

construction & aggregates

in Merced County

An Economic Analysis of the Construction and Aggregate Industries in Merced County

August, 2003



Prepared for Construction Materials Association of California,
Merced County Chapter

*By Sharon Prager, e concepts and
Randy Evans, Applied Development Economics*

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by

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Note

An Economic Analysis of the Construction and Aggregate Industries in Merced County is the third in a series of economic studies that analyze the economic impacts of the construction and aggregate industries in the state and selected counties. The first study in 2001 provided statistical data on the importance of the aggregates industry statewide. Research on the economic impacts of the construction and aggregate industries in individual counties was launched in 2002 with the release of the second study examining Tulare County. In addition to this study, other reports to follow during 2003 include economic studies for Fresno and Shasta Counties.

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1. EXECUTIVE SUMMARY

This report examines and assesses the contributions of the aggregate and construction industries on the Merced County economy measured by total output, including revenues, employment, wages, value added impacts, and taxes.

SIGNIFICANT FINDINGS

Based on 2000 data, without factoring in any projected growth, this study finds that:

- The total economic impact from the aggregate and construction industries in Merced County is over half a billion dollars (**\$576 million**).
- Over \$479 million in direct output was contributed to the Merced County economy by the aggregate and construction industries, **more than 6%** of the County's total output.
 - This output compares favorably with the \$685 million high profile poultry industry, and \$362 million from wholesale trade and transportation.
- **Nearly \$100 million** of aggregate and construction's direct output was used by the County's major industries. Two industries, agriculture and manufacturing, had the greatest need for construction and aggregate products.
- **Over \$97 million** was contributed indirectly by the aggregate and construction industries to the Merced County economy.
- The aggregate and construction industries employed **over 4,100 people**, more than the poultry industry (4,041), or wholesale trade and transportation (3,746). Indirect

employment (employment generated through aggregate and construction spending) was over 1,300.

During the first two decades of the 21st century, Merced County's population growth rate is estimated at 48.6%. As a result of continuing growth, Merced County is in the midst of a building boom, most of which does not yet include the development that will result from the new UC Merced campus. Nonetheless, how successfully Merced County grows will largely be determined by its ability to provide first-rate infrastructure.

Not only is infrastructure investment important for retaining current businesses and employers, but it is fundamental for developing a diversified economy, and attracting "new economy" companies that offer higher salaries. This is especially material to Merced County, taking into account its 2000 unemployment rate of 14.4%, and per capita income of \$14,257 (compared to 6.6% and \$22,711 for California overall).

Providing the necessary infrastructure requires access to local, large, and low-cost supplies of high quality sand and gravel and crushed stone – called "aggregates". Aggregates are the basic raw materials required for building, and for making ready-mix concrete, asphaltic concrete (often called "black top"), road base, sub base, and a wide variety of other products. Without aggregates there would be no buildings, hospitals, roads, airports, shopping centers, homes, sewer systems, or any other structure used by Californians. Approximately 60% of all aggregates are used in public works projects, and nearly 90% of all materials required to build federal, state, and local roads consist of sand, gravel, and stone.

In addition, aggregates are not only essential for construction, but for manufacturing, wholesale trade, and tourism as well. Manufacturing and wholesale trade need the transportation systems and distribution infrastructure, and tourism requires roads to access various recreational sites. Agriculture uses aggregate products such as crushed limestone, and remineralizes soils with byproduct fines from aggregate processing. Agriculture also uses large amounts of concrete for dairies and processing plants, and relies heavily upon roads for production and transportation of agricultural goods.

Nevertheless, according to a 1999 Division of Mines and Geology study, critical supply areas for the County are in danger of depletion unless additional aggregate resources are permitted. Failure to do so is analogous to gambling away the County's future.

This report focuses on the economic contribution of the aggregate and construction industries in Merced County. However, the findings also have implications for how the County chooses to grow, its ability to have the infrastructure that favorably impacts its economic, social, and environmental future, and the inclusion of aggregate resources in its long range land use planning. All state and regional demographic and economic indicators point toward growth and development continuing in Merced County for decades to come. That information, combined with the economic data herein, indicates that planning for Merced County's future livability also means planning for the continuous availability of aggregates.

2. OVERVIEW

2.1 CALIFORNIA'S INSUFFICIENT INFRASTRUCTURE

Since 1990, California has gained over 4 million new residents. The California Department of Finance estimates a population of 45 million in 2020, and 50 million in the 2030s. Although California attracts worldwide immigration, most of the state's growth in the 1990s was attributable to the birthrates of Latino and Asian residents. This trend is expected to continue, as future growth rate projections are based primarily on newborn residents.¹

Although growth continues unabated throughout California, it is occurring most rapidly beyond the San Francisco and Los Angeles regions. Over half of the state's population now lives outside the state's coastal megalopolises.

At the same time, California has failed at planning for growth and the concomitant infrastructure required. It has been well publicized that California's expenditures for infrastructure rank near the bottom nationally, and that the state needs to spend over \$90 billion to meet its infrastructure needs.²

California is only producing one-half its housing needs, and while the state's population has grown by 50% during the past 20 years, road capacity has barely increased 7%. In the 1960s approximately 20% of state spending was directed towards infrastructure. Today that figure is closer to 3% despite tremendous growth, and outdated and crumbling infrastructure.³

There is a direct correlation between increased population and infrastructure requirements. Infrastructure comprises public works such as roads, highways, bridges, water and sewer systems, airports, dams, and power plants, as well as schools, libraries, and other public buildings. Residential and commercial construction is also included as infrastructure in this report. A dynamic economy, sustainable

environment, quality school system, and a healthy quality of life all depend upon the construction and maintenance of infrastructure.

2.2 MERCED COUNTY'S FRUITFUL GROWTH

Population in the Central Valley overall, and in the San Joaquin Valley particularly, is growing at a faster rate than the state. Merced County is sharing in this growth. During the first two decades of this century, Merced County's population growth rate is estimated at 48.6%.⁴

From 1990-2000 Merced County grew by 19.2% to over 210,000 residents. By 2010, Merced, the largest of 6 incorporated cities, will see its population increase to 80,000 from its current 62,000. Since 1980 the city's annual growth rate of 3.4% has outpaced the state's average. Last year, 40-50 single-family homes were being built monthly in the Merced/Atwater area, and that rate is expected to increase to 75-80 per month during 2003. Over 15,000 homes are in progress or in the planning stage.⁵

In general, these housing rates do not include the increase that will occur from the new UC campus. The current housing boom is due to a number of factors: Bay Area residents and commuters seeking affordable housing; Sacramento and Stanislaus County residents moving south for similar reasons; new federal prison employees, others upgrading to larger homes, and those investing in real estate rather than the stock market. In addition to low interest rates, there is also less than a 2% vacancy rate in multi-family housing.

Merced's rapid population growth has stimulated a number of retail and commercial developments, including The Plaza at El Portal, a 19-acre, \$40 million project on G Street, and the Merced Market Place, a 26-acre shopping center on Olive Avenue.

UC Merced, the University of California's 10th campus, and the first in the San Joaquin Valley, is scheduled to open in 2004, and already offering classes and programs. Its presence is being felt as an economic driver in the community, and an air of excitement and anticipation permeates throughout Merced. The planned capacity is for 25,000 students, but the university and its two research

institutes will be a resource for 3.5 million residents from Stockton to Bakersfield. UC campuses receive about 25% state funding, but yield a 300% return on investment. Historically, UC campuses buy from local businesses, and generate new companies, technologies, and high-paying, knowledge-industry jobs.⁶

During 2000 Merced County had a 14.4%⁷ unemployment rate and a per capita income of \$14,257 (compared to 6.6% and \$22,711 in California overall).⁸ Retaining and adding infrastructure capacity is not only necessary to ensure the County's successful growth, but important for retaining current county businesses and employers.

Additionally, several recent studies have recommended that the San Joaquin Valley economy be strengthened and diversified. If Merced County is to develop a diverse economy, attracting "new economy" businesses that offer higher salaries, it will need to link economic development with infrastructure investment. In a highly competitive global economy, quality infrastructure is a primary consideration of businesses when deciding location. Innovative companies, and their highly skilled workforces, choose communities with excellent infrastructure and cultural and recreational opportunities.

Since infrastructure directly impacts a county's livability and ability to achieve its goals, it is one of a number of indicators that residents, planners, and decision makers consider when striving for positive outcomes.

2.3 NO INFRASTRUCTURE IS BUILT WITHOUT AGGREGATES

Building and maintaining infrastructure requires a continuous supply of locally available sand and gravel and crushed stone, called "aggregates". These natural resources are the first step in the construction process and used in a wide variety of products. Aggregates are necessary for making portland cement concrete and asphaltic concrete.

Physical infrastructure, or the “built environment”, comprises public works projects and residential, commercial, and industrial buildings:

INFRASTRUCTURE CATEGORIES	EXAMPLES
<ul style="list-style-type: none"> • TRANSPORTATION 	<p>Roads, highways, bridges, ports, airports, railroad beds, and public transit</p>
<ul style="list-style-type: none"> • WATER RESOURCES 	<p>Water and sewer systems, pumping and power plants, canals, pipelines, reservoirs, and flood control structures</p>
<ul style="list-style-type: none"> • PUBLIC BUILDINGS 	<p>Schools, libraries, hospitals, laboratories, correctional facilities, and government offices</p>
<ul style="list-style-type: none"> • OUTDOOR AND RECREATIONAL 	<p>Parks, trails, fire stations, forest and agricultural stations</p>
<ul style="list-style-type: none"> • RESIDENTIAL, COMMERCIAL, AND INDUSTRIAL BUILDINGS 	<p>Homes, shopping centers, manufacturing plants, office complexes, agricultural structures</p>

- Aggregates make up more than 94% of asphalt and 80% of concrete pavements.
- Construction of an average home requires 400 tons of aggregates.
- 38,000 tons of aggregates are required for one lane-mile of a four-lane highway.
- Water and sewer facilities use aggregates for filtration in water purification and sewage treatment.

- Thousands of tons of aggregates are required for water and sewage treatment plants, water storage, power plants, prisons, dams, tunnels, and erosion control.
- A school or hospital requires at least 15,000 tons of aggregates.⁹
- Aggregates are also used in agriculture and forestry, environmental protection, and in the manufacturing of glass, paint, cosmetics, pharmaceuticals, and many other consumer products.

Without aggregates there would be no buildings, hospitals, roads, airports, shopping centers, homes, sewer systems, or any other structure used by Californians. Approximately 60% of all aggregates are used in public works projects, and nearly 90% of all materials required to build federal, state, and local roads consist of sand, gravel, and stone.

Aggregates' indispensability to infrastructure demonstrates that aggregates are both a natural resource and a community asset. Therefore, when determining what data to include and exclude in long-range planning, it is important to incorporate local aggregate resources into the planning process, because aggregate availability has direct consequences on a community's livability.

2.4 ALL AGGREGATES ARE NOT ALIKE

Not every aggregate deposit is physically or chemically suited for every use. Certain physical property characteristics and qualities must be present depending on the ultimate application, and specifications have been set by various government agencies to ensure the suitability of the aggregates to the specific use. Concrete aggregate is construction aggregate that meets the quality standards for use in portland cement concrete and asphaltic concrete. The California Geological Survey (formerly the California Division of Mines and Geology) states that "Most aggregate specifications have been established to ensure the manufacture of strong, durable structures capable of withstanding the physical and chemical effects

of weathering and use.”¹⁰ Specifications for portland cement concrete and concrete products prohibit or limit certain mineral substances within the rock materials, and often mandate particle-size distributions.

High-tech industries receive the attention, but society depends on aggregates as much as on gasoline, electricity, and food products. Citizens drive by road work, or casually notice a ready-mix truck rolling along, but don't link sand and gravel to those activities. For most uses, there are no substitutes for aggregates – they can't be manufactured or duplicated, and their locations are determined by geological conditions. There are few other industries that can't be moved or grown elsewhere, or that are so critical and unique to their applications. What is often assumed to be a common commodity, accessible everywhere, and taken for granted, is actually quite the opposite.

2.5 AGGREGATE SHORTAGES SIGNAL TROUBLE DOWN THE ROAD

If Merced County is to build, maintain, and replace current and future infrastructure, it will require hundreds of millions of tons of high-grade construction aggregates. Due to growth, the average per capita consumption of aggregates in Merced County is 8.1 tons per person.¹¹ This is higher than the state's average of 7 tons per person per year, and is unlikely to decrease in the near future.¹²

A 1999 Division of Mines and Geology Mineral Land Classification report indicated that projected demand for construction aggregates in Merced County through 2049 will require 144 million tons. Of this total, approximately 70%, or 101 million tons, will be needed for use in concrete aggregates, and 30%, or 43 million tons, for other construction and aggregate uses. Two-thirds will be for use in eastern Merced County, and one-third in western Merced County.¹³

Aggregates are a low value, high weight commodity, and supplies must be obtained locally or transportation costs can rapidly exceed the value of the aggregates. Hence, “transportation cost is the principal constraint defining the market area” for an aggregates operation.¹⁴ Because of the cost of transporting aggregates, two

market regions exist in Merced County - one in the west and one in the east.

There are also additional environmental and safety impacts associated with longer-distance transport. Increased fuel consumption, air pollution, traffic congestion, and road maintenance all affect the environment, and longer transportation distances also raise safety concerns.

While the state report indicated western Merced County had adequate permitted reserves, the Merced County Association of Governments has noted that the county as a whole is facing “continued pressures of urban growth and development.”¹⁵

For example, there are an accelerating number of Bay Area and Silicon Valley families moving into western Merced County, particularly the Los Banos area, who are choosing longer commutes in exchange for affordable housing. As a consequence, earlier estimates of aggregate reserves may be utilized at a greater rate than anticipated by the state report.

The state study indicated that permitted reserves in eastern Merced County, would be depleted in 3-4 years, or during 2003, unless new resources were permitted. Since the report, eastern Merced County is still running very low on permitted reserves for concrete-grade aggregates, despite additional resources having been permitted. If new resources are not permitted on a timely basis, companies will be unable to supply enough material to meet market demand.

The rapid development in eastern Merced County may require more aggregates from western Merced County. However, continued growth pressures throughout the entire county will put additional strains on all aggregate resources, especially as western Merced County increases the utilization of its own local aggregate supplies.

2.6 RESTORING, RECLAIMING, AND REUSING AGGREGATE LAND

Aggregate companies are heavily regulated and must meet the requirements of nearly 80 agencies overseeing federal, state, county, and local laws. Once permitted, the regulatory process continues throughout the life of the operation.

Nevertheless, aggregate production is an interim land use. After providing the building materials necessary for infrastructure, the land is reclaimed and restored. In California, aggregate producers reclaim land to nearly 50 diverse and desirable uses, including open space, agriculture, and recreation. While over 90% of California's wetlands have been lost over the past 100 years due to statewide settlement, California's sand and gravel producers are a major resource for creating and restoring thousands of acres of wetlands and wildlife habitat. The California Office of Mine Reclamation reports that statewide, aggregate producers have reclaimed over 50 square miles of land during the decade of 1990-2000.¹⁶

Many land use projects are the result of successful partnerships between aggregate producers, communities, and local and county governments. Whether reclaimed to residential or commercial developments that generate additional economic value, or to recreational uses for the public's enjoyment, reclaimed aggregate land is a community asset.

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1. Mark Baldassare, A California State of Mind (Berkeley: University of California Press, 2002), 37.
 2. Ibid., 38.
 3. "Infrastructure in California: Overburdened, Outdated, and Overlooked", California Rebuild America Coalition Fact Sheet
 4. "Projected Population Growth Rates: 2000-2020," California Department of Finance, Demographic Research Unit, 1998, as shown on http://www.mercedcountypedc.com/Regional_Info/overall_demo/hRIn_ODs_PGh.html
 5. Marvin Bolling, "Special Residential Real Estate Supplement," The Greater Merced Chamber of Commerce Business Journal, 8 (November, 2002): 2-3.
 6. Merced Today, The Greater Merced Chamber of Commerce, 2002-2003, "UC Merced: A University For Our Future."
 7. State of California Employment Development Department, County Snapshots, www.calmis.ca.gov/file/COsnaps/merceSNAP/pdf.

8. US Census Bureau, Census 2000
9. 50 Fascinating Facts about Stone, Sand and Gravel (Arlington, VA: National Stone, Sand and Gravel Association).
10. John P. Clinkenbeard, Mineral Land Classification of Merced County, California (Sacramento: California Department of Conservation, Division of Mines and Geology, 1999), 14.
11. Clinkenbeard, 41.
12. Kohler, Susan L., Aggregate Availability in California (Sacramento: California Department of Conservation, California Geological Survey, 2002), 16.
13. Clinkenbeard, 49.
14. Ibid., 13.
15. "About MCAG", Merced County Association of Governments, <<http://www.mcag.cog.ca.us/about.htm>
16. Sharon Prager, Reclamation Survey (Sacramento: Construction Materials Association of California, 2001), 6-7.

3. THE AGGREGATE AND CONSTRUCTION CONTRIBUTION TO MERCED COUNTY'S ECONOMY

This portion of the report describes the contribution of aggregates and construction to the Merced County economy in 2000. Economic contributions of other selected industries are also shown for context and comparison purposes.

3.1 THE MERCED COUNTY ECONOMY – 2000

Merced County, located in the heart of California's Central Valley, is economically dominated by agriculture and manufacturing. However, many industries drive the county's economy, including large service sectors; transportation and wholesale trade, and tourism. The county's population growth, and associated employment opportunities in both the public and private sectors, requires an expanded infrastructure. The construction and aggregate industries are integral for building and maintaining the necessary infrastructure, and are an important economic component as well.

The total economic output of all Merced County industries in 2000 was \$7.8 billion. The largest industry in terms of direct output was manufacturing with \$2.3 billion, followed by agriculture at \$1.4

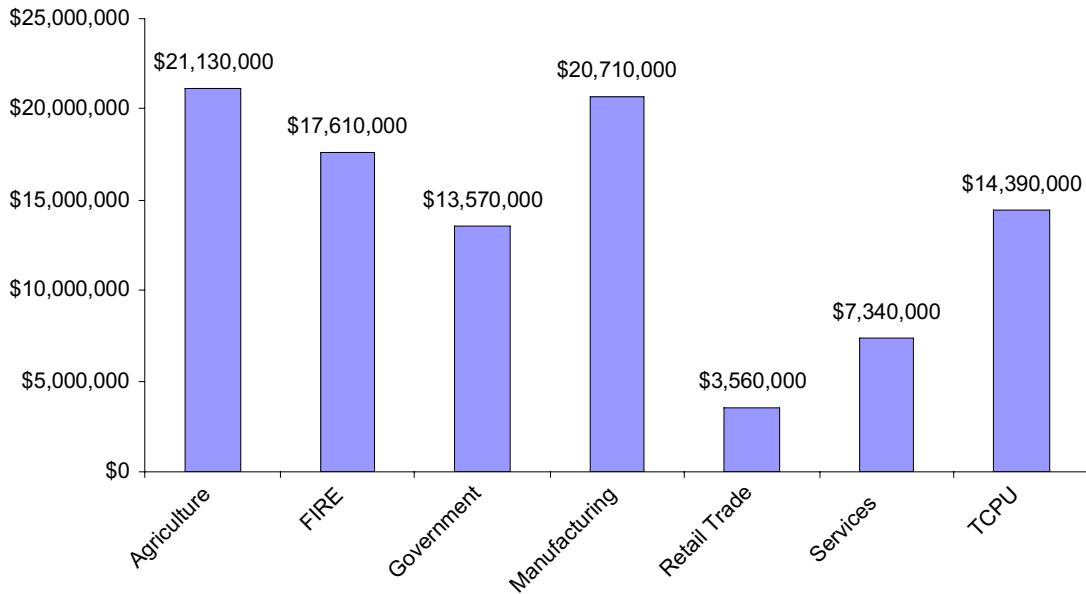
billion. Construction alone had a direct contribution of \$451 million.¹

While manufacturing is the largest industry in direct economic output, it is definitively tied to the agricultural industry. In 2000, food processing, a manufacturing component, accounted for \$1.5 billion (63%) of manufacturing's total output. This underscores how many of Merced County's industries are interlinked.

Of the \$479 million of aggregate and construction output, \$98 million was attributed to production for other industries. In other words, \$98 million of aggregate and construction products and services were used to produce goods in other industries. Agriculture and manufacturing were the two industries that had the greatest need for aggregate and construction products and services. Figure 1 is the amount that the aggregate and construction industries contribute to each of the major Merced County industries.

¹ Industries are at the industry division level. The industry definitions used are from the Standard Industrial Classification (SIC) system. The SIC system has served as the structure for the collection, aggregation, presentation, and analysis of the US economy since the 1930's. An industry consists of a group of establishments primarily engaged in producing or handling the same product, or group of products or in rendering the same services. Industry definitions come from the 1987 Standard Industrial Classification (SIC) Manual.

FIGURE 1
CONTRIBUTIONS OF AGGREGATES & CONSTRUCTION
TO MERCED INDUSTRIES IN 2000



Source: Applied Development Economics; IMPLAN Professional 2.0, Merced County 2000

Note: Agriculture includes agricultural crops, agricultural services, forestry, and fishing; TCPU—Transportation, communications, and public utilities; FIRE—Finance, insurance, and real estate.

3.2 AGGREGATES AND CONSTRUCTION IN MERCED COUNTY

Since sand and gravel and crushed stone are the basic raw materials used in construction, road building, and asphaltic and ready-mix concrete, the aggregates industry is an indispensable component of the construction industry. All of California's public and private infrastructure –its roads, highways, homes, schools, and buildings depend upon aggregates for construction. Having access to local, large, and high-quality supplies of aggregates is a prerequisite for efficient, cost-effective building.

In 2000, the contribution of the aggregate and construction industries to Merced County was \$576 million. This total includes

both direct and indirect contributions, and is larger than the transportation and wholesale industry, or tourism.

The aggregate and construction industries employed 4,126 people in Merced County in 2000 – 5 percent of all county employment. Purchases by the aggregate and construction industries employed over 1,300 additional personnel. Altogether, 6 percent of Merced County’s output in 2000 was directly attributable to the aggregate and construction industries.

**TABLE 1
TOTAL IMPACT OF THE AGGREGATE AND CONSTRUCTION INDUSTRY ON THE MERCED COUNTY ECONOMY**

2000 Merced County Aggregates & Construction Industry	Output	Employment
Direct	\$479,228,000	4,126
Indirect	\$97,474,394	1,328
Total	\$576,702,394	5,454

Source: IMPLAN Professional 2.0; 2000 Merced County Implan Data.

3.3 INDUSTRY COMPARISONS – WHERE DO AGGREGATES AND CONSTRUCTION FIT IN THE ECONOMY?

The construction industry depends upon the aggregates industry. Without readily available aggregates, construction costs skyrocket and work is delayed or postponed. In this sense, the construction industry can be seen as a value-added component of the aggregates industry. The connection between aggregates and construction is similar to the soil needed for crop production, or to silicon for semiconductors. Recognizing the importance of the construction industry to the Merced County economy, therefore, is not possible without conferring equal weight to the aggregates industry.

In addition, aggregates are not only essential for construction, but for manufacturing, wholesale trade, and tourism as well. Manufacturing and wholesale trade need the transportation systems and distribution infrastructure, and tourism requires roads to access various recreational sites. Agriculture uses aggregate products such

as crushed limestone, and remineralizes soils with byproduct fines from aggregate processing. Agriculture also uses large amounts of concrete for dairies and processing plants, and relies heavily upon roads for production and transportation of agricultural goods.

While all industries are interdependent, it is useful to examine individual industries to gauge their performance and impacts. Since this study focuses on the aggregate and construction industries, some other prominent Merced County industries have been selected for comparison. This is not meant to imply that any industry is less important than another. Instead, it is simply a measure of the contribution of each. For instance, while direct output (dollars contributed to the total Merced County economy) may be higher in one industry, wages or employment may be higher in another. The industries used herein for comparison purposes were simply chosen because of their acknowledged importance to Merced County.

Construction

The construction industry builds structures for both the public and private sector, including roads, highways, bridges, dams, commercial buildings, hospitals, power plants, pipelines, sewage treatment facilities, homes, apartments, railroads, and airports. The term “construction” includes new work, additions, alterations, reconstruction, installations, and repairs. In other words, virtually every project that needs building, remodeling, or repairing involves some sector of the construction industry. The industry employs a wide range of trades and craftspeople, as well as architects, engineers, contractors, supervisors, truck drivers, equipment operators, and skilled and unskilled labor.

For this report, the construction industry includes:

TABLE 2
CONSTRUCTION INDUSTRY COMPONENTS

New Residential Structures
New Industrial And Commercial
New Utility Structures
New Highways And Streets
New Farm Structures
New Mineral Extraction Facilities
New Government Facilities
Maintenance And Repair, Residential
Maintenance And Repair Other Facilities

Source: IMPLAN Professional 2.0

In Merced County, there are 432 businesses engaged in the construction industry.²

Aggregates

Sand, gravel, and crushed stone are collectively referred to as “aggregates”. These basic raw materials are the first step in the construction process and used in a huge variety of products. Aggregates are required for making portland cement concrete and asphaltic concrete –essential substances for building and maintaining

² Dun & Bradstreet Sales & Marketing Solutions

our public and private infrastructure. Without aggregates there would be no buildings, hospitals, roads, airports, shopping centers, homes, sewer systems, or any other structure used by Californians. Approximately 60% of all aggregates are used in public works projects, and nearly 90% of all materials required to build federal, state, and local roads consist of sand, gravel, and stone.

The aggregates industry includes the following:

**TABLE 3
AGGREGATE INDUSTRY COMPONENTS**

Dimension Stone
Sand And Gravel
Nonmetallic Minerals
Misc. Nonmetallic Minerals
Paving Mixtures And Blocks
Asphalt Felts And Coatings
Cement, Hydraulic
Concrete Block And Brick
Concrete Products
Ready-Mixed Concrete
Gypsum Products

Source: IMPLAN Professional 2.0

In Merced County, there are 7 businesses engaged in the aggregates industry.³

Poultry and Poultry Processing

The poultry industry is the largest single industry in Merced County measured by output. Poultry processing is the manufacturing component of the poultry industry. Combined, poultry and poultry processing represent a large portion of the Merced County economy. The poultry and poultry processing industry are made up of the following industries.

**TABLE 4
POULTRY AND POULTRY PROCESSING INDUSTRY COMPONENTS**

Poultry and Eggs
Poultry Processing

Source: IMPLAN Professional 2.0

³ Ibid

In Merced County, there are 3 businesses engaged in the poultry and poultry processing industry.⁴

Transportation and Wholesale Trade

The county's central location, combined with the traversing of Highway 99, helps make the distribution of goods another important economic contributor. Transportation is the movement of the goods, while wholesale trade includes establishments or places of business primarily engaged in selling merchandise to a) retailers; b) industrial, commercial, institutional, farm, construction contractors; and c) professional business users, or to other wholesalers, or those acting as agents or brokers in buying merchandise for, or selling merchandise to, such persons or companies. Transportation and Wholesale Trade is made up of the following industries.

**TABLE 5
TRANSPORTATION AND WHOLESALE TRADE COMPONENTS**

Transportation Equipment
Motor Freight Transport and Warehousing
Wholesale Trade

Source: IMPLAN Professional 2.0

In Merced County, there are 492 businesses engaged in the transportation and wholesale trade industry.⁵

Tourism

As the gateway to Yosemite, Merced County generates much of its output from tourism. Tourist spending is concentrated in the industry categories of eating & drinking establishments; hotels and lodging; and amusement and recreation. The State of California estimates that tourists spent \$154 million in 2000 in Merced County. While the components listed here also serve local residents, no

⁴ Ibid

⁵ Ibid

percentage was estimated for local versus tourist capture. Instead, all industries are shown as if travelers were 100 percent of business.

TABLE 6
TOURISM COMPONENTS

Eating & Drinking
Hotels and Lodging Places
Amusement and Recreation Services

Source: IMPLAN Professional 2.0

In Merced County, there are 437 businesses engaged in the tourism industry.⁶

⁶ Ibid

3.4 CONTRIBUTIONS & EFFECTS OF SELECTED INDUSTRIES TO THE MERCED COUNTY ECONOMY – 2000

The graphs below compare the contributions of selected industries to Merced County's economy in 2000. The comparisons put into context the economic contribution of aggregates and construction to the county.

The three industries selected for comparison purposes were chosen because of their high profiles in Merced County:

- The poultry industry is the largest single industry in Merced County measured by its output.
- Transportation and wholesale trade are crucial because Highway 99 is a major corridor connecting the County to the San Francisco Bay Area and major ports.
- Tourism is important, especially since Merced is considered the "Gateway to Yosemite".

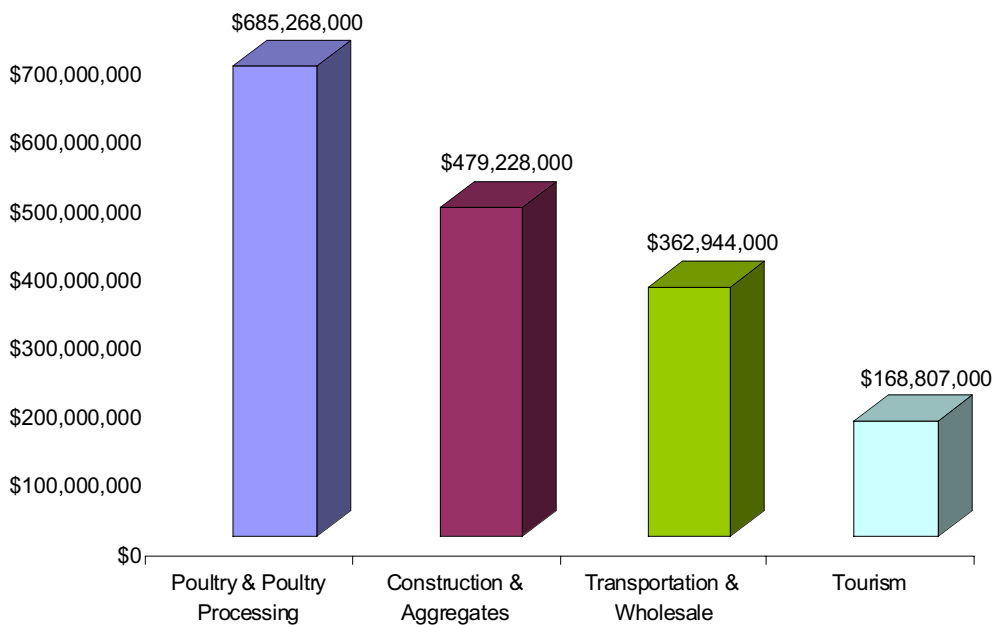
As shown by the data herein, the economic contributions of aggregates and construction –often overlooked industries –compare favorably to other Merced County industries.

Direct Output

The total output of all Merced County industries in 2000 was \$7.8 billion. Together, the direct total output of the aggregate and construction industries was \$479 million, or 6.1% of the Merced County output.

The direct output of aggregates and construction compares favorably to other important Merced County industries. The total direct output for poultry and poultry processing in 2000 was \$685 million, while transportation and wholesale trade's output was \$362 million. Tourism, as described in Table 6, had direct output of \$168 million.

FIGURE 2
2000 DIRECT OUTPUT OF SELECTED MERCED COUNTY INDUSTRIES

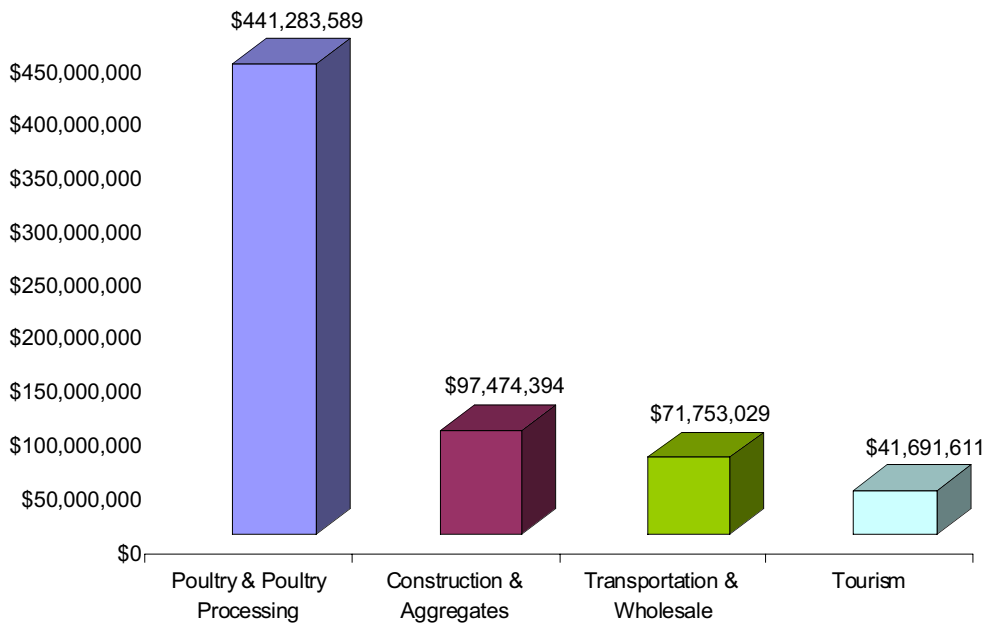


Source: Applied Development Economics; IMPLAN Professional 2.0, Merced County 2000

Indirect Output

In addition to the direct output of industries, their indirect contribution is an important component of the impacts on an economy. The indirect contributions of an industry are the revenues, salaries, and taxes generated by the industry's purchases. Aggregate and construction's indirect contribution of over \$97 million in indirect output is significant to the Merced County economy. Figure 3 compares the indirect impacts of the selected industries in Merced County in 2000.

**FIGURE 3
2000 INDIRECT OUTPUT OF SELECTED MERCED COUNTY INDUSTRIES**



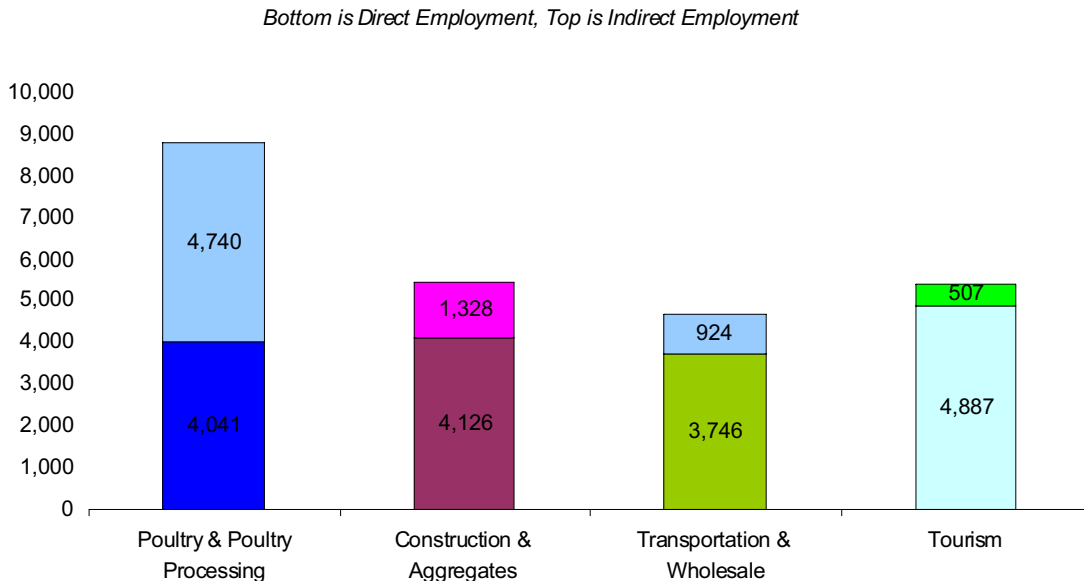
Source: Applied Development Economics; IMPLAN Professional 2.0, Merced County 2000

Employment

Direct employment of the aggregate and construction industries in 2000 was 4,126, or 5% of Merced County's total employment. Also in 2000, poultry and poultry processing employed 4,041, and transportation and wholesale trade employed 3,746. Of the selected industries, tourism had the highest employment rate at 4,887.

In addition to those employed directly by the aggregate and construction industries, the purchases made by aggregate and construction created employment in other industries. The indirect employment of the aggregate and construction industries in 2000 was 1,328. This figure is greater than the indirect employment generated by either transportation and wholesale trade or tourism.

**FIGURE 4
2000 EMPLOYMENT (DIRECT AND INDIRECT) FOR SELECT MERCED COUNTY
INDUSTRIES**



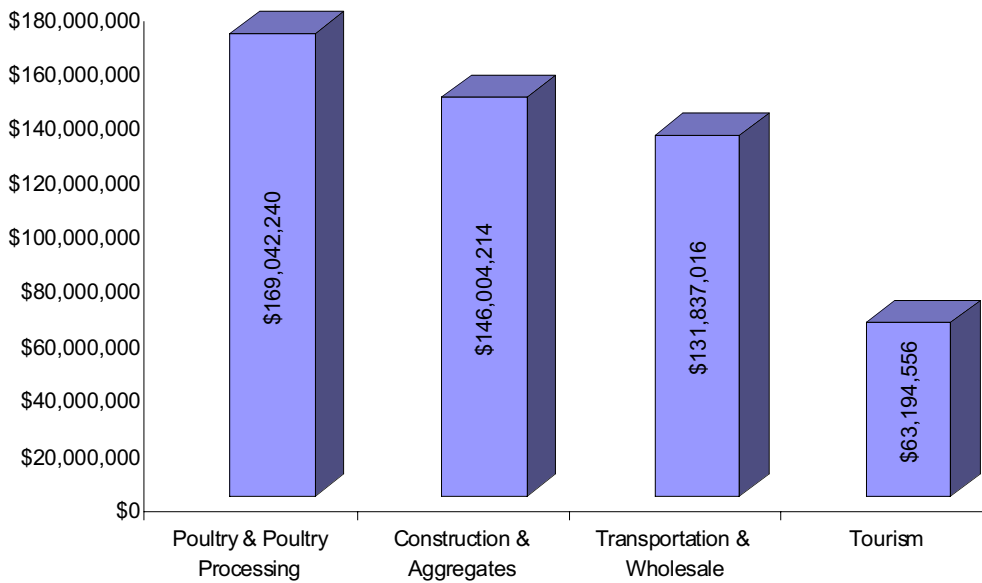
Source: Applied Development Economics; IMPLAN Professional 2.0, Merced County 2000

Dividing the number of employees by the direct output, an aggregate and construction employee contributed \$116,000 to direct industry output. This compares to \$96,000 per employee for transportation and wholesale trade, and \$34,000 per employee for tourism.

Labor Income

Labor income represents all forms of employment income. This includes proprietor income along with employee compensation. Direct labor income of the aggregate and construction industries in 2000 was \$146 million. This compares favorably to poultry and poultry processing with direct labor income of \$169 million. Direct labor income for transportation and wholesale trade was \$131 million, and for tourism, \$63 million.

**FIGURE 5
LABOR INCOME IN 2000 FOR SELECT MERCED COUNTY INDUSTRIES**

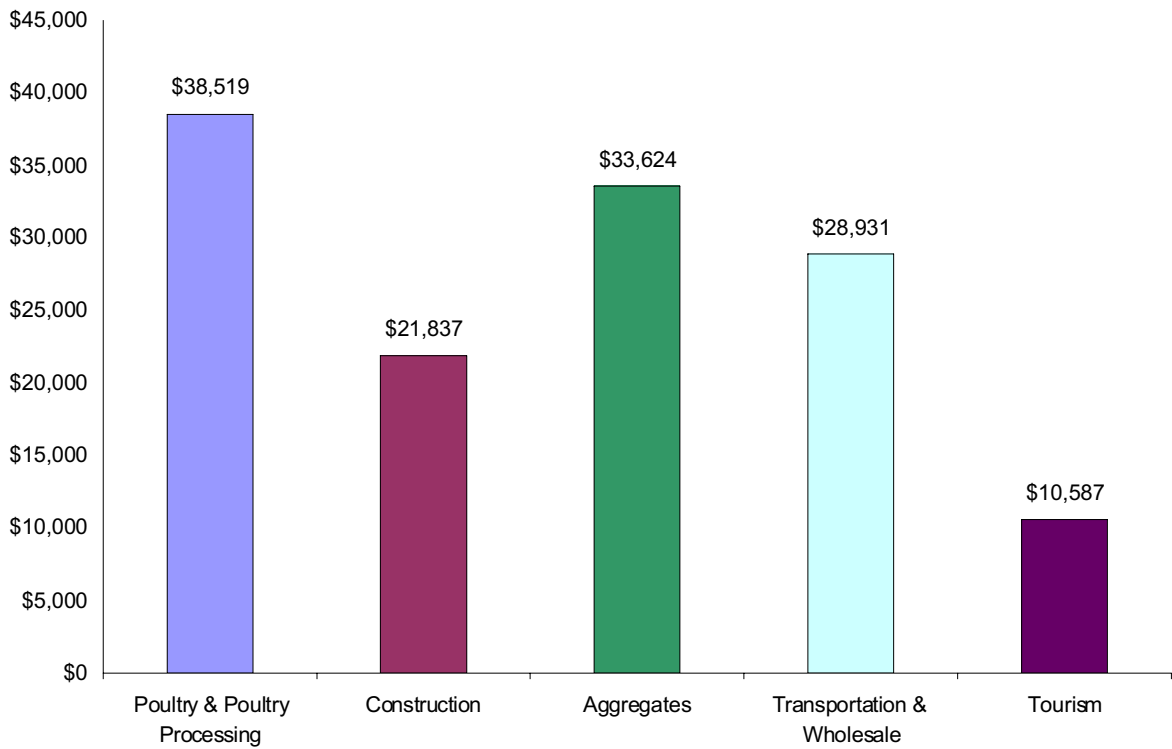


Source: Applied Development Economics; IMPLAN Professional 2.0, Merced County 2000

Employee Compensation

Unlike labor income, employee compensation are wages paid to employees in the form of pay and benefits. While aggregates and construction had an average wage of \$22,000, aggregates alone had the second highest wage of the selected industries at \$33,000. Figure 6 is the average wage paid to an employee in the selected industries in Merced County in 2000.

**FIGURE 6
AVERAGE WAGES IN 2000 FOR SELECT MERCED COUNTY INDUSTRIES**

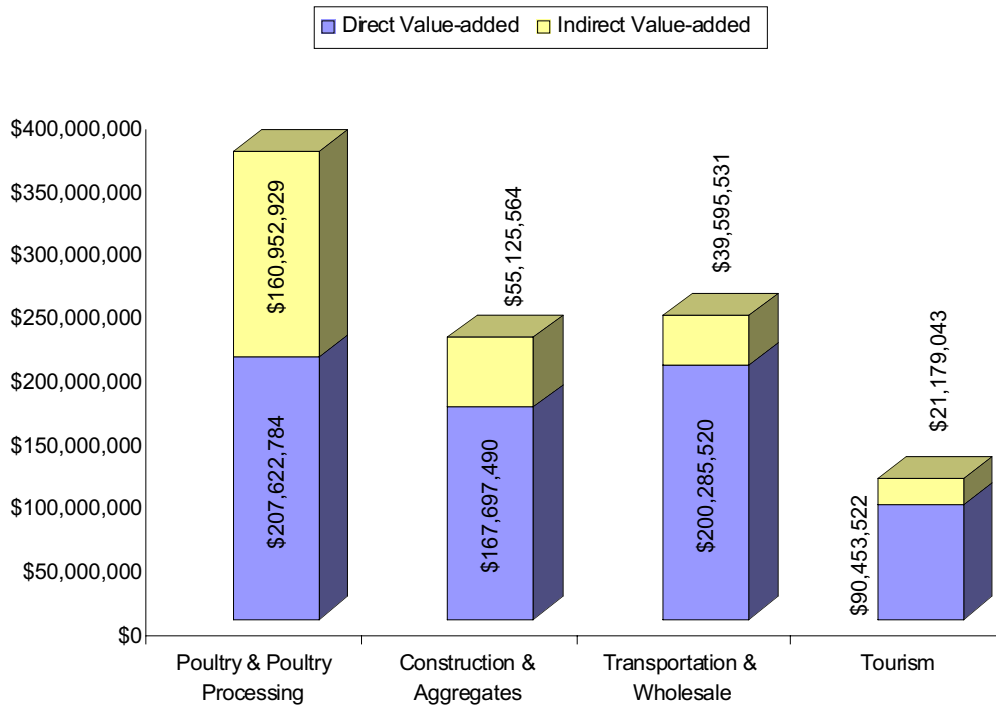


Source: Applied Development Economics; IMPLAN Professional 2.0, Merced County 2000

Value-added Contributions

Value-added contributions represent employee compensation⁷, proprietor income⁸, other property income⁹ and indirect business taxes¹⁰. The direct value-added contribution of the aggregate and construction industries to the Merced County economy in 2000 was \$167 million. Figure 7 is the direct and indirect value-added contributions of the select industries in 2000.

FIGURE 7
2000 VALUE-ADDED CONTRIBUTIONS OF SELECT MERCED COUNTY INDUSTRIES



Source: Applied Development Economics; IMPLAN Professional 2.0, Merced County 2000

⁷ Includes wages, salary payments and non-cash compensation sources such as benefits.

⁸ Includes income derived from self-employment.

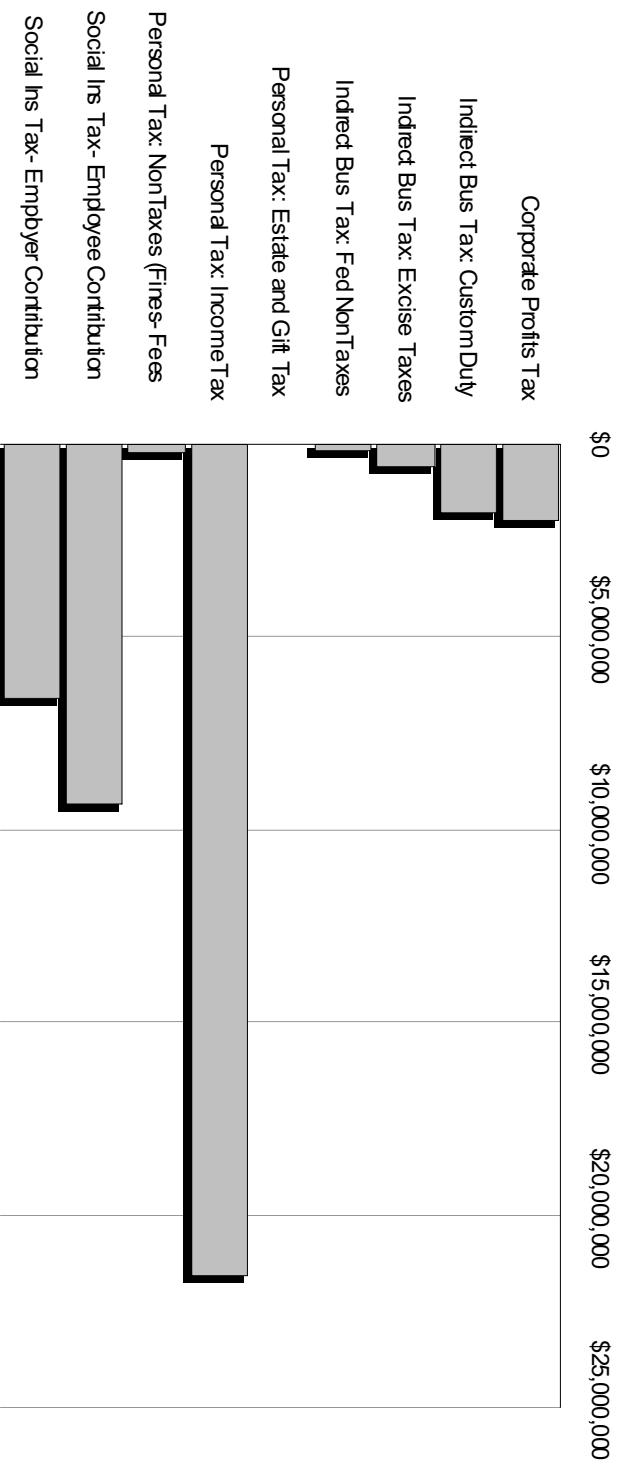
⁹ Includes payments from interest, rents, royalties, dividends and profits.

¹⁰ Includes household excise and sales taxes paid to business by households, excluding taxes on profit and income.

Taxes

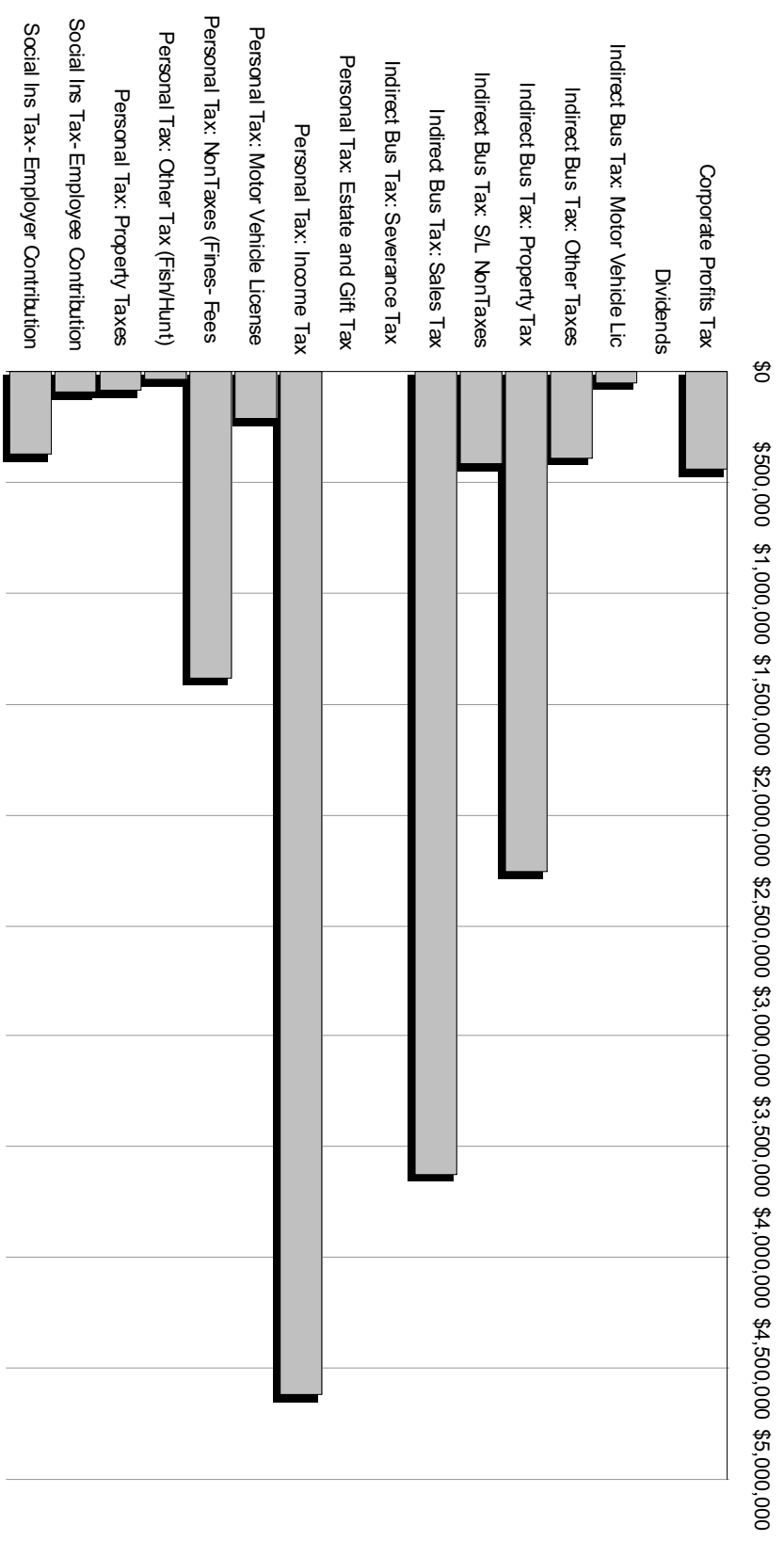
Federal, state and local governments receive significant additional tax revenues from the economic activity generated by the aggregate and construction industries. In Merced County, these industries contributed over \$42 million in federal taxes, and \$14 million in state and local taxes. The following charts illustrate the estimated tax impact of the aggregate and construction industries in Merced County in 2000.

**FIGURE 8
2000 FEDERAL TAX CONTRIBUTIONS OF THE MERCED COUNTY AGGREGATE AND CONSTRUCTION INDUSTRIES**



Source: Applied Development Economics; IMPLAN Professional 2.0, Merced County 2000

**FIGURE 9
2000 STATE/LOCAL TAX CONTRIBUTIONS OF THE MERCED COUNTY AGGREGATE AND CONSTRUCTION INDUSTRIES**



Source: Applied Development Economics; IMPLAN Professional 2.0, Merced County 2000

4. CONCLUSION

This study finds that the aggregate and construction industries contribute over a half billion dollars (\$577 million) to Merced County's economy, comparing favorably to other major county industries such as poultry, and wholesale trade and transportation.

The aggregate and construction industries' \$479 million direct output contributes over 6% of the county's total output, employs 5% of the county's workforce, and pays over \$56 million in federal, state, and local taxes. In a county where the per capita personal income is about \$14,257, the aggregates industry paid an average of \$33,000 per employee.

In addition, nearly \$100 million of aggregate and construction products and services are used by other industries to produce their goods. Agriculture and manufacturing are the two industries in Merced County that have the greatest need for aggregate and construction products. This underscores the linkage and essentiality of aggregates and construction to every other county industry, and in turn, to Merced County's total industry output.

This study also notes that all construction depends upon having sufficient long-term quantities of locally available supplies of aggregates. Aggregates are the basic raw materials necessary for making ready mix concrete, asphaltic concrete, and a variety of other products required for building infrastructure.

However, as documented in a State Division of Mines and Geology Mineral Land Classification study, two-thirds of the projected demand for construction aggregates is in eastern Merced County - an area found to be currently at risk for depletion of concrete-grade aggregates unless new resources are permitted.

Merced County is economically energetic, excited about a new world-class university, and proud of its quality of life. A great deal of its continued success will be determined by recognizing and planning

for the first class infrastructure that successful growth requires: affordable housing, efficient transportation systems, school construction, improved water storage capacity, and all other public works and private structures that protect its quality of life and vibrant economy.

Citizens have rightly learned to appreciate and value natural resources such as open space and wetlands. However, if community livability is a worthwhile value, now and in the future, greater recognition and education will be required if residents are to make land use decisions affecting the availability of aggregates, another important and irreplaceable natural resource.

Merced County is slated to continue growing. How it chooses to grow is the important issue. William McDonough, Dean and Edison Professor of Architecture at the University of Virginia, said “The question before us is not growth versus no growth. It is: what would good growth look like?” A county that includes its valuable aggregate resources as an integral part of its land use planning will be miles ahead of other places when building its road to the future.

Glossary

Direct output: This is the direct contribution directly attributed to an industry – their employees, revenues and wages.

Employee compensation: wage and salary payments as well as benefits, including health and life insurance, retirement payments and other non-cash compensation.

Indirect effect: the secondary impact caused by changing input needs of directly affected industries (e.g., additional input purchases to produce additional output).

Indirect business taxes: consist primarily of excise and sales taxes paid by individuals to businesses; these taxes occur during the normal operation of the businesses but do not include taxes on profit and income.

Indirect output: the revenues, salaries and taxes generated by the purchases made by an industry.

Industries: the collection of businesses in an economy within a given region; purchasing goods and services and paying workers.

Labor income: represents all forms of employment income as the sum of employee compensation and proprietor income.

Output: industry output is a measure of the value of goods and services produced in a given area.

Proprietary income: consists of payments received by self-employed individuals as income. This includes income received by private business owners, doctors, lawyers and so forth.

Value-added: employee compensation, proprietary income, other property type income, and indirect business taxes. Generally, the value of goods and services less the cost of materials.

Appendix A

THE IMPLAN ECONOMIC MODEL

The IMPLAN United States Economic Model

The IMPLAN economic impact model was used to estimate the economic and tax contributions of the aggregate & construction, poultry and poultry processing, transportation and wholesale trade and tourism industries to the Merced County economy in 2000. The model, which is licensed by the Minnesota IMPLAN Group, Inc., was developed over a period of eight years at the University of Minnesota. IMPLAN is used by more than 500 universities and government agencies to estimate the economic and fiscal impacts of investments and/or changes in industry employment. IMPLAN is an economic impact assessment modeling system that estimates the national and local, private- sector impacts of economic changes.

IMPLAN Economic Impact Analysis

IMPLAN is an input-output model. Input-output accounting describes commodity flows from producers to intermediate and final consumers. The total industry purchases of commodities, services, employment compensation, value added, and imports is equal to the value of the commodities produced. Purchases for final use (final demand) drive the model. Industries producing goods and services for final demand purchase goods and services from other producers. These other producers, in turn, purchase goods and services. This buying of goods and services (indirect purchases) continues until leakages from the jurisdiction (imports and taxes) stop the cycle.

The model summarizes these complex interactions as economic multipliers, which can be used to estimate the total economic impact of the employment, sales and taxes generated by the industries in Merced County. No adjustments were made to the model for specific industries or special conditions in Merced County.

Industry Definition

IMPLAN industrial sectors are made up of BEA (Bureau of Economic Analysis) Commodity and Standard Industry Classifications (SIC). The industries defined for the model constructed for Merced County contain aggregated and partial industry sectors as defined by Standard Industry Classifications. Below is a crosswalk for the industries from the IMPLAN model to the Standard Industry Classifications.

IMPLAN SECTOR TO SIC CROSSWALK

IMPLAN Sector	SIC
Construction	
New Residential Structures	1500, 1600, 1700
New Industrial And Commercial	1500, 1600, 1700
New Utility Structures	1500, 1600, 1700
New Highways And Streets	1500, 1600, 1700
New Farm Structures	1500, 1600, 1700
New Mineral Extraction Facilities	1500, 1600, 1700
New Government Facilities	1500, 1600, 1700
Maintenance And Repair, Residential	1500, 1600, 1700
Maintenance And Repair Other Facilities	1500, 1600, 1700
Aggregates	
Dimension Stone	1410, 1420
Sand And Gravel	1440
Nonmetallic Minerals	1480
Misc. Nonmetallic Minerals, N.E.C.	1490
Paving Mixtures And Blocks	2951
Asphalt Felts And Coatings	2992
Cement, Hydraulic	3251
Concrete Block And Brick	3271
Concrete Products, N.E.C	3272
Ready-Mixed Concrete	3273
Gypsum Products	3275
Poultry	
Poultry & Eggs	0191, 0219, 0251, 0252, 0253, 0259, 0291
Poultry Processing	2015, 2021
Transportation	
Transportation Equipment	3799
Motor Freight Transport & Warehousing	4200, 4789
Wholesale Trade	
Wholesale Trade – Non-durable Goods	5000, 5100
Wholesale Trade – Durable Goods	5000, 5100
Eating & Drinking	5800
Hotels & Lodging Places	7000
Amusement and Recreation Services	7910, 7991, 7992, 7993, 7996, 7999

Source: IMPLAN Pro

