
Georgia Construction Economic Impact Study

Written by:

Paul S. Chinowsky, Ph.D.
School of Civil and Environmental Engineering
Georgia Institute of Technology

And

Keith R. Molenaar, Ph.D.
Department of Civil, Environmental and Architectural Engineering
University of Colorado at Boulder

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Executive Summary

The Georgia Construction Economic Impact Study (GCEIS) is a statistical analysis addressing the need for greater information on the impact of the construction industry on the State of Georgia's economy. The development of the GCEIS analysis has evolved over a 14-month effort, and included representatives from the sponsoring associations and the research organizations. Incorporating data from general contractors, subcontractors, home builders, and design/engineering firms, the research team calculated the overall economic numbers for this report. Specifically, this analysis centered on developing numbers that accurately reflect a combination of existing government numbers, private industry numbers, and the survey responses. The analysis of these data points provided the basis for determining a 5.8% increase in construction expenditures within the State of Georgia from 1997 to 1998.

Overall, the construction economy in the State of Georgia and throughout the Southeast continued to be strong in 1998, reflecting the overall strength in the economy within the region. Inflation remained low at under 4% and economic expansion continued for the 8th consecutive year. Unemployment remained at the lowest rate in more than 30 years and consumer confidence continued at historic high levels. The stock market continued its climb into record territories and high-tech firms, both in Georgia and throughout the country, took their places as dominant players in the new economy.

The strong economic picture for Georgia translated into a total construction volume of \$14.283 billion. This total corresponds to 15.28% of the \$93.5 billion that was spent in the South Atlantic region and 2.2% of the \$657 billion spent nationally on construction in 1998. Associated with this volume was a direct payroll of 180,000 jobs in Georgia and a payroll of \$5.124 billion as tracked by the Bureau of Labor Statistics. As a comparison to the last published statistics in 1997, notable industries within the state had revenues as follows: the information and communication industry had revenues of \$18.939 billion, the health care industry had revenues of \$12 billion, and the education industry had revenues of \$413 million.

When the presence of the construction industry is factored into other industries within Georgia, the total impact of construction activity in the State of Georgia can be seen as follows:

Total Revenues:	\$26.589 billion
Total Employment	346,302 jobs
Personal Income:	\$9.728 billion
Business Taxes:	\$849 million

This impact represents a 2 to 1 impact from the initial construction expenditures. However, it should be noted that this impact is from a one-year construction

expenditure. The continued expenditure of similar amounts over a continued period of time will have a cumulative effect on the Georgia economy. Similarly, the 2 to 1 ratio identified here represents the impact on Georgia private industries. An expanded impact is in evidence when the impact on industries outside the state are considered and the impact created by additional public sector jobs and services. As such, the economic presence of the construction industry is spread throughout Georgia's industries. From manufacturing to services, construction revenue is recirculated into both closely related and non-related industries. For example, an illustration of a closely related impact is in the finance and real estate industries where the construction industry has a financial impact of \$1,889,551,510. Similarly, illustrations of non-direct impact occur in the food industry where an impact of \$238,199,213 is contributed and the wholesale and retail trade industries where an economic impact of \$3,135,237,700 is detected.

The overall result of this impact is an industry that is distributed throughout the state in a manner that is greater than that seen through construction sites. Specifically, the construction industry is a direct contributor to the economic health of Georgia through a diverse set of industries and personal expenditures. When combined with the profiles of industry firms that indicate existence in terms of decades, it is clear to see how construction is a primary component of the permanent Georgia economy.

Acknowledgments

The following report represents a combined effort of many individuals throughout the State of Georgia. First, this report was sponsored by a unique coalition of the Georgia Branch of the Associated General Contractors, the Georgia Chapter of the Associated Builders and Contractors, the Home Builders Association of Georgia, the American Consulting Engineers Council of Georgia, the Construction Education Foundation of Georgia and the Atlanta Chapter of the National Electrical Contractors Association.

In addition to these sponsors, the Construction Market Data Group provided invaluable assistance to this project by providing access to their project database. In combination with the numerous companies throughout Georgia who provided information on their companies, these resources provided the data used to complete this study.

Finally, the authors acknowledge the School of Civil and Environmental Engineering at the Georgia Institute of Technology, the Georgia Tech Economic Development Research Program at the Economic Development Institute, the Construction Resource Center at Georgia Tech, and the Housing Research Center at the University of Georgia for providing additional input for the project.

The individuals associated with these projects need to be acknowledged as well as the many students who spent many hours collecting data for this project.

Paul S. Chinowsky, Ph.D.
School of Civil and Environmental Engineering
Georgia Institute of Technology

Keith R. Molenaar, Ph.D.
Department of Civil, Environmental and Architectural Engineering
University of Colorado at Boulder

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Introduction

The Georgia Construction Economic Impact Study (GCEIS) is a statistical analysis addressing the need for greater information on the impact of the construction industry on the State of Georgia's economy. The GCEIS provides data to assist the industry in developing a "Comprehensive Summary" of the key contributions provided by the overall industry. Included within the study are the following focal areas:

- Employment generated by construction and construction-related activities;
- Overall revenue generated by the construction industry;
- Tax revenue generated for the State of Georgia;
- Economic trends affecting the industry; and,
- Profiles of the industry sectors including descriptions of their economic output.

The study provides an independent analysis of data to support the initiatives of owners, designers, engineers, and contractors. Combining the strengths of industry and academic institutions within Georgia, the study incorporates recognized leaders who combined to develop a comprehensive analysis of the construction industry. Developed in cooperation with construction industry members from throughout Georgia, the study utilized surveys, personal interviews, and statistical analysis to create a multi-perspective, comprehensive picture of the industry, its participants, the consumers, and the economic benefactors.

The release of this report is intended to provide benefits to the construction industry at-large and to all participants in the AEC process. The construction industry is a significant component of the Georgia economy, and thus, facilitating the success of this industry is in the benefit of all parties. However, in addition to this general statement, specific benefits of this report include:

- First Comprehensive Source of Economic-Based Statistical Data.
- Assists Companies to Benchmark their Performance Against the Overall Industry.
- Improves Organization of Long-Term Strategic Planning by Providing a Basis for Economic Trend Analysis.
- Provides a Measure to Quantify Costs Associated with Projects and Development Efforts.

Part I - Methodology

The development of the GCEIS analysis has evolved over a 14-month effort, and included representatives from the sponsoring associations and the research organizations. During this time period, the research team implemented a four-stage research effort as follows.

Phase I – Industry Activity Analysis

As documented previously, the motivation for this study originated from the lack of data currently available on construction activity in the State of Georgia. The first focus of the research team emphasized the acquisition and assembly of existing data on the industry and a definition of what the industry activity actually encompasses. In terms of the former, data was analyzed from both public and private sources. From the public sector, data from the U.S. Census Bureau, the U.S. Bureau of Labor Statistics, the Federal Reserve Board and the U.S. Department of Housing and Urban Development provided initial input for both national and regional construction statistics. However, limitations existed for each of these data sources including lack of comprehensive coverage, lack of up to date data, and limited focus on all construction sectors. Therefore, a second group of resources was incorporated into the baseline data analysis, private research data. The primary resource of the private sector data originated from the Construction Market Data (CMD) Group that is responsible for an array of industry tracking reports including the Clark Reports.

Given the combination of public and private data sources, the research team focused on defining the sectors and scope of the construction industry study. In terms of the former issue, the research team adopted the accepted industry classification breakdown for construction sectors as follows:

- Residential
- Commercial
- Highway/Heavy
- Industrial
- Government

This classification system permitted the research team to correlate the collected data with established industry data sources. As will be discussed in a later section, this classification was later augmented with geographic and professional classifications.

In terms of the scope of the industry study, the research team determined that two elements were of primary importance, the demonstration of the direct impact of the industry through company employment and revenues, and the demonstration

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of the direct impact to “first touch” industries. This second category incorporates industries that construction related firms make direct payments to on a regular basis such as financial institutions, marketing firms, insurance companies, and legal firms. The remainder of this report will emphasize this definition of the construction industry impact.

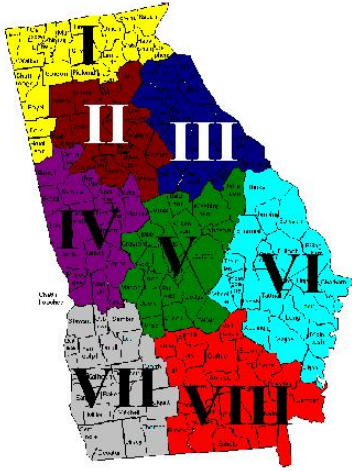
Phase II – Data Verification

Given the historic void in available data for the construction industry in Georgia, the research team undertook a verification study of the data provided to the team from the private and public sources. This verification process focused on correlating data provided by CMD with actual financial numbers reported by construction organizations within the state. This process commenced with the selection of a random sample of 10% of the construction projects undertaken in the State of Georgia during 1998. Given this sample, the research team surveyed the general contractors responsible for these projects to determine the actual value of the projects as compared to reported value. In total, 500 companies were surveyed to validate this information. The research team received a 10% response from this survey. The principal conclusion of this validation study was that the error in reporting increased with the greater value of given projects. Therefore, companies that were responsible for larger projects within the State reported greater revenue volume for projects than that reported in the overall databases. Although a specific correction factor was not implemented during this phase of the process, it was determined that a greater focus on revenue amounts was required during the following phases of the project.

The second component of the data verification task emphasized the association of industry revenues to specific geographic areas within the state. Using data compiled from the survey and data provided by CMD, the research team divided the state into the following regions:

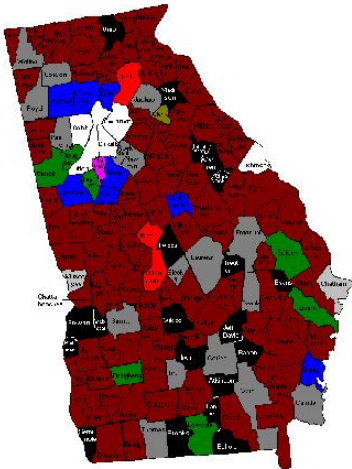
“...process commenced with the selection of a random sample of 10% of the construction projects undertaken in the State of Georgia during 1998.”

Georgia Regions



Mountain:	21 Counties
Atlanta:	17 Counties
Augusta:	20 Counties
Columbus:	21 Counties
Macon:	20 Counties
Savannah:	20 Counties
Bainbridge:	20 Counties
Viking:	20 Counties

Georgia Work Breakdown - Non-Residential



Legend (est.)

Black	0
Dark Red	1-10
Grey	11-20
Blue	21-30
Green	31-40
Red	41-50
Magenta	51-60
Light Green	61-70
Yellow	71-80
Light Blue	81-90
White	91-100+

Phase III – Data Collection

Given a focus on the types of projects, the location of activity, and the accuracy of the available data, the research team moved into the third phase of the study, economic data collection. The emphasis of this activity was two-fold, collect sufficient data from which to develop a profile of the construction industry in Georgia and determine the increase or decrease in construction volume from known 1997 data.

Undertaking this activity required the research team to conduct a survey of a representative sample of projects and participants from those commenced in 1998. Selecting a representative set of small, medium, and large-scale projects from each of the industry sectors, the research team surveyed 500 participating general contractor, subcontractor, and AE firms with the surveys in Appendix A. As a follow-up to this survey, a second round of surveys was sent out to an additional 320 companies to validate responses and increase response rate to the desired 20%.

The results of this survey analysis are summarized in the industry profiles.

Phase IV – Data Analysis

Upon collecting the data from Phase III, the research team undertook the task to calculate the overall economic numbers for this report. The focus of this analysis centered on developing numbers that accurately reflect the three inputs developed for this study from the government numbers, the private industry numbers, and the survey responses. The analysis of these data points provided the basis for determining the 5.8% increase from 1997 that is outlined in this report and provides the basis for the discussions in the following sections.

“The analysis of these data points provided the basis for determining the 5.8% increase from 1997 [to 1998]...”

Part II – Industry Introduction

Construction Industry

The construction industry is the second largest industry in the United States. Because construction is an exciting, dynamic process, which often provides high income for workers and contractors, it provides an appealing career opportunity. However, the seasonal and sporadic nature of construction work often serves to significantly reduce the annual income of many workers. In addition, construction contracting is a very competitive business with a high rate of bankruptcy.

It is widely recognized that the construction discipline is a combination of art and science. While an understanding of the technical aspects of construction is extremely important, it is also essential that construction professionals have knowledge of the business and management aspects of the profession. Close observation and participation in actual construction projects is very valuable in obtaining an understanding of the construction process as well.

While construction has traditionally been a very conservative industry, the increasing rate of technological development and growing international competition in the industry are serving to accelerate the development of new construction methods, equipment, materials, and management techniques. As a result, there will be an increasing need for innovative and professionally competent construction professionals.

Construction intersects almost all fields of human endeavor, and this diversity is reflected in its projects. Designers of hospitals interact closely with medical professionals to best serve the needs of patients. Educational philosophies and practices take shape in the architecture of schools and colleges, while governments and corporations express their “images” with structures that house their offices and production facilities. The design and construction of refineries, factories, and power plants generally require that the builders be more knowledgeable of the related industrial technologies than the manufacturers and utilities that operate them. Builders of dams, tunnels, bridges, and other civil works today must be geologists, ecologists, and sociologists as well as architects, engineers, and managers. And most of us, in our homes, recognize how intimately the design and quality of our constructed environment either enhance or frustrate our personal lives.

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Industry Sectors

Residential

Residential construction can be defined as the construction of any dwelling that is ultimately designed to house people and their belongings. This may include houses, apartment units, condominiums, or any other similar name. Examples may include the multi-million dollar home being built on a luxurious parcel of land, the “cookie-cutter” homes of the suburbs, the new high-rise apartment complex, or the duplex next door. Residential construction can be separated into two major categories, multi and single-family units. The term multi-unit eliminates the inclusion of “stand-alone houses” in the sector description. Therefore, the types of projects considered multi-family are as follows:

- Apartments
- Condominiums
- Dormitories
- Housing Projects
- Townhouses

Most multi-unit residential projects are privately funded and owned. However, government regulations and policies play a large role in denoting the number, type, and quality of residential projects generated within a fiscal year. Within the private sector, most of the owners of multi-unit projects are sizeable developer builders whose intentions are profit-oriented. Many developers provide their own construction services. Other owners contract with independent general contractors.

Typically, architects perform design services for residential construction. There is a possibility, however, that homebuilders, owners, engineers, and other design professionals may also generate design. As a result of the small amount of startup capital needed to begin in residential construction, there are a large number of small firms and suppliers. Typically, these companies are marred by a low success rate attributable to demand instability. Contractors often choose to hire out several of the smaller tasks associated with residential construction. Company size of the subcontractors varies, but they generally specialize in a specific task.

Commercial

Commercial construction plays a large role in the construction industry. In the booming economy of Georgia, the Commercial sector is currently one of the most vital sectors. As industry continues to grow, the commercial sector provides the infrastructure to support the addition of people and services. The growing workforce requires more space to work and the growing population requires facilities to purchase food, clothing other necessities for everyday life. Commercial construction involves projects such as office buildings, shopping malls, hotels, department stores, urban entertainment centers and others.

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“The growing workforce requires more space to work and the growing population requires facilities to purchase food, clothing other necessities for everyday life.”

The owner is the individual or organization who possesses the need for the specific project, pays for the construction of the project, and receives the finished product. For the state of Georgia, the majority of owners are private individuals or organizations. Examples include the YMCA, Guardian Savings, and Equifax. The type of owner and the owner's role in a particular project influences the specific nature of requirements. Private owners usually have fewer restraints and can therefore act more expeditiously than public owners. Private owners have stronger vested economic interests and are influenced by economic factors such as short vs. long term financing, size of the investment and profitability. There are also a variety of private owners both, which make part of the commercial sector. The first type of private owner is the one who is going to make use of the facilities being built or who knows beforehand who will occupy the facilities and have the office spaces rented out. The second type of private owner, known as a speculative builder, builds a facility without a particular tenant in mind and advertises the spaces available to possible tenants during and after construction.

The design professional can be a wide range of individuals such as architects, engineers, and consultants. The purpose of the design professional is to assist the owner in the conceptual stages of the project, place the owner's ideas on paper, create a set of plans and specifications by which the project is to be built, and ensure that the project is built by the design. Almost all design professionals are hired based upon their qualifications and experience. In the commercial sector in the state of Georgia we found that many of the architecture/engineering firms are either based in Georgia or in a neighboring state such as Alabama, Tennessee, or Florida.

In the construction industry, contractors are the companies that organize construction activities. These contractors are chosen based upon project bids and/or qualifications. Contractors can be classified as either prime contractors or subcontractors. Prime contractors deal directly with the owner or the owner's representative and are responsible for delivering and managing the project. They hold a contract with the owner or the owner's representative. Prime contractors can either self-perform all of the work or subcontract some of the work to other contractors. In the state of Georgia, most prime contractors are general contractors, and they tend to be located within Georgia. The specialty contractors that are hired by prime contractors to do some of the work are classified as subcontractors. Typically, the subcontractors perform a specific job within the project. They deal directly with the prime contractor and are paid by them. In large projects where the general contractor primarily offers its management expertise to the owner some subcontractor may have as much as 10-15 percent of the total project cost under their subcontracts.

The commercial division of the industry is a very large portion with visible results seen around the entire state. In this area are new projects and the remodeling and revitalizing of existing ones. Both of these require the work of design professionals, and as growth continues and current projects become obsolete, this

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is one area that will continue to remain a major portion as long as people support these private owners. Examples of commercial projects in 1998 included corporate headquarters and facilities such as the Home Depot Headquarters estimated at \$50 million and a new MCI Cost Center valued at \$12 million. Retail centers played a large role in the Georgia construction industry with large projects including the \$81 million Lenox Courtyard, the \$25 million Isakson Barnhart Retail Complex, and the \$50 million Lenox Marketplace. Smaller projects also played a large role in the industry with retail spending occurring throughout Georgia. Finally, the hospitality and food sectors within the industry saw continued strength in 1998 with companies such as Marriott, Kroger, Publix, and Harris Teeter continuing to make strong commitments to Georgia.

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Heavy/Highway

The heavy/highway, or infrastructure sector may be defined as any of the transportation networks, parks, sidewalks, and other such items associated with being in a populated area. Typical examples of this are public streets, public parks, freeways, stadiums, arenas, and any other project funded by the public to enhance the living quality of an area. In a major city, infrastructure enhancements or additions are constantly happening. In the era of moving professional sports teams, new stadiums and arenas are being built in several of the major cities. And as the country grows, more and more automobiles are entering the highways. This increased strain requires increased capacity, and this often manifests itself in the widening of existing freeways and other major thoroughfares as well as the addition of new beltways and bypasses. As population continues to increase, more of this will be seen, and as transportation is optimized, many more light-rail lines, fixed-guideway bus lanes, and HOV lanes will be a part of the infrastructure.

The owners of infrastructure projects are almost always public taxpayers. Road improvements are often made by increases in the gas tax, and any new transportation network results in either a general tax increase or an appropriation from government resources. Although significant discussion has emerged within Georgia regarding infrastructure development, 1998 witnessed extensive work in this area including road widening and repair in all geographic areas, airport expansion from Hartsfield to the Southwest Georgia Regional Airport, and water system expansion from Cobb County to Columbia County. In addition, more funding is starting to come from corporate sponsors such as stadium districts, who are searching for ways to decrease the burden on taxpayers.

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Design professionals involved in the infrastructure sector are often specialized in their specific area of expertise. Transportation networks are often designed fully by transportation firms. Subcontractors are a very large part of this sector, and because many of these projects are so complex, subcontractors will actually do most of the work. Construction managers are often utilized in this area, and design-build is quickly becoming a preferred way to speed these projects along.

Infrastructure is a major portion of civil engineering, and a vast majority of these projects are publicly owned. Infrastructure is one area that is ideal for design-build in many applications, and many projects are headed in this direction.

Industrial

The industrial sector is unique in that it does not have nearly as many projects as the other sectors. Because of this it is difficult to pinpoint many companies that focus on the industrial sector. The majority of companies doing work in the industrial sector also work on projects in other sectors. The industrial sector also differs from the other sectors because of the large amount of specialty subcontractors required to complete the projects. This is especially true in projects involving manufacturing processes. In manufacturing projects the scope of the mechanical and electrical work is greatly increased. Special equipment must also be installed in these plants to produce the desired products.

The majority of projects included in the industrial sector are warehouses or distribution centers. The next largest sub-sector of projects was manufacturing buildings. The average cost of industrial sector projects is approximately \$1-2 million. The projects had a wide range of costs ranging from \$50,000 to \$23 million. The more expensive projects tended to be from the manufacturing sub-sector. Some of the more expensive projects completed in 1998 were a Coca-Cola bottling plant for \$8.5 million and a Caterpillar Mining Equipment project for \$23 million. The types of projects completed in the industrial sector did not deviate very much, but the cost of these projects did.

The types of owners in the industrial sector include both public and private sector organizations. The public sector consists of organizations such as city, state, and county governments. The Dade County Schools Commission had a project for a maintenance building with an estimated value of \$300,000. The city of Forest Park also funded a project for a new maintenance building, which cost approximately \$500,000. A new warehouse project was also completed at the Hartsfield International Airport for approximately \$5 million. The private sector organizations are composed of large worldwide corporations and smaller, more local companies. One of the larger corporations was the J.C. Bamford corporation. J.C. Bamford is the world's fifth largest manufacturer of construction equipment. Their project in Georgia was their North American Headquarters. Caterpillar, another construction equipment manufacturer, also completed a large project in Georgia recently. Caterpillar is the largest manufacturer of construction equipment in the world. They completed a \$23 million plant for the manufacturing of engines used on the mining equipment assembly line. Coca-Cola Bottling Enterprises completed a new bottling plant worth \$8.5 million. Flexsteel Industries completed a \$2 million project in 1998. Flexsteel is a large, worldwide furniture manufacturer with its main headquarters in Iowa. Another furniture manufacturer included was the Rooms to Go Corporation. They completed a \$9 million distribution center. Some of the other companies completing industrial sector projects in Georgia last year were Mark

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Lynn Foods, Quality Plastics, Mutec Alkaline Batteries, Yancey Heavy Equipment, and Peachtree Construction Company.

The majority of the companies contacted in the industrial sector were in the architect/engineer category. The A/E firms studied all seemed to do projects in other sectors. No A/E firm focused their work solely on the industrial sector. The firms overlapped their work in to the retail, commercial, educational, medical, and civil sectors. Architect/Engineer firms make up a large portion of the firms working in the industrial sector because of the extensive design work required in the manufacturing projects. Engineers and designers must produce solutions for the many problems that can arise in the intricate design of manufacturing plants.

None of the General Contractors in the industrial sector concentrate on only the industrial sector. As with the architect/engineers the general contractors overlap into the medical, commercial, retail, educational, and civil sectors. Many different types of subcontractors were utilized on the industrial sector projects. Subcontractors specializing in excavation, mechanical, electrical, and concrete all turned up in our list companies. Many more specialty subcontractors would have to be utilized in the completion of the industrial sector projects.

The industrial sector is a major portion of the construction industry. Typical owners of this sector can be in either the public or the private sector, and projects can be of any magnitude. As Georgia grows in population and construction increases, much more industrial work will be needed.

Government

The Government sector deals with publicly funded projects. This sector is commonly referred to as the public sector. The funding agencies can include state, county, and local governments. Many of the projects in the government sector are similar to those in the commercial or residential sector, but most of the companies who work in the government sector focus their energies in this sector only. To be successful in the government sector companies must be structured to deal with its unique owners.

Projects in the government sector range from large federal courthouses to small city baseball fields. The government facilities comprise the infrastructure that is needed to run the government agencies. Administrative buildings, courthouses, jails, police departments, maintenance facilities, parks and recreation centers are but a few of the project types that can be found in this sector. As previously stated, similar projects can be found in both the public and private sectors. School and office buildings will be found in both the commercial and government sectors. The primary difference, and it is significant, is the funding source. Whereas a private office building may need to be built in a short time span so that a revenue stream can be generated to sustain the project, a public office building may have sustained funding and the start-up date may not be so critical. Also, government projects will often have a much longer operating period and therefore

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need to be built at a higher quality to offset higher lifecycle operating costs. Many private projects are built to be sold quickly, but private projects will be operated and maintained by the government agencies for many years.

Public owners range from the federal government to small municipalities. Federal, state, county, and local governments have differing needs and levels of construction sophistication. The federal government has specific agencies authorized to spend public money on construction. Atlanta is a regional home to the US General Services Agency (GSA) who builds the majority of the federal government's administrative buildings. The GSA is a highly sophisticated owner who conducts construction on a daily basis. The state of Georgia, as well as the larger county and city governments also staff construction experts to oversee construction. Government entities are the stewards of the taxpayer's dollars and therefore must operate under the most ethical and impartial standards. The majority of the government agencies operate under a low bid selection process to ensure that there is no favoritism when selecting contractors.

The majority of the companies conducting government work specialize in this sector. Contractors and subcontractors must learn to win work by being the lowest bidder. Very few companies can be successful both bidding and negotiating work because the business strategies are so different. Public sector work creates opportunities for small and disadvantaged business to gain work because work is awarded on price only. Companies do not need to be large or have a long operating history to work in the public sector. They only need to have minimum qualifications and bid the lowest price. Design and engineering, on the other hand, is selected on the basis of qualifications. For reasons of public safety and quality, designers and engineers are selected on their qualifications and past performance.

The government sector comprises a significant portion of the Georgia construction economy. In particular, education construction is a dominant component of the construction economy. In 1998, projects such as the \$4.5 million Lake Forest elementary school, the \$4 million Bainbridge high school, and the \$6 million Columbus middle school represented a few of the common expenditures witnessed throughout the state. In addition, higher education facilities witnessed expenditures such as the \$500,000 Reinhardt College Visual Arts Building, the \$18 million Valdosta State University Biology Building, and the \$3.4 million Middle Georgia College Walker Hall Classrooms. Although the government sector may yield lower profit margins for companies due to fierce competition, it offers sustained funding to an open forum of players. Government projects are constructed to last for generations and are a great source of pride for both owners and constructors.

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Electrical/Mechanical

The Electrical/Mechanical sector deals with any means of getting electricity from an outside source into a building, and providing living systems for that building.

The electrical and mechanical systems in buildings are vital to the livelihood of any modern building as these systems provide the comfort level expected in a building. Because of the necessity of these systems, they exist in public and private buildings alike. Some examples of these systems are the telephone lines, electricity lines, network lines, heating, venting, air conditioning, water, waste, and hot water.

“The electrical and mechanical systems in buildings are vital to the livelihood of any modern building as these systems provide the comfort level expected in a building.”

The electrical/mechanical sector does not provide its own projects, as many of the other examples do. Instead, it acts as a “project within a project”, as every building or residential construction requires these services. With that in mind, every building can be expected to have vastly different electrical and mechanical systems. A microprocessor manufacturing facility, for example, will require much precision in both mechanical and electrical aspects of the building, due to the nature of its business. Electrically, the building must be designed with extreme precision to allow for uninterrupted services absent of surges and spikes. Mechanically, the building must be designed precisely enough to maintain a very controlled environment (absent of temperature and humidity fluctuations and without potential for harmful static discharges) 100% of the time. A common house, or apartment, on the other hand, requires only the most basic of these services. Electrically, the homeowner would expect a constant electric service, but uninterruptibility, for example, would be of much less importance. Likewise, the homeowner would likely only need basic mechanical services (plumbing, dependable water, and basic heat) to remain satisfied. Between these two extremes are a multitude of projects which all have different requirements and designs.

As previously mentioned, there is no “typical owner” of electrical and mechanical systems. Owners can be from either the public or the private sector. Electrical and mechanical systems will not change substantially based upon this fact. This simply means that the work performed will be identical for buildings of equal type in both sectors. The only way that the owner affects design is in the design of the complexity and the size, and these are more a product of the building type than the building owner.

“Every modern building requires at least some portion of these services, and as a result, the work has no bearing on owner, but instead on building type.”

The design professionals involved with the electrical and mechanical structures are usually quite small and specialized. Because these firms are so specialized, there will likely be a high number of firms involved in this design. For example, one firm might design the wiring and electricity, another might design the lighting, another might design the telephone system, and another might design the networking throughout the building. Mechanically, one firm might do heating, ventilation, and air conditioning, while another might do plumbing.

The mechanical and electrical sectors are quite specialized in their respective areas. Every modern building requires at least some portion of these services, and as a result, the work has no bearing on owner, but instead on building type. Because of the wide range of building types, there is great variation between

buildings of the design of these systems. Because of the importance of these systems, they must be designed carefully, and because of this, most of these areas are subcontracted out.

Part III - Construction in the State of Georgia

As previously stated, this study emphasizes two classifications for construction in the State of Georgia, 1) geographic analysis and 2) sector analysis. This section highlights the findings from this study for the overall state and these two specific areas. The following section additionally describes the economics as classified by specific construction disciplines.

Overall Numbers

Based on the data collected in this study and the data available from research centers related to the construction industry, it is the research team’s estimate that construction volume in the State of Georgia increased 5.8% from 1997. This increase translates into a total construction volume of \$14.283 billion. This total corresponds to 15.28% of the \$93.5 billion that was spent in the South Atlantic region and 2.2% of the \$657 billion spent nationally on construction in 1998. Associated with this volume is a direct payroll of 180,000 jobs in Georgia and a payroll of \$5.124 billion as tracked by the Bureau of Labor Statistics.

As a comparison, 1997 statistics illustrate that notable industries within the state had revenues as follows: the information and communication industry had revenues of \$18.939 billion, the health care industry had revenues of \$12 billion, and the education industry had revenues of \$413 million.

As a further comparison, in 1997, the last year of complete statistics published by the U.S. Census Bureau, the following totals were developed for the remaining industry classifications in Georgia:

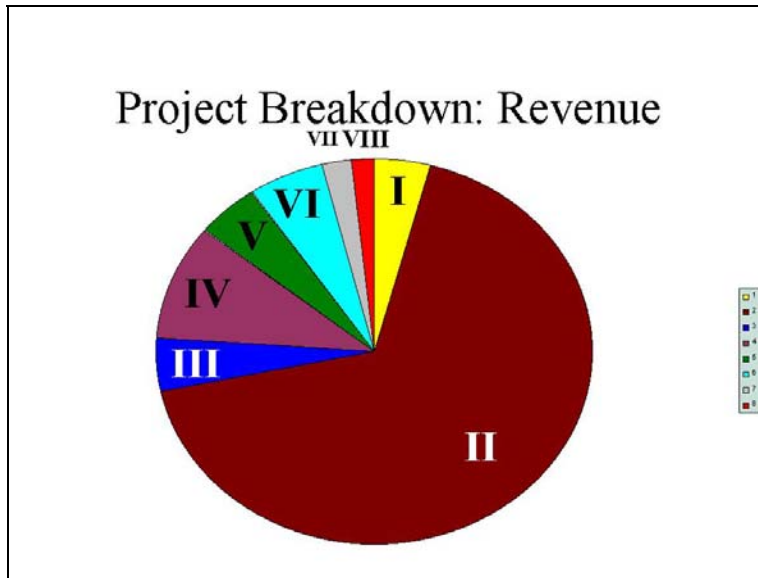
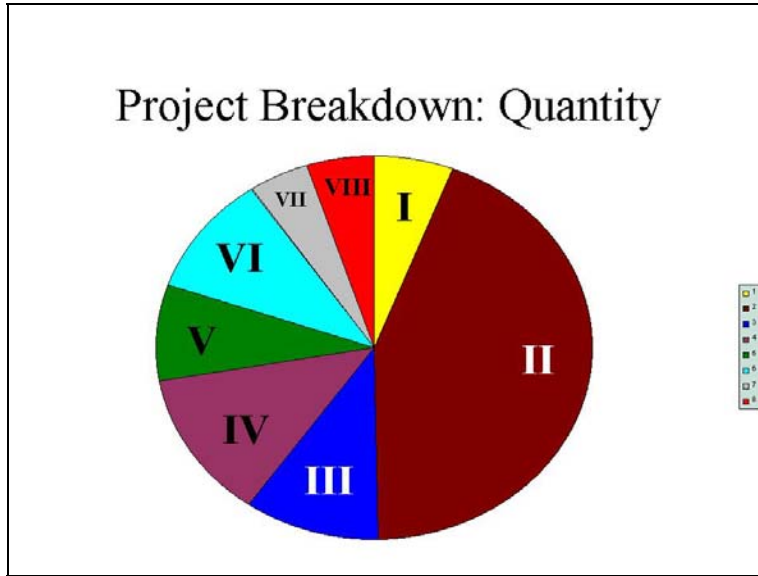
Industry	Employees	Payroll
Agricultural Services, Forestry, And Fishing	23,355	\$ 451,935,000
Mining	6,929	261,329,000
Manufacturing	599,516	18,809,856,000
Transportation And Public Utilities	228,044	8,840,073,000
Wholesale Trade	225,959	8,718,045,000
Retail Trade	669,520	9,757,509,000
Finance, Insurance, And Real Estate	194,991	7,638,412,000
Services	996,320	26,493,067,000
Health Services	276,001	8,631,939,000

“...translates into a total construction volume of \$14.283 billion.”

“Associated with this volume is a direct payroll of 180,000 jobs in Georgia and a payroll of \$5.124 billion...”

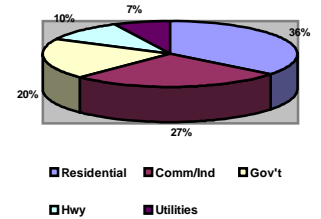
Dividing the overall total into geographic sectors, the following table and graphs illustrate the estimated breakdown in the eight regions identified for this report.

Region Number	Estimated Revenue	Percent of Total
I	\$ 599,886,000	4.2
II	\$9,641,025,000	67.5
III	\$ 628,452,000	4.4
IV	\$1,399,734,000	9.8
V	\$ 642,735,000	4.5
VI	\$ 799,848,000	5.6
VII	\$ 314,226,000	2.2
VIII	\$ 242,811,000	1.7



Dividing this total by industry sectors, the following table illustrates the estimated breakdown in the industry categories identified for this report.

Sector	Estimated Revenue	Percent of Total
Residential	\$7,859,172,000	55.03
Commercial & Industrial	\$2,676,809,000	41.67
Government	\$2,021,578,000	31.47
Heavy & Highway	\$1,034,236,000	16.10
Utilities	\$ 691,204,000	10.76



Dividing this total by industry trades (after general contractor and design fees have been considered); the following table illustrates the estimated breakdown in the industry categories of commercial, industrial, and residential buildings. Heavy/highway and utilities are excluded from these totals due to the fact that these sectors are not typically broken down into system trade categories. These numbers represent totals that result from the average expenditures on different trade specialties in each of the building sectors¹. Given projects or sectors may experience ratios that are slightly different. Additionally, site development costs are variable depending on location and site specific circumstances. Therefore, costs for each trade should be considered representative of the approximate total allocated during 1998.

Specialty	Estimated Revenue	Percent of Total
Foundation and Site	\$ 517,841,500	5.5
Structure	\$1,468,786,800	15.6
Exterior Finishes	\$1,233,404,300	13.1
Roofing	\$ 207,136,600	2.2
Interiors	\$2,240,841,400	23.8
Mechanical	\$2,495,054,500	26.5
Electrical	\$1,148,666,600	12.2

¹ These percentages represent averages developed from the Means Square Foot Estimating Guides.

The Sectors²

Overall, the construction economy in the State of Georgia and throughout the Southeast continued to be strong in 1998, reflecting the overall strength in the economy within the region. Inflation remained low at under 4% and economic expansion continued for the 8th consecutive year. Unemployment remained at the lowest rate in more than 30 years and consumer confidence continued at historic high levels. The stock market continued its climb into record territories and high-tech firms, both in Georgia and throughout the country, took their places as dominant players in the new economy.

In addition to these positive aspects, some negative factors influenced the construction market during 1998. First, the craft labor situation remains a primary concern throughout the industry. Specifically, the continued shortage of qualified labor is a concern that registers throughout all the sectors in the construction industry. Although 1998 witnessed a continued climb in the number of companies supporting craft education and construction programs in secondary and post-secondary education institutions, the construction industry continued to face a decline in the number of individuals choosing construction as a career choice. The emergence of new information careers in the high-tech, finance, and service sectors continued to attract new entrants to the workforce and put continued strain on the construction industry. Finally, lack of support from the State and significant marketing of competing industries continued to place construction in a catch-up position to attract top workforce entrants.

In addition to the workforce issues, increased overhead from salary increases were a source of concern for the industry in 1998. Although the boom in the economy has increased the level of activity for all construction-related firms, the shortage of qualified personnel at all levels has resulted in a continued pressure on wages and benefits. Witnessing wage increases in the double-digit range on an annual basis, the construction industry is fighting a battle to remain competitive in both attracting workers and providing services to customers. The continued presence of this issue is expected to remain throughout 1999 and 2000.

In summary, the Georgia economy remained strong throughout 1998 and no significant slowdown is predicted for the construction industry in the near future. However, uncertainty remains from influence external to the region including the international economy, the overall political climate, and the continuation of historic low unemployment rates.

“...the construction economy in the State of Georgia and throughout the Southeast continued to be strong in 1998...”

“Although 1998 witnessed a continued climb in the number of companies supporting craft education and construction programs in secondary and post-secondary education institutions, the construction industry continued to face a decline in the number of individuals choosing construction as a career choice.”

² Parts of this section are adapted from data available from the U.S. Census Bureau and the, “1999-2000 U.S. Markets Construction Update,” FMI Corporation, Sanya King, Editor, 1999.

Residential Construction

The residential sector continued to outperform market forecast projections in 1998. Comprising over half of the construction expenditures in Georgia, the residential market continued to reflect the influx of workers throughout the State and the region. Interest rates continued to be at low levels and the demand for new housing developments throughout Georgia provided a strong boost for home builders of every size. However, this strength once again highlighted the difficulty in attracting qualified labor and the rise in salaries required to attract workers. Home builders were successful in passing most of these costs on to the buyers in terms of higher prices and the forecast remains strong for builders to continue this trend. Economic prosperity, low unemployment, low mortgage rates, and a large influx of professionals into Georgia provide strong indicators of continued growth in this sector.

Industrial Construction

The industrial sector witnessed slight growth in 1998 primarily due to increased efficiencies obtained by industrial organizations. Continuing a flat to slightly downward trend in construction over the last several years, the industrial sector is realizing the results of increased productivity measures implemented by industrial organizations in all areas of manufacturing. Investments in machinery and factory improvements represent a continued focus for industrial customers. Although manufacturers do not need to construct as many new buildings to increase their output, they do need to modify existing plants to accommodate the new technologies. Construction of improvements to existing buildings, including additions and alterations, offset the decline new construction.

Commercial Construction

Privately owned new office and retail construction continued to see strong growth patterns in 1998. The supply of new office facilities continued to be tight, requiring additional complexes to be constructed throughout the area. Additionally, the need for greater electronics and telecommunications continued to create demand for new facilities or significant improvements of older facilities. Although increased attention was paid to the rehabilitation of urban areas, suburban areas continue to be the focus of commercial construction. Retail malls, office complexes, and corporate campuses continue to be located in suburban areas, creating significant construction opportunities for contractors of all sizes. The only area to not witness continues strength of previous years was the healthcare industry that witnessed a national leveling of investment by healthcare organizations. Increased pressure by HMOs and other regulatory bodies appears to indicate a continued decrease in this sector. However, the increase in elder care and other non-hospital care facilities appears to be offsetting a segment of this decline.

Government Construction

The population increase throughout Georgia was reflected in 1998 with commensurate expenditures in all areas of public construction including education facilities, correctional facilities, and municipal construction. Suburban areas witnessed significant growth in education facilities as a strong school-age population continued to relocate to Georgia. Demands at all levels, but especially the elementary school level, forced local districts to expend significant revenue on new school construction and existing school renovations. Similarly, many former rural areas faced significant pressure to increase municipal facilities such as courthouses to accommodate the growth in populations in local areas. Indications point to continued strength in all of these areas with local governments continuing to place an emphasis on education and municipal facilities. The only question in this market will be an appearance of reluctance by local voters to approve new tax authorizations for public construction projects.

Infrastructure Construction

Georgia once again witnessed strong infrastructure construction expenditure in 1998. The growing need for both highways and utilities is creating opportunities for infrastructure construction firms. Similarly, the engineering consulting industry witnessed strong revenues from infrastructure projects in 1998, reflecting the demand for engineered projects such as highway interchanges, water treatment facilities, and electric power facilities. Although significant debate continued throughout 1998 on the appropriateness of growth in Georgia and its metro areas, the debate did little to slow opportunities for infrastructure construction organizations. This trend is expected to continue in 1999 and 2000 even though Federal restrictions have caused delays in some projects. Offsetting these delays is the Federal TEA-21 legislation that is placing large amounts of funding in State budgets to complete large-ticket projects. This funding is anticipated to create increased opportunities for this market over the next several years.

Industry Profiles

Contractor Profile

The data collected in this study provides a foundation for creating profiles of typical contracting organizations within the Georgia construction industry. In this profile, the characteristics of a contracting organization are reviewed based on a sample of contractors responsible for \$1,091,083,284 in construction revenue in the State of Georgia in 1998. This total represents 7.64% of the total construction dollars expended in 1998.

Project Size

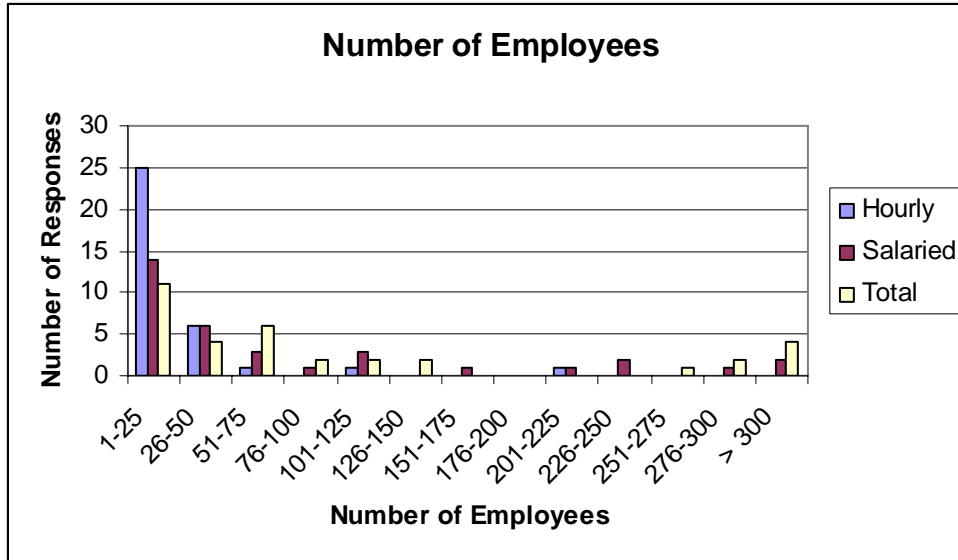
Projects and contractors within Georgia vary widely in size as is typical throughout the United States. The organizations profiled in the current study follow the national pattern of both large companies and small businesses operating together in a single geographical area. These companies were involved in annual installed construction totals that ranged from \$70,000 to \$394,000,000. This variance is significant for one central point, the construction industry permits both sole proprietors and large organizations to pursue opportunities in the construction domain. In contrast to industries such as the manufacturing domain and many facets of the high-tech domain, construction has very few barriers for new companies to overcome in entering the industry. In this respect, opportunity is abundant for an array of construction organizations and entrepreneurs.

“...companies were involved in annual installed construction totals that ranged from \$70,000 to \$394,000,000.”

Company Size and Demographics

As stated earlier, the size of construction organizations within the State of Georgia varies widely from one or two employees to several hundred employees. However, the profile of a contractor within Georgia reflects an average organization size of 25 salaried employees and 86 hourly employees. Once again, these numbers represent an average profile and the numbers in any individual company can be greater or fewer. The figure below displays the wide range of company sizes. There are numerous smaller companies (less than 50 employees) and a few very large companies (over 300 employees).

“...the profile of a contractor within Georgia reflects an average organization size of 25 salaried employees and 86 hourly employees.”



As to the age of the workforce, the current study queried organizations on the age of the skilled craft force. In response to this query, organizations indicated that 97% of their skilled laborers were between 25 and 45 years of age. These workers were obtained from a variety of sources, with permanent employees being the preferred avenue for skilled craft laborers where possible.

Experience

While significant attention has been paid to the economic boom in Georgia during the last decade and the influx of new industries, the construction industry remains a core industry in Georgia. As reflected in the survey data, construction organizations within the State have been a presence for many decades. The average time for a company being in business in the State is 24 years. This length of time is significant because it represents stability in both employment opportunities and generated revenue for the State. Although construction is a cyclical business, the industry does not evaporate during low points in the cycle. Rather, construction industries attempt to retain employees for extended careers and in turn have provided the State of Georgia with a stable tax base for many decades.

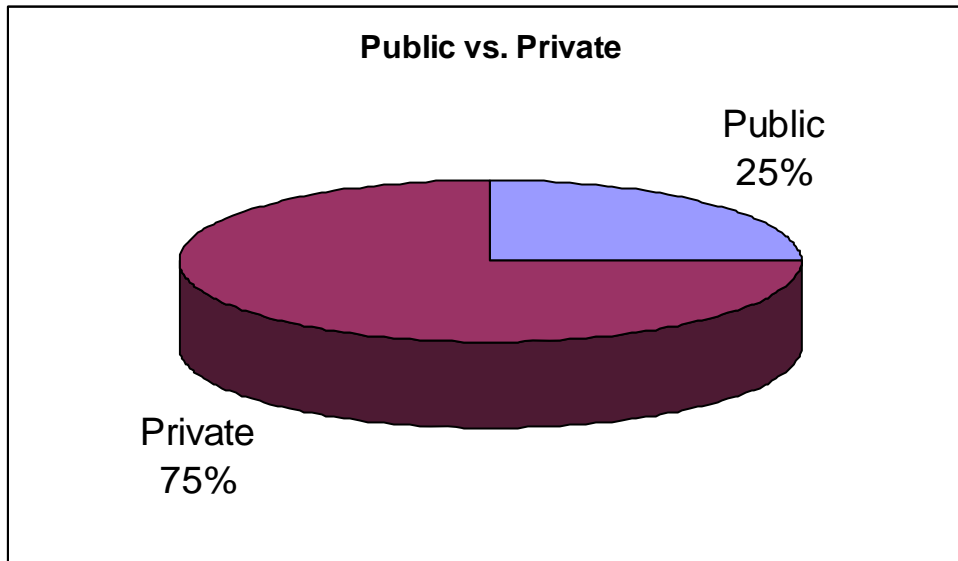
Work in State

The construction industry in Georgia is predominantly an in-state business. With an 86% average for in-state projects, the construction industry is focusing on building the State through its own resources rather than exporting them to other states or regions. Although the larger contracting organizations within the state are beginning to expand these out-of-state operations, the typical profile of a contractor within Georgia remains focused on in-state projects.

“...the typical profile of a contractor within Georgia remains focused on in-state projects.”

Public vs. Private Projects

Images of construction in Georgia often focus on the large amount of commercial development that is occurring throughout the State. While that is definitely true, a large percentage of construction projects remains in the public sector. Specifically, the profile of a contractor in Georgia reflects that 75% of the number of projects started in 1998 were publicly funded. Of particular note in this fact is the number of small projects from public entities such as local school boards, which support the smaller construction organizations within the State. Although these projects may not be as large as many of the privately funded projects under development, the frequency and availability of these projects form the backbone of many organization work portfolios.



Labor Posture

Union and non-union projects is always an issue in the construction industry. The results received in this survey should be read as they are being provided, as a profile of the industry and not necessarily as a comprehensive summary. With this as a caveat, the following profile can be summarized. First, as an overall industry, contractors in Georgia tend to use a non-union format to a greater degree than a union format. The numbers in the current survey reflect \$863,014,784 of non-union work and only \$5,600,000 of union work. However, it is important to note that there is some difference depending on whether the contractors are specialty contractors or general contractors. Specifically, the data obtained in this study indicates that general contractors in Georgia are predominantly following a non-union focus, but specialty contractors are mixed depending on the trade that they represent. The conclusion from this data should thus be interpreted that Georgia is still open to both labor postures and further studies will be required to monitor the trends within the industry.

Bid vs. Negotiated Contracts

Although the stated preference of the majority of contracting firms is to focus on negotiated contracts, the average contracting organization remains a bid-based organization. As survey data indicates, the average contractor undertakes 58% bid work and 42% negotiated work. However, it should be noted that these profiles vary widely within the industry. Typically, an individual organization will not have such a balanced approach to projects. Rather, most of the companies focus on either a bid or negotiated format to some degree. However, as an overall average, the profile of the industry is one that emphasizes a balance between the two contracting opportunities.

Financial Data

Revenue and Profit

Revenue within Georgia construction firms can be as varied as the size of firms. Gross revenue from surveyed firms ranged from \$70,000 to \$409,000,000. This wide variation makes it difficult to create a “typical” profile of a given firm since an average is an inaccurate measure for this data. However, a better measure of financial data is a comparison between net and gross revenue and an analysis of the change in profits for 1998. In relation to these data points, net revenues for 1998 ranged from \$34,000 to \$1,856,585. This data represents a smaller data set than the gross revenue data due to reluctance by some privately held firms to divulge net revenue data. However, in terms of change of profitability from 1997, this data represents a small gain of 1% over 1997. Focusing on projected revenues for 1999, these same organizations project a general increase in revenues, with the average organization projecting an increase of gross revenue in the amount of 38.8%. However, these same organizations are predicting a drop in net revenue of 16.86%. Although it is unlikely that all firms will end 1999 with commensurate increases and reductions, these numbers do indicate the general trend within Georgia is that the construction industry is still in a growth mode and the cost of labor is also increasing.

“...the general trend within Georgia is that the construction industry is still in a growth mode...”

Outside Expenses

One component of economic impact is the amount of funds paid by an organization to outside industries. In terms of the construction industry, these amounts can be significant as companies make financial payments to financial, bonding, insurance, marketing, and permitting organizations. The construction organization profile reflects this impact. The following averages exist for a typical construction organization from the survey:

Financial Institution Expenditures:	\$ 69,103
Bonding Company Expenditures:	\$135,780
Insurance Company Expenditures:	\$163,554
Marketing Company Expenditures:	\$ 9,910
Permitting Agency Expenditures:	\$ 11,811

Technology Focus

The rapid increase in technology throughout the AEC industry is changing many construction processes. Of particular note in this technology increase is the influx of Internet-related tools and technologies. With the anticipation that the Internet will be the technology focus of the near future, the survey attempted to obtain a current profile of the inroads that this technology has made in the construction industry. The results of these questions indicate that Internet technologies are increasingly being used within the industry, but as of today, additional adoption is still required in the industry to achieve the levels of comparable industries. Specific profile values indicate that the majority of companies (68%) are using e-mail and the Internet (74%), but fewer organizations (41%) have implemented company Web pages and 21% of organizations are not using any Internet-related tools of any type. Similarly, 77% of organizations are adopting computer-based project management tools to enhance their project performance.

“...the majority of [construction] companies (68%) are using e-mail and the Internet (74%)...”

Education

The education of employees is acknowledged by almost all organizations as a critical element to long-term success. However, finding time for this education is a significant challenge to organizations of all sizes. In the current survey, 94% of organizations use on the job training to train crews on new materials and products, while 94% use on the job training as a primary focus for overall training activities. Lectures and classroom education follow far behind at less than 30% of the time each. The impact of this contrast is a question that remains to be answered, but one which requires further attention.

Home Builder Profile

The second profile of construction organizations originating from the current survey is for a large component of the industry within the State of Georgia, the residential homebuilding industry. In this profile, the characteristics of organizations that have a primary focus on residential construction are reviewed based on a sample of builders responsible for \$1,736,072,575 in housing revenue in the State of Georgia in 1998. This total represents 11.71% of the total construction dollars expended in 1998.

Project Size

Similar to commercial construction, residential builders within Georgia vary widely in size. Following the national pattern of both large companies and small businesses operating together in a single geographical area, the organizations profiled in the current study were involved in annual installed construction totals that ranged from \$210,000 to \$7,079,699. This variance represents the large spectrum of home builders that exist within Georgia, ranging from custom builders that construct a handful of houses each year, to large builders that number their residential properties in the hundreds. Once again, in contrast to industries such as the manufacturing domain and many facets of the high-tech domain, construction has very few barriers for new companies to overcome in entering the industry. In this respect, opportunity is abundant for an array of residential building start-ups.

Company Size and Demographics

As stated earlier, the size of residential constructors within the State of Georgia varies widely from one or two employees to several hundred employees. However, the profile of a residential builder within Georgia reflects an average organization size of 6 salaried employees and 6 hourly employees. Once again, these numbers represent an average profile and the numbers in any individual company can be greater or fewer. As to the age of the workforce, the current study queried organizations on the age of the skilled craft force. In response to this query, organizations indicated that 96% of their skilled laborers were between 25 and 45 years of age. These workers were obtained from a variety of sources, with permanent employees being the preferred avenue for skilled craft laborers where possible.

Experience

While significant attention has been paid to the economic boom in Georgia during the last decade and the influx of new industries, the construction industry remains one of the core industries in Georgia. As reflected in the survey data, residential builders within the State have been a presence for many decades. The average time for a company being in business in the State is 12 years. Similar to commercial builders, this length of time is significant because it represents stability in both employment opportunities and generated revenue for the State. Although construction is a cyclical business, the industry does not evaporate

“...the profile of a residential builder within Georgia reflects an average organization size of 6 salaried employees and 6 hourly employees.”

“The average time for a company being in business in the State is 12 years.”

during low points in the cycle. Rather, construction industries attempt to retain employees for extended careers and in turn have provided the State of Georgia with a stable tax base for many decades.

Work in State

The residential construction industry in Georgia is almost exclusively an in-state business. With a 99.7% average for in-state projects, the residential construction industry is focusing on building the State through its own resources rather than focusing on exporting its resources to other states or regions. Reinforcing this factor is the element that the majority of residential builders must focus their resources on a particular geographic area, thus reducing the opportunity to undertake jobs beyond the state borders.

Public vs. Private Projects

Images of construction in Georgia often focus on the large amount of commercial development that is occurring throughout the State. However, commercial construction only represents one-half of the equation. Residential construction actually accounted for more than half of the construction in the State of Georgia in 1998. Of this construction, the profile of a residential builder in Georgia reflects that 94% of these residential projects started in 1998 were privately funded. These projects included both custom homes and large subdivision developments, incorporating the use of both small organizations and large residential constructors.

Labor Posture

In contrast to the commercial sector where union and non-union construction is a primary issue, the union status question is less of a factor in the residential sector. As reflected in this profile, 100% of the industry respondents reported that they used non-union labor in the development of residential projects.

Bid vs. Negotiated Contracts

Similar to the stated preference of commercial contracting firms to focus on negotiated contracts, residential builders would prefer to enter into negotiated contracts or self-develop projects. However, bid work remains an element of the residential sector. As per the survey data, the average residential builder undertakes 38% bid work and 62% negotiated work. However, it should be noted that these profiles vary widely within the industry. Typically, an individual organization will not have such a balanced approach to projects. Rather, most of the companies participating in the survey focus on either a bid or negotiated format to some degree over the other. However, as an overall average, the profile of the industry is one that emphasizes a negotiated approach versus a bid approach to contracts.

Financial Data

Revenue and Profit

Revenue within residential construction firms can be as varied as the size of firms within Georgia. As reflected in the survey data, gross revenue from surveyed firms ranged from \$166,450 to \$731,000,000. This wide variation makes it difficult to create a “typical” profile of a given firm since an average is an inaccurate measure for this data. However, a better measure of financial data is a comparison between net and gross revenue and an analysis of the change in profits for 1998. In relation to these data points, net revenues for 1998 ranged from \$16,400 to \$385,154,059. This data represents a smaller data set than the gross revenue data due to reluctance by some privately held firms to divulge net revenue data. However, in terms of change of profitability from 1997, this data represents a solid gain of 10% over 1997. Focusing on projected revenues for 1999, these same organizations project a small increase in revenues, with the average organization projecting an increase of gross revenue in the amount of 5.08%. However, these same organizations are predicting a drop in net revenue of 37.63%.

“With a 99.7% average for in-state projects, the residential construction industry is focusing on building the State through its own resources rather than focusing on exporting its resources to other states or regions.”

Outside Expenses

One component of economic impact is the amount of funds paid by an organization to outside industries. In terms of the residential construction industry, these amounts can be significant as companies make financial payments to financial, bonding, insurance, marketing, and permitting organizations. This impact is reflected in the construction organization profile constructed in this study. As reflected in the survey data, the following averages exist for a typical residential construction organization:

Financial Institution Expenditures:	\$2,321,007
Bonding Company Expenditures:	\$ 119,966
Insurance Company Expenditures:	\$1,306,170
Marketing Company Expenditures:	\$1,014,629
Permitting Agency Expenditures:	\$ 713,431

Technology Focus

The rapid increase in technology throughout the AEC industry is changing many of the processes associated with construction. Of particular note in this technology increase is the influx of Internet-related tools and technologies. With the anticipation that the Internet will be the technology focus of the near future, the survey attempted to obtain a current profile of the inroads that this technology has made in the residential construction industry. The results of these questions indicate that Internet technologies are increasingly being used within the industry similar to the inroads being made in the commercial contracting sector. Specific profile values indicate that the majority of companies (75%) are using e-mail and the Internet (63%), but fewer organizations (30%) have implemented company Web pages and 23% of organizations are not using any Internet-related tools of

any type. Similarly, 86% of organizations are adopting computer-based project management tools to enhance their project performance.

Education

The education of employees is acknowledged by almost all organizations as a critical element to long-term success. However, finding time for this education is a significant challenge to organizations of all sizes, whether they are in the residential or commercial sectors. In the current survey, 79% of organizations use on the job training to train crews on new materials and products, while 94% use on the job training as a primary focus for overall training activities. Lectures and classroom education follow far behind at less than 23% of the time each. The impact of this contrast is a question that remains to be answered, but one which requires further attention.

Architect/Engineering (AE) Profile

The final profile of construction organizations originating from the current survey is for the design oriented component of the industry, the architecture and engineering (AE) firms within Georgia. In this profile, the characteristics of organizations that have a primary focus on designing construction projects are reviewed based on a sample of AE firms responsible for \$1,245,310,330 of designed projects in the State of Georgia in 1998. This total represents 8.72% of the total construction dollars expended in 1998.

Company Size and Demographics

In contrast to the contracting component of the construction industry, the AE sector is primarily a professional, salaried workforce. However, similar to the contracting organizations, the size of AE firms within the State of Georgia varies widely from one or two employees to several hundred employees. However, the profile of an AE firm within Georgia reflects an average organization size of 36 salaried employees. Once again, these numbers represent an average profile and the numbers in any individual company can be greater or fewer.

“...the size of AE firms within the State of Georgia varies widely from one or two employees to several hundred employees.”

Experience

Complementing the contracting sectors, the AE firms in the construction industry also form a strong component of the core construction industry in Georgia. As reflected in the survey data, AE firms within the State have been a presence for many decades. The average time for a firm being in business in the State is 22 years. Similar to construction companies, this length of time is significant because it represents stability in both employment opportunities and generated revenue for the State. Although construction is a cyclical business, the industry does not evaporate during low points in the cycle. Rather, AE firms attempt to retain their professionals for extended careers and in turn have provided the State of Georgia with a stable tax base for many decades.

Work in State

Similar to the contracting organizations in Georgia, AE firms are almost exclusively an in-state business. With an 81% average for in-state projects, the AE firms are focusing on assisting in-state contractors to build the State through its own resources.

Public vs. Private Projects

Reflecting the fact that the majority of work undertaken by AE firms is related to commercial construction, the breakdown of public versus private projects is similar to the commercial construction sector. Specifically, the profile of an AE firm in Georgia reflects that 48% of projects were publicly funded and 52% of projects originated in the private sector. In contrast to the contracting component of the industry, AE firms are much more likely to divide their focus on public and

private projects. Specialization is a focus for larger AE firms, but the majority of firms have a broad design basis and participate in both types of project categories.

“The average time for a firm being in business in the State is 22 years.”

Financial Data

Revenue and Profit

Revenue within AE firms can be as varied as the size of firms within Georgia. As reflected in the survey data, gross revenue from surveyed firms ranged from \$14,500 to \$26,000,000. This wide variation makes it difficult to create a “typical” profile of a given firm since an average is an inaccurate measure for this data. However, a better measure of financial data is a comparison between net and gross revenue and an analysis of the change in profits for 1998. In relation to these data points, net revenues for 1998 ranged from \$1,570 to \$15,900,000. This data represents a smaller data set than the gross revenue data due to reluctance by some privately held firms to divulge net revenue data. However, in terms of change of profitability from 1997, this data represents a gain of 8.4% over 1997. Focusing on projected revenues for 1999, these same organizations project a small decrease in revenues, with the average organization projecting a decrease of gross revenue in the amount of 7.3%. However, these same organizations are predicting a rise in net revenue of 48.4%. Although it is unlikely that all AE firms will achieve this increase, it is a positive note for the sector that a strong outlook continues to be in place for the industry.

Outside Expenses

One component of economic impact is the amount of funds paid by an organization to outside industries. In terms of the AE firms, these amounts tend to be smaller than their contracting counterparts, but still remain a significant impact on the Georgia economy. This impact is reflected in the AE organization profile constructed in this study. As reflected in the survey data, the following averages exist for a typical AE firm:

Financial Institution Expenditures:	\$120,706
Insurance Company Expenditures:	\$898,290
Marketing Company Expenditures:	\$ 14,000

Technology Focus

The rapid increase in technology throughout the AEC industry is changing many of the processes associated with construction. Of particular note in this technology increase is the influx of Internet-related tools and technologies. With the anticipation that the Internet will be the technology focus of the near future, the survey attempted to obtain a current profile of the inroads that this technology has made in the AE sector. The results of these questions indicate that Internet technologies are increasingly being used within the industry, with a greater proportion than that seen by the construction sectors. Specific profile values

indicate that the all companies (100%) are using e-mail and the majority are using the Internet (89%), but slightly fewer organizations (46%) have implemented company Web pages. Similarly, 100% of organizations are adopting computer-based design tools to enhance their project performance.

Part IV-Economic Presence of the Construction Industry

Introduction³

The Georgia Input-Output Impact Model provides estimates of growth likely from economic development opportunities and initiatives. The model estimates new household income, employment, state and local tax revenues, and industrial activity associated with new funds brought into the economy. The model has the capability of providing estimates at a 542-industry level of detail.

The foundation for the model’s growth estimates comes from the observation that most of the variation in the area’s economic fortunes results from the changes in the flow of funds into (or out of) the area from (or to) the outside. That is, growth occurs by exporting goods and services or by replacing imports with local production. The revenue received for these goods and services pays local suppliers of the factors of production that produce the exported items. The economic chain of events leading to growth continues as the funds recirculate through the area’s economy. The recirculation eventually subsides (and growth stops) when the funds purchase items supplied from outside, i.e., imports to the area. The economic growth is higher when more of the goods that are consumed locally are produced locally.

Another aspect of impact is greater demand for government services likely to occur as a consequence of the growth. These services would include education, public safety, public health, and others. The cost of providing these services must be paid by the persons making the new demands, i.e., the new employees and their families, and the new firms. If the tax revenues do not equal the increased costs, service quality must decline or taxes must go up. Also, if the tax revenues exceed the increased costs, service quality can improve or taxes can go down.

The following section highlights the impact of the 1998 construction activity on the State of Georgia over 525 industries within the Georgia input-output model. In summary, the total impact of construction activity in the State of Georgia can be seen as follows:

Total Revenues:	\$26.589 billion
Total Employment	346,302 jobs
Personal Income:	\$9.728 billion
Business Taxes:	\$849 million

This impact represents a 2 to 1 impact from the initial construction expenditures. However, it should be noted that this impact is from a one-year construction

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³ Parts adapted from: Riall, William (1994). “The Georgia Input-Output Impact Model,” Georgia Tech Economic Development Research Program, Economic Development Institute.

expenditure. The continued expenditure of similar amounts over a continued period of time will have a cumulative effect on the Georgia economy. Similarly, the 2 to 1 ratio identified here represents the impact on Georgia private industries. An expanded impact is in evidence when the impact on industries outside the state are considered and the impact created by additional public sector jobs and services. Estimates for this total impact have been reported to be as high as 4 or 6 to 1 ratios. However, in this section a conservative estimate is used that focuses on the results from the Input-Output model.

Summary

As summarized in the following table, the economic presence of the construction industry is spread throughout Georgia's industries. From manufacturing to services, construction revenue is recirculated into both closely related and non-related industries. For example, an illustration of a closely related impact is in the finance and real estate industries where the construction industry has a financial impact of \$1,889,551,510. Similarly, illustrations of non-direct impact occur in the food industry where an impact of \$238,199,213 is contributed and the wholesale and retail trade industries where an economic impact of \$3,135,237,700 is detected.

The overall result of this impact is an industry that is distributed throughout the state in a manner that is greater than that seen through construction sites. Specifically, the construction industry is a direct contributor to the economic health of Georgia through a diverse set of industries and personal expenditures. When combined with the profiles of industry firms that indicate existence in terms of decades, it is clear to see how construction is a primary component of the permanent Georgia economy.

Georgia Construction Economic Impact Study

Description	Business Revenue	Employment	Employee Compensation	Business Taxes	Personal Income
Construction	14,476,705,418	182,877	4,028,866,835	106,374,259	5,211,809,337
Agriculture	130,835,709	2,837	25,723,139	2,500,686	53,406,267
Mining	14,263,613	123	4,225,576	505,853	4,443,401
Food	238,199,213	1,140	36,581,437	1,987,174	37,615,751
Tobacco	47,484,774	37	3,492,982	8,381,036	3,750,907
Textiles and Apparel	77,498,598	902	19,328,959	399,513	20,166,438
Lumber and Wood Products	895,262,925	7,145	209,370,881	7,074,229	252,572,229
Furniture and Fixtures	44,165,255	558	14,338,266	173,370	15,349,604
Paper and paper Products	42,364,755	217	9,044,914	422,483	9,279,510
Printing and Publishing	94,819,747	928	30,716,474	2,143,215	34,705,010
Chemicals and allied Products	130,491,891	489	23,865,887	1,166,519	25,109,834
Petroleum Refining	90,662,731	270	13,079,841	2,176,646	12,851,751
Rubber and Plastics	4,314,589	30	955,957	19,206	973,598
Leather Products	3,612,782	67	1,417,041	23,899	1,452,302
Stone, Clay, and Glass	27,680,414	246	8,253,863	283,174	8,622,338
Primary and Fabricated Metals	98,520,659	666	23,084,583	814,902	24,553,036
Machinery Manufacturing	239,728,814	1,385	50,145,077	4,295,714	52,364,811
Electrical Machinery	204,249,964	1,103	52,524,913	1,565,085	54,107,578
Transportation Equipment	48,287,300	165	8,466,063	573,931	9,012,508
Miscellaneous Manufacturing	49,270,570	562	19,619,005	360,677	20,255,415
Transportation and Utilities	1,250,389,039	9,137	333,294,669	67,453,062	382,474,758
Wholesale and Retail Trade	3,135,237,700	65,070	1,330,701,090	434,381,830	1,413,619,580
Finance, insurance, and real estate	1,889,551,510	9,843	320,544,280	162,510,869	340,102,000
Hotels and Lodging Places	120,805,400	2,175	39,313,000	8,653,720	45,778,880
Personal and Business Services	935,371,546	18,983	332,518,737	20,954,129	407,260,495
Entertainment	122,018,158	2,777	37,612,888	3,879,084	42,756,225
Professional Services	966,810,230	14,026	478,258,710	5,553,708	615,565,910
Education	109,210,830	2,891	57,089,048	371,125	59,199,551
Child and Social Services	58,927,594	1,832	30,991,970	109,537	30,991,970
Organizations	64,793,790	2,328	31,949,041	122,223	31,903,631
Consulting Services	778,874,740	11,655	360,986,847	3,460,848	408,944,995
Government Services	198,093,835	3,823	96,815,940	0	96,815,940
TOTALS	26,588,504,104	346,302	8,033,177,924	848,691,719	9,727,815,570

Part V - Implications

The development of the GCEIS data and report provides a basis for developing several conclusions on the implications of the current direction of the construction industry within the State of Georgia.

First, an implication relating to education is a significant element of the construction industry. The continued issue of lack of qualified personnel is one that must be addressed before the construction industry finds itself unable to keep pace with the demand for construction. If this occurs, a greater number of out-of-state organizations will begin to fill the void, thus leading to a greater percentage of revenues leaving the state for other locations. Addressing this education need should become a priority for state authorities. Specifically, a greater emphasis on introductory courses at a high school level, professional courses at a university level, and lifelong learning opportunities at a professional level should be pursued and implemented. While it is true that new industries such as telecommunications and computing are creating large opportunities for Georgia, it should not be forgotten that the construction industry has traditionally played, and will continue to play, a significant role in the Georgia economy.

Second, an implication relating to government regulations is an important component of the construction industry. Although it is important to protect the interests of construction consumers, regulatory bodies too often create environments where the individual constituents within the construction industry must spend more time in conflict with each other than they do on developing better solutions for the general public. The State of Georgia is not immune to this tendency. Continued attempts to legislate advantages for one constituency over another within the industry such as in the context of insurance, environmental protection, or bonding regulations, is leading to an ever increasing antagonism within the construction industry. This is not productive for the general public. Rather than legislating antagonism, the State of Georgia should look at ways to work collaboratively with the construction industry to ensure that the concerns of both consumers and providers are equally addressed.

Finally, an implication regarding the need for greater data has become evident in this study. While a segment of industries enjoy significant data banks to support their efforts, the construction industry is lacking comparable data. Many theories exist for why this lack of data exists including lack of support by the industry, lack of interest by the government, and lack of participation in elected bodies. However, the actual reason is less important than the conclusion that greater data is required in this industry. Whether this data is sponsored by the State or through private efforts, the construction industry deserves to have its voice heard through statistics and through recognition by public officials.

In summary, this report has presented a snapshot of the construction industry in the State of Georgia. The report illustrates the value of the construction industry to Georgia and the need for both public and private constituencies to support all facets of the industry. One hundred years from now, a new set of technologies will dominate the economic landscape of the state, but construction will continue to provide a backbone for the Georgia economy.