REPORT OF THE
SECRETARY OF COMMERCE AND TRADE
SECRETARY OF TRANSPORTATION

STUDY OF COMPREHENSIVE ECONOMIC DEVELOPMENT CENTERS

TO THE GOVERNOR AND
THE GENERAL ASSEMBLY OF VIRGINIA

SENATE DOCUMENT NO. 54

COMMONWEALTH OF VIRGINIA
RICHMOND
1995

COMMONWEALTH of VIRGINIA

Office of the Governor

George Allen
Governor

Robert T. Skunda
Secretary of Commerce and Trade

TO: The Honorable George Allen
Members of the General Assembly of Virginia

Senate Joint Resolution No. 62, agreed to by the General Assembly in 1994, requests that the Secretary of Commerce and Trade and the Secretary of Transportation "study the appropriateness of a statewide program to foster comprehensive economic development centers involving integrated transportation facilities co-located with high-technology research and development, manufacturing, and related facilities [and] identify potential sites for the location of such centers, provide analysis of relevant factors and costs for instituting such a program, and make such recommendations as may be appropriate."

As directed by this joint resolution, I am pleased to submit the attached report.

I wish to express my sincere appreciation to the many individuals who collaborated with my office in carrying out the request of the General Assembly for this study.

Respectfully submitted,

Robert T. Skunda
Secretary of Commerce and Trade

PREFACE

Senate Joint Resolution No. 62 passed by the 1994 General Assembly requested the Secretary of Commerce and Trade and the Secretary of Transportation to conduct a study of the concept of comprehensive economic development centers for possible implementation in the Commonwealth.

This study focuses on a short-term tactical approach to bolster Virginia's existing intermodal facilities, identifies two potential sites for possible development as comprehensive economic development centers, and generates a methodology to develop data on possible future sites within the Commonwealth.

The methodology for locating potential sites was developed utilizing data from the Virginia Employment Commission and the Geographic Information System used by the Department of Planning and Budget. By overlaying infrastructure information (ports, highways, railways and airports) with employment data and educational facilities, a series of maps is under development that will indicate where pockets of appropriate infrastructure, employment and educational concentrations overlap. These maps should be available through the Department of Planning and Budget once the latitude and longitude coordinates for establishments have been verified. This methodology has the potential to be invaluable to the Commonwealth and has myriad practical and marketing applications.

Staff members from the Department of Economic Development (VDED), the Department of Transportation (VDOT), the Department of Rail and Public Transportation, the Department of Aviation, the Virginia Port Authority (VPA), the Virginia Employment Commission (VEC) and the Department of Planning and Budget assembled data on existing infrastructure in Virginia and comprehensive economic development centers (CEDCs) in other areas. Robert W. McClintock, Jr. (VDED), Betty Anne Teeter (VDED), Robert R. Merhige, III (VPA), Dr. Mary Lynn Tischer (VDOT), and Mark Kilduff (VDED) provided insightful editorial guidance for the study. Alfredo C. Frauenfelder (Planning and Budget) and Larry Robinson (VEC) coordinated the database development and geocoding of the establishment data for use on the Geographical Information System (GIS). The principal author of the study was Timothy C. Grollimund, a research economist.

TABLE OF CONTENTS

EXECUTIVE SUMMARY	4
CHAPTER I -- BACKGROUND	11
CHAPTER II -- EXAMPLES OF CEDCs IN OTHER AREAS	14
CHAPTER III -- CEDC POTENTIAL SITES IN VIRGINIA	19
CHAPTER IV -- CONCLUSIONS	26
CHAPTER V -- RECOMMENDATIONS	29
APPENDIX A -- SENATE JOINT RESOLUTION NO. 62	
APPENDIX B -- TECHNICAL NOTE ON METHODOLOGY	
APPENDIX C -- SELECTED BIBLIOGRAPHY	

EXECUTIVE SUMMARY

INTRODUCTION

As the Commonwealth advances into the Twenty-first Century, it will likely face complex strategic issues. The next millennia offers worldwide opportunities as well as domestic challenges. This report offers a pragmatic and logical direction for Virginia, in concert with the efforts underway for *Virginia Connections* and *Opportunity Virginia.*

Current economic development theory indicates a trend towards an aviation-based "fifth wave" of development. Industrial development history can be tracked with advances in modes of transportation. Seaports, river canal systems, railroads and interstate highways constitute the first four waves of development. The theory suggests that significant economic changes have followed significant changes in modes of transportation. As the world grows closer together through aviation technology, and as international sourcing for manufacturing expands, economies likely will be transformed into aviation-dependent entities.

A comprehensive economic development center (CEDC) is defined as an intermodal facility that includes some combination of air, rail, water and ground transportation capabilities. Movement between the modes of transportation approaches a seamless logistical system of materials movement from source to manufacture to delivery with a focus on "just-in-time" (JIT) manufacturing and rapid delivery to international markets. "Just-in-time" manufacturing is essentially an attempt to run a firm at the margin, with as small an inventory as possible, where a single day's production literally departs the facility on the next plane, truck, ship or rail car (depending on the final destination).

Virginia has great potential for long-term competitive advantage. The Commonwealth, in partnership with local governments and private enterprise should, through forward thinking and forward actions, commit to developing a network of futuristic facilities now. Other states have demonstrated a willingness and commitment to place strategically facilities with sufficient room for growth. Virginia has several areas that have the potential for development of this type. First, the Smart Highway consortium has already received federal grant money for research. Virginia Tech is one of three universities in the nation designated for Intelligent Vehicle Highway System (IVHS) research. The second effort is Virginia Gateway 21. Further study, site feasibility and intermodal ties should be examined for this project. Washington Dulles is also a candidate for consideration in comprehensive economic development.

EXAMPLES OF CEDCs IN OTHER AREAS

Comprehensive Economic Development Centers (CEDCs), have relatively few fully developed examples to examine. There is little consensus on the issue of enhancing existing facilities

versus building an entirely new facility. This study will examine two well-publicized new facilities (Alliance Center in Texas and Global TransPark in North Carolina) as well as an example of existing infrastructure (Alameda Corridor in California). There is also a discussion of what may be one of the most advanced centers at the present time at Charles De Gaulle Airport in Paris. The findings on all four examples will demonstrate a serious commitment of funds through either new construction or enhancement approach. The advantage of enhancing present facilities lies in building upon existing business relationships and the marketability of the demonstrated history of the facility. As for the new facility construction, one major development obstacle is, even though the industrial park may be ready, industries themselves may not be ready (financially or logistically) to relocate. On the other hand, building a new facility may position the site for anticipated growth for the Twenty-first Century.

CEDC POTENTIAL SITES IN VIRGINIA

As pointed out in the previous discussion, there are potential sites in the Commonwealth of Virginia that lend themselves to development as CEDCs (Washington Dulles and I-73/Smart Highway corridor). The methodology developed through the integration of employment, educational and infrastructure data can, with further study and refinement, identify additional potential sites. There are also existing intermodal facilities that are well-positioned and have the expansion potential to embrace a looser interpretation of the CEDC concept. These include the Virginia Inland Port (VIP) at Front Royal and the Ports of Hampton Roads. The VIP is somewhat limited by the size of the current facility. It is served by the Winchester Regional Airport. The Ports of Hampton Roads are similar in some respects to the California Alameda Corridor. Air facilities are not in the immediate vicinity and the Norfolk International Airport has limited room for expansion. The Ports of Hampton Roads can be seen as a prime example of the importance of enhancing existing intermodal facilities.

CONCLUSIONS

The broad geographical distribution of these four sites, Virginia's demonstrated strength as a major East Coast international port-of-call, excellent access to domestic and international markets and the strategic planning efforts that have targeted industries for the Commonwealth can lead the Commonwealth on a long-term, balanced growth path into the Twenty-first Century. Key findings of this study include:

1. While existing CEDCs have been somewhat slow to develop, long-term implications (based on the De Gaulle and Washington Dulles histories) indicate a gravitational effect for incremental business location activity where the appropriate infrastructure already exists. This may mean it may take several decades to build a CEDC to its market capacity. But the advantage is, as Research Triangle Park in North Carolina has shown, adequate facilities will fill to capacity as the industrial base grows. Virginia is in an advantageous position to offer a variety of sites. Few other states can offer the array

Virginia has to offer: for the short-run, as a tactical approach, bolster Virginia's existing facilities at the Virginia Inland Port, the Ports of Hampton Roads and Washington Dulles; for the longer-term, strategic approach, develop the I-73 Corridor/Smart Highway, continue to examine the feasibility of Virginia Gateway 21, and continue to develop the Virginia Inland Port, the Ports of Hampton Roads and Washington Dulles with significant capital improvements leading to increased intermodal connectivity.

2. Virginia has existing infrastructure capable of supporting near-term tactical efforts required to implement the *Virginia Connections* [Transportation] and *Opportunity Virginia* [Economic Development] strategic plans. These sites include Washington Dulles International Airport, the Virginia Inland Port and the Ports of Hampton Roads.

3. Virginia has sufficient existing infrastructure with significant upgrade potential to establish comprehensive economic development centers in a geographically diverse environment. Many areas of the Commonwealth could experience positive effects from the development of these sites. These include the I-73 Corridor/Smart Highway and Washington Dulles Airport.

4. Virginia has studies in progress to determine the feasibility of designing, building and launching a major international superport, Virginia Gateway 21. This is a long-term commitment and the process of site selection and environmental impact should be addressed in the near future. Also, high-speed rail access may be an important element in moving the large numbers of passengers necessary to support the planned facility.

5. Virginia has embarked on several important transportation initiatives. The *Virginia Connections* strategic plan, the Smart Highway and the Dulles Task Force have the information base and demonstrated public support to establish a critical mass for the integration of land use planning and transportation infrastructure development.

6. Virginia has developed a comprehensive strategic plan for Economic Development, *Opportunity Virginia*. This document outlines an organizational structure and specifically targets ten sectors of the economy for concentrated development efforts. Eighteen Regional Economic Development Advisory Councils have been established as part of the strategic planning initiative and can serve as conduits to promote joint projects between state and local governments and the private sector.

7. Other states have developed and implemented plans that will lead to the development of comprehensive economic development centers. Alliance (Texas) and Global TransPark (North Carolina) are new facilities. Charles De Gaulle (France) is a facility in its third stage of development. All three examples have made extensive use of long-term planning for the integration of land use and transportation infrastructure. All three use a combination of public and private sector financing.

8. As new forms of transportation have fostered economic development throughout history, an aviation-based "fifth wave" is underway. Contemporary theory suggests aviation will drive a global economy, where multi-national component and materials sourcing for manufacturing becomes the norm. Geographic areas that are not able to provide adequate access to air transportation will lag significantly in economic development. Both public and private sector initiatives and financing will be effective components in the "fifth wave."

9. A comprehensive economic development center requires the extensive use of intermodal transportation facilities and relies heavily on seamless interconnectivity, mixed-use land development, concentration on international markets, and transportation infrastructure development that complements the mixed-use land development. Comprehensive economic development centers are largely aviation-based. The focus of these centers is on distribution centers, high-tech firms, export markets, research and development facilities, office facilities, and retail and support services. Manufacturing facilities emphasize "just-in-time" processes. All CEDC examples had direct ties for each type of land use to more than one mode of transportation. In short, a CEDC is a "gathering of activities," interconnected by at least two modes of transportation, with seamless integration between modes and directly tied to air transportation.

10. North Carolina has made extensive commitments to build Global TransPark from the ground up and is similar to the Alliance project in Texas. Virginia has facilities that can be upgraded and positioned competitively against Global TransPark. Based on the Alliance experience, in five to eight years Global TransPark will be a significant competitor. But, Virginia has an immediate advantage that may be exploited while Global TransPark begins construction: Washington Dulles. Virginia also has a developing area in Southwest Virginia (I-73 Corridor/Smart Highway) that can build access to new markets and new technology-based industry. University resources could be co-located and foster improved educational development with industrial ties.

11. As international markets expand, there may be additional opportunities for agricultural as well as manufactured products for distribution. By learning more about newly developed markets and studying consumption patterns, adjustments in Virginia's agricultural mix may be instituted to exploit overseas consumption habits and enhance the value of agricultural exports.

RECOMMENDATIONS

1. Prioritize infrastructure development projects by cost, funding availability and projected economic impact for the completed facility. Push for public and private sector cooperation and privatize operations where feasible. Exploit every opportunity to designate Foreign Trade Zones as an element of local economic development proposals.

2. For Washington Dulles International Airport, concentrate on implementation of current initiatives:
   - the extension of the Dulles Toll road to Leesburg (currently under construction);
   - HOV lane development through the corridor;
   - support the construction of a western bypass around the current urban edge. The Task Force favors the route furthest to the east, which will pass east of Goose Creek and west of Washington Dulles, and is the closest of the alternatives under consideration;
   - support the development of a bus-based transit system throughout the Dulles Corridor to create transit ridership patterns in the short run, and act as a feeder system to a future rail system;
   - support the development of a passenger rail system over the next decade;
   - use Aviation Fund entitlements for expansion;
   - work with adjacent localities to focus on the expansion and potential for increased economic development with an emphasis on the integration of land-use planning and transportation infrastructure development;
   - work with local governments to leverage marketing efforts for the airport and the region as a whole;
   - support the goals delineated by the Washington Airports Task Force.

3. At the Port of Hampton Roads, support the implementation of the VPA's Marketing, Operations and Development Plan (October, 1994), including intermodal rail improvements relative to key intermodal development at Norfolk International Terminals and Portsmouth Marine Terminal. Additionally, support the implementation of highway improvements detailed in the 1993 Ports Access Study. These include significant expansions and interchange improvements on I-64 and U.S. 17, as well as future plans for improving several at-grade crossings to grade separated crossings at critical access points. Other important projects to be considered include an additional parallel tube that accommodates two lanes of travel in each direction at the Midtown Tunnel between Norfolk and Portsmouth, an extension of I-564 allowing direct limited access to Norfolk International Terminal and a new tunnel/bridge combination between Norfolk and Portsmouth designated as the Uptown Crossing.

4. For the Virginia Inland Port (VIP), support the required market-driven development of the VIP as outlined in the Marketing, Operations and Development Plan. Utilize the VIP as an economic development tool to enhance the competitiveness of the region and attract industries targeted through the *Opportunity Virginia* initiatives. Leverage the VIP through local economic development organizations and the Regional Economic Development Advisory Council specified in *Opportunity Virginia.* Encourage and support the local communities to implement pre-emptive zoning in the vicinity of VIP to reduce long-term conflicts with residential housing. Study the feasibility of direct rail access from the VIP to Washington Dulles, in addition to existing rail access to the Port of Hampton Roads. Support local zoning and plans for improved highway and rail infrastructure between Washington Dulles and VIP to accommodate a logistics/distribution corridor which will

attract world-class industrial/transportation clients. Combine light rail commuter development with heavy rail requirements so that Washington Dulles, VIP and points in-between can be served with both intermodal and passenger rail service. Right-of-way acquisition should be forward-looking enough to anticipate double-tracking along with air and underground rights for pipelines, power lines and communication conduits. Also, target businesses that are export-oriented or process components for "just-in-time" manufacturers along the rail line or in Washington Dulles. Additionally, identify key existing and potential rail/highway crossings in the vicinity of VIP and plan for grade separation to reduce local complaints and to ensure high speed rail transit.

5. Study long term development and infrastructure projects in the I-73 Corridor/Smart Highway. Leverage the development of smart highway and smart vehicle technologies through the Center for Transportation Research (Virginia Tech) and the Center for Innovative Technology. Study the feasibility of expanding the New River Valley Airport to handle the jumbo air freighters of the future. Begin conceptual design of an aviation-based comprehensive economic development center that focuses on the new intelligent vehicle/highway industry that will develop as a result of the National Highway System initiatives. The characteristics essential for the formation of a comprehensive economic development center are present in I-73 Corridor/Smart Highway, and can be leveraged through the development of a new industry.

6. Identify and recommend enhancements to current freight corridors linking ports by rail and highway to national freight corridors and air freight hubs. Extend and coordinate smart highway and smart vehicle technologies to freight corridors. Develop dedicated freight corridors which will connect to the current Port Intermodal Infrastructure to support seamless freight flow concepts.

7. Support a comprehensive inter-agency effort to develop a statewide Geographic Information System (GIS). Establish a central point of control for the assimilation and standardization of information. Allow dissemination of information requests through a distributed computing environment. Implement an ongoing effort to develop secondary sites. Use the methodology developed for this study as a benchmark tool to compare future results in conjunction with the implementation of *Virginia Connections* and *Opportunity Virginia* initiatives.

8. Integrate the development of the I-73 Corridor/Smart Highway, Washington Dulles and the Ports with the 18 Regional Economic Development Advisory Councils. Use the knowledge gained through the development of these centers to assist other areas of the state in planning for future infrastructure development. Use the initial sites to further refine the target prospects pursued by VDED. Foster joint economic development projects that utilize public and private sector resources and privatization (where feasible) through the network of local economic development organizations. Use the *Opportunity Virginia* organizational structure to formalize the study of possible CEDCs. Allow localities the opportunity to work with local corporate citizens and the eighteen regional

economic development advisory councils to bring proposals before the General Assembly for economic development projects that integrate transportation infrastructure with land-use planning. Establish proposal standards that mandate the combined use of land-use planning and transportation infrastructure development. Design a marketing plan based on CEDC site study results and the proposal standards that will compete directly with Global TransPark, Alliance and other CEDCs that are likely to be established. Devise a promotional strategy that presents Virginia as a state that is well positioned to compete in the worldwide marketplace.

9. Examine the feasibility of expanding agricultural exports through Washington Dulles and the Ports as new international connections or steamship lines are developed. Study the first efforts of Global TransPark to enter new export markets through new international connections. Cross reference new international destinations with their agricultural needs. Disseminate the information to Virginia farmers through the Department of Agriculture and Consumer Services and its extension services.

10. Continue to develop the concept of Gateway 21. Acknowledge the study initiatives that are currently underway, and expand the scope of the project to include more cargo facilities and on-site and/or adjacent manufacturing, distribution, food production and communication facilities. Factor into the studies the potential competition of Global TransPark.

CHAPTER I -- BACKGROUND

Current Economic Development Theory

Current economic development theory promotes the trend towards an aviation-based "fifth wave" of development. In a definitive paper entitled *Global Air Cargo-Industrial Complexes as Development Tools*, Dr. John D. Kasarda of the University of North Carolina outlines the progression towards this development wave. Multinational sourcing of manufacturing components, increased access to international markets, "just-in-time" manufacturing and the growth in air cargo movements will characterize the new development era. Industrial development history can be tracked with advances in modes of transportation. Seaports, river canal systems, railroads and interstate highways constitute the first four waves of development. The theory suggests that significant economic changes have followed significant advances in modes of transportation. As the world grows closer together through aviation technology, and as multinational sourcing for manufacturing expands, economies will be transformed into aviation-dependent entities for many products. The freighter of the future will have wings, travel at supersonic speeds, and have the ability to deliver raw materials and finished goods to European and Asian markets in a matter of hours. The concept of an aviation-based comprehensive economic development center is a logical extension of following the next advance in transportation technology. The concentration on an aviation-based industrial complex can be expected to foster additional growth in support facilities and residential communities. It is, therefore, *essential* to integrate the transportation infrastructure with land-use planning.

A comprehensive economic development center (CEDC) is defined as an intermodal facility that includes some combination of air, rail, water and ground transportation capabilities. Movement between modes of transportation is a seamless logistical system of materials movement from source to manufacture to delivery with a focus on "just-in-time" (JIT) manufacturing and rapid delivery to international markets. "Just-in-time" manufacturing is essentially an attempt to run a firm at the margin, with as small an inventory as possible, where a single day's production leaves the facility, literally, on the next plane, truck, ship or rail car (depending on the final destination). Under this process, and particularly in an aviation mode of transfer, night-time movements of cargo become critical to a firm's ability to reduce inventory holdings and prepare for the next day's production run. Utilizing this practice has also led to greater flexibility in the manufacturing process, less inventory carrying costs, and an increased reliance on ready access to components and raw materials sources.

There are several sites under development, according to the strict definition of comprehensive economic development center, in other states. Alliance Center in Texas and Global TransPark in North Carolina are two such facilities. A third facility, the Alameda Corridor (California) is taking a different approach. They have committed substantial resources to upgrade and integrate existing facilities, but do not have direct air access. The fourth example is Charles De Gaulle Airport in Paris, which is, in reality, the best example of both a long-term mission and a long-term funding commitment to achieve a true comprehensive economic development center.

Applicability of Theory to Virginia

The strength of Virginia's economy has long been associated with the Commonwealth's strategic location. Nearly half of the nation's population and domestic manufacturers are within 500 miles of Richmond. The Ports of Hampton Roads and Washington Dulles Airport are key elements linking Virginia to rapidly integrating international markets. These factors have allowed Virginia to remain relatively robust during times of recession, and take a leadership role in expansion periods.

Virginia has several existing sites that have the potential to be developed according to a broader definition of a comprehensive economic development center, but are in need of additional facilities to achieve this designation. These are the Washington Dulles International Airport (currently lacking rail service), the Virginia Inland Port and the Ports of Hampton Roads (both of these sites lack direct air access). There are also two relatively new initiatives, the I-73 Corridor/Smart Highway and Virginia Gateway 21, that have excellent potential for development as comprehensive economic development centers under a stricter definition of the term.

Focus of the Study

The focus of this study is to examine recent efforts in other states concerning the implementation of comprehensive economic development centers (CEDCs), examine the Commonwealth's potential for development of CEDCs and/or enhancement of intermodal facilities, and make recommendations that are consistent with, and utilize, the strategic planning tools and doctrines advanced through earlier studies.

The report will explore the Alliance facility in Texas, Global TransPark in North Carolina, the Alameda Corridor in California and Charles De Gaulle Airport in Paris. The first two examples are of relatively new sites that are being developed from the ground up. Alameda Corridor is an example of facilities that are being tied together and enhanced through upgrades in existing infrastructure, but lack direct air service. Charles De Gaulle Airport is an example of an established, but continuously evolving economic development center. One question that has been raised is the concept of "if you build it they will come." This is one of the key concerns for Virginia's economic development decision makers as we move into the Twenty-first Century. Is the concept of one massive CEDC the appropriate direction for Virginia? Or is there merit in a concept of a network of somewhat smaller, more specialized, more concentrated facilities sprinkled throughout the state in strategic locations, that complement the existing and potential industry mix at a specific location? Can all these diverse sites eventually be tied to a superport such as Virginia Gateway 21?

While overnight success has not been realized at Alliance, for example, the growing interest in facilities of this type indicates a desire on the part of economic development officials across the nation to channel economic growth in a manner most logically consistent with the globalization

of markets and changes in the manufacturing process to more customized, faster and less inventory dependent methods. In this way, just as Research Triangle Park in North Carolina, and Washington Dulles Airport in Virginia, were built with some speculation as to their usefulness at the time of implementation, *time* has played a critical role in the realization of concepts and sites such as these to spur future economic growth. Through foresight and diligence in marketing, Research Triangle Park has become a bastion of research and high technology and now employs more than 35,000 workers in 65 firms. As for Washington Dulles, the last half dozen years have witnessed a trebling of nonstop flights and markets served, more than double the number of passengers carried, and more than four times the amount of cargo carried. Washington Dulles is now poised to capitalize on the growing passenger and cargo movement by promoting continued development of cargo facilities, expanding to encompass manufacturing and distribution facilities, and aligning a new wave of transportation infrastructure to accommodate rapid growth, including commuter/passenger rail in the corridor.

Intermodal Transportation Industry Growth

The growth in intermodal transportation has been very strong in the 1990's. Most proponents of the intermodal industry point to future economic development as both a catalyst and a source of potential economic activity to increase the U.S. share of international markets. For example, in the first half of 1994, intermodal traffic grew at nearly twice the rate it has grown over the previous decade. According to the American Association of Railroads (AAR), by mid-July 1994, trailer and container movements were up 23.6% over 1993, while carload freight was up 3.1%. For specific carriers, second quarter 1994 intermodal traffic was up 22% at Union Pacific, 26% at Southern Pacific, 24.9% at Conrail, 12.3% at Norfolk Southern and 17% at CSX.

Methodology

To assist in forming conclusions and making recommendations for specific sites in Virginia, the report analyzed a combination of factors. A digital overlay map series is under development in a cooperative effort between the Department of Planning and Budget and the Virginia Employment Commission (see Appendix B). The methodology is designed to identify concentrations of manufacturing industries, transportation infrastructure and educational facilities. The maps overlay the air, water and land transportation facilities, nonattainment areas, manufacturing concentrations and educational facilities. Latitude and longitude coordinates have been appended to manufacturing establishment data, and the database is currently undergoing verification. It is suggested this methodology be studied and refined further in conjunction with the Geographic Information System initiative in the *Virginia Connections* plan.

CHAPTER II -- EXAMPLES OF CEDCs IN OTHER AREAS

Alliance Development Company, Texas

The project began construction in 1988. Alliance is funded with public and private sector resources, and bills itself as the nation's first master planned industrial airport. The 7,500 acre site has air, rail and highway access and is equipped with new transportation, communications, electrical, natural gas, water supply and waste disposal systems. The Alliance project has been accorded Foreign Trade Zone Status (#196). The project is divided into specific geographic sectors, each catering to different business needs:

Alliance Airport - cargo airport with a 9,600 foot runway with direct taxiway access to business and industrial facilities. The FAA has granted environmental approval to extend the runway to 13,000 feet to accommodate larger cargo carriers.

Alliance Center - business complex with direct airport access. American Airlines, Federal Express and the U.S. Drug Enforcement Administration have established facilities here.

Alliance Gateway - provides sophisticated highway and rail transportation for large scale distribution and manufacturers. Food Lion and Nestle have direct rail access at their distribution centers.

Westport at Alliance - Santa Fe railroad has established the Intermodal and Carload Transportation Center. The facility handles trailer and containerized traffic, with a capacity of 900,000 lifts annually. There is also an automobile distribution center capable of handling 130,000 cars per year. This site has rail, air and truck access.

Alliance Tech Center - a business park for office, distribution, light manufacturing and high-tech firms. This site has road access to I-35. Construction has begun on 1.35 million square feet of light industrial space for lease. SICPA SECURINK Corp. has an ink manufacturing facility here.

Heritage Reserve at Alliance - a wooded area for office and research/development facilities with road access to I-35.

Alliance Crossing - retail development with access to I-35. The site has a medical center, service station, restaurants, a law firm and the headquarters for Alliance Development Company.

Circle T Ranch - currently undeveloped, will become a high end mixed-use community. Plans include executive and up-scale residences, corporate headquarters, campus-style office complexes, retail centers and recreational facilities.

As of March, 1994, there were 22 facilities, employing approximately 2,400 workers throughout the entire complex. Over 3,800 permanent employees were forecast at this point in time. Developers say that over 8,000 construction jobs will be created during the build-out phase of Alliance. More than $1.3 billion has been invested thus far. Eighty-eight percent has been private sector investment ($1.2 billion), with $164 million in federal, state and local funds. Officials of Alliance indicate that interest in the site is beginning to accelerate, particularly after the announcement of the Federal Express hub in 1993. Since then Zenith has announced development of a distribution facility and Riddell has announced a footwear distribution facility. Officials also note that all facilities that have been constructed have been leased prior to completion of the facility, and that construction time and resources are the main lags in filling additional facilities.

Global TransPark, North Carolina

Global TransPark (GTP) is North Carolina's entry in the CEDC race. The proposed cargo-only airport and industrial center was first conceptualized at the Kenan Institute of Private Enterprise at the University of North Carolina by Dr. John D. Kasarda. The Kinston site is 5,000 acres, with possible expansion to 20,000 acres with the full build-out of the industrial park. There will be twin 11,000 foot runways, reasonable access to I-95, I-40 and I-85, rail service with CSX and Norfolk Southern and two deep water ports within a 90 minute drive by truck. Global TransPark has been delayed for at least one year due to an Environmental Impact Study required before they can complete their final development plan. Currently Global TransPark is operating the existing facilities of the Kinston Jetport.

Projections by Global TransPark are 55,000 jobs and $3.8 billion in revenue by the year 2000. Kinston gave its airport ($100 to $140 million in value) to the newly formed airport authority, and has agreed to support additional investment by Lenoir County of up to $40 million for water, sewer and gas lines. Mountain Air Cargo (a small aircraft cargo operation) will be the first tenant at Global TransPark, projected to come on line in the fall of 1995. The General Assembly has allocated $2.2 million for feasibility studies and the creation of the airport authority (1991), an additional $6.4 million for master plan development (1992) and $7.5 million (1993) to create the Eastern Economic Development Zone and fund upgrades in infrastructure in anticipation of the growth that Global TransPark will generate. It is estimated the surrounding industrial park will cost an additional $30 million, to be raised through the North Carolina Global TransPark Foundation. Global TransPark has approached Germany and Thailand and proposed similar facilities. Thailand's cabinet has given initial approval for the project. Officials at Global TransPark indicate the international proposals are an effort to create direct links and establish international business connections during the domestic development phase of the park. The main concept is to give industrial plants direct access to cargo planes by building assembly plants along the taxiways so cargo planes can deliver manufacturing components directly to the plant and load finished goods directly onto the plane. The plant will also have direct access to

truck and/or rail for domestic distribution or component acceptance. The park is the brainchild of Dr. Kasarda, and is based on his findings that major shifts in economic development follow major advances in transportation technology. Internationalization of markets and component sourcing, coupled with a shift towards increased air cargo traffic and just-in-time manufacturing theory drive the concept. He also stresses the need for the park, and its surrounding development, to be situated near, but not necessarily in, a major urban center because of the need for a large tract of land (15,000 acres at a minimum) and uncongested access to highways. Dr. Kasarda also predicts a decline in seaport activity as air cargo activity becomes more cost effective through the implementation of new freighters such as the Boeing Jumbo Jet 747-400.

Alameda Corridor, California

Alameda Corridor was chosen for discussion because of its similarity to the Ports of Hampton Roads. The corridor is a twenty mile strip that will run from I-10 to the north (central Los Angeles) to the ports of Los Angeles and Long Beach, collectively known as the Ports of San Pedro Bay. This area accounts for 25 percent of all waterborne international trade in the nation, valued at $116 billion. There is no direct air access at the ports, but there are three municipal airports (Torrence, Hawthorne and Compton) along the corridor. The Alameda Corridor Transportation Authority was formed in 1989 to coordinate the project among the localities. The total project cost is estimated at $1.8 billion, with $700 million (proposed) coming from Federal funding, and the remainder coming from state and local sources, including a $600 million revenue bond issue.

The project will consolidate over 90 miles of rail into a 20 mile fully grade-separated corridor linking the ports with transcontinental rail yards near downtown Los Angeles. The project has highway and rail components. The rail component involves consolidating the Atchison, Topeka and Santa Fe Railway, the Union Pacific Railroad Company and the Southern Pacific Railroad Company into an upgraded right of way along Alameda Street. The three railroads will consolidate four separate tracks, with nearly 200 street crossings, into a single corridor that eliminates street crossings. The road component will widen Alameda Street from four to six lanes and add left turn pockets. The road component is included in the National Highway System.

The consolidation of rail elements and improvements to Alameda corridor are projected to reduce delays at road crossings by 90 percent; reduce noise from trains by 90 percent, reduce air pollution from trains by 28 percent, train stoppages by 75 percent and increase railroad speeds to an average of 40 miles per hour (currently 20 miles per hour). The Authority projects 33,000 truck trips and 70 trains per day by the year 2010, far above the current level of 20,000 truck trips and 29 trains per day.

Although the Alameda Corridor does not comply with the strict definition of a comprehensive economic development center, the illustration is useful to demonstrate several key points. First, the realization by the Alameda Corridor Transportation Authority that future economic vitality

of the ports is tied closely with the integration of transportation infrastructure development with land-use planning is an important consideration, and a direct parallel with needs of the Ports of Hampton Roads. Also, the ability to leverage state and local funding with Federal funding and the inclusion of the corridor in the National Highway System assures continued Federal support. Finally, while current theory suggests aviation access is a critical component for economic development success, there will continue to be essential cargos that are not conducive to air movement for both domestic and export markets. The Ports of Hampton Roads highlight the latter point well, as the nations leader in coal exports.

Charles De Gaulle Airport, Paris

Charles De Gaulle (CDG) is the leading airport in continental Europe and seventh largest in the world. In its first year (1974), 2.6 million passengers traversed its gates. Now, twenty years later, the 7,600 acres of former beet fields handled over 26 million passengers, surpassing Paris Orly for the first time. Over 80 million annual passengers are projected by the year 2030. According to Aeroports de Paris (ADP), three waves of development have positioned CDG to become Europe's first true "airport city." ADP is the airport regulatory unit of the French government. It has fiscal autonomy, and borrows on the private market.

Defined as an international, multimodal transport center of people and goods, the airport city will emphasize a continuing program of infrastructure development resulting in a complete urban entity. The first wave involved basic airport infrastructure for passengers and air cargo, and has escalated to three terminals. The third terminal is scheduled to be delivered in 1997.

The second wave of development (Roissytech) has concentrated on specialized facilities and small modular warehouses in a 270,000 square foot facility, and a cluster of office, laboratory and storage space for high-tech firms. When fully built, Roissytech will contain over 320,000 square feet of mixed-use space. Currently, 145,000 square feet of space have been built; over 100,000 square feet of space have been occupied since the facility opened in 1991. Also under development is a new air freight logistics center with over 860,000 square feet of warehouses and nearly 200,000 square feet of office space on a 54 acre site. This is a multimodal air-road facility, with simplified customs procedures and new materials handling technology. The facility is projected to handle 400,000 tons of freight annually. Examples of current tenants include La Poste (postal sorting center for Chronopost express mail service), Le Figaro France Soir (newspaper printing and distribution) and Air France (maintenance for Air France and other airlines).

The third wave of development, Roissypole, will create a complete business city. Its first facility, Continental Square (1992) has captured 10 tenants to the 260,000 square foot, four building complex. The second project, Le Dome, is composed of smaller spaces (164,000 square feet in eight buildings), and opened in 1993. The third project is the headquarters of Air France (650,000 square feet), scheduled to come on line in 1995. There are also several hotels, a shopping mall and an exhibition center under development. Over fifty percent of the space put

on the market since 1992 has been rented. ADP development plans forecast a $2 billion investment between 1993 and 1997.

General Comments and Observations

The examination of the preceding examples provides a cross section of experience for assisting in a determination of the path for the Commonwealth.

- Alliance, while somewhat slower to develop than predicted, has the space for future expansion and has begun to target specific industries. Alliance officials indicate 1994 has been a year of increased interest in the facility.
- De Gaulle has been in development for twenty years, and may provide the best example of a concentrated effort with a long-term plan for the integration of land use and transportation access.
- Global TransPark, while not currently on line, demonstrates both a serious funding commitment and significant economic development competition from our southern neighbors. Global TransPark is perhaps the purest example of the concept of a comprehensive economic development center, and a good example of public and private sector cooperation.
- Alameda Corridor, while not a comprehensive economic development center under the strict definition of the term, serves as a good example of the continued importance of enhancing existing intermodal facilities.

Virginia has the potential to utilize both methods of development to capitalize on short term strengths and to emphasize several key points concerning future economic development. First, the importance of public and private sector cooperation seems to have emerged as a critical element for aviation-based CEDCs. Also, the integration of transportation infrastructure development with land-use planning is essential, since the scale of a comprehensive economic development center facility encompasses many more facility and land uses than a traditional airport or industrial park. Seamless integration of different modes of transportation and the capability of reaching international markets daily are critical elements for comprehensive economic development centers. A focus on high-tech industries and finished goods that are transportable by air at a reasonable cost will constitute the backbone of comprehensive economic development centers.

CHAPTER III -- CEDC POTENTIAL SITES IN VIRGINIA

Washington Dulles International Airport

With the formation of the Washington Airports Task Force twelve years ago, Washington Dulles International Airport has implemented a focused, planned approach to airport development. Because of this approach, Washington Dulles has demonstrated excellent potential for further development. For example, Washington Dulles recently ranked second as an East Coast Transatlantic Gateway (May 1994), with 129 weekly departures. A significant factor in the gain in rank is the addition of air service to Africa and the Ukraine, which are *emerging* markets, as opposed to the traditional European market. By positioning Washington Dulles to serve new markets, the potential for sustained economic growth in the region is strong. To summarize the region, the Washington Airports Task Force has prepared a document entitled *Washington Dulles: Gateway to Growth.* Summary statements from the study include:

- The international service area for Washington Dulles passed the greater Chicago area in 1988 to become the third largest economic entity in the United States after Los Angeles and New York. Major reasons for this region's growth are its strategic location, excellent transportation infrastructure and proximity to markets.

- The Dulles service area contains the Nation's Capital and is within a two-hour flight or day's truck journey of 60 percent of the consumers in the United States.

- Growth in the Washington portion of the region has been rapid and concentrated in the private sector. In 1990, one in every four people employed held a job which did not exist in 1983; the federal government now accounts for only 16.6 percent of regional employment.

- High-tech and service oriented companies dominate Washington's private sector. These employers, on average, have a 50 percent higher propensity to travel than other United States industries. As a result, for every job in the Washington area, ten airline tickets are sold each year.

- Growth in jobs has matched growth in population within the National Capital Region leading to the highest income per household of any city in the United States.

- Among major United States markets, Washington has the highest percentage of professionals, managers, and women in its work force.

- Washington's air cargo has grown rapidly since 1983; 21.9 percent of the National Capital Region's exports now move by air. These exports were worth $5.8 billion in 1989.

- Washington and its neighboring states are major tourism destinations whose regional governments invest significant funds to attract European and foreign tourists to the National Capital Region.

- Over the next twenty years, the population of the National Capital region is projected to increase from 3.7 million to 4.5 million and the number of persons employed from 2.4 million to 3.4 million. Much of this growth is projected to occur in areas convenient to Washington Dulles International Airport.

Indicative of this rapid growth is the track record for air cargo traffic. The number of domestic wide-body services has doubled since 1982, and international service has increased by over 400 percent in the same period. Washington Dulles has an annual cargo growth rate of 17.8 percent, nearly double the world cargo average of 9 percent. In 1993, total freight and mail cargo grew 22 percent, the second highest growth rate among the world's leading airports. According to a recent study by Leeper, Cambridge & Campbell for the Metropolitan Washington Airports Authority, Washington Dulles has achieved growth in international freight well above other U.S. gateway airports. Specifically, between 1983 and 1993, total import/export weight going through Washington Dulles grew at an average annual rate of 18.8 percent, compared to 14.9 percent for Atlanta, 3.4 percent for New York/JFK and 6.7 percent for the nation. Current physical plant includes 11,000 acres, three runways over 10,500 feet and 400,000 square feet of space in 5 cargo buildings. Foreign Trade Zone #137 has over 200 acres available in the World Cargo Center area. Projected improvements include two additional runways, each over 10,000 feet, two additional cargo buildings with 250,000 square feet of space, and an eventual build-out in additional buildings to reach an on-airport total of one million square feet.

Washington Dulles is positioned well for growth as an intermodal hub and a comprehensive economic development center for the Twenty-first Century. There are, however, transportation challenges that face the region over the next decade that will impact growth in the next Century. As cargo shipments have increased over the last decade, additional strain has been placed on existing ground access to Washington Dulles. Also, vast changes in commuting patterns in the region, from suburban-to-core, to suburban-to-suburban, have put additional strain on roadways due to the increase in vehicle usage and low usage of the Metro system in Fairfax. The Washington Airports Task Force has identified several projects they support that will enhance the competitiveness of Washington Dulles. These include:

- the extension of the Dulles Toll road to Leesburg (currently under construction);
- HOV lane development through the corridor;
- support of the construction of a western bypass around the current urban edge. The Task Force favors the route furthest to the east, which will pass east of Goose

Creek and west of Washington Dulles, and is the closest of the alternatives under consideration;

- support of the development of a bus-based transit system throughout the Dulles Corridor to begin to create transit ridership patterns in the short run, and act as a feeder system to a future rail system;
- support of the development of a passenger rail system over the next decade;
- support of the goals delineated by the Washington Airports Task Force;
  * accelerate the economic return from new air services, generate the air service needed to position the region strategically with respect to *emerging* world markets, and support the business and tourism initiatives of the region
  * support the Metropolitan Washington Airports Authority Capital Development Program at Dulles
  * work for reliable access to Dulles from all parts of the region
  * support expansion of the National Air and Space Museum on site
  * promote Dulles as a World Cargo Center.

In a recent report, *All Aboard! The Case for Rail in the Dulles Corridor*, the Task Force outlines a detailed plan for the development of the transit and rail systems. Their conclusion is that for Washington Dulles to remain a leading economic development center, transit issues must be faced now. Specifically,

> "Today's congestion is a measure of our region's failure to implement integrated land-use and transportation planning in the 1960s, a failure which led the region's transportation to take a significant backward step toward increased reliance on the automobile in the 1980s. Clearly, we need to learn from the recent past and develop the transit systems and plan land-use in a compatible manner."

Washington Dulles, while on line for ten years longer than De Gaulle, demonstrates the lack of a regional integrated land-use and transportation infrastructure plan. Only over the last several years has the Washington Airports Task Force been able to assemble a comprehensive plan for approaching the project on the scope of De Gaulle. Washington Dulles also has the space for future expansion, and with the advent of rail in the Dulles corridor over the next decade, has the true potential to evolve into a leading comprehensive economic development center. Recalling the definition of comprehensive economic development center, in its broadest sense, and remembering the example of Charles De Gaulle Airport in Paris, suggests the Washington Airports Task Force should be a leading element in the next decade to transform the Dulles Corridor and its environs into a true comprehensive economic development center.

The high incidence of technology-based firms in the region, and their high usage of air transportation also signifies a strong potential. Technology-based economic development has been the norm in the region over the last decade, with Washington Dulles being both a source and a catalyst for this type of development. Infrastructure improvements, transit and rail systems are a logical evolution for the continued success of the region. The strength of air cargo growth

and the move by the Task Force to integrate land-use planning with infrastructure development are critical elements to elevating the Dulles Corridor to world class proportions during the "fifth wave" of economic development.

Virginia Inland Port

The Virginia Inland Port (VIP) began operations in 1989. The primary focus in the initial development of VIP was to access markets in Maryland, Washington, D.C., Pennsylvania, the Ohio Valley and West Virginia that would normally truck goods to and from other ports north of Virginia. VIP is 220 miles inland at Front Royal. The facility is one mile from I-66, and within 5 miles of I-81. The site has 161 acres, a maintenance facility for road repairs, a warehouse facility and five rail spurs that run the length of the site. It is a U.S. Customs designated port of entry. There is a general aviation airport several miles south of the facility (Front Royal/Warren County Airport). The airport currently has a 3,000 foot runway. Nearby Winchester Regional Airport has been designated as the official airport for use by the VIP. Winchester Regional currently has a 5,500 foot runway and uses customs and immigration services through Washington Dulles.

The VIP was originally marketed for international trade, stressing the Norfolk Southern connection to the Norfolk International Terminals at the Ports of Hampton Roads. From modest beginnings, the VIP has increased volume and become viable based on the strength of recent domestic cargo transfers.

As a site for a comprehensive economic development center, the Virginia Inland Port has some limited potential. Other examples noted in Chapter II all have considerably larger tracts of land available for development. With only 161 acres a pragmatic approach would suggest the Inland Port remain an intermodal hub. There is a tract of land adjacent to the Inland Port (Clifton L. Good Site) available for development. Preliminary plans show a small industrial park tied directly to the rail facilities. The site is 220 acres, again, small in comparison to centers in other states. A possible alternative for consideration would be to tie the Virginia Inland Port to Washington Dulles by rail. The Inland Port is approximately 50 miles from Washington Dulles, and could possibly serve new commercial expansion at Washington Dulles as a site for component manufacturers to complement new, "just-in-time" manufacturers likely to be attracted to Washington Dulles.

Ports of Hampton Roads

The consolidation of the Ports of Hampton Roads in 1982 marked a new era for Virginia. Since the consolidation, Hampton Roads has risen to be the second leading port on the East Coast, behind New York. Twelve years of sustained growth, with a strong commitment to technology, have propelled the Ports of Hampton Roads to world-renowned excellence in customer service and the efficient handling of containers and cargos. At the end of 1991, 117,500 Virginians held

port or port-related jobs, with a payroll of $2.4 billion, and over $275 million in tax contributions to the state. Rapid growth and future expansion plans have resulted in a need to upgrade infrastructure and access to the ports. These improvements will be necessary to keep the Ports of Hampton Roads competitive in the Twenty-first Century.

As an intermodal facility, Hampton Roads is already one of the world leaders. As a comprehensive economic development center, a slightly different approach than the aviation focus of other sites may steer future development of the ports. For example, as the aviation-driven comprehensive economic development centers attract firms and handle their inputs and outputs primarily by air, the Ports of Hampton Roads will find it necessary to become more efficient and add services to maintain their market position. Concentration on breakbulk cargo may help bolster the ports' development prospects in the future. Dr. Kasarda's theory of massive shifts to air cargo should be monitored in the coming years, and the Ports of Hampton Roads should take an aggressive position to combat attrition in cargo shipments that have a high probability of transfer to air cargo movements. Another view for consideration is one of tying the Ports of Hampton Roads to Global TransPark. North Carolina's marketing efforts for the park place a high emphasis on rail access. Both Norfolk Southern and CSX will serve Global TransPark. Arnold B. McKinnon of Norfolk Southern is, in fact, chairman of the Executive Committee of the Board of Directors of the Global TransPark Foundation. The Ports of Hampton Roads could leverage the railway relationship with Global TransPark to capture additional component and raw materials shipments, as appropriate, to and from Global TransPark.

The Ports of Hampton Roads completed a Ports Access Study in 1993 in which necessary highway and rail improvements were detailed. These include significant expansions and interchange improvements on I-64 and U.S. 17, as well as future plans for improving several at-grade crossings to grade-separated crossings at critical access points. Other important access projects proposed include an additional parallel tube that accommodates two lanes of travel in each direction at the Midtown Tunnel between Norfolk and Portsmouth, an extension of I-564 allowing direct limited access to Norfolk International Terminal and a new tunnel/bridge combination between Norfolk and Portsmouth designated as the Uptown Crossing. No site has been specified for this crossing. Estimated costs from the study approach $1.52 billion for southeastern Virginia, and nearly $1.2 billion in other areas of the state. These projects should be examined to determine if they can be made part of the National Highway System and receive funding assistance from the Federal government.

I-73 Corridor/Smart Highway

In October, 1994, a consortium including General Motors, Bechtel, Martin Marietta, Hughes Aircraft, the Virginia Department of Transportation and the Center for Transportation Research at Virginia Tech was awarded a federal contract to build a two-mile section of Smart Highway in Montgomery County. The road will serve as a research and testing facility for automated vehicles. Smart Highway technology includes both intelligent vehicles and intelligent highways. Intelligent vehicles will be equipped with sensory devices, on-board mapping systems and

communications equipment that allow the transfer of data (such as 'there is a traffic jam on Route X, re-route your path to the office using Route Y'). Intelligent roads will contain sensory devices and cameras, and will be linked to central information systems that update and disseminate current information to traffic monitoring centers and motorists. When completed, the Smart Highway will be a $50 million, 5.8-mile four lane highway that will connect Blacksburg with I-81. The intelligent vehicle and automated highway technologies are projected to become a $300 billion industry in the next decade. The Smart Highway project is also scheduled to receive over $18 million in Federal Demonstration Funds and State Funds. The Smart Highway is encompassed within the I-73 corridor.

According to the Dr. Kasarda's contemporary theory of aviation-based comprehensive economic development centers, a potential site should have several characteristics. First, adequate highway access is necessary. The I-73 corridor, and specifically, the area around Blacksburg, has excellent access to I-81, the West Virginia Turnpike and I-77. Next, rail access is needed. Norfolk Southern operates two lines that transverse the I-73 corridor and run to the Ports of Hampton Roads. Most importantly, a comprehensive economic development center must have an air cargo facility. There are general aviation airports at Blacksburg (Virginia Tech) and Martinsville (Blue Ridge Airport). Officials at the Virginia Tech airport are in the process of completing a master plan, which includes limited site improvements. In addition to these characteristics, the site should be located in a relatively rural area that facilitates unimpeded allows unencumbered access to all modes of transportation. The I-73/Smart Highway area exhibits many of these characteristics. This area is already committed to a project that will be acknowledged throughout the world as a leading transportation research center. Among the questions to be addressed are the expansion potential of the general aviation airport at Virginia Tech and the availability of a suitable tract of land in the 15,000 to 20,000 acre range. The strength of Federal funding and Virginia Tech's Center for Transportation Research, coupled with the potential development spawned by a new industry and new access to markets in Kentucky, Tennessee, West Virginia and western North Carolina enhance the potential for the I-73 Corridor/Smart Highway for the formation of a comprehensive economic development center. This area is also outside of Virginia's nonattainment areas and will require less stringent economic and environmental requirements than a site located in a nonattainment area.

Virginia Gateway 21

Virginia Gateway 21 is designed primarily as a passenger consolidation point for three regional airports (Richmond, Newport News/Williamsburg and Norfolk) that are projected to be overloaded by the early Twenty-first Century. According to the "fifth wave" theory, however, transportation infrastructure improvements integrated with land-use planning should focus on the industrial development side first, followed by passenger and commuter transportation. Future studies and searches for an appropriate site for Virginia Gateway 21 should factor these considerations into the planning matrix. Additional considerations include the proximity to and competition from Global TransPark and linking cargo movements to the Ports of Hampton Roads, as appropriate.

CHAPTER IV -- CONCLUSIONS

The broad geographical distribution of the sites discussed in Chapter III, Virginia's demonstrated strength as a major east coast international port of call, excellent access to domestic markets and the strategic planning efforts that will target key industries for the state can lead the Commonwealth on a long-term, balanced growth path into the Twenty-first Century. Key findings include:

1. While existing CEDCs have been somewhat slow to develop, long-term implications (based on the De Gaulle and Washington Dulles histories) indicate a gravitational effect for incremental business location activity where the appropriate infrastructure already exists. This may mean it may take several decades to build a CEDC to its market capacity. But the advantage is, as Research Triangle Park in North Carolina has shown, adequate facilities will fill to capacity as the industrial base grows. Virginia is in an advantageous position to offer a variety of sites. Few other states can offer the array Virginia has to offer: for the short-run, as a tactical approach, bolster Virginia's existing facilities at the Virginia Inland Port, the Ports of Hampton Roads and Washington Dulles; for the longer-term, strategic approach, develop the I-73 Corridor/Smart Highway, continue to examine the feasibility of Virginia Gateway 21, and continue to develop the Virginia Inland Port, the Ports of Hampton Roads and Washington Dulles with significant capital improvements leading to increased intermodal connectivity.

2. Virginia has existing infrastructure capable of supporting near-term tactical efforts required to implement the *Virginia Connections* [Transportation] and *Opportunity Virginia* [Economic Development] strategic plans. These sites include Washington Dulles International Airport, the Virginia Inland Port and the Ports of Hampton Roads.

3. Virginia has sufficient existing infrastructure with significant upgrade potential to establish comprehensive economic development centers in a geographically diverse environment. Many areas of the Commonwealth could experience positive effects from the development of these sites. These include the I-73 Corridor/Smart Highway and Washington Dulles Airport.

4. Virginia has studies in progress to determine the feasibility of designing, building and launching a major international superport, Virginia Gateway 21. This is a long-term commitment and the process of site selection and environmental impact should be addressed in the near future. Also, high-speed rail access may be an important element in moving the large numbers of passengers necessary to support the planned facility.

5. Virginia has embarked on several important transportation initiatives. The *Virginia Connections* strategic plan, the Smart Highway and the Dulles Task Force have the information base and demonstrated public support to establish a critical mass for the integration of land use planning and transportation infrastructure development.

6. Virginia has developed a comprehensive strategic plan for Economic Development, *Opportunity Virginia.* This document outlines an organizational structure and specifically targets ten sectors of the economy for concentrated development efforts. Eighteen Regional Economic Development Advisory Councils have been established as part of the strategic planning initiative and can serve as conduits to promote joint projects between state and local governments and the private sector.

7. Other states have developed and implemented plans that will lead to the development of comprehensive economic development centers. Alliance (Texas) and Global TransPark (North Carolina) are new facilities. Charles De Gaulle (France) is a facility in its third stage of development. All three examples have made extensive use of long-term planning for the integration of land use and transportation infrastructure. All three use a combination of public and private sector financing.

8. As new forms of transportation have fostered economic development throughout history, an aviation-based "fifth wave" is underway. Contemporary theory suggests aviation will drive a global economy, where multi-national component and materials sourcing for manufacturing becomes the norm. Geographic areas that are not able to provide adequate access to air transportation will lag significantly in economic development. Both public and private sector initiatives and financing will be effective components in the "fifth wave."

9. A comprehensive economic development center requires the extensive use of intermodal transportation facilities and relies heavily on seamless interconnectivity, mixed-use land development, concentration on international markets, and transportation infrastructure development that complements the mixed-use land development. Comprehensive economic development centers are largely aviation-based. The focus of these centers is on distribution centers, high-tech firms, export markets, research and development facilities, office facilities, and retail and support services. Manufacturing facilities emphasize "just-in-time" processes. All CEDC examples had direct ties for each type of land use to more than one mode of transportation. In short, a CEDC is a "gathering of activities," interconnected by at least two modes of transportation, with seamless integration between modes and directly tied to air transportation.

10. North Carolina has made extensive commitments to build Global TransPark from the ground up and is similar to the Alliance project in Texas. Virginia has facilities that can be upgraded and positioned competitively against Global TransPark. Based on the Alliance experience, in five to eight years Global TransPark will be a significant competitor. But, Virginia has an immediate advantage that may be exploited while Global TransPark begins construction: Washington Dulles. Virginia also has a developing area in Southwest Virginia (I-73 Corridor/Smart Highway) that can build access to new markets and new technology-based industry. University resources could be co-located and foster improved educational development with industrial ties.

11. As international markets expand, there may be additional opportunities for agricultural as well as manufactured products for distribution. By learning more about newly developed markets and studying consumption patterns, adjustments in Virginia's agricultural mix may be instituted to exploit overseas consumption habits and enhance the value of agricultural exports.

CHAPTER V -- RECOMMENDATIONS

A comprehensive economic development center (CEDC) is defined as an intermodal facility that includes some combination of air, rail, water and ground transportation capabilities. Movement between the modes of transportation approaches a seamless logistical system of materials movement from source to manufacture to delivery with a focus on "just-in-time" manufacturing and rapid delivery to international markets. Current economic development theory promotes the trend towards an aviation-based "fifth wave" of development. Multi-national sourcing of manufacturing components, increased access to international markets, "just-in-time" manufacturing and the growth in air cargo movements will characterize the new development era. As the world grows closer together through aviation technology, and as multi-national sourcing for manufacturing expands, economies will be transformed into aviation-dependent entities for many products. The concept of an aviation-based comprehensive economic development center is a logical extension of following the next advance in transportation technology. The concentration on an aviation-based industrial complex can be expected to foster additional growth in support facilities and residential communities. It is, therefore, *essential* to integrate the transportation infrastructure with land-use planning.

In Virginia, a strong infrastructure already exists. In addition, there are sites that have potential for development as comprehensive economic development centers. The Commonwealth should utilize existing infrastructure first by building these facilities to full capacity and integrating them throughout the state in order to minimize capital investments. This includes upgrades and expansions to existing facilities where necessary. But Virginia must also position itself for economic development into the next century. Accordingly, the following recommendations are made:

1. Prioritize infrastructure development projects by cost, funding availability and projected economic impact for the completed facility. Develop a model and methodology to measure the projected impact of a specific project so that priorities can be established in an objective manner, consistent with long term strategies for the state. Push for public and private sector cooperation and privatize operations where feasible. Exploit every opportunity to designate Foreign Trade Zones as an element of local economic development proposals.

2. For Washington Dulles International Airport, concentrate on implementation of current initiatives:
   - the extension of the Dulles Toll road to Leesburg (currently under construction);

- HOV lane development through the corridor;
- support the construction of a western bypass around the current urban edge. The Task Force favors the route furthest to the east, which will pass east of Goose Creek and west of Washington Dulles, and is the closest of the alternatives under consideration;
- support the development of a bus-based transit system throughout the Dulles Corridor to create transit ridership patterns in the short run, and act as a feeder system to a future rail system;
- support the development of a passenger rail system over the next decade;
- use Aviation Fund entitlements for expansion;
- work with adjacent localities to focus on the expansion and potential for increased economic development with an emphasis on the integration of land-use planning and transportation infrastructure development;
- work with local governments to leverage marketing efforts for the airport, and the region as a whole;
- support the goals delineated by the Washington Airports Task Force.

These initiatives will enhance the marketability of Washington Dulles and the region as a whole. Attracting additional high-tech firms to the area will solidify the local economy, expand the tax base and provide new opportunities for employment in an area that is projected to grow rapidly in the Twenty-first Century. Channeling job creation opportunities towards high-tech firms also supports the initiatives in the Commonwealth's strategic economic development plan, *Opportunity Virginia.*

3. At the Port of Hampton Roads, support the implementation of the VPA's Marketing, Operations and Development Plan (October, 1994), including intermodal rail improvements relative to key intermodal development at Norfolk International Terminals and Portsmouth Marine Terminal. Additionally, support the implementation of highway improvements detailed in the 1993 Ports Access Study. These include significant expansions and interchange improvements on I-64 and U.S. 17, as well as future plans for improving several at-grade crossings to grade separated crossings at critical access points. Other important projects to be considered include an additional parallel tube that accommodates two lanes of travel in each direction at the Midtown Tunnel between Norfolk and Portsmouth, an extension of I-564 allowing direct limited access to Norfolk International Terminal and a new tunnel/bridge combination between Norfolk and Portsmouth designated as the Uptown Crossing. Enhancing existing infrastructure is an essential element in an overall growth strategy for Virginia. With the advent of intelligent vehicle and intelligent highway technology in other areas of Virginia, the Ports of Hampton Roads must also continue to improve to ensure and support a balanced, long term strategy of economic development.

4. For the Virginia Inland Port (VIP), support the required market-driven development of the VIP as outlined in the Marketing, Operations and Development Plan. Utilize the VIP as an economic development tool to enhance the competitiveness of the region and attract

industries targeted through the *Opportunity Virginia* initiatives. Leverage the VIP through local economic development organizations and the Regional Economic Development Advisory Council specified in *Opportunity Virginia*. Encourage and support the local communities to implement pre-emptive zoning in the vicinity of VIP to reduce long-term conflicts with residential housing. Study the feasibility of direct rail access from the VIP to Washington Dulles, in addition to existing rail access to the Port of Hampton Roads. Support local zoning and plans for improved highway and rail infrastructure between Washington Dulles and VIP to accommodate a logistics/distribution corridor which will attract world-class industrial/transportation clients. Combine light rail commuter development with heavy rail requirements so that Washington Dulles, VIP and points in-between can be served with both intermodal and passenger rail service. Right-of-way acquisition should be forward-looking enough to anticipate double-tracking along with air and underground rights for pipelines, power lines and communication conduits. Also, target businesses that are export-oriented or process components for "just-in-time" manufacturers along the rail line or in Washington Dulles. Additionally, identify key existing and potential rail/highway crossings in the vicinity of VIP and plan for grade separation to reduce local complaints and to ensure high speed rail transit. The development of the area around the VIP can assist in extending the strength of the Washington Dulles region to a wider geographical base, and provide new opportunities for growth in the localities of the region.

5. Study long term development and infrastructure projects in the I-73 Corridor/Smart Highway. Leverage the development of smart highway and smart vehicle technologies through the Center for Transportation Research (Virginia Tech) and the Center for Innovative Technology. Study the feasibility of expanding the New River Valley Airport to handle the jumbo air freighters of the future. Begin conceptual design of an aviation-based comprehensive economic development center that focuses on the new intelligent vehicle/highway industry that will develop as a result of the National Highway System initiatives. The I-73 Corridor/Smart Highway area is poised for sustained growth in the coming years. The development of intelligent vehicle and intelligent highway technology in the corridor has the potential to spawn rapid growth. The critical path for development of the new industry in the area is through the integration of land-use planning and transportation infrastructure development principles to realize the fullest potential for the Commonwealth. The characteristics essential for the formation of a comprehensive economic development center are present in I-73 Corridor/Smart Highway, and can be leveraged through the development of a new industry. Utilize the resources of the Center for Transportation Research, the Community College System, the Regional Economic Development Advisory Council, and other appropriate organizations in the area to coordinate a study and design plan for the corridor. The focus on the creation of high-tech transportation job opportunities is consistent with the goals in the *Opportunity Virginia* and *Virginia Connections* plans.

6. Identify and recommend enhancements to current freight corridors linking ports by rail and highway to national freight corridors and air freight hubs. Extend and coordinate

smart highway and smart vehicle technologies to freight corridors. Leveraging the technology developed in the I-73 Corridor/Smart Highway to other areas of the state can provide a competitive advantage for Virginia. Develop dedicated freight corridors which will connect to the current Port Intermodal Infrastructure to support seamless freight flow concepts.

7. Support a comprehensive inter-agency effort to develop a statewide Geographic Information System (GIS). Establish a central point of control for the assimilation and standardization of information. Allow dissemination of information requests through a distributed computing environment. Implement an ongoing effort to develop secondary sites. Use the methodology developed for this study as a benchmark tool to compare future results in conjunction with the implementation of *Virginia Connections* and *Opportunity Virginia* initiatives. Use the GIS as an economic development tool by developing additional databases that concentrate on the needs of existing industry as well as potential relocation candidates.

8. Integrate the development of the I-73 Corridor/Smart Highway, Washington Dulles and the Ports with the 18 Regional Economic Development Advisory Councils. Use the knowledge gained through the development of these centers to assist other areas of the state in planning for future infrastructure development. Use the initial sites to further refine the target prospects pursued by VDED. Foster joint economic development projects that utilize public and private sector resources and privatization (where feasible) through the network of local economic development organizations. Use the *Opportunity Virginia* organizational structure to formalize the study of possible CEDCs. Allow localities the opportunity to work with local corporate citizens and the eighteen regional economic development advisory councils to bring proposals before the General Assembly for economic development projects that integrate transportation infrastructure with land-use planning. Establish proposal standards that mandate the combined use of land-use planning and transportation infrastructure development. Design a marketing plan based on CEDC site study results and the proposal standards that will compete directly with Global TransPark, Alliance and other CEDCs that are likely to be established. Devise a promotional strategy that presents Virginia as a state that is well positioned to compete in the worldwide marketplace.

9. Examine the feasibility of expanding agricultural exports through Washington Dulles and the Ports as new international connections or steamship lines are developed. Study the first efforts of Global TransPark to enter new export markets through new international connections. Cross reference new international destinations with their agricultural needs. Disseminate the information to Virginia farmers through the Virginia Department of Agriculture and Consumer Services and its extension services. By studying the agricultural needs of emerging markets Virginia's agricultural mix can be enhanced and expanded for these new international markets.

10. Continue to develop the concept of Gateway 21. Acknowledge the study initiatives that are currently underway, and expand the scope of the project to include more cargo facilities and on-site and/or adjacent manufacturing, distribution, food production and communication facilities. Factor into the studies the potential competition of Global TransPark.

APPENDIX A -- SENATE JOINT RESOLUTION NO. 62

1994 SESSION
ENGROSSED

LD6970749

SENATE JOINT RESOLUTION NO. 62

Senate Amendments in [ ] — February 8, 1994

Requesting the Secretary of Commerce and Trade and the Secretary of Transportation to conduct a study of the concept of comprehensive economic development centers for possible implementation in the Commonwealth of Virginia.

Patrons—Waddell and Calhoun; Delegates: Albo, Callahan, Harris, Keating, McClure and Plum

---

Referred to the Committee on Rules

WHEREAS, a comprehensive economic development program for the Commonwealth of Virginia is a critical factor in the ability of the Commonwealth to create skilled, high-paying jobs for its citizens, develop the revenue base necessary to fund transportation and other infrastructure improvements, ensure quality public and higher education programs, and provide various other public safety, health, and other programs for the citizenry of the Commonwealth; and

WHEREAS, a comprehensive, integrated, and balanced transportation program involving air, water, and land transportation facilities is also a critical factor in fostering and maintaining an effective economic development program; and

WHEREAS, the Virginia Chamber of Commerce has recently issued a two-year study entitled "An Economic Vision for Virginia," which calls for a comprehensive state program to encourage a wide variety of business programs such as aerospace, biotechnology, systems integration, international trade, maritime, manufacturing, tourism, etc., in the Commonwealth through a broad-based program of tax incentives, infrastructure improvements, etc.; and

WHEREAS, the concept of comprehensive economic development centers, such as the State of North Carolina's "Global TransPark," wherein a seamless logistical system of materials movement from source to manufacture to delivery — including an airport, rail lines, highways, telecommunications and materials handling — combine to facilitate just-in-time manufacturing, appears to be a major economic development concept for the 21st century; and

WHEREAS, the Virginia Inland Port, located near Front Royal in Frederick County, in close proximity to Interstate Route 81 and Interstate Route [~~70~~ 66] and enjoying direct access to rail transport, is an example of a transportation-only economic development center and might well serve as a future site for a comprehensive economic development center involving manufacturing as well as a logistical materials movement system; and

WHEREAS, the Commonwealth of Virginia has a number of other areas where aviation, rail and highway facilities and, in some cases, seaports or navigable streams are in close proximity to land already properly zoned for commercial and industrial use and within a 500-mile radius of nearly one-third of this nation's markets in terms of population; now, therefore, be it

RESOLVED by the Senate, the House of Delegates concurring, That the Secretary of Commerce and Trade and the Secretary of Transportation be requested to study the appropriateness of a statewide program to foster comprehensive economic development centers involving integrated transportation facilities co-located with high technology research and development, manufacturing, and related facilities. This study shall also identify potential sites for the location of such centers, provide an analysis of relevant factors and costs for instituting such a program, and make such recommendations as may be considered appropriate.

The Secretaries shall complete their work in time to submit their findings and recommendations to the Governor and the 1995 Session of the General Assembly as

processing legislative documents.

Official Use By Clerks	
Agreed to By The Senate	**Agreed to By The House of Delegates**
without amendment ☐	without amendment ☐
with amendment ☐	with amendment ☐
substitute ☐	substitute ☐
substitute w/amdt ☐	substitute w/amdt ☐
Date: _____	Date: _____
_____	_____
Clerk of the Senate	Clerk of the House of Delegates

APPENDIX B -- TECHNICAL NOTE ON METHODOLOGY

The aggregation of business establishment, educational facility and infrastructure data was accomplished with the cooperation of the Virginia Employment Commission and the Department of Planning and Budget. The methodology was coordinated across agency lines by Timothy C. Grollimund, a research economist.

Virginia Employment Commission

Larry Robinson of the Economic Information Services Division used an extract of the ES202 file. Establishment addresses were matched and longitude/latitude coordinates appended in a two stage process. First, records were extracted from the ES202 Employment file for SIC codes 20-39, 40, 42 and 45 (7,869 records). These codes represent all manufacturing establishments and selected transportation establishments. The resulting file was matched with a CD-ROM based Zip+4 file maintained by the U.S. Postal Service. A match rate of 89.3% was achieved. The second step of the geocoding process requires another CD-ROM based file, which takes the Zip+4 address and adds census tract, block group, latitude and longitude. Appending latitude and longitude allows the establishment to be shown as a precise point location on a map.

The final form of the file contained the following fields:

Field Name	Description
SIC	Standard Industrial Classification Code
TRADE	Business Name
ADDRESS	Mailing Address
CITY	
STATE	
ZIP	
TRACT	Census Tract Number
BG	Census Block Group Number
LAT2	Latitude
LON2	Longitude
EMP3	Employment

The file was formatted in DBF format using Foxpro and delivered to the Department of Planning and Budget.

Department of Planning and Budget

Alfredo Frauenfelder is the State Geographic Information Systems Coordinator. Previous to receiving the VEC file, a base map was prepared using the following layers of data:

City/County Boundary Lines
Railways
General Aviation Airports
Commercial Airports
Community Colleges
Four-year Colleges and Universities
Major Highways
Ozone Nonattainment Areas
Enterprise Zones

The result was a detailed map of Virginia's transportation and educational infrastructure. The VEC file was loaded into the Geographic Information System (GIS) and used as the final layer of information. The longitude and latitude information is currently being verified for accuracy. Upon completion, the GIS will have the capability of point sourcing and plotting establishments by industry type. The resulting map series will show manufacturing and transportation establishments revealed as clusters around the transportation and educational infrastructure.

Many other uses have been discussed and will be implemented from this base information. The next project for consideration in the comprehensive economic development process will be the geocoding and transferral of the Department of Economic Development Site and Building file. This file contains an updated list of site and buildings available for development throughout the state.

APPENDIX C -- SELECTED BIBLIOGRAPHY

The following is a partial list of sources used in the preparation of this study:

Alameda Corridor Transportation Authority. "The National Significance of the Alameda Corridor", (February, 1994).

_____. "Testimony of the Alameda Corridor Transportation Authority before the Subcommittee on Surface Transportation, Committee on Public Works and Transportation, U.S. House of Representatives," (March 15, 1994).

Anselmo, Joseph C. "Smart Highway business attracts Aerospace firms," *Aviation Week and Space Technology*, vol. 140:5, (January 31, 1994), p. 56.

Candler, Julie. "Just-in-time deliveries", *Nation's Business*, vol. 81 (April, 1993), p. 62.

_____. "Road and rail connections," *Nation's Business*, vol. 82 (July, 1994), p. 73.

Conway, McKinley. "Airport Cities 21: The New Global Transport Centers of the 21st Century," *Site Selection*, (June, 1994), pp. 460-476.

de Voursney, Robert M. "To Disney and Beyond: Creating an Economic Development Strategy for Virginia," *University of Virginia Newsletter*, vol. 70:7, (August, 1994).

Frauenfelder, Alfredo C. "An Update on the Virginia Geographic Network," *Virginia Review*, (July/August, 1994), pp. 40-42.

Fuquay, Jim. "Patience pays off to the tune of $200 million; Deal for Federal Express was five years in the making," *The Fort Worth Star-Telegram*, (December 19, 1993), p. 1A.

Gardner, Ralph. "And Now The Fifth Wave," *Air Cargo USA*, (October, 1991), pp. 8-10.

Gill, George. "Really Heavy News: Dulles Cargo Business Grows Strongly," *The Loudoun Times-Mirror.*

Gleckman, Howard. "A Tonic for the Business Cycle: Just-in-time delivery may be the remedy for wild inventory swings," *Business Week*, (April 4, 1994), p. 57.

Grossman, Barbara. "Zen and the art of 'just-in-time' parts: TMM trains its suppliers in lean manufacturing," *Lane Report*, vol. 9:10, (October, 1993), p. 38.

Haar, Steven V. "A sweet deal; Nestle to build $20 million distribution center in north Fort Worth," *The Fort Worth Star-Telegram*, (May 8, 1992), p. 1B.

_____. "Dental-equipment maker to build facility at Alliance," *The Fort Worth Star-Telegram*, (May 11, 1993), p. 1B.

_____. "Santa Fe unveils huge shipping hub," *The Fort Worth Star-Telegram*, (April 2, 1994), p. 1B.

Hoke, John. "GM-led group wins contract; New technology to build 'smart' road," *Richmond Times-Dispatch*, (October 8, 1994), p. B4.

Hunt, James. "Logistics Down South," *Inbound Logistics*, (February, 1994), pp. 46-48.

"Increased tonnage, expanded steamship services characterize the Ports of Virginia in 1994," *The Virginia Maritimer*, (September/October 1994), pp. 14-15.

Kasarda, Dr. John D. "Global Air Cargo-Industrial Complexes as Development Tools," *Economic Development Quarterly*, Vol 5:3, (August 1991), pp. 187-196.

Keenan, Tim. "Smart highways? Not quite. (Intelligent Vehicle Highway System could be a reality by 2000," *Ward's Auto World*, vol. 30:4, (April, 1994), p. 72.

Kimley-Horn and Associates. "North Carolina's Global TransPark, Executive Summary: Master Planning and Environmental Study," (January, 1994).

Leeper, Cambridge & Campbell, Inc. "Domestic and International Air Cargo Market Study for Washington Dulles International Airport," (June, 1994).

Larance, Leigh Anne. "Attainment Anxiety," *Virginia Business*, vol. 9:11, (November, 1994), pp. 77-84.

Leach, Mark S. "All aboard for profits; Santa Fe breaks ground for transportation center near Alliance," *The Fort Worth Star-Telegram*, (January 12, 1992), p. 1B.

Liston, Linda. "The Third Wave: Paris Launches an Airport City," *Site Selection*, (June, 1994).

Miller, Luther S. "What still needs fixing in intermodal?" *Railway Age*, vol. 195, (August, 1994), p. 2.

National Association of State Development Agencies. *Virginia Economic Development Competitiveness Study*, (April, 1993).

"Peña proposal for National Highway System could have implications for aviation," *The Weekly of Business Aviation*, vol. 57:24, (December 13, 1993), p. 246.

Petzold, Roger. "Yielding the benefits of GIS," *American City and County*, vol. 109, (March, 1994), p. 56.

Powell, Barbara. "Federal Express will build Alliance cargo hub," *The Fort Worth Star-Telegram*, (December 17, 1993), p. 1A.

Rappleye, Willard C. "The Ports of Virginia: Destiny Controlled," *Financial World*, (July 20, 1993), pp. 63-70.

Reed, Dan. "American base ready for takeoff," *The Fort Worth Star-Telegram*, (June 26, 1991).

Ryans, Cynthia C. "Resources (just-in-time inventory systems)," *Journal of Small Business Management*, vol. 31, (October, 1993), p. 70.

SH&E, Inc. "Eastern Virginia Air Service Demand Study to the Year 2030," (November, 1991).

Sherber, Paul M. "Thai Industry-Transit Park is Proposed," *The Asian Wall Street Journal*, (August 31, 1994).

Slack, Charles. "Look! On the track! It's a truck! It's a train! It's Intermodal!," *Richmond Times-Dispatch*, (August 8, 1994), pp. D14-16.

Smith, Randolph. "Global Airport Soars in N.C.," *Richmond Times-Dispatch*, (July 10, 1994).

Sparaco, Pierre. "GV Rail link key to De Gaulle Growth," *Aviation Week and Space Technology*, vol. 138:13, (March 29, 1993), p. 39.

Swiger, Ernest. "NC's Next RTP-Level Success? Global TransPark," *Triangle Report*, (Autumn 1993), pp. 30-33.

"The Uses of Time." *Economist*, vol. 330, (March 5, 1994), p. m15.

Tucker, Marvin W. and Davis, David A. "Key ingredients for successful implementation of just-in-time: a system for all business sizes," *Business Horizons*, vol. 36, (May-June, 1993), p. 59.

USA-BIAS. "Free Trade, Fair Trade and Economic Progress, the Aviation Contribution," (January, 1993).

U.S. Department of Aviation. "Eastern Virginia Airport Capacity Enhancement Plan," (May, 1994).

Ward, Alvah H., Jr. "Global TransPark: Strategy for Success," *Industry Week*, vol. 242, (October 4, 1993), p. A12.

Washington Airports Task Force. "You Cannot Trade if You Cannot Get There," (August, 1994).

_____. "Washington Dulles: Gateway to Growth," (December, 1992).

_____. "Washington Dulles: America's New Cargo Gateway".

Washington Airports Task Force Rail Committee. "All Aboard! The Case for Rail in the Dulles Corridor," (December, 1993).

Welty, Gus, "What's needed to keep intermodal growing," *Railway Age*, vol. 194, (October, 1993).

_____, "Integrated transportation: can DOT make it happen?" *Railway Age*, vol. 195, (August, 1994), p. 31.

Whittington, Dennis, "Joining the Jet Set," *Planning*, (September, 1993), pp. 22-23.

Woolpert Consultants, "Ports Access Study, 1993," Virginia Port Authority.