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16. Abstract

This study was undertaken at the request of the Texas Department of Transportation in response to its obligations under Senate Bill 352, 72nd Texas State Legislature (Texas Revised Statutes, Article 6669C) to conduct a fact-finding study in support of a state-funds contracting and procurement program for businesses owned by minorities and women.

This report examines more than five years of Disadvantaged Business Enterprise (DBE) participation in TxDOT highway construction contracting and presents DBE participation data calculated from the Department's Subcontractor Monitoring System (SMS) for prime contracts and associated contracts. The period covered runs from the beginning of January 1987 through early June 1992. It describes participation by minority-owned and women-owned businesses in the contracting and subcontracting processes associated with the construction of highways by TxDOT. While a comparative analysis of this information shows important differences between DBE and non-DBE firms, it reveals important similarities as well.

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PARTICIPATION OF DISADVANTAGED BUSINESS ENTERPRISES (DBE) IN TEXAS DEPARTMENT OF TRANSPORTATION CONTRACTING AND PROCUREMENT, 1987–1992

by
Ray Marshall,
Naomi Ledé,
J. Jorge Anchondo,
and
Jon Wainwright

Research Report 980-4

Research Project 3-14-92/93-980
Disadvantaged Business Enterprise (DBE) Capacity Study

conducted for the

Texas Department of Transportation

by the

LYNDON B. JOHNSON SCHOOL OF PUBLIC AFFAIRS
CENTER FOR TRANSPORTATION RESEARCH
GRADUATE SCHOOL OF BUSINESS

THE UNIVERSITY OF TEXAS AT AUSTIN

January 1994

PREFACE

This Report, entitled "Participation of Disadvantaged Business Enterprises in Texas Department of Transportation Contracting and Procurement, 1985–1992," is Volume IV of the seven-volume "Disadvantaged Business Enterprise (DBE) Capacity Study." The Study was undertaken at the request of the Texas Department of Transportation in response to its obligations under Senate Bill 352, 72nd Texas State Legislature (Texas Revised Statutes, Article 6669C) to conduct a fact-finding study in support of a state-funds contracting and procurement program for businesses owned by minorities and women.

We have had joint responsibility for this Study. To assist in carrying out the assignment, we recruited a number of economic, financial, business, legal, and policy experts from both the public and private sectors. This draft report was prepared by Jon Wainwright, Research Director for Project 7-980 and a Research Associate at the Lyndon B. Johnson School of Public Affairs. He was assisted by Mr. John Wilton, Staff Research Assistant.

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IMPLEMENTATION

The information contained in this report provides a basis for assessing TxDOT's DBE participation over the last five to seven years along several important dimensions, including among others: (a) race and ethnicity, (b) sex, (c) highway district, (d) source of funds, and (e) prime contracts versus subcontracts.

Prepared in cooperation with the Texas Department of Transportation

DISCLAIMER

The contents of this report reflect the views of the co-principal investigators, the research director, and the author of this volume, who are solely responsible for the facts and the accuracy of the data presented therein. The contents do not necessarily reflect the official views or policies of the Texas Department of Transportation. This report should be regarded strictly as preliminary.

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SUMMARY

This report examines more than five years of Disadvantaged Business Enterprise (DBE) participation in TxDOT highway construction contracting and presents DBE participation data calculated from the Department's Subcontractor Monitoring System (SMS) for prime contracts and associated subcontracts. The period covered runs from the beginning of January 1987 through early June 1992.

This volume provides a description of participation by minority-owned and women-owned businesses in the contracting and subcontracting processes associated with the construction of highways by TxDOT. A comparative analysis of this information reveals important differences between DBE and non-DBE firms—as well as important similarities.

The tables in this report present detailed information concerning key participation variables, including the number of (1) prime contracts, (2) prime contract dollars, (3) subcontracts, (4) subcontract dollars, (5) DBE subcontracts, (6) DBE subcontract dollars, (7) DBE prime contracts, and (8) DBE prime contract dollars. These measures are also cross-tabulated according to DBE type (i.e., Anglo female, Hispanic, black, Asian, Native American) and by source of contract funds (federal, state, or joint federal-state). We present the information using both absolute and relative measures.

Considered in conjunction with appropriate measures of DBE availability, the information contained in this report provides a way to assess the extent to which disparities exist between DBE participation and DBE availability in highway construction contracting in Texas. Demonstrating the existence, significance, and importance of such disparities appears to be a key requirement of the U.S. Supreme Court in justifying the constitutionality of state-mandated race and sex-based contracting preference programs.

CHAPTER ONE: DATA SOURCES AND RESEARCH METHODS

This report examines more than five years of Disadvantaged Business Enterprise (DBE) participation in TxDOT highway construction contracting and presents DBE participation data calculated from the Department's Subcontractor Monitoring System (SMS) for prime contracts and associated subcontracts. Chapter two presents this information for the state as a whole while chapter three presents this information for individual highway districts. The period covered runs from the beginning of January 1987 through early June 1992.

This volume provides a description of participation by minority-owned and women-owned businesses in the contracting and subcontracting processes associated with the construction of highways by TxDOT. A comparative analysis of this information reveals important differences between DBE and non-DBE firms; and important similarities as well.[1]

The tables in this report present detailed information concerning key participation variables, including the number of (1) prime contracts, (2) prime contract dollars, (3) subcontracts, (4) subcontract dollars, (5) DBE subcontracts, (6) DBE subcontract dollars, (7) DBE prime contracts, and (8) DBE prime contract dollars. These measures are also cross-tabulated according to DBE type (i.e., Anglo female, Hispanic, black, Asian, Native American) and by source of contract funds (federal, state, or joint federal-state). We present the information using both absolute and relative measures.

Absolute measures are numerical values or percentage changes in values representing the comparison of a variable with itself over time. It is often also important to examine changes in a variable against changes in other variables, that is, in relative terms. One common approach is to express a variable that is part of a composite as a percentage of the total composite. This report uses this approach often, for example when examining the DBE share of the total of a given participation variable, or when examining the ethnic and sex composition of a particular variable.

Several additional sources of information regarding TxDOT's DBE participation record will complement the primary analysis just described. These include annual departmental compliance reports to the Federal Highway Administration (FHWA) and annual departmental compliance reports under the Texas Small Business Assistance Act of 1975.[2] The former will allow a closer look at the federal side of TxDOT's DBE

program, while the latter helps broaden the perspective beyond construction to consider the remaining areas of TxDOT contracting and procurement, such as goods and services procurement and professional services contracting.

Considered in conjunction with appropriate measures of DBE availability, the information contained in this report provides a way to assess the extent to which disparities exist between DBE participation and DBE availability in highway construction contracting in Texas. Demonstrating the existence, significance, and importance of such disparities appears to be a key requirement of the U.S. Supreme Court in justifying the constitutionality of state mandated race and sex-based contracting preference programs. Another volume of this Study (980-5) deals with the various issues surrounding the subject of availability, so these will not be taken up here. Ideally, availability information would also have been gathered based on a sample survey of all businesses in Texas. Due to resource constraints, however, this survey was not undertaken. Suffice it to say that two main sources provide the measures of availability developed in that volume: (1) TxDOT's existing pool of contractors and subcontractors, and (2) Federally produced data regarding business enterprise.

The information contained in this report provides a basis for assessing TxDOT's DBE participation over the last five to seven years along several important dimensions, including among others: (a) race and ethnicity, (b) sex, (c) highway district, (d) source of funds, and (e) prime contracts versus subcontracts.

DATA SOURCES USED: SMS DATA

Data extracted from the SMS system provide the basis for the primary analysis used in the report. Department personnel made this data available to the research team in machine-readable format.[3] Included are all prime highway construction contracts let between January 1987 and early June 1992 on which any subcontract awards were made. Each record in the SMS data represents either a prime contract or an associated subcontract. Each record contains contract identification information, prime and subcontract amounts, contractor and subcontractor names, letting dates, and subcontract award dates.

Since smaller prime contracts sometimes do not involve any subcontracting, the SMS does not encompass 100% of the highway construction prime contract dollars awarded during the period (although it *does* encompass 100% of the subcontract dollars awarded).[4] Thus, the numbers presented below will, to some degree, overstate

(understate) DBE participation insofar as prime contracts not encompassed in the SMS have lower (higher) DBE participation than SMS subcontracts.

However, highway construction contracts involving subcontracting *do* constitute the vast majority of contract dollars awarded in any given fiscal year (See Table 1.1). SMS coverage ranges from 76% of prime contract dollars awarded in FY88 to 95% in FY89. Coverage is more limited for FY87 and FY92 because the research team obtained only three instead of the full four quarters of fiscal year for these two years. Nevertheless, the three quarters of SMS data for FY87 cover almost 63% of the total dollars awarded that year while the data for FY92 cover almost 45%.

Furthermore, as this report will show, TxDOT's DBE participation has historically occurred primarily and overwhelmingly through subcontracting rather than prime contracting. Therefore, the SMS data used for this report is likely to be representative of DBE participation as a whole in TxDOT's highway construction contracting.[5] Due to the overall bias towards subcontracting, and to the high levels of coverage achieved, excluding these smaller prime contracts has minimal impact on our findings.

TABLE 1.1: Highway Construction Awards in the SMS Database Relative to All Highway Construction Awards

Fiscal Year	Total Dollars Awarded	Total SMS Dollars Awarded	Percent Coverage of SMS
1987	$1,612,688,445	$1,012,452,788[a]	62.8%
1988	1,845,911,361	1,401,481,621	75.9%
1989	1,354,358,873	1,288,075,881	95.1%
1990	1,459,406,977	1,240,795,146	85.0%
1991	1,269,570,127	1,045,350,581	82.3%
1992	1,651,879,437	732,943,361[b]	44.4%

SOURCE: Total Dollars Awarded: Whitley & Siddons (1993).

NOTE: [a]This figure excludes first quarter SMS data. [b]This figure excludes fourth quarter SMS data.

DATA SOURCES USED: FHWA COMPLIANCE DATA

The *Surface Transportation and Uniform Relocation Assistance Act of 1987* (STURAA), renewed the Federal-aid highway program through 1991 and provided approximately $80 billion in federal-aid funding for highway construction. The

Intermodal Surface Transportation Efficiency Act of 1991 (Public Law 102-240), also referred to as ISTEA, renewed and extended the federal-aid program through 1996, and is forecast to provide another $100 billion in funding through 1996 (International Trade Administration 1992, 5-11; Office of Technology Assessment 1991, 10).

The expenditure of at least 10% of these funds with certified DBE's is an obligation of TxDOT under each of these acts (SDHPT 1990b, 1; Federal Highway Administration 1992, 238–39).[6] U.S. Department of Transportation implementing regulations for the FHWA DBE program appear under Title 49, Code of Federal Regulations, Part 23. TxDOT is obligated to report its compliance with these regulations each quarter of the federal fiscal year by completing and submitting to the FHWA form *DOT F 4630* entitled "Quarterly Report of DBE Awards and Commitments."

Findings from these compliance reports appear in chapter 4 along with more specific information about this data source.

DATA SOURCES USED: SMALL BUSINESS ASSISTANCE ACT REPORTS

In 1975, the Texas State Legislature passed the Small Business Assistance Act (V.T.C.S. Art. 5190.3). The Legislature concluded that "it is the policy of this state to insure economic competition by assisting small business entities to the greatest extent possible" after determining that "the preservation and expansion of economic competition is essential to the economic well-being of this state" and that "the continuing vitality of small business entities is of utmost importance to economic competition" The specific intent of the act was to promote increased participation by small businesses in the contracting and procurement activities of state agencies. The act defined a "small business" as any for-profit legal entity having either fewer than 100 employees or less than $1,000,000 annually in gross revenues.

Under this act, each state agency was directed to attempt to award 10% of all purchases and/or contracts to small business entities as well as to undertake other activities designed to improve access and opportunities for small businesses. To monitor compliance, the Legislature required each agency to submit an annual report of its performance under the act and submit it to the Texas Industrial Commission, later the Texas Economic Development Commission). In 1987, the Texas Economic Development Commission was merged into the newly created Texas Department of Commerce (Lyndon B. Johnson School of Public Affairs 1992, 64).

The compliance reports for the Small Business Assistance Act of 1975 cover a broader but more highly aggregated spectrum of contracting and procurement activity than either the FHWA compliance data or the SMS data. They provide information on the various purchases of goods and services undertaken by the Equipment and Procurement Division and on highway maintenance contracts not administered by the Construction Division (i.e., those administered by the Maintenance Division). These compliance reports cover the period from state fiscal year 1987 through state fiscal year 1992.

Although not required under the law, TxDOT staff have also included information on MBE/WBE/DBE entities in their annual Small Business Assistance Act compliance reports. These reports provide the basis for our findings, presented below in chapter 4. That chapter also includes more specific information about this particular data source.

RESEARCH METHODS EMPLOYED

The Department does business on a regular basis with private firms in the highway construction and maintenance industries as well as with firms that provide other goods and services in support of agency operations. This report, as previously indicated, focuses primarily on the highway construction and maintenance contracts let by the Department[7]—although certain aggregate information on purchases of goods and services appears as well.

The area of highway construction and maintenance represents TxDOT's principal mission, however, and as Table 1.2 below demonstrates, the direct pursuit of this mission comprises about 90% of the contracting and procurement spending the Department undertakes. This pattern applies to both appropriations ands expenditures. In FY88, for example, appropriations for highway construction and maintenance accounted for 89.7% of the Department's total appropriations (SDHPT 1990a, 19).

The SMS data provided to the research team contain information on 2,275 prime contracts and 9,253 associated subcontracts, with a combined value of over $6.7 billion (See Table 1.1 above).[8] For each prime contract and subcontract, the SMS provided the following information:[9]

- The Controlling Control Section Job (CCSJ) number for each prime contract and subcontract;
- The (Controlling) Project Number

- The name of the county to which the contract is assigned;
- The date the prime contract was awarded or let;
- The name of the prime contractor and associated subcontractor(s);
- The dollar amount of the prime contract and the associated subcontract(s);
- The date the subcontract(s) was (were) awarded or let;

TABLE 1.2: TxDOT Construction Contracting Relative to All TxDOT Contracting and Procurement Expenditures

	State Fiscal Year		
Type of Contract or Procurement Expenditure	**FY87**	**FY88**	**FY89**
Spot Purchase Orders	$13,623,483	$23,944,920	$25,060,642
Emergency Purchase Orders	7,277,423	3,131,019	2,999,977
Distributor Purchase Orders	1,594,540	1,658,603	2,274,483
Purchase of Services	16,717,652	25,025,000	31,324,962
Agreements for Emergency Repairs	542,104	0	0
Maintenance Contracts Not Administered by D-6	37,750,477	69,490,164	58,959,726
Architectural Contracts	215,982	736,725	822,316
Engineering/Surveying Contracts	25,412,938	41,487,379	14,705,049
Other Consultant Contracts	3,680,280	6,800,432	4,514,938
Construction Contracts	**1,606,974,000**	**1,872,840,000**	**1,460,111,000**
Miscellaneous	8,581,111	10,898,909	15,887,691
Total Expenditures	**1,722,369,991**	**2,056,013,151**	**1,616,660,784**
Construction Contracts as a Percent of Total	**93.3%**	**91.1%**	**90.3%**

SOURCE: State Department of Highways and Public Transportation, Equipment and Procurement Division (n.d. - a, n.d. - b, 1989a, 1989b).

The research team then added the following fields for each of the 11,528 SMS records, using a variety of supplementary information developed by the research team from other Departmental records:

- The unique identification number assigned to all bidders, past and present, listed on either the Prequalified Contractors (PQ) list or the Bidders Questionnaire Contractors (BQ) list;
- The vendor identification number assigned to all firms, past and present, applying for federal DBE program certification;
- A flag indicating whether or not the firm is or was a certified DBE;
- A flag indicating the race/ethnicity of the majority (51% or more) owner(s) of the firm—firms were designated as either Anglo, Hispanic, Black, Asian/Pacific Islander, Native American, or Other;[10]

- A flag indicating the sex of the majority (51% or more) owner(s) of the firm;
- A flag indicating the highway district to which the prime contract is assigned;
- A flag indicating the source of project funds—either Federal, State, or Joint Federal-State;[11]
- Flags indicating state and federal fiscal years and fiscal year quarters.

Chief among these other Departmental records were (1) past and present issues of the PQ list, the BQ list, and the Certified Directory of DBE's; (2) computer files from TxDOT's Civil Rights Division (D-14) containing vendor identification numbers for DBE firms, certification status, the number of owners of each firm, the percentage share of ownership of each owner, each owner's ethnicity/race/sex; and (3) a computer file from D-6 containing names and unique identification numbers for past and present PQ and BQ contractors.

From the resulting database, it is possible to calculate in both absolute and relative terms the number of contract awards and contract dollars going to (a) DBE's and non-DBE's and (b) among DBE's according to ethnicity, race, and/or sex, and to cross-tabulate this information by fiscal year, highway district, and funding source.[12] This database is referenced as Lyndon B. johnson School of Public Affairs (1993) and provides the basis for most of the analyses that follow.[13] The team was able to make effective use of the FHWA compliance data or the Small Business Assistance Act data without making similar enhancements.[14]

The methods employed in this study to estimate DBE participation on SMS contracts make it necessary to clearly define how the term DBE is being used for the purposes of this report. The research team used the vendor identification number to assign DBE status. Therefore, participation measures for "minority-owned and women-owned firms" (for short, MBE or WBE) will not be identical to those for DBE firms. The most appropriate designation for the measures given below is MBE/WBE rather than DBE, although there is an extremely large amount of overlap between the two.

The difference is due to (1) graduation of firms from the DBE program, and (2) non-renewal and decertification of firms from the program. Some firms have graduated from the DBE program. That is, although initially certified as DBE's, they have left the program, and they continue to compete for and win work on TxDOT subcontracts. Although the ethnic and sex status of these firms presumably has not changed, their DBE status has. For purposes of this report, firms are counted as DBE's even if they have 'graduated.' Also, the Department has rejected applications for renewal into the

program for several firms, and has decertified several others. The Department rejected firms primarily because they were determined to be owned by Anglo males. This report counts these firms as non-DBE's. The Department decertified a few firms for reason other than a determination of Anglo male ownership. Presumably, therefore, the ownership of these firms did not change even though their DBE status did. This report counts these latter firms as DBE's.

The remainder of this report presents descriptive statistics covering key aspects of departmental contracting and subcontracting over the last several years. Namely, (1) differences for DBE's in prime contracting versus subcontracting opportunities, (2) differences in DBE participation among the various ethnic, race, and sex groups, and (3) differences between federal-aid contracting and state-funds contracting. Chapter two examines these differences at the statewide level, while chapter three compares differences in DBE participation among highway districts. Chapter four presents additional information and findings culled from the FHWA compliance reports and from the Small Business Assistance Act reports.

CHAPTER TWO: FINDINGS AT THE STATEWIDE LEVEL

Presented below in a series of tables are measures describing various aspects of statewide TxDOT DBE participation data as identified in the SMS database. This section presents tables for number of (1) prime contract awards, (2) subcontract awards, (3) prime contract dollars, and (4) subcontract dollars. The tables present data both in absolute (contract awards & contract dollar amounts) and relative (percentages) form. The tables present data on an annual basis covering a period from the second quarter of state fiscal year 1987 to the third quarter of 1992. In most cases we only present results from FY88 through FY91 (hereafter, the study period), since the inclusion of the partial year data from FY87 and FY92 would distort the analysis.

PRIME CONTRACT AWARDS—NUMBER OF AWARDS

TxDOT awards prime or general highway construction contracts on a low-bid basis. That is, the low bidder is awarded the contract. Table 2.1 shows that TxDOT awarded an average of 434 such contracts (involving subcontracting) annually between fiscal years 1988 and 1991. The total number of prime contracts awarded statewide during the period under study was 2,275. TxDOT awarded DBE firms an average of 28 prime contracts annually during the study period. Over the entire period, DBE's won 141 of the 2,275 contracts. Thus, DBE's have been low bidders on 6.2% of the prime contracts awarded. Table 2.2 shows that the DBE percentage of prime contract awards ranged from a high of 7.9% (37 awards) in FY88 to a low of 4.7% (19 awards) in FY89.

The overall number of prime contracts let by the Department varied substantially during the study period. While 469 prime contracts were let in FY88, only 407 were awarded in 1989. The number of awards climbed back to 467 in FY90 but then fell again to 392 in FY91. DBE prime contractors also experienced a similar year-to-year pattern of variance. As already noted, DBE's won 37 prime contracts in FY88. That number fell to 19 in FY89, recovered to 32 in FY90, and fell back again in FY91 to 24.

Although significant variances exist for both DBE and non-DBE awards, the data indicate a greater variance among DBE prime contractors than among non-DBE prime contractors. Moreover, for DBE prime contracts the relative variance was over three times greater than that for total prime contracts awarded.[15] That is, in years when the number of prime contracts let by the Department fell prime contracts to DBE's fell even

more, from a relative standpoint. In years when the number of prime contract awards grew, awards to DBE's grew even more.

TABLE 2.1: Number of Prime Contract Awards by DBE Type

	TOTAL	DBE	Anglo female	Hispanic	Black	Asian-Pacific Islander	Native American	Mixed Race and Other DBE
FY 1987 pt.	279	16	12	2	1	0	1	0
FY 1988	469	37	21	12	1	2	0	0
FY 1989	407	19	14	4	0	0	0	1
FY 1990	467	32	22	7	1	1	0	1
FY 1991	392	24	16	6	0	1	1	0
FY 1992 pt.	261	13	11	1	0	1	0	0
TOTAL	2,275	141	96	32	3	5	2	2

SOURCE: Lyndon B. Johnson School of Public Affairs, 1993.

Thus, the relative position of DBE's improves in direct proportion to the overall number of prime contracts let. Therefore, if the Department is committed to improving the overall standing of DBE's according to this particular measure of success (i.e., number of prime contracts awarded), it might consider making an effort to award more DBE prime contracts in fiscal years when the overall number of prime contract awards is down from the previous year.

The aggregate category of "DBE," although useful as a summary measure, obscures certain differences among DBE contractors that are important for the present analysis. Examination of DBE prime contract awards by ethnicity and race reveal two items of note. First is the dominance of Anglo female-owned firms among DBE's winning prime contracts, and second is the apparent lack of prime contract awards to firms owned by blacks, Asians, or Native Americans.

Tables 2.1 and 2.2 show that DBE firms owned by Anglo females won slightly more than 67% of all DBE prime contract awards during the period under study (96 of 141). In addition, 32 awards, or 23% of the total, went to Hispanic-owned firms (male- or female-owned). Together these two DBE sub-groups received over 90% of the prime contracts awarded to DBE's—about 5.6% (128 of 2275) of all prime contracts awarded during the period.

TABLE 2.2: Number of DBE Prime Contract Awards as a Percentage of Total Prime Contract Awards, by DBE Type

	TOTAL	DBE	Anglo female	Hispanic	Black	Asian-Pacific Islander	Native American	Mixed Race and Other DBE
FY 1987 pt.	279	5.7%	4.3%	0.7%	0.4%	0.0%	0.4%	0.0%
FY 1988	469	7.9%	4.5%	2.6%	0.2%	0.4%	0.0%	0.0%
FY 1989	407	4.7%	3.4%	1.0%	0.0%	0.0%	0.0%	0.2%
FY 1990	467	6.9%	4.7%	1.5%	0.2%	0.2%	0.0%	0.2%
FY 1991	392	6.1%	4.1%	1.5%	0.0%	0.3%	0.3%	0.0%
FY 1992 pt.	261	5.0%	4.2%	0.4%	0.0%	0.4%	0.0%	0.0%
TOTAL	2,275	6.2%	4.2%	1.4%	0.1%	0.2%	0.1%	0.1%

SOURCE: Lyndon B. Johnson School of Public Affairs, 1993.

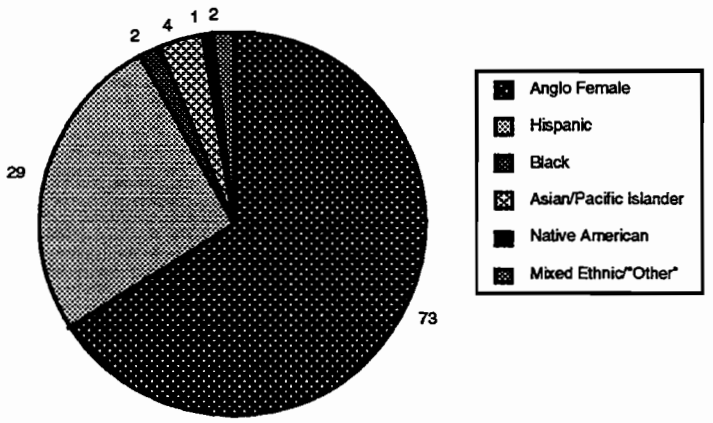
In great contrast, all other types of DBE firms combined received less than 10% of all DBE prime contract awards. This amounts to about one-half of one percent of all prime contract awards (12 of 2275). Black-owned firms won no prime contract awards in FY89 and FY91, and won only one award each year in FY88 and FY90. Asian-owned firms received two awards in FY88, none in FY89, and one each in FY90 and FY91. Native American-owned firms received no awards in FY88 through FY90, and only received one in FY91. Figure 2.1 illustrates the distribution of awards among DBE firms.

PRIME CONTRACT AWARDS—DOLLAR VALUE OF AWARDS

As noted at the beginning of this chapter, the *number* of awards is one of two primary measures of DBE participation. The second is the *dollar* amount of those awards. Tables 2.3–2.5 present this information for the TxDOT prime contracts contained in the SMS.

The annual dollar amount of prime contract awards has fallen in recent years. Total prime contract dollars fell 25% from over $1.4 billion in FY88 to about $1 billion by FY91. During the same period, DBE prime contract dollars fell by almost 50% from $29.9 to $15.1 million.

FIGURE 2.1: Ethnic/Sex Distribution of Number of DBE Prime Contracts Awarded, FY88 to FY91 (Percentages)



SOURCE: Table 2.1 above.

As happened with the number of DBE prime contracts, DBE prime contract dollars exhibit greater relative variance during the period than the prime contract dollars overall. The variance of DBE prime contract dollars during the study period is over $7.1 million against a mean of slightly more than $20 million. The overall variance during the same period is approximately $149 million against a mean of over $1.24 billion. As with the number of prime contract awards, the difference in relative variance is a factor of approximately three.[16]

This variance differential in both number of awards and dollar amount of awards introduces relatively greater uncertainty for DBE primes as opposed to Non-DBE primes, thus comparatively worsening the competitive position of DBE firms.

DBE's were low bidders on slightly more than $101 million in SMS prime construction contracts, out of a total of more than $ 6.7 billion. DBE prime contracts amounted to 1.51% of the overall total. This DBE participation figure fluctuated from 1.13% in FY89 and 2.13% in FY88.

Regarding ethnic, racial, and sex differences in prime contract dollars awarded, we again find that Anglo female-owned DBE's command by far the largest share—more than 67% of the $101.2 million DBE total and slightly more than one percent of the overall total. Hispanic-owned DBE's, as before, claim the next largest share with $22.5 million. This is about 22% of the DBE total and 0.33% of the overall total.

TABLE 2.3: Dollar Amount of Prime Contracts by DBE Type

	TOTAL	DBE	Anglo female	Hispanic	Black	Asian-Pacific Islander	Native American	Mixed Race and Other DBE
FY 1987 pt.	1,012,452,788	6,518,154	3,975,973	215,216	89,972	0	2,236,993	0
FY 1988	1,401,481,621	29,893,721	17,398,587	10,571,334	962,318	773,902	0	0
FY 1989	1,288,075,881	14,598,936	12,336,718	2,192,793	0	0	0	69,425
FY 1990	1,240,795,146	20,628,713	14,250,557	4,782,643	384,792	486,086	0	724,635
FY 1991	1,045,350,581	15,065,539	9,876,293	4,200,989	0	96,970	891,287	0
FY 1992 pt.	732,943,361	14,523,434	13,891,927	531,005	0	100,503	0	0
TOTAL	6,721,099,378	101,228,497	71,730,055	22,493,980	1,437,082	1,457,461	3,128,280	794,060

SOURCE: Lyndon B. Johnson School of Public Affairs, 1993.

TABLE 2.4: DBE Prime Contract Dollar Amounts as a Percentage of Total Prime Contract Dollar Amounts, by DBE Type

	TOTAL	DBE	Anglo female	Hispanic	Black	Asian-Pacific Islander	Native American	Mixed Race and Other DBE
FY 1987 pt.	1,012,452,788	0.64%	0.39%	0.02%	0.01%	0.00%	0.22%	0.00%
FY 1988	1,401,481,621	2.13%	1.24%	0.75%	0.07%	0.06%	0.00%	0.00%
FY 1989	1,288,075,881	1.13%	0.96%	0.17%	0.00%	0.00%	0.00%	0.01%
FY 1990	1,240,795,146	1.66%	1.15%	0.39%	0.03%	0.04%	0.00%	0.06%
FY 1991	1,045,350,581	1.44%	0.94%	0.40%	0.00%	0.01%	0.09%	0.00%
FY 1992 pt.	732,943,361	1.98%	1.90%	0.07%	0.00%	0.01%	0.00%	0.00%
TOTAL	6,721,099,378	1.51%	1.07%	0.33%	0.02%	0.02%	0.05%	0.01%

SOURCE: Lyndon B. Johnson School of Public Affairs, 1993.

The remaining DBE types, as happened with number of prime contract awards, obtained a much smaller portion—only 7% of the DBE total (about $6.8 million). These latter firms' share of the overall total—combined—was 0.1%. Prime contract dollars going to black-owned DBE's never exceeded 0.07% in any given year during the period. For Asians and Native Americans, the figures are 0.06% and 0.22%, respectively.

PRIME CONTRACT AWARDS—SUMMARY STATISTICS

Table 2.5 presents summary statistics of the distribution of prime contract dollars during the study period. Overall, the largest prime contract awards during the period ranged from $44.6 million and $59.1 million, while the smallest ranged between $18,000 and $25,000. The largest DBE prime contracts, in contrast, spanned a range from only $2.5 million to $4.2 million, while the smallest ranged from $21,000 and $63,000. The largest contracts during the period were 15 to 21 times larger than the average contract. The largest DBE prime contracts during the period, in contrast, were only four to five times the average. The smallest prime contract awards, however, appear to have gone consistently to non-DBE firms during the study period. In three of the four years for which complete state fiscal year data are available, the minimum DBE prime contract was at least $50,000 while the minimum overall award was typically closer to $20,000.

The mean prime contract during the period ranged from $2.7 million to $3.2 million, while the mean DBE prime contract, in contrast, ran between $628,000 and $808,000. The average DBE contract was, therefore, only 27% of the size of the average overall prime contract in FY88. This figure fell to 24% by FY91.

The median DBE contract was only 17% of the size of the average overall prime contract in FY88 but grew consistently and strongly over the period to 48% by FY91. This trend toward equalization in medians is a positive sign, notwithstanding the lower DBE means. Such a trend indicates that DBE's are becoming increasingly successful in winning prime contracts in the lower half of the distribution. As we shall see below, this trend disappears quickly in the upper half of the distribution.

Table 2.5 also shows that the medians are consistently below the means in each year. This is true for DBE's as well as overall. This indicates that a few very large awards distort or bias the average upward.[17] In other words, relatively few very large awards are coupled with relatively many smaller ones. Almost 50% (1077/2275) of the awards fell between $500,000 and $2.5 million in value, and almost 90% (2024/2275) of the awards fell between $100,000 and $10 million. Only two percent of awards exceeded $25 million. Table 2.6 presents the complete distribution.

Table 2.6 shows the number of DBE prime contracts as a specific percentage of overall prime contracts for each size class. This table shows that DBE participation drops dramatically as the size class of the award rises.

TABLE 2.5: Summary Statistics for Total Dollar Amount of Prime Contracts, FY88–FY91

OVERALL

	FY88	FY89	FY90	FY91
Mean	2,988,234	3,164,806	2,656,949	2,666,711
Median	1,378,688	959,608	846,974	950,729
Maximum	44,579,060	59,070,605	56,197,054	51,987,758
Minimum	17,907	20,780	24,988	19,022

DBE's

	FY88	FY89	FY90	FY91
Mean	807,938	768,365	644,647	627,731
Median	237,109	333,560	383,847	453,307
Maximum	4,197,416	3,654,088	2,939,746	2,463,083
Minimum	20,700	52,750	53,887	63,149

SOURCE: Lyndon B. Johnson School of Public Affairs, 1993.

For example, for contract awards below $100,000 DBE participation is 23% (27/117). TxDOT made nineteen percent of all DBE prime awards in the under $100,000 range (27/141) versus only 5% (117/2275) overall. For awards greater than $1 million, in contrast, DBE participation falls to just under 2.5% (28/1167). Only 20% of all DBE awards fall in this range (28/141) versus 51% overall (1167/2275).

TABLE 2.6: Distribution of Prime Contract Awards by Size, DBE's versus Overall, FY87, Qtr. 2 to FY92 Qtr. 3

Prime Contract Size	Number of Prime Contracts	Distribution of Number of Prime Contracts	Number of DBE Prime Contracts	Distribution of Number of DBE Prime Contracts	DBE Prime Contracts as a Percentage of All Prime Contracts
Less than $25,000	7	0.3%	1	0.7%	14.3%
$25,000 to $49,999	26	1.1%	7	5.0%	26.9%
$50,000 to $99,999	84	3.7%	19	13.5%	22.6%
$100,000 to $249,999	205	9.0%	30	21.3%	14.6%
$250,000 to $499,999	326	14.3%	23	16.3%	7.1%
$500,000 to $999,999	460	20.2%	33	23.4%	7.2%
$1,000,000 to $2,499,999	617	27.1%	20	14.2%	3.2%
$2,500,000 to $4,999,999	260	11.4%	8	5.7%	3.1%
$5,000 000 to $9,999,999	156	6.9%	0	0.0%	0.0%
$10,000,000 to $24,999,999	88	3.9%	0	0.0%	0.0%
$25,000,000 to $49,999,999	41	1.8%	0	0.0%	0.0%
More than $50,000,000	5	0.2%	0	0.0%	0.0%
TOTAL	2,275	100.0%	141	100.0%	6.2%

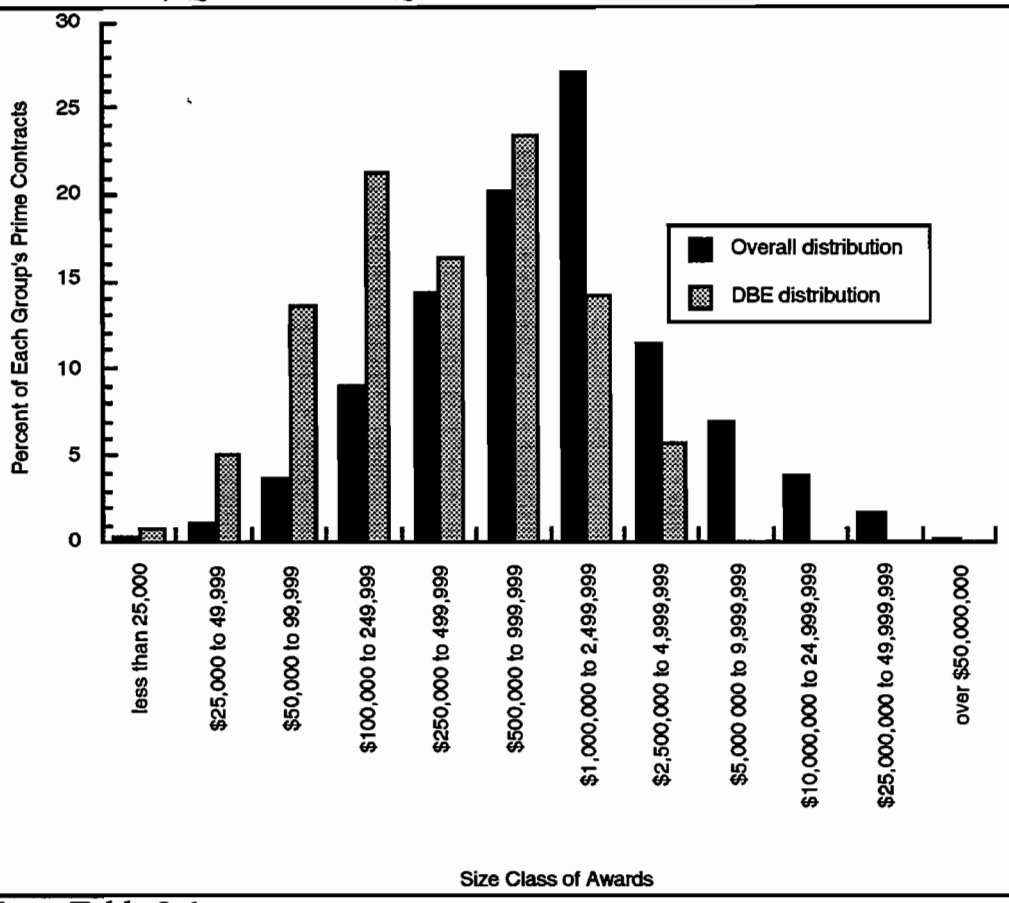
SOURCE: Lyndon B. Johnson School of Public Affairs, 1993.

For awards greater than $5 million, there is no DBE participation. Although TxDOT awarded 290 contracts worth $5 million or more during the period, it awarded no such contracts to DBE firms. These 290 contracts had a total value of $4.36 billion,

representing 65% of *all* prime contract dollars awarded over the study period. Figure 2.2 depicts the distribution of DBE prime contract awards compared to that for overall prime awards.

DBE firms won 53 prime contracts in the $500,000 to $2.5 million range during the study period. Additionally, TxDOT made eight DBE prime awards in the $2.5 million to $5 million range. Together, these 61 contracts comprise 43% (61/141) of all DBE prime contract awards over the period.

FIGURE 2.2: Distribution of Prime Contract Awards by Size, DBE's versus Overall, FY87, Qtr. 2 to FY92 Qtr. 3



SOURCE: Table 2.6.

Clearly, at least some DBE's in the available TxDOT pool have demonstrated they possess the capability and experience to win and successfully complete large TxDOT contracts. As the experience and track record of these firms grow and as more

DBE firms join their ranks, one would expect to see more DBE awards in these ranges and—to the extent artificial barriers to competition do not bar their participation—eventually begin to see DBE's become competitive for awards in the higher ranges.

PRIME CONTRACT AWARDS—MARKET SHARE CONCENTRATION

This report focuses on one last set of questions regarding prime contracts before turning to an examination of participation patterns in subcontracting—those of industry concentration and market share. As the analysis below demonstrates, market concentration in the heavy and highway construction industries is quite high. That is, relatively few firms control a significant share of a particular market or set of markets. When market concentration exists, the DBE participation levels of the largest firms doing business with TxDOT will have a disproportionately strong influence on overall DBE participation levels.

Further increasing the importance of this market concentration is that this sector of the construction industries has been growing strongly and steadily in recent years. According to the investor relations manager for one of TxDOT's largest prime contractors, heavy construction is "the right business to be in if you're in construction" (McManamy 1992a, 90). This recent growth in heavy construction, and publicly owned construction in particular, began in the early 1980's, reflecting at least in part a nationwide commitment to upgrade and improve the declining infrastructure conditions. Assuming moderate levels of overall growth and stable interest rates, the U.S. Department of Commerce (1992, 5–10) forecasts publicly owned construction to increase moderately between 1992 and 1996.

Heavy construction work, often referred to as Standard Industrial Classification (SIC) 16, accounted for 16% of all new domestic construction contracts awarded in 1991, up from 14% in 1990. According to a leading trade publication, "transportation was the driving force behind much of this growth" (McManamy 1992a, 90). Transportation dominates the SIC 16 field, accounting for 13% of all new contracts awarded nationwide in 1991, up from 9% in 1990 (McManamy 1992a, pp. 55, 90; 1991, pp. 35, 66).

The federal government forecasts Highway construction to remain near current levels throughout the 1992–1996 period, barring legislative initiatives to increase motor fuel taxes (which would fund new growth in highway construction) or to draw down the federal Highway Trust Fund. It also forecasts highway construction expenditures to increase over the longer term in order to prevent a decline in the condition of the

nation's infrastructure. Maintenance and repair spending will grow faster than spending for new construction. By 1996, 77¢ of maintenance and repair work will accompany every dollar of new highway construction put in place, much of it in traditional construction areas such as repaving and bridge painting. Thus, this spending will be at least in part a substitute for, rather than a complement to, new publicly owned construction spending. Also, the FHWA forecasts bridge work to grow faster than flatwork in the coming years due to the need to replace what they estimate to be 23% of U.S. highway bridges that are structurally deficient and 21% that are functionally obsolete. Texas has more than 14,000 of these bridges—more than any other state (Matustik and South 1993, 1). About a quarter of all new highway construction put in place in 1991 was for tunnels, overpasses, and bridges (U. S. Department of Commerce 1992, 5–10, 5–11).

Thus the largest firms in this sector, due to their strength and standing in the industry (as well as their ability to determine which subcontractors receive opportunities), can be either strong forces of resistance or powerful catalysts for change concerning any program designed to increase equality of business or employment opportunities for minorities or women in the nation's construction industries. Given the growth forecasts for this sector, their influence is not likely to decline and will probably increase into the near future.

Table 2.7 presents comparative industry concentration ratios for the nation as a whole from the most recent Economic Census. The industry concentration ratio is defined as the cumulative market share of some set number of K firms. the choice of firms is arbitrary, but certain rules of thumb are widely recognized. According to Curry and George (1983, 207) "for studies of aggregate concentration K is frequently taken to be 100; for market concentration values between 3 and 8 are usually employed." The formal expression of this measure appears in Equation 2.1.

$$\text{K-firm concentration ratio} = \sum_{i=1}^{K} s_i \sum_{i=1}^{K} s_i \qquad \text{(Eq. 2.1)}$$

Market concentration ratios are a useful, practical measure of market power or market influence—although they are by no means infallible. According to Mueller and Hamm (1974, 511), "industry concentration ratios are the single best available index of the degree of oligopoly. ... [M]ost industrial economists agree that concentration ratios ...

not only are the best available, but provide useful measures of *one* dimension of the extent of oligopoly in American industry."

TABLE 2.7: Industry Concentration Ratios, Selected Industries, U.S., 1987

Industry and Largest Company Based on Employment	Companies (number)	Employees (number)	Sales and Receipts (millions)	Employees Concentration	Sales and Receipts Concentration
All Industries					
All companies	3,876,866	68,140,393	7,234,108.3		
4 largest companies	4	1,599,205	161,868.9	2.3%	2.2%
8 largest companies	8	2,474,938	294,572.3	3.6%	4.1%
20 largest companies	20	4,181,602	441,771.2	6.1%	6.1%
50 largest companies	50	6,815,288	724,192.3	10.0%	10.0%
Other companies	3,878,816	61,325,105	6,509,916.0	90.0%	90.0%
Construction Industries					
All companies	529,194	5,116,624	515,775.9		
4 largest companies	4	118,085	12,696.7	2.3%	2.5%
8 largest companies	8	155,337	17,335.9	3.0%	3.4%
20 largest companies	20	231,513	27,286.5	4.5%	5.3%
50 largest companies	50	310,952	38,110.7	6.1%	7.4%
Other companies	529,144	4,805,690	477,665.2	93.9%	92.6%
Heavy And Highway Construction Industries					
All companies	35,369	885,424	93,073.9		
4 largest companies	4	118,639	12,833.3	13.4%	13.8%
8 largest companies	8	146,855	16,203.4	16.6%	17.4%
20 largest companies	20	181,740	18,673.7	20.5%	20.1%
50 largest companies	50	223,520	23,411.5	25.2%	25.2%
Other companies	35,319	661,904	69,662.4	74.8%	74.8%

SOURCE: U.S. Bureau of the Census (1991, 106).

Thus market concentration is not the only source of market power or oligopoly. Market power also stems from the erection of entry barriers, product differentiation, and firm conglomeration, among others (Mueller and Hamm 1974, 511). Furthermore, if the market being analyzed is "contestable," market concentration may not accurately

reflect market power. Nevertheless, market concentration ratios are believed by many industrial organization economists to be "meaningful indices of market structure" and "causally related to industrial performance."

Table 2.7 shows clearly that industry concentration ratios are much higher in highway construction than in either construction as a whole or all industries nationwide. Over all industries, the 50 largest firms account for ten percent of employment as well as 10 percent of sales. Concentration is lower for the construction industries as a whole, with figures of 6.1% and 7.4% respectively. For heavy and highway construction, however, the 50 largest firms control over 25% of nationwide employment and sales—two and one-half times the national average and more than three times the overall construction industries average.

Although SIC 16 is quite concentrated, relative to overall construction and to an all industry composite, it is not the most concentrated set of industries in the nation. In fact, the federal government categorizes all construction industries (including SIC 16) as "small-business-dominated industries." In other words a minimum of 60 percent of employment or sales originates in firms with fewer than 500 employees. The 35,241 firms in the SIC 16 industries with fewer than 500 employees (99.6% of all SIC 16 firms) account for almost 69% of industry employment and just over 68% of industry sales and receipts.

Even in industries with relatively low levels of concentration, however, there usually exists to some extent a small collection of firms with a disproportionately significant amount of influence in the market. This collection of firms is evident in Table 2.8, both for construction as a whole and for heavy construction separately. For example, the 0.4% of SIC 16 firms (128 firms) that have 500 or more employees accounted for 31% of industry employment and 32% of industry sales—a considerable amount of market share for such a small fraction of overall firms.

TABLE 2.8: Enterprise Statistics, Selected Industries by Employment Size Class, U.S., 1987

Industry and Largest Company Based on Employment	Companies (number)	Employees (number)	Sales and Receipts (millions)
Construction Industries			
All companies	529,194	5,116,624	515,775.9
With employment of:			
None	10,072	0	440.0
1 to 4	296,961	641,943	58,292.4
5 to 9	113,960	744,028	58,340.2
10 to 19	61,533	820,788	71,476.5
20 to 49	33,632	995,182	99,034.3
50 to 99	8,489	573,711	63,083.9
100 to 249	3,452	504,116	59,735.0
250 to 499	705	237,576	29,397.5
500 to 999	248	166,644	19,661.1
1,000 to 2,499	108	157,777	23,646.2
2,500 to 4,999	16	50,000	6,221.2
5,000 to 9,999	13	89,311	11,131.0
10,000 or more	5	135,548	15,316.6
Heavy and Highway Construction Industries			
All companies	35,369	885,424	93,073.9
With employment of:			
None	595	0	10.7
1 to 4	14115	31,424	2,613.3
5 to 9	7271	48,990	4,031.5
10 to 19	5898	80,045	7,400.5
20 to 49	4754	144,606	14,855.1
50 to 99	1582	108,694	12,088.0
100 to 249	812	121,376	14,189.9
250 to 499	214	71,932	8,501.4
500 to 999	71	47,573	5,199.1
1,000 to 2,499	43	60,981	6,740.0
2,500 to 4,999	4	11,809	674.4
5,000 to 9,999	6	39,355	3,936.7
10,000 or more	4	118,639	12,833.3

SOURCE: U.S. Bureau of the Census (1991, pp.18–19, 106).

Further reflecting market concentration in the heavy and highway construction industries, SIC 16 firms accounted for only 6.7% of all firms in the construction industries in 1987 (35,369/529,194), yet earned 18% of all construction sales and employed 17% of all construction employees (U.S. Bureau of the Census 1991, 18–19). In

1982, the figures were 6%, 25% and 26%, respectively (U.S. Bureau of the Census 1986, 9).

As demonstrated above, the 50 largest domestic heavy construction contractors control roughly 25% of the heavy construction market. In 1991, this market had a value (according to new contracts) of $25.2 billion, up 15% from $21.9 billion in 1990. The 1990 market, in turn, was up 28% from 1989 ($17.1 billion) and was twice the 1988 market of $11 billion (McManamy 1992a, 90; 1991, 66). These upward trends are largely the result of growing demands for maintenance of and additions to the nation's infrastructure.

According to the Census Bureau, most of the "Top 50" heavy construction contractors in the country typically have 1,000 or more employees and have sales and receipts of more than $100 million (U.S. Bureau of the Census 1991, pp. 14, 19, 56, 61). Between 1990 and 1991 at least nine TxDOT prime contractors appeared among the ranks of the nation's 50 largest SIC 16 firms. In 1991, the four largest of these nine firms (Granite Construction Co., T.L. James & Co., Inc., H.B. Zachry, and Brown & Root Inc.) ranked among the top 20 award-winningest transportation contractors in the nation, and two (Brown & Root, Inc. and H.B. Zachry) were among the top 400 U.S. contractors overseas. Engineering News-Record ranked three more TxDOT contractors among the "Top 400" contractors in the country in 1991: Austin Industries (Dallas, TX), J.D. Abrams Inc. (Austin, TX) and Young Brothers Inc., Contractors (Waco, TX) (McManamy 1991; 1992).

Table 2.9 presents selected information for these 12 firms. Included in the table are two columns (far right) showing the percentage of each firm's total heavy construction contracts accounted for by TxDOT prime contracts. The reader can see that TxDOT contracts a significant source of revenue for some of the world's largest construction firms. Some, such as Williams Brothers Construction Company, Inc., are almost entirely dependent on TxDOT as a revenue source. None of these firms is a DBE.

An additional feature to note from Table 2.9 is that only half of the 12 firms are Texas-based. The remaining six firms are located in California, Louisiana, Kansas, Indiana, and Ohio. Clearly, the geographic market for TxDOT work, although concentrated in Texas, ranges beyond state boundaries.

TABLE 2.9: TxDOT Prime Contractors Ranked Among the Nation's 50 Largest Heavy Construction Contractors, 1990–1991

Firm[a]	Headquarters	1991 rank	1990 rank	1991 contracts ($ mil.)	1990 contracts ($ mil.)	1991 TxDOT (%)	1990 TxDOT (%)
Granite Construction Co.	Watsonville, CA	9	8	487.7	548.9	19.4%	2.3%
T.L. James & Co., Inc.	Ruston, LA	20	20	320.4	225.5	8.7%	16.9%
H.B. Zachry	San Antonio, TX	27	23	188.0	215.1	58.1%	25.8%
Brown & Root Inc.	Houston, TX	31	na	174.1	na	51.2%	na
Williams Brothers Const. Co., Inc.	Houston, TX	33	46	163.3	139.2	90.2%	100%
Boh Bros. Construction Co. Inc.	New Orleans, LA	37	50	150.7	126.2	14.6%	0.0%
Kokosing Construction Co. Inc.[b]	Frederickstown, OH	45	29	128.2	193.8	0.0%	0.0%
Traylor Bros., Inc.	Evansville, IN	na	19	na	236.1	na	27.0%
Eby Corp.	Wichita, KS	na	47	na	132.5	na	0.8%
Austin Industries	Dallas, TX	na	na	524.6	660.1	7.0%	18.6%
J.D. Abrams Inc.	Austin, TX	na	na	72.8	105.2	99.4%	89.3%
Young Brothers Inc.	Waco, TX	na	na	49.2	na	49.2%	na

SOURCE: McManamy (1991, 66; 1992, 90).

[a]Excludes joint ventures, except those among subsidiaries of the same firm.

[b]Kokosing hasn't won any TxDOT awards since 1988.

NOTE: Contract amounts include heavy construction contracts only for all but the last three firms listed. For these firms, total construction awards is used.

Overall, 351 distinct firms performed the 2,275 prime contracts represented in the SMS data set, an average of 6.5 contracts per contractor during the period. Table 2.10 shows the percentage of the dollar value of these TxDOT prime contracts accounted for during 1990 and 1991 by the firms listed in Table 2.9. Together, these firms accounted for more than 64% of all TxDOT prime contracts during 1991, up from almost 48% in 1990. The top four alone commanded an impressive 40% market share in 1991, up from about 20% in 1990. These figures provide one measure of concentration in the market for TxDOT prime highway contracts.

TABLE 2.10: Share of TxDOT Prime Contracts for Selected Prime Contractors, 1990–91

Firm[a]	TxDOT Prime Contracts, 1991 ($)	As a Percent of Total TxDOT Prime Contracts, 1991	TxDOT Prime Contracts, 1990 ($)	As a Percent of Total TxDOT Prime Contracts, 1990
Top 4	$440,516,852	40.0%	$239,714,549	19.7%
Top 8	624,654,956	56.7%	436,590,199	35.9%
Top 12	707,662,232	64.2%	578,957,706	47.6%
TOTAL-All Prime Contracts	1,101,572,553	100.0%	1,215,875,351	100.0%

SOURCE: Lyndon B. Johnson School of Public Affairs, 1993.
[a]Excludes joint ventures.

Several additional market concentration measures for this report. Table 2.11 presents the top fifteen TxDOT prime contractors according to number of awards won. The top 4 firms shown in Table 2.11 comprise 1.1% of all TxDOT prime contractors (4/351). The 240 awards garnered by these 4 firms account for 10.5% of all prime awards. These 240 awards, taken together, were valued at almost $652 million or 9.7% of all prime contract dollars awarded during the period. The top 8 firms account for 2.3% of all TxDOT prime contractors and 17.4% of all prime awards. These awards have a combined value of $1.4 billion or 21% of all prime contract dollars awarded during the period. The top 12 firms comprise 3.4% of all TxDOT prime contractors and 23.6% of all prime awards. These awards have a combined value of $2.3 billion or about 34.8% of all prime contract dollars awarded during the period. All fifteen firms combined make up 4.3% of all TxDOT prime contractors. The 633 awards garnered by these 15 firms account for 29.1% of all prime awards. Taken together, they are valued at $3.1 billion, or 46.1% of all prime contract dollars awarded during the period.

None of these firms is a DBE. However, the DBE subcontracting percentages achieved by each of these firms appears in Table 2.11. As we will show in more detail in the next section, DBE subcontracting participation on TxDOT SMS prime contracts during the period was almost exactly ten percent. Taken together, the achievement of the top 15 firms in this area is marginally higher at 10.2% for the period. DBE participation levels are somewhat lower than 10% for the top four and top eight firms.

TABLE 2.11: Top Fifteen Prime Contractors, by Number of Awards, FY87, Qtr. 2 to FY92, Qtr. 3.

Rank	Contractor Name[a]	Number of Awards	Dollar Amount of Awards	Average Award Size	DBE Sub-contractor %
1	APAC-Texas, Inc.	73	$102,211,386	$1,400,156	12.5%
2	Duininck Bros., Inc.	62	197,949,755	3,192,738	10.5%
2	Jones G. Finke, Inc.	62	88,469,687	1,426,930	13.2%
3	Brown & Root, Inc.	43	262,869,698	6,113,249	5.7%
4	Foremost Paving, Inc.	42	71,639,254	1,705,697	6.3%
5	H. B. Zachry	39	510,406,093	13,087,336	10.4%
6	Young Bros, Inc.	37	99,118,357	2,678,875	11.1%
6	Dean Word Company	37	77,295,138	2,089,058	8.7%
7	J. D. Abrams	36	425,359,726	11,815,548	11.3%
7	Austin Paving Company	36	88,314,661	2,453,185	6.9%
8	Austin Bridge & Road Co.	35	254,964,955	7,284,713	9.5%
8	Heldenfels Brothers, Inc.	35	157,827,122	4,509,346	14.0%
8	Williams Brothers	35	660,954,293	18,884,408	10.7%
9	Jones Bros. Dirt & Paving Contractors, Inc.	32	41,424,054	1,294,502	6.2%
10	Hunter Industries	29	57,248,501	1,974,086	10.7%
	Top 4	240	651,500,526	2,714,586	9.3%
	Top 8	395	1,409,959,368	3,569,517	9.6%
	Top 12	537	2,336,425,832	4,350,886	10.1%
	Top 15	633	3,096,052,680	4,891,078	10.2%
	TOTAL-OVERALL	2,275	6,721,099,377	2,954,329	10.0%

SOURCE: Lyndon B. Johnson School of Public Affairs, 1993.
[a]Excludes joint ventures.

Individually, there is a great deal of variation among these fifteen firms. Some of these large firms have achieved DBE subcontract participation levels significantly higher than 10%, while several fall significantly below 10%. Heldenfels Brothers, Inc. has the highest DBE subcontract participation over the period among the top 15 firms. Brown & Root, Inc. is the firm with the lowest DBE subcontract participation over the period.

Table 2.12 presents a final measure of market concentration among TxDOT prime contractors. This table presents summary measures of market concentration (according to value of contracts) for TxDOT prime contractors—individually for the eight largest firms and collectively for the largest 4, 8, 20, and 50 firms.

TABLE 2.12: Largest TxDOT Prime Contractors, by Dollar Value of Awards, FY87, Qtr. 2 to FY92, Qtr. 3.

	Rank	Prime Contract Dollars	Prime %	DBE Sub Dollars	DBE Sub %	DBE Partici-pation
Williams Brothers	1	660,954,293	9.8%	70,745,905	10.5%	10.7%
H.B. Zachry Company	2	510,406,093	7.6%	52,971,431	7.9%	10.4%
J.D. Abrams, Inc.	3	425,359,726	6.3%	47,875,363	7.1%	11.3%
Granite Construction Co.	4	289,968,166	4.3%	39,647,090	5.9%	13.7%
Brown & Root, Inc.	5	262,869,698	3.9%	15,039,450	2.2%	5.7%
Austin Bridge Company	6	254,964,955	3.8%	24,265,002	3.6%	9.5%
Traylor Bros., Inc.	7	252,753,512	3.8%	31,211,849	4.6%	12.3%
Duininck Bros., Inc.	8	197,949,755	2.9%	20,852,812	3.1%	10.5%

	Firms	Firms %	Prime Contract Dollars	Prime %	DBE Sub Dollars	DBE Sub %	DBE Partici-pation
All Companies	351	100.0%	6,721,099,377	100.0%	671,290,650	100.0%	10.0%
Four Largest Companies	4	1.1%	1,886,688,278	28.1%	211,239,789	31.5%	11.2%
Eight Largest Companies	8	2.3%	2,855,226,198	42.5%	302,608,902	45.1%	10.6%
20 Largest Companies	20	5.7%	4,001,601,660	59.5%	425,295,850	63.4%	10.6%
50 Largest Companies	50	14.2%	5,229,512,378	77.8%	541,528,453	80.7%	10.4%
Other Companies	269	76.6%	1,491,586,999	22.2%	129,762,197	19.3%	8.7%

SOURCE: Lyndon B. Johnson School of Public Affairs (1993).

Table 2.12 shows that the largest firms ranked by dollars awarded command a very large portion of the TxDOT highway construction and maintenance market. TxDOT awarded the 50 largest firms—although they represented only 15% of all prime contractors—78% of all prime contract dollars. TxDOT awarded the four largest firms—representing just over 1% of all prime contractors—28% of all prime contract dollars. DBE subcontracting percentages for the largest 20 firms approach 11%. For the 50

largest, the figure is closer to 10%. Again, Brown & Root, Inc. stands out as having surprisingly low DBE participation (5.7%).

Table 2.12 also shows that the largest prime contractors are responsible for subcontracting the vast majority of all DBE subcontract dollars. The four largest firms were responsible for almost 32% of all DBE subcontract dollars, while the 50 largest firms together account for 81% of all DBE subcontract dollars. Thus, less than 15% of the Department's prime contractors account for about 80% of the Department's DBE achievements over the study period.

Although not as strong as in Table 2.9, in Table 2.12 a significant out-of-state presence is apparent among the top eight firms. Two of the eight largest firms are based out-of-state. Combined, these two firms commanded an 8.1% market share over the study period. This data supports the assertion that, although concentrated in Texas, the highway construction market is national in scope.

We now turn to market concentration among DBE firms in SIC 16, having examined SIC 16 market concentration for firms overall. We have already seen above that about 14% of TxDOT primes (50 firms) win almost 80% of TxDOT prime contracts. Does the same pattern hold true among DBE prime contractors? Tables 2.13 and 2.14 below present data to that illuminate this question. As the reader can see, TxDOT DBE prime contractors do indeed exhibit significant levels of market concentration. However, DBE market concentration levels are significantly lower than those found for TxDOT prime contractors overall.

For DBE's, 38 distinct firms performed the 141 DBE prime contracts appearing in the SMS data set. The top 15 DBE primes listed below in Table 2.13 thus comprise 39.5% of all DBE prime contractors (15/38). The 108 awards garnered by these 15 firms account for 76.6% of all DBE prime awards. These 108 awards, taken together, were valued at $92.5 million—that is, these 15 firms won 91.4% of all DBE prime contract dollars awarded during the period.

For the top eight firms, the figures are as follows. The top eight DBE primes comprise 21% of all prime contractors (8/38). The 79 awards garnered by these eight firms account for 56% of all DBE prime awards. These 79 awards, taken together, were valued at $73.9 million—that is, these eight firms won 73% of all DBE prime contract dollars awarded during the period. Thus, slightly more than 20% of the DBE prime contractors collected 73% of the dollar value of all DBE prime awards and accounted for 56% of all DBE prime awards won.

TABLE 2.13: Top Fifteen DBE Prime Contractors, by Number of Awards, FY87, Qtr. 2 to FY92, Qtr. 3.

Rank	Contractor Name	Number of Awards	Dollar Amount of Awards	Average Award Size
1	Reece Construction Co., Inc.	13	9,657,245	742,865
2	Clark Construction Co., Inc.	12	23,087,343	1,923,945
2	South Texas Utility Contractors	12	18,422,359	1,535,197
3	Traffic Maintenance & Construction, Inc.	11	1,067,368	97,033
4	Fuqua Construction Co., Inc.	10	4,392,925	439,293
5	Bandas Industries, Inc.	8	11,586,842	1,448,355
5	V. C. Huff, Inc.	8	2,512,798	314,100
6	Austin Traffic Signal Construction Co.	5	3,201,321	640,264
6	Gerico Traffic Systems, Inc.	5	458,189	91,638
7	H. H. Howard & Sons, Inc.	4	6,038,964	1,509,741
7	Jordan Paving Corporation	4	5,341,068	1,335,267
7	Contract Paving Co.	4	3,991,594	997,899
7	Longhorn Paving & Const., Inc.	4	1,655,190	413,798
7	Michelle Electric Co., Inc.	4	938,126	234,532
7	Traffic Regulators, Inc.	4	183,723	45,931
	TOTAL-TOP EIGHT	79	73,928,201	935,800
	TOTAL-TOP FIFTEEN	108	92,535,055	856,806
	TOTAL-OVERALL	141	101,228,497	717,933

SOURCE: Lyndon B. Johnson School of Public Affairs, 1993.

Table 2.14 presents summary measures of market concentration (according to dollar value of contracts) for TxDOT DBE prime contractors—individually for the eight largest firms and collectively for the largest 4, 8, and 20 firms.

From this table we can see that the largest DBE primes command a very large share of the *prime DBE portion* of the TxDOT highway construction and maintenance market. TxDOT awarded the eight largest DBE primes—representing about 21% of all DBE prime contractors—82% of all DBE prime contract dollars. TxDOT awarded the four largest DBE primes—representing just over 1% of all DBE prime contractors—28% of all DBE prime contract dollars. The levels of market concentration, however, are

somewhat lower than overall concentration levels for the heavy construction industries described above.

Finally, the reader may note that Anglo females own the third through the eighth largest DBE primes. This is consistent with information presented earlier in this section. The largest DBE prime is, however, a Native American-owned (male) firm, while the second largest is Hispanic-owned (male).

TABLE 2.14: Twenty Largest TxDOT DBE Prime Contractors, by Dollar Value of Awards, FY87, Qtr. 2 to FY92, Qtr. 3.

Firm[a]	Rank	Prime Contract Dollars	Prime %	DBE Sub Dollars	DBE Sub %	DBE Participation
Clark Construction Co., Inc. (NM)	1	$23,087,343	22.8%	$941,477	14.8%	4.1%
South Texas Utility Contractors (HM)	2	18,422,359	18.2%	1,291,232	20.3%	7.0%
Bandas Industries, Inc. (WF)	3	11,586,842	11.4%	1,066,425	16.7%	9.2%
Reece Construction Co., Inc. (WF)	4	9,657,245	9.5%	721,711	11.3%	7.5%
H.H. Howard & Sons, Inc. (WF)	5	6,038,964	6.0%	139,764	2.2%	2.3%
Jordan Paving (WF)	6	5,341,068	5.3%	582,556	9.1%	10.9%
Fuqua Construction Co., Inc. (WF)	7	4,392,925	4.3%	357,605	5.6%	8.1%
Contract Paving Co. (WF)	8	3,991,594	3.9%	451,862	7.1%	11.3%

	Firms	Firms %	Prime Contract Dollars	Prime %	DBE Sub Dollars	DBE Sub %	DBE Participation
All Companies	38	100.0%	$101,228,497	100.0%	$6,375,406	100.0%	6.3%
Four Largest Companies	4	10.5%	62,753,789	62.0%	4,020,846	64.1%	6.4%
Eight Largest Companies	8	21.1%	82,518,339	81.5%	5,552,633	87.1%	6.7%
20 Largest Companies	20	52.6%	98,829,826	97.6%	6,244,169	97.9%	6.3%
Other Companies	18	47.4%	2,399,121	2.4%	131,237	2.1%	5.5%

SOURCE: Lyndon B. Johnson School of Public Affairs, 1993.

[a]DBE type indicated in parentheses. N=Native American, H=Hispanic, W=Anglo, F=female, M=male.

SUBCONTRACT AWARDS—NUMBER OF AWARDS

Table 2.15 shows that TxDOT's prime contractors awarded an average of 1,784 subcontracts per year during the study period. The total number of subcontract awards during the period under study was 9,253. The number of subcontract awards in FY91 was down 9% from its FY88 level. The average number of subcontract awards per prime contract has fluctuated within a fairly narrow range of 3.8 to 4.5, with an average over the period of 4.1 (2275/9253).

TxDOT awarded DBE firms an average of 842 subcontracts per year during the FY88 to FY91 period, for a total of 4,369 contracts or 47.2% of all subcontract awards during the period. This is in stark contrast to prime contracts, of which DBE's won

slightly more than 6% of awards (See Table 2.1). The number of DBE awards grew steadily from FY88 to FY90 but dropped back in FY91 to pre-FY88 levels. Specifically, in FY88, TxDOT prime contractors awarded DBE's 43% of all subcontracts. Between FY89 and FY91, 47% and 50% of all subcontract awards were awarded to DBE's.

In comparison to prime awards, the variance in the number of subcontracts awarded each year is much lower for DBE's and non-DBE's alike. And although the variance in DBE subcontract awards—as was the case with DBE prime awards—is higher than for subcontract awards overall, the magnitude of the differential is far smaller than was the case for prime awards.[18]

TABLE 2.15: Number of Subcontract Awards by DBE Type

	TOTAL	DBE	Anglo female	Hispanic	Black	Asian-Pacific Islander	Native American	Mixed Race and Other DBE
FY 1987 pt.	1,122	481	231	162	39	3	16	25
FY 1988	1,837	794	403	263	51	9	40	25
FY 1989	1,820	871	493	288	38	11	26	13
FY 1990	1,810	912	502	283	77	6	27	16
FY 1991	1,668	789	428	250	63	19	14	12
FY 1992 pt.	996	522	285	164	32	18	6	16
TOTAL	9,253	4,369	2,342	1,410	300	66	129	107

SOURCE: Lyndon B. Johnson School of Public Affairs, 1993.

Turning now to ethnic and sex comparisons among subcontract awards, Table 2.15 and 2.16 show that, as happened with prime contract awards, Anglo females lead the field, garnering an impressive 53.6% share of all DBE subcontract awards during the study period (2342/4369) and a 25.3% share overall (2342/9253). Anglo female DBE's received an average of 457 subcontracts per year during the study period, and they won more than half of all DBE subcontract awards in each of these years.

Hispanic DBE's received the second largest share of subcontract awards over the period with 1,410 awards—32.3% of DBE subcontract awards and 15.3% of total subcontract awards. Black's received 300 awards during the study period—only 6.9% of DBE subcontracts and only 3.2% of subcontract awards overall. Native American DBE's received 129 subcontracts—3% of DBE awards and 1.4% of overall awards. "Other" DBE's received, respectively, 2.4% and 1.2%. Asian DBE's received the fewest numbers of subcontracts—66. This amounted to 1.5% of DBE awards and 0.7% of awards overall.

TABLE 2.16: Number of DBE Subcontract Awards as a Percentage of Total Subcontract Awards, by DBE Type

	TOTAL	DBE	Anglo female	Hispanic	Black	Asian-Pacific Islander	Native American	Mixed Race and Other DBE
FY 1987 pt.	1,122	42.9%	20.6%	14.4%	3.5%	0.3%	1.4%	2.2%
FY 1988	1,837	43.2%	21.9%	14.3%	2.8%	0.5%	2.2%	1.4%
FY 1989	1,820	47.9%	27.1%	15.8%	2.1%	0.6%	1.4%	0.7%
FY 1990	1,810	50.4%	27.7%	15.6%	4.3%	0.3%	1.5%	0.9%
FY 1991	1,668	47.3%	25.7%	15.0%	3.8%	1.1%	0.8%	0.7%
FY 1992 pt.	996	52.4%	28.6%	16.5%	3.2%	1.8%	0.6%	1.6%
TOTAL	*9,253*	*47.2%*	*25.3%*	*15.2%*	*3.2%*	*0.7%*	*1.4%*	*1.2%*

SOURCE: Lyndon B. Johnson School of Public Affairs, 1993.

Thus, as happened with the number of prime awards, Anglo female DBE's, followed by Hispanic DBE's, dominate the field for subcontract awards. Together, these two groups won more than 85% of all DBE subcontract awards during the study period. As was also the case with prime awards, Black DBE shares are more similar to Asian, Native American, and "Other" DBE shares, than to those for Anglo females and Hispanics. Figure 2.3 depicts the distribution of DBE subcontract awards by ethnicity, race, and sex.

FIGURE 2.3: Ethnic/Sex Distribution of Number of DBE Subcontracts Awarded, FY88 to FY91 (number of subcontracts)

SOURCE: Table 2.15 above.

SUBCONTRACT AWARDS—DOLLAR VALUE OF AWARDS

Tables 2.17–2.19 present information pertinent to assessing DBE participation in the dollar value of TxDOT's subcontract awards let during the study period. TxDOT prime contractors awarded over $1.5 billion in subcontracts during the study period, averaging over $290 million per year. The annual dollar amount of subcontract awards trended downward during the study period, parallel to the downward trend in prime awards discussed earlier. The ratio of total subcontract to total prime contract dollars, however, has remained constant in the range of 23-24% per year.

As with prime contract dollars, there is a fairly large variance across fiscal years. Unlike prime contract dollars, however, the DBE variance is much lower than the overall variance.[19] Thus, DBE variance is higher than overall variance in all but this category—indicating much greater stability of DBE's in the market for TxDOT subcontracts than in that for prime contracts. This presence is evident in the Tables 2.17–2.19.

TABLE 2.17: Dollar Amount of Subcontracts by DBE Type

	TOTAL	DBE	Anglo female	Hispanic	Black	Asian-Pacific Islander	Native American	Mixed Race and Other DBE
FY 1987 pt.	241,626,439	73,211,696	23,683,730	36,236,009	5,112,742	146,002	4,912,169	2,260,454
FY 1988	319,234,721	125,051,569	33,535,711	62,399,865	8,077,996	1,986,965	11,768,263	6,210,420
FY 1989	305,172,291	137,012,251	45,072,083	64,451,737	6,675,904	4,857,769	12,612,676	2,889,031
FY 1990	282,949,620	129,324,725	45,314,556	66,558,122	9,960,187	2,331,317	4,032,002	603,542
FY 1991	253,697,482	125,549,378	37,573,763	70,497,990	12,375,881	1,992,965	2,184,818	473,577
FY 1992 pt.	166,521,398	81,141,030	30,783,769	41,694,062	5,136,146	2,434,015	378,879	594,741
TOTAL	1,569,201,951	671,290,649	215,963,612	341,837,785	47,338,856	13,749,033	35,888,807	13,031,765

SOURCE: Lyndon B. Johnson School of Public Affairs, 1993.

During the study period, TxDOT's DBE subcontractors won over $671 million in awards. This represents exactly 10% of *all* TxDOT dollars and 43% of total *subcontract* dollars over the period. Thus it is clear that DBE participation in TxDOT highway construction comes almost entirely through subcontracting. Subcontracting amounts consistently to 23–24% of total contract dollars. In order for DBE's to receive a 10% share overall, they have to receive a 43% share of subcontracting dollars. This places a heavy

burden on non-DBE subcontractors to bear the costs of the DBE program, while releasing those prime contractors—who receive 77% of all contract dollars—from practically all the costs associated with the program.

The DBE share of all TxDOT dollars awarded grew strongly from 8.9% to 12% during the study period. TxDOT subcontracts to DBE's have been worth, on average, $129 million per year. The DBE share of subcontract dollars has also grown strongly during the period. DBE's won 39% of all subcontract dollars in FY88. By FY91, this share had grown to 49.5%.

TABLE 2.18: Subcontract Dollar Amounts as a Percentage of Total Prime Contract Dollar Amounts, by DBE Type

	TOTAL	DBE	Anglo female	Hispanic	Black	Asian-Pacific Islander	Native American	Mixed Race and Other DBE
FY 1987 pt.	23.87%	7.23%	2.34%	3.58%	0.50%	0.01%	0.49%	0.22%
FY 1988	22.78%	8.92%	2.39%	4.45%	0.58%	0.14%	0.84%	0.44%
FY 1989	23.69%	10.64%	3.50%	5.00%	0.52%	0.38%	0.98%	0.22%
FY 1990	22.80%	10.42%	3.65%	5.36%	0.80%	0.19%	0.32%	0.05%
FY 1991	24.27%	12.01%	3.59%	6.74%	1.18%	0.19%	0.21%	0.05%
FY 1992 pt.	22.72%	11.07%	4.20%	5.69%	0.70%	0.33%	0.05%	0.08%
TOTAL	23.35%	9.99%	3.21%	5.09%	0.70%	0.20%	0.53%	0.19%

SOURCE: Lyndon B. Johnson School of Public Affairs, 1993.

Anglo female-owned DBE's and Hispanic-owned DBE's again account for most of the DBE subcontract dollars awarded during the study period. Such firms won 83% of all DBE subcontract dollars and 8.3% of overall contract dollars. Hispanic-owned DBE's commanded the largest share among DBE firms—receiving 21.8% of all DBE subcontract dollars over the period. This amounted to slightly more than 5% of total dollars. Hispanic participation in DBE subcontract awards grew consistently over the period from 19.6% in FY88 to 27.8% in FY91. Hispanic participation over the entire study period totalled $341.8 million. Anglo female DBE's garnered 13.8% of DBE subcontract awards over the period, or 3.2% of total highway construction dollars. Anglo female participation grew from FY88 to FY90, but fell back in FY91 to FY89 levels.

TABLE 2.19: Subcontract Dollar Amounts as a Percentage of Total Subcontract Dollar Amounts, by DBE Type

	TOTAL	DBE	Anglo female	Hispanic	Black	Asian-Pacific Islander	Native American	Mixed Race and Other DBE
FY 1987 pt.	241,626,439	30.30%	9.80%	15.00%	2.12%	0.06%	2.03%	0.94%
FY 1988	319,234,721	39.17%	10.51%	19.55%	2.53%	0.62%	3.69%	1.95%
FY 1989	305,172,291	44.90%	14.77%	21.12%	2.19%	1.59%	4.13%	0.95%
FY 1990	282,949,620	45.71%	16.02%	23.52%	3.52%	0.82%	1.42%	0.21%
FY 1991	253,697,482	49.49%	14.81%	27.79%	4.88%	0.79%	0.86%	0.19%
FY 1992 pt.	166,521,398	48.73%	18.49%	25.04%	3.08%	1.46%	0.23%	0.36%
TOTAL	1,569,201,951	42.78%	13.76%	21.78%	3.02%	0.88%	2.29%	0.83%

SOURCE: Lyndon B. Johnson School of Public Affairs, 1993.

Black-owned firms account for only 3% of subcontract dollars awarded—0.7% of highway construction dollars overall. Black participation fell from FY88 to FY89, but has grown steadily since. Native American DBE participation is almost that of Blacks, accounting for 2.3% of subcontract dollars and 0.5% of total dollars. Asian and "Other" DBE's each accounted for less than 1% of subcontract dollars and 0.2% or fewer of total dollars awarded. Together, Black, Asian, Native, and "Other" DBE firms were awarded 7% of all subcontract dollars and 1.6% of total dollars awarded.

SUBCONTRACT AWARDS—SUMMARY STATISTICS

Table 2.20 presents summary statistics (i.e., mean, median, maximum, and minimum) of the distribution of TxDOT subcontract dollars between FY88 and FY91. Unlike their prime contract counterparts, these are population statistics for the entire universe of TxDOT subcontracts during the study period (See chapter 1). Overall, the largest subcontracts during the period were in the $4.9 million to $8.1 million range—only 10%-20% the size of the maximum prime contract awards (See Table 2.5). In FY88 and FY90, the largest DBE subcontract awards were $2.2 million and $3.8 million, respectively—significantly lower than the overall largest subcontract awards in those years. In FY89 and FY91, however, the largest subcontract awards of $8.1 million and $4.9 million, respectively, went to a Hispanic-owned DBE firm. The smallest subcontracts were all under $500 with some as low as $16. The smallest DBE awards

were generally somewhat larger than overall. The smallest DBE awards generally went to Anglo female DBE's.

TABLE 2.20: Summary Statistics for Total Dollar Amount of Subcontracts, FY88–FY91

OVERALL				
	FY88	FY89	FY90	FY91
Mean	$173,780	$167,677	$156,326	$152,097
Median	54,519	46,342	45,101	44,462
Maximum	6,098,146	8,056,438	6,488,519	4,929,300
Minimum	16	216	269	181
DBE's				
	FY88	FY89	FY90	FY91
Mean	$157,496	$157,305	$141,803	$159,125
Median	57,827	44,815	45,668	49,470
Maximum	2,211,401	8,056,438	3,798,061	4,929,300
Minimum	35	360	496	181

SOURCE: Lyndon B. Johnson School of Public Affairs, 1993.

The mean subcontract overall during the period ranged from $152,000 to $174,000. The mean DBE subcontract paralleled this range at somewhat lower levels. The average DBE subcontract award was about 90% the size of the average overall subcontract between FY88 and FY90. In FY91, the average DBE award was about 5% greater than the average overall subcontract award. These results contrast sharply with the size of prime DBE awards, which never amounted to more than 27% of the average overall prime award.

Similar results are observed regarding medians. As with prime contracts, the median subcontract award is consistently below the mean, indicating that a few large awards skew the distribution rightwards (See discussion of Table 2.5 above).[20] However, unlike prime contract awards, for which DBE medians ranged between 17% and 48% of overall medians, DBE subcontract award medians have generally been slightly larger than their overall counterparts. The DBE median subcontract award was 6% higher than the overall median subcontract award in FY88, 3% lower in FY89, 1% higher in FY90, and 11% higher in FY91.

TABLE 2.21: Summary Statistics for Total Dollar Amount of Subcontracts, FY88–FY91

DBE's	FY88	FY89	FY90	FY91
Mean	$157,496	$157,305	$141,803	$159,125
Median	57,827	44,815	45,668	49,470
Maximum	2,211,401	8,056,438	3,798,061	4,929,300
Minimum	35	360	496	181
Anglo female	FY88	FY89	FY90	FY91
Mean	$83,215	$91,424	$90,268	$87,789
Median	38,096	35,475	36,135	35,344
Maximum	769,445	1,831,918	1,770,163	1,117,322
Minimum	35	360	496	181
Hispanic	FY88	FY89	FY90	FY91
Mean	$237,262	$223,791	$235,188	$281,992
Median	89,178	61,194	65,771	84,960
Maximum	2,211,401	8,056,438	3,798,061	4,929,300
Minimum	797	784	1,300	1,012
Black	FY88	FY89	FY90	FY91
Mean	$158,392	$175,682	$129,353	$196,443
Median	87,250	42,607	53,193	85,815
Maximum	678,152	3,166,357	1,014,713	1,868,653
Minimum	1,181	3,086	1,291	2,400
Asian	FY88	FY89	FY90	FY91
Mean	$220,774	$441,615	$388,553	$104,893
Median	247,820	117,852	51,901	57,580
Maximum	483,122	2,063,282	2,086,548	601,310
Minimum	6,576	14,557	7,758	2,534
Native	FY88	FY89	FY90	FY91
Mean	$294,207	$485,103	$149,333	$156,058
Median	136,267	95,208	72,765	106,431
Maximum	1,725,996	4,068,657	521,641	774,349
Minimum	6,727	6,950	5,098	17,612
Other	FY88	FY89	FY90	FY91
Mean	$248,417	$222,233	$37,721	$39,465
Median	69,447	126,750	26,973	23,384
Maximum	1,685,010	740,329	160,471	174,692
Minimum	935	2,388	5,600	5,100

SOURCE: Lyndon B. Johnson School of Public Affairs, 1993.

Clearly, concerning these summary statistics at least, DBE subcontractors are much more difficult to distinguish from their non-DBE competitors than is the case concerning prime contract awards. Distinctions among various DBE's however, are more apparent, just as with prime awards. Table 2.21 presents the same set of summary statistics as above according to the sex, race, and/or ethnicity of the DBE subcontractor firm.

Table 2.21 shows most clearly the relatively small size of the average Anglo female DBE subcontract award—ranging between 52% and 63% of the size of the overall average DBE award. Coupled with the previous observation of the large number of subcontract awards won by these firms, it is clear that Anglo female DBE's are performing, on average, large numbers of relatively small contracts (in the areas of traffic control devices, fencing, landscaping, etc.), while Hispanic DBE's appear to be performing fewer, yet larger size contracts in the areas, for example, of constructing major and minor structures (See also Tables 2.23 and 2.24, below).

Table 2.22 presents the distribution of DBE subcontract by size class. Comparing this table with Table 2.6 shows that DBE subcontractors are much more competitive with their non-DBE counterparts than is the case for DBE prime contractors. DBE subcontractors commanded just under half of the entire TxDOT subcontract market during the study period, compared with 1.5% of the prime contract market during the same period.

TABLE 2.22: Distribution of Subcontract Awards by Size, DBE's versus Overall, FY87, Qtr. 2 to FY92 Qtr. 3

Prime Contract Size	Number of Subcontracts	Distribution of Number of Subcontracts	Number of DBE Subcontracts	Distribution of Number of DBE Subcontracts	DBE Prime Contracts as a Percentage of All Subcontracts
Less than $2,500	364	3.9%	160	3.7%	44.0%
$2,500 to 4,999	445	4.8%	197	4.5%	44.3%
$5,000 to 9,999	767	8.3%	346	7.9%	45.1%
$10,000 to 24,999	1,577	17.0%	731	16.7%	46.4%
$25,000 to 49,999	1,548	16.7%	768	17.6%	49.6%
$50,000 to 99,999	1,533	16.6%	776	17.8%	50.6%
$100,000 to 249,999	1,598	17.3%	762	17.4%	47.7%
$250,000 to 499,999	712	7.7%	346	7.9%	48.6%
$500,000 to 999,999	422	4.6%	176	4.0%	41.7%
$1,000,000 to 2,499,999	225	2.4%	83	1.9%	36.9%
$2,500,000 to 4,999,999	53	0.6%	23	0.5%	43.4%
Over $5,000,000	9	0.1%	1	0.0%	11.1%
TOTAL	**9,253**	100.0%	**4,369**	100.0%	47.2%

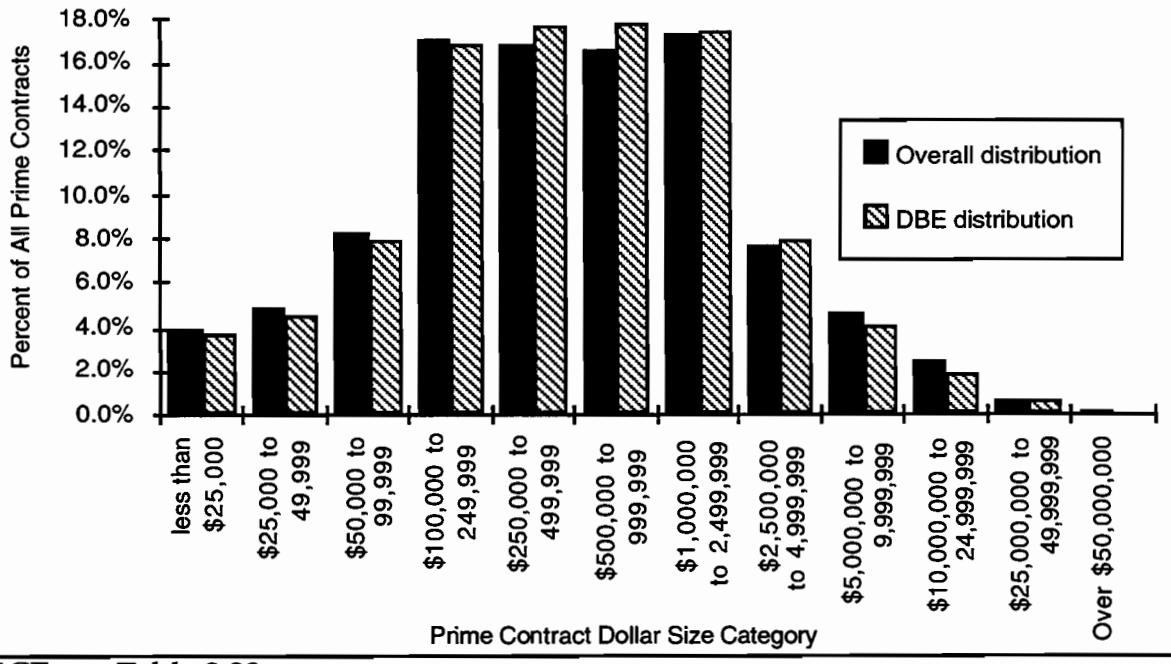
SOURCE: Lyndon B. Johnson School of Public Affairs, 1993.

The overall distribution of subcontract dollars and the distribution of DBE subcontract dollars are similarly shaped—although the DBE distribution is skewed left and more tightly concentrated around the mean. DBE penetration into the TxDOT subcontracting market appears from this table to be highest in the middle ranges of the subcontract distribution (i.e., $25,000 to $500,000). The DBE share of contracts in this range was 49.2% during the study period. In the ranges below $25,000, the DBE share

was lower, averaging 45%. In the ranges above $500,000 the DBE share was even lower, averaging only 39.9%.

DBE's appear to participate significantly in TxDOT subcontracting activities at all size levels except, importantly, the largest (contract over $5 million). In that category, DBE's received only one of nine awards during the study period (11%).

FIGURE 2.4: Distribution of Subcontract Awards by Size, DBE's versus Overall, FY87, Qtr. 2 to FY92 Qtr. 3



SOURCE: Table 2.22.

SUBCONTRACT AWARDS—MARKET SHARE CONCENTRATION

According to SMS, almost 23% of all federal and state highway funds go to TxDOT subcontractors (See Table 2.18). TxDOT's prime contractors award an average of about 4 subcontracts for each general contract with subcontractable items (See Table 2.15).

An earlier discussion pointed out that significant levels of industry concentration are in many instances also associated with significant market influence or power. It was also demonstrated that concentration in the heavy and highway construction industries is higher than for the construction industries as a whole, and that concentration among TxDOT primes is high.

TABLE 2.23: Top TxDOT Subcontractors, by Number of Awards, FY87, Qtr. 2 to FY92, Qtr. 3.

	Rank	Number of Awards	Subcontract Dollars	Average Award Size	DBE Type
Safety Lights Company	1	286	$17,560,580	$61,401	—
MICA Corporation	2	199	78,843,984	396,201	—
Traffic Systems, Inc.	3	198	13,758,134	69,486	WF
Erosion Control, Inc.	4	180	3,404,908	18,916	WF
Bluebonnet Turf and Seed, Inc.	5	151	7,325,258	48,512	WF
Linda's Construction	6	138	8,131,749	58,926	WF
Lectric Lites Co.	7	138	6,501,037	47,109	WF
Texas Slip-Form, Inc.	8	133	18,192,190	136,783	HM
Joe Valencik Highway Barricades, Inc.	9	132	13,682,150	103,653	—
Blinking Caution Lites, Inc.	10	126	5,145,690	40,839	WF

	Firms	%	Awards	%	Subcontract Dollars	%	%DBE
All Companies	1,336	100%	9,253	100%	$1,569,201,951	100%	33.2%
Four Largest Companies	4	0.3%	863	9.3%	113,567,606	7.2%	50.0%
Eight Largest Companies	8	0.6%	1,423	15.4%	153,717,840	9.8%	75.0%
12 Largest Companies	12	0.9%	1,905	20.6%	190,061,377	12.1%	66.7%
20 Largest Companies	20	1.5%	2,507	27.1%	260,233,401	16.6%	50.0%
50 Largest Companies	50	3.7%	3,549	38.4%	607,062,186	38.7%	52.0%
Other Companies	1,286	96.3%	5,704	61.6%	962,139,765	61.3%	32.5%

SOURCE: Lyndon B. Johnson School of Public Affairs, 1993.

NOTE: "WF" = Anglo female DBE. "HM" = Hispanic Male DBE. "—" = Non-DBE.

It is important to note that the measures presented earlier in Tables 2.7 and 2.8 included SIC 16 subcontractors as well as prime contractors. We have shown that about 23% of the contract dollars tracked by SMS go to subcontractors.[21] Thus, the market for TxDOT subcontracts is very large, on average almost $300 million per year. It is appropriate therefore to perform an analysis of TxDOT subcontractor market shares similarly to the one done earlier for prime contractors to determine if a comparably influential group of firms exists among subcontractors.

Each one of the top ten firms listed in Table 2.23 was awarded more than 125 subcontracts during the study period. For DBE's, the total value of these awards ranged from a low of $3.4 million to a high of $18.2 million. For non-DBE's, the range was $13.7 million to $78.8 million. According to Table 2.23, the top four subcontractors (according to number of awards), representing only 0.3% of all subcontractors garnered over 9% of all subcontract awards and over 7% of all subcontract dollars. The top 50 subcontractors in this regard constituted less than 4% of all firms yet were awarded over 38% of all subcontracts and almost 39% of all subcontract dollars.

Perhaps the most notable difference in Tables 2.23 and 2.24 from their prime contractor counterparts (presented in Tables 2.11 through 2.14) is the prevalence of DBE subcontractors who rank among subcontractors who have won the most TxDOT awards during the study period. This result follows the same pattern evident in Tables 2.15 through 2.22. Also consistent with previous findings, the number *one* firm in both tables is a non-DBE.

Seven out of the top ten firms in Table 2.23 are DBE's, and Anglo females owned six of these seven firms. In terms of number of subcontract awards, the most successful DBE firm during the study period is Traffic Systems, Inc.—an Anglo female-owned firm. TxDOT prime contractors have awarded Traffic Systems, Inc. more than 200 subcontracts. All six Anglo female DBE's had average award sizes that were much smaller than overall averages (See also Tables 2.20 and 2.21). This number of awards undoubtedly relates to the type of highway construction work these firms perform. All six firms had specialties in one or more of the categories fencing, landscaping, or traffic control devices. The only other DBE listed among the top ten, L. Steel Inc., is Hispanic male-owned. Its average contract size was much higher than the other DBE firms in the list, but was still below the average subcontract size, both DBE and non-DBE (See also Table 2.20). The higher average award size of this firm is also probably due to the category of work performed—construction of minor structures.

TABLE 2.24: Top TxDOT Subcontractors, by Dollar Value of Awards, FY87, Qtr. 2 to FY92, Qtr. 3.

	Rank	Number of Awards	Subcontract Dollars	Average Award Size	DBE Type
MICA Corporation	1	199	$78,843,984	$396,201	
Lopez-Gloria Construction Services, Inc.	2	27	52,869,379	1,958,125	HM
L.A. Utilities, Inc.	3	44	39,468,298	897,007	HM
APAC-Texas, Inc.	4	35	25,418,733	726,250	
Austin Paving Company	5	40	23,523,295	588,082	
Bear River Steel	6	46	22,456,304	488,181	NM
L. Steel, Inc.	7	59	20,692,541	350,721	HM
Florida Traffic Control Devices	8	27	18,504,403	685,348	
Texas Slip-Form, Inc.	9	133	18,192,190	136,783	HM
Safety Lights Company	10	286	17,560,580	61,401	

	Firms	%	Awards	%	Subcontract Dollars	%	%DBE
All Companies	1,336	100%	9,253	100%	$1,569,201,951	100%	33.2%
Four Largest Companies	4	0.3%	305	3.3%	196,600,394	12.5%	50.0%
Eight Largest Companies	8	0.6%	477	5.2%	281,776,937	18.0%	50.0%
12 Largest Companies	12	0.9%	972	10.5%	348,253,168	22.2%	50.0%
20 Largest Companies	20	1.5%	1,598	17.3%	445,693,801	28.4%	35.0%
50 Largest Companies	50	3.7%	2,665	28.8%	679,703,553	43.3%	40.0%
Other Companies	1,286	96.3%	6,588	71.2%	889,498,398	56.7%	33.0%

SOURCE: Lyndon B. Johnson School of Public Affairs, 1993.

NOTE: "WF" = Anglo female DBE. "HM" = Hispanic Male DBE. NM = "Native American DBE.

Overall, this report examines 9,253 subcontracts that TxDOT prime contractors awarded to 1,336 distinct firms. Of those 1,336 firms, 444 (one-third of the total) were designated as minority-owned and/or female-owned. However, among the top 50 subcontractors—measured by number of awards—DBE's account for *half* or more of all subcontractor firms (See Table 2.23). Three of the top ten firms appearing in Table 2.23 also appear in Table 2.24.

Each one of the top ten firms listed in Table 2.24 was awarded more than $17 million in subcontracts during the study period. Two of these firms, one of which is a DBE, were awarded over $50 million in subcontracts. Five more received more than $20 million each. Average award sizes for this group ranged from a low of $61,401 to a high of over $1.9 million.

The top four subcontractors (according to dollar value of awards), consisting of only 0.3% of all subcontractors received 12.5% of all subcontract dollars and more than 3% of all awards. The top 50 accounted for less than 4% of all firms but claimed over 43% of all subcontract dollars and nearly 29% of subcontract awards.

Five of the top ten DBE firms in Table 2.24 were DBE's, and Hispanic males owned four of the five. The remaining DBE had Native American male ownership. The most successful DBE firm during the study period was Lopez-Gloria Construction Services, Inc. TxDOT prime contractors, particularly Williams Brothers, awarded Lopez-Gloria 27 subcontracts during the study period with a total value of almost $53 million. Lopez-Gloria's primary work categories are listed as engineering and production of plant-mixed materials.

Most of the firms listed in Table 2.24 had average award sizes significantly higher than overall award averages. The DBE firms appearing on this list worked primarily constructing major and minor structures, producing and supplying road-building materials, and providing engineering services.

In a state as large as Texas examining exclusively statewide measures of DBE participation is likely to obscure many important features of minority-owned business enterprise and women-owned business enterprise in the state's highway construction industries. In order to shed more light in this area, we examine in the next chapter DBE participation by highway district rather than statewide.

CHAPTER THREE: FINDINGS AT THE DISTRICT LEVEL

Texas, with almost 17 million inhabitants, was the third most populous state in 1990, and is forecast to become second (surpassing New York) before 2000. As Texas State Comptroller John Sharp noted in his long-term economic and demographic report for Texas, examining the state's economic and public policy issues on a strictly statewide level "glosses over substantial demographic differences between different areas of the state" (Texas State Comptroller of Public Accounts, 1992, 20).

From a geographic standpoint, Texas is already the second largest state in the nation. Texas contains 695,677 square kilometers of land and 123,667 kilometers of highway. Like the heterogeneity of its population, Texas is characterized by great variety of geography, geology, weather and climate, and industry and economy. Although each one contains about the same number of counties, TxDOT's 24 district Offices reflect this diversity—from the Gulf Coast to the Trans-Pecos and from the Rio Grande Valley to the Great Plains. According to the Department:

> The District Offices...are a model of specialization and decentralization. ... Decentralization is desirable and indispensable in District Office operations, considering the diversity of Texas and the contrasts of its geography. Differing climates and soils, diverse topography, local environmental concerns, and special needs of the public practically dictate that the Department rely heavily on its local District Offices (SDHPT 1990a, 9-10).

This chapter focuses on the district office level. The district level analysis will provide more specific information on DBE participation in the Department's construction activities in recent years. The first section of this chapter presents some general transportation statistics and a discussion of their influence on DBE participation. Subsequent sections of the chapter introduce specific DBE participation information for each of 24 highway districts in existence during the study period.[22]

BASIC TRANSPORTATION STATISTICS BY DISTRICT

Table 3.1 presents some basic transportation-related data for Texas taken from Department as well as United States Census Bureau sources. It is clear from this table that the 24 highway districts in Texas vary significantly with such measures as land area, registered vehicles, and population.

TABLE 3.1: Basic Transportation Statistics by District, State of Texas

District Name	#	Square kilometers (Km^2)	Reg. Vehicles (1,000s)	Center-line km	Population (1990)	Daily Vehicle km	Adult Hispanic Pop. 1990	Adult White Pop. 1990	Adult Black Pop. 1990
Paris	01	16,514	280	5,149	290,641	11,637	5,484	192,688	18,472
Fort Worth	02	18,363	1,326	4,951	1,461,100	41,477	99,768	886,302	96,860
Wichita Falls	03	21,339	218	4,371	227,938	8,103	9,973	149,941	9,388
Amarillo	04	46,394	321	6,420	319,913	10,739	29,292	197,697	7,562
Lubbock	05	41,178	364	8,256	413,263	11,890	72,457	235,453	15,747
Odessa	06	47,573	285	5,305	307,723	9,003	57,004	168,999	10,017
San Angelo	07	61,429	176	5,960	189,343	6,548	43,698	111,731	3,675
Abilene	08	30,704	226	5,855	242,391	9,137	26,327	150,083	7,988
Waco	09	20,036	425	5,324	533,086	17,296	38,677	300,993	60,882
Tyler	10	17,638	494	5,854	514,932	18,686	16,161	307,894	60,278
Lufkin	11	19,526	218	4,548	244,135	10,222	7,707	147,747	28,117
Houston	12	17,438	3,007	4,252	3,658,317	81,619	483,118	1,813,963	446,075
Yoakum	13	28,557	274	5,633	296,381	13,558	45,261	169,681	20,926
Austin	14	24,885	762	5.046	919,988	27,441	120,217	548,224	56,026
San Antonio	15	45,983	1,230	8,333	1,545,905	39,738	475,578	842,177	62,866
Corpus Christi	16	22,668	383	4,421	496,841	14,770	165,865	270,093	11,677
Bryan	17	20,264	236	4,901	309,257	13,307	23,928	183,171	37,343
Dallas	18	14,885	2,225	5,302	2,593,288	66,107	234,255	1,419,848	281,211
Atlanta	19	14,297	259	4,283	279,632	12,015	4,697	158,943	39,615
Beaumont	20	18,850	439	3,698	495,357	17,668	12,859	278,275	69,247
Pharr	21	15,128	529	4,527	871,097	17,902	458,289	427,452	1,201
Brownwood	23	39,181	118	4,273	117,191	5,052	8,853	80,553	1,885
El Paso	24	56,242	395	2,991	615,196	12,410	270,841	323,812	15,083
Childress	25	29,156	45	4,012	43,595	3,391	3,328	28,501	1,464
TOTAL		695,677	14,236	123,667	16,986,510	479,714	2,713,637	9,394,221	1,363,605

SOURCE: TxDOT (1992, 5–17); U.S. Bureau of the Census (1992b, Tables 5, 7, 11)

The Houston district, for example, although it accounts for less than 3% of the state's land area, contains 21.1% of its general population and 21.5% of its registered vehicles. The Houston, Dallas, San Antonio, and Fort Worth districts combined account for only 14% of the state's land area, but contain 55% of both the population and registered vehicles. About 90% of the state's population and its registered vehicles reside in only two-thirds (16) of the highway districts. In contrast, just seven districts contain almost 50% of the state's total land area: San Angelo, El Paso, Odessa, Amarillo, San Antonio, Lubbock, and Pharr. These seven districts contain only 25% of the general population.

Furthermore, some highway districts contain significantly larger or smaller shares of various racial and ethnic groupings than statewide averages would suggest. The Houston district, for example, contains almost one-third of the state's black population and two-fifths of the Asian population, although it accounts for less than

one-fifth of the Hispanic origin or Non-Hispanic Anglo populations. The Pharr district, on the other hand, contains only 0.09% of the black population, although it contains almost 17% of the Hispanic population and almost 5% of the Anglo population.

Table 3.2 presents complete cumulative distributions of the 1990 Texas population for adults 18 years and older by ethnicity and race. As may be seen from that table, over 90% of the state's black population reside in just 11 districts. In order of decreasing importance these are: Houston, Dallas, Fort Worth, Beaumont, San Antonio, Waco, Tyler, Austin, Atlanta, Bryan, and Lufkin.

Similarly just 11 districts contain over 90% of the Hispanic origin population, although with the exception of first-place Houston the list of eleven districts is much different: Houston, San Antonio, Pharr, El Paso, Dallas, Corpus Christic, Austin, Fort Worth, Lubbock, Odessa, and Yoakum. The Anglo population is more widely dispersed—it takes 17 districts to account for 90% of the Anglo population. The Native American population, unlike other minority groups, is almost as widely dispersed as that of whites—it takes 16 districts to account for 90% of the population. The Asian population, in contrast, is concentrated—even relative to other minority groups such as blacks or Hispanics. A mere eight districts contain over 90% of this group—62% in the Houston and Dallas districts alone.

These examples of the wide variety in Texas demography provide the context for the information that appears in the tables below. These tables present DBE participation data by district. These data vary widely, and the basic information presented in Table 3.1 facilitates the district-level analysis. What Table 3.1 relates is perhaps obvious—differences in contracting and subcontracting dollars awarded across districts are strongly and positively influenced by differences in the overall size of the population—as measured by either people, vehicles, or miles of road. What the data in Table 3.2 show is that there are important differences *within* the overall population in Texas in terms of racial and ethnic composition and also in terms of the geographic location and relative concentration of various racial and ethnic sub-populations.

The measures presented in Table 3.1 are, in general, highly statistically correlated with the distribution of highway construction contract and subcontract dollars across districts—DBE and non-DBE alike.[23] In most cases, these measures can explain upwards of 90% of the variance of these distributions.[24] Thus, to focus the analysis on the remaining influences (i.e., other than sheer population size) such as DBE program

operation or discrimination, it is important to recognize the basic influence of overall population.

There is also some evidence that the measures in Table 3.2, as well, are significantly correlated with highway construction dollars. The relationship of the number and revenues of business enterprise to the size of the general population, as the *Croson* court pointed out, is unlikely to ever be exactly one-to-one. Neither is it likely to be the same for each racial or ethnic group. It is another matter entirely, however, to proceed from these observations, as the court apparently did, to conclude that there is no relationship at all between general population and business enterprise and thus no room at all for the introduction of population statistics into the evidentiary record upon which a disparity study is based (City of Richmond v. J.A. Croson Co. 1989, 725).

TABLE 3.2: Cumulative Distributions of Texas Population, Selected Age and Ethnic Characteristics, 1990

Total Population, 1990		Black Adults, 1990		White Adults, 1990	
District	Cum. percent	District	Cum. percent	District	Cum. percent
Houston	21.54	Houston	32.71	Houston	19.31
Dallas	36.80	Dallas	53.34	Dallas	34.42
San Antonio	45.90	Fort Worth	60.44	Fort Worth	43.86
Fort Worth	54.51	Beaumont	65.52	San Antonio	52.82
Austin	59.92	San Antonio	70.13	Austin	58.66
Pharr	65.05	Waco	74.59	Pharr	63.21
El Paso	68.67	Tyler	79.01	El Paso	66.66
Waco	71.81	Austin	83.12	Tyler	69.93
Tyler	74.84	Atlanta	86.03	Waco	73.14
Corpus Christi	77.77	Bryan	88.76	Beaumont	76.10
Beaumont	80.68	Lufkin	90.83	Corpus Christi	78.97
Lubbock	83.12	Yoakum	92.36	Lubbock	81.48
Amarillo	85.00	Paris	93.72	Amarillo	83.59
Bryan	86.82	Lubbock	94.87	Paris	85.64
Odessa	88.63	El Paso	95.98	Bryan	87.59
Yoakum	90.38	Corpus Christi	96.83	Yoakum	89.39
Paris	92.09	Odessa	97.57	Odessa	91.19
Atlanta	93.73	Wichita Falls	98.26	Atlanta	92.88
Lufkin	95.17	Abilene	98.84	Abilene	94.48
Abilene	96.60	Amarillo	99.40	Wichita Falls	96.08
Wichita Falls	97.94	San Angelo	99.67	Lufkin	97.65
San Angelo	99.05	Brownwood	99.80	San Angelo	98.84
Brownwood	99.74	Childress	99.91	Brownwood	99.70
Childress	100.00	Pharr	100.00	Childress	100.00

Note: Table continues on next page

The relationship between population and business enterprise is clearly in operation concerning highway construction subcontracting in Texas, as shown in Table

3.3. That table presents regression results that document the explanatory power of measures of the adult population by race/ethnicity vis-a-vis contract and subcontract dollars awarded by race/ethnicity. In all but one case, these simple statistical exercises show that measures of population correlate strongly with measures of business enterprise activity when matched according to racial and ethnic groupings.

TABLE 3.2: Cumulative Distributions of Texas Population, Selected Age and Ethnic Characteristics, 1990 (Continued from previous page)

Hispanic Adults, 1990		Native American Adults, 1990		Asian /Pacific Adults, 1990	
District	Cum. percent	District	Cum. percent	District	Cum. percent
Houston	17.80	Dallas	19.29	Houston	40.78
San Antonio	35.33	Houston	36.16	Dallas	61.72
Pharr	52.22	Fort Worth	46.92	Fort Worth	71.12
El Paso	62.20	San Antonio	55.86	Austin	77.85
Dallas	70.83	Austin	61.08	San Antonio	83.33
Corpus Christi	76.94	El Paso	64.89	Waco	86.21
Austin	81.37	Amarillo	68.58	El Paso	88.40
Fort Worth	85.05	Waco	71.93	Bryan	90.20
Lubbock	87.72	Paris	75.12	Beaumont	91.82
Odessa	89.82	Tyler	77.99	Corpus Christi	93.02
Yoakum	91.49	Corpus Christi	80.80	Amarillo	94.12
San Angelo	93.10	Wichita Falls	83.01	Lubbock	95.19
Waco	94.52	Odessa	85.13	Pharr	95.94
Amarillo	95.60	Beaumont	87.12	Wichita Falls	96.58
Abilene	96.57	Lubbock	89.01	Abilene	97.13
Bryan	97.46	Pharr	90.89	Tyler	97.68
Tyler	98.05	Atlanta	92.65	Odessa	98.21
Beaumont	98.52	Lufkin	94.37	Yoakum	98.69
Wichita Falls	98.89	Bryan	95.83	San Angelo	99.09
Brownwood	99.22	Abilene	97.19	Paris	99.44
Lufkin	99.50	San Angelo	98.21	Lufkin	99.71
Paris	99.70	Yoakum	99.12	Atlanta	99.87
Atlanta	99.88	Brownwood	99.70	Brownwood	99.98
Childress	100.00	Childress	100.00	Childress	100.00

SOURCE: U.S. Bureau of the Census, 1992b, Tables 5, 7, 11.

A simple regression model was constructed using SMS data for the dependent (left-hand side or endogenous) variables and Census Bureau data for the independent (right-hand side or exogenous) variables. The ethnic/racial groupings used were Anglo, Black, Hispanic, Asian/Pacific Islander, Native American, and "Other." The dependent (Y) variables used were (1) prime contract awards by ethnic/racial group, (2) prime contract dollars by ethnic/racial group, (3) subcontract awards by ethnic/racial group, and (4) subcontract dollars by ethnic/racial group. Table 3.3 presents results based on dependent variable (4), subcontract dollars by ethnic/racial group. The independent variables used were the ethnic/racial groupings of the adult (18 and over) population

taken from the 1990 Census. The resulting regression model takes the form of Equation 3.1.

$$Yi = \alpha + \beta X1i + \beta X2i + \beta X3i + \beta X4i + \beta X5i + \varepsilon \ (i = 1,2,\ldots,24) \qquad \text{(Eq. 3.1)}$$

Variable X_1 measures the Texas adult Hispanic population, X_2 the adult Anglo population, X_3 the adult black population, X_4 the adult Native American population, and X_5 the adult Asian/Pacific Islander population. The subscript i in this equation represents each of the 24 TxDOT highway districts. Results of this exercise using subcontract dollars as the dependent variable are reported in Table 3.3.[25] Standard errors are also reported for each estimated coefficient, allowing the user to derive T-statistics and p-values as desired.

Table 3.3 shows that, with the single exception of Native American firms, the coefficient on each group's "own" population variable has a positive sign and is statistically significant at least the 10% level. Thus the size of a region's various ethnic/racial groups do indeed appear to correlate with each group's participation in TxDOT contracting and subcontracting activities. However, it should be noted that population is likely not the most important influence, and that this influence is not uniform across ethnic/racial groups. For whites, each person in the adult population is associated with $286.02 of subcontract dollars. For Hispanics, the figure is only $42.55, however, and for blacks, $32.04. For Asians, the figure is closer to that of whites at $162.28. As noted, the results for Native Americans are anomalous. This may be due to the relatively small number of observations on this group (129) available from the SMS. It could also be the case that firms claiming Native American status do not conform to standard Census Bureau definitions for this group.

A second point to notice from Table 3.3 is the relatively high adjusted squared multiple R statistics, ranging from 79% to almost 99% recorded for each group. These indicate that the explanatory variables in the model are in fact capable of accounting for a large degree of the variance in the dependent variable. Also, the sign of the intercept (CONSTANT) is positive for all groups except whites— although it is not significant in most cases. This is, perhaps, indicative of a redistributive influence of the Departmental DBE program from whites to other ethnic or racial groupings.

TABLE 3.3: Results of Ordinary Least Squares Regression of TxDOT Contracting Participation on 1990 Census Adult Population

	CONSTANT		ADHISPOP		ADWHTPOP		ADBLKPOP	
	Value	Std. error	Value	Std. error	Value	Std. error	Value	Std. error
HISPANIC	3,299,890	2,821,470.00	42.55*	20.80	13.39	30.44	4.59	83.37
ANGLO‡	-1,992,320	3,395,270.00	-153.34†	25.03	286.02†	36.63	-429.0†	100.32
BLACK	1,096,640*	528,536.00	-4.56	3.90	9.10	5.70	32.04*	15.62
NATIVE	234,065	333,253.00	-6.24†	2.46	8.27†	3.60	-18.34*	9.85
ASIAN	387,766	263,651.00	-2.40	1.94	4.46	2.84	-21.73†	7.79

	ADINPOP		ADASPOP		$Adj.R^2$	S.E.E
	Value	Std. error	Value	Std. error		
HISPANIC	-5,850.21	3,279.82	1,306.3†	418.75	0.930	6,889,220.00
ANGLO‡	-24,716.98†	3,946.84	2,898.9†	503.91	0.986	8,290,280.00
BLACK	-2,380.93†	614.40	74.62	78.44	0.880	1,290,530.00
NATIVE	-1,422.83†	387.39	276.88†	49.46	0.955	813,708.00
ASIAN	-794.75†	306.48	162.28†	39.13	0.786	643,761.00

NOTES:
‡ Includes non-DBE's and Anglo female DBE's.
ADHISPOP: Adult Hispanic Population, 1990;
ADWHTPOP: Adult White Population, 1990;
ADBLKPOP: Adult Black Population, 1990;
ADINPOP: Adult Native American Population, 1990;
ADASIPOP: Adult Asian/Pacific Islander Population, 1990;
Adj. R^2 = Adjusted Squared Multiple R;
S.E.E. = Standard Error of the Estimate.
* indicates significance at the 10% level.
† denotes significance at the 5% or better level.
Dependent (Y_i) variable is subcontract dollars by ethnic/racial group.

It should be noted, finally, that the results of this section are intended to be suggestive only. The econometric analysis is not particularly refined. The analysis did not include other possibly relevant explanatory variables (for example, those presented in Table 3.1). The purpose was simply to point out that interpretations of the *Croson* ruling that avoid measures of the general population *in toto* simply because of the Court's admonitions against the use of such data go too far. It is likely that the Court meant only that statistical measures of general population data, *taken alone*, as they were

in the case of the City of Richmond, are not sufficient to establish a compelling interest. It was unlikely that it was the intention of the Court to encourage the complete exclusion of such measures from analyses that attempt to provide the factual background for so-called DBE programs.

PRIME CONTRACT AWARDS IN THE DISTRICTS—NUMBER OF AWARDS

Table 3.4 presents information by district on the 1,735 prime highway construction contract awards let by TxDOT in each of the state's fiscal years FY88 through FY91 (hereafter, the study period). We present the data in absolute terms (i.e., number of awards) and in relative terms (i.e., each district's percentage share of the total number of awards). The information presented in Tables 3.5 through 3.11 is constructed in the same manner.

TABLE 3.4: Prime Contract Awards by Highway District, FY88–FY91

District Name	No.	Prime Contract Awards (number)							
		FY88		FY89		FY90		FY91	
		#	%	#	%	#	%	#	%
Paris	1	7	1.49	5	1.23	5	1.07	6	1.53
Fort Worth	2	38	8.10	26	6.39	26	5.57	27	6.89
Wichita Falls	3	18	3.84	8	1.97	19	4.07	12	3.06
Amarillo	4	11	2.35	6	1.47	12	2.57	2	0.51
Lubbock	5	11	2.35	6	1.47	6	1.28	3	0.77
Odessa	6	17	3.62	13	3.19	12	2.57	11	2.81
San Angelo	7	4	0.85	9	2.21	7	1.50	8	2.04
Abilene	8	8	1.71	10	2.46	11	2.36	4	1.02
Waco	9	16	3.41	13	3.19	15	3.21	10	2.55
Tyler	10	10	2.13	12	2.95	14	3.00	11	2.81
Lufkin	11	9	1.92	13	3.19	9	1.93	9	2.30
Houston	12	99	21.11	67	16.46	90	19.27	87	22.19
Yoakum	13	13	2.77	18	4.42	18	3.85	15	3.83
Austin	14	19	4.05	30	7.37	32	6.85	39	9.95
San Antonio	15	37	7.89	34	8.35	44	9.42	25	6.38
Corpus Christi	16	25	5.33	19	4.67	24	5.14	25	6.38
Bryan	17	19	4.05	12	2.95	15	3.21	13	3.32
Dallas	18	26	5.54	46	11.30	30	6.42	34	8.67
Atlanta	19	17	3.62	12	2.95	18	3.85	12	3.06
Beaumont	20	15	3.20	15	3.69	20	4.28	8	2.04
Pharr	21	30	6.40	15	3.69	22	4.71	20	5.10
Brownwood	23	7	1.49	9	2.21	7	1.50	4	1.02
El Paso	24	12	2.56	6	1.47	8	1.71	6	1.53
Childress	25	1	0.21	3	0.74	3	0.64	1	0.26
TOTAL		469	100.0	407	100.0	467	100.0	392	100.0

SOURCE: Lyndon B. Johnson School of Public Affairs (1993).

Within each district, there are large annual variations in the number of prime awards received. In relative terms, however, (i.e., percentage of total prime awards per district) each district's annual share was fairly stable during the FY88–FY91 period.

The Houston district, by far, awarded the largest number of prime contracts each year, accounting for just under 20% of all awards made during the period (343/1735). After Houston, six other districts consistently awarded large numbers of prime contracts during the FY88 to FY91 period: San Antonio, Dallas, Austin, Fort Worth, Corpus Christi , and Pharr. These six districts, after Houston, represent the largest metropolitan areas in the state. Combined with Houston, these seven highway districts account for almost 60% of all prime awards—even though they comprise less than 30% of all districts. Clearly, the outcome of decisions made in these largest of districts, and Houston in particular, is going to have an enormous relative impact on the success of the Department's DBE initiatives.

At the other end of the spectrum, the seven smallest districts, from the standpoint of the number of prime contracts let during the FY88 to FY91 period, comprised just over 10% of total prime awards even though they account for almost 30% of all districts. In order of increasing importance they are Childress, Paris, Lubbock, Brownwood, San Angelo, Amarillo, and El Paso. The El Paso district let less than 2% of all prime contracts; the Childress district awarded less than 0.5%.

Using the information on square mileage and on registered vehicles in Table 3.1, the reader can see that there is a positive relationship between a district's population size and the number of prime contract awards it receives. There is also an inverse relationship between a district's land area and the number of prime awards it receives. Thus, the districts receiving the largest number of prime awards, tend to receive the fewest awards per capita or per registered vehicle, but receive the most awards per square mile. The opposite applies to smaller districts—they receive the most awards per capita, but the least per square mile. Overall, the population effect strongly dominates the land area effect, but both are important to determining construction spending in a given district. This is true for prime contract dollars as well as prime contract awards, as can be seen by referring to Table 3.6 below.

Table 3.5 shows that DBE's received 112 of the 1,735 prime awards made during the study period, or 6.5% (See also Table 2.1 above). Houston, not surprisingly, was the most important district for DBE prime awards during the FY88–91 period, making 29 awards—26% of the DBE total. The Pharr district ranked a fairly close second, while the

San Antonio and Dallas districts tied for a distant third. Pharr accounted for 18% (20/112), while San Antonio and Dallas made eight awards each—7.1%—to DBE's. Four districts—Fort Worth, Odessa, Brownwood, and Lubbock—made no prime awards to DBE's during the period. Fort Worth is particularly striking since this district has consistently been one of the five top districts for prime awards in the state. The Fort Worth district awarded 117 prime contracts during the study period—almost 7% of the total.

Another way to look at DBE participation across districts is from a relative standpoint. When using relative measures one asks "what share of prime awards do DBE firms receive in each district?" Ranking districts according to this criterion yields results in contrast to those obtained by ranking DBE participation according to the absolute number of prime contracts received in each district.

TABLE 3.5: DBE Prime Contract Awards by Highway District, FY88–FY91

District Name	No.	DBE Prime Contract Awards (number)							
		FY88		FY89		FY90		FY91	
		#	%	#	%	#	%	#	%
Paris	1	0	0.00	0	0.00	1	3.13	2	8.33
Fort Worth	2	0	0.00	0	0.00	0	0.00	0	0.00
Wichita Falls	3	0	0.00	0	0.00	2	6.25	3	12.50
Amarillo	4	0	0.00	0	0.00	1	3.13	0	0.00
Lubbock	5	0	0.00	0	0.00	0	0.00	0	0.00
Odessa	6	0	0.00	0	0.00	0	0.00	0	0.00
San Angelo	7	0	0.00	0	0.00	0	0.00	2	8.33
Abilene	8	2	5.41	1	5.26	1	3.13	0	0.00
Waco	9	3	8.11	0	0.00	1	3.13	0	0.00
Tyler	10	0	0.00	2	10.53	1	3.13	1	4.17
Lufkin	11	1	2.70	0	0.00	0	0.00	0	0.00
Houston	12	10	27.03	3	15.79	9	28.13	7	29.17
Yoakum	13	1	2.70	1	5.26	0	0.00	0	0.00
Austin	14	0	0.00	0	0.00	0	0.00	1	4.17
San Antonio	15	2	5.41	2	10.53	4	12.50	0	0.00
Corpus Christi	16	2	5.41	0	0.00	0	0.00	0	0.00
Bryan	17	3	8.11	3	15.79	1	3.13	1	4.17
Dallas	18	4	10.81	1	5.26	2	6.25	1	4.17
Atlanta	19	0	0.00	1	5.26	1	3.13	1	4.17
Beaumont	20	0	0.00	2	10.53	2	6.25	0	0.00
Pharr	21	8	21.62	3	15.79	5	15.63	4	16.67
Brownwood	23	0	0.00	0	0.00	0	0.00	0	0.00
El Paso	24	0	0.00	0	0.00	1	3.13	1	4.17
Childress	25	1	2.70	0	0.00	0	0.00	0	0.00
TOTAL		37	100.0	19	100.0	32	100.0	24	100.0

SOURCE: Lyndon B. Johnson School of Public Affairs (1993).

Houston loses its number one ranking when measured in relative terms. The Houston district awarded only 8.5% its prime awards to DBE firms—making it only the eighth most important district. Topping the relative ranking is the Pharr district. Pharr made 23% of all its prime awards to DBE firms. Following Pharr, are Bryan, Paris, Childress, and Abilene. Each of these districts awarded between 12% and 14% of their prime contracts to DBE firms during the period. Most of the largest districts fell much farther down the list in relative terms. Dallas, ranked 13th, awarded only 5.9% of its prime awards to DBE's. San Antonio ranked 14th with 5.8%, Corpus Christi ranked 19th with 2.2%, and Austin ranked 20th with less than 1%. Fort Worth, Odessa, Brownwood, and Lubbock all tied for last with 0% each.

Chapter two showed that Anglo female-owned DBE's dominate the ranks of DBE prime award winners, followed by Hispanic-owned DBE firms. Important to also examine is the distribution of DBE prime contracts according to race, ethnicity, and sex in each district. DBE firms owned by Anglo females (WBE's) won 65.2% (73/112) prime awards overall during the study period. Almost 58% of these awards came from five districts: Houston (15), Bryan (8), Pharr (7), Dallas (6), and San Antonio (6). Wichita Falls, Abilene, Tyler, and Beaumont each made 4 WBE awards; Waco and Paris made 3 each; Atlanta and Yoakum each made 2; and San Angelo, El Paso, Corpus Christi , Amarillo, and Childress each made one award. Besides Fort Worth, Odessa, Brownwood, and Lubbock, neither the Lufkin nor the Austin districts made any DBE awards to Anglo female-owned firms during the period. As with Fort Worth, Austin stands out here due to its overall importance statewide.

From a relative standpoint, the most important districts for WBE's are, Bryan, Paris, Childress, and Abilene. Each of these districts awarded between 12% and 14% of all their prime awards to WBE firms. Tyler, Pharr, Wichita Falls, and Beaumont each awarded between 7% and 9% of prime awards to DBE's. Dallas, Houston, and San Antonio awarded only about 4% each to WBE's. The remaining districts—other than those listed above that made zero awards—averaged between 3–4% each to WBE's. The exception was the Corpus Christi district. Corpus Christi awarded only 1% to WBE's.

Turning to MBE's, the distribution of awards is even more concentrated than for WBE's. We also find even more districts that have made no prime awards at all to MBE's over the period. Only 39 of 112 awards during the FY88–91 period went to MBE firms—about 35% of the total. Houston is, again, the most important district with a total of 14 MBE prime awards during the period. Pharr ranks a close second with 13.

Together, these two districts account for almost 70% of all MBE prime awards. The next closest districts—Dallas and San Antonio—fall far behind these top two. Dallas and San Antonio made only two awards each to MBE prime contractors. Wichita Falls, San Angelo, Waco, Lufkin, Austin, Corpus Christi, Atlanta, and El Paso each made one award to an MBE prime during the period. Twelve districts—half of the total—made no awards to MBE primes during the study period. Along with those districts already mentioned as making no DBE awards at all are Paris, Amarillo, Abilene, Tyler, Yoakum, Bryan, Beaumont, and Childress.

In relative terms, the most important district for MBE's was Pharr, where almost 15% of its prime awards went to MBE firms (13/87). Twelve of these 13 awards were made to DBE firms owned by Hispanic males, the other to an Asian-owned DBE firm. Houston made only 4% of its prime awards to MBE's. Dallas and San Antonio made less than 1.5% each. Corpus Christi made only 1% and Austin made less than 1%.

PRIME CONTRACT AWARDS IN THE DISTRICTS—DOLLAR VALUE OF AWARDS

Table 3.6 presents information on the almost $5 billion in prime highway construction contract awards let by TxDOT districts in each of the state's fiscal years FY88 through FY91. This table presents data in both absolute and relative terms.

As with number of prime awards by district, there is a large amount of variance from year-to-year in the dollars awarded by each district. Dallas, for example, awarded less than $50 million in FY88 but almost $164 million in FY90. Wichita Falls awarded almost $42 million in FY88 but only $2.2 million in FY89. Due to such large annual changes, each district's annual share of total prime dollars has varied significantly. Continuing the example, the Wichita Falls district's share has been as low as 0.17% and as high as 3%. The Dallas district's share has ranged from 3.3% to 13.2%. The only strong exceptions to this trend are the Abilene, Waco, and Brownwood districts. These districts' shares were quite stable during the period.

Houston, of course, is the most significant district from the standpoint of prime dollars awarded. Houston awarded more than $1.7 billion in highway contracts during the study period. FY89 saw the largest amount awarded—almost $529 million. Houston has awarded annually between 28% and 41% of all prime dollars during the period. The Dallas district runs a distant second with a total of more than $485 million awarded during the period. San Antonio ranks a close third with almost $403 million, and Fort

Worth a close fourth with over $389 million. Together, these four districts account for over 60% of all prime contract dollars during the study period. Thus, fewer than 17% of the state's highway districts award over 60% of the total prime dollars.

TABLE 3.6: Prime Contract Dollars by Highway District, FY88–FY91

District Name	No.	Prime Contract Dollars (millions)							
		FY88		FY89		FY90		FY91	
		$	%	$	%	$	%	$	%
Paris	1	8.2	0.58	17.6	1.37	23.4	1.89	6.1	0.59
Fort Worth	2	95.2	6.80	71.3	5.54	113.9	9.18	108.8	10.41
Wichita Falls	3	41.8	2.98	2.2	0.17	12.6	1.02	8.2	0.78
Amarillo	4	23.9	1.71	3.0	0.23	17.0	1.37	4.6	0.44
Lubbock	5	44.3	3.16	32.5	2.52	43.6	3.52	15.4	1.47
Odessa	6	30.8	2.20	10.1	0.79	15.3	1.23	13.5	1.29
San Angelo	7	13.0	0.93	19.3	1.50	8.6	0.69	10.2	0.97
Abilene	8	15.7	1.12	18.1	1.41	18.0	1.45	13.9	1.33
Waco	9	24.2	1.73	15.6	1.21	19.1	1.54	15.3	1.47
Tyler	10	37.1	2.65	38.8	3.01	20.5	1.65	30.6	2.93
Lufkin	11	10.6	0.76	23.3	1.81	11.5	0.93	10.9	1.05
Houston	12	473.5	33.79	528.8	41.05	343.6	27.69	376.0	35.97
Yoakum	13	36.7	2.62	27.9	2.17	22.8	1.83	16.5	1.58
Austin	14	73.2	5.22	40.8	3.16	95.7	7.71	62.5	5.98
San Antonio	15	129.6	9.25	99.2	7.70	84.5	6.81	89.2	8.53
Corpus Christi	16	88.1	6.29	26.6	2.07	36.0	2.90	32.2	3.08
Bryan	17	27.4	1.95	19.9	1.54	24.2	1.95	13.9	1.33
Dallas	18	46.9	3.35	150.9	11.71	163.9	13.21	123.8	11.84
Atlanta	19	32.8	2.34	18.3	1.42	13.9	1.12	14.1	1.35
Beaumont	20	41.2	2.94	68.5	5.32	90.4	7.29	18.2	1.74
Pharr	21	49.5	3.53	36.0	2.79	40.7	3.28	30.7	2.94
Brownwood	23	8.1	0.58	7.3	0.56	5.6	0.45	6.0	0.57
El Paso	24	47.4	3.38	7.0	0.54	8.4	0.67	18.4	1.76
Childress	25	2.3	0.17	5.0	0.39	7.6	0.61	6.4	0.61
TOTAL		1,401.5	100.0	1,288.1	100.0	1,240.8	100.0	1,045.4	100.0

SOURCE: Lyndon B. Johnson School of Public Affairs (1993).

Following these largest districts are Austin and Beaumont. Both these districts awarded $200–$300 million in prime contracts over the four year period. Together, they awarded almost 10% of all prime dollars. Behind these two districts are Corpus Christi, Pharr, Lubbock, Tyler, and Yoakum, each awarding $100–$200 million during the period. These latter districts together accounted for just over 14% of all prime dollars awarded.

Districts that awarded $75 million to $100 million during the period include, in descending order of importance, Bryan, El Paso, and Atlanta. These three districts together awarded 5% of the total. Districts awarding $50 million to $75 million included, again in descending order: Waco, Odessa, Abilene, Wichita Falls, Lufkin,

Paris, and San Angelo. These seven districts combined awarded about 9% of the total. The smallest districts were Amarillo, Brownwood, and Childress. Each of these districts awarded less than $50 million in prime contracts. Together, these three smallest districts contributed only about 2% of the total.

TABLE 3.7: DBE Prime Contract Dollars by Highway District, FY88–FY91

District Name	No.	DBE Prime Contract Dollars (millions)							
		FY88		FY89		FY90		FY91	
		$	%	$	%	$	%	$	%
Paris	1	0.0	0.00	0.0	0.00	0.3	1.55	1.5	10.01
Fort Worth	2	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00
Wichita Falls	3	0.0	0.00	0.0	0.00	1.4	6.83	2.5	16.48
Amarillo	4	0.0	0.00	0.0	0.00	0.9	4.59	0.0	0.00
Lubbock	5	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00
Odessa	6	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00
San Angelo	7	0.0	0.00	0.0	0.00	0.0	0.00	0.3	1.82
Abilene	8	4.8	16.01	1.7	11.95	0.9	4.57	0.0	0.00
Waco	9	1.6	5.20	0.0	0.00	2.0	9.65	0.0	0.00
Tyler	10	0.0	0.00	2.0	13.65	0.2	1.09	2.5	16.35
Lufkin	11	1.0	3.22	0.0	0.00	0.0	0.00	0.0	0.00
Houston	12	1.7	5.59	0.5	3.44	1.7	8.36	2.7	17.74
Yoakum	13	0.2	0.78	0.2	1.21	0.0	0.00	0.0	0.00
Austin	14	0.0	0.00	0.0	0.00	0.0	0.00	0.1	0.70
San Antonio	15	0.9	3.00	1.1	7.42	1.7	8.40	0.0	0.00
Corpus Christi	16	1.1	3.64	0.0	0.00	0.0	0.00	0.0	0.00
Bryan	17	2.0	6.60	0.8	5.41	0.7	3.49	1.1	7.01
Dallas	18	4.1	13.56	0.1	0.48	1.8	8.88	0.4	2.95
Atlanta	19	0.0	0.00	3.7	25.03	0.7	3.51	0.9	5.85
Beaumont	20	0.0	0.00	2.4	16.65	2.4	11.42	0.0	0.00
Pharr	21	10.4	34.64	2.2	14.76	5.2	25.30	3.0	19.78
Brownwood	23	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00
El Paso	24	0.0	0.00	0.0	0.00	0.5	2.36	0.2	1.30
Childress	25	2.3	7.74	0.0	0.00	0.0	0.00	0.0	0.00
TOTAL		30.1	100.0	14.6	100.0	20.6	100.0	15.1	100.0

SOURCE: Lyndon B. Johnson School of Public Affairs (1993).

As was the case regarding the total number of DBE prime *awards*, the Pharr district topped the ranking for DBE prime contract *dollars*. As shown in Table 3.7, Pharr let almost $21 million in DBE prime dollars—over 13% of all prime dollars awarded by the district during the study period. Abilene ranked a surprising second, with $7.5 million awarded—over 11% of that district's total prime dollars awarded. Houston and Dallas, each with about $6.5 million in prime DBE dollars, ranked third and fourth, respectively. Together, these four districts accounted for more than 50% of all DBE prime dollars.

The Houston and Dallas districts, however, ranked much lower in relative terms. Houston awarded less than 0.4% of its total prime dollars to DBE's. Dallas awarded only slightly more than 1.3%. Clearly, given what we already know about the impact of these two districts, if Houston or Dallas was to increase the proportion of its prime dollars awarded to DBE firms this would strongly impact overall DBE participation in prime contracting.

As can be seen from a comparison of Tables 3.6 and 3.7, Childress is the only district other than Pharr or Abilene that awarded more than 10% of its prime dollars to DBE's. Childress awarded almost 11% of its total prime dollars to DBE firms—about $2.3 million over the four-year period. This result, however, is due partly yo the very small number of prime contracts awarded by Childress. Childress made only eight such awards during the four-year period, one of which was to a DBE firm for $2.3 million. Other districts with relatively high percentages of their prime dollars going to DBE firms were: Atlanta (6.7%), Wichita Falls (6%), Bryan (5.3%), Waco (4.8%), Tyler (3.7%), and Paris (3.3%). Districts with the lowest share of prime dollars going to DBE's include: Beaumont (2.2%), Amarillo (2%), Lufkin (1.7%), Dallas (1.3%), San Antonio (0.9%), El Paso (0.8%), Corpus Christi (0.6%), San Angelo (0.5%), Yoakum (0.4%), Houston (0.4%), and Austin (0.04%). Of course, Fort Worth, along with Lubbock, Odessa, and Brownwood, awarded zero prime dollars to DBE firms and therefore rank lowest overall.

Perhaps the most crucial observation to be made from this particular set of findings is to note how low some of the state's most important highway districts rank when measured by the proportion of their prime dollars being awarded to DBE's. Houston, by far the most influential of all districts, awarded less than one-half of one percent of its prime awards to DBE's. Dallas and San Antonio only awarded about 1% each of their prime dollars to DBE contractors. El Paso, Corpus Christi, Houston, and Austin all awarded less than 1% each. Austin's share appears especially low at 0.04%. Fort Worth's share of course was 0%. These six districts are the six largest in the state. Clearly, if they were to improve their DBE prime participation even marginally, this would have a profound impact on the overall prime DBE participation numbers.

Another important comparison is the distribution of DBE prime contract dollars between Anglo female-owned firms and minority-owned firms. As indicated previously, WBE's have a commanding presence among DBE prime contractors, followed by Hispanic contractors. As noted in chapter two, two-thirds of all DBE prime

contract dollars went to Anglo female-owned DBE's, while another 23% were awarded to Hispanic-owned firms. Table 3.9 shows that for Anglo women, the Abilene, Dallas, Beaumont, Tyler, and Bryan districts, taken together, accounted for just over 50% of all prime DBE dollars awarded to Anglo female DBE's. Indeed, the Abilene, Beaumont, Tyler, and Bryan districts awarded DBE prime contracts exclusively to Anglo females. In other words, these four districts made no prime awards to minority-owned DBE's during the study period. However, only two districts awarded more than 10% of their prime dollars to WBE's—Abilene and Childress, both relatively small districts.

Regarding minority-owned DBE's, only one district awarded more than 10% of its prime dollars to MBE's—Pharr. The Pharr district awarded almost 12% of its prime dollars—almost $19 million—to minority firms. As mentioned above, over 90% of these dollars went to Hispanic male-owned firms. After Pharr, the proportion of prime dollars awarded to MBE firms by district diminishes radically. Lufkin, the second-ranked district on this measure, awarded only 1.7% of its prime dollars to MBE's. Wichita Falls, number three, awarded only 1.4%. The next ten districts awarded less than 1% each. between. Of course, as noted above, 12 districts awarded nothing at all to MBE firms, including Bryan, Beaumont, and Fort Worth.

Both this chapter and the last chapter have shown the prevalence of WBE's to a large extent and Hispanic DBE's to a lesser extent among TxDOT's DBE prime contractors. TxDOT highway districts let only seven prime contract awards to DBE's owned by blacks, Asian/Pacific Islanders, or Native Americans during the four year study period. Blacks received two awards—one from the Lufkin district in FY88 and one from the Dallas district in FY90. These two contracts together totalled approximately $1.4 million and were made to different firms (both male-owned). Asian/Pacific Islander-owned DBE's received four prime contracts during the period. The Houston district made two of these awards, the Pharr district made one, and the El Paso district made one. Together, these four awards totalled almost $1.4 million and were awarded to the same firm (male-owned). Only one award was made during the period to a Native American-owned DBE (female-owned). The Wichita Falls district made this award in FY91 for roughly $900,000.

SUBCONTRACT AWARDS IN THE DISTRICTS—NUMBER OF AWARDS

Tables 3.8 and 3.9 present detailed participation information by district for each fiscal year between 1988 and 1991. TxDOT prime contractors made 7,135 subcontract

awards during the study period, an average of almost 1,800 per year. DBE subcontractors received 3,366 of these subcontracts, on average winning 842 awards per year. Thus, TxDOT's DBE subcontractors received on average over 47% of all subcontract awards during the period.

The Houston district alone was responsible for 1,958 subcontract awards during the period, or 27.4% of the total. Houston's share was highest in FY88 with almost 32% of the total, or 580 awards. Houston's share declined to about 25% in FY89 (454 awards), but rose to almost 28% by FY91 (463 awards). TxDOT's Houston contractors awarded 39.1% of these 1,958 subcontracts to DBE's. This share is much lower than the statewide average of 47.2%, placing Houston lowest among districts according to the share of subcontracts awarded to DBE's. Measured by *number* of subcontract awards however, Houston, with 766 over the entire study period, is the single most important district for DBE's.

Dallas, Fort Worth, San Antonio, Austin, Corpus Christi, and Pharr, respectively, are the next six largest districts according to total number of subcontracts awarded during the period. These districts correlate precisely with those receiving the most prime contract awards during the same period. This is not at all surprising, given the stability of the 23-24% subcontracting rate (See Table 3.4). These districts awarded 2,694 subcontracts—almost 38% of the total. For DBE subcontractors, the list is the same except that Fort Worth ranks first while Dallas is second. Prime contractors in these six districts awarded a total of 1,443 subcontracts to DBE's during the period—almost 43% of the DBE total. Fort Worth, Dallas, and San Antonio each awarded around 300 DBE subcontracts; Austin and Corpus Christi, about 200 each; and Pharr, 161.

Other districts with fairly large amounts of subcontracting during the period were Beaumont, Waco, and Yoakum, together contributing another 9% of the total. Almost all districts awarded at least 100 contracts during the period. Exceptions were Brownwood, Amarillo, Paris, and Childress. Brownwood and Amarillo each awarded about 75 subcontracts, while Paris awarded 63. Childress awarded only 20 subcontracts during the entire FY88–91 period. Other important districts for DBE's were Waco and Beaumont—each with over 100 awards. Almost all districts awarded at least 50 DBE subcontracts over the period. Exceptions were Amarillo, Paris, and Childress. Amarillo made 47 and Paris made 37. Childress made 10 DBE subcontract awards—exactly half of its total.

TABLE 3.8: Subcontract Awards by Highway District, FY88–FY91

District Name	No.	Subcontract Awards (number)							
		FY88		FY89		FY90		FY91	
		#	%	#	%	#	%	#	%
Paris	1	9	0.49	25	1.37	14	0.77	15	0.90
Fort Worth	2	156	8.49	138	7.58	156	8.62	155	9.29
Wichita Falls	3	56	3.05	12	0.66	41	2.27	26	1.56
Amarillo	4	30	1.63	15	0.82	24	1.33	6	0.36
Lubbock	5	49	2.67	31	1.70	26	1.44	16	0.96
Odessa	6	36	1.96	35	1.92	36	1.99	46	2.76
San Angelo	7	17	0.93	40	2.20	19	1.05	18	1.08
Abilene	8	17	0.93	28	1.54	33	1.82	19	1.14
Waco	9	52	2.83	47	2.58	59	3.26	41	2.46
Tyler	10	25	1.36	44	2.42	45	2.49	43	2.58
Lufkin	11	15	0.82	51	2.80	18	0.99	18	1.08
Houston	12	580	31.57	454	24.95	461	25.47	463	27.76
Yoakum	13	41	2.23	52	2.86	57	3.15	44	2.64
Austin	14	89	4.84	118	6.48	126	6.96	151	9.05
San Antonio	15	160	8.71	174	9.56	157	8.67	93	5.58
Corpus Christi	16	100	5.44	64	3.52	84	4.64	84	5.04
Bryan	17	40	2.18	44	2.42	46	2.54	37	2.22
Dallas	18	89	4.84	227	12.47	153	8.45	220	13.19
Atlanta	19	47	2.56	37	2.03	39	2.15	28	1.68
Beaumont	20	62	3.38	75	4.12	91	5.03	32	1.92
Pharr	21	90	4.90	58	3.19	84	4.64	62	3.72
Brownwood	23	18	0.98	27	1.48	17	0.94	15	0.90
El Paso	24	57	3.10	19	1.04	17	0.94	30	1.80
Childress	25	2	0.11	5	0.27	7	0.39	6	0.36
TOTAL		1,837	100.0	1,820	100.0	1,810	100.0	1,668	100.0

SOURCE: Lyndon B. Johnson School of Public Affairs (1993).

In 14 of 24 highway districts, DBE's received 50% or more of all subcontracts awarded during the period. DBE shares were highest in Brownwood, Waco, Amarillo, Corpus Christi, Abilene, and Lufkin. These districts each awarded over 60% of their total to DBE's. Other districts with 50% or greater shares included, in descending order, Atlanta, Paris, Lubbock, Tyler, San Angelo, Pharr, El Paso, and Childress. Houston posted the lowest DBE share, as already mentioned, at 39.1%. The situation, obviously, was reversed for non-DBE subcontractors. For non-DBE's, each of the following districts (in descending order) awarded 50% or more of their subcontract totals to non-DBE's: Houston, Yoakum, Dallas, Beaumont, Bryan, Wichita Falls, Austin, Odessa, San Antonio, and Fort Worth.

TABLE 3.9: DBE Subcontract Awards by Highway District, FY88–FY91

District Name	No.	DBE Subcontract Awards (number)							
		FY88		FY89		FY90		FY91	
		#	%	#	%	#	%	#	%
Paris	1	7	0.88	17	1.95	6	0.66	7	0.89
Fort Worth	2	77	9.70	70	8.04	73	8.00	77	9.76
Wichita Falls	3	20	2.52	5	0.57	22	2.41	12	1.52
Amarillo	4	16	2.02	7	0.80	18	1.97	6	0.76
Lubbock	5	26	3.27	19	2.18	16	1.75	10	1.27
Odessa	6	14	1.76	13	1.49	18	1.97	28	3.55
San Angelo	7	10	1.26	26	2.99	11	1.21	5	0.63
Abilene	8	8	1.01	21	2.41	20	2.19	10	1.27
Waco	9	35	4.41	26	2.99	36	3.95	28	3.55
Tyler	10	14	1.76	29	3.33	23	2.52	22	2.79
Lufkin	11	4	0.50	30	3.44	16	1.75	12	1.52
Houston	12	205	25.82	186	21.35	201	22.04	174	22.05
Yoakum	13	12	1.51	20	2.30	29	3.18	17	2.15
Austin	14	26	3.27	42	4.82	62	6.80	86	10.90
San Antonio	15	73	9.19	82	9.41	77	8.44	49	6.21
Corpus Christi	16	58	7.30	42	4.82	55	6.03	47	5.96
Bryan	17	7	0.88	20	2.30	26	2.85	19	2.41
Dallas	18	45	5.67	96	11.02	71	7.79	74	9.38
Atlanta	19	30	3.78	21	2.41	22	2.41	16	2.03
Beaumont	20	27	3.40	33	3.79	32	3.51	20	2.53
Pharr	21	46	5.79	30	3.44	46	5.04	39	4.94
Brownwood	23	9	1.13	23	2.64	13	1.43	11	1.39
El Paso	24	25	3.15	12	1.38	13	1.43	17	2.15
Childress	25	0	0.00	1	0.11	6	0.66	3	0.38
TOTAL		794	100.0	871	100.0	912	100.0	789	100.0

SOURCE: Lyndon B. Johnson School of Public Affairs (1993).

Although DBE's have a 50% or higher share in more districts than do non-DBE's, those districts in which non-DBE's receive the majority of awards include the five largest metropolitan areas in the state. If, on average, subcontract awards tend to be larger in the metropolitan districts, then DBE participation measured by the share of subcontract *dollars* will be lower than when measured according to the share of subcontract *awards*. This is indeed the case with the records in the SMS. Of the 50 largest subcontract awards in the database, districts other than Houston, Dallas, Fort Worth, San Antonio, and Austin awarded only four. Also, of these four awards, only one was made in a district where DBE's receive a greater than 50% share of subcontract awards. Thus, although DBE's receive over 47% of all subcontract awards, they receive—as we shall see in more detail below—only about 44.5% of all subcontract dollars.

As with prime contracts, this analysis also examines the differences in the number of subcontract awards received between WBE's and MBE's. WBE's won 54.2% of all subcontract awards during the period (1826/3366), and MBE's won 45.8%

(1540/3366). Houston accounted for 22.3% of all WBE awards and 23.2% of all MBE awards.

In relative terms, Brownwood, Atlanta, Pharr, Lufkin, Paris, Waco, and Corpus Christi were especially important districts to WBE's, awarding them between 33% and 40% of all subcontracts during the period. Ten more districts awarded WBE's between 20% and 30% of all subcontracts, and six more awarded them between 12% and 20%. Only one district, Childress, made less than 10% of its subcontract awards to WBE's. Childress made only one WBE award during the study period. The next lowest district, Amarillo, awarded 12.

Amarillo, Lubbock, Childress, El Paso, and Abilene awarded MBE's between one-third and one-half of all subcontract awards during the period. Eleven more districts awarded between 20% and 33% of their subcontracts to MBE's. Eight more awarded these firms between 12% and 20% of subcontract awards. All districts awarded MBE's at least 12% of all subcontracts during the period.

Among MBE's, Hispanic-owned firms are predominant. Of the 1,540 subcontract awards won by minority-owned DBE's during the study period, Hispanic-owned DBE's won 1,084 subcontracts—70.4% of the MBE total. The Houston district awarded Hispanic-owned DBE's 69.6% of the MBE total, San Antonio, 91.3%, Corpus Christi 91.2%, and Pharr, 95.7%. In comparison, Fort Worth awarded Hispanic-owned DBE's 57.3% of the MBE total while Austin awarded 61.2%, Dallas, 73.8%, and El Paso, 85.7%. El Paso and Lubbock both awarded more than one-third of all subcontract awards to Hispanic-owned DBE subcontractors. Six additional districts awarded approximately one-quarter of all subcontract awards to Hispanic-owned DBE's: San Antonio, Odessa, Corpus Christi , Abilene, Brownwood, and San Angelo. In contrast, Yoakum, Dallas, Paris, Beaumont, Atlanta, and Lufkin, all awarded less than 10% of all their subcontracts to Hispanic-owned DBE's.

Black-owned DBE subcontractors received 229 subcontracts during the study period—14.9% of the DBE total. Prime contractors in Houston awarded black-owned DBE's 19.7% of the DBE total for that district. Prime contractors in Beaumont awarded blacks 10.5% of the total. Tyler awarded 9.2%. Fort Worth, Waco, Atlanta, and Lufkin, awarded about 8% each. The following districts awarded fewer than 5 subcontracts each to black-owned DBE's during the period: Lubbock, Childress, San Antonio, El Paso, Odessa, Corpus Christi, Pharr, San Angelo, Yoakum, Paris, and Brownwood. All of these districts have relatively small black populations (See table 3.1). Relatively, blacks

DBE participation ranked higher in districts such as Lufkin, Childress, Tyler, and Atlanta. These districts awarded black subcontractors 10–15% of all subcontract awards. Larger districts with larger black populations had much lower participation levels for black DBE subcontractors. For example, Fort Worth awarded only 3.1% of its subcontracts to blacks. The figures for Houston, Austin, Dallas, San Antonio, and Corpus Christi are, respectively, 2.3%, 2.3%, 1.6%, 0.3%, 0.3%.

According to the 1990 census, Texas has the fourth-largest Asian/Pacific Islander population in the United States, up from fifth in 1980 (Barringer 1993, 112). In Texas, this population consisted of almost 320,000 persons in 1990. Asians have the larger presence in Texas, while Pacific Islanders account for less than 2.5% of the overall Asian/Pacific Islander population in the state. According to the Census Bureau (1992a, 30), the largest Asian groups in Texas are, in descending order, Vietnamese, Chinese, Asian Indian, Filipino, and Korean. About 80% of all Asians in the state belong to these groups (See also Table 3.2). The Asian/Pacific Islander population of Texas is concentrated in the state's largest metropolitan areas. The Houston district alone holds almost 41%, while Dallas has another 21%. The five most populous highway districts: Houston, Dallas, Fort Worth, San Antonio, and Austin contain over 83% of Asian in Texas.

Asian-owned DBE firms received 45 subcontract awards over the study period. This number represents 0.6% of all subcontract awards during the period, 1.3% of all DBE awards, and 2.9% of MBE awards. Austin, with 11 awards to Asian-owned DBE's, and Houston, with 8, top the list of districts awarding the most subcontracts to these firms. In relative terms, prime contractors in Austin awarded 2.3% of all subcontracts to Asian-owned DBE's. Houston awarded less than 0.5% percent to such firms. The other three largest districts *combined* awarded less than 0.5% to such firms.

Ten districts made zero subcontract awards to Asian-owned firms during the period: Beaumont, Tyler, Atlanta, Lufkin, Dallas, Bryan, Wichita Falls, Corpus Christi, San Angelo, and Paris. The remaining districts awarded between one and four subcontracts each to Asian-owned DBE firms. Relatively, Childress stands out from other districts awarding 10% of its subcontracts to Asian DBE's. In part, however, the large percentage figure in Childress is due to the small base upon which it is calculated. Since the Childress district made a total of 20 sub awards over the period, its 10% Asian DBE share is accounted for by just two subcontract awards.

Texas has the eighth largest Native American population in the nation, and the seventh largest American Indian population. The state's Native American population, which stood as 65,877 in 1990, consists almost entirely of American Indians. According to the 1990 census (1992a, 30), only 1,528 Eskimos and Aleuts lived in the state (See also Table 3.2). Almost 20% of Native Americans living in Texas reside in the Dallas district, while 61% live in the five most populous districts.

Native American-owned DBE's received 107 subcontracts during the study period—with Houston and Dallas responsible for almost half of the total. Five districts awarded between 5 and 10 awards each: Austin, Dallas, Paris, Tyler, and Corpus Christi. Eleven more awarded less than five each. Six districts made no awards to Native American-owned DBE firms during the period: Brownwood, El Paso, Pharr, Atlanta, Wichita Falls, and San Angelo.

From a percentage standpoint, the Paris district, with eight awards to Native-American-owned DBE's had the largest share: 12.7% of all subcontracts awarded in the district during the period. Six additional districts awarded between 2% and 5% of all their subcontracts to Native American-owned DBE's: Childress, Lubbock, Tyler, Fort Worth, Amarillo, and Yoakum. Houston, Austin, Dallas, and San Antonio each awarded less than 2% to such firms.

SUBCONTRACT AWARDS IN THE DISTRICTS—DOLLAR VALUE OF AWARDS

Table 3.10 shows that TxDOT's prime contractors awarded approximately $1.16 billion dollars worth of highway construction subcontracting work during the FY88 to FY91 period. The total number of dollars subcontracted dropped from $319 million in FY88 to $254 million in FY91. This represents a decline of more than 20%. A similar drop in prime contract dollars awarded by the Department over the same period, however, largely explains the drop in subcontract dollars (See chapter two). In other words prime contract dollars and subcontract dollars declined in tandem, leaving the ratio of subcontract to prime contract dollars essentially constant in the range of 23%–24%.

TABLE 3.10: Subcontract Dollars by Highway District, FY88–FY91

District Name	No.	Subcontract Dollars (millions)							
		FY88		FY89		FY90		FY91	
		$	%	$	%	$	%	$	%
Paris	1	2.1	0.66	5.1	1.69	3.1	1.09	2.0	0.78
Fort Worth	2	30.6	9.59	19.1	6.25	33.2	11.72	29.2	11.52
Wichita Falls	3	11.7	3.66	0.6	0.18	2.5	0.88	1.3	0.53
Amarillo	4	5.7	1.80	0.8	0.25	1.9	0.66	0.7	0.28
Lubbock	5	7.9	2.49	5.3	1.74	6.6	2.33	3.4	1.35
Odessa	6	4.6	1.45	2.0	0.67	3.1	1.11	5.0	1.98
San Angelo	7	2.8	0.86	5.1	1.69	2.6	0.91	1.9	0.73
Abilene	8	3.5	1.09	4.1	1.35	3.0	1.06	6.3	2.47
Waco	9	6.3	1.97	6.1	2.00	5.4	1.92	3.3	1.30
Tyler	10	5.4	1.70	11.2	3.68	4.4	1.56	8.3	3.28
Lufkin	11	3.0	0.94	5.2	1.72	1.7	0.61	2.4	0.94
Houston	12	106.7	33.41	130.0	42.58	69.6	24.58	87.9	34.64
Yoakum	13	8.9	2.77	6.8	2.24	4.3	1.52	3.6	1.42
Austin	14	26.2	8.20	10.4	3.40	26.2	9.26	13.8	5.44
San Antonio	15	23.1	7.22	16.3	5.34	21.9	7.74	19.9	7.83
Corpus Christi	16	14.9	4.67	3.1	1.01	5.9	2.09	5.6	2.23
Bryan	17	4.3	1.35	4.2	1.39	4.8	1.69	4.6	1.80
Dallas	18	10.7	3.36	39.2	12.83	39.5	13.95	31.4	12.38
Atlanta	19	6.1	1.90	5.0	1.63	2.1	0.73	2.1	0.84
Beaumont	20	8.1	2.53	13.0	4.26	26.4	9.34	3.5	1.37
Pharr	21	5.8	1.81	8.2	2.69	12.4	4.39	6.8	2.70
Brownwood	23	2.3	0.72	1.7	0.54	0.8	0.28	1.7	0.67
El Paso	24	18.2	5.71	2.3	0.77	1.1	0.39	6.2	2.44
Childress	25	0.5	0.14	0.4	0.12	0.6	0.20	2.8	1.09
TOTAL		319.2	100.0	305.2	100.0	282.9	100.0	253.7	100.0

SOURCE: Lyndon B. Johnson School of Public Affairs (1993).

Furthermore, the decline in subcontract dollars was not uniform across districts. Several districts experienced relatively large declines during the period. Wichita Falls and Amarillo, especially, experienced the largest declines. Other districts that also had large relative declines include: El Paso, Corpus Christi, Atlanta, Yoakum, Lubbock, Austin, and Waco. Other districts had relatively smaller declines, including Paris, Fort Worth, San Antonio, Houston, Lufkin, San Angelo, Beaumont, and Brownwood. Only a few districts had increases during the period. Childress saw a larger relative increase. Dallas, Abilene, and Tyler experienced increases as well. Also, Pharr, Odessa, and Bryan each experienced modest rates of growth during the period.

Although DBE subcontracting did not experience the strong declines that non-DBE subcontractors experienced, noticeable shifts occurred in the distribution of DBE subcontract dollars across districts. These shifts were largely offsetting, however, leaving the overall DBE subcontractor dollar volumes essentially unchanged. Districts experiencing strong growth in DBE participation over the study period include

Childress, Lufkin, Brownwood, Abilene, Dallas, Fort Worth, and Austin. Bryan, Pharr, Odessa, Beaumont, Tyler, and Houston also saw modest increases. In contrast, districts such as Wichita Falls, Yoakum, Corpus Christi, Amarillo, Atlanta, San Angelo, and Paris all experienced large declines in DBE subcontract dollar volume. El Paso, Lubbock, San Antonio, and Waco also experienced smaller declines.

The stability of *statewide* DBE subcontract volume during the period largely explains the increase in the relative position of DBE subcontractors for the same period as noted in chapter two. Chapter two showed that the DBE share of total subcontract dollars grew from 39% in FY88 to 49.5% in FY91.

Over the study period, Houston awarded the largest dollar volume of subcontracts—over one-third of the total or $394.1 million. Dallas awarded $120.7 million, Fort Worth, $112.1 million, San Antonio $81.1 million, and Austin, $76.6 million. These four districts combined contributed another third, while the other 19 districts account for the final third. After the top five, only one district awarded more than $50 million in subcontracts during the period—Beaumont, with $51 million. Four more districts awarded $25 million to $50 million each: Pharr, $33.3 million, Corpus Christi, $29.5 million, Tyler, $29.4 million, and El Paso, with $27.9 million. Yoakum, Lubbock, Waco, Bryan, Abilene, Wichita Falls, and Atlanta each made awards totaling $15 million to $25 million each during the period. Lufkin, San Angelo, Paris, Amarillo, Brownwood, and Childress all awarded less than $15 million over the period. Childress awarded the smallest amount—$4.2 million.

For DBE subcontractors, who received a total of $516.9 million during the period, Houston's importance was even stronger. Houston awarded $201.5 million in DBE subcontracts during the period—39% of the total. San Antonio, with $43 million, Dallas, with $40.9 million, Fort Worth, with $37.5 million, and Austin, with $24.4 million, together awarded 28.2% of all DBE subcontracts for a total of almost $146 million. As happened with subcontract dollars overall, these five districts awarded two-thirds of all DBE subcontract dollars. Six districts awarded $10 million to $20 million each in DBE subcontracts over the period: Beaumont, $19.8 million, Corpus Christi, $18.3 million, Tyler, $15.4 million, Lubbock, $14.8, Pharr. $13 million, and El Paso, $11.8 million.

Districts awarding the largest shares of their respective subcontract dollars to DBE's were Lubbock, 64%, Corpus Christi, 62%, Atlanta, 55%, San Antonio, 53%, Tyler, 52%, Brownwood, 52%, and Houston, with 51%. Districts awarding the largest shares of their respective subcontract dollars to non-DBE's were Childress, 78%, Odessa, 72%,

Austin, 68%, Fort Worth, 67%, and Dallas, with 66%. Along with these districts, five more districts awarded more than 60% of all subcontract dollars to non-DBE's: Yoakum, Wichita Falls, Beaumont, Pharr, and San Angelo. Waco, El Paso, Paris, Bryan, Abilene, Amarillo, and Lufkin each awarded 50%–60% of all subcontract dollars to non-DBE's.

TABLE 3.11: DBE Subcontract Dollars by Highway District, FY88–FY91

District Name	No.	DBE Subcontract Dollars (millions)							
		FY88		FY89		FY90		FY91	
		$	%	$	%	$	%	$	%
Paris	1	1.6	1.30	2.2	1.57	0.9	0.69	0.6	0.45
Fort Worth	2	7.9	6.34	4.4	3.21	11.5	8.89	13.7	10.90
Wichita Falls	3	4.2	3.33	0.4	0.28	1.1	0.86	0.4	0.35
Amarillo	4	2.0	1.57	0.4	0.27	1.3	1.03	0.7	0.56
Lubbock	5	3.7	2.92	3.4	2.52	5.1	3.98	2.6	2.04
Odessa	6	1.0	0.80	0.5	0.40	1.4	1.09	1.2	0.98
San Angelo	7	1.3	1.07	2.1	1.52	1.2	0.94	0.2	0.16
Abilene	8	1.3	1.01	1.9	1.40	1.8	1.41	2.6	2.09
Waco	9	2.2	1.73	1.7	1.21	2.9	2.22	2.1	1.64
Tyler	10	3.1	2.47	7.0	5.11	1.9	1.46	3.4	2.71
Lufkin	11	0.5	0.42	2.1	1.55	1.5	1.16	1.9	1.54
Houston	12	47.0	37.56	67.6	49.35	37.6	29.09	49.3	39.29
Yoakum	13	4.2	3.37	2.1	1.54	1.4	1.10	0.8	0.63
Austin	14	3.0	2.43	3.8	2.79	11.5	8.92	6.0	4.77
San Antonio	15	13.6	10.91	9.9	7.23	7.7	5.97	11.7	9.36
Corpus Christi	16	9.4	7.53	2.1	1.51	3.7	2.88	3.1	2.49
Bryan	17	1.2	0.94	1.8	1.28	3.2	2.49	1.9	1.49
Dallas	18	3.7	2.94	10.9	7.99	16.3	12.59	10.0	7.99
Atlanta	19	3.7	2.92	2.4	1.78	1.1	0.84	1.2	0.99
Beaumont	20	2.3	1.85	5.0	3.65	9.5	7.38	3.0	2.38
Pharr	21	2.1	1.66	3.4	2.49	4.5	3.47	3.0	2.38
Brownwood	23	0.6	0.45	0.9	0.64	0.7	0.54	1.2	0.96
El Paso	24	5.6	4.45	0.9	0.67	0.8	0.65	4.4	3.54
Childress	25	0.0	0.00	0.1	0.05	0.5	0.36	0.4	0.32
TOTAL		125.1	100.0	137.0	100.0	129.3	100.0	125.5	100.0

SOURCE: Lyndon B. Johnson School of Public Affairs (1993).

The previous section showed that WBE's dominate DBE subcontracting when the participation measure used is the number of awards. On the basis of this measure, WBE's won 54.2% of all DBE awards during the period, When using the dollar volume of awards as a participation measure, however, WBE performance is more modest. TxDOT prime contractors awarded WBE's slightly more than 31% of all DBE subcontract dollars during the study period, or $161.5 million. As with prime contractors, WBE's appear to be performing large numbers of smaller-than-average subcontracts. The average value of WBE subcontracts during the period was $88,445, compared to an overall DBE average of $153,565.

Houston awarded more than 30% of all WBE dollars during the study period, $49 million, followed by Dallas, $19.6 million, Fort Worth, $15.5 million, San Antonio, $10.3 million, and Austin, with $7.7 million. These five districts together accounted for somewhat less than two-thirds of overall WBE subcontract dollars, indicating that the distribution of WBE dollars is somewhat more dispersed than for other types of DBE's. All districts except Childress awarded at least $1 million to WBE subcontractors during the period.

TxDOT prime contractors in Brownwood and Atlanta each awarded more than one-third of all their subcontract dollars to WBE's. Paris and Lufkin each awarded WBE's over one-fourth of the their totals. TxDOT prime contractors in Bryan, San Angelo, Tyler, and Waco, awarded WBE's more than one-fifth of subcontract dollars. WBE's experienced lower amounts in the Childress, El Paso, Lubbock, Wichita Falls, and Yoakum districts. Each of these districts awarded less than 10% of total subcontract dollars to WBE's. Childress, the lowest, awarded 1.2%.

MBE subcontractors won a total of $355.4 million over the period. Of this total amount, $263.9 million, or 67%, went to Hispanic-owned MBE's. This latter amount represents 45.8% of the DBE subcontract total, and almost 23% of the overall subcontract total. The Houston district alone is responsible for 40.6% of all Hispanic DBE subcontract dollars during this period. San Antonio ranks a distant second with just over 12% of the total. The Dallas and Fort Worth districts are also of somewhat disproportionate importance to Hispanic-owned DBE subcontract dollars.

Other types of MBE's account for the remaining one-third. Blacks won a total of $37.1 million or 10.4% of the MBE total. This amount is equivalent to 7.2% of the DBE total, and 3.2% of the overall subcontract total. Asian-owned DBE's won $11.2 million—3.2% of the MBE total. This amount is equal to 2.2% of the DBE total and just under 1% of the overall subcontract total. Native American-owned DBE's won $30.6 million in subcontract awards over the period, an amount equivalent to 8.6% of the MBE total, 5.9% of the DBE total, and 2.6% of the overall subcontract total.

For black-owned DBE's Houston is the most important district, having awarded 42% of all black subcontract dollars during the period. After Houston, the next most important districts for overall subcontract dollars were Tyler, $3.34 million, Atlanta, $2.44 million, Lufkin, $2.01 million, Fort Worth, $1.98 million, and Waco, with $1.97 million. Lufkin and Atlanta also stand out when considered according to the largest share of district DBE subcontract dollars going to black firms. TxDOT prime contractors

in each district awarded over 16% of their subcontract dollars to blacks during the period. Three other districts, Tyler, Bryan, and Waco, each awarded black DBE's between 9% and 12% of total subcontract dollars awarded. Fort Worth awarded 1.8% of all subcontract dollars to black DBE's. Dallas awarded 1.1%. San Antonio awarded 0.6% of its total to blacks. Corpus Christi and Pharr each awarded black-owned DBE firms less than 0.15%.

Combined, the Houston district, with $5.23 million, and the Austin district, with $3.58 million, awarded almost 80% of all Asian-owned DBE subcontract dollars during the period. No other district awarded more than $650,000 to Asian-owned DBE's, and the same ten districts, listed earlier, made no awards at all to Asians. Districts with Asian-owned DBE participation include Childress, 6.6%, Austin, 4.7%, Brownwood, 2.5%, El Paso, 2.3%, and Amarillo, with 2.0%. Houston awarded 1.3% of its subcontract dollars to Asians, San Antonio awarded 0.3%, and Fort Worth awarded 0.04%.

Native American-owned DBE firms received almost 60% of their subcontract dollars from Houston—$18.06 million. Fort Worth, with $4.5 million, contributed another 15%. Five more districts made at least $1 million in awards: Austin, Lubbock, Yoakum, Dallas, and Tyler. As noted earlier, six districts made no awards to Native American-owned DBE firms. At between 4%-5% each, Lubbock, Houston, Paris, Yoakum, and Fort Worth all awarded relatively large shares of total subcontract dollars to Native American firms. Dallas awarded 0.9% of its total to such firms. San Antonio awarded 0.2% and Austin awarded 1.8%.

SUBCONTRACT AWARDS IN THE DISTRICTS—SUMMARY STATISTICS

Table 3.12 presents information on average subcontract award sizes for each district. These data cover the FY88 to FY91 period. Statewide, the average subcontract award was valued at $162,727. Average subcontract values fluctuated significantly across districts. The district with the smallest average subcontract size was Brownwood with $83,519. The Corpus Christi and Odessa districts also had average award sizes below $100,000. The district with the largest average subcontract award size was El Paso with $226,442. The Houston and Childress districts also had average award sizes above $200,000. Of the five largest highway districts in the state, San Antonio had the smallest average award size—$138,880 and Houston had the largest.

The average DBE subcontract award was $153,576. This was about 6% smaller than overall average subcontract award size. The average values of DBE subcontracts

also fluctuated across districts. Odessa was the district with the smallest average DBE subcontract award size—$57,394, or less than 60% of its overall subcontract award size. Other districts with average DBE subcontract award sizes below $100,000 include from lowest to highest Waco, Amarillo, San Angelo, Childress, Brownwood, Pharr, Corpus Christi, Atlanta, and Lufkin. The district with the largest average DBE award was Houston. Houston's average DBE subcontract award size was $263,116 over the period. This is almost 31% larger than Houston's overall average subcontract award size. Lubbock also had an average DBE subcontract award size greater than $200,000. In addition, Tyler, Beaumont, and El Paso had relatively high average DBE subcontract values of between $175,000 and $177,000.

Statewide, the average value of WBE subcontract awards is only 54% of the overall subcontract award average. Furthermore, it is only 38% of the average MBE subcontract award. This finding is consistent with our previous observations that WBE predominance among DBE's is (a) stronger when measured by number of awards than when measured by dollar value of awards and (b) fueled by the performance of relatively large numbers of contracts being performed at below average contract values.

The highest average WBE subcontract awards were in the Paris district. WBE awards in Paris were worth an average of $157,932. Other districts with relatively high average WBE award sizes include Tyler at $142,463, and Houston at $120,030. Pharr had the lowest average WBE subcontract award sizes. WBE subcontracts in Pharr were worth an average of $39,311. Other districts with relatively low average WBE award sizes include Yoakum, Corpus Christi, Wichita Falls, and Childress.

TABLE 3.12: Average Subcontract Award Sizes by District, FY88–FY91 (dollars)

	No.	All Subs	DBE Subs	MBE Subs	WBE Subs	HBE Subs	BBE Subs	ABE Subs	NBE Subs
Paris	1	195,382	141,614	111,489	157,932	218,394	13,225	0	70,319
Fort Worth	2	185,218	126,291	200,199	82,816	234,586	104,473	42,160	249,821
Wichita Falls	3	119,006	103,453	149,418	45,113	152,346	30,708	0	0
Amarillo	4	120,989	92,874	93,217	91,876	102,285	83,055	92,260	20,923
Lubbock	5	190,651	208,463	238,086	97,871	254,996	88,387	26,439	300,503
Odessa	6	97,001	57,394	52,912	66,000	55,512	24,440	22,260	143,344
San Angelo	7	131,105	92,798	82,867	101,310	85,296	26,997	0	0
Abilene	8	173,831	129,399	155,926	95,729	173,290	104,452	127,778	104,343
Waco	9	106,047	69,975	79,788	61,750	65,513	103,793	28,380	137,803
Tyler	10	187,295	174,954	207,445	142,463	266,216	158,814	0	200,125
Lufkin	11	120,992	98,226	105,153	94,142	76,341	118,503	0	22,264
Houston	12	201,259	263,116	426,186	120,030	430,787	348,978	653,580	547,355
Yoakum	13	121,645	109,624	220,944	43,741	267,425	19,145	114,250	258,662
Austin	14	158,202	112,869	161,520	68,524	146,509	159,143	325,431	155,781
San Antonio	15	138,880	153,103	190,287	94,427	202,249	224,997	221,444	45,577
Corpus Christi	16	88,971	90,790	147,545	44,262	149,685	41,558	0	181,169
Bryan	17	107,079	111,428	128,400	99,304	98,479	219,944	0	24,398
Dallas	18	175,253	143,088	253,262	97,273	292,225	116,530	0	127,581
Atlanta	19	100,844	94,653	112,497	86,883	57,688	135,833	0	0
Beaumont	20	196,056	177,152	334,380	82,815	767,808	93,309	0	35,375
Pharr	21	113,127	80,478	180,328	39,311	182,048	34,560	248,709	0
Brownwood	23	83,519	59,617	43,349	70,956	44,040	0	40,065	0
El Paso	24	226,442	175,591	211,152	78,787	227,215	18,423	210,716	0
Childress	25	207,888	92,699	97,261	51,641	67,630	91,387	136,147	126,000
TOTAL		162,727	153,576	230,806	88,443	243,457	161,965	248,200	285,960

SOURCE: Lyndon B. Johnson School of Public Affairs (1993).

NOTES: HBE = Hispanic-owned DBE; BBE = Black-owned DBE; ABE = Asian-owned DBE; NBE = Native American-owned DBE.

Average values of MBE subcontracts were higher than for WBE's in most cases. Statewide, the average MBE subcontract award was worth $230,806—almost 42% higher than the overall average subcontract value of $162,727. Six districts had average MBE subcontract values greater than $200,000. In descending order they are Dallas, Lubbock, Yoakum, El Paso, Tyler, and Fort Worth. The district with the smallest average value was Brownwood, with $43,349, followed by Odessa, with $52,912. Other districts with average values below $100,000 include in descending order Childress, Amarillo, San Angelo, and Waco.

Statewide, Hispanic-owned DBE's (HBE) won subcontracts valued at an average of $243,457, slightly higher than the average for MBE's overall. The average value of HBE subcontracts in some districts was very high. Beaumont, in particular, recorded an average HBE subcontract value of $767,808 over the period. Houston recorded an average value of $430,787 for Hispanic subcontractors. Dallas awarded HBE's subcontracts averaging $292,225. Districts with low average HBE subcontract values include Brownwood, Odessa, Atlanta, Waco, Childress, Lufkin, and San Angelo.

Statewide, black-owned DBE subcontractors (BBE) won awards with an average value of $161,965 over the study period. Districts awarding some of the highest average values to BBE's include Houston with $348,973, San Antonio with $224,997, and Bryan with $219,994. Districts with relatively small average award sizes for BBE's include Brownwood, $0, Paris, $13,225, El Paso, $18,423, Yoakum, $19,145, Odessa, $24,440, San Angelo, $26,997, Wichita Falls, $30,708, Pharr, $34,560, and Corpus Christi, with $41,558.

Statewide, subcontracts won by Asian-owned DBE's (ABE) had an average value of $248,200. This was almost 62% higher than average DBE awards overall. Also, this average was achieved even though ten districts made no subcontract awards at all to ABE's. The average ABE subcontract award in Houston was $653,530. In Austin the figure was $325,431. Other districts with high average levels include San Antonio, with $221,444, and El Paso with $210,716. In Odessa, Lubbock, Waco, and Brownwood, average award values to ABE's were all less than about $40,000.

The average subcontract award for Native American-owned DBE's (NBE) was worth $285,960 during the study period. This average is more than 86% larger than the average DBE subcontract. Too, in six districts TxDOT prime contractors made no awards to NBE subcontractors. The largest NBE awards were made in Houston. These awards had an average value of $547,355. Other districts with relatively large average award sizes include Lubbock, with $300,503, Yoakum, with $258,662, Fort Worth, with $249,821, and Tyler, with $200,125. Five districts awarded NBE subcontracts with average amounts of less than $50,000. In descending order, these are, San Antonio, Beaumont, Bryan, Lufkin, and Amarillo.

CHAPTER FOUR: SUPPLEMENTARY FINDINGS

This chapter includes several analyses intended to complement, extend, and corroborate the findings from previous chapters. The first section presents statewide SMS data disaggregated according to source of funding. This section provides valuable insight into differences in DBE participation between federally funded and state-funded highway contracts. The second section presents detailed data from TxDOT's DBE program compliance reports to FHWA. This section provides, among other things, further insight into DBE participation by work category and DBE participation prior to the 1985-1986 period. The final section of the chapter presents data from TxDOT's Small Business Assistance Act of 1975 compliance reports. This section extends the analysis to cover TxDOT contracting and procurement in areas outside highway construction proper. These reports also extend back to late 1985 and include contracts and procurements for maintenance, professional services, commodities, and other services.

FEDERALLY-FUNDED VERSUS STATE-FUNDED AWARDS

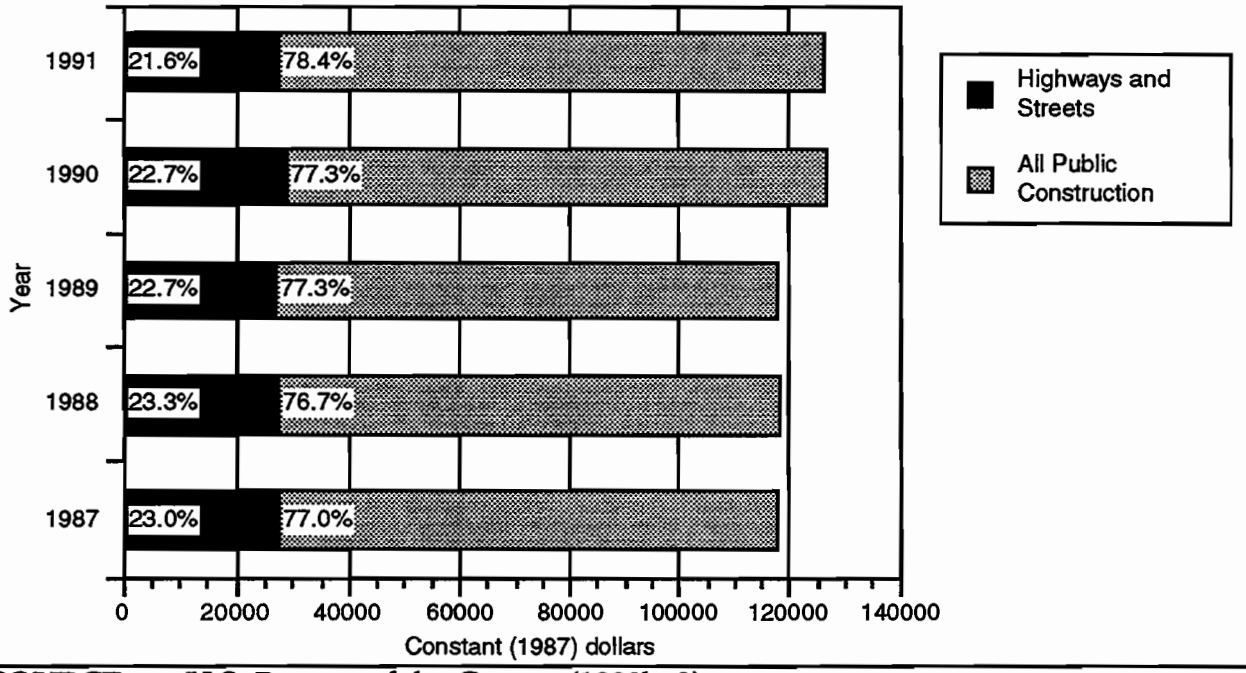
Construction and maintenance of highways and streets constitute the single largest component of publicly owned construction contracting in the United States today, accounting for 22-23% of all new public construction each year (See Figure 4.1). The U.S. Department of Transportation's Federal-Aid Highway Program is responsible for roughly half of this amount, while the remainder comes generally from states and their component localities and municipalities.

The Federal-Aid Highway Program, administered by the Federal Highway Administration (FHWA), spends about $14 billion per year and is, according to the U.S. Department of Commerce (1992, 5-10), "by far the largest public works program in the United States." The State of Texas, with its vast network of highways, bridges, and roads, has been a major recipient of these funds. TxDOT received almost $1 billion in federal-aid funding in FY89 and projects that it will receive more than $1.3 billion in FY94 and FY95 (See Table 4.1).

The Department receives federal funds from several agencies, including the FHWA, the Urban Mass Transit Administration, the National Highway Safety Administration, and the U.S. Army Corps of Engineers (Texas Sunset Advisory Commission 1990, 7). The FHWA is by far the largest source of federal funding for the

Department. On the other hand, federal funds are not the most important revenue source for TxDOT.

FIGURE 4.1: Annual Value of New Public Construction Put in Place, 1987–1991



SOURCE: U.S. Bureau of the Census (1992b, 3).

Table 4.1 shows that the Department's largest revenue source is the State Highway Fund. Sales taxes on motor fuels and lubricants provide revenue for this fund. The Department also receives revenues from state funds financed chiefly by motor vehicle registration and title fees. Combined, these state funds contribute between three-fifths and two-thirds of the Department's annual budget, with the remainder coming from the federal government.

TxDOT spends between $1 and $2 billion of its entire budget each fiscal year contracting with the private sector to build and maintain the State's surface transportation system (See Table 1.1 above). There are three primary ways in which these contracts are funded: federal funds only, joint federal-state funding, and state funds only. These three different funding sources are referred to as "federal", "joint", and "state", respectively.[26] Later in this chapter reference is made to the "federally assisted" portion. This includes all "federal" as well as the federal portion of "joint."

TABLE 4.1: Major Sources of TxDOT Revenue, Amounts and Percentages, Fiscal Years 1989, 1994, and 1995)

	FY89 (actual)	FY89 %	FY94 (requested)	FY94 %	FY95 (requested)	FY95 %
State Highway Fund	1,779,792,810	66.3%	1,850,855,475	58.3%	1,836,440,471	59.3%
Other State Funds	168,692,495	6.3%	18,969,569	0.6%	5,249,562	0.2%
Total State Funds	1,948,485,305	72.6%	1,869,825,044	58.9%	1,841,690,033	59.4%
Estimated Federal Funds	929,000,000	34.6%	1,305,016,585	41.1%	1,256,061,831	40.6%
TOTAL FINANCING	2,683,000,000	100.0%	3,174,841,629	100.0%	3,097,751,864	100.0%

SOURCE: FY89: Texas Sunset Advisory Commission (1990, 7–8); FY94–95: Texas Legislative Budget Board (1993, I-286).

Table 4.2 shows that, during the period under study, the federal government funded almost 43% of the prime contract dollars in the SMS database. Another one-third was funded jointly, and about 23% was funded with state monies. Table 4.2 also shows that the respective annual shares from each of these three sources have varied substantially during this period.

A majority of prime contract funding involves either strictly federal or joint federal-state funding, and thereby falls under the mandatory 10% DBE federal-funds participation guidelines contained in STURAA and ISTEA. The remainder involves state funds only, and is not subject to the federal DBE program requirements. As demonstrated below, contracts funded with strictly state funds exhibit significantly lower DBE participation than federally assisted contracts.

The second significant finding is that the combined federal and joint share has increased substantially over the period—thus widening the reach of the federal DBE program and, consequently, narrowing that of any state-funds DBE program. The federal share has increased during the period under study, while the jointly funded and state-funded shares have decreased. On net, the combined federal and joint shares of funding have increased from 70 percent in fiscal year 1987 to almost 82 percent in fiscal year 1992.

Table 4.3 presents levels of participation by DBE subcontractors on TxDOT prime construction contracts, arrayed by funding source and fiscal year quarter. The data show that levels of DBE participation on federally and jointly funded contracts generally meet or exceed the 10% federal goal while participation levels on state-funded

contracts have been far below 10% in all but fiscal year 1992. However, participation in state-funded contracts has increased substantially over the period, reflecting, at least in part, the Department's decision to extend the federal goals to the state-portion of jointly funded federal-aid contracts. This upward trend may also reflect the efforts of the Texas Legislature during recent sessions to encourage TxDOT to extend its DBE program to state-funded highway contracts. Departmental officials estimate that they made the decision to extend the federal goals to the state-funds portion of jointly funded awards around mid-1991. However, the data indicate the change occurred around mid-1990. The Texas Sunset Advisory Commission (1993, 64) also reports that this change occurred prior sometime in 1990.

TABLE 4.2: Total SMS Prime Contract Dollars, By Source of Funding, FY87pt.–FY92pt.

	Total SMS Funds		Federal Funds	Joint Funds	State Funds
Fiscal Year	Dollars	Percent	Percent	Percent	Percent
FY87pt.	1,012,452,788	100.0%	34.5%	35.2%	30.3%
FY88	1,401,481,621	100.0%	18.8%	44.4%	36.9%
FY89	1,288,075,881	100.0%	35.9%	51.8%	12.3%
FY90	1,240,795,146	100.0%	57.5%	20.6%	21.9%
FY91	1,045,350,581	100.0%	61.4%	21.9%	16.7%
FY92pt.	732,943,361	100.0%	60.9%	20.9%	18.2%
TOTAL	6,721,099,377	100.0%	42.8%	34.0%	23.2%

SOURCE: Lyndon B. Johnson School of Public Affairs (1993).

The next section contains a closer examination of the federal side of TxDOT's DBE program. As mentioned in chapter one, the FHWA requires TxDOT to report its compliance with the 10% federal DBE goal on a quarterly basis. This particular information source complements, extends, and reinforces earlier observations.

TABLE 4.3: DBE Subcontract Participation, By Type of Funding, FY87, Qtr. 2–FY92, Qtr. 3

	DBE Subcontract Participation (as a percentage of total subcontract dollars) According to Primary Funding Source		
Fiscal Year Quarter	Federal	Joint	State
FY87Q2	12.1	6.6	1.9
FY87Q3	8.6	8.1	3.4
FY87Q4	10.2	7.1	5.6
FY88Q1	12.2	12.4	4.2
FY88Q2	11.0	8.0	3.3
FY88Q3	13.9	10.2	6.8
FY88Q4	12.2	10.0	9.9
FY89Q1	13.5	7.5	3.2
FY89Q2	9.2	8.8	2.1
FY89Q3	11.6	10.6	5.9
FY89Q4	13.4	12.5	4.9
FY90Q1	9.9	9.5	5.3
FY90Q2	11.6	14.8	2.5
FY90Q3	10.6	14.7	8.7
FY90Q4	13.1	9.1	9.4
FY91Q1	15.2	13.0	7.1
FY91Q2	13.1	8.3	7.3
FY91Q3	13.2	12.6	7.8
FY91Q4	11.9	11.6	8.1
FY92Q1	12.3	13.7	10.5
FY92Q2	13.9	9.8	10.7
FY92Q3	6.2	10.5	9.8

SOURCE: Lyndon B. Johnson School of Public Affairs, 1993.

FINDINGS FROM TXDOT FHWA COMPLIANCE REPORTS

As mentioned in chapter one, this analysis is based on the Department's FHWA compliance reports from the first quarter of federal fiscal year 1985 to the third quarter of 1993.[27] The federal fiscal year begins October 1 and ends September 30. The reports include data on the number and dollar amounts of overall prime contract awards, and the number and dollar amount of DBE prime contract awards, subcontract awards, and subcontract commitments. The reports aggregate data according to DBE type and type

of work awarded. They also present limited data for female minority-owned DBE's versus nonminority female-owned DBE's, and for subcontract commitments versus subcontract awards.[28] Table 4.4 presents the types of work included in the federal compliance reports.

TABLE 4.4: Work Categories Reported in Federal DBE Compliance Reports

Professional Services—Engineering	Construction—Grading & Drainage
Professional Services—Architectural	Construction—Paving
Professional Services—Accounting*	Construction—Structures/Buildings
Professional Services—Right-of-Way	Construction—Materials
Professional Services—Other	Construction—Equipment
Supplies—Fuel*	Construction—Equipment
Supplies—Other*	Construction—Trucking
Equipment—Leasing*	Construction—Traffic Control
Equipment—Purchase*	Construction—Landscaping
Equipment—Other*	Construction—Other
Other*	

NOTE: *Not applicable to the FHWA as of 3rd Quarter FY 1992.

It is important to note that the FHWA DBE program is mandatory only for the federal portion of federal-aid highway contracts. Although the Department has voluntarily extended the 10% goal to apply to the state-funded share as well (Texas Sunset Advisory Commission 1990, 64), it does not include this information in the quarterly reports.

Important to note is that although there is substantial overlap between the federal compliance data and the SMS data, they are not the same. The federal compliance reports, as mentioned, include only the federal contribution to those TxDOT contracts receiving federal or joint funding, while the SMS data also includes the state contribution to jointly funded contracts as well as contracts receiving strictly state funds. On the other hand, the federal compliance reports include prime contracts awarded to DBE's on which no subcontract awards were made. As noted previously, the SMS database excludes these types of prime contracts.

The FHWA compliance data serve to complement and reinforce the primary analyses presented above. These data provide better insight into DBE participation by work category than the SMS data affords. They also provide DBE participation information for the 1985-86 period that was not available from the SMS. Too, they

provide an opportunity to examine differences in participation between female minority-owned DBE's and Anglo female-owned DBE's.

Tables 4.5 through 4.16 present summary information for FY85–FY92 from the FHWA compliance reports. These tables present data for the dollar volume and number of prime contract and subcontract awards as well as for the average award size. The tables present data according to DBE status (prime contract versus subcontract, minority-owned versus woman-owned) and according to race, ethnicity, and sex. Data is also presented on the number and distribution of DBE, MBE, and WBE awards by type of work.

Dollar Value of Federally-Assisted DBE Awards

Table 4.5 presents data on the dollar value of Federal prime contract and subcontract awards by DBE status. Table 4.6 presents the same information using a percentage distribution of dollar value by DBE status.

An examination of the information in Tables 4.5 and 4.6 reveals several important similarities to the SMS data. First, the stark differences between DBE prime contracting participation and DBE subcontracting participation are quite evident. The total value of DBE prime contracts during the FY85–FY92 period ranged between $705,000 and $8,016,349 annually. During the same time, the total value of DBE subcontracts ranged between $73.8 million and $122 million. DBE prime contracts never exceeded 0.7% of total prime dollars during the period. In contrast, DBE subcontracts never fell below 8.1% and ranged as high as 15.1% in FY90. Clearly, subcontracting has played a much larger role than prime contracting for DBE's attempting to do business with TxDOT.

A second important similarity between federally funded contracting and overall departmental contracting is that, in terms of total dollars awarded, WBE prime contractors do well compared to MBE prime contractors, while WBE subcontractors do less well than their MBE counterparts. WBE prime contractors, for example, won almost 48% of all DBE prime contract dollars awarded during the FY85–FY92. In contrast, WBE subcontractors were awarded about 21% of all DBE subcontract dollars during the same period.

TABLE 4.5: Dollar Value of Federal Prime Contract and Subcontract Awards by DBE Status, Federal FY85 to FY92

Current Dollars

	FY85	FY86	FY87	FY88
Total Prime Contracts	907,780,257	940,544,368	665,790,498	885,766,171
DBE Prime Contracts	5,057,084	3,925,237	769,105	705,762
DBE Subcontract Awards	73,825,264	107,716,535	75,336,086	86,485,422
DBE Subcontract Commitments	121,370,450	182,389,796	126,603,745	131,600,208
MBE Prime Contracts	2,368,748	2,771,136	769,105	621,154
MBE Subcontract Awards	65,037,153	94,206,962	67,488,555	68,905,010
MBE Subcontract Commitments	67,405,901	96,978,098	68,257,660	69,526,164
WBE Prime Contracts	2,688,336	1,154,101	0	84,608
WBE Subcontract Awards	8,788,111	13,509,573	7,847,531	17,580,412
WBE Subcontract Commitments	53,964,549	85,411,698	58,346,085	62,074,044

	FY89	FY90	FY91	FY92
Total Prime Contracts	921,489,820	811,023,007	804,645,538	1,216,298,257
DBE Prime Contracts	1,497,390	735,740	3,111,550	8,016,349
DBE Subcontract Awards	98,770,493	122,077,109	104,141,167	112,408,598
DBE Subcontract Commitments	146,983,624	170,577,376	154,587,681	182,009,275
MBE Prime Contracts	979,621	735,740	730,384	3,524,131
MBE Subcontract Awards	75,548,094	90,472,885	81,927,156	82,259,068
MBE Subcontract Commitments	76,527,714	91,208,625	82,657,540	87,977,144
WBE Prime Contracts	517,769	0	2,381,166	4,492,218
WBE Subcontract Awards	23,222,399	31,604,224	22,214,011	30,149,530
WBE Subcontract Commitments	70,455,910	79,368,751	71,930,141	94,032,131

SOURCE: FHWA (1985–1993).

Table 4.5 and Table 4.6 also highlight important differences between federally funded contracting and overall departmental contracting. First, DBE participation is higher in federally funded subcontracts than in DBE subcontracts overall (cf. Table 2.18). In contrast, DBE prime contract participation in federally funded contracts is much lower than for DBE prime contracts overall (cf. Table 2.4).

TABLE 4.6: Dollar Value of Federal Prime Contract and Subcontract Awards by DBE Status, Federal FY85 to FY92, as a Percentage of Total Prime Contract Dollars

	FY85	FY86	FY87	FY88
Total Prime Contracts ($)	907,780,257	940,544,368	665,790,498	885,766,171
DBE Prime Contracts	0.6	0.4	0.1	0.1
DBE Subcontract Awards	8.1	11.5	11.3	9.8
DBE Subcontract Commitments	13.4	19.4	19.0	14.9
MBE Prime Contracts	0.3	0.3	0.1	0.1
MBE Subcontract Awards	7.2	10.0	10.1	7.8
MBE Subcontract Commitments	7.4	10.3	10.3	7.8
WBE Prime Contracts	0.3	0.1	0.0	0.0
WBE Subcontract Awards	1.0	1.4	1.2	2.0
WBE Subcontract Commitments	5.9	9.1	8.8	7.0

	FY89	FY90	FY91	FY92
Total Prime Contracts ($)	921,489,820	811,023,007	804,645,538	1,216,298,257
DBE Prime Contracts	0.2	0.1	0.4	0.7
DBE Subcontract Awards	10.7	15.1	12.9	9.2
DBE Subcontract Commitments	16.0	21.0	19.2	15.0
MBE Prime Contracts	0.1	0.1	0.1	0.3
MBE Subcontract Awards	8.2	11.2	10.2	6.8
MBE Subcontract Commitments	8.3	11.2	10.3	7.2
WBE Prime Contracts	0.1	0.0	0.3	0.4
WBE Subcontract Awards	2.5	3.9	2.8	2.5
WBE Subcontract Commitments	7.6	9.8	8.9	7.7

SOURCE: FHWA (1985–1993).

Another important difference evident from these tables is that the overall participation of WBE's is lower in federally funded contracts and subcontracts than for contracts overall. Whereas, WBE dollars account for about 32% of all DBE dollars in the SMS data, they account for only between 20%-27% on the strictly federal side. This implies that WBE's are doing relatively more work on the state-funds side than the federal-funds side. The SMS data bear this fact out. During the 1987–1992 period for which SMS data is available, WBE's received almost 53% of all state DBE dollars. In contrast, WBE's received only about 30% of federal DBE dollars and about 27% of joint DBE dollars.

There appears to be a large discrepancy between WBE awards and WBE commitments in all years for which we have data. This discrepancy does not exist for MBE's. Indeed, the two measures are quite close for MBE's. Without additional information, however, it is difficult to say definitively whether the the WBE award data is more accurate than the WBE commitment data or vice-versa. This issue is discussed further below under the topic heading "Other Findings.

TABLE 4.7: Dollar Value of All Federal DBE Awards by Race, Ethnicity, and Sex, Federal FY85 to FY92

Current Dollars

	FY85	FY86	FY87	FY88
Blacks	13,441,353	11,566,400	9,911,575	7,452,120
Hispanics	39,630,932	67,527,842	52,813,740	55,058,919
Native Americans	13,267,900	14,253,696	5,079,558	5,604,387
Asian Indians	25,334	0	378,108	73,063
Asian Pacific Islanders	1,040,383	3,630,160	74,679	415,256
Other	0	0	0	922,419
Women	11,476,447	14,663,674	7,847,531	17,665,020
Total DBE	78,882,348	111,641,772	76,105,191	87,191,184

	FY89	FY90	FY91	FY92
Blacks	6,071,804	11,839,874	10,727,399	9,965,464
Hispanics	56,756,220	71,239,878	68,732,074	71,861,685
Native Americans	11,329,115	4,204,171	1,755,834	1,252,033
Asian Indians	1,489,703	319,400	472,143	421,459
Asian Pacific Islanders	310,226	1,865,247	970,090	2,282,558
Other	570,646	1,740,055	0	0
Women	23,740,168	31,604,224	24,595,177	34,641,748
Total DBE	100,267,882	122,812,849	107,252,717	120,424,947

SOURCE: FHWA (1985–1993).

TABLE 4.8: Dollar Value of Federal DBE Awards by Race, Ethnicity, and Sex, Federal FY85 to FY92, as a percentage of All Federal DBE Awards

Current Dollars

	FY85	FY86	FY87	FY88
Blacks	17.0	10.4	13.0	8.5
Hispanics	50.2	60.5	69.4	63.1
Native Americans	16.8	12.8	6.7	6.4
Asian Indians	0.0	0.0	0.5	0.1
Asian Pacific Islanders	1.3	3.3	0.1	0.5
Other	0.0	0.0	0.0	1.1
Women	14.5	13.1	10.3	20.3
Total DBE	78,882,348	111,641,772	76,105,191	87,191,184

	FY89	FY90	FY91	FY92
Blacks	6.1	9.6	10.0	8.3
Hispanics	56.6	58.0	64.1	59.7
Native Americans	11.3	3.4	1.6	1.0
Asian Indians	1.5	0.3	0.4	0.3
Asian Pacific Islanders	0.3	1.5	0.9	1.9
Other	0.6	1.4	0.0	0.0
Women	23.7	25.7	22.9	28.8
Total DBE	100,267,882	122,812,849	107,252,717	120,424,947

SOURCE: FHWA (1985–1993).

Table 4.7 and Table 4.8 present the total dollar volume of all DBE awards (i.e., prime and subcontracts combined) by race, ethnicity, and sex. Again, several important similarities to the SMS data are obvious. The relative ranking of groups is similar to the SMS data. In the FHWA data, Hispanic DBE's are the most successful by far as a group, followed by Anglo women DBE's. Hispanic DBE's received more than half of all DBE dollars annually during the period. In most of these years, the figure was closer to 60%–65%. Women have seen their participation rise dramatically over the same period. During FY85 to FY87, for instance, WBE participation never exceeded 15% of total DBE participation. After FY87, it never fell below 20%. By FY92, the figure stood at 28.8% of

the total. Some of this increase may be attributable to the decision by Congress to consolidate the MBE and WBE goals under the 1987 STURAA.

Black-owned DBE's usually ranked third behind Hispanics and Anglo women. Black DBE's have seen their share of total DBE dollars decline over the FY85 to FY92 period. Between FY85 and FY87, the share of DBE dollars going to Blacks never fell below 10%. After FY87, it never rose above 10%. Native Americans have also seen their share deteriorate over the period, although in several instances it has exceeded that of Blacks (i.e., FY86 and FY89).

Asians were the next most successful DBE group during the study period, with Asian/Pacific Islanders usually having greater participation than Asian Indians. The only exception is FY89. In no instance, however, has total Asian DBE dollar volume exceeded $2.75 million annually.

Number of Federally-Assisted DBE Awards

Because contracts vary in size, the absolute and relative numbers of contract and subcontract awards are less precise than award dollars as measures of economic impact. However, such awards are still useful complementary measures of DBE participation. Tables 4.9 through 4.11 present this information for federally assisted contract and subcontract awards during the FY85 to FY92 period. Table 4.9 shows awards by type of contract and DBE/MBE/WBE status. Tables 4.10 and 4.11 present total DBE awards distributed by race, ethnicity, and sex. Table 4.10 provides this information in absolute terms (total number of awards in each category) and Table 4.11 provides it in relative terms (total number of awards in each category as a fraction or percent of total DBE awards).

DBE prime contracts ranged from a low of 2 in FY87 to a high of 11 in FY92. Relative to total prime contracts, DBE prime contracts were of little consequence, ranging from a low of 0.7% in FY87 to a high of 2.6% in FY92. Over the entire FY85-FY92 period, TxDOT awarded 48 DBE prime contracts out of a total of 2,739. This amounts to less than 1.8% of the total.

WBE prime contracts fluctuated substantially relative to total DBE prime contracts. In four of the eight years for which data were provided, WBE's received roughly half of all DBE prime contracts (FY85, FY89, FY91, and FY92). In other years WBE's received no prime contracts at all (FY87 and FY90). MBE's, on the other hand, never received less than 44% of the DBE prime contracts in any given year of the period.

TABLE 4.9: Number of Federal Prime Contract and Subcontract Awards by DBE Status, Federal FY85 to FY92

Awards	FY85	FY86	FY87	FY88	FY89	FY90	FY91	FY92
Total Prime Contracts	373	254	275	288	376	427	326	420
DBE Prime Contracts	4	6	2	6	9	4	6	11
DBE Subcontract Awards	515	537	518	637	965	1,225	757	911
DBE Subcontract Commitments	691	654	685	720	1,009	1,173	700	1,154
MBE Prime Contracts	2	5	2	5	4	4	3	6
MBE Subcontract Awards	385	356	375	387	606	766	395	522
MBE Subcontract Commitments	387	361	377	392	610	770	398	537
WBE Prime Contracts	2	1	0	1	5	0	3	5
WBE Subcontract Awards	130	181	143	250	359	459	362	389
WBE Subcontract Commitments	304	293	308	328	399	403	302	617

SOURCE: FHWA (1985–1993).

The number of DBE subcontracts per prime contract averaged 2.2 during the FY85 to FY92 period, ranging from a low of 1.4 in FY85 to a high of 2.9 in FY90. TxDOT awarded a total of 6,065 subcontracts during the FY85–FY92 period. WBE's received 2,273 of these awards, for a total over the period of 37%. MBE's received 3,792 subcontract awards, or 63% of the DBE total.

This distribution between MBE and WBE awards has changed substantially over the FY85–FY92 period, however. Table 4.9 also shows clearly the increasing participation of WBE's after FY87, noted earlier, when Congress combined previously separate MBE and WBE goals into one overall DBE goal. Before the 1987 change, the split between MBE subcontract awards and WBE subcontract awards was 70-75% MBE and 25-30% WBE. Since FY88, the split has been much closer to 60% MBE and 40% WBE.

Table 4.10 and Table 4.11 show the absolute and relative distribution, respectively, of all DBE awards (prime contracts and subcontracts alike) by the major DBE race, ethnicity, and sex categories. Hispanic DBE's received the most awards during the FY85–FY88 period, winning an average of 260 awards per year. Hispanic-

owned DBE's won annually between 42% and 55% of all DBE awards. Female-owned DBE's surpassed Hispanic DBE's starting in FY89 and continuing up to the FY92. By FY92, WBE's received almost 43% of all DBE awards, compared to 41% for Hispanics.

Black-owned DBE's have had the third-highest annual number of awards during the entire FY85–FY92. Blacks won just under 18% of all awards during the FY85–FY92 period. Annually, the share of Black DBE's has ranged as low as 10% in FY88 to 30% in FY90. In FY91 and FY92, Black-owned DBE's received just under 13% of all DBE awards.

Native American firms rivaled Blacks in terms of total number of awards during the early part of the period (FY85–FY86). However, the number of awards to Native American-owned DBE's has dropped substantially in recent years. Native American firms received 12.1% of all DBE awards in FY85 and 9.2% in FY86. Since that time, these firms have never received higher than a 3.4% share. In the three most recent years for which data is available, Native-Americans have received less than 1.5% of all DBE awards.

TABLE 4.10: Total Number of Federal DBE Awards by Race, Ethnicity, and Sex, Federal FY85 to FY92

Awards

	FY85	FY86	FY87	FY88	FY89	FY90	FY91	FY92
Blacks	83	68	69	64	211	367	96	119
Hispanics	228	230	284	295	364	372	278	376
Native Americans	63	50	17	22	26	18	11	11
Asian Indians	2	0	4	1	3	2	2	3
Asian Pacific Islanders	11	13	3	5	4	7	11	19
Other	0	0	0	5	2	4	0	0
Women	132	182	143	251	364	459	365	394
Total DBE	519	543	520	643	974	1229	763	922

SOURCE: FHWA (1985–1993).

Total awards to Asian American-owned DBE's averaged 13 per year in the FY85–FY86 period and then fell off sharply during the FY87–FY90 period. Awards recovered to their FY85 levels in FY91 and peaked in FY92 at 22 awards. On a percentage basis,

awards to Asians peaked in FY85 at 2.5% of the total and reached a low of 0.7% in FY89. By FY92 this figure had recovered to 2.4% of the total—very close to FY85 levels.

Among Asian DBE's, awards to Asian/Pacific Islanders significantly outpaced awards to Asian Indians in all but FY87. In most years, Asian/Pacific Islander firms have accounted for upwards of 85% of all DBE awards to Asians.

TABLE 4.11: Number of Federal DBE Awards by Race, Ethnicity, and Sex, Federal FY85 to FY92, as a percentage of Total DBE Awards

Awards	FY85	FY86	FY87	FY88	FY89	FY90	FY91	FY92
Blacks	16.0	12.5	13.3	10.0	21.7	29.9	12.6	12.9
Hispanics	43.9	42.4	54.6	45.9	37.4	30.3	36.4	40.8
Native Americans	12.1	9.2	3.3	3.4	2.7	1.5	1.4	1.2
Asian Indians	0.4	0.0	0.8	0.2	0.3	0.2	0.3	0.3
Asian Pacific Islanders	2.1	2.4	0.6	0.8	0.4	0.6	1.4	2.1
Other	0.0	0.0	0.0	0.8	0.2	0.3	0.0	0.0
Women	25.4	33.5	27.5	39.0	37.4	37.3	47.8	42.7
Total DBE	519	543	520	643	974	1229	763	922

SOURCE: FHWA (1985–1993).

Average Size of Federally-Assisted DBE Awards

The average federally assisted TxDOT prime contract during the FY85–FY92 period was worth $2,668,450 with a median value of $2,459,505. Average size fluctuated substantially during the period from a low of $1,899,351 in FY90 to a high of $3,702,931. In FY92 average size was $2,895,948.

In contrast, during the same period, the average federally assisted DBE prime contract was worth $502,290—11 percent higher than the median DBE value of $451,573. The average value of DBE prime contracts over the period has varied even more than have prime contract awards overall. Average DBE prime contract size peaked at $1,264,271 in FY85. This amount is about half the average size of $2,433,727 for overall prime contracts in that year.

Since FY85 the average size of DBE prime contracts has deteriorated substantially. Average size never exceeded $750,000 on federally assisted contracts

during the FY86–FY92 period. Average value fell steadily from FY85 until reaching its nadir in FY88 at $117,627—well below average DBE *subcontract* sizes in that year. Average size has recovered somewhat since FY88, reaching $728,759 in FY92. This level, however, is still less than 60% of average DBE prime contract size at the beginning of the period.

Total DBE prime contract dollars on federally assisted awards followed a pattern of decline and recovery over the period similar to that just described for *average* prime contract dollars, while the *number* of DBE prime contract awards fluctuated around a slight upward trend. Thus, as total DBE prime contract dollars shrank between FY85 and FY88, TxDOT and its prime contractors tended to make *smaller* awards rather than *fewer* awards. As funding recovered after FY88, average size recovered only partially while the number of awards continued to grow moderately.

TABLE 4.12: Average Size of Federal Prime Contract and Subcontract Awards (in Dollars) by DBE Status, Federal FY85 to FY92

Average Award Size (current dollars)

	FY85	FY86	FY87	FY88	FY89	FY90	FY91	FY92
Total Prime Contracts	2,433,727	3,702,931	2,421,056	3,075,577	2,450,771	1,899,351	2,468,238	2,895,948
DBE Prime Contracts	1,264,271	654,206	384,553	117,627	166,377	183,935	518,592	728,759
DBE Sub Awards	143,350	200,589	145,436	135,770	102,353	99,655	137,571	123,390
DBE Sub Commitments	175,645	278,883	184,823	182,778	145,673	145,420	220,840	157,720
MBE Prime Contracts	1,184,374	554,227	384,553	124,231	244,905	183,935	243,461	587,355
MBE Sub Awards	168,928	264,626	179,969	178,049	124,667	118,111	207,411	157,584
MBE Sub Commitments	174,175	268,637	181,055	177,363	125,455	118,453	207,682	163,831
WBE Prime Contracts	1,344,168	1,154,101	0	84,608	103,554	0	793,722	898,444
WBE Sub Awards	67,601	74,639	54,878	70,322	64,686	68,855	61,365	77,505
WBE Sub Commitments	177,515	291,508	189,435	189,250	176,581	196,945	238,179	152,402

SOURCE: FHWA (1985–1993).

No clear relationship appears between MBE's and WBE's concerning average contract values. In four of the eight years, average award sizes for WBE's are much

higher than for MBE's. In other years, however, this has not been the case. Indeed, in some years, as noted earlier, WBE's received no prime awards at all.

Concerning DBE subcontracts, although total DBE subcontract dollars have grown moderately over the FY85 to FY92 period, average size has declined substantially. This is due to strong growth in the total number of DBE subcontract awards. Furthermore, over the FY85–FY92 period, the average MBE subcontract of $174,918 is over 2.5 times larger than the average WBE subcontract of $67,481. This trend also existed with the SMS data discussed earlier in this report.

Combining prime contracts with subcontracts and examining average award sizes by race, ethnicity and sex—as in Table 4.13—reveals significant variation across groups and across time, with Hispanic DBE's and Native American DBE's generally having a higher average award size than other groups and women having the lowest average award size. In FY89, average award size was highest for Asian Indian DBE's. In FY90, average award size was highest for "Other" DBE's.

TABLE 4.13: Average Size of Federal DBE Awards by Race, Ethnicity, and Sex, Federal FY85 to FY92

Average Awards Size (current dollars)

	FY85	FY86	FY87	FY88	FY89	FY90	FY91	FY92
Blacks	161,944	170,094	143,646	116,439	28,776	32,261	111,744	83,743
Hispanics	173,820	293,599	185,964	186,640	155,924	191,505	247,238	191,122
Native Americans	210,602	285,074	298,798	254,745	435,735	233,565	159,621	113,821
Asian Indians	12,667	0	94,527	73,063	496,568	159,700	236,072	140,486
Asian Pacific Islanders	94,580	279,243	24,893	83,051	77,557	266,464	88,190	120,135
Other	0	0	0	184,484	285,323	435,014	0	0
Women	86,943	80,570	54,878	70,379	65,220	68,855	67,384	87,923
Total DBE	151,989	205,602	146,356	135,601	102,944	99,929	140,567	130,613

SOURCE: FHWA (1985–1993).

Another area that deserves attention is the distribution of DBE contracts across various types of highway construction work. Tables 4.14 through 4.16 below contain information on DBE awards distributed by work category. Table 4.4 above lists the specific categories of work tabulated in the FHWA compliance reports.

This type of information is available only for the *number* of awards in each category and not for the *dollar value* of such awards or for their average size. As such, we can say here nothing definitive about which work categories are most lucrative for DBE's—measured either by total dollars received or average contract size. The only statistic available is the frequency with which DBE's were awarded federally assisted work in various areas.

TABLE 4.14: Number of All DBE Federal Awards by Category of Work, Federal FY85 to FY92.

DBE's	FY85	FY86	FY87	FY88	FY89	FY90	FY91	FY92	Total
Professional Services:	15	7	17	0	254	395	123	166	977
Construction	504	536	503	572	720	823	628	753	5,039
Supplies	0	0	0	0	0	5	4	3	12
Equipment	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0

MBE's	1985	1986	1987	1988	1989	1990	1991	1992	Total
Professional Services:	15	7	17	0	203	327	67	95	731
Construction	372	354	360	321	407	438	323	431	3,006
Supplies	0	0	0	0	0	5	1	2	8
Equipment	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0

WBE's	1985	1986	1987	1988	1989	1990	1991	1992	Total
Professional Services:	0	0	0	0	51	68	56	71	246
Construction	132	182	143	251	313	385	305	322	2,033
Supplies	0	0	0	0	0	0	3	1	4
Equipment	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0

SOURCE: FHWA (1985–1993).

The FHWA compliance reports filed by TxDOT each fiscal quarter contain, in theory, information regarding DBE participation in five major areas of work: (1) professional services, (2) construction, (3) materials and supplies, (4) equipment, and (5)

other. Table 4.14 shows that in practice, however, almost all DBE participation occurs in construction and professional services. Few awards have been made to DBE's in the area of materials and supplies, and no awards have been made in the "equipment" or "other" categories.

TABLE 4.15: Percentage Distribution of All DBE Federal Construction Awards, Federal FY85 to FY92

DBE's	1985	1986	1987	1988	1989	1990	1991	1992	Total
Construction awards (#)	504	536	503	572	720	823	628	753	5,039
Construction awards (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Grading & Drainage	12.9	16.4	20.7	16.3	5.4	5.2	4.6	1.1	9.3
Paving	11.3	8.4	10.5	7.5	10.8	10.9	5.4	5.2	8.7
Structures/Buildings	9.3	10.6	11.9	16.8	31.0	29.8	28.5	22.4	21.4
Materials	6.9	3.7	4.4	0.9	0.0	0.0	0.0	0.1	1.6
Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trucking	4.0	8.4	7.4	5.9	9.2	8.3	10.0	9.8	8.1
Traffic Control	19.0	22.4	15.1	24.1	16.5	15.1	18.5	16.5	18.1
Landscaping	11.7	11.4	10.1	10.7	10.8	13.2	11.6	10.6	11.4
Other	24.8	18.7	19.9	17.8	16.3	17.5	21.3	34.3	21.4
MBE's	**1985**	**1986**	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**Total**
Construction awards (#)	372	354	360	321	407	438	323	431	3,006
Construction awards (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Grading & Drainage	15.3	21.5	24.7	24.6	6.6	5.0	7.1	1.6	12.6
Paving	14.2	12.4	13.3	9.7	15.5	13.7	6.5	4.4	11.3
Structures/Buildings	9.9	15.0	13.6	24.3	41.5	41.8	40.6	33.6	28.1
Materials	8.9	5.6	6.1	0.6	0.0	0.0	0.0	0.0	2.6
Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trucking	4.8	11.9	8.3	8.4	11.8	12.1	13.3	10.7	10.2
Traffic Control	16.9	9.0	6.9	10.3	3.7	4.6	5.3	6.5	7.8
Landscaping	3.0	1.7	1.7	1.2	0.2	0.2	0.3	0.7	1.1
Other	26.9	22.9	25.3	20.9	20.6	22.6	26.9	42.5	26.3
WBE's	**1985**	**1986**	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**Total**
Construction awards (#)	132	182	143	251	313	385	305	322	2,033
Construction awards (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Grading & Drainage	6.1	6.6	10.5	5.6	3.8	5.5	2.0	0.3	4.4
Paving	3.0	0.5	3.5	4.8	4.8	7.8	4.3	6.2	4.9
Structures/Buildings	7.6	2.2	7.7	7.2	17.3	16.1	15.7	7.5	11.4
Materials	1.5	0.0	0.0	1.2	0.0	0.0	0.0	0.3	0.3
Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trucking	1.5	1.6	4.9	2.8	5.8	3.9	6.6	8.7	4.9
Traffic Control	25.0	48.4	35.7	41.8	33.2	27.0	32.5	29.8	33.4
Landscaping	36.4	30.2	31.5	22.7	24.6	28.1	23.6	23.9	26.5
Other	18.9	10.4	6.3	13.9	10.5	11.7	15.4	23.3	14.2

SOURCE: FHWA (1985–1993).

Furthermore, construction awards dominate professional service awards for DBE's—although this gap has lessened in recent years. The strong growth of WBE's in the post-FY87 period is evident in Table 4.14. WBE's also won no federally assisted professional services contracts during the FY85–FY88 period.

Tables 4.15 and 4.16 provide a detailed breakdown of awards into specific sub-areas for construction and professional services, respectively. DBE participation, with a few significant exceptions, appears to be fairly broadly distributed across the nine different work areas shown on the FHWA compliance reports.

Over the entire FY85–FY92 period the areas of construction work with the highest number of DBE awards were "structures/buildings" and "other." The same is true for MBE's but not for WBE's. For WBE's the two most frequently awarded areas of work were "traffic control" and "landscaping." Almost 60% of all WBE awards during the period came from these two areas—as contrasted with only 8.9% for MBE's. MBE participation was fairly high in "traffic control" and quite low in "landscaping." This latter observation is consistent with the limited information we reported in chapter two concerning WBE work areas.

Nevertheless, "other" and "structures/buildings" were still important categories for WBE's—ranking third and fourth, respectively, out of nine areas. For MBE's, "grading & drainage," "paving," and "trucking" ranked third, fourth, and fifth, respectively. These three categories only accounted for 4%–5% of WBE awards, however. The categories "materials" and "equipment" had low or non-existent participation for both MBE's and WBE's.

Table 4.16 itemizes professional services awards to DBE's, MBE's, and WBE's. From this table, several points are immediately obvious. First, professional services contracts involving the acquisition and disposition of right-of-way dominate the number of awards for all three groups—DBE, MBE, and WBE. For example, in the FY89 to FY92 period, right-of-way contracts always accounted for over 90% of the total. Indeed, *all* federally assisted professional services contracts let to WBE's during the FY85–FY92 period have been in this category.

Second, no professional services contracts have been awarded to any DBE's in the architectural or accounting fields. Third, the "other" category accounted for a significant number of MBE awards in the FY85–FY87 period but for very few, if any, since then. Fourth, the only other category with any DBE participation is engineering, but no trend or rule is evident. No engineering awards at all were made to MBE's in

FY87, FY88, or FY89. In other years, the amount ranged from a low of 1% to a high of 20%.

TABLE 4.16: Percentage Distribution of All DBE Federal Professional Services Awards, Federal FY85 to FY92

DBE's	1985	1986	1987	1988	1989	1990	1991	1992	Total
Profess. Services (#)	15	7	17	0	254	395	123	166	977
Profess. Services (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Engineering	20.0	14.3	0.0	0.0	0.0	1.0	6.5	4.2	2.4
Architectural	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Accounting	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Right-of-Way	46.7	28.6	41.2	0.0	100.0	99.0	93.5	94.0	95.4
Other	33.3	57.1	58.8	0.0	0.0	0.0	0.0	1.8	2.3
MBE's	**1985**	**1986**	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**Total**
Profess. Services (#)	15	7	17	0	203	327	67	95	731
Profess. Services (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Engineering	20.0	14.3	0.0	0.0	0.0	1.2	11.9	7.4	3.1
Architectural	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Accounting	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Right-of-Way	46.7	28.6	41.2	0.0	100.0	98.8	88.1	89.5	93.8
Other	33.3	57.1	58.8	0.0	0.0	0.0	0.0	3.2	3.0
WBE's	**1985**	**1986**	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**Total**
Profess. Services (#)	0	0	0	0	51	68	56	71	246
Profess. Services (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Engineering	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Architectural	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Accounting	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Right-of-Way	0.0	0.0	0.0	0.0	100.0	100.0	100.0	100.0	100.0
Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SOURCE: FHWA (1985–1993).

Other Findings

A final issue merits closer examination. Several of the tables presented in chapter four present both "awards" and "commitments" data for DBE, MBE, and WBE subcontracts. "Awards" refers to actual subcontract awards made during the reporting period. "Commitments" refers to the commitment during the period to make future awards. Thus, over time, the two categories should amount to substantially the same thing.

Earlier in this section it was noted that while this congruence exists for the MBE data, it clearly does not for the WBE data. For example, the total MBE backlog

(commitments minus awards) over the period amounts to approximately $14.7 million. Over the same period the backlog for WBE's, in contrast, was $208.6 million—over 14 times the size of the MBE backlog. While the MBE backlog amounted to only 2.3% of total MBE dollars or 18.8% of average annual MBE dollars, the corresponding figures for WBE's were 272% and 2,172%. The reader may easily verify that a similar situation holds concerning the *number* of WBE contract commitments. These discrepancies appear to indicate that either many promises of business made to WBE's have gone unfulfilled or that some type of serious reporting error has occurred and not yet been detected by the Department of by the FHWA. The research team can offer no other reasonable explanation for this phenomenon.[29]

FINDINGS FROM TEXAS SMALL BUSINESS ASSISTANCE ACT OF 1975 COMPLIANCE REPORTS

This final section of the report presents data from TxDOT's Small Business Assistance Act of 1975 compliance reports.[30] This section widens our analysis of TxDOT spending patterns to encompass procurement areas other than highway contracting and subcontracting. The reports cover the FY87 to FY91 period and include contracts and procurements for maintenance, professional services, and commodities and other services, as well as highway construction.

Specifically, the compliance reports include information on the number and dollar amount of Departmental contract and procurement awards in several major procurement categories, and provide summaries according to small business status and MBE status. Table 4.17 presents the contracting/purchasing categories contained in the reports.[31] Tables 4.18–4.20 present summary data culled from the Small Business Assistance Act compliance reports.

Table 4.18 in the series presents information on the total number of awards and the total dollar value of awards, for all the procurement categories listed in Table 4.17. The table also presents similar data for minority business awards and small business awards. Table 4.18 shows clearly the overwhelming importance of construction contracting and subcontracting when measured according to award dollars. This is evident not only for overall departmental awards but for minority and small business awards as well. According to the compliance reports, spending on construction contracts and subcontracts over the period amounted to over 90% of total spending. Construction accounted for almost 89% of all spending with minority-owned businesses

and 84% of all spending with small businesses. Also, in stark contrast to small business and overall business participation, MBE participation in construction is much higher in subcontracting than in general contracting. This finding reinforces similar observations noted earlier regarding the disproportionate exclusion of DBE firms from general contracting and their consequent strong concentration in subcontracting.

TABLE 4.17: Contracting/Procurement Categories Included in the Small Business Assistance Act of 1975 Compliance Reports

Spot Purchase Orders	Maintenance Contracts[ab]	Construction Subcontracts
Emergency Purchase Orders	Architectural Contracts	Miscellaneous Transactions
Distributor Purchases	Engineering Contracts[c]	Right-of-Way Services[d]
Purchase of Services	Other Consultant Contracts	
Emergency Repairs[a]	Construction Contracts	

NOTES: [a]Category doesn't appear in the FY86 report. [b]Excludes maintenance contracts administered by the construction division (D-6). These contracts are included under "construction." [c]Includes surveying and related categories. [d]Category doesn't appear in the FY86, FY87, or FY88 reports.

When it comes to the sheer number of awards made (as opposed to the dollar value of those awards), construction contracts and subcontracts are relatively unimportant compared to other types of procurement. According to the reports, only slightly more than 15,000 construction awards were made over the period out of a total of over 930,000, or 1.7%. Spot purchases (commodities) and purchases of services, on the other hand, were responsible for more than 820,000 awards made during period—amounting to 89% of all awards. However, spot purchases and the purchase of services accounted for less than 3% of total dollars spent.

Another way to see the contrast is to compare average award values. Table 4.18 provides information that shows that while the average construction contract during the period was valued at almost $1.5 million, and the average construction subcontract at about $134,000, the average commodities-services purchase was less than $900.

The importance of maintenance contracting as a source of business for private sector contractors is also evident in Table 4.18. Maintenance spending is the second largest procurement area after construction for all types of businesses—large, small, and MBE. TxDOT spend more than $300 million on maintenance during the FY87–91 period.

Over $24 million of this was with MBE's and over two-thirds was with small businesses generally.

TABLE 4.18: Small Business Assistance Act Compliance Reports, Summary, FY87–FY91

Category of Business Conducted	Total Amount (Number of Purchases)	Total Amount (Dollar Value of Purchases)	Minority Business Amount (Number of Purchases)	Minority Business Amount (Dollar Value of Purchases)	Small Business Amount (Number of Purchases)	Small Business Amount (Dollar Value of Purchases)
Spot Purchases	741,230	106,482,008	37,558	7,163,967	532,586	69,417,956
Emergency Purchases	15,479	18,586,947	572	1,191,142	6,744	8,366,849
Distributor Purchases	36,796	7,359,229	803	172,603	21,689	4,104,108
Services Purchased	82,046	129,766,733	6,743	3,631,388	48,638	50,031,225
Emergency Repairs	119	542,104	10	20,135	116	489,849
Maintenance Contracts	11,540	305,293,075	3,136	24,008,147	9,834	218,269,745
Architectural Contracts	34	2,088,224	4	111,580	23	1,621,680
Engineering Contracts	1,881	125,609,681	122	8,088,315	1,453	85,175,982
Consultant Contracts	501	26,378,822	20	770,216	212	9,933,875
Construction Contracts	4,020	5,931,895,592	84	36,532,739	2,188	1,797,929,014
Const. Subcontracts	11,356	1,524,810,302	3,693	374,767,449	7,496	841,070,970
Miscellaneous	11,348	54,656,600	427	5,550,557	3,371	30,548,451
Right of Way services	13,723	29,869,266	1,216	1,610,649	13,717	20,846,758
TOTAL	930,073	8,263,338,683	54,388	463,621,588	648,067	3,137,806,462

SOURCE: SDHPT (various years).

Other important procurement areas evident in Table 4.18 included the purchase of services, engineering contracts, and spot purchases. Over $100 million of spending occurred in each of these three areas during the FY87–FY91 period—approximately 45% of all non-construction procurement. Table 4.19 presents a complete distribution of awards and award dollars across procurement.

Several procurement categories in the department are clearly small-business dominated. Small businesses received: (1) 99% of all Right-of-Way services; (2) 97% of all purchased emergency repairs; (3) 85% of all maintenance contracts; (4) 77% of all engineering contracts; and (5) 70% of all spot purchases awarded. Only in the categories of emergency purchases, consultant contracts (other than engineering and architectural), and miscellaneous goods and services were less than 50% of awards made to small businesses.

According to the Small Business Assistance Act compliance reports, the Department awarded over $463 million to MBE's between FY87 and FY91. Of that, 89%

was for construction subcontracts or prime contracts. Disregarding construction, the remainder of TxDOT procurement is distributed among MBE's as follows:

Maintenance Contracts	45.9%
Engineering Contracts	15.5%
Spot Purchases	13.7%
Miscellaneous	10.6%
Services Purchased	6.9%
Right of Way services	3.1%
Emergency Purchases	2.3%
Other Consultant Contracts	1.5%
Distributor Purchases	0.3%
Architectural Contracts	0.2%
Emergency Repairs	0.0%

Table 4.18 also shows that in most instances the average size of an MBE award falls well below comparable non-MBE procurements. The average MBE prime construction contract, for example, was less than 30% of the average value of prime construction contracts overall and less than 53% of the average value of prime construction contracts awarded to small businesses generally.

For maintenance contracts, the average MBE award was also less than 30% of the average award overall. For services, the average MBE award was 34% the size of the average overall award and 52% the size of the average small business award.

In contrast, in a few categories the average MBE award was equivalent to or higher than the overall average. In engineering contracts, for example, the MBE average is essentially equal to the overall average. The average MBE spot purchase was $191 compared to $144 overall and $130 for small businesses. In emergency purchases also, the average MBE award was $2,082 compared to $1,201 overall and $1,241 for small businesses. MBE averages were also higher in distributor purchases and miscellaneous purchases.

TABLE 4.19: Small Business Assistance Act Compliance Reports, Summary, FY87–FY91, Percentage Distribution of Awards and Dollars across Procurement Categories

Category of Business Conducted	Total Amount (Number of Purchases)	Total Amount (Dollar Value of Purchases)	Minority Business Amount (Percent of total number)	Minority Business Amount (Percent of total dollars)	Small Business Amount (Percent of total number)	Small Business Amount (Percent of total dollars)
Spot Purchases	79.7	1.3	69.1	1.5	82.2	2.2
Emergency Purchases	1.7	0.2	1.1	0.3	1.0	0.3
Distributor Purchases	4.0	0.1	1.5	0.0	3.3	0.1
Services Purchased	8.8	1.6	12.4	0.8	7.5	1.6
Emergency Repairs	0.0	0.0	0.0	0.0	0.0	0.0
Maintenance Contracts	1.2	3.7	5.8	5.2	1.5	7.0
Architectural Contracts	0.0	0.0	0.0	0.0	0.0	0.1
Engineering Contracts	0.2	1.5	0.2	1.7	0.2	2.7
Consultant Contracts	0.1	0.3	0.0	0.2	0.0	0.3
Construction Contracts	0.4	71.8	0.2	7.9	0.3	57.3
Const. Subcontracts	1.2	18.5	6.8	80.8	1.2	26.8
Miscellaneous	1.2	0.7	0.8	1.2	0.5	1.0
Right of Way services	1.5	0.4	2.2	0.3	2.1	0.7
TOTAL (percent)	100.0	100.0	100.0	100.0	100.0	100.0
TOTAL (level)	930,073	8,263,338,683	54,388	463,621,588	648,067	3,137,806,462

SOURCE: SDHPT (various years).

Table 4.20 shows percentage MBE participation and percentage small business participation in both the number of awards as well as in award dollars. The table shows that MBE participation varied substantially across procurement categories during the period. For example, using award dollars as the measure of participation, the table shows that construction subcontracting afforded MBE's their highest level of participation over the period—24.6 percent. This is consistent with earlier findings regarding DBE concentration in construction subcontracting.

The procurement area with the next highest MBE participation level over the period, miscellaneous, was far below this level at 10.2%. Other areas with significant MBE activity include maintenance, 7.9%, spot purchases, 6.7%, engineering contracts, 6.4%, and emergency purchases, 6.4%.

Areas with the lowest MBE participation over the period were construction contracts, 0.6%, distributor purchases, 2.3%, purchased services, 2.8%, consultant contracts, 2.9%, and emergency repairs, 3.7%. On average, the Small Business Assistance Act compliance reports show that MBE participation in all areas of TxDOT procurement amounted to 5.8% of awards and 5.6% of award dollars. Small businesses overall received 69.7% of awards and 38% of award dollars.

TABLE 4.20: Small Business Assistance Act Compliance Reports, Summary, FY87–91, Percentage DBE and Small Business Participation by Procurement Category

Category of Business Conducted	Total Amount (Number of Purchases)	Total Amount (Dollar Value of Purchases)	Minority Business Amount (Percent of total number)	Minority Business Amount (Percent of total dollars)	Small Business Amount (Percent of total number)	Small Business Amount (Percent of total dollars)
Spot Purchases	741,230	106,482,008	5.1	6.7	71.9	65.2
Emergency Purchases	15,479	18,586,947	3.7	6.4	43.6	45.0
Distributor Purchases	36,796	7,359,229	2.2	2.3	58.9	55.8
Services Purchased	82,046	129,766,733	8.2	2.8	59.3	38.6
Emergency Repairs	119	542,104	8.4	3.7	97.5	90.4
Maintenance Contracts	11,540	305,293,075	27.2	7.9	85.2	71.5
Architectural Contracts	34	2,088,224	11.8	5.3	67.6	77.7
Engineering Contracts	1,881	125,609,681	6.5	6.4	77.2	67.8
Consultant Contracts	501	26,378,822	4.0	2.9	42.3	37.7
Construction Contracts	4,020	5,931,895,592	2.1	0.6	54.4	30.3
Const. Subcontracts	11,356	1,524,810,302	32.5	24.6	66.0	55.2
Miscellaneous	11,348	54,656,600	3.8	10.2	29.7	55.9
Right of Way services	13,723	29,869,266	8.9	5.4	100.0	69.8
TOTAL	930,073	8,263,338,683	5.8	5.6	69.7	38.0

SOURCE: SDHPT (various years).

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FOOTNOTES

1 It should be noted here that this data does not take account of those highway construction firms, DBE and non-DBE alike, that for whatever reason(s) did not participate in TxDOT contracting during the period.

2 During the course of this study, digital and hard-copy contract data was also collected from D-18 concerning maintenance contracts not administered by D-6 for state fiscal years 1987 through 1992 and from D-4 concerning delegated, contract, and open-market purchases of goods and services by the Department for the same years. However, due to resource constraints, this information was not processed or analyzed for the present report. Although the size of the aforementioned expenditures pale in comparison with highway construction proper, since contract and procurement spending by D-18 and D-4 consists almost exclusively of state (as opposed to federal) funds, these records represent an important source of data in the context of S.B. 352's requirement that the Department establish and maintain a state-funds procurement program for minority-owned and women-owned

businesses. We urge the Department to continue the analysis of these D-18 and D-4 records in future research.

3 The team wishes to acknowledge the gracious assistance of Ms. Barbara Tutt of TxDOT's D-6 Division in securing this data for purposes of analysis by the team.

4 All dollar amounts reported in this volume are expressed in *current* not constant dollars.

5 The data necessary to construct a complementary analysis dealing with the remaining prime contracts (i.e. those that never have, or have not yet, awarded subcontracts) was not available. To the extent that most DBE participation occurs through subcontracting, and to the extent that these non-SMS prime contracts are smaller, on average, than SMS prime contracts, it is likely that the SMS data actually overstate participation by DBE's in TxDOT highway construction contracts. Further analysis of this data should be undertaken, both for completeness' sake and in order to verify the representativeness of the SMS data.

6 Section 106(c) and Section 1003(b), respectively. The FHWA's federal-aid DBE program came into existence in 1978 under section extending the federal-aid highway program in the Public Works Employment Act of 1977, and was renewed in the 1982 Surface Transportation Assistance Act.

7 Some maintenance contracts are administered by the construction division (D-6) and some are administered by the maintenance division (D-18). Only those maintenance contracts administered by D-6 are included in the SMS database.

8 As noted above, *all* SMS contracts were examined for this study. It was not necessary to employ sampling procedures since the entire universe of SMS data was available for the period. The data was submitted with this disclaimer: "The following information is accurate to the best of our knowledge pending human input errors." Nineteen duplicate records (with an overall value of almost 130 million dollars) and several minor errors in coding were discovered and corrected during an extensive data-editing and cleaning process.

9 This information was uploaded into Filemaker® Pro for the Apple Macintosh®, a flat-file database program.

10 The "Other" designation was used in two types of situations. First, the ownership of the company was of mixed race/ethnicity/sex (e.g. three owners, one Hispanic, one Black, and one Asian, each with 33% ownership). Second, DBE status was confirmed but sufficient race/ethnicity and/or sex information could not be identified.

11 This was determined using the Controlling Project Number. According to the Department, Project numbers containing dashes indicate a state-funds only project, while those containing parentheses indicate a federal funds only project. Contracts whose Controlling Project Numbers contain both dashes and parentheses indicate the presence of both federal and state funds.

12 Key database variables were uploaded into Systat® for the Apple Macintosh®, a statistical software package, to produce many of the descriptive statistics and tables appearing below in this report.

13 Few if any references will be given when statements or data in the text (other than Tables and Figures) are based on this source.

14 Information from these several reports was simply entered into a computer from hard copy printouts using standard spreadsheet software (Microsoft Excel® for the Apple Macintosh® and arrayed to facilitate presentation and examination.

15 In more formal terms, the coefficient of variation for the total number of prime contracts awarded between FY88 and FY91 is 9 percent while the CV for the number of DBE prime contracts awarded during the same period is 29 percent, more than three times greater relative variance. The CV is defined as the standard deviation divided by the mean, and it provides a measure of the relative difference in variance when comparing two populations or samples.

16 That is, the overall CV is 11.9% versus a DBE CV of 35.5%.

17 In statistical jargon, the distributions exhibit positive skewness.

18 Specifically, the overall CV for the FY88–FY91 period was 3.8%, while the CV for DBE's was 6.2%.

19 The overall CV is 8.5% against a DBE CV of 3.7%.

20 Only one exception was observed in which this was not the case. For Asian DBE subcontracts in FY88, the median award of $247,820 was higher than the mean award of $220,774.

21 Although, as noted in chapter one, since prime contracts without any associated subcontracting are not covered by the SMS, the overall figures for subcontracting therefore, will be somewhat less than the 23% figure.

22 Information for the newly created Laredo district was not included in this report. This district is composed of mostly non-metropolitan counties from districts 7, 15, and 21. Specifically, it includes the counties of

23 Only one of the basic measures used in this report—DBE prime contract dollars—is not strongly correlated with these variables.

24 Statistical results documenting these correlations are available from the author upon request for up to one year from the date of publication of this report.

25 Due to space limitations, the results for the remaining participation variables listed are not displayed here. However, these results were similar to those reported in Table 3.2.

26 Any given prime contract may have multiple Project Numbers. These individual projects, although all related, may be funded differently. The SMS data used in this report include only the controlling CSJ and its associated (controlling) Project Number. A flag for multiple projects under one contract was not included. Thus the funding source was assigned according to the controlling project number only. Although Department personnel attempt generally to group project numbers together according to funding source and to assign the controlling project number to that project with the largest amount of funding under a particular contract, they are not always 100% successful in their efforts. Thus, the distinctions among funding sources in DBE participation drawnhere should be taken as rough approximations only rather than precise measurements.

27 In many of the tables appearing below, data from the 1993 reports are excluded due to the lack of the fourth quarter information.

28 No discussion of minority versus nonminority WBE's is contained in the text. The interested reader may examine the differences using the FHWA compliance reports contained in the Appendix to this volume.

29 For the analyses contained in this section of the report, we have used the awards rather than the commitments data.

30 The Department provided these reports to the research team in hard copy format. The team wishes to acknowledge the gracious assistance of Mr. Sil Romero of D-4 in supplying us with the Small Business Assistance Act data.

31 The reports also provide similar data at the district level for fiscal years 1989, 1991, and 1992. This analysis could not be undertaken under the modified scope of work due to resource constraints.