62	$81,880	Bachelor's or higher, + work experience	SC/C

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Table 16 - Continued

SOC Code	SOC Title	Estimated Share of Cluster Workforce %	Median Annual Earnings	Principal Education and/or Training Requirement	Education Cluster
11-1021	General & Operations Managers	1.60	$77,420	Bachelor's or higher, + work experience	HS/SC/C
11-3051	Industrial Production Managers	1.12	$73,000	Work experience in a related occupation	HS/SC/C
13-1023	Purchasing Agents, Except Wholesale, Retail, & Farm	1.09	$47,680	Work experience in a related occupation	HS/SC/C
43-1011	First-Line Supervisors/Managers of Office & Admin Support Workers	0.79	$41,030	Work experience in a related occupation	HS/SC/C
19-4031	Chemical Technicians	0.49	$38,170	Associate degree	HS/SC/C
17-3012	Electrical & Electronics Drafters	0.17	$43,180	Postsecondary vocational award	SC/C
17-3013	Mechanical Drafters	0.35	$43,000	Postsecondary vocational award	SC/C
17-3023	Electrical & Electronic Engineering Technicians	1.23	$46,310	Associate degree	HS/SC
17-3026	Industrial Engineering Technicians	0.63	$43,590	Associate degree	HS/SC
17-3027	Mechanical Engineering Technicians	0.48	$43,400	Associate degree	HS/SC
51-1011	First-Line Supervisors/Managers of Production/Operating Workers	2.76	$44,740	Work experience in a related occupation	HS/SC
47-2111	Electricians	0.15	$42,300	Long-term on-the-job training	HS/SC

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Table 17
U.S. Average Educational Characteristics of Key Occupations: Offices Cluster

SOC Code	SOC Title	Estimated share of cluster workforce %	Median Annual Earnings	Principal Education and/or Training Requirement	Education Cluster
13-2051	Financial Analysts	1.25	$61,910	Bachelor's degree	C
15-1031	Computer Software Engineers, Applications	0.73	$74,980	Bachelor's degree	C
15-1032	Computer Software Engineers, Systems Software	0.22	$79,740	Bachelor's degree	C
13-1111	Management Analysts	0.69	$63,450	Bachelor's or higher, + work experience	C
13-2011	Accountants & Auditors	1.42	$50,770	Bachelor's degree	C
15-1021	Computer Programmers	1.17	$62,890	Bachelor's degree	SC/C
11-3021	Computer & Information Systems Managers	0.71	$92,570	Bachelor's or higher, + work experience	SC/C
11-1011	Chief Executives	0.86	$140,350	Bachelor's or higher, + work experience	SC/C
41-3031	Securities, Commodities, & Financial Services Sales Agents	5.53	$69,200	Bachelor's degree	SC/C
15-1051	Computer Systems Analysts	1.05	$66,460	Bachelor's degree	SC/C
13-2041	Credit Analysts	0.57	$47,260	Bachelor's degree	SC/C
13-2053	Insurance Underwriters	1.05	$48,550	Bachelor's degree	SC/C
15-1081	Network Systems & Data Communications Analysts	0.42	$60,600	Bachelor's degree	SC/C
11-3031	Financial Managers	2.78	$81,880	Bachelor's or higher, + work experience	SC/C

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Table 17 - Continued

SOC Code	SOC Title	Estimated share of cluster workforce %	Median Annual Earnings	Principal Education and/or Training Requirement	Education Cluster
29-1111	Registered Nurses	0.27	$52,330	Associate degree	SC/C
13-2072	Loan Officers	2.92	$48,830	Bachelor's degree	SC/C
11-1021	General & Operations Managers	2.64	$77,420	Bachelor's or higher, + work experience	HS/SC/C
13-1031	Claims Adjusters, Examiners, & Investigators	3.22	$44,220	Long-term on-the-job training	HS/SC/C
11-3011	Administrative Services Managers	0.61	$60,290	Bachelor's or higher, + work experience	SC/C
41-1012	First-Line Supervisors/Managers of Non-Retail Sales Workers	0.58	$59,300	Work experience in a related occupation	HS/SC/C
43-1011	First-Line Supervisors/Managers of Office & Admin Support Workers	3.01	$41,030	Work experience in a related occupation	HS/SC/C

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Table 18
U.S. Average Educational Characteristics of Key Occupations: Security Cluster

SOC Code	SOC Title	Estimated share of cluster workforce %	Median Annual Earnings	Principal Education and/or Training Requirement	Education Cluster
11-9041	Engineering Managers	1.17	$97,630	Bachelor's or higher, + work experience	C
17-2011	Aerospace Engineers	0.23	$79,100	Bachelor's degree	C
15-1031	Computer Software Engineers, Applications	8.37	$74,980	Bachelor's degree	C
15-1032	Computer Software Engineers, Systems Software	4.56	$79,740	Bachelor's degree	C
17-2071	Electrical Engineers	1.23	$71,610	Bachelor's degree	C
17-2072	Electronics Engineers, Except Computer	0.97	$75,770	Bachelor's degree	C
17-2141	Mechanical Engineers	1.21	$66,320	Bachelor's degree	C
19-3021	Market Research Analysts	0.68	$56,140	Bachelor's degree	C
13-1111	Management Analysts	1.12	$63,450	Bachelor's or higher, + work experience	C
13-2011	Accountants & Auditors	1.00	$50,770	Bachelor's degree	C
15-1021	Computer Programmers	4.59	$62,890	Bachelor's degree	SC/C
11-3021	Computer & Information Systems Managers	1.95	$92,570	Bachelor's or higher, + work experience	SC/C
17-2112	Industrial Engineers	0.97	$65,020	Bachelor's degree	SC/C
17-2061	Computer Hardware Engineers	0.56	$81,150	Bachelor's degree	SC/C
11-1011	Chief Executives	0.58	$140,350	Bachelor's or higher, + work experience	SC/C

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Table 18 - Continued

SOC Code	SOC Title	Estimated share of cluster workforce %	Median Annual Earnings	Principal Education and/or Training Requirement	Education Cluster
15-1051	Computer Systems Analysts	3.27	$66,460	Bachelor's degree	SC/C
15-1081	Network Systems & Data Communications Analysts	0.98	$60,600	Bachelor's degree	SC/C
11-3031	Financial Managers	0.73	$81,880	Bachelor's or higher, + work experience	SC/C
11-1021	General & Operations Managers	2.07	$77,420	Bachelor's or higher, + work experience	HS/SC/C
11-3051	Industrial Production Managers	0.62	$73,000	Work experience in a related occupation	HS/SC/C
13-1023	Purchasing Agents, Except Wholesale, Retail, & Farm	0.88	$47,680	Work experience in a related occupation	HS/SC/C
43-1011	First-Line Supervisors/Managers of Office & Admin Support Workers	0.81	$41,030	Work experience in a related occupation	HS/SC/C
17-3012	Electrical & Electronics Drafters	0.19	$43,180	Postsecondary vocational award	SC/C
17-3013	Mechanical Drafters	0.28	$43,000	Postsecondary vocational award	SC/C
17-3023	Electrical & Electronic Engineering Technicians	1.20	$46,310	Associate degree	HS/SC
17-3026	Industrial Engineering Technicians	0.39	$43,590	Associate degree	HS/SC
17-3027	Mechanical Engineering Technicians	0.30	$43,400	Associate degree	HS/SC
51-1011	First-Line Supervisors/Managers of Production/Operating Workers	1.27	$44,740	Work experience in a related occupation	HS/SC

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V. LAND ISSUES IN SOUTHERN NEVADA

Given the unique land issues in Southern Nevada compared to many regions, the issue of "adequate" land for future development is both an issue of discussion and controversy.

Investigations of land availability have been undertaken from several perspectives.

From the perspective of regional planning and land use, two research efforts are particularly noteworthy. The Regional Transportation Commission [RTC] as part of its due diligence in forecasting travel demand has addressed this issue within its Travel Demand Forecast Model.[12] Planning for our community's future travel needs and required infrastructure clearly needs to address the fundamental issue of available space. Working with the RTC, the SNRPC Land Use Working Group [with participation of the City of Las Vegas, Clark County, City of North Las Vegas, and the City of Henderson] has engaged in a collaborative research effort to define planned land use categories and needs.[13]

Industry associations have shown serious interest in the concept of land availability. The Southern Nevada chapter of NAIOP [National Association of Industrial and Office Properties] has expressed concern over the general availability of industrial land, for example, in its newsletters and monthly meetings. A recent report sponsored by a prominent local industrial broker offered an alternative view.[14]

Recently, the Lied Institute of Real Estate Studies, College of Business, UNLV sponsored the Lied Roundtables of 2006 with a theme of the future availability of industrial land and economic development. A lively discussion of this issue ensued, and will be released as a future "White Paper."[15] Based upon our interpretation of the materials presented, there was a consensus view that a significant shortfall in available industrial land of minimum size and other factors exists in Southern Nevada.

In this section, we attempt to summarize the available data and to offer our perspective as it relates this issue.[16]

In our view, there is much less disagreement among the various analyses than popularly believed. This is due to the simple dichotomy, or alternative perspectives, of viewing

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[12] For example, see the document "Draft Final Planning Variables for the RTC 2004 Travel Demand Forecast Model."
[13] This collaborative effort is discussed at length in "Planning Variable Development and Methodology", RTC and Metropolitan Planning Organization, October 2005
[14] A summary of this report sponsored by Dean Willmore of IPG Commercial is available in the Review-Journal [September 19,2006].
[15] The white paper on this issue is currently being prepared.
[16] The focus is on land within the Las Vegas Valley. Thus, for discussion purposes, the large amount of land at the specific location of APEX Industrial Park is not included in the tables.

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land in terms of its physical availability as contrasted to viewing land as an economic and business concept.

From the first perspective of availability, subject to physical constraints that may inhibit development, is there enough total acreage available to support development? From the second perspective of land as a business and economic concept, are there minimum size acreage constraints, deed restrictions or the lack thereof, possibilities for land speculation, infrastructure issues, and price points relative to possible competitive locations to Southern Nevada that make land scarce?

Presented below, subject to date limitations, are a set of variables used in the infrastructure planning and research analyses of the RTC and Land Use Working Group.[17]

Table 19 Land Use per Employee

LAND USE	EMPLOYMENT PER ACRE	COMMERCIAL SQUARE FEET PER ACRE	SQUARE FEET PER EMPLOYEE
Hotel Resort(Resort Corridor)	100	83,000	850
Other Hotel Resort (Non-Corridor)	40	21,000	650
Retail (General)	22	12,000	725
Retail Specialty Services (Restaurants, Auto, etc.)	25	9,000	250
Office	50	-	-
A. Deluxe Office [Vertical per present]	100	23,000	275
B. General Office	20	15,000	500
Industrial	12	16,000	1,200

[17] Since the summary material above is from separate sources, calculations within the table above do not necessarily match due to different sample sizes due to reporting restrictions on firms by size and the number of employees. For example, the employees per acre for hotel (resort corridor) of 100 employees are not derived specifically from the other two columns (which suggest an employee number of approximately 98 employees). The numbers above are based upon a careful and detailed matching of the assessor data in a well-documented methodology. See the previously cited sources for complete reference calculations.

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Based upon the population forecast for Clark County to 2030, the analysis suggests the following:

Table 20 Growth in Land Use Forecasted Developed Acres

TIME PERIOD	RESIDENTIAL	NON-RESIDENTIAL	TOTAL
2005-2010	21,218	16,447	37,665
2010-2015	13,275	11,070	24,345
2015-2020	7,423	6,761	14,284
Forecast 2005-2030	52,037	41,138	93,175

There is a total build out in Clark County by 2030 [with land remaining of 54,000 acres primarily undeveloped due to physical constraints].[18] This calculation is based upon land availability which both we and the authors define as, for example, all acreage available for industrial use irrespective of size. Thus, at least conceptually, 25 acres spread across 10 separate locations is equivalent to one 25 acre parcel of industrial land.

By contrast, the calculations shown below based upon data obtained from NAIOP suggest a serious limitation on larger scale projects associated with large bay warehousing on single 25 acre parcels [supporting up to 200,000 square foot buildings at accepted coverage rates per acre]. From this perspective, within seven years [2012] development associated with industrial uses in Southern Nevada is facing a serious constraint.

Table 21
Large Bay Warehouse/Distribution Feasibility Analysis

CLARK COUNTY	
Remaining Land	1,100 Acres
Estimated Space Remaining to be Developed	21,562,200 Sq. Ft.
Estimated Annual Absorption in Sq. Ft.	3.0 Million
Remaining Time Until Capacity	7.19 Years

It is true that industrial land in Southern Nevada is relatively expensive compared to competitor locations. This would suggest, even if only as indirect evidence, that "land" does have the potential to become a growth constraint.

[18] See the 2005 report, op. cit, pp. 8-11 and particularly Table 7 , p.10.

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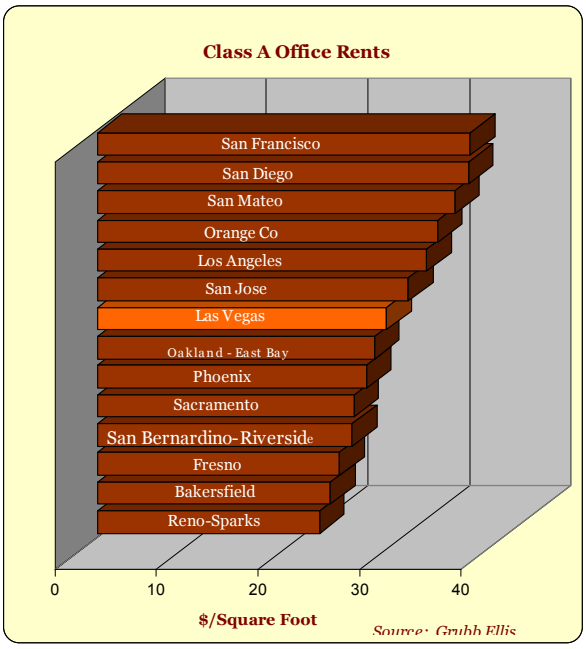
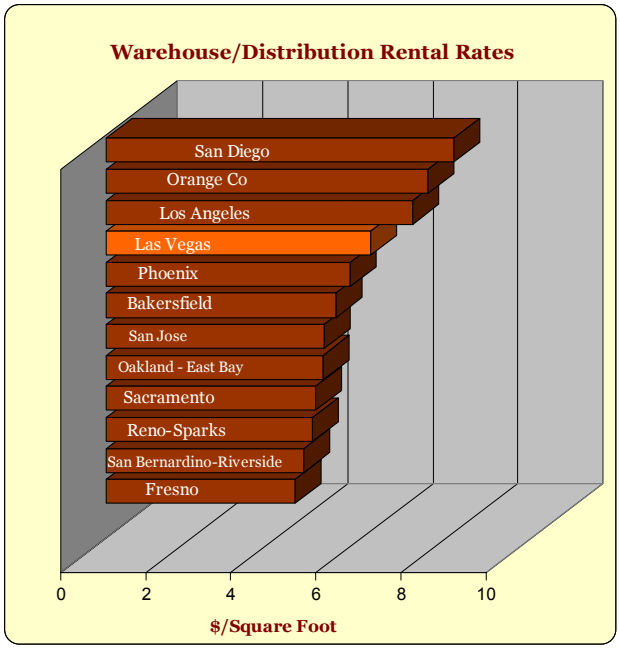


Source: Grubb Ellis Office Market Trend 2nd Quarter 2006



Source: Grubb Ellis Industrial Market Trend 2nd Quarter 2006

To provide a perspective on land availability, shown below are a series of maps showing available land use by type in Southern Nevada.[19]

These maps and summaries of acreage by type begin on the next page.

[19] These maps are also included in electronic form as part of Appendix B.

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SUMMARY OF MAP ACREAGE: INDUSTRIAL

Table 22
City of North Las Vegas
Vacant Industrial/Research Land

Land Use	Number of Parcels	Acres
Heavy Industrial	401	4,815.3
Light Industrial/Research	71	1,557.8

Table 23
City of Las Vegas Vacant Industrial/Research Land

Land Use	Number of Parcels	Acres
Light Industrial/Research	50	124.9
University Medical Center	24	12.1

Table 24
Unincorporated Clark County Vacant
Industrial/Research Land in Las Vegas Valley

Land Use	Number of Parcels	Acres
Business Design Research Park	1,485	5,388.6
Business Park Industrial	626	1,033.1
Industrial	551	2,124.6

Table 25
City of Henderson Vacant Industrial/Research Land

Land Use	Number of Parcels	Acres
Business/Industry	40	3,183.4
Industrial in College Plan	1	127.6
Light Business/Industry	5	186.7

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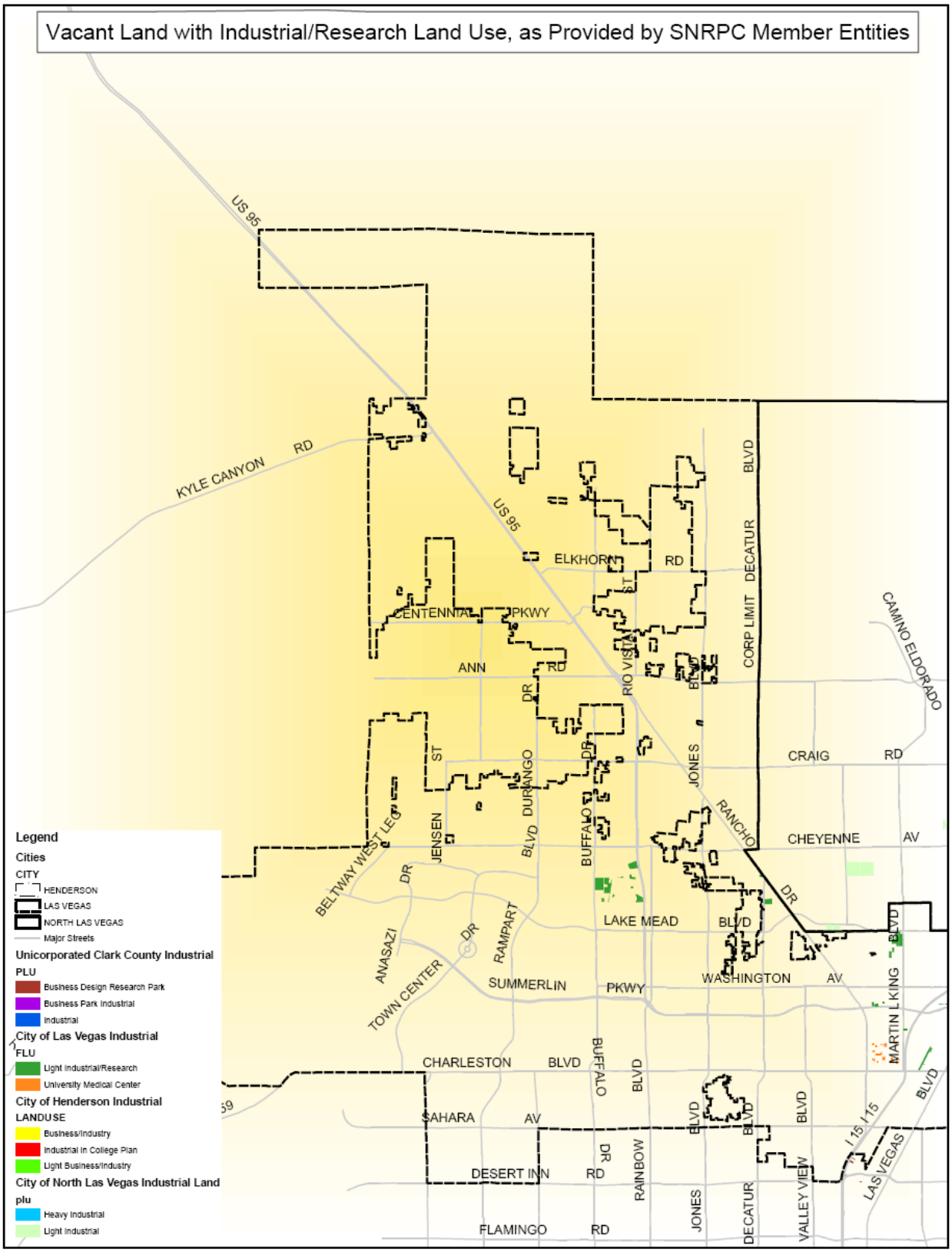

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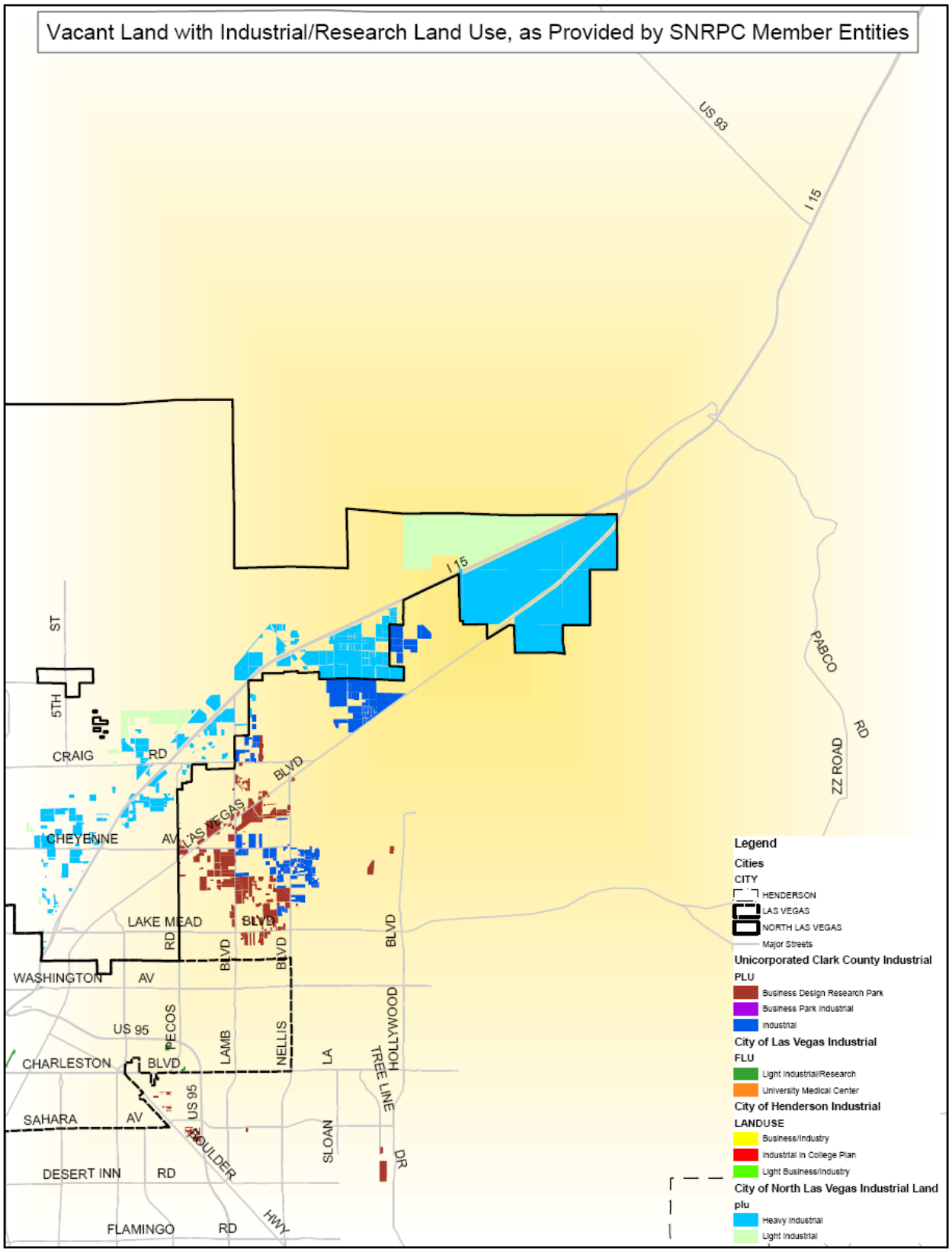

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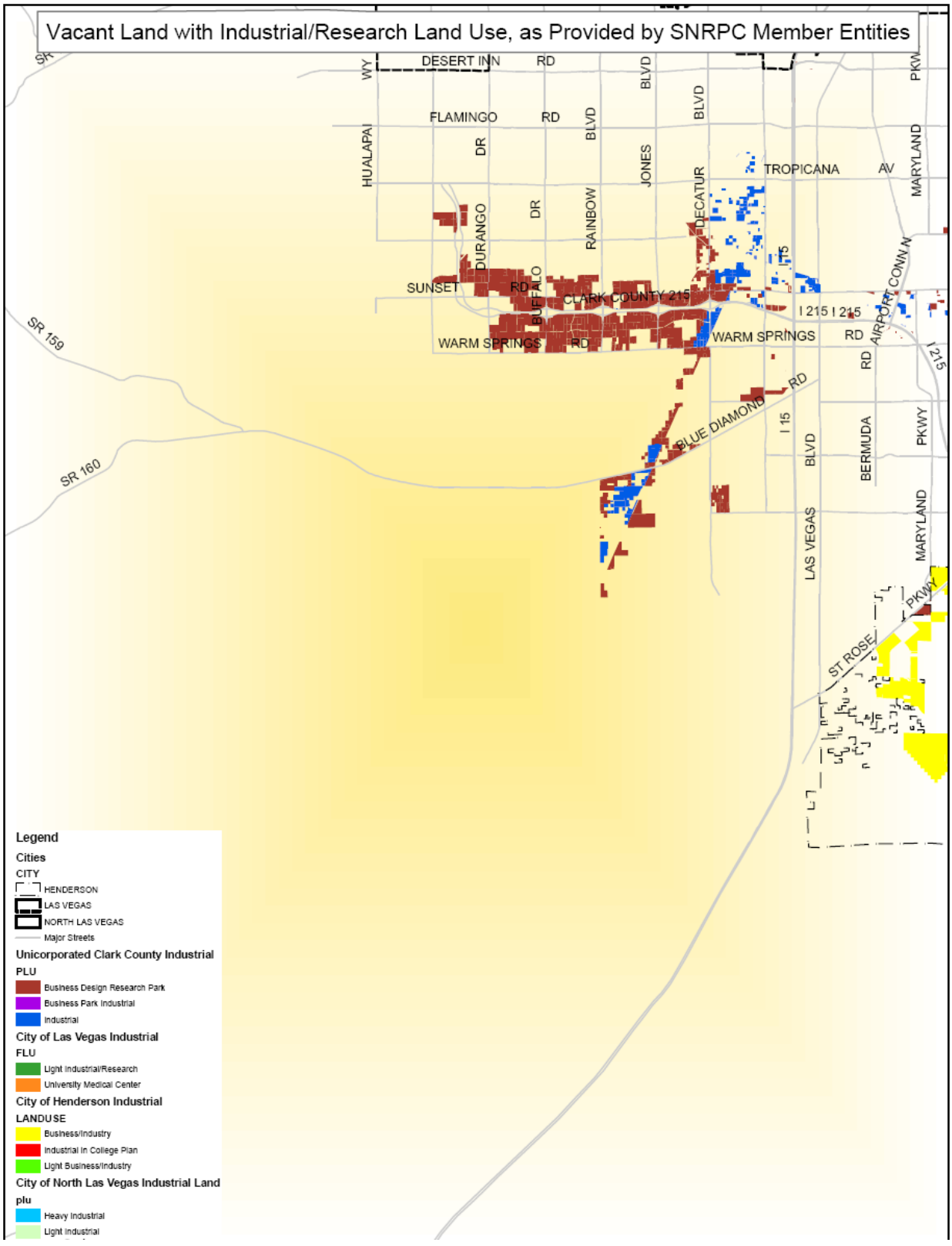

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